



**Rashtrasant Tukadoji Maharaj Nagpur University,
Nagpur 440033**

**Scheme and Syllabus
Bachelor of Science (Home Science)**

Submitted by
Board of Studies,
Bachelor of Science (Home Science)

FYUGP- Scheme I-VIII Semester

Bachelor of Science (Honors/Research)
(Home Science - Major)
Four Year (Eight Semester Degree Course)
Teaching and Examination Scheme
B.Sc. Sem-I (Home Science - Major)

S N	Course Catego ry	Name of Course	Course Code	Teaching Scheme Hrs.			Total Credi ts	Examination Scheme								
				TH	TU	P		Theory				Practical				
								Exam Hrs	SEE	CIE	Min	SEE	CIE	Min		
1	DSC	Fundamentals of Food and Nutrition	BHS1T01	2	-	-	2	3	80	20	40	-	-	-		
2	DSC	Fundamentals of Food and Nutrition	BHS1P01	-	-	2	1	-	-	-	-	25	25	25		
3	DSC	Fundamentals of Human Development	BHS1T02	2	-	-	2	3	80	20	40	-	-	-		
4	DSC	Fundamentals of Human Development	BHS1P02	-	-	2	1	-	-	-	-	-	50	25		
5	GE/OE	Refer GE/OE Basket	BGO1T01	2	-	-	2	3	80	20	40	-	-	-		
6	GE/OE	Refer GE/OE Basket	BGO1T02	2	-	-	2	3	80	20	40	-	-	-		
7	VSC	Refer VSC Basket	BVS1P01(A) BVS1P01(B)	-	-	4	2	-	-	-	-	50	50	50		
8	SEC	Refer SEC Basket	BVS1P02(A) BVS1P02(B) BVS1P02(C)	-	-	4	2	-	-	-	-	50	50	50		
9	AEC	Compulsory English	BAE1T01	2	-	-	2	3	50	50	40	-	-	-		
10	VEC	Environmental Science	BVE1T01	2	-	-	2	3	80	20	40	-	-	-		
11	IKS	Indian Knowledge of Home Science - I	BIK1T01	2	-	-	2	3	80	20	40	-	-	-		
12	CC	Refer CC Basket	BCC1P01	-	-	4	2	-	-	-	-	-	100	50		
				14	-	16	22		530	170		125	275			

B.Sc. Sem-II (Home Science - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme								
				(Th)	TU	P		Theory				Practical				
								Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.		
1	DSC	Fundamentals of Textile and Clothing	BHS2T03	2	-	-	2	3	80	20	40	-	-	-		
2	DSC	Fundamentals of Textile and Clothing	BHS2P03	-	-	2	1	-	-	-	-	25	25	25		
3	DSC	Interior Decoration and Design	BHS2T04	2	-	-	2	3	80	20	40	-	-	-		
4	DSC	Interior Decoration and Design	BHS2P04	-	-	2	1	-	-	-	-	-	50	25		
5	GE/OE	Refer GE/OE Basket	BGO2T03	2	-	-	2	3	80	20	40	-	-	-		
6	GE/OE	Refer GE/OE Basket	BGO2T04	2	-	-	2	3	80	20	40	-	-	-		
7	VSC	Refer VSC Basket	BVS2P03(A) BVS2P03(B) BVS2P03(C)	-	-	4	2	-	-	-	-	50	50	50		
8	SEC	Refer SEC Basket	BVS2P04(A) BVS2P04(B) BVS2P04(C)	-	-	4	2	-	-	-	-	50	50	50		
9	AEC	Second Language	BAE2T02	2	-	-	2	3	50	50	40	-	-	-		
10	VEC	Constitution of India	BVE2T02	2	-	-	2	3	80	20	40	-	-	-		
11	IKS	Indian Knowledge of Home Science - II	BIK2T02	2	-	-	2	3	80	20	40	-	-	-		
12	CC	Refer CC Basket	BCC2P02	-	-	4	2	-	-	-	-	-	100	50		
Total				14	-	16	22		530	170	-	125	275			

Exit option: Award of UG Certificate in Major with 40-44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor

B.Sc. Sem-III (Home Science - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
				(Th)	TU	P		Theory				Practical		
								Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	DSC	Fundamentals of Home Science Extension	BHS3T05	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Fundamentals of Home Science Extension	BHS3P05	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Chemistry in Home Science	BHS3T06	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Chemistry in Home Science	BHS3P06	-	-	2	1	-	-	-	-	-	50	25
5	Minor	Minor 1 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
6	Minor	Minor 1 (Refer Minor Basket)		-	-	2	1	-	-	-	-	25	25	25
7	Minor	Minor 2 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
8	Minor	Minor 2 (Refer Minor Basket)		-	-	2	1	-	-	-	-	-	50	25
9	GE/OE	Refer GE/OEBasket	BGO3T05	2	-	-	2	3	80	20	40	-	-	-
10	VSC	Refer VSC Basket	BVS3P05(A) BVS3P05(B) BVS3P05(C)	-	-	4	2	-	-	-	-	50	50	50
11	AEC	Second Language	BAE3T03	2	-	-	2	3	50	50	40	-	-	-
12	FP	Field Project	BFP3P01	-	-	4	2	-	-	-	-	50	50	50
13	CC	Refer CC Basket	BCC3P03	-	-	4	2	-	-	-	-	-	100	50
Total				12	-	20	22		450	150		150	350	

B.Sc. Sem-IV (Home Science - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
				(Th)	TU	P		Theory				Practical		
								Exam Hrs.	SEE	CIE	Min. n.	SEE	CIE	Min.
1	DSC	Family and Community Nutrition	BHS4T07	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Family and Community Nutrition	BHS4P07	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Physics in Home Science	BHS4T08	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Physics in Home Science	BHS4P08	-	-	2	1	-	-	-	-	-	50	25
5	Minor	Minor 3 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
6	Minor	Minor 3 (Refer Minor Basket)		-	-	2	1	-	-	-	-	25	25	25
7	Minor	Minor 4 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
8	Minor	Minor 4 (Refer Minor Basket)		-	-	2	1	-	-	-	-	-	50	25
9	GE/OE	Refer GE/OE Basket	BGO4T06	2	-	-	2	2	80	20	40	-	-	-
10	SEC	Refer SEC Basket	BVS4P06(A) BVS4P06(B) BVS4P06(C) BVS4P06(D)	-	-	4	2	-	-	-	-	50	50	50
11	AEC	English Compulsory	BAE4T03	2	-	-	2	3	50	50	40	-	-	-
12	CEP	Community Service (Community Health and Family Welfare)	BCM4P01	-	-	4	2	-	-	-	-	50	50	50
13	CC	Refer CC Basket	BCC4P04	-	-	4	2	-	-	-	-	50	50	50
Total				12	-	20	22		450	150		150	350	

Exit option; Award of UG Diploma in Major and Minor with 80-88 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor

B.Sc. Sem-V (Home Science - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
				(Th)	TU	P		Theory				Practical		
								Exa m Hrs .	SEE	CIE	M i n.	SEE	CIE	Min .
1	DSC	Childhood and Adolescent Development	BHS5T09	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Childhood and Adolescent Developmet	BHS5P09	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Fabric Construction	BHS5T10	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Fabric Construction	BHS5P10	-	-	2	1	-	-	-	-	-	50	25
5	DSC	Resource Management	BHS5T11	2	-	-	2	3	80	20	40	-	-	-
6	DSC	Resource Management	BHS5P11	-	-	2	1	-	-	-	-	25	25	25
7	DSE	Elective 1 (Refer Elective DSE Basket)	BHS5T12	3	-	-	3	3	120	30	60	-	-	-
8	DSE	Elective 1 (Refer Elective DSE Basket)	BHS5P12	-	-	2	1	-	-	-	-	-	50	25
9	Minor	Minor 5 (Refer Minor Basket		2	-	-	2	3	80	20	40	-	-	-
10	Minor	Minor 5 (Refer Minor Basket)		-	-	2	1	-	-	-	-	25	25	25
11	Minor	Minor 6 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
12	Minor	Minor 6 (Refer Minor Basket)		-	-	2	1	-	-	-	-	-	50	25
13	VSC	Refer VSC Basket	VS5P07(A) VS5P07(B)	-	-	4	2	-	-	-	-	50	50	50
14	CEP	Community Service and Family Welfare	BCM5P02	-	-	2	1	-	-	-	-	25	25	25
Total				13	-	18	22	-	520	130	--	150	300	-

B.Sc. Sem-VI (Home Science- Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credi t	Examination Scheme						
				(Th)	TU	P		Theory				Practical		
								Exa m Hrs.	SE E	CI E	Mi n.	SE E	CIE	Min.
1	DSC	Developmental Programme	BHS6T13	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Developmental Programme	BHS6P13	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Gerontology and Care of Elderly	BHS6T14	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Gerontology and Care of Elderly	BHS6P14	-	-	2	1	-	-	-	-	-	50	25
5	DSC	Household Biology- Human Physiology	BHS6T15	2	-	-	2	3	80	20	40	-	-	-
6	DSC	Household Biology- Human Physiology	BHS6P15	-	-	2	1	-	-	-	-	25	25	25
7	DSE	Elective 2 (Refer Elective Basket)	BHS6T16	3	-	-	3	3	120	30	60	-	-	-
8	DSE	Elective 2 (Refer Elective Basket)	BHS6P16	-	-	2	1	-	-	-	-	-	50	25
9	Minor	Minor 7 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
10	Minor	Minor 7 (Refer Minor Basket)		-	-	2	1	-	-	-	-	25	25	25
11	VSC	Refer VSC Basket	BVS6P08(A) BVS6P08(B)	-	-	4	2	-	-	-	-	50	50	50
12	OJT	Internship (Related toDSC)	BOJ6P01	-	-	8	4	-	-	-	-	100	100	100
Total				11	-	22	22		440	110		225	325	

Exit option: Award of UG Degree in Major with 120-132 credits OR Continue with Major and Minor

B.Sc. Sem-VII (Honors) (Home Science - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
				(Th)	TU	P		Theory				Practical		
								Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	DSC	FSN 1/HD 1/T and C 1/ RM1/ HSc.Ext 1	BHS7T17	2	-	-	2	3	80	20	40	-	-	-
2	DSC	FSN 1/HD 1/T and C 1/ RM1/ HSc Ext 1	BHS7P17	-	-	2	1	-	-	-	-	25	25	25
3	DSC	FSN 2/HD 2/T and C 2/ RM 2/ HSc Ext 2	BHS7T18	2	-	-	2	3	80	20	40	-	-	-
4	DSC	FSN 2/HD 2/T and C 2/ RM 2/ HSc Ext 2	BHS7P18	-	-	2	1	-	-	-	-	-	50	25
5	DSC	FSN 3/HD 3/T and C 3/ RM 3/ HSc Ext 3	BHS7T19	2	-	-	2	3	80	20	40	-	-	-
6	DSC	FSN 3/HD 3/T and C 3/ RM 3/ HSc Ext 3	BHS7P19	-	-	2	1	-	-	-	-	25	25	25
7	DSC	FSN 4/HD 4/T and C 4/ RM 4/ HSc Ext 4	BHS7T20	2	-	-	2	3	80	20	40	-	-	-
8	DSC	FSN 4/HD 4/T and C 4/ RM 4/ HSc Ext 4	BHS7P20	-	-	2	1	-	-	-	-	-	50	25
9	DSE	Elective 3	BHS7T21	3	-	-	3	3	120	30	60	-	-	-
10	DSE	Elective 3	BHS7P21	-	-	2	1	-	-	-	-	25	25	25
11	RM	Research Methodology	BHS7T22	2	-	-	2	3	80	20	40	-	-	-
12	RM	Research Methodology	BHS7P22	-	-	4	2	-	-	-	-	50	50	50
Total				13	-	14	20		520	130		125	225	

B.Sc. Sem-VIII (Honors) (Home Science - Major)

S N	Cou rse Cate gory	Name of Course	Course Code	Teaching Scheme (hrs.)			Tota l Cred it	Examination Scheme						
				(Th)	TU	P		Theory				Practical		
								Exam Hrs.	SE E	CI E	M in.	SEE	CI E	Min .
1	DSC	FSN 1/HD 1/ T and C 1/ RM 1/ HSc Ext 1	BHS8T23	2	-	-	2	3	80	20	40	-	-	-
2	DSC	FSN 1/HD 1/ T and C 1/ RM 1/ HSc Ext 1	BHS8P23	-	-	2	1	-	-	-	-	25	25	25
3	DSC	FSN 2/HD 2/ T and C 2/ RM 2/ HSc Ext 2	BHS8T24	2	-	-	2	3	80	20	40	-	-	-
4	DSC	FSN 2/HD 2/ T and C 2/ RM 2/ HSc Ext 2	BHS8P24	-	-	2	1	-	-	-	-	-	50	25
5	DSC	FSN 3/HD 3/ T and C 3/ RM 3/ HSc Ext 3	BHS8T25	2	-	-	2	3	80	20	40	-	-	-
6	DSC	FSN 3/HD 3/ T and C 3/ RM 3/ HSc Ext 3	BHS8P25	-	-	2	1	-	-	-	-	25	25	25
7	DSC	FSN 4/HD 4/ T and C 4/ RM 4/ HSc Ext 4	BHS8T26	2	-	-	2	3	80	20	40	-	-	-
8	DSC	FSN 4/HD 4/ T and C 4/ RM 4/ HSc Ext 4	BHS8P26	-	-	2	1	-	-	-	-	-	50	25
9	DSE	Elective 4	BHS8T27	3	-	-	3	3	120	30	60	-	-	-
10	DSE	Elective 4	BHS8P27	-	-	2	1	-	-	-	-	25	25	25
11	OJT	Apprenticeship (Related to DSC)	BOJ8P02	-	-	8	4	-	-	-	-	100	100	100
Total				11	-	18	20		440	110		175	275	

Four Year UG Honours Degree in Major and Minor with 160-176 credits

B.Sc. Sem-VII (Research) (Home Science - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Cred it	Examination Scheme						
				(Th)	TU	P		Theory				Practical		
								Exam Hrs.	SE E	CI E	M in.	SEE	CIE	Mi n.
1	DSC	FSN 1/HD 1/ T and C 1/RM 1/ HSc Ext 1	BHS7T17R	2	-	-	2	3	80	20	40	-	-	-
2	DSC	FSN 1/HD 1/ T and C 1/RM 1/ HSc Ext 1	BHS7P17R	-	-	2	1	-	-	-	-	25	25	25
3	DSC	FSN 2/HD 2/ T and C 2/ RM 2/ HSc Ext 2	BHS7T18R	2	-	-	2	3	80	20	40	-	-	-
4	DSC	FSN 2/HD 2/ T and C 2/ RM 2/ HSc Ext 2	BHS7P18R	-	-	2	1	-	-	-	-	-	50	25
5	DSC	FSN 3/HD 3/ T and C 3/ RM 3/ HSc Ext 3	BHS7T19R	2	-	-	2	3	80	20	40	-	-	-
6	DSC	FSN 3/HD 3/ T and C 3/ RM 3/ HSc Ext 3	BHS7P19R	-	-	2	1	-	-	-	-	25	25	25
7	DSE	Elective 3	BHS7T20R	3	-	-	3	3	120	30	60	-	-	-
8	DSE	Elective 3	BHS7P20R	-	-	2	1	-	-	-	-	-	50	25
9	RM	Research Methodology	BHS7T21R	2	-	-	2	3	80	20	40	-	-	-
10	RM	Research Methodology	BHS7P21R	-	-	4	2	-	-	-	-	50	50	50
11	RP	Research Project/ Dissertation (Core)	BRP7P01	-	-	6	3	-	-	-	-	75	75	75
Total				11	-	18	20		440	110		175	275	

‘R’ in the subject code indicates ‘Research’.

B.Sc. Sem-VIII (Research) (Home Science - Major)

S N	Course Categor y	Name of Course	Course Code	Teaching Scheme (hrs.)			Tota l Cre dit	Examination Scheme								
				(Th)	TU	P		Theory				Practical				
								Exam Hrs.	SEE	CIE	Min	SEE	CIE	Min		
1	DSC	FSN 1/HD 1/ T and C 1/RM 1/ HSc Ext 1	BHS8T22R	2	-	-	2	3	80	20	40	-	-	-		
2	DSC	FSN 1/HD 1/ T and C 1/RM 1/ HSc Ext 1	BHS8P22R	-	-	2	1	-	-	-	-	25	25	25		
3	DSC	FSN 2/HD 2/ T and C 2/ RM 2/ HSc Ext 2	BHS8T23R	2	-	-	2	3	80	20	40	-	-	-		
4	DSC	FSN 2/HD 2/ T and C 2/ RM 2/ HSc Ext 2	BHS8P23R	-	-	2	1	-	-	-	-	-	50	25		
5	DSC	FSN 3/HD 3/ T and C 3/ RM 3/ HSc Ext 3	BHS8T24R	2	-	-	2	3	80	20	40	-	-	-		
6	DSC	FSN 3/HD 3/ T and C 3/ RM 3/ HSc Ext 3	BHS8P24R	-	-	2	1	-	-	-	-	25	25	25		
7	DSE	Elective 4	BHS8T25R	3	-	-	3	3	120	30	60	-	-	-		
8	DSE	Elective 4	BHS8P25R	-	-	2	1	-	-	-	-	-	50	25		
9	RP	Research Project / Dissertation (Core)	BRP8P02	-	-	14	7 (4+2 +1)	-	-	-	-	175	175	175		
Total				09	-	22	20		360	90		225	325			

‘R’ in the subject code indicates ‘Research’.

Four Year UG Honours with Research Degree in Major and Minor with 160-176 credits

Total Credits:

1. Three Year UG Degree Program: 132
2. Four Year UG Degree Program: 172

Abbreviations: Generic/Open Electives: OE, Vocational Skills & Skill Enhancement Courses: VSEC, Vocational Skill Courses: VSC, Skill Enhancement Courses: SEC, Ability Enhancement Courses: AEC, Indian Knowledge Systems: IKS, Value Education Courses: VEC, On Job Training (Internship/Apprenticeship): OJT, Field Project: FP, Community Engagement & Service: CEP, Co-curricular Courses: CC, Research Methodology: RM, Research Project: RP

Basket for VSC Category Courses (HOME SCIENCE)

Semester	Course Category	Name of Course	BOS	Course Code
I	VSC	Basic Garments and Accessory Making Water quality Testing	Home Science	BVS1P01(A) BVS1P01(B)
II	VSC	Early Childhood Education Measuring Instrument Horticulture	Home Science	BVS2P03 (A) BVS2P03 (B) BVS2P03 (C)
III	VSC	Nursing Methods Electric Safety and Maintenance Housing and Home Furnishing	Home Science	BVS3P05(A) BVS3P05(B) BVS3P05(C)
V	VSC	Information Communication Techniques Bakery and Confectionary	Home Science	BVS5P07(A) BVS5P07(B)
VI	VSC	Pattern Making and Fashion Designing Event Management	Home Science	BVS6P08 (A) BVS6P08 (B)

Basket for ELECTIVE (DSE) Category Courses (Home Science)

Semester	Course Category	Name of Course	Course Code
V	Elective 1	A. Entrepreneurship Management	BHS5T12
		B. Nutritional Biochemistry	
VI	Elective 2	A. Toy Based Pedagogy	BHS6T16
		B. Diet Therapy	
VII (Honors)	Elective 3	A. Food Science and Nutrition	BHS7T21
		B. Human Development	
		C. Textile & Clothing	
		D. Resource Management	
		E. Home Science Extension	
VIII (Honors)	Elective 4	A. Food Science and Nutrition	BHS8T27
		B. Human Development	
		C. Textile & Clothing	
		D. Resource Management	
		E. Home Science Extension	
VII (Research)	Elective 3	A. Food Science and Nutrition	BHS7T20R
		B. Human Development	
		C. Textile & Clothing	
		D. Resource Management	
		E. Home Science Extension	
VIII (Research)	Elective 4	A. Food Science and Nutrition	BHS7T25R
		B. Human Development	
		C. Textile & Clothing	
		D. Resource Management	
		E. Home Science Extension	

B.Sc. Home Science
Semester –I

B.Sc. Home Science Semester –I (DSC)
BHS1T01
Fundamentals of Food and Nutrition

Total Marks	150
Theory=SEE+ CIE	80+20 = 100
Practical=SEE +CIE	25+25 = 50

OBJECTIVES:

- To understand the functions of food and the role of various nutrients, their requirements and effects of deficiency.
- To promote basic knowledge pertaining to various food groups and nutrients.
- To make students familiar with the different methods of cooking, their advantages and disadvantages.

THEORY

UNIT- I

I-Introduction to Food and Nutrition

1. Basic terms used in Food and Nutrition- Definition- Food, Nutrition, Nutrients, and Balanced Diet
2. Functions of food- Physiological, psychological, and social
3. Characteristics of basic food groups and their contribution to the diet

II-Energy- Definition and factors affecting BMR

III-Carbohydrates- Definition, classifications, functions, sources, deficiency states, and digestion-absorption
Dietary Fibre- Types and sources

UNIT- II

I-Proteins- Definition, classifications, functions, sources, deficiency states, and digestion-absorption

II-Fats- Definition, classifications, functions, sources, deficiency states, and digestion-absorption

UNIT- III

I- Vitamins- Functions, Sources and Deficiency of:

a) Fat Soluble Vitamins:

- i) Vitamin A ii) Vitamin D iii) Vitamin E iv) Vitamin K

b) Water Soluble Vitamins:

- i) Thiamine (B₁) ii) Riboflavin (B₂) iii) Niacin (B₃) iv) Cyanocobalamin (B₁₂) v) Vitamin C

II- Minerals- Functions, Sources and Deficiency of:

- i) Calcium ii) Phosphorus iii) Iodine iv) Iron v) Sodium vi) Potassium

Unit -IV

I-Water- Functions of water in human body, water balance, and sources of water

II- Methods of Cooking:

- i. Objectives of cooking food
- ii. Advantages of cooking food
- iii. Different cooking methods and cooking media

CIE

Total Marks	20
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PRACTICAL:

(SEE-25 marks)

1. Food Presentation and Table Setting.
2. Simple Cooking- Food preparation, serving, calculation of cost and yield.

a) **Cereals:** Plain Rice, Pulao, Sweet Rice, Masale Bhat, Chapati, Puri, Paratha, Missi Roti, Puran Poli, Bhakri (any 2)

c) **Pulses:** Whole, De-husked and Sprouted (any 2)

d) **Vegetables:** Curries, Dry preparation and Baked (any 2)

e) **Fruits:** Fresh, Dried Baked and Steamed (any 2)

f) **Milk and Milk Products:** Porridge, Desserts, Curds, and Paneer (any 2)

g) **Eggs:** Boiled, Fried, Poached and Custard (any 2)

3. **Cooking Methods-** Planning and preparation of recipes by

a) Boiling (any 1)

b) Steaming (any 1)

c) Pressure cooking (any 1)

d) Frying (any 1)

SEE-Total Marks	25
Cooking	15
Presentation	05
Record	05
CIE	25

CIE: (25 marks)

Any two of the following:

- Market survey of the food commodities as per food groups and their cost.
- Latest kitchen appliances in the market-their use and upkeep.
- Scrap book related to food groups, sources, deficiencies of various nutrients.

References:

- Nutritive Value of Indian Foods: Gopalan C, Rama Shastri & Balasubramanin S.C., National Institute of Nutrition 1993.
- Food Science, Chemistry and Experimental Foods: Dr.M.Swaminathan, The Bangalore Printing and Publishing Co. Ltd. 1995.
- Essentials of Food and Nutrition, Vol.I (Fundamental aspects): Dr. Swaminathan, 2nd edition BAPPCO, 2000.
- Applied Nutrition: R. Rajlakshami Oxford & IBH Pub. Co.pvt Ltd, 3rd edition, 1981.
- Foods and Nutrition: The Educational Planning Group, Delhi, Arya Publishing House. 3rd edition, 1991.
- B. Srilakshmi, Nutrition Science, sixth edition, new age international (P) Ltd, New Delhi (2018).
- Joshi. A. S, "Nutrition & Dietetics", third edition, Tata McGraw hill education Pvt. Ltd., New Delhi (2010).
- The book of Ingredients: Philip Dowell & Adrian Bailey, Michael Joseph, Ltd, 1980.
- Indian Food Composition Tables: Longvah T, Ananthan R, Bhaskarachary K and Venkaiah K. National Institute of Nutrition, 2017.

B.Sc. Home Science Semester –I (DSC)
BHS1T02
Fundamentals of Human Development

Total Marks	150
Theory	Marks
SEE	80
CIE	20
Practical	Marks
CIE	50

Objectives:

- To develop an understanding about the discipline of Human Development
- To acquire a detailed understanding of developmental milestones and domains from conception to middle childhood
- To gain insight on context specific cultural practices of development in children and explore the role of family and community in the life of children
- To make student aware of methods of studying human behaviour.

COURSE CONTENT: THEORY

UNIT I: Introduction to Human Development

- Definition, History, Interdisciplinary nature and scope of Human Development
- Domains, Stages and Context of Human Development
- Principles of Growth and Development
- Factors influencing Growth and Development

UNIT II: Prenatal, Birth and the Neonate

- Fertilization, Pregnancy – Signs, Symptoms, Complications, Discomforts
- Conception and Stages of Prenatal Development
- Child Birth - Process and types, complications during birth
- Reflexes and Care of the new-born

UNIT III: Infancy

- Characteristics of infancy
- Major adjustments of infancy
- Physical and Motor Development of infants
- Emotions and Vocalizations of infants
- Sensory capacities of infants

UNIT IV: Toddlerhood

- Developmental tasks and Characteristics
- Physical and Motor Development

- Social and Emotional Development
- Cognitive, Moral and Language Development

Practical (1 credit)

(CIE-50 marks)

Preparation of a Workbook, on the following-

10 Marks

- Developmental tasks
- Immunization
- Album on the stages of Pre-natal development
- Care during Pregnancy

Methods of child study

10 Marks

- Anthropometry, Observation, Interview, Questionnaire, Case study, Projective, Psychological tests, Sociometry, Longitudinal and Cross-sectional approach

Plan and prepare stimulatory activities for sensory development of infants. (0-1 year) 10 Marks

Plan & develop activities to facilitate development in different domains and submit a flip/ album of activities. 10 Marks

Audio and video resources to study prenatal development, infancy and toddlerhood. 10 Marks

References:

- Berk, L. (2013). *Child development*. 9th ed. Boston: Pearson.
- Rice, F. P. (1998). *Human Development: A Life-span Approach*. New Jersey: Prentice Hall.
- Santrock, J. W. (2011). *Life-span development*. New York: McGraw-Hill.
- Singh, A. (Ed.) 2015. *Foundations of Human Development*. New Delhi: TataMcGraw-Hill.

B.Sc. Home Science Semester –I (VSC)
BVS1P01 (A)
Basic Garments and Accessory Making

Total Marks	100
Practical	Marks
SEE	50
CIE	50

CIE = 50 Marks

PRACTICALS

1. Demonstration of taking body measurements.
2. Introduction to Tools for Garment construction- Measuring tools, marking tools, Cutting tools, sewing tools, Pressing tools,
3. Sewing machine –parts, functions, care
4. Drafting, cutting & stitching of ; -Apron, Baby Frock
5. Make fashion accessory (Any One)-Head gears, Hand bags and Jewellery,
6. Make samples of Surface ornamentation- Appliqué, Quilting, smoking,
7. Make an Embroidery album of Decorative stitches (Any Five)– Chain Stitch, Herringbone Stitch, Stem Stitch, Running Stitch, Lazy-Daisy, Satin Stitch, French knot Stitch, Bullion stitch, Buttonhole Stitch

CIE = 50 Marks

Total Marks – SEE	50
Drafting	10
Stitching	15
Surface Ornamentation	15
Record and Album	10

References:

1. Complete Guide to Sewing-Readers Digest, The reader's digest association, 1976
2. Dorling Kindersley- The complete Book of Sewing, London, New York.
3. Complete Book of Sewing, Alison Smith Dorling Kindersley, 1999
4. Singer Sewing Book, Gladys Cunningham, The Singer Company
5. Aswani K.T. Fancy Weaving Mechanism, Mahajan Books, Ahmedabad.
6. Deulkar Durga - Household Textile and laundry work, Atmaram and sons, Delhi

B.Sc. Home Science Semester – I (VSC)
BVS1P01(B)
Water quality Testing

Course Content:

Total Marks	100
Practical	Marks
SEE	50
CIE	50

1. Working principles and operations of basic equipment's of Chemistry laboratory
(pH meter, Physical balance, electronic balance, Hare`s apparatus, etc.)
2. Demonstration of handling of basic apparatus in chemistry laboratory
(Burette, Pipettes, Volumetric flask, thermometer, Bunsen burner, and other common glassware.)
3. Demonstration of preparation of Solutions: Normal and Molar solutions.
4. Preparation of Buffer Solutions.
5. Single acid base single titration, Determine the Normality and weight per liter.
6. Titration of strong acid vs strong base (Acid-base double titration)
7. Determination of Calcium and Magnesium hardness of water by EDTA titration.
8. Determination of total and permanent hardness of water by EDTA titration.
9. Determination of viscosity of given liquid by Ostwald's Viscometer.
10. Determination of Surface tension of given liquid by Stalagmometer.
11. Preparation of colloidal solution of starch.
12. Determination of the Density of given liquid by using Hare's apparatus.

Reference books:

- 1) Morrison, R. N.; Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- 2) Finar, I. L. Organic Chemistry (Volume 1& 2), Dorling Kindersley (India) Pvt. Ltd.
(Pearson Education).
- 3) Ahluwalia, V.K.; Dhingra, S. (2004), Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press.
- 4) Sharma, R.K., Sidhwani, I.T., Chaudhari, M.K. (2013), Green Chemistry Experiments: A monograph, I.K. International Publishing House Pvt Ltd. New Delhi.
- 5) Chandra, R.; Singh, S.; Singh, A. (2019), Basic Organic Chemistry, Arcler Press.

Course Outcome:

1. This course is designed to offer enhanced practical skills to the students.
2. After completion of this course student will have understand, learn and perform skills needed for water quality testing in a chemistry laboratory.

B.Sc. Home Science Semester –I (AEC)
BAE1T01
COMPULSORY ENGLISH

COURSE OUTCOMES:

Students will be able to enhance their awareness of correct usage of English language in writing and speaking.

- Students will improve their speaking ability in English both in terms of fluency and comprehensibility.
- Students will enlarge their vocabulary.
- Students will review the grammatical forms of English and the appropriate use of these forms in specific communicative contexts.
- Students will develop their ability as critical readers and connect issues discussed in the text with life.
- Students will attain and enhance competence in the four modes: writing, speaking, reading & listening
- Students will develop skills that enable them to present their ideas clearly and logically to achieve a specific purpose.

Theory Exam: 50 Marks

Continuous Internal Evaluation (CIE): 50 Marks

Total: 100 Marks

Prescribed Text: Stepping Stone - Board of Editors
(Published by Macmillan Education India Pvt. Ltd.)

UNIT-1

1. Grassroots Innovation and Social Enterprise - Saji woe Oa
2. Two Gentlemen of Verona - A. J. Cronin
3. Go, Kiss the World - Subroto Bagchi

UNIT-2

4. Little Girls Wiser than Men - Leo Tolstoy
5. The Narmada
6. Old Man at the Bridge - Ernest Hemingway

UNIT-3 (LANGUAGE SKILLS-1)

- Greetings and Introduction
- Countries and Nationalities
- Interesting Products
- Activities and Interest
- Food
- My Family

UNIT-4 (LANGUAGE SKILLS-2)

- Preparing a Flyer for an Event, Preparing Advertisement for a Product, Preparing a Handout for a Social Cause/ Issue
- Resume Writing

Continuous Internal Evaluation (CIE): 50 Marks

A Continuous Internal Assessment of 50 marks shall be based on the different oral communication skills activities regularly conducted by the Teacher and the worksheets/ written assignments /creative projects to be submitted by the students. The students are required to actively participate in these activities and mandatorily submit the worksheets/written assignments/creative projects. The guidelines and some suggested items for the activities/assignments are given in the prescribed Text Book, 'Stepping Stone'.

QUESTION PAPER PATTERN
THEORY EXAM
(50 MARKS)

Q.1 Answer any Two (Out of Three) of the given questions in about 50 words each.
(UNIT-1) (2 X 5 Marks = 10)

Q.2 Answer any Two (Out of Three) of the given questions in about 50 words each.
(UNIT-2) (2 X 5 Marks = 10)

Q.3 (A) Five Very Short Answer Questions to be answered in one or two sentences each
(UNIT-1) (5 X 1 Mark = 5)

(B) Five Very Short Answer Questions to be answered in one or two sentences each
(UNIT-2) (5 X 1 Mark = 5)

Q.4 Writing a script of the dialogue of any ONE (Out of Two) of the conversational situations. (UNIT-3) (1 X 10 Marks = 10)

Q.5 Attempt any ONE (Out of Two) of the Questions based on the items prescribed in UNIT-4 (1 X 10 Marks = 10)

B.Sc. Home Science Semester –I
BVE1T01
ENVIRONMENTAL SCIENCE

COURSE OUTCOMES:

At the end of the course, students shall be able to:

- Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment
- Explicate the importance of Environmental Education.
- Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.
- Describe the various physical and chemical characteristics and properties of Water and Soil
- Understand the Ecology and its allied branches
- Comprehend about Population and Community Ecology
- Study the changes in Population by understanding the concept of Population ecology

Unit-I: Basics of Environmental Science (7.5 Hrs)

- A. Introduction of Environmental Science: Definition, Types, Classification, Characteristics, Components and principles of environment. Scope and need for environmental science, Multidisciplinary nature of environmental science, Environmental ethics.
- B. Environmental Education: Goals, Objectives and principles of environmental education, formal and non-formal environmental education, environmental programme, importance of environmental education, environmental awareness.
- C. Components of Environment: Atmosphere (Structure and composition), hydrosphere – distribution of water, hydrological cycle, global water balance, lithosphere – Internal structure of Earth, types of rocks, Biosphere- Boundaries of biosphere.

Unit-II: Basics of Atmospheric Science (7.5 Hrs)

- A. Atmospheric Chemistry: Structure of atmosphere based on temperature, photochemical reaction in the atmosphere, temperature inversion and lapse rate, smog formation, types of smog (sulphur and photochemical smog), adverse effect of smog on human being, aerosol.
- B. Green House Effect: Greenhouse gases, relative contribution and effects of greenhouse effect, control of greenhouse gases. Ozone depletion: chemistry of ozone depletion, Dobson Unit, ozone depleting substances (ODS), ozone hole, consequences of ozone depletion, mitigation measures and international protocols.
- C. Acid Rain: Chemistry of Acid Rain, effect of acid rain on ecosystem, control measures. Precipitation – Forms of precipitation (rain, drizzle, snow, sleet, and hail), types of precipitation (conventional, orographic, and cyclonic).

Unit-III: Basics of Ecology (7.5 Hrs)

- A. Ecology: Definition, subdivision and modern branches of ecology, ecology spectrum, scope of ecology. Application and significance of ecology to human beings.
- B. Abiotic Factors: Temperature: effect of temperature on plants and animals, Adaptation to meet extreme temperature. Light: Zonation in marine habitat, effects of light on plants and animals, Microclimate and fire, Shelford law of tolerance, Leibigs law of minimum.
- C. Biotic Factor: Inter specific relationship Positive: Mutualism (symbiosis),

commensalism, proto- cooperation Negative: Parasitism, predation, competition, Antibiosis, Neutralism.

Unit-IV: Ecosystems and food chain (7.5 Hrs)

- A. Ecosystem: Definition, structure and function of ecosystem, types of ecosystem: Terrestrial (forest, grassland, desert, cropland), Aquatic (Marine and freshwater)
- B. Food chain: Definition & types: Grazing food chain, detritus food chain, and parasitic food chain, food web in forest and grassland ecosystem. Ecological pyramids (number biomass and energy), energy flow in ecosystem (Y- shaped). Energy flow and the law of thermodynamics.
- C. Biogeochemical Cycles: Definition, classification, gaseous cycle (oxygen, carbon and nitrogen) Sedimentary cycle (phosphorus and sulphur).

Reference Books:

1. Text Book of Environment: K M Agrawal, P.K. Sikdar, and S.C. Deb, Mc'Millan Publication, Mumbai.
2. Man and Environment: M.C. Dash and P.C. Mishra, Mc'Millan Publication, Mumbai.
3. Environmental Science: S.C. Santra, New Central Book Pvt.Ltd, Kolkatta.
4. Environmental Problems and Solution: D.K. Asthana, S.Chand Publication, New Delhi.
5. Environmental Chemistry: S.S. Dara, S.Chand Publication ,New Delhi.
6. Environmental Chemistry: A.K. Dey, New Age International Publishers,2001.
7. A Textbook of Environmental Studies: Dr S.Satyanarayan, Dr S.Zade, Dr S Sitre and Dr P.U. Meshram, Allied Publishers, New Delhi.
8. Environmental Biology: Biswarup Mukherjee, Tata McGraw-Hill Publishing Company Ltd, New Delhi,1996.
9. Animal Ecology and Distribution of Animals: Veer Bala Rastogi, Rastogi Publication, Meerut (U.P).
10. Ecology and Environment: P.D.Sharma, Rastogi Publication ,Meerut (U.P).
11. Fundamentals of Environmental Biology: S. Arora, Kalyani Publishers.
12. Environmental Biology: P.K.G. Nair, Himalaya Publication.
13. Environmental Biology: K.C. Agrawal, Agro Botanical Publisher, Bikaner,1994

B.Sc. Home Science Semester –I (IKS)
BIK1TO1
Indian Knowledge of
Home Science- I

Total Marks	100
Theory	Marks
SEE	80
CIE	20

OBJECTIVES:

- 1) To enable the students to acquire the knowledge of food and nutrition.
- 2) To know the history of human development.
- 3) To impart knowledge about textile and clothing.
- 4) To gain the knowledge about resource management.
- 5) To assess the knowledge regarding home science extension.

Unit I

- History of nutrition.
- Nutrition research in India.
- Introduction, definition and importance of traditional foods.
- Introduction and benefit of satvik diet.
- Regional food patterns-Typical breakfast, meals and snacks foods of different regions of India.
- History of millets, types of millets and health benefits of millets.
- Nutrition composition of millets -Jowar, Bajara and Ragi.

Unit -II

- Manusmriti : Indian mental concepts of children (IMCC)
- About Children in Manusmriti: 16 Sanskaars
- Children's education, guru, student, and varna,
- Hinduism and Children, Jainism and Children, Buddhism and Children

Unit III

Traditional Costumes of Different States of India

- History and Accessories of Male and Female Costumes of Maharashtra,
- History and Accessories of Male and Female Costumes of Punjab,
- History and Accessories of Male and Female Costumes of Gujrat
- History and Accessories of Male and Female Costumes of Rajasthan,
- History and Accessories of Male and Female Costumes of Tamil Nadu

UNIT- IV

1. Concept of Housing, Need of Housing and Functions of housing
2. Evolution of Housing – The First shelter, Temporary shelter, Permanent shelter
3. Shelter in ancient civilization
4. Changes in housing needs and standards due to influence of services and modern amenities.
5. Factors affecting housing

UNIT-V

- Home science extension in India, History, concept, characteristics.
- Role of home science extension in National development
- Teaching and learning Indian knowledge system through extension education
- Folk and traditional media: Meaning, Strength of the folk & traditional media, Limitations of folk and traditional media.
- Traditional folk media: Folk song, folk dance, powada, puppet show, street play.

References:

- B. Srilakshmi, Nutrition Science, Sixth Edition, New Age International (P) Ltd, New Delhi (2018).
- B. Srilakshmi, Food Science, Third Edition, New Age International (P) Ltd, New Delhi (2006)
- Joshi. A. S, “Nutrition & Dietetics”, Third Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi (2010).
- Ambedkar BR. *Buddha and his Dhamm. (Hindi translation: Anand Kausalyayan)* Nagpur: Samata Sainik Dal; 1993. pp. 217–9.
- Kapur M, Mukundan H. Child care in ancient India from the perspective of developmental psychology and paediatrics. 1st ed. New Delhi: Sri Satguru Publications; 2002.
- Sitholey P, Agarwal V, Vrat S. Indian mental concepts on children and adolescents. *Indian J Psychiatry.* 2013 Jan;55(Suppl 2):S277-82. doi: 10.4103/0019-5545.105551. PMID: 23858268; PMCID: PMC3705696, retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3705696/>
- The compendium of eight branches of Ayurveda- Astangasamgraha, Vol. 3. New Delhi: Sri Satguru Publications; 1999. (Translated by a board of scholars).

- Vastrashastra: Prof. Vimal Adhau Maharashtra Vidhyapeeth Granth Nirmal Mandalasathi, Vidhya Books Aurangabad.
- William Watson - Textile Design and colour, Longman Green and Co. London.
- Agan T.C. – The House Oxford and I.B.H. publishing Co.
- Andreas, P (2019), Housing for all : Building Catalogue, Dom publishers
- Balchin, P & M Rhoden, (2003), Housing – The essential Foundation, Routledge.
- Castro, a & Hope (2015), Housing and Habitat in the Ancient Mediterranean: Cultural and Environmental responses, Peeters Pub and Booksellers.
- Deshpande R.S. – Modern Indian Homes in India, United Book Corporation, Poona 2nd Edition
- Dwivedi, R.M (2007), Urban Development and Housing in India: 1947 to 2007,

New Century Publication

- Hiraskar, G.K. (2016), The Great Ages of World architecture, Dhanpat Rai Publication Limited, New Delhi.
- Modern Houses in India (2017) Creavity Publishers.
- Dahama, O.P. and Bhatnagar O.P. Education and Communication for Development, Oxford & IBH Publishing Co., New Delhi.
- Supe, S.V. An Introduction to Extension education, Oxford Publishing Company, New Delhi & Kolkata, 1999.

B.Sc. Home Science
Semester - II

B.Sc. Home Science Semester –II (DSC)
BHS2T03
Fundamentals of Textile and Clothing

Total Marks	150
Theory	Marks
SEE	80
CIE	20
Practical	Marks
SEE	25
CIE	25

Objectives:

1. To get acquainted with basic knowledge of Textile fibers.
2. To understand the importance and necessity of various construction techniques for different fabrics, and to acquire the skills to apply those construction techniques in a sample form
3. To acquire knowledge and skill regarding stitching techniques for various garment components such as plackets, pockets, cuffs, collars, and fasteners which are ultimately used for stitching of any garments
4. To acquire knowledge and skill regarding stitching techniques for various garment components

Unit I :

1. Scope of Textile and Importance of Clothing :
2. Classification of textile fibers, General and Essential properties of Textile fibers
3. Manufacturing process of natural fibers.:-Cotton, silk, wool
4. Physical and chemical properties of natural fibres

Unit II :

1. Manufacturing process, of man made fibers :- viscose rayon, nylon, polyester
2. Physical and chemical properties of manmade fibres
3. Types of Yarn – Simple, novelty, textured yarns, Yarn twist,

Unit III :

1. Introduction to Seams –Plain ,French, Lapped Flat fell,
2. Tucks- Pin, Cord, Cross
3. Pleats – Knife, box, inverted.
4. Gathers – Machine and hand gathers
5. Types and uses of - Frills, Buttons, Yokes, Pockets, Sleeves

Unit IV :

1. Fashion accessories –Types and uses of-- Head gears, Foot wear, Hand bags, Types and use of jewellery
2. Surface ornamentation –Types and application of- Appliqué, Quilting, smoking, embroidery

Total Marks SEE	25
Drafting	05
Stitching-	10
Sample Making	05
Record	05

CIE -25 Marks

PRACTICAL

1. Drafting cutting and stitching of :-Baba suit, Romper
2. Make an album of :
 - a..Seams : French, Lapped, Flat fell
 - b. Tucks : Pin, Cross, Corded
 - c. Pleats : Side, Box, Inverted

References:

- Deulkar Durga - Household Textile and Laundry Work, Orient Longman, Delhi.
- Dantyagi S. - Fundamentals of Textile and their care. Orient Longman, Delhi.
- Dorling Kindersley- The complete Book of Sewing, London, New York.
- Dorothy Siegart, Lyle-Modem Textiles, John Wiley and Sons.Inc New York
- Doongaji. S and Deshpande R - Basic Process of Clothing Construction.
- Erwin, Mabel and kinchen- Clothing for Modern, Mac Milan publishing, New York.
- Fabrics science by Joseph Puzzuto
- Modern textiles by Dorothy Siegert Lyle
- Understanding fabric from fiber to finished cloth by Dbbie and Giollo
- Understanding textiles by Phyllis G. Tortora and Billie J Collier
- Corbman,P.B., Textiles-Fibre to Fabric, Gregg Division/McGraw Hill Book Co.,US,1985.
- Joseph M.L.,Essentials of Textiles (5th Edition), Holt, Rinehart and WinstonInc.,Florida, 1988.
- Complete Guide to Sewing-Readers Digest, The reader's digest association, 1976
- Complete Book of Sewing, Alison Smith Dorling Kindersley, 1999
- Singer Sewing Book, Gladys Cunningham, The Singer Company

B.Sc. Home Science Semester –II (DSC)

BHS2T04

Interior Decoration and Design

Objectives:

- 1) To develop skill in using colors to create different effects in space, with the use of various color schemes.
- 2) To leave techniques of using color in different media
- 3) To give knowledge of flowers / floral decoration and arrangement

Total Marks	150
Theory	Marks
SEE	80
CIE	20
Practical	Marks
CIE	50

UNIT – I – Importance of colour in Interior Decoration

- A. Detail Study of Prang colour system:
 - i. Characteristics or dimensions of colour
 - a. Hue, b. Value, c. Intensity
 - ii. Classification of color
 - a. Primary, b. Secondary, c. Intermediate, d. Tertiary, e. Quaternary, f. Neutral
 - iii. Warm & cool colours
 - iv. Advancing & Receding colours
 - v. Colour wheel

UNIT – II Colour Schemes:

- A. Related colour scheme:
 - a. Monochromatic, b. Analogous
- B. Contrast colour scheme:
 - a. Complementary, b. Double complementary, c. Split complementary, d. Triad, e. Neutral
- C. Colour schemes for different rooms
 - a. Kitchen and dining, b. Drawing room /Living room, c. Bed room

UNIT – III– Decorating Interior & Exterior

- A. Floral Decoration:
 - a) Definition and Importance
 - b) Objectives
 - c) Material Required
- B. Flower Arrangement
 - a) Application of Elements of Art in flower Arrangement
 - b) Application of Principles of Art in Flower Arrangement.
- C. Use of Flower arrangements:
 - a) Personality
 - b) Occasion
 - c) Placement in rooms
 - d) Flowers as gift
 - a) Bouquet
 - b) Spray of flowers
 - c) Potted

Unit – IV- Types of flower arrangement

- a) Traditional
 - b) Oriental / Japanese
 - c) Modern
 - d) Floating
 - e) Miniature
 - f) Dry
- B. Artificial Flower Arrangement:
 - i. Method of making Artificial Flower
 - ii. Material required for artificial flower arrangement

C. Do's & Don'ts in flower arrangement

PRACTICALS

1. Classification of colors (Primary, Secondary and Intermediate) and Colour Wheel-
2. Warm & Cool colours-
3. Value Scale-
4. Colour Schemes (Monochromatic, Analogous, Complementary, Triad and Neutral)-
5. Types of flower decoration/arrangements (i) Single stick ii Small Bunch
iii)Miniature iv) Modern) -Accessories in home decoration (Creative Art) -

Practicals	CIE Total Marks – 50
Colour Wheel/ Warm & Cool colours/ Value Scale	10
Colour Scheme	20
Flower arrangement	10
Record Book	10

B.Sc. Home Science Semester-II (VSC)
BVS2P03 (A)
Early Childhood Education

Total Marks	100
Practical	Marks
SEE	50
CIE	50

OBJECTIVES:

1. To realize the importance of early years and why childhood matters.
2. To understand the significance of various creative activities and teacher's role in implementing them.
3. To develop the skills and techniques to plan activities in ECCE centres of different types, to conduct activities in early childhood care and education and to work effectively with parents and community.

Introduction to ECCE:

CIE-50marks

1. Concept and importance of early childhood years
2. Objectives and significance of ECCE.
3. Case study of a government and private pre-school center and report writing.
4. Designing low cost and environment friendly appropriate learning materials for:
 - o Story telling
 - o Readiness activities
 - o Art and Craft (crayon work, paper cutting, collage and origami, paintings and printings, etc.)
 - o Rhyme booklets
 - o Language and Literacy Skills
 - o Numeracy Skills
5. Preparation of teaching aids for preschool children (Any-4)
6. Theme based -Plan a lesson plan to execute and participate in a preschool.
7. Organize a workshop/exhibition for involving parents of pre-school children.

Total Marks	100
SEE	50
Preparation of teaching aid	10
Preparation of Lesson Plan	20
Design a low-cost learning material	10
Record/ Resource file	10
CIE	50

References

1. Grewal, J.S. (1984). Early Childhood Education, Agra National Psychological Corporation Pub.
2. Swaminathan Mina. A Source book on Early Childhood Care and Education, UNESOC, Clinical Co-Operative Programme Paris.
3. <https://www.ncert.nic.in/dee/pdf/deethemebased.pdf>
4. <https://www.egyankosh.ac.in/bitstream/123456789/96681/1/Unit-27.pdf>

B. Sc. (Home Science) Semester II (VSC)
BVS2P03 (B)
Measuring Instrument

VSC Practical	04 hours/week	Marks: 100	Credit: 02
Instruments	Name of Experiments (Any 10 experiments to be performed)		
Vernier Calipers, Screw Gauge, Scale, Balance	1) Use of Vernier Calipers to determine dimensions of a given object.		
	2) Use of Screw Gauge to determine dimension of a given object.		
	3) Comparison of measurements with Scale, Vernier Calipers and Screw Gauge.		
	4) Determining Density of solid object using a Balance and vernier Calipers.		
Travelling Microscope	5) Use of Travelling Microscope to determine inner diameter of a Capillary tube.		
Thermometer	6) Measurement of temperature using thermometer and its inter-conversion in other scales.		
Convex lens and Glass slab	7) Determination of refractive Index of a material of glass slab.		
	8) Determination of Focal Length of a given convex lens.		
Resistors	9) To study the colour coding of given Resistance and compare it with its practical value measured by a Multimeter.		
	10) Determine the unknown resistance by using Ohm's Law.		
multi-meter	11) Use of multi-meter to measure voltage of AC supply.		
Transformer	12) Study of transformer and determination of turn's ratio.		

Course outcomes:

- 1) Develop precise measurement skills using various instruments, including vernier calipers, screw gauges, scales, and travelling microscopes.
- 2) Understand and apply key principles such as density calculation, Ohm's Law, and focal length determination.
- 3) Learn to compare measurements obtained from different instruments to evaluate accuracy and precision.
- 4) Gain experience in using both digital (multimeter) and analog (thermometer, balance) instruments for various measurements.
- 5) Explore and understand advanced topics like the refractive index, transformer turn ratios and the colour coding of resistors.

B.Sc. Home Science Semester-II (VSC)
BVS2P03 (C)
Horticulture

Total Marks	100
Practical	Marks
SEE	50
CIE	50

Objectives:-

1. Features of orchard, planning and layout of orchard, tools and implements.
2. Preparation of nursery beds for sowing of seeds.
3. Preparation of plant material for potting, hardening plants in the nursery.
4. Practicing different types of cuttings, layering, graftings and buddings including opacity and grafting etc

Experiments:

1. Features of orchard, planning and layout of orchard
2. Identification of tools and implements
3. Preparation of nursery beds for sowing of horticulture crops (Any 4 Plants)
4. Digging of pits for fruit plants
5. Study of planting systems
6. Training and pruning of orchard trees.
7. Preparation of fertilizer mixtures and field application.
8. Study of harvesting and grading of horticultural crops
9. Study of packaging and storage of horticultural crops
10. Preparation of nursery beds and sowing seeds.
11. Potting reporting and preparation of plant material for potting.
12. Practicing different types of cutting, layering
13. Practicing different budding method.
14. Practicing different grafting methods.
15. Preparation growth regulators for seed germination and vegetative propagation.
16. Visit to different Orchards. Visit to established model Govt. and Private Nurseries of adjoining areas

Suggested Reading:

- Chadha,K.L.(ICAR),2002,2001. Handbook of Horticulture, ICAR, NewDelhi
- D.K. Salunkhe and S.S. Kadam, 2013. A handbook of Fruit Science and Technology. CRC Press.
- Denisen E.L.,1957. Principles of Horticulture. Macmillan Publishing Co., New York.
- Edmond,J.B, Sen,T.L, Andrews,F.S and Halfacre R.G., 1963. Fundamentals of Horticulture. Tata McGraw Hill Publishing Co., New Delhi.
- Gardner/Bardford/Hooker. J.R., 1957. Fundamentals of Fruit Production. Mac Graw Hill Book Co., New York.
 - Jitendra Singh, 2002. Basic Horticulture. Kalyani Publishers, Hyderabad.
 - K.V.Peter, 2009. Basics Horticulture. New India Publishing Agency
 - Kausal Kumar Misra and Rajesh Kumar, 2014. Fundamentals of Horticulture. Biotech Books.
 - Kumar, N., 1990. Introduction to Horticulture. Rajyalakshmi publications, Nagarcoil, Tamilnadu
 - NeerajPratap Singh, 2005. Basic concepts of Fruit Science 1 stEdn. IBDC Publishers.
 - Prasad and Kumar, 2014. Principles of Horticulture 2 ndEdn. Agrobios (India).

B.Sc. Home Science Semester –II (VEC)
BVE2T02
CONSTITUTION OF INDIA

UNIT – I:

- Historical Background to the Framing of the Indian Constitution: General Idea about the Constituent Assembly of India.

UNIT – II

- Preamble – Nature and key concepts/Constitutional values, Socialism, Secularism, Democracy, Justice, Liberty, Equality and Fraternity
- Salient Features of the Constitution of India

UNIT – III

- General study about the kinds, nature and importance of; Fundamental Rights, Directive Principles of State Policy and Fundamental Duties.

UNIT –IV

- Introduction of the Constitutional Institutions and Authorities;
- Central Legislature and Executive (Parliament of India, President of India and Council of Ministers)
- State Legislature and Executive (State legislative Assemblies, Governors and Council of Ministers)
- Higher Judiciary (Supreme Court of India and High Courts)

B.Sc. Home Science Semester –II (IKS)

BIK2T02

Indian knowledge of Home Science-II

Total Marks	100
Theory	Marks
SEE	80
CIE	20

Objectives:

1. To enhance the knowledge of food and nutrition.
2. To acquire knowledge regarding child care in ancient India
3. To familiarize with the traditional sarees of different states of India
4. To comprehend the knowledge about vastushastra.
5. To understand the evolution of knowledge system in home science extension and traditional folk media

UNIT I

- Concept of health.
- Guidelines for good health
- Relationship between nutrition and health.
- Introduction and definition of yoga.
- Yogasana - meaning, principal and their health benefit.
- Introduction to Pranayama and Dhyana and their health benefits.
- Concepts of Aahara (Diet) according yogic text.

UNIT II

Child care in Ancient India (Perspectives of developmental psychology)

- Care of the newborns and children
- Rites of passage and rituals
- Common childhood disorders
- Treatment of childhood disorders

UNIT III

Traditional Sarees of Different states of India:

- Bandhani :-History, Colour, Designs and Threads used in it
- Patola :- History, Colour, Designs and Threads used in it
- Chanderi :- History, Colour, Designs and Threads used in it
- Paithani :- History, Colour, Designs and Threads used in it
- Dacca :- History, Colour, Designs and Threads used in it
- Brocades :- History, Colour, Designs and Threads used in it
- Kashmiri Shawls :- History, Colour, Designs and Threads used in it

UNIT IV

1. History of Vastushastra
2. Importance of Vastushastra
3. Placement of Rooms according to vastushastra
4. Placement of Doors according to vastushastra
5. Location of Water bodies according to vastushastra

UNIT V

- Evolution of knowledge system in home science extension.
- Evolution of system approaches to agricultural innovations.
- Use of natural resources
- Different folk media to transmit knowledge, culture, traditions, custom, social values, norms.
- Traditional folk media: Drama, bhajan, kirtan, bharud, davandi.

References:

- Maimum Nisha, Health Food & Nutrition, Kalpaz Publication.
- B. Srilakshmi, Nutrition Science, sixth edition, new age international (P) Ltd, New Delhi (2018).
- Joshi. A. S, "Nutrition & Dietetics", third edition, Tata McGraw hill education Pvt. Ltd., New Delhi (2010).
- Sen Colleen Taylor Food Culture in India Greenwood Press, 2005
- Swami Mangalteertham : Synthetic approach to Diet & Nutrition, Deogarh Nutan Publication, Deogarh, 2005 4. Swami Gambh
- Dr R Nagarathna and Dr H R Nagendra: Yoga and Health, Swami Vivekananda Yoga Prakashana, 2002.
- Kapil Kapoor, "Indian Knowledge Systems: Nature, Philosophy and Character" in Indian Knowledge Systems, Kapil Kapoor & Avadhesh Kumar Singh (eds), DK Printworld, New Delhi, 2002
- <https://www.exoticindiaart.com/book/details/child-care-in-ancient-india-from-perspectives-of-developmental-psychology-and-paediatrics-nac410/>
- Usha Shrikant - Ethnic Embroidery of India, Samaia Enterprises, Mumbai.
- Vastrashastra: Prof. Vimal Adhau Maharashtra Vidhyapeeth Granth Nirmal Mandalasathi, Vidhya Books Aurangabad.
- William Watson - Textile Design and colour, Longman Green and Co. London.
- Agan T.C. – The House Oxford and I.B.H. publishing Co.
- Deshpande R.S. – Modern Indian Homes in India, United Book Corporation, Poona 2nd Edition
- Goldstein H./Goldstein V. – Art in Every day Life Macmillan Co., New York, 4th Edition
- Pak – Tin & Helan Yeap – Feng Shui – Health Harmony B. Jain Publishers Pvt. Ltd. New Delhi, 1998
- Edition Shrivastav - Remedial Vastushastra, Manoj Publication, Delhi, 2001
- Dahama, O.P. and Bhatnagar O.P. Education and communication for Development, Oxford & IBH Publishing Co., New Delhi, 1977.
- Supe, S.V., An introduction to Extension Education, Oxford Publishing Company, New Delhi and Kolkata

B.Sc. Home Science Semester –I (SEC)
BVS1P02(A)
Elements of Art

Total Marks	100
Practical	Marks
SEE	50
CIE	50

PRACTICALS:

1. Types of Line

- Vertical,
- Horizontal,
- Zigzag,
- Diagonal
- Curved

2. Types of design

- Structural and Decorative,
- Naturalistic and stylized,
- Geometric and Abstract,
- Modern and Traditional

3. Principles of Art/design

- Harmony, Balance, Proportion, Rhythm and Emphasis

Total Marks- SEE	50
Type of Lines	10
Type of Design	20
Principle of Art	10
Record Book	10

Total Marks - CIE	50
Workshop	20
Project work	20
Presentation of Relevant topics	10

B.Sc. Home Science Semester –I (SEC)
BVS1P02(B)
HYBRID EXTENSION METHODS

Total Marks	100
Practical	Marks
SEE	50
CIE	50

CIE -50
Marks

PRACTICALS:

1. Prepare innovative chart for community on any developmental issue.
10 Marks
2. Collection and capture of photographs on developmental aspects through camera.
10 Marks
3. Prepare album on rural\urban development issues or prepare power-point presentation on developmental news through newspaper.
10 Marks
4. Method demonstration for communication for community.
10 Marks
5. Plan and perform extension activity for community development programme using ICT material\ digital media.
10 Marks

Total Marks - SEE	50
Presentation	20
Innovative chart	20
Record	10

B. Sc. (Home Science) Semester I
BVS1P02 (C)
Digital Literacy for Home Science

SEC Practical	04 hours/week	Marks: 100	Credit: 02
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Course Outcomes:

- 1) Comprehend the basic components and block diagram of a computer, including the CPU, memory, input/output devices, and storage.
- 2) Develop practical skills in using input devices such as the keyboard and mouse for various tasks, including text entry in note pad and drawing in Paint.
- 3) Gain experience in scanning documents and saving them in different formats, such as JPEG and PDF.
- 4) Develop proficiency in using MS Office applications, including Word, Excel, and PowerPoint, for document creation, data entry, and presentation enhancement.
- 5) Learn to create and manage an email account, including sending and receiving emails.
- 6) Students will learn to create and share Google Forms for data collection and acquire basic web development skills to create and enhance a personal website.

LIST OF PRACTICALS: (Any 10 experiments to be performed)

1. Introduction to different blocks of computer and study its characteristics.
2. Study block diagram of computer with its functioning.
3. Use of keyboard as an input device for computer to enter text in note pad. Save and print the file.
4. Use of mouse as an input device for computer to draw different shapes in 'Paint'. Save and print the file.
5. Scan a document, save it in JPEG (Joint Photographic Experts Group) format and print it.
6. Scan a document, save it in PDF (Portable Document Format) and print it.
7. Open MS-Office, create file in MS Word and perform various operations in it.
8. Open MS-Office, create file in MS Excel and enter given data in it, creating a worksheet in excel.
9. Creating and enhancing Power Point Presentation with MS-Office.
10. Create slides using different slide layouts.
11. Creating e-mail id and use of internet to send/ receive e-mails.
12. To learn how to create, customize, and share a Google Form for collecting data or conducting surveys.
13. Creating and enhancing self-website.

B.Sc. Home Science Semester –II (SEC)
BVS2P04 (A)
Innovative Community Practices

PRACTICALS:

Total Marks	100
Practical	Marks
SEE	50
CIE	50

CIE -50 Marks

1. Preparation of computerized or handmade advertisement on any use. **10 Marks**
2. Prepare innovative poster on any topic for rural development. **10 Marks**
3. Innovative practices for entrepreneurship development through natural resources.
(Compost making/agarbatti sticks or dhoop making)
10 Marks
4. Potential applicability of findings to social practices towards drama or puppet show.
10 Marks
5. Report writing on latest community development programmes. **10 Marks**

Total Marks (SEE)	50
Advertisement	20
Puppet making	20
Record	10

B.Sc. Home Science Semester II - (SEC Basket)
BVS2P04 (B)
Food Preservation

Objectives:

- To acquire knowledge of food preservation and preservation techniques.
- To know the importance and basic principles of food preservation.
- To understand the importance of preservation.

PRACTICAL:

Introduction of Food Preservation

1. Preparation of Squash/Syrup
2. Preparation of Pickle
3. Preparation of Jam and Jelly
4. Preparation of Chutney
5. Preparation of Sauce
6. Preparation of Tutti frutti and candy
7. Preparation of Murabba

CIE

Any two of the following:

- Scrap book related to methods of food preservation.
- To organize exhibition of food products.
- Visit to preservation units.

Total Marks	100
SEE	50
Cooking	20
Presentation	15
Record	15
CIE	50

References:

- B. Srilakshmi, Food Science, third edition, new age international (P) Ltd, New Delhi (2006).
- N Shakuntala Manay and M Shakuntala Manay, Foods Facts and Principles, New Age International (P) Ltd, New Delhi (1995).
- Rahman M S (2007) Handbook of Food Preservation 2nd ed CRC Press .
- Srivastava R P and Kumar S (2002) Fruits and Vegetables Preservations : Principles and Practices, 3rd Edition . International Book Distributing Co. Lucknow.
- Dubey, S.C. Basic Baking IV Edition, The Society of Indian Bakers, New Delhi.

B.Sc. Home Science Semester – II
BVS2P04 (C)

Cosmetic Preparation

Total Marks	100
Practical	Marks
SEE	50
CIE	50

Course Content:

1. Chemistry laboratory standards and safety rules.
2. Demonstration and practice of handling of basic apparatus in chemistry laboratory (Burette, Pipettes, Volumetric cylinders, Volumetric flask, thermometer, Bunsen burner, and other common glassware.)
3. Working principles and practice of handling of basic equipment's of Chemistry laboratory (pH meter, Physical balance, electronic balance, etc.)
4. Preparation of 0.025 N solution of Sodium Hydroxide.
5. Preparation of 0.025 N solution of Oxalic Acid.
6. Preparation of 0.025 N solution of Hydrochloric Acid.
7. Preparation of 0.5% solution of starch.
8. Preparation of Herbal Extract.
9. Preparations of Shampoo base (simple).
10. Preparations of herbal Shampoo.
11. Preparation of colloidal solution of starch.
12. Colour reaction of starch.

Reference books:

- 1) Morrison, R. N.; Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- 2) Finar, I. L. Organic Chemistry (Volume 1& 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- 3) Ahluwalia, V.K.; Dhingra, S. (2004), Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press.
- 4) Sharma, R.K., Sidhwani, I.T., Chaudhari, M.K. (2013), Green Chemistry Experiments: A monograph, I.K. International Publishing House Pvt Ltd. New Delhi.
- 5) Chandra, R.; Singh, S.; Singh, A. (2019), Basic Organic Chemistry, Arcler Press.

Course Outcome:

1. This course is designed to offer enhanced practical skills to the students.
2. After completion of this course student will have understand, learn and perform skills needed for preparation of cosmetics in a chemistry laboratory.

Annexure – III
Basket of Open Electives (OE)

GE/OE Basket Semester I
Faculty of Science and Technology

Sem.	Course Category		Name of Course	BoS	Course code
I	GE/OE	1	Bio fertilisers, bio-pesticides and composting	Botany	BGO1T01
		2	Food Biochemistry	Biochemistry	
		3	Biotechnology and Human Welfare	Biotechnology	
		4	Computer fundamentals	Computer Science/Computer Application	
		5	Basic Electronics Components & Instruments	Electronics	
		6	Environmental Conservation Movements	Environmental Science	
		7	A. Introduction to Sports Forensics / B. Toxicology in Everyday Life / C. Optics and Optical Instruments / D. General Instruments in Forensic Biology / E. Psychology of Health & Well Being-I (Psychology)/ F. Computer Fundamentals/ G. Crime and Criminal Behaviour (Law)	Forensic Science	
		8	Topographic Map Reading	Geology	
		9	Quantitative aptitude	Mathematics	
		10	Introduction and scope of Microbiology	Microbiology	
		11	Space Science	Physics	
		12	Elementary Descriptive Statistics	Statistics	
		13	Human anatomy and physiology	Zoology	
			Indian birds	Zoology	
		14	Physical Chemistry	Cosmetic Technology	
		15	Computer Basics	Fashion Design	
		16	Computer Basics	Textile Science	
		17	Food Adulteration	Chemistry	
		18	Mathematics I	Interior Design	
19F	Engineering Mathematics I	Applied Electronics & Software Technology			

B. Sc. Semester-I			
GE / OE-1 Botany (BGO1T01)			
Bio-fertilizers, Bio-pesticides and Composting			
GE/OE-I Theory	Hours: 2 Hours/Week	Marks: 80+20=100	Credit: 2
Unit-I			
1. Biofertilizers: Definition, scope and importance 2. Classification of Biofertilizers on basis of organisms 3. Biological Nitrogen Fixation 4. Plant Growth Promoting Rhizobacteria (PGPR)			7.5 Hrs.
Unit-II			
1. Microbes: Various microbes used as Biofertilizers 2. Commercial production of Biofertilizers: <i>Rhizobium</i> , <i>Azotobactor</i> , <i>Nostoc</i> and, <i>Azolla</i> 3. Phosphate Solubilizer Bacteria (PSB), e.g. <i>Bacillus polymyxa</i> 4. Phosphate Solubilizer Fungi (PSF), e.g. <i>Aspergillus awamori</i>			7.5 Hrs.
Unit-III			
1. Biopesticides: History and concept, Definitions, scope and importance 2. Classification of Biopesticides 3. Role of Biopesticides in Ecofriendly agriculture and Organic farming. 4. Production of Biopesticides (Microorganism and Plant based) 5. Methods of applications of Biopesticides			7.5 Hrs.
Unit-IV			
1. Composting: Definition, scope and importance 2. Science of composting, Classification of composting 3. Methods for composting: Indore method; 4. Methods to improve process of Composting. 5. Vermicomposting 6. Agricultural waste composting 7. Uses of Weed in composting			7.5 Hrs.

Suggested Readings:

1. Maheshwari D.K. (2012) Bacteria in Agrobiolgy: Plant Probiotics; Springer Berlin, Heidelberg, New York.
2. Rai M.K. (2006) Handbook of Microbial Biofertilizers; Food Product Press, An Inprint of the Haworth Press, Inc. New York.
3. Reddy Shankara, R. (2012) Biofertilizer Technology; Akhand Publishing House Sadatpur, Dehli.

4. Sharma A.K. (2007) Biofertilizers for Sustainable Agriculture; Agrobios, Jodhpur.
5. Siddiqui, Zaki & Anwar (2012) PGPR: Biocontrol and Biofertilization; Springer Heidelberg, New York.
6. Tivedi P.C. (2008) Biofertilizer; Pointer Publishers Jaipur
7. Leo, M.L. Nollet, Hamirsingh Rathore (2015). Bio Pesticide Handbook. CRC Press Taylor & Francis group, New York. 1-29.
8. Md. Arshad Anwer (2017). Bio Pesticides and Bio Agents e book CRC Press Taylor & Francis group New York. 1-365.
9. Dwijendra Singh. (2014), Advances in Plant Bio Pesticides. Publisher Springer 1-401.
10. Vaishali Kandpal 2014. Bio Pesticides. International Journal of Environmental Research and Development. 4(2), 191-196.
11. Jamie Mc Sweeney (2019), Community Scale Composting systems: A Comprehensive Practical Guide for closing the Food system Loop solving our waste crisis Chelsea Green Publishing, USA.
12. Grace Gershuny (1992), The Rodale Book of Composting, Rodale Press, Pennsylvania.
13. Michelle Balz and Anna Stockton (2017), Composting for a New Generation: Latest Techniques for the Bin and Beyond, Cool Springs Press.

GE/OE Basket (Biochemistry) Semester-I

FOOD BIOCHEMISTRY

Course Objectives:The specific objectives of the course are:

- This course will help you to enrich your knowledge on how energy generates from foods, namely carbohydrate, proteins and fat molecules, in human body
- How molecules breakdown or rebuild in your body, what other molecules (like, enzymes, minerals, vitamins) needed for the utilization of these molecules.
- You will also be able to get a detail picture of formation DNA, RNA and hormones and their functions in living organisms.
- You will be able to describe methods for food processing and underlying safety aspects.

PREREQUISITES : Basic Training in Chemical and Biological Concepts at the level of Higher Secondary.

Unit 1

Biochemical Changes in Carbohydrates in Food Systems, Changes in Carbohydrates during Seed Germination, Basics of Metabolism of Carbohydrates; Biochemical Changes of Proteins and Amino Acids in Foods, Proteolysis in Animal Tissues, Proteolysis in Geminating Seeds;

Unit 2

Biochemical Changes of Lipids in Foods, Changes in Lipids in Food Systems, Changes in Lipids during Cheese Fermentation, Lipid Degradation in Seed Germination, Biochemical Degradation and Biosynthesis of Plant Pigments, Degradation of Chlorophyll in Fruit Maturation

Unit 3

Foundations of Food Processing: Transglutaminase Activity in Seafood Processing, Proteolysis during Cheese Fermentation ,Removal of Glucose in Egg Powder Production, Production of Starch Sugars and Syrups; Proteases in Chill-Haze Reduction in Beer Production; Biogenesis of Fresh-Fish Odor, Biochemically Induced Food Flavors

Unit 4

Selected Biochemical Changes Important in the Handling and Processing of Foods, Production of Ammonia and Formaldehyde from Trimethylamine and Its N-Oxide, Production of Biogenic Amines, Production of Ammonia from Urea, Adenosine Triphosphate Degradation, Polyphenol Oxidase Browning, Ethylene Production in Fruit Ripening, Reduction of Phytate in Cereals.

Text Books and References:

1. Ashie IA, Lanier TC. 2000. Transglutaminases in seafood processing. In: NF Haard, BK Simpson, editors, *Seafood Enzymes*. New York: Marcel Dekker, Inc. Pp. 147–166.
2. Berger M. 1994. Flour aging. In: B Godon, C Willm, editors. *Primary Cereal Processing*. New York: VCH Publishers, Inc. Pp. 439–452.
3. Bewley JD. 1997. Seed germination and dormancy. *Plant Cell* 9:1055–1066.
4. Bewley JD, Black M. 1994. *Physiology of Development and Germination*, 2nd ed. New York: Plenum Press. Pp. 293–344.
5. Bryce JH, Hill SA. 1999. Energy production and plant cells. In: PJ Lea, RC Leegood, editors, *Plant Biochemistry and Molecular Biology* Chichester: John Wiley and Sons. Pp. 1–28.
6. Cadwallader KR. 2000. Enzymes and flavor biogenesis. In: NF Haard, BK Simpson, editors, *Seafood Enzymes*. New York: Marcel Dekker, Inc. Pp. 365–383.
7. Chin HW, Lindsay RC. 1994. Modulation of volatile sulfur compounds in cruciferous vegetables. In: CJ Mussinan, ME Keelan, editors, *Sulfur Compounds in Foods*. Washington, DC: American Chemical Society. Pp. 90–104.
8. Croteau R, Kutchan TM, Lewis NG. 2000. Natural products (secondary metabolites). In: BB Buchenan, W Grusse, RL Jones, editors, *Biochemistry and Molecular Biology of Plants*. Rockwell, Maryland: American Society of Plant Physiologists. Pp. 1250–1318.
9. Gill T. 2000. Nucleotide-degrading enzymes. In: NF Haard, BK Simpson, editors, *Seafood Enzymes*. New York: Marcel Dekker, Inc. Pp. 37–68.
10. Gopakumar K. 2000. Enzymes and enzyme products as quality indices. In: NF Haard, BK Simpson, editors, *Seafood Enzymes*. New York: Marcel Dekker, Inc. Pp. 337–363.
11. Grappin R, Rank TC, Olson NF. 1985. Primary proteolysis of cheese proteins during ripening. *J. Dairy Science* 68:531–540.
12. Greaser M. 2001. Postmortem muscle Chemistry. In: YH Hui, WK Nip, RW Rogers, OA Young, editors, *Meat Science and Applications*. New York: Marcel Dekker, Inc. Pp. 21–37.
13. Gripon JC. 1987. Mould-ripened cheeses. In: PF Fox, editor, *Cheese: Chemistry, Physics and Microbiology*. London: Elsevier Applied Science. Pp. 121–149.
14. Haard CE, Flick GJ, Martin RE. 1982. Occurrence and significance of trimethylamine oxide and its derivatives in fish and shellfish. In: RE Martin, GJ Flick, CE Haard, DR Ward, editors, *Chemistry and Biochemistry of Marine Food Products*, Westport, Connecticut: AVI Publishing Company. Pp. 149–304.
15. Haard NF. 1990. Biochemical reactions in fish muscle during frozen storage. In: EG Bligh, editor, *Seafood Science and Technology*. London: Fishing News Books (Blackwell Scientific Publications, Ltd.) Pp. 176–209.

Open Elective Courses

SEMESTER – I

BIOTECHNOLOGY FOR HUMAN WELFARE

Course Code: BGO1T01

Total Contact

Hours: 30

Course Outcomes:

After successful completion of this Course, students will be able to:

CO 1. Understand the biotechnological applications in the industry

CO 2. Appreciate application of biotechnology in environmental management

CO 3. Describe application of biotechnology to forensic science

CO 4. Comprehend contributions of biotechnology to biomedical fields, such as diagnostics, genomics and therapeutics

CO 5. Understand the biotechnological applications in the agriculture and livestock management

Unit I

8 hrs

Environment: Application of biotechnology in environmental aspects: Degradation of organic pollutants – chlorinated and non-chlorinated compounds; degradation of hydrocarbons and agricultural wastes; Biodegradable plastics & Biofuels- production and its futuristic applications; Bioremediation, Biomining

Unit II

7 hrs

Industry: Important enzymes used in Industries, Biotechnological intervention in enzyme engineering; Industrial production of alcoholic beverages (wine), antibiotics (Penicillin), enzymes (lipase), food supplements (Single Cell Protein), Vitamin (B12). Food processing- Production of cheese and yoghurt

Unit III

8 hrs

Forensic science: Application of biotechnology in forensic science: Solving crimes of murder and rape; solving claims of paternity and theft by using DNA finger printing techniques

Health: Application of biotechnology in health: Genetically engineered insulin, recombinant vaccines, gene therapy, molecular diagnostics using ELISA, PCR; monoclonal antibodies and their use in cancer; human genome project.

Unit IV

7 hrs

Agriculture: N₂ fixation: transfer of pest resistance genes to plants; interaction between plants and microbes; biofertilizers & biopesticides.

Livestock: Transgenic animals, animal vaccine production, increased milk production, artificial insemination- poultry, fisheries

References:

- Bhasin M.K. and Nath, S. (2002). Role of Forensic Science in the New Millennium, University of Delhi, Delhi
- Crueger W. and Crueger A. (2000). Biotechnology: A textbook of Industrial Microbiology. 2nd Ed., Panima Publishing Co. New Delhi.
- Eckert W.G. (1997) Introduction to Forensic Sciences, 2nd Ed., CRC Press, Boca Raton
- James S.H. and Nordby, J.J. (2005). Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton
- Mohapatra, P.K. (2006) Textbook of Environmental Biotechnology, I.K. International Publishing House Pvt. Ltd., New Delhi
- Patel A.H. (1996). Industrial Microbiology. 1st edition, Macmillan India Limited.
- Stanbury P.F, Whitaker A and Hall S.J. (2006). Principles of Fermentation Technology. 2nd Ed., Elsevier Science Ltd.
- Nanda B.B. and Tiwari R.K. (2001). Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi
- Joerdening H.-J. and Winter J. (2005). Environmental Biotechnology – Concepts and Applications

B.Sc. Sem-I (Computer Science/ Computer Application)

BGO1T01

COMPUTER FUNDAMENTALS

Credits : 2

Duration : 30 Hours

Course Objectives:

- 1.To understand the basic digital components of computer.
- 2.To understand the working of peripheral devices.
- 3.To understand the number systems and logical gates.
- 4.To understand the network topologies.

Course Outcomes :

After completing this course satisfactorily, a student will be able to:

- 1.Confidently operate computers to carry out computational tasks
- 2.Understand working of Hardware and Software and the importance of operating systems
- 3.Understand number systems, peripheral devices, networking, multimedia and internet concepts

UNIT I

Basic Components of Digital Computers: Block Diagram.

CPU: Functions of Each Unit: Primary Memory, ALU and CU: Fetch and Execution cycle, Execution of Instructions in Single Address CPU.

Memory: RAM, ROM, PROM, EPROM, EEPROM and Cache. CISC and RISC Technology

Bus: Data, Control and Address Bus, Bus Organization.

Language Evolution: Generation of Languages: Machine, Assembly, High Level Languages. Characteristics of Good Language

Translators: Compiler, Interpreter and Assembler. Source and Object Program.

UNIT II

Storage Devices: Hard Disk and Optical Disk. Pen Drive, SD Card, Cloud as storage.

Input Devices: Keyboard, Mouse, Light Pen, Touch Screen, Voice Input, MICR, OCR, OMR, Barcode Reader and Flatbed Scanner. **Output Devices:** VDU, Printers: Dot Matrix, Laser and Inkjet. Plotters: Drum, Flat-Bed and Inkjet.

UNIT III

Number Systems: Binary, Octal, Decimal, Hexa-Decimal, Their Conversions, Binary Arithmetic. ASCII, BCD, EBCDIC.

Logic Gates: Truth table, properties and symbolic representation of NOT, AND, OR, NOR, NAND, EXOR, EXNOR gates. NOR and NAND gates as a universal gates.

Binary Arithmetic: Binary addition, binary subtraction using 1's and 2's compliment.

UNIT IV

Network: Network terminology, Topologies: Linear, Circular, Tree and Mesh. Types of Networks: LAN, WAN, MAN. Networking Devices: Repeaters, Bridges, Routers and Gateway. Modem for Communication between pc's, wi-fi network, Introduction of Bluetooth and Infrared devices. Network Architecture: Peer-to-Peer, Client/Server

Internet Protocols: TCP/IP, FTP, HTTP, HTTPS, Internet Addressing: IP Address, Domain Name, URL.

Books

1. Information Technology Concepts by Dr. Madhulika Jain, Shashank & Satish Jain, [BPB Publication, New Delhi.]
2. Fundamentals of Information Technology By Alexis And Mathews Leon [Leon Press, Chennai & Vikas Publishing House Pvt. Ltd, New Delhi]
3. Fundamental of Micropocessor by B Ram

Electronics BoS : Semester - 1: OE1:

Basic Electronic Components and Instruments (BGO1T01)

Course outcome:

At the end of this course students will have ability to

1. Identify various electronic components understand their role
2. Make series and parallel combinations of components.
3. Understand working & replacement

Syllabus

1. Electrical Signal and parameters Current Voltage Wattage AC DC Components
Identification: Resistor, Capacitor, Inductor, Transformer, Switches, Semiconductors
2. Serial and parallel connection of Resistor, capacitor, inductor, Lead & Lag Concepts.
3. Study of Voltmeter & Ammeter, concept of Range, Resolution, Impedance, Loading effect, Multi-meter.
4. Visualization of electrical signal, Introduction to Oscilloscope, Application in general

Books:

1. Charles Platt, Make: Electronics, O'Reilly Publications
2. Paul Scherz, Practical Electronics for Inventors, McGraw-Hills Publications
3. J. M. Hughes, Practical Electronics, O'Reilly Publications
4. B. L. Theraja, Basic Electronics (Solid State): S. Chand & Company

GE/OE-1: Environmental Conservation Movements (BGO1T01)

Unit-I: Civilization and Environmental Pollution:

Environment: Definition, role of environment in shaping civilizations. Inter-relation between civilization and environment- Ecological economic and socio-cultural.

Industrialization revolution and environmental pollution, Globalization and environmental pollution, Modern agriculture and environmental degradation.

Unit-II: Development and Environment:

Development: Definition, population growth and its impact on natural resources, modernization and population, causes for industrialization, impact of industrialization on quality of human life, negative impact of industrialization and urbanization.

Environmental Management: Definition, objectives, components, principle and importance of Environmental management; **Development and Environment:** Types of development, sustainable development- need and relevance in contemporary society.

Unit-III: Sustainable Development:

Sustainable Development: Definition, concept, principle and planning for sustainable development, Environmental issues and crises, Preventive Environmental Policy (PEP), desertification, invasive species, wildlife depletion and social insecurity.

United Nation Sustainable Development Goals, Strategies for implementing eco-development programmes, sustainable development through- trade, economic growth, carrying capacity and public participation.

Unit-IV: Environmental Movements:

Environmental Movements: Concept of environmental movements, the local grassroots movement level, United Nations Conference on Environment, 1972- 'Limits to Growth'. The Brundtland Commission, 1987- 'Our Common Future'. The United Nations Conference on Environment and Development, 1992.

Environmental Movements in India: Bishnoi Movements, The Chipko Movements, Appiko Movements, Silent Valley Movements, Narmada Bachao Andolan, Beej Bachao Andolan and Tehri Dam Conflicts,

References:

1. Bindra, P.S.(2017). The Vanishing: India's Wildlife Crisis. Penguin Random House India.
2. Climate Change: Science and Politics.(2021). Centre Science and Environment, New Delhi.
3. Edwards, Andres R. (2005). The Sustainability Revolution: Portrait of a Paradigm Shift. New Society Publishers.
4. Flanders, L. (1997). The United Nations Department for Policy Co-ordination and Sustainable Development (DPCSD), Global Environmental Change, 7 (4), 391-394.
5. McNeill, John R. (2000). Something New Under the Sun: An Environmental History of the Twentieth Century.
6. Nagendra, H., and Mundoli, S. (2009). Cities and canopies: Trees in Indian cities,Penguin Random House India Private Limited.
7. Nepal, Padam. (2009). Environmental Movements in India: Politics of Dynamism and Transformation, Author Press, Delhi.
8. Rachel Carson. (2002). Silent Spring. Houghton Mifflin Harcourt.
9. Rajit Sengupta and Kiran Pandey. (2021). State of India's Environment 2021: In Figures. Centres Science and Environment.
10. Sustainable Development in India: Stocktaking in the run up to Rio + 20. (2011) TERI for MoEF and CC.

Semester I

GE/OE (Forensic Science)

GE 1 (BGO1T01): Introduction to Sports Forensics

Learning Outcomes: By the end of this Course, the learners will be able to:

1. Recall and identify the concept of sports forensic, sports doping its history n prevalence along with its forensic investigation.
2. Evaluate and analyze different anti-doping organizations and the acts related to it, and also understand the concept of e-doping and e-sporting.
3. Understand the concepts of doping of drugs in sports their classification and effects on human body.
4. Apply the knowledge of analytical chemistry to use preliminary and confirmatory analytical techniques for drug testing in sport.
5. By the end of the course students will have knowledge and understanding about detection of drugs of abuse in sports and its role in forensic science.

Unit-I Basics of Sports Forensics

Introduction to Sports Forensics, History and Prevalence, Sports doping, why do athletes' resort to doping, investigation of deaths in sports, Forensic investigation in sport malpractices, case studies related to sports forensics.

Unit II Legal Provisions for Drugs Abuse in Sports

Anti-doping organization; World Anti-Doping Organizations (WADA) and NADA. National Anti-Doping Act 2022. Concept of e-sports and e-doping. Understanding E-doping and need for fair competition in E-Sports.

Unit-III Drug doping in sports

Drug doping in sports, Classification of prohibited substances in sports: Stimulants, Amphetamines, Cocaine, Sympathomimetic Amines, Narcotic Analgesic, Anabolic steroids. Notable abused drugs in sports-performance enhancing drugs; effects of drugs on the human body;

Unit IV Analytical techniques for drug testing

Use of preliminary and confirmatory analytical techniques for drug testing in sports: Gas Chromatography- Mass Spectrometry, Liquid Chromatography- Mass Spectrometry, HPLC- UV Immuno- Assays. Detection of drugs of abuse: Steroids, Narcotics, Stimulants, Masking agents, contaminants of other dietary supplements and other substances on WADA prohibited list. Detection of doping in sports and role of forensic science.

Semester I

GE/OE (Forensic Chemistry)

GE 1 (BGO1T01): Toxicology in Everyday Life

Course Outcomes: By the end of this Course, the learners will be able to:

1. Recall and identify the key terms and concepts related to poisons, fatal dose and fatal period, classification of poison, types of poisoning, mode of action, sources of poison, signs and symptoms of poison along with their antidotes.
2. Understand the classification of cosmetic products and certain poisonous substances present in them along with their side effects and precautions.
3. Analyze some common poisonous agents present in household cleaning agents along with their classification, side effects and precautions.
4. Evaluate the effects of some commonly used insecticides and pesticides along with their precautions.

Unit I: Introduction to Toxicology

Introduction, definition of poison, classification of poisons, modes of action of poisons, types of poisoning, fatal dose and fatal period, signs and symptoms of common poisoning and their antidotes. Sources of poisons in everyday life.

Unit II: Cosmetic Products

Introduction, Classification, common poisonous substances found in cosmetics products like – lipsticks, fairness creams, facewash, lotions, nail paints, hair colours and hair care products, talcum powders, deodorants, etc. their side effects and precautions related to use of cosmetics.

Unit III: Household Cleaning Agents

Introduction, Classification, common poisonous substances found in household cleaning agents like – Floor cleaners, toilet and bathroom cleaners, electronic gadgets cleaners, sanitizers, soaps, detergents, etc. their side effects and precautions related to use of cleaning agents.

Unit IV: Pesticides and Insecticides

Introduction, classification, commonly used pesticides and insecticides in house like – mosquito and cockroach repellents, rat kills, termiticides, fungicides, herbicides, agrochemicals, safety measure and precautions related to use of Pesticides and Insecticides.

Semester I

GE/OE (Forensic Physics)

GE 1 (BGO1T01): Optics and Optical Instruments

Course Outcomes: By the end of this Course, the learners will be able to:

1. Understand the introduction of lenses, equations of lenses, and formulae of optical systems.
2. Understand the types and their reduction of chromatic and achromatic aberration.
3. Analyze the working principles of microscope telescope eyepiece spectrometer interferometer.
4. Remember the working concept of optical and advanced microscope.

Unit I: Geometric Optics

Introduction, Thin and Thick Lenses, Lens Equation, Lens Maker's Formula, Cardinal Points of an Optical System, Combination of Two Thin Lenses (Equivalent Lenses) (Including Derivation for Focal Length and Cardinal Points).

Unit II: Aberrations

Achromatic and Chromatic Aberration, Types of Achromatic Aberration and their Reduction: Spherical Aberration, Coma, Astigmatism, Curvature of Field, Distortion, Types of Chromatic Aberration: Achromatism (Lenses in Contact and Separated by Finite Distance).

Unit III: Optical Instruments

Simple Microscope and Compound Microscope, Telescopes, Reflection and Transmission Type of Telescope, Eyepieces: Huygens's Eyepiece, Ramsden's Eyepiece, Gauss's Eyepiece, Constant Deviation Spectrometer, Michelson Interferometer, Resolving Power and Magnifying Power of Microscope and Telescope.

Unit IV: Microscopes

Optical Microscopes: Stereomicroscope, Polarizing Microscope, Phase Contrast Microscope and Comparison Microscope.

Advanced Microscopes: Scanning Electron Microscopes (SEM), Transmission Electron Microscope (TEM), X-Ray Diffraction (XRD), X-Ray Fluorescence (XRF).

Semester I

GE/OE (Forensic Biology)

GE 1 (BGO1T01): General Instrumentation in Forensic Biology

Course Outcome: By the end of this Course, the learners will be able to:

1. Analyze the function of pH and buffer along with its mechanism and action relevant to forensic science.
2. Understand and examine the titration curve of weak acids and amino acids.
3. To gain hands-on experience in various laboratory techniques and immunoassay methods.
4. Understand the principles, working mechanism and forensic application of certain techniques and assay related to forensic biology.

Unit-I : pH and Buffer

pH and Buffer- Biochemical buffers, measurement of pH; Mechanism of buffer action; Henderson-Hasselbalch equation; Isoelectric pH, Titration curve of weak acids; Titration curve of amino acids.

Unit-II: Spectroscopy

Spectroscopy- Principle of spectroscopy, Concepts of electromagnetic radiation, Concept of chromophores; Beer- Lambert's law and deviations, Extinction coefficient; Principle and working of Spectrophotometer (UV-Visible); Applications of spectrophotometry in forensic biology.

Unit-III: Chromatography

Chromatography- Types of chromatography, Principle and working of Planar chromatography (Paper and Thin layer); Column chromatography (Preparation of column, Sample loading, Elution, and Detection); Ion exchange chromatography (Principle, working and applications); Applications of chromatography in forensic biology.

Unit-IV: Electrophoresis

Electrophoresis- Theory of electrophoresis, Methods of electrophoresis; Principle, working and applications of (Agarose gel electrophoresis, Polyacrylamide gel electrophoresis, Immunoelectrophoretic) with reference to forensic biology.

B.Sc. Sem-I (Forensic Science - Major)

Semester I

GE/OE (Psychology)

GE 1 (BGO1T01): Psychology of Health and Wellbeing-I

Course Outcomes: By the end of this Course, the learners will be able to:

1. Understand the spectrum of health and illness for better health management
2. Identify stresses in one's life and how to manage them
3. Understand a variety of health announcing health protective and health compromising behaviour and to be able to know their application in illness management

Unit I: Illness, Health, and Wellbeing

Illness, Health and Wellbeing, Health continuum; models of health and illness: Medical, Bio psychosocial; Holistic Health.

Unit II: Stress and Coping:

Nature and Sources of Stress; Personal and Social Mediators of Stress; Effects of Stress on Physical and Mental Health; Coping and Stress management.

Unit III: Health Management

Health enhancing behaviours: Exercise, Nutrition, Meditation, Yoga; Health compromising behaviours (alcoholism, smoking, internet addiction); Health Protective behaviours, Illness Management.

Unit IV: Promoting Human Strengths and Life Enhancing virtues

Strength: Meaning; Realizing strength; Maximizing Unrealized Strength. Weakness – meaning, measures towards identifying & overcoming weaknesses. Strategies for improving hope and optimism.

Semester I

GE/OE (Digital and Cyber Forensics) GE 1 (BGO1T01): Computer Fundamentals

Course Outcomes: By the end of this Course, the learners will be able to:

1. Understand the meaning of basic components of digital computers and remembering the different types of storage devices, translators etc used in digital computers.
2. Understand how data is stored and retrieved from different types of storage media.
3. Understand the conversion process between different number systems (e.g., binary to decimal, decimal to hexadecimal, etc.).
4. Remember the basic properties of each number system, including their base values and corresponding digit symbols and the logical operations performed by basic logic gates.
5. Apply knowledge of networking protocols to analyze network traffic and identify potential security threats or anomalies.

Unit I: Basic Components of Digital Computers

Basic Components of Digital Computers: Block Diagram. CPU: Functions of Each Unit: Primary Memory, ALU and CU: Fetch and Execution cycle, Execution of Instructions in Single Address CPU. Memory: RAM, ROM, PROM, EPROM, EEPROM and Cache. CISC and RISC Technology. Bus: Data, Control and Address Bus, Bus Organization. Language Evolution: Generation of Languages: Machine, Assembly, High Level Languages. Characteristics of Good Language. Translators: Compiler, Interpreter and Assembler, Source and Object Program.

Unit II: Storage, Input and Output Devices

Storage Devices: Hard Disk, Optical Disk, Pen Drive, SD Card, and Cloud as storage. Input Devices: Keyboard, Mouse, Light Pen, Touch Screen, Voice Input, MICR, OCR, OMR, Barcode Reader and Flatbed Scanner. Output Devices: VDU, Printers: Dot Matrix, Laser and Inkjet, Plotters: Drum, Flat-Bed and Inkjet.

Unit III: Number Systems, Logic Gates and Binary Arithmetic

Number Systems: Binary, Octal, Decimal, Hexadecimal, Their Conversions, Binary Arithmetic. ASCII, BCD, EBCDIC. Logic Gates: Truth table, properties and symbolic representation of NOT, AND, OR, NOR, NAND, EXOR, EXNOR gates. NOR and NAND gates as a universal gate. Binary Arithmetic: Binary addition, binary subtraction using 1's and 2's compliment.

Unit IV: Network Topology and Internet Protocols

Network: Network terminology, Topologies: Linear, Circular, Tree and Mesh. Types of Networks: LAN, WAN and MAN, Networking Devices: Repeaters, Bridges, Routers and Gateway. Modem for Communication between PC's, Wi-Fi network, Introduction of Bluetooth and Infrared devices. Network Architecture: Peer-to-Peer, Client/Server. Internet Protocols: TCP/IP, FTP, HTTP, HTTPS, and Internet Addressing: IP Address, Domain Name, URL.

B.Sc. Sem-I (Forensic Science - Major)

Semester I

GE/OE (Law)

GE 1 (BGO1T01): Crime and Criminal Behaviour

Learning Outcomes: By the end of this Course, the learners will be able to:

1. Demonstrate knowledge and understanding of the basic concepts, theories, and terminology related to crime, criminal behaviour, and the criminal justice system in India.
2. Apply their knowledge and understanding of crime and criminal behaviour to practical scenarios.
3. Develop the ability to analyze crime-related information, including crime scenes, criminal profiles, and legal documents.
4. Develop critical thinking skills to evaluate the effectiveness and fairness of the criminal justice system in India. They will assess the application of forensic techniques, legal procedures, and ethical considerations in the investigation and punishment of crimes.

Unit I: Introduction to Crime

Nature and Concept of crime, Essential elements of crime, Types of crime, Causes of crime: Social Causes of Crime, Economic Causes of Crime, Physical and Psychological causes of crime, Geographical Causes of Crime. Organized Crimes, Environmental Crimes, Crime and Politics, Economic Crimes, White Collar Crimes, Juvenile Delinquency and Female Delinquency, Terrorism, Cyber Crimes.

Unit II: Crime and Criminal Behaviour

Definition, Scope and Nature of Criminology. Interrelationship between Criminology, Penology and Criminal Law. Schools of Criminology. Pre-Classical, Classical and Neo-Classical Schools. Lombroso Theory/Positive School. Typological School. Sociological School. Psychological School.

Unit III: Crime and Punishment

Introduction and History, Theories of Punishment, Kinds of Punishment. Historical development from punishment to Correction and Reformation. Prevention and control mechanism. Prison system: Traditional prison, Open air prison, Pennsylvanian system etc. Prison Reforms in India. Correctional Administration. Probation and Parole.

Unit IV: Criminal Justice System in India

History and evolution of the criminal justice system. Overview of Indian Criminal Justice System. Wings of Criminal Justice System. Police: History, Structure and Functions. Accountability of Police towards Law Enforcement Agencies and Society. Role of Investigating Officer in crime investigation. Other Specialized Agencies in India: CBI, CID, RAW, ED, NCB etc. Police Reforms in India. International Investigation Agencies: FBI, INTERPOL etc. Introduction of Prison Administration.

BACHELOR OF SCIENCE (HONORS/RESEARCH)

(Geology - Major)

SYLLABUS (GE/OE)

SEMESTER - I

Paper I: Topographic Map Reading (BGO1T01)

Unit I

History of cartography; modern cartography; introduction to toposheets and aerial photography; maps and globe; map projections - conical, cylindrical, azimuthal; general information on regional maps - (physical, political thematic) - India, Asia, Europe, Africa, North America, South America, Oceans and Antarctica.

Unit II

Types of geological maps; toposheet numbering- national and international; quadrants in toposheets; scale of toposheet - representative fraction, written statement scale, graphical scale; topographic maps and their numbering by Survey of India; types of maps- large scale map, small scale maps; general purpose maps- physical maps

Unit III

Objectives of geological mapping - institutional interest, government mandate, academic purpose; precision required in geological mapping; base maps for geological mapping; outcrop maps and sections; geological symbols in maps; contours and landforms - conical hills, plateau, spur and valley, col and pass, gorge, cliff, knoll, convex slope, concave slope.

Unit IV

General principles of geological mapping; mapping methods in sedimentary, igneous and metamorphic terrains; maps of India - political maps, physical map, rainfall trends, wind maps, drainage maps, soil and land-use maps, mineral deposits, food – crop maps, irrigation maps, agro-climatic zone maps, road and inland maps, railway maps, population maps, natural hazard maps.

Books Recommended:

1. Macmillan Publishers India Private Limited (2021)
2. Survey of India toposheets
3. Compton, R.R. (1962) Manual of Field Geology, John Wiley and Sons, Inc.
4. Forrester, J.D. (1957) Principles of Field Geology and Mining Geology, John Wiley.
5. Lahi, F.H. (1987) Field Geology, CBS Publishers.
6. Mathur, S.M. (2001) Guide to Field Geology, Prentice-Hall, New Delhi

SEMESTER I

1. QUANTITATIVE APTITUDE

Course Outcomes: This course will enable the students to

1. Have a strong base in the fundamental mathematical concepts.
2. Grasp the approaches and strategies to solve problems with speed and accuracy
3. Gain appropriate skills to succeed in preliminary selection process for recruitment

UNITS	TOPICS	HOURS
Unit 1	Number System • H.C.F. and L.C.M. of Numbers • Decimal Fractions • Simplification • Square Roots and Cube Roots • Average • Problems on Numbers • Problems on Ages • Surds and Indices • Logarithms	8
Unit 2	Percentage • Profit and Loss • Ratio and Proportion • Partnership • Chain Rule • Pipes and Cisterns • Time and Work • Time and Distance • Boats and Streams • Problems on Trains • Alligation or Mixture • Simple Interest • Compound Interest	8
Unit 3	Area • Volume and Surface Area • Races and Games of Skill • Calendar • Clocks • Stocks and Shares • Permutations and Combinations • Heights and Distances	7
Unit 4	<u>Data Interpretation</u> • Tabulation • Bar Graphs • Pie Chart • Line Graphs	7
	TOTAL	30 HRS

Recommended Books:

1. R.S. Aggarwal, “Quantitative Aptitude for Competitive Examinations”, Revised Edition, S. Chand and Co. Ltd, New Delhi, 2018.
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers.
4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hill publications.

INTRODUCTION AND SCOPE OF MICROBIOLOGY**Course Code: BGO1T01**

GE / OE	Hours: 2 Hours/Week	Marks: 80+20=100	Credit: 2
Unit-I			
Bacteria	Discovery of Microorganism, Differences between prokaryotes and eukaryotes cell Bacteria: General characteristics of different groups. Important archaeal and eubacterial groups. Bacterial Cell size, shape and arrangement, Typical bacterial cell structure & their function		7.5 Hrs
Unit-II			
Fungi	General characteristics of fungi including habit, habitat, nutritional requirements, thallus organization and aggregation, Asexual reproduction, sexual reproduction, heterokaryosis and parasexual mechanism. Slide culture techniques.		7.5 Hrs
Unit III			
Algae	General characters and industrially important algal cells, Asexual & sexual reproduction Cyanobacteria: occurrence and structure of the following: Spirulina and Anabaena. Application of Algae		7.5 Hrs
Unit IV			
Scope of Microbiology	a] Medical microbiology, b] Biotechnology, c] Agriculture microbiology d] Environmental microbiology e] Geomicrobiology,		7.5 Hrs

Reference books -

1. Atlas RM. (1997). Principles of Microbiology. 2nd edition. W.M.T. Brown Publishers.
2. Black JG. (2008). Microbiology: Principles and Explorations. 7th edition. Prentice Hall
3. Madigan MT, and Martinko JM. (2014). Brock Biology of Micro-organisms. 14th edition. Parker J. Prentice Hall International, Inc.
4. Pelczar Jr MJ, Chan ECS, and Krieg NR. (2004). Microbiology. 5th edition. Tata McGraw Hill.
5. Stanier RY, Ingraham JL, Wheelis ML, and Painter PR. (2005). General Microbiology. 5th edition. McMillan.

COURSE OUTCOMES

After this course the students will be able to

Sr. No.	Course outcome
1.	Students will be able to understand diversity of microorganisms
2.	Students will be aware of prokaryotic & eukaryotic cellular organization
3.	Justify various scopes of microbiology.

FYUGP Semester-I
Generic Elective / Open Elective Course (GE/OE-1) (BGO1T01)
(Space Science)

GE/OE-1 THEORY	Hours: 04 Hours /Week	Marks: 80 + 2- = 100	Credit: 02
Unit-I			
Solar system and measurements	Solar System, Kepler's Laws, Earth-Moon System, Solar and Lunar eclipses, Exploration of Solar System by Telescopes, Rockets and Satellites. Exploration of Mars and Moon. Measurement of terrestrial distances, distance of moon, distance of planets, Astronomical unit, light year and parsec.		7.5 Hrs
Unit-II			
Telescopes and their principles	Optical telescopes, (Refractor, Galilean, Newtonian or Dobsonian, Cassegrainian & Hubble Space Telescope), Magnifying power & Resolving power of telescopes, UV, X-ray, IR, Radio & Gravitational Astronomy, Spectroscope.		7.5 Hrs
Unit III			
Observational and Experimental Tools for Space Science	Rockets and Satellite Payloads. Rocket principle and types. Detectors for optical and infrared regions, Application of CCD's and CMOS to stellar imaging, Techniques of observations of astronomical sources.		7.5 Hrs
Unit IV			
Fundamental Particles and Basic Forces	Particles originated from space, cosmic rays, Protons, Electrons, Neutrons, Neutrinos, Mesons, leptons, and quarks. The concept of Basic forces viz., strong, weak, electromagnetic, and gravitational forces. Basic ideas about galaxy, black hole, neutron star, red giant, black matter and pulsars, nebula, white dwarfs etc.		7.5 Hrs

Reference Books:

1. Ionospheric Radio Propagation by Kenneth Davis. National Bureau of Standards Monograph 80 (1965), US Government Printing office, Washington D.C.
2. Physics of the Upper Atmosphere edited by J, A. Ratcliffe, Cavendish Laboratory, University of Cambridge. Academic Press New York and London (1960)
3. Research in Geophysics: Vol.1- Sun, Upper Atmosphere and space edited by Hugh Odishaw, National Academy of Sciences. Washington D.C.
4. Source book on the Space Sciences - Samuel Glasstone, Princeton, New Jersey.
5. The Upper Atmosphere - S K Mitra

Course outcomes

After the completion of this course students will be able to

Sr. No.	Course Outcome
1.	Get acquainted with the space related events
2.	Get knowledge about solar system and planets
3.	Determine the average distance and sizes of heavenly bodies
4.	Understand the concept of black hole and other giants
5.	Know the measurement related to large distance
6.	Understand the communication time requirement for longer distances

Generic Elective Courses/ Open Elective Courses (GE/OE)

For Statistics major

	Semester I	(GE/OE)
	Name of the Paper - Elementary Descriptive Statistics	
	Paper code – (BGO1T0I)	2 Credits (2 hrs Theory per week)
	Total 30 Hrs	
	OBJECTIVES	
	Students acquire knowledge about how to classify and tabulate data . They also learn various methods of graphical and diagrammatic representations of data.	
	OUTCOMES	
	Students acquire knowledge about: Construction of tables with many factors of classification. They also learn analysis of categorical data.	
	Unit-I (15 Hrs)	
(A)	Types of data: Concepts of a statistical population and sample from a population; qualitative and quantitative data; nominal and ordinal data; cross sectional and time series data; discrete and continuous data; frequency and non-frequency data.	
(B)	Different types of scales — nominal, ordinal, ratio and interval. Primary data and Secondary data, Methods of data collection: Interview method, Questionnaire method, Personal Observation method, designing a questionnaire and a schedule; checking their consistency, Pilot survey Instruction	
(C)	Controlled experiments: Observational studies and Scrutiny of data for internal consistency and detection of errors of recording.	
(D)	Sample surveys and Population Census: methods of conducting population census with special reference to Census in India. Analysis of Categorical data: Consistency of categorical data. Independence and association of attributes. Various measures of association for two- way classification, Odds ratio.	
	Unit-II (15 Hrs)	
(A)	Presentation of data: Construction of tables with one or more factors of classification,	
(B)	Classification: Geographical, chronological, qualitative and quantitative. Formation of frequency distribution of discrete and continuous type, relative frequency, frequency density and cumulative frequencies. Construction of Stem and leaf chart	
(C)	Diagrammatic representation of data: Construction of Simple bar diagram, multiple bar diagram, subdivided bar diagram, percentage bar diagram, pie- diagram and pictogram.	
(D)	Graphical representation of grouped data: Construction of Frequency bar diagram, frequency polygon, histogram, cumulative frequency diagrams and ogives	
	REFERENCES	
1	Bhat B.R,Srivenkataramana T And RaoMadhava K.S(1997): STATISTICS: A BEGINNER’S TEXT,VOL I,NEW AGE INTERNATIONAL (P) LTD.	
2	Goon A. M,Gupta M. K, Das Gupta,B (1999): FUNDAMENTALS OF STATISTICS, VOL I, WORLD PRESS, CALCUTTA.	
3	Croxtone F.E,Cowden D.J And Kelin S(1973): APPLIED GENERAL STATISTICS, PRENTICE HALL OF INDIA	
4	Agrawal B. L: BASIC STATISTICS (New Age International Publishers)	
5	SudhaPurohit, GoreS.D., Deshmukh S. R.: Statistics Using R (Narosa)	
6	Christian S. Albright, Wayne L. Winston, Zappe Christopher J. : Decision Making using Microsoft	

General Elective (GE)/ Open Elective (OE) for FYUGP

GE/OE for B.Sc. I Human anatomy and Physiology (BGO1T01)

Credit: 2

Course outcomes: After completion of the course, students will able to-

- Learn, describe and explain structure and histology of human digestive system.
- Learn, describe and explain structure and physiology of excretion and muscles.
- Learn, describe and explain structure and physiology of respiration and circulation.
- Learn, describe and explain structure and physiology of nervous system.

UNIT-I

- 1.1 Digestion – Structure and function of digestive system.
- 1.2 Histology stomach, Intestine, pancreas, liver, large intestine.
- 1.3 Digestion of carbohydrates, proteins and lipids.
- 1.4 Composition and function of Saliva, Gastric juice, Bile juice, Pancreatic juice, Intestinal juice.

UNIT-II

- 2.1 Excretory system –Excretory organs, structure of kidney.
- 2.2 Juxtaglomerular apparatus, formation of urine.
- 2.3 Muscles – E.M. structure of muscles, contraction of muscle.
- 2.4 Single muscle twitch, tetanus, summation, fatigue, tonus.

UNIT-III

- 3.1 Respiratory system- Structure of respiratory system, mechanism of respiration (breathing).
- 3.2 Histology of lungs and trachea, Transport of O₂ and CO₂ through alveoli
- 3.3 Circulatory system – Structure of heart, cardiac cycle, Composition of blood
- 3.4 Mechanism of clotting of blood.

UNIT-IV

- 4.1 Nervous system – structure of brain.
- 4.2 Structure and histology of spinal cord.
- 4.3 Structure and types of neuron.

4.4 Transmission of impulse through neuromuscular junction.

Suggested reading:

Garg K, Joshi M, Kundu S (2022). Human anatomy and physiology theory and practical 2 edition. CBS Publishers and Distributors Pvt. Ltd. pp. 352.

Murugesh N. (2021). Human anatomy and physiology. Sathya publishers, pp. 286.

GE/OE for B.Sc. I Indian Birds (BGO1T01)

Credit: 2

Course outcomes: After completion of the course, students will able to-

- Understand, describe and explain importance of birds.
- Learn how to record and study the birds.
- Identify and recognized certain Indian birds.

Unit - I

- 1.1 Methods of identification of birds.
- 1.2 Terms used in the description of birds plumage and body parts.
- 1.3 Bird study techniques: equipments, field data recording, Bird sanctuaries in India.
- 1.4 Role of birds in ecosystem: pollination, seed dispersal, insect control.

Unit- II

- 2.1 Morphological features, distribution, feeding habit and habitat of Sarus crane (*Grus antigone*); purple moorhen (*Porphyrio porphyrio*); black Ibis (*Pseudibis papillosa*); Indian coot (*Fulica atra*).
- 2.2 Morphological features, distribution, feeding habit and habitat of Indian spot billed duck (*Anas poecilorhyncha*); Lesser whistling teal (*Dendrocygna javanica*); ruddy shelduck (*Tadorna ferruginea*); bronze-winged jacana (*Metopidius indicus*).
- 2.3 Morphological features, distribution, feeding habit and habitat of black-winged kite or oriental honey buzzard (*Elanus caeruleus*); black kite (*Milvus migrans*); shikra (*Accipiter badius*); Indian white backed vulture (*Gyps bengalensis*).
- 2.4 Morphological features, distribution, feeding habit and habitat of peacock (*Pavo cristatus*); common quail (*Coturnix coturnix*); grey jungle fowl (*Gallus sonneratii*); black partridge (*Francolinus francolinus*).

Unit- III

- 3.1 Morphological features, distribution, feeding habit and habitat of red-wattled lapwing (*Vanellus indicus*); common sandpiper (*Tringa hypoleucos*); little ringed plover (*Charadrius dubius*); black-winged stilt (*Himantopus himantopus*).
- 3.2 Morphological features, distribution, feeding habit and habitat of common green pigeon (*Treon phoenicoptera*); rock pigeon (*Columbia livia*); spotted dove (*Streptopelia chinensis*); red turtle dove (*Streptopelia tranquebarica*).
- 3.3. Morphological features, distribution, feeding habit and habitat of koyal (*Eudynamys scolopacea*); Coucal (*Centropus sinensis*); spotted owlet (*Athene brama*); house swift (*Apus affinis*).
- 3.4 Morphological features, distribution, feeding habit and habitat of little blue kingfisher (*Alcedo atthis*); pied kingfisher (*Ceryle rudis*); green bee eater (*Meropsorientalis*); hopoe (*Upupa epops*).

Unit- IV

- 4.1 Morphological features, distribution, feeding habit and habitat of roller (*Coracias benghalensis*); Indian grey hornbill (*Ocyeros birostris*); coppersmith barbet (*Psilopogon haemacephalus*); black drongo (*Dicrurus adsimilis*).
- 4.2 Morphological features, distribution, feeding habit and habitat of jungle babber (*Argya striata*); pied bushchat (*Saxicola caprata*); oriental magpie robin (*Copsychus saularis*); scarlet minivet (*Pericrocotus speciosus*).
- 4.3 Morphological features, distribution, feeding habit and habitat of tree pie (*Dendrocitta vagabunda*); redvented bulbul (*Pycnonotus cafer*); paradise flycatcher (*Terpsiphone paradise*); tailor bird (*Orthotomus sutorius*).
- 4.4 Morphological features, distribution, feeding habit and habitat of ashy wren-warbler (*Prinia socialis*); grey wagtail (*Motacilla cinerea*); baya or common weaver bird (*Ploceus philippinus*); purple sunbird (*Nectarinia asiatica*).

Suggested reading:

Salim Ali and Futehally L. (1968). Common Indian Birds: A picture album. National Book Trust, India, pp. 51.

Salim Ali (2003). The book of Indian birds. 13th edition, Oxford publication, pp. 326.

Grewal B, Sen S, Singh S, Devasar N and Bhatia G. (2016). Birds of India - A Pictorial Field Guide. Om Books International, pp. 792.

Fashion Design/Textile Science
Four Year (Eight Semester Degree Course)

Semester – I
Computer Basics
GE/OE (BGO1 TO1)

Theory Marks : 50	Practical : 50	Total Credits : 2
SEE : 40	SEE : -	Theory : 1
CIE : 10	CIE : 50	Practical : 1

Time Required: 45 Hours

Theory (15 Hours)

Objectives:

1. Students should understand the significance and utility of computer.
2. To describe basic computer architecture.
3. To understand the working of Networking.
4. To help student to learn basic presentation skills

Learning outcomes:

After undergoing the subject, the students will be able to understand the working of computers. The students are expected to know the different parts and flow of data in computer and network. Students are expected to develop their skills in application software.

Unit I: (3 Hours)

Computer Fundamentals

- 1.1 Basic component of computer system
- 1.2 Characteristics of computer
- 1.3 Classification of Computers

Unit II: (4 Hours)

Computer Memory

- 2.1 Primary Memory
- 2.2 Secondary Memory
- 2.3 Types of Primary Memory
- 2.4 Types of Secondary Memory

Unit III : (4 Hours)

Software

- 3.1 System Software
- 3.2 Operating System
- 3.3 Functions of Operating System
- 3.4 Multiprogramming, Multitasking OS

Unit IV: (4 Hours)

Networking

- 4.1 Network Types
- 4.2 LAN
- 4.3 WAN
- 4.4 MAN

Practical**(30 Hours)**

1. Introduction to Ms. Paint, Motif development for specific end use symmetrical/asymmetrical.
2. Introduction to MS Word, Menus, Working with Documents, Formatting, Setting Margins, Editing, Creating Tables, Table settings, Tools, Word Completion, Spell Checks, Drawing and printing Importing and Exporting, Sending files to others, Inserting and Deleting, Find, Search, Replace Commands

Reference:

1. Computer Fundamentals -Sinha P.K. -Vol I, II, III, IV
2. Introduction to Computers - Peter Nartons
3. Microsoft Windows 98 - Lery J.O. Linda, Leary
4. Micro soft Office 2000 - Lery J.O. Linda, Leary 10
5. Computer for Beginners - Arora Pawan,
6. Fundamentals of Computer -V.Rajaram.

B.Sc. Semester – I
BGO1T01: Food Adulteration
Theory: 2 credits

Course Outcomes

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

1. *Understand the adulteration of common foods and their adverse impact on health.*
2. *Comprehend certain basic skills of detecting adulteration in common foods.*
3. *The students are able to understand role and importance of food additives.*
4. *Apply their knowledge of food safety and regulations.*
5. *Prevent food adulteration in the day to day life.*

Unit I: Introduction and Types of Adulterants (7.5 h)

Adulteration – Introduction and definition. Types of adulteration- Intentional adulteration, Incidental adulteration, Metallic adulteration and Packaging Hazard.

Methods of food adulteration- Mixing, substituting, using decomposed food, additions of toxic substances and misbranding. Reasons for food adulteration,

Types of Adulterants – Poisonous substances, foreign matter, cheap substitutes, Spoiled parts. General Impact of food adulteration on Human Health.

Unit II: Adulteration of Common Foods and Methods of Detection (7.5 h)

Adulteration of Common Foods, Methods of Detection of Adulterants in the following Foods: Milk, Oil, Grain, Sugar, Spices and Condiments, Processed Food, Fruits and Vegetables, Additives and Sweetening agents (at least two methods of detection for each food item).

Quality management system - Quality control, Quality assurance, Quality Improvement and assessment.

Unit III: Food Additives (7.5 h)

Introduction, definition, principles categories of food additives on the basis of functional use – Preservatives, Colours, Antioxidants, Anti-caking and anti-foaming agents, Flavouring agent, Buffering agents, raising agents, bulking Nutritive additives, sweetening agents, thickening and jelling agents, enzymes, firming agents, acidity regulators, leavening agents, emulsifiers and stabilizers. (Role and examples), safe levels of additive uses.

Unit IV: Laws and Procedures on Adulteration (7.5 h)

Mitigation measures for addressing food adulteration. Highlights of Food Safety and Standards Act 2006 (FSSAI), Food Safety and Standards (International standards, ISO standards and Indian standards).

Auditing and accreditation (BIS, QCI, AGMARK), Importance and application of food regulation in the Indian and Global context, responsibilities for maintaining and enforcing food safety FSSAI, CODEXALIMENTARIUS, HACCP. ISO 22000 series, TQM and codes of GMP.

References

1. A first course in Food Analysis, A.Y. Sathe, New Age International (P) Ltd., 1999.
2. Food Safety, case studies – R. V. Bhat, NIN, 1992.
3. DART- Detect adulteration with rapid test. FSSAI, Imprinting Trust, assuring safe and nutritious food, Ministry of Health and Family Welfare, Government of India.
4. Rapid detection of food adulterants and contaminants Theory and Practice, S. N. Jh, 2016, Kindle Edition.
5. Domestic Tests for Food Adulterations, H. G. Christian, Forgotten books.
6. A Laboratory Manual of Food Analysis, S. Sehgal, Wiley Publishers.
7. Food Safety and Standards Act, 2006. Bare ACT, November 2020, Commercial law publishers.
8. Food science and nutrition by Sunetra Roday, Oxford university, 3rd addition.
9. Malik R. K. and K. C. Dhigra, Hand book of food industries, Small industry, Research institute.
10. [https://fssai.gov.in/upload/uploadfiles/files/Manual_Food_Additives_25_05_2016\(1\).pdf](https://fssai.gov.in/upload/uploadfiles/files/Manual_Food_Additives_25_05_2016(1).pdf)
11. Fox B. A. and A. G. Cameron, Food science and chemical approach Hodder and Stoughton educational, 1982.
12. Fitch and Francis, foods and principles of cookery, Prentice-Hall, Inc 1960.

Bachelor of Science (Honors/Research) 4 yr. 8 Semester Degree Program
B.Sc. Sem I (Interior Design – Major)

BGO1T01 MATHEMATICS I

AIM: To understand elementary principles of mathematics. To apply mathematics in practical problems. To obtain accuracy in calculations and results of various mathematical experiments.

UNIT I : Complex Numbers

Cartesian and polar form of complex numbers, De Moivre's theorem, Exponential function of a complex variable, circular functions of a complex variable, Hyperbolic functions and their inverses

UNIT II : Theory of Equations

General properties of polynomial equations, Relation between roots and coefficients, Transformation of equations, Horner's method of synthetic division, Reciprocal equations

UNIT III : Tangents and Normals

Tangent and Normals, length of the tangent, subtangent, normal and subnormal

UNIT IV : Expansion of functions

Maclaurin's series, Taylor's theorem for functions of one variable

UNIT V : Indeterminate Forms

Indeterminate forms, L' Hospital Rule for evaluating the indeterminate forms.

REFERENCE BOOKS :

1. Higher Engineering Mathematics – Dr.B.S.Grewal
- 2 . A Text Book of Engineering Mathematics – N.P.Bali, Manish Goyal
- 3 . Engineering Mathematics – H.K.Das

S. No	Course Outcomes
CO1	Students will understand the concept of complex numbers.
CO2	Students will learn about theory of equations.
CO3	Students will be able solve problems related to tangents and normal.
CO4	Students will learn about expansion of functions and they will able to solve problems on indeterminate forms of limit

B. Sc (Applied Electronics & Software Technology) – Semester I (GE/OE)

BGO1T01

ENGINEERING MATHEMATICS I

Scheme of Examination (Theory)

SEE – 80

CIE - 20

Total - 100

Course Outcomes:

1. Develop understanding of Sets, Relations and Functions
2. Develop understanding of Logarithms
3. Develop understanding of Trigonometry
4. Develop understanding of Plane Co-ordinate Geometry
5. Develop understanding of Angle between the Lines

Unit I :

- Sets, Relations and Functions : Definition , Domain , Range
- Cartesian Product
- Even-Odd Functions , Inverse Functions

Unit II :

- Logarithms
 - Product, Division, Use of Log Tables
 - Simple Calculations using Log Tables

Unit III :

- Trigonometry
 - Trigonometric Ratios , Ratios of Sum and Differences of Angles
 - Multiple Angles and Half Angles

Unit IV:

- Plane Co-ordinate Geometry ,Distance Formula
- Equation to a Line , Section Formula and their applications

Unit V:

- Angle between the Lines
 - Parallel Lines, Perpendicular Lines , Length of Perpendicular

Reference Books :

1. Algebra by K P Basu
2. Set Theory Schaum Series
3. Trigonometry by S L Loney
4. Plane Co-ordinate Geometry by S L Loney

GE/OE Basket Semester I
Faculty of Science and Technology

Sem.	Course Category		Name of Course	BoS	Course code
I	GE/OE	1	Indoor gardening and landscaping	Botany	BGO1T02
		2	Health & Wellness	Biochemistry	
		3	Fermented Foods	Biotechnology	
		4	Office Automation	Computer Science/ Computer Application	
		5	Communication & Broadcasting	Electronics	
		6	Environmental and Public Health	Environmental Science	
		7	A. Introduction to Forensic Journalism/ B. Basic Analytical Chemistry/ C. Basic Analog and Digital Electronics / D. Basics of Enzymology / E. Psychology of Health & Well Being-II (Psychology)/ F. Programming with C /	Forensic Science	
		8	Geo-statistics in Geology	Geology	
		9	Basic Statistics	Mathematics	
		10	Statistics for Competitive examinations	Statistics	
		11	Reproductive biology	Zoology	
			Attractive insects	Zoology	
		12	Organic Chemistry	Cosmetic Technology	
		13	Chemical Processing-I	Fashion Design	
		14	Chemical Processing-I	Textile Science	
		15	Cosmetic Chemistry	Chemistry	
		16	Introduction to Microscopy and staining	Microbiology	
		17	Cultural Anthropology I	Interior Design	
18	Social Science I	Applied Electronics & Software Technology			

B. Sc. Semester-I			
GE / OE-2 Botany (BGO1T02)			
Indoor Gardening and Landscaping			
GE/OE-II Theory	Hours: 2 Hours/Week	Marks: 80+20=100	Credit: 2
Unit-I			
1. Indoor Gardening: Introduction, objectives, and scope. 2. Essential Factors to grow indoor plants. 3. Establishment of the indoor garden. 4. Decoration of conference hall, living room & dining hall by indoor plants. 5. Common problems of indoor plants and their management.			7.5 Hrs.
Unit-II			
1. Selection of indoor plants: Potted plants, hanging baskets, bonsai, bromeliad tree terrarium, bottle garden and dish garden. 2. Importance as popular indoor plants: a) Foliage plants: <i>Begonia</i> sp., <i>Coleus</i> sp. b) Ferns: <i>Adiantum</i> sp., <i>Nephrolepis</i> sp. c) Flowering plants: <i>Anthurium</i> sp., <i>Bromeliads</i> d) Orchids: <i>Milioniopsis</i> sp., <i>Dendrobium</i> Sp. e) Palms: <i>Areca palm</i> , <i>Ravenea rivularis</i>			7.5 Hrs.
Unit-III			
3. Landscaping: Introduction, objectives, and scope. a) Landscape architecture b) Tools and equipment used c) Lawn and lawn maintenance d) Fertilizing, weed control, pruning & disease and insect pest control for plants used in landscaping.			7.5 Hrs.
Unit-IV			
4. Landscape management and conservation. a) Heritage and cultural landscape, Urban open space systems, Rural landscape b) Different elements used in construction and designing of landscape c) Landscaping elements in residential, commercial, bungalow, public area, hotel educational institute and religious places. d) Selection of plants for landscaping e) Computer applications in landscaping.			7.5 Hrs.
Note: Field visits are compulsory.			

SUGGESTED READINGS

1. Agarwal, V. K. and Bhargava P. (2017), Home Gardening, Pustak Mahal, Allahabad (India)
2. Bose T. K. and Mukharjee D. (1977) Gardening in India. Oxford & IBH Publishing Co. Pvt. Ltd., Calcutta.
3. Gopal Swamy Iyengar (1990). Complete Gardening in India, IBH, India.
4. Grewall H. S. and Singh P. (2014), Landscape designing and ornamental plants, KalyaniPublication, New Delhi
5. Nambison, K.M.P. (1992). Design elements of landscape gardening. Oxford and IBH Publications, New Delhi.
6. Randhawa G. S. (1973). Ornamental Horticulture in India, Today and Tomorrow's printers and Publishers, New Delhi.
7. Vishnu Swarup (1993), Publication and information-Division ICAR, New Delhi
8. Vishnu Swarup (2002). Indoor Gardening, ICAR, New Delhi.
9. Walker D. T. (1983). Planting Designs, PDA Publishers Corporation, USA.

WEBSITES:

1. www.dgt.gov.in
2. www.baratskills.gov.in
3. www.andhrauniversity.edu.in
4. www.sevenmentor.com
5. www.jsscacs.edu.in

GE/OE Basket (BOS Biochemistry Major)

Health and Wellness (BG01T02)

Course Outcomes:

1. Students will know about importance of healthy lifestyle.
2. Students will know about physical and mental health.
3. Students will aware about various lifestyle diseases and how to modulate them.
4. Students will aware about stress management techniques.
5. Students will know about importance of yoga and pranayama.

Unit -I: General awareness.

Definition of health and wellness. Factors affecting health and wellness (Social, economic, emotional, occupational, intellectual, physical). Types of Physical Fitness and its Health benefits. Sedentary lifestyle and its risk of disease. Modern lifestyle and hypo-kinetic diseases; prevention and management. Benefits of exercise in adulthoods. Use of Health Management Information System (HMIS) in hospitals.

Unit -II: Physiological aspects.

Brief idea about different parts of kidney, heart, brain. Structure and function of Hemoglobin. LDL in plaque formation. Importance of HDL. International classification of adults underweight, overweight and obesity according to BMI. Parts of respiratory system. Breathing pattern. Stages of breathing in yoga pranayama. Health benefits of Kapalbhathi and Anuloma Viloma pranayama.

Unit -III: Mental aspects.

What is mental health? Types of mental health disorders. Factors affecting mental health. What is anxiety? Types, causes, symptoms and treatment of anxiety. What is depression? Symptoms, factors affecting, and treatment of depression. Causes and treatment of migraine. Brief idea about stress and it's management. Identification of suicidal tendencies.

Unit- IV: Nutritional aspects.

Diet and nutrition for health & wellness. Essential components of balanced diet (carbohydrates, proteins, fats, vitamins & minerals) for healthy lifestyle. Malnutrition, under nutrition and over nutrition. Healthy foods for prevention and progression of Obesity, Diabetes, Polycystic Ovarian Syndrome, Cancer, Cardiovascular diseases and Hypertension. WHO recommendations of healthy diet for adults, infants and young children.

Reference Books:

1. Jesse Peoring Williams “The Principles of Physical Education” Published by College Book House, Shivaji Road, Meerut.
2. William D McArdle, Frank I Katch and Vitor I Katch, Essential of Exercise Physiology, Second edition, New York: LipincoffWelliams and wilkins, 2000.
3. Scott K. Powers and Stephen L. Dodd. Total Fitness: Exercise, Nutrition and wellness, Boston: Allyn and Bacon, 1999.
4. P Sembulingam, K Sembulingam. Essentials of medical physiology. 8 th edition. Jaypee Brothers Medical Publishers.
5. Vladimir Gordin. Nutrition and diet The Triangle of health: Chemical components Book 2). Gordin Medical Centre publication.
6. Arvind Upadhyay. Mental health problems. 2nd edition. Notion press publication.
7. James Hewitt. The Complete Yoga Book: The Yoga of Breathing, Posture and Meditation. Ebury Publication.

Open Elective Courses

SEMESTER – I

FERMENTED FOODS

Course Code: BGO1T02

Total Contact Hours: 30

Course Outcomes:

After successful completion of this Course, students will be able to:

CO 1. Understand the importance of fermented foods, probiotics, prebiotics and nutraceuticals.

CO 2. Make the students aware of the different types of beverages.

CO 3. Understand the importance of fermented meat and fish products.

CO 4. Understand the importance of fermented dairy and vegetable products.

Unit I

7 Hours

History of food fermentations; Types of fermented foods, Nutritional Values, Advantages and Health Benefits; Prebiotics- Sources of prebiotics, Probiotics- Characteristic features, Sources and Microorganisms used as Probiotics; Synbiotics and Nutraceutical Foods; Oriental fermented foods- Soy sauce, Miso, Tempeh, Tofu, Natto; Traditional fermented foods – Idli, Dosa, Khaman

Unit – II

8 Hours

Beverages- Introduction, Health Importance of Beverages; Ingredients of beverages: Water, fruit pulps, juices, concentrates, sweeteners and preservatives; Alcoholic Beverages- Undistilled Alcoholic Beverages, Beer- commercial production of beer, Elements of brewing process; Types of beer; Wines- commercial production, Types of wine, Distilled alcoholic beverages- Whisky, Rum, Gin, Brandy, Vodka, Non-Alcoholic Beverages- Coffee, Tea, Carbonated beverages, Mocktails, Quality-control in beverage industry

Unit III

7 Hours

Fermented Meat product Sausages- History of fermented meats industry, Meat composition, Fermentation principles, Meat starter cultures, Manufacture of fermented sausage- Cutting and mixing, Stuffing, Casing materials, Fermentation, Cooking, drying, and smoking, Mold-ripening, Flavour of fermented meats, Defects and spoilage of fermented meats. Fermented fish products- Fish sauces, Fish paste- Manufacturing steps, Storage and Shelf-life of products.

Unit IV

8 Hours

Fermented Dairy products- Introduction, Cultured dairy products- Yogurt, Cultured buttermilk, Sour cream, Kefir, Other cultured dairy products. Cheese-Introduction, Manufacturing principles, General steps in cheese making, Types of cheese, Cheese ripening, Recent technological advances in cultured dairy products technology. Fermented Vegetable products- Introduction, Production principles, Manufacture of Sauerkraut, Principles of pickle production, fermented olives, Kimchi and Fermented vegetables.

References:

- Hutkins, Robert W. *Microbiology and technology of fermented foods*. John Wiley & Sons, 2008.
- Joshi, V. K. “Biotechnology Food Fermentation” Volume 1. Educational Publishers

&Distributors, 2004.

- Hui Y. H “Handbook of Food and Beverage Fermentation Technology”. Marcel Dekker, 2004.
- Wood, Brian J. B. “Microbiology of Fermented Foods” Volume 1 and 2. II Edition. BlackieAcademic and Professional, 1998.
- Ramesh C. Ray and Didier Montet, “Fermented Foods, Part- II Technological Interventions”,CRC Press, 2017.
- Kosikowski, F.V. 1997. Cheese and fermented milk foods. Frank Kosikowski and Vikram Mistry, Brooktondale, N. Y.
- Feiner, G. 2006. Meat products handbook. ISBN 978-1-84569-050-2
- Industrial Fermentations- Leland, N. Y. Chemical Publishers.
- Prescott and Dunn’s- Industrial Microbiology, 4 th, ed.
- Bamforth, C.W. 2004. Beer: Health and Nutrition. Blackwell Science Ltd., Oxford, United Kingdom.

B.Sc. Sem-I (Computer Science/ Computer Application)

BGO1T02

OFFICE AUTOMATION

Credits : 2

Duration : 30 Hours

Course Objectives:

- 1.To understand functionality of Operating Systems and its applications.
- 2.To understand the working with the user interface.
- 3.To understand Word Processing, their usage, details of word processing screen, Opening, saving and printing a document
- 4.To understand Worksheet creation, inserting and editing data in cells.

Course Outcomes :

After completing this course satisfactorily, a student will be able to:

1. understand functionality of Operating Systems and its applications.
2. Working with the user interface.
3. prepare documents, letters and do necessary formatting of the document.
4. Worksheet creation, inserting and editing data in cells.
5. Opening/saving a presentation and printing of slides and handouts.

UNIT I

Introduction to windows Operating System

Advantages of windows operating system, using different windows applications simultaneously, operating with windows, GUI, use of help features, starting an application, essential accessories, creating shortcuts, windows explorer, control panel, my computer, my documents, recycle bin, finding folders and files, changing system settings, system tools, use of run command, setting peripherals, drivers, editing graphics in windows, new features in windows XP/Vista versions.

UNIT II

Introduction, basics, starting Word, creating document, parts of Word window, mouse and keyboard operations, designing a document; Formatting- selection, cut, copy, paste; Toolbars, operating on text; Printing, saving, opening, closing of document; Creating a template; Tables, borders, pictures, text box operations; Mail Merge.

UNIT III

Introduction to MS EXCEL, navigating, Excel toolbars and operations, Formatting; copying data between worksheets; entering formula, chart creation; data forms, data sort; Functions in Excel ROUND(), SQRT (), MAX(), MIN(), AVERAGE(), COUNT(), SUMIF(), SUMIF(), ABS(), ROMAN(), UPPER(), LOWER(), CELL(), TODAY(), NOW().

UNIT IV

Introduction to MS POWER POINT Working with Power Point Window, Standard Tool Bar, Formatting tool bar, Drawing tool Bar, Moving the Frame, Inserting Clip Art, Picture, Slide, Text Styling, Send to back, Entering data to graph, Organization Chart, Table, Design template, Master Slide, Animation Setting, Saving and Presentation , auto Content Wizard.

Books:

1. MS Office XP for Everyone By Sanjay Saxena (Vikas Publi, Noida)
2. MS-Office 2000(for Windows) By Steve Sagman
3. A First Course in Computers – Sanjay Saxena

Semester – 1; OE2: Communication & Broad Casting (BGO1TO2)

Course outcome:

At the end of this course students will have ability to

- 1 Historical understanding about evolution of Electronics Communication Technology
- 2 Appreciate transformation and Geo-reach concept in Broad casting
- 3 Define purpose of present day communication & Broad Cast Technology, Entertainment, information Education, Alerts, Agricultural
- 4 Conversant with modern digital systems

Syllabus

- 1 Concept of Communication, One-one, One to Many, One way, Two way Distance & media wise, communication applications
- 2 Global & National History about evolution & growth, Akashwani, Vividh Bharti, FM service, HAM radio web based Radio, Doordarshan, Gyan Vani & other.
- 3 Contemporise Communication & Broad Casting system, working features, Sub module of communication system, Regulatory bodies, Law, Standards
- 4 Advances in Communication & Broad Casting Human-Machine communication, Machine-Machine communication, Integration of AI

GE/OE-2: Environment and Public Health (BGO1TO2)

Unit-I:

Environment and Public Health: Definition of health and diseases, Perspective on individual health: Nutritional, Socio-cultural and developmental aspects, Dietary diversity for good health; Human developmental indices for public health, Effect of quality of air, water and soil on human health.

Diseases in Contemporary Society: Need for good health – factors affecting health, Types of diseases – deficiency, infection, pollution diseases – allergies, respiratory, cardio-vascular and cancer, Personal hygiene: food- balanced diet, Health effects of smoking, drugs and alcohol consumption.

Unit-II:

Malnutrition: Vitamin deficiency diseases and Mineral deficiency diseases, Folic acid requirement during pregnancy; Food safety- adulterants and preservatives, pesticides toxicity, endosulfan and DDT, genetically modified food.

Non-communicable diseases and life style diseases: Diabetes and Hypertension; Communicable diseases: Definition, mode of transmission- pandemic, epidemic and endemic diseases.

Unit-III:

Vector Borne Diseases : Plague and Malaria, emerging diseases: Dengue, Chikungunia. Ebola, Zika, Swine flu, Bird flu, Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), Zoonosis-Leptospirosis.

Water and Air Borne Diseases: Water borne diseases (Cholera, diarrhea. Typhoid, ameobiasis, hepatitis, gastroenteritis and giardiasis. Air borne diseases (Pneumonia, tuberculosis, Anthrax, COVID-19 and Acute Flaccid Myelitis (AFM).

Unit-IV:

Occupational Health: Sick building Syndrome, Noise and Radiation; Ergonomoics – Stress and fatigue, Carpal Tunnel Syndrome (CTS), Methyl mercury and cerebral palsy, Synergistic effect, Irritable bowel syndrome, Crohn's diseases.

Environmental Sanitation and Hygiene : Safe disposal of human excreta, solid waste disposal, sanitation value chain. Drug safeties – Thalidomide Tragedy, Antibiotic stewardship, New Delhi Antibiotic – Resistant superbug.

References:

1. Aktar, R. (Ed.). (2019). Extreme weather events and human health: International case studies. Springer Nature.
2. Bedi and Yashpal. (1971). Handbook of Hygienic and Public Health. Atma Ram & Sons, Delhi.
3. Kessel, A. (2006). Air, the environment and public health. Cambridge University Press.
4. Lopez, R.P. (2012). The built environment and public health (Vol.16). John Wiley & Sons.
5. Nandini N. (2018). Environment and public Health. Sapna Book House, Bengaluru,
6. Q'Carroll, P.W., Yansnoff, W.A., Ward, M.E., Ripp, L.H., & Martin E.L. (Eds.). (2003). Public health informatics and information systems.
7. Park, K (2009). Park's Textbook and Preventive and Social Medicine, 20th Edition. Misc Publication
8. Rajit Sengupta and Kiran Pandey. (2021). State of India's Environment 2021: In Figures. Centre Science and Environment, New Delhi.
9. Van den Bosch, M., & Bird, W. (Eds.). (2018). Oxford textbook of nature and public health: The role of nature in improving the health of a population. Oxford University Press.
10. Walton, M (2017). One planet, One Health. Sydney University Press.

GE/OE (Forensic Science)

GE 2(BGO1T02): Introduction to Forensic Journalism

Course Outcome: By the end of this Course, the learners will be able to:

1. Recall and identify the key terms and concepts related to forensic journalism, including investigative reporting, forensic journalist, types of news reporting, news editing, and ethical practices.
2. Understand the principles, practices, and challenges of forensic journalism in contemporary society.
3. Apply the techniques, methods, and skills required for effective forensic journalism, including researching, reporting, writing, and editing.
4. Analyze the role and impact of forensic journalism in uncovering the truth, promoting justice, and addressing social issues, as well as the challenges and limitations of forensic journalism.
5. Evaluate the effectiveness and ethics of forensic journalism in different contexts, including reporting on crime, human rights abuses, disasters, and crises, as well as assessing the future directions and innovations in forensic journalism.

Unit-I Writing and Editing of News

Introduction to News, Types of News, Sources of News, Writing News, The Leads, Types of Leads, Method of Writing Leads, Tips for Writing News, Function of News, News Editing, Nature and Need for Editing, Editors, Method of Editing, Proof Reading, Preparation of Copy for Press.

Unit-II: Introduction to Forensic Journalism

Definition of forensic journalism and its importance: What is forensic journalism and how is it different from regular journalism? The importance of forensic journalism in uncovering the truth and promoting justice, The origins of forensic journalism in investigative reporting. Ethics and best practices in forensic journalism: The importance of accuracy, fairness, and balance in forensic journalism

Unit-III: Basics of Forensic Journalism

Forensic Journalism, Investigative Journalism, Forensic Journalist, Scope and Need of Forensic Journalist. 5W1H, Reporting, Reporter, Type of News Reporting such as Straight News Report, Beat Reporting, Investigative News Reports, Role and Responsibilities of Forensic Journalist, Research methods and tools for investigative reporting, Ten Golden Rules for Forensic Journalist, Qualities of Good Forensic Journalist.

Unit IV: Applications of Forensic Journalism

Covering crime and courts. Investigating human rights abuses and social justice issues. Reporting on disasters and crises. The challenges and limitations of reporting on disasters and crises. Challenges and limitations of forensic journalism. The potential future directions and innovations in forensic journalism.

GE/OE (Forensic Chemistry)

GE 2(BGO1T02): Basic Analytical Chemistry

Learning Outcomes: By the end of this Course, the learners will be able to:

1. Recall and identify the key terms and concepts related to SI units, methods of expressing concentrations, calculations, solutions and their concentration.
2. Understand the principles, descriptions, handling, calibration and use common laboratory apparatus.
3. Apply the knowledge and skills of volumetric analysis to classify different volumetric methods and understand the concept of different types of titrations.
4. Analyze the principles, theory, types of gravimetric analysis their application and limitations.

Unit I: SI Units

Definitions of the Seven Basic Units (Mass, Length, Time, Temperature, Amount of substance, Electrical current and Luminous intensity). Methods of expressing concentrations - Mole, molar mass, Molarity, Calculations in grams and moles, Solutions and their concentrations, Molar concentration b) Percent concentration, Parts per million/billion (ppm, ppb)

Unit II: Description and use of common laboratory apparatus

Volumetric flasks, burettes, pipettes, meniscus readers, weighing bottles, different types of funnels chromatographic columns, chromatographic jars, desiccators, drying ovens, filter crucibles, rubber policeman. Calibration and use of volumetric glassware.

Unit III: Volumetric Analysis A

Definitions: Volumetric Titration, Gravimetric Titration, Coulometric Titration. B. The equivalence point, the end point; Classification of volumetric methods, theory of indicators and buffers Equilibria Principles-Aqueous and non-aqueous acid-base titration- Redox titrations- Complexometric titrations – Precipitation titrations

Unit IV: Volumetric Analysis B

Principle, theory and types of Gravimetric analysis, properties of precipitates and precipitating agents, application and limitations of gravimetric methods

GE/OE (Forensic Physics)

GE 2(BGO1T02): Basic Analog and Digital Electronics

Course Outcome: By the end of this Course, the learners will be able to:

1. Recall and identify the key terms and concepts related to basic electronics, including active and passive components, identification techniques of components, and rectifier circuits.
2. Understand the principles, practices, and challenges of analog and digital electronics, including the working principle of oscillators and waveform generators, and the applications of logic gates, flip-flops, and shift registers.
3. Apply the knowledge and skills required to properly design and analyze analog and digital electronic circuits, including the use of filters, waveform generators, and signal converters.
4. Analyze the characteristics and properties of electronic components, including resistors, capacitors, inductors, diodes, and transistors, and their applications in electronic circuits.
5. Evaluate the performance and limitations of electronic circuits, including waveform shaping circuits and signal processing techniques, and the ethical considerations surrounding the use of electronic devices.

Unit I: Basic Electronics

Active and Passive Components (Resistors, Capacitors, Inductors, Diodes, Transistors), Field Effect Transistors, IC's and IC packages, Identification Techniques of Components, Rectifier Circuits, Introduction to OPAMP (Inverting & Non-inverting Amplifier) and Applications.

Unit II: Analog Electronics

LR, CR, LCR Circuits, Timer Circuits (using IC 555 & UJT). Active Filters: Low Pass, High Pass, Band Pass. Waveform Generators: Working Principle of Oscillators, Waveform Generators; Sine (Phase-shift, Wien Bridge, Colpitts and Hartley), Square, Triangular, Sawtooth.

Unit III: Digital Electronics

Logic Gates and Their Applications, Flip Flops, Shift Registers and Counters (Asynchronous, Synchronous and Decade).

Unit IV: Signal Processing

Signal Converters: Analog to Digital Converters (Dual Slope & Successive Approximation), Digital to Analog Converters (Weighted Resistors & R-2R Ladder). Wave Shaping Circuits: Wave Clipping, Clamping Circuits.

GE/OE (Forensic Biology)

GE 2(BGO1T02): Basics of Enzymology

Course Outcome: By the end of this Course, the learners will be able to:

1. Recall and identify key terms, historical developments, and classification of enzymes.
2. Understand the specificity of enzyme action, mechanisms of enzyme catalysis, and the role of regulatory enzymes.
3. Apply knowledge of enzyme mechanisms to predict and explain enzyme-substrate interactions.
4. Analyze enzyme kinetics, including the measurement of initial velocities and interpretation of graphs.
5. Evaluate the effects of enzyme concentration, temperature, and pH on enzyme activity.

Unit-I: Fundamentals of Enzymology and Enzyme Catalysis

History and Terminology; Classification & nomenclature of enzymes; Specificity of enzyme action (Lock & key model & Induced fit model); Introduction to Enzyme catalysis: Proximity and Orientation effect; covalent catalysis; acid-base catalysis; metal ion catalysis; Introduction to regulatory enzymes.

Unit-II: Enzyme Mechanisms, Coenzymes, and Factors Affecting Enzyme Activity

Mechanism of action of Chymotrypsin; Role of vitamins as coenzyme precursors (Niacin, Biotin); Effect of enzyme concentration; Effect of temperature on enzyme activity & temperature quotient.

Unit-III: Enzyme Kinetics

Enzyme kinetics: Importance of measuring initial velocities; Michaelis-Menten equation; Single & double reciprocal plots; Graphical representation of various inhibitors (Competitive, Non-competitive & Uncompetitive) on Lineweaver-Burke plots.

Unit-IV: Advanced Enzyme Kinetics and Assay Techniques

Definition and importance of K_{cat} / K_m ; Introduction to Bisubstrate reactions, sequential and ping-pong mechanisms with examples; Effect of pH, General pH profile diagram; Concept of enzyme assay & its importance, Enzyme activity units (Katal & Specific activity).

GE/OE (Psychology)

GE 2(BGO1T02): Psychology of Health and Wellbeing-II

Learning Outcomes: By the end of this Course, the learners will be able to:

1. Understand the spectrum of health and illness for better health management
2. Identify stresses in one's life and how to manage them
3. Understand a variety of health announcing health protective and health compromising behaviours and to be able to know their application in illness management.

Unit I: Aptitude

Concept of Aptitude, Aptitude Tests: DAT, GATB. Concept of Interest; Interest Tests: The strong Campbell Interest Inventories, Kuder preference Record. Application: Use of Psychological tests in career selection.

Unit II: Emotions

Theories of emotions: James-Lange's theory, Cannon-Bard's theory, Schachter-Singer's theory, cognitive appraisal theory. Application to everyday life: use of incentives to motivate the employees to work hard.

Unit III: Personality

Assessment of Personality- Behavioural assessment (Observation, Rating scales), Personality inventories (16 PF, MMPI, NEO-PI). Projective techniques: TAT, Rorschach Ink Blot Test, Sentence Completion Test. Applying psychology to everyday life: Parents as a role model for children and film stars as role models for adolescents.

Unit IV: Intelligence

Theories of Intelligence: Spearman, Gardner, and Sternberg. Individual Differences in Intelligence: mental retardation, and giftedness. Application: Early childhood intervention: towards boosting intelligence.

GE/OE (Digital and Cyber Forensics)

GE 2(BGO1T02): Programming with C

Course Outcomes: By the end of this Course, the learners will be able to:

1. Understand programming structures like Sequence, Selection, Iteration and Modular.
2. Understand development tools such as algorithm, flowchart and pseudo code for any problem to solve them programmatically.
3. Understand basic concepts of programming in C such as character set, Operators, Functions, arrays, strings, functions, structures, unions and pointers.
4. Understand the file handling, sequential access and random access programmatically.
5. Apply their knowledge to solve programming problems using C language.

Unit I: Programming Fundamentals

Programming Structure: Sequence, Selection, Iteration and Modular, Problem-Solving Techniques and Development Tools: Algorithm, Flowcharts and Pseudo code (Definition and its characteristics), Developing Algorithm and Drawing flowcharts

Unit II: Introduction to C Programming

C Character set, Tokens, Identifier, Keywords, Variables, Data types, Qualifiers. Operators and Expressions: Arithmetic, Relational, Logical, Bit-Wise, Increment, Decrement, Conditional and Special operators. typedef, Type Conversion, Constants, Declaring Symbolic Constants, Character Strings, Enumerated Data Types, Operator Precedence and Associativity. Library functions: Maths, string handling Functions. Control Structure: Compound Statement, Selection Statement: if, if-else, Nested if, switch. Iteration statement: for, while, do...while, Nested loops, jump statements: break, continue, goto (Special emphasis on problem solving)

Unit III: Arrays, Strings, and Functions in C Programming

Arrays: Need, Types: Single and Two-Dimensional Array. Strings: Strings Manipulation, Arrays of Strings, Evaluation order. Function: Function Components, Return Data type, Parameter Passing, Return by Reference, Default Arguments, Recursive Functions, Arrays with Functions, Storage Classes. (Special emphasis on problem Solving)

Unit IV: Structures, Unions, Pointers, and File Handling in C Programming

Structure: Declaration, Definition, Accessing structure members, Initialization, Nesting of Structures. Union: Unions, Differences between Structure and Union. Pointer: Introduction, Address Operator (&), Pointer variables, void pointers, Pointer Arithmetic, Pointers to Pointers. File handling: Hierarchy of File Stream Classes, Opening & closing a file, Testing for errors, File Modes, File pointers and their manipulations, Sequential Access, Random Access, Command Line arguments.

Paper II: Grain Size and Geostatistics in Geology (BGO1T02)

Unit I

Concept of grain size of minerals-grains; very coarse-grained, medium-grained, fine-grained, glassy material; grain-size distribution of acidic, intermediate, basic and ultrabasic igneous rocks with textures of rocks; glassy acidic and basic igneous rock types.

Unit II

Surface processes leading to rock breakdown- physical, chemical and biological; weathering; resistance of rocks to weathering; factors influencing weathering; Processes of sediment transport; grain size variation from river, marine, deltaic and glacial sediments.

Unit III

Wentworth's scale of grain sizes of sediments; grain sizes of sediments and sedimentary rock types; grain angularity and roundness, conversion of millimeter to phi scale of grain size.

Unit IV

Arithmetic mean, mode, median, range, variance, frequency, skewness, kurtosis, standard deviation of grain sizes; identification of depositional environment based on grain size distribution; CM plot, depositional environment based on grain size distribution from probability ordinate paper.

Books Recommended:

1. Blatt, H., Middleton, G.V. and Murray, R.C. (1980) Origin of Sedimentary Rocks, Prentice-Hall Inc.
2. Hota, R.N. (2011) Practical Approach to Petrology, CBS Publisher and Distributors Pvt Ltd., New Delhi
3. Reineck, H.E. and Singh, I.B. (1973) Depositional Sedimentary Environments, Springer-Verlag.
4. Isaaks, E.A. and Srivastava, R.M. (1990) An Introduction to Geostatistics, Oxford University Press.
5. Morrison, D.F. (1967) Multivariate statistical methods, McGraw-Hill.
6. Tucker, M.E. (1981) Sedimentary Petrology: An Introduction, Wiley and Sons, New York.

SEMESTER 1: BASIC STATISTICS

Course Outcomes:

1. To discuss the interpretations of Statistics in numerical data.
2. To give overview of Statistics in various sectors & disciplines
3. To apply & use of Statistics Methods in various diverse fields

UNITS	TOPICS	HOURS
Unit 1	Concept of Sample Space - Events - Definition of Probability - Addition and Multiplication laws of Probability - Conditional Probability - Baye's Theorem - Simple Problems.	8
Unit 2	Random Variables - Distribution Function - Expectation and Moments - Moment Generating Function - Probability Generating Function - Simple Problems.	8
Unit 3	Concept of Bivariate Distribution - Correlation - Karl Pearson's Coefficient of Correlation - Rank Correlation - Linear Regression.	7
Unit 4	Standard distributions: Discrete distributions - Binomial, Poisson, Hyper Geometric and Negative Binomial Distributions - Continuous Distributions Normal, Uniform, Exponential.	7
	TOTAL	30 HRS

Recommended books:

1. S.C. Gupta & V.K. Kapoor : Fundamentals of Mathematical Statistics, Sultan & sons
2. Hoel, P.G (1971): Introduction to Mathematical Statistics, Wiley.
3. Wilks S.S. Elementary Statistical Analysis, Oxford and IBH
4. Hogg, R.V. & Craig.A.T.(1998) : Introduction to Mathematical Statistics, Macmillan
5. Statistical Methods, Gupta S. P.: Sultan Chand and Sons, New Delhi.

	Semester I (GE/OE)
	Name of the Paper - Statistics for Competitive examinations
	Paper code – (BGO1T02) 2 Credits (2 hrs Theory per week)
	Course Objectives
	To train the students to solve the problems of statistics that appear in most of the competitive exams conducted by Banking, State and Central Governments and other agencies.
	Course Outcomes (CO)
	After the successful completion of the course, the students will be able to develop the data analysis skills required for Competitive Examinations.
	CONTENTS
	Unit 1 (15 Hrs)
(A)	Collection Classification and Presentation of Statistical Data Primary and Secondary data, Methods of data collection; Tabulation of data; Graphs and charts; Frequency distributions; Diagrammatic presentation of frequency distributions.
(B)	Measures of Central Tendency Meaning of central tendency and essentials of a good measure of central tendency. Types of measures of central tendency, Arithmetic mean, Median, Mode, Geometric mean and Harmonic mean - definition, merits and demerits. Properties of arithmetic mean. Empirical relation between mean median and mode. Problems on both grouped and ungrouped data for all the measures. Partition values-definition and types of partition values: quartiles, deciles and percentiles. Problems on Quartiles for grouped ungrouped data only
	Unit 2 (15 Hrs)
(A)	Measures of Dispersion Meaning and objectives of measures of dispersion. Essentials of a good measure of dispersion, absolute and relative measures of dispersion. Types of measures of dispersion- Range, Quartile deviation, Mean deviation and standard deviation with relative measures – definition, merits and demerits. Properties of Standard deviation, simple problems on ungrouped and grouped data.
(B)	Introduction to Probability Introduction to probability, Basic concepts: Random experiment, Sample space, Mutually exclusive, exhaustive, equally likely events, complimentary events, classical, statistical and axiomatic definition of probability, properties, Addition theorem of Probability and Definition of independent, dependent events, Conditional probability, Multiplication theorem of Probability without proof. Simple numerical problems.
	References
1	Freedman, D., Pisani, R. and Purves, R. (2014), Statistics, 4th Edition, W. W. Norton & Company.
2	Gupta S. C. Fundamentals of Statistics, Himalaya Publishing House, Bombay.
3	Gani S. G., Sankhyshastra and Ganakayantra. Udaya Ravi Publications, Bijapur

GE/OE for B.Sc. I Reproductive Biology (BGO1T02)

Credit: 2

Course outcomes: After completion of the course, students will be able to-

- Understand, describe and explain the male reproductive system.
- Understand, describe and explain the female reproductive system.
- Understand, describe and explain menstrual cycle.
- Understand, describe and explain spermatogenesis, oogenesis and fertilization.

Unit- I

1. Male reproductive organs.
2. Function of Sertoli cells and Leydig cells.
3. Structure of Sperm.
4. Sperm transportation in male tract.

Unit -II

1. Female reproductive organs.
2. The anatomy, histology and function of uterus, cervix, vagina, fallopian tubes and mammary gland.
3. Structure of Ovary.
4. Sperm transport in female tract.

Unit- III

1. Menstrual cycle- different phases of menstrual cycle, menarche and menopause.
2. Hormonal control of menstrual cycle.
3. Male reproductive hormone and their function.
4. Female reproductive hormone and their function.

Unit- IV

1. Spermatogenesis, spermiogenesis and spermiation
2. Oogenesis, Folliculogenesis, Ovogenesis, Ovulation
3. Oocyte maturation – Primary follicle to Graffian follicle
4. Fertilization- Sperm egg recognition, Acrosome reaction and species barriers

Suggested Reading:

Tortora GJ and Derrickson BH (2009). Principles of Anatomy and Physiology, XII Edition, John Wiley and Sons, Inc., pp. 1281.

Widmaier EP, Raff H and Strang KT (2008). Vander's Human physiology. 11th Edition. McGraw Hill, pp. 770.

Khurana I (2018). Medical Physiology for undergraduate students. 2nd edition, Elsevier, pp. 938.

GE/OE for B.Sc. I Attractive Insects BGO1T02

Credit: 2

Course outcomes: After completion of the course, students will be able to-

- Understand, describe and explain the general characters of insects.
- Understand, describe and explain suborders of Odonata.
- Identify, recognize, describe and explain certain damselflies.
- Understand, describe and explain ecological significance of dragonflies.
- Identify, recognize, describe and explain certain dragonflies.
- Identify, recognize, describe and explain certain butterflies.
- Identify, recognize, describe and explain certain beetles.

Unit -I

- 1.1 Introduction to class Insecta: Systematic position of class Insecta, General Characters of class Insecta.
- 1.2 Introduction to order Odonata: General characters of Odonata, suborders and families of order Odonata.
- 1.3 General characters of suborder Zygoptera, morphological difference between dragonflies and damselflies.
- 1.4 General characters, distribution of Coromandel marsh dart, *Ceriagrion coromandelianum* (Fabricius, 1798) and golden dartlet, *Ischnura aurora* (Brauer, 1865)

Unit- II

- 2.1 General characters of suborder Anisoptera, Ecological importance of dragonflies.
- 2.2 General Characters of Family Libellulidae; general characters, morphological features and distribution of green marsh hawk, *Orthetrum sabina* (Drury, 1770); ground skimmer, *Diplocodes trivalis* (Rambur, 1842).
- 2.3 General characters, morphological features and distribution of the granite ghost, *Bradinopyga geminata* (Rambur, 1842), ditch jewel, *Brachythemis contaminata* (Fabricius, 1793).
- 2.4 General characters, morphological features and distribution of the scarlet skimmer, *Crocothemis servilia* (Drury, 1770); pied paddy skimmer, *Neurothemis tullia* (Drury, 1773).

Unit- III

- 3.1 General characters of family Aeshnidae; Morphological features, distribution of pale spotted emperor, *Anax guttatus* (Burmeister, 1839).
- 3.2 General characters of family Gomphidae; Morphological features, distribution of common clubtail, *Ictinogomphus rapax* (Rambur, 1842).
- 3.3 Introduction to Coleoptera: General characters, distribution and habitat of beetles.
- 3.4 Morphological features, distribution and habitat of Indian glow worm, *Lamprophorus tenebrosus* (Walker, 1858); seven spotted ladybird beetle, *Coccinella septempunctata* (Linnaeus, 1758); six-spotted zigzag ladybird, *Cheilomenes sexmaculata* (Fabricius, 1781).

Unit- IV

- 4.1 General characters, distribution and habitat of butterflies; morphological features of Nymphalidae, Papilionidae and Pieridae.

- 4.2. Morphological features, distribution and habitat of the common core, *Euploea core* (Cramer, 1780); the blue pansy, *Junonia orithya* (Linnaeus, 1758); *Danaus chrysippus* (Linnaeus, 1758)
- 4.3 Morphological features, distribution and habitat of lemon butterfly, *Papilio demoleus* (Linnaeus, 1758); the crimson rose, *Pachliopta hector* (Linnaeus, 1758); the tailed jay, *Graphium agamemnon* (Linnaeus, 1758).
- 4.4 Morphological features, distribution and habitat of common jezebel, *Delias eucharis* (Drury, 1773); common grass yellow, *Eurema hecabe* (Linnaeus, 1758); common emigrant, *Catopsilia pomona* (Fabricius, 1775).

Suggested Reading

Marshal SA (2018). Beetles: The natural history and diversity of Coleoptera. Boston Mills Press, pp. 800.

Smetacek P (2016). A naturalists guide to the butterflies of India. Prakash Books India Private Limited, pp. 176.

Andrew R.J., Subramanian K.A., Tiple A.D. (2008). Common odonates of Central India. e-book for “ the 18th International Symposium of Odonatology, Hislop College, Nagpur”, pp. 56.

Subramanian K.A. (2005). Dragonflies and damselflies of peninsular India: A field guide. Project report of Centre for Ecological Science, Indian Institute of Science, Bangalore and Indian Academy of Science, Bangalore, pp. 35.

Fashion Design/Textile Science
Four Year (Eight Semester Degree Course)
Semester - I
Chemical Processing – I
GE/OE (BGO1 TO2)

Theory Marks : 100

SEE : 80

CIE : 20

Total Credits : 2

Theory : 2

Time Required: 30 Hours

Theory (30 Hours)

Objectives

1. To study the chemical processing of textile Material.
2. To become aware about Textile Chemistry.

Unit I: (8 Hours)

1.1 Comparison of organic & Inorganic compounds

1.2 Water (Required for Textile Industry)

- Impurities in water
- Purification softening of water by using
- Lime soda Treatment
- Zeolite or Base Exchange plant.

Unit II: (7 Hours)

2.1 Fiber Classification according to Chemical group

2.2 Textile fibres: Physical and Chemical properties of following fibres-

- | | | | | |
|-----------|--------------|---------------------|-------------|--------------|
| i. Cotton | ii. wool | iii. Silk | iv. Viscose | v. polyester |
| vi. Nylon | vii. Acrylic | viii. polypropylene | | |

Unit III: (8 Hours)

1.1 Cotton Fabric processing sequence

1.2 Shearing & cropping

1.3 Singeing & Designing

1.4 Scouring

Unit IV: (7 Hours)

1.1 Souring

1.2 Bleaching: (i) Hypochlorite (ii) Peroxide

1.3 Mercerizing – Fabric & Yarn & Barium number test

References:

- 1 Technology of Textile Processing - Vol 1(Textile Fiber) - Dr. V.A. Shenoi
- 2 Technology of Textile Processing - Vol III (Technology of Bleaching) - V.A. Shenoi
- 3 Technology of Textile Processing - Vol IX (Fundamental Principal of Textile Processing) - V.A. Shenoi
- 4 Chemical technology of Fibre materials - F. Sadav
- 5 Textile scouring & Bleaching - E.R. Trotman

B.Sc. Semester – I
BGO1T02: Cosmetic Chemistry
Theory: 2 credits

Course Outcomes: By the end of this course, students will be able to:

- *Understand the basic principles of cosmetic chemistry.*
- *Identify and describe the function of various cosmetic ingredients.*
- *Formulate and evaluate different types of cosmetic products.*
- *Apply knowledge of skin and hair biology to cosmetic product development.*
- *Understand the regulatory and safety considerations in the cosmetic industry.*

Unit I: Introduction to Cosmetic Chemistry (7.5h)

- (A) **Overview of the cosmetic industry:** Historical development of cosmetics, Basic principles of cosmetic formulation, Types of cosmetics (skincare, haircare, color cosmetics, etc.).
- (B) **Cosmetic Ingredients:** Categories of cosmetic ingredients: Emollients, Humectants, Surfactants, Preservatives, Colorants, Fragrances, Natural vs. synthetic ingredients. Functions and mechanisms of action of key ingredients.

Unit II: Skin-Hair Biology and Products (7.5h)

- (A) **Structure and function of the skin:** Skin types and conditions, Structure and function of hair, Hair types and conditions.
- (B) **Skincare Products:** Formulation of cleansers, moisturizers, sunscreens, and anti-aging products. Key ingredients and their roles in skincare products. Evaluation and testing of skincare products (e.g., stability, efficacy, safety).
- (C) **Haircare Products:** Formulation of shampoos, conditioners, hair dyes, and styling products. Key ingredients and their roles in haircare products. Evaluation and testing of haircare products (e.g., performance, safety).

Unit III: Colour and Fragrances in Cosmetics (7.5h)

- (A) **Colour:** Formulation of makeup products (foundations, lipsticks, eye shadows, etc.). Pigments and colorants used in cosmetics. Safety and stability of color cosmetics. Trends and innovations in color cosmetics.
- (B) **Fragrances:** Basics of fragrance chemistry. Types of fragrances (natural and synthetic). Role of fragrances in cosmetics and personal care products. Regulatory considerations for fragrances.

Unit IV: Regulatory Safety Considerations, Sustainability and Ethics (7.5 h)

- (A) **Regulatory and Safety Considerations:** Cosmetic regulations and standards (FDA, EU, etc.). Safety assessment of cosmetic ingredients. Good Manufacturing Practices (GMP) in the cosmetic industry. Labeling and claims in cosmetics.
- (B) **Sustainability and Ethics:** Sustainable sourcing of ingredients. Green chemistry principles in cosmetic formulation. Ethical considerations in the cosmetic industry (e.g., animal testing, fair trade).

References

1. "Introduction to Cosmetic Formulation and Technology" by Gabriella Baki and Kenneth S. Alexander
2. "Harry's Cosmeticology" by Ralph Gordon Harry, Martin M. Rieger, and Edward Sagarin
3. Baki, G., & Alexander, K. S. (2015). 'Introduction to cosmetic formulation and technology'. Wiley.
4. Harry, R. G., Rieger, M. M., & Sagarin, E. (2000). 'Harry's cosmeticology' (8th ed.). Chemical Publishing Co.
5. Sakamoto, K., Lochhead, R., Maibach, H., & Yamashita, Y. (Eds.). (2017). 'Cosmetic science and technology: Theoretical principles and applications'. Elsevier.
6. "Cosmetic Science and Technology: Theoretical Principles and Applications" edited by Kazutami Sakamoto, Robert Lochhead, Howard Maibach, and Yuji Yamashita

Weblinks

<https://onlinelibrary.wiley.com/journal/14682494>

<https://www.scconline.org/journal-of-cosmetic-science>

<https://www.cosmeticsandtoiletries.com/>

<https://onlinelibrary.wiley.com/journal/16000846>

<https://www.scconline.org/journal-of-cosmetic-science>

B.Sc. Semester-I
Subject: Microbiology
Course Code: BGO1T02
INTRODUCTION TO MICROSCOPY & STAINING

GE/OE	Hours: 2 Hours/Week	Marks: 80+20=100	Credit: 2
Unit-I			
Microscopy I	<ol style="list-style-type: none"> 1. Discovery of Microscope 2. Properties of Light 3. Simple Microscope 4. Compound microscope—Bright field Microscopy, 5. Principle, applications and ray diagram Dark field Microscopy, 		7.5 Hrs
Unit-II			
Microscopy II	Principle, applications and ray diagram: <ol style="list-style-type: none"> 1. Transmission Electron microscopy 2. Scanning Electron microscopy 3. Phase-contrast microscopy, 4. Fluorescent microscopy 		7.5 Hrs
Unit III			
Staining Techniques I	<ol style="list-style-type: none"> 1. Stains & dyes, chromophore, auxochrome & chromogenes 2. Types of stains 2. Theories of staining 3. Staining techniques : Simple, negative staining, 4. Differential staining- Gram staining 		7.5 Hrs
Unit IV			
Staining Techniques II	Special staining Technique <ol style="list-style-type: none"> 1. Acid-fast staining 2. Flagella staining 3. Endospores staining 4. capsule staining 5. Inclusion bodies staining 		7.5 Hrs

Reference books -

1. Introduction to Microbial Techniques by Gunasekaran
2. Microbiology: Fundamentals and Applications by Ronald M. Atlas, New York: Macmillan Publication
3. Powar C. B. and Daginawala H. I. (2005). General microbiology Volume I. Himalaya Publishing House Private Limited, Pune, India.
4. Powar C. B. and Daginawala H. I. (2005). General microbiology Volume II. Himalaya Publishing House, Private Limited, Pune, India
5. Debnath M., Prasad G. B. and Bisen P. S. (2012). Microbes: Concepts and Applications. Germany: Wiley.
6. Pelczar M. J. Jr., Chan E.C.S. and Krieg N. R. (2010). Microbiology: An Application based Approach. McGraw-Hill Education (India) Private Limited, New Delhi, India.
7. Pierce B. E. and Leboffe M. J. (2019). Microbiology: Laboratory Theory and Application: Essentials. United States: Morton Publishing

COURSE OUTCOMES

Sr. No.	Course outcome
1.	Students will be able to understand the needs and basics of techniques used in observing microbes.
2.	Students will be aware of applications of basic techniques.
3.	Handling and use of microscopes for the study of microorganisms which are among the basic knowledge expected from a practicing microbiologist.

Bachelor of Science (Honors / Research) 4 yr. 8 Semester Degree Program
B.Sc. Sem I (Interior Design – Major)

BGO1T02 CULTURAL ANTHROPOLOGY I

AIM: Students of design have to be sensitized to various cultural aspects such as traditions , fine arts and the performing arts of a particular country and have to understand the symbolism, patterns and forms that manifest themselves in the architecture of that place.

UNIT I : Industrial Psychology

i) Meaning and Definition

ii) Scope

UNIT II : Fatigue in Industry

i.)Meaning and Definition of Fatigue

ii) Internal environment

iii) Factors creating fatigue

iv) Techniques of lessening physical fatigue, Other Techniques

v)External environment

vi) boredom and monotony

UNIT III : Recruitment , Selection and training

i) Recruitment: sources of Recruitment

ii) Selection: steps in selection process

iii) Training: methods of training, Advantages of Training

UNIT IV : Indian Constitution and Federal System

i) Remarkable features

ii) Federal System

iii) A Quasifederal constitution

UNIT V : Fundamental Rights and Directive Principles of state policy

i) Fundamental rights

ii) Characteristics

iii) Fundamental Right enshrined in the constitution

iv) The directive principles of state policy

REFERENCE BOOKS

1) A new Outlook into Social Science – S. Shabbir, A. M. Sheikh, Jaya Dwadashiwar, S.

Chand, Delhi

2) T. Ramasamy, 2012, Principles of Management, Himalaya Publishing House,

Mumbai.

3) Dr. Pratibha M. Siriya, 2011, Principles of Business Management, Sai Jyoti

Publication, Nagpur.

4) King's, Personnel management & Industrial Relations, Harsha Rastogi, Delhi.

S. No	Course Outcomes
	The students will gain knowledge regarding
CO1	Indian Constitution
CO2	Fundamental Rights & Duties
CO3	Federal System
CO4	Fatigue in Industry
CO5	Indian Constitution

B. Sc (Applied Electronics & Software Technology) – Semester I (GE/OE)

BGO1T02 SOCIAL SCIENCE I

Scheme of Examination (Theory)

SEE – 80

CIE - 20

Total - 100

Course Outcome : The students will gain knowledge regarding

1. Types of Society
2. Culture – types & characteristics
3. Importance of anthropology
4. Importance of Ethnography
5. Types of Communication

UNIT I: Society – i) Meaning and Definition ii) Characteristics of Society iii) Types of Society iv) Factors Bringing Changes in Society v) Impact of Modernization on Society and Study of Society

UNIT II: Culture – Meaning and Definition ,Characteristics of Culture ,Types of Culture in India ,Factors bringing changes in Culture – Modernization, Urbanization, Technology ,Tradition and Rituals of any one State Art form and Craft form in Indian States

UNIT III: Anthropology - Meaning and Definition of Cultural Anthropology ,Importance of Anthropology

UNIT IV: Ethnography : Meaning and Definition , History of Ethnography , Significance of Ethnography

UNIT V: Communication : Meaning and Definition , Types and Channels of Communication , Significance of Communication in Interior Design.

Reference Books

- Nadeem Hasnain, 2011, Indian Anthropology
- Mohd. Irfan, 2012 , Social Exclusion And Muslim Ethnograph, Neha Publishers & Distributors

GE/OE Basket Semester II
Faculty of Science and Technology

Sem.	Course Category		Name of Course	BoS	Course code
II	GE/OE	1	Sustainable agriculture	Botany	BGO2T03
		2	Bioethics	Biochemistry	
		3	Applications of Biotechnology in Agriculture	Biotechnology	
		4	Programming in C	Computer Science/ Computer Application	
		5	PC Assembly & Maintenance	Electronics	
		6	Introduction to Climate Crises	Environmental Science	
		7	A. Introduction to Forensic Auditing & Fraud Assessment / B. Chemistry of Natural & Synthetic Molecules / C. Instrumentation Aids/ D. Basics of Microbial Forensics/ E. Basics of Clinical Psychology (Psychology)/ F. Office Automation/ G. Criminal Law-I (Law)	Forensic Science	
		8	Introduction to Landforms	Geology	
		9	Business statistics I	Mathematics	
		10	Microbial world	Microbiology	
		11	Energy sources	Physics	
		12	Statistical methods and psychological testing	Statistics	
		13	Industrial entomology	Zoology	
		14	Physical Chemistry	Cosmetic Technology	
		15	Computer Application in Design	Fashion Design	
		16	Computer Application in Designing	Textile Science	
		17	Kitchen and Nutrition Chemistry	Chemistry	
		18	Mathematics II	Interior Design	
		19	Engineering Mathematics II	Applied Electronics & Software Technology	

B. Sc. Semester-II			
GE / OE-3 Botany (BGO2T03)			
Sustainable Agriculture			
GE/OE-III Theory	Hours: 2 Hours/Week	Marks: 80+20=100	Credit: 2
Unit-I			
Introduction			7.5 Hrs.
<ol style="list-style-type: none"> 1. Concept and importance of sustainable agriculture 2. General principles and goals of sustainable agriculture 3. History and policy for sustainable agriculture in India 4. Barriers or problems in adoption of sustainable agriculture 5. Farming system: Scope and types 			
Unit-II			
Sustainable agriculture system: Objectives, Characteristics and advantages of following practices			7.5 Hrs.
<ol style="list-style-type: none"> 1. Organic farming. 2. Natural farming. 3. Biodynamic of agriculture. 4. Conservation agriculture. 5. Integrated farming system. 6. Precision farming. 7. Crop rotation and inter cropping 8. Vertical farming 			
Unit-III			
Sustainable agriculture system: Objectives, Characteristics and advantages of following practices			7.5 Hrs.
<ol style="list-style-type: none"> 1. Permaculture. 2. Agroforestry. 3. Integrated pest management 4. Rain water harvesting- artificial ground water recharge. 5. Floating farming. 6. Mulching. 7. Vermi-composting. 8. Soil solarization. 			
Unit-IV			
Factors affecting: sustainability of agricultural resources and control measures			7.5 Hrs.
<ol style="list-style-type: none"> 1. Land or soil related problems. 2. Irrigation related problems. 3. Indiscriminate use of agrochemicals. 4. Environmental pollution. 5. Erosion of genetic biodiversity. 			
Note: Field visits are compulsory.			

Suggested readings

1. Gopal Chandra De. 1980., Fundamentals of Agronomy. Oxford and IBH Publishing Co. Ltd.,Bangalore. 3) Hand book of Agriculture, ICAR Publication.
2. Panda, S.C., 2006. Agronomy Agribios Publication, New Delhi.
3. Reddy, S.R. Principles of Agronomy Kalyani Publishers, Ludhiana, India.
4. Sankaran, S and Subbiah Mudliyar, V.T., 1991. Principles of Agronomy. The BangalorePrinting and Publishing Co. Ltd., Bangalore.
5. Lampkin, N (1990) Organic Farming. Farming Press, Ipswich (ISBN 0 85236 191 2)
6. Kristensen, P., Taji, A. and Reganold, J. (2006). Organic Agriculture: A Global Perspective. CSIRO Press, Victoria, Australia.
7. Palsnipsn S. P., Cropping systems in tropics- Principles and practices
8. Altieri, M. A. 1995, Agroecology: The Science and Sustainable Agriculture. 2ndEdnWestvies Press, Colorado.
9. A. Zaman. 2002 Watershed Management for Sustainable Agriculture in IndianPerspectives. 12th ISCO Conference
10. Chadha G. K. Sen S. and Sharma H. R. 2004. State of Indian Farmer: A Millenium Study,Vol.2: Land resources, Ministry of Agriculture, Govt of India.
11. Niti Gupta, Shanal Pradhan, Abhishek Jain and Nahya Patel (2021); Sustainable Agriculturein India: What we know and how to scale up. New Delhi. CEEW Report April 2021
12. Deb, D. L. 1994. Natural Resources Management for Sustainable Agriculture andEnvironment. Angkor Publishers Ltd., New Delhi.
13. Saroja Raman. 2006. Agricultural Sustainability- Principles, Processes and Prospects. Food products Press, New York.
14. Subramaniyan, S. 2004. Globalization of Sustainable Agriculture. Kalyani Publishers,Ludhiyana.

General Elective Paper (Biochemistry-Major)

Semester 2 : BIOETHICS (BGO2T03)

COURSE OUTCOMES:

This course is designed to provide:

1. To Understand the terms 'ethics' and 'bioethics';
2. To Demonstrate understanding of the biosciences and ethical considerations associated with a current advance in biotechnology, modern biomedicine, agriculture and in the utilization of natural resources.
3. Integrate the use of scientific facts and ethical principles and argumentation in discussing cases involving moral dilemmas;
4. Use and critically evaluate information gathered from a variety of sources; a Recognize the diversity of informed ethical opinions regarding the development of current advancements in biology and biomedicine;
5. Develop scientific attitudes, reflective processes and decision making skills; a Develop a sense of moral obligation and responsibility both in their relationship with nature and in their future professional activity.

UNIT I: Theoretical background to bioethics

The nature of bioethics (defining bioethics, history and philosophy, modern science, a new history of biology, the scientific method, bioscience and biotechnology, importance of bioethics for the biosciences); theories of ethics (introduction to ethics, ethics and morality, moral reasoning and major ethical theories)

UNIT: II. Environmental ethics

Interactions of humans with the natural world (the place of humans in nature, environmental values, origin and emergence of environmental ethics, ideas of stewardship and Gaia); current themes in environmental ethics (anthropogenic impact on the biosphere and precautionary principles, environmental sustainability); current issues in environmental ethics (terrestrial and aquatic pollution, global climate change, environmental degradation and loss of biodiversity, ecotourism and ethics); humans and non-humans animals (animal welfare and animal rights, human use of nonhuman animals, ethics of animal research, legislation for, and alternatives to animal experimentation).

UNIT: III Ethics of biotechnology

Genetic modification (general ethical issues related to genetic modification, application of genetic modification – pharmaceuticals, GM food and crops, genetic modification of animals, research use of genetic modification, GM and less-developed countries; GM microorganisms as bacteriological warfare; conception of risk, assessment, management, communication and standards of risk; interpreting the precautionary principles); Introduction to the Human Genome Project.

UNIT: IV Biomedical ethics

Cloning and stem cells (ethics of human cloning, reproductive cloning and therapeutic cloning, embryonic stem cells and the status of the early human embryo, experiments on embryonic stem cells, legislation and therapeutic cloning); ethical aspects of the assisted reproductive technologies (artificial insemination and donor insemination, in vitro fertilization, surrogate mothering, designer babies etc. in brief)

References:

1. Bryant J., Baggott la Velle L., Searle S. (2006) Introduction to Bioethics, John Wiley & Sons, Chichester.
2. Downie R., Clarkeburn H. (2005) Bioscience Education,
3. Encyclopedia of Bioethics (2004) 3rd Edition (Stephen G. Post, Ed.), Thomson Gale, p. xi.
4. Greenwell P. and McCulley M. (2007) Molecular therapeutics: 21st Century Medicine. John Wiley & Sons, Chichester.
5. Hristova S. (2009). Ethics in the world of biotechnology, Faber, Sofia. (in Bulgarian);.
6. Jonsen A. (1998) The Birth of Bioethics, Oxford University Press, Oxford.

SEMESTER – II

APPLICATIONS OF BIOTECHNOLOGY IN AGRICULTURE

Course Code: BGO2T03

Total Contact Hours: 30

Course Outcomes:

After successful completion of this Course, students will be able to:

- CO 1. Understand the biotechnological applications in agriculture
- CO 2. Comprehend the pros and cons of GM crops and their plant products
- CO 3. Appreciate the biotechnological applications for effective pest control and crop improvements
- CO 4. Understand the importance of molecular markers in agriculture

Unit I

8 hours

Agricultural Biotechnology: Concept and scope of biotechnology in Agriculture; Plant tissue culture, micro propagation; entrepreneurship in commercial plant tissue culture; Banana tissue culture – primary and secondary commercial setups, Small scale bio enterprises: Mushroom cultivation

Unit II

7 hours

Transgenic plants: The GM crop debate – safety, ethics, perception and acceptance of GM crops; GM crops case study: Bt cotton, Bt brinjal; Plants as biofactories for molecular pharming; edible vaccines, plantibodies, nutraceuticals.

Unit III

8 hours

Pest control and crop improvement: Baculovirus pesticides, Mycopesticides; Post-harvest Protection: Antisense RNA technology for extending shelf life of fruits and shelf life of flowers; Genetic engineering for quality improvement: Golden rice, Seed storage proteins, Flavours– capsaicin, vanillin

Unit IV

7 hours

Molecular marker aided breeding: RFLP maps, linkage analysis, RAPD markers, STS, microsatellite, SCAR (sequence characterized amplified regions), SSCP (single strand conformational polymorphism), QTL, map based cloning, molecular marker assisted selection

References:

- Chrispeels M.J. and Sadava D.E. (1994) *Plants, Genes and Crop Biotechnology*, 2nd Ed., Jones and Bartlett Publishers, Boston.
- Gamborg O.L. and Philips G.C. (1998) *Plant cell, tissue and organ culture*, 2nd Ed., Narosa Publishing House. New Delhi.
- Gistou, P. and Klu, H. (2004). *Handbook of Plant Biotechnology (Vol. I & II)*. John Publication.
- Hammond J., McGarvy P. and Yusibov.V. (2000). *Plant Biotechnology*, Springer Publ.
- Heldt. H.-W. (1997). *Plant Biochemistry and Molecular Biology*. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi.
- Kyte, L., Kleyn, J., Scoggins, H., and Bridgen M. (2003) *Plants from test tubes. An introduction to micropropagation*, 4th Ed., Timber Press, Portland.
- Murray D.R. (1996) *Advanced methods in plant breeding and biotechnology*. Panima Publishing Corporation.
- Nickoloff, J.A. (1995). *Methods in molecular biology, Plant cell electroporation and electrofusion protocols*-Humana Press Incorp, USA.
- Sawahel, W.A. (1997). *Plant genetic transformation technology*. Daya Publishing House, Delhi.

B.Sc. Sem-II (Computer Science/ Computer Application)
BGO2T03

PROGRAMMING IN 'C'

Credits : 2

Duration : 30 Hours

Course Objectives:

- 1.To formulate simple algorithms for arithmetic and logical problems.
- 2.To translate the algorithms to programs (in C language).
- 3.To test and execute the programs and correct syntax and logical errors.
- 4.To implement conditional branching, iteration and recursion.
5. To implement operations on arrays, strings , structures, unions , functions and file handling.

Course Outcomes :

After completing this course satisfactorily, a student will be able to:

1. Write simple algorithms for arithmetic and logical problems.
2. Write the C code for a given problem
3. Perform input and output operations using programs in C
4. Write programs that perform operations on arrays, strings , structures, unions , functions and file handling.

UNIT I

Programming Structure: Sequence, Selection, Iteration and Modular. Problem Solving techniques: Development Tools: Algorithm, Flowcharts and Pseudo code (Definition and its characteristics) Developing Algorithm and Drawing flowcharts

UNIT II

C Character set, Tokens, Identifier, Keywords, Variables, Data types, Qualifiers. Operators and Expressions: Arithmetic, Relational, Logical, Bit-Wise, Increment, Decrement, Conditional and Special operators. typedef, Type Conversion, Constants, Declaring Symbolic Constants, Character Strings, Enumerated Data Types, Operator Precedence and Associativity. Library functions: Maths, string handling Functions. Control Structure: Compound Statement, Selection Statement: if, if-else, Nested if, switch. Iteration statement: for, while, do...while, Nested loops, Jump statements: break, continue, goto (Special emphasis on problem solving)

UNIT III

Arrays: Need, Types: Single and Two Dimensional Array.

Strings: Strings Manipulation, Arrays of Strings, Evaluation order

Function: Function Components, Return Data type, Parameter Passing, Return by Reference, Default Arguments, Recursive Functions, Arrays with Functions, Storage Classes. (Special emphasis on problem Solving)

UNIT IV

Structure: Declaration, Definition, Accessing structure members, Initialization, Nesting of Structures.

Union: Unions, Differences between Structure and Union

Pointer: Introduction, Address Operator (&), Pointer variables, void pointers, Pointer Arithmetic, Pointers to Pointers.

File handling: Hierarchy of File Stream Classes, Opening & closing a file, Testing for errors, File Modes, File pointers and their manipulations, Sequential Access, Random Access, Command Line arguments.

Books

1. The Art of programming through flowcharts & algorithm by Anil B. Chaudhari Firewall Media, Laxmi publication, New Publication.
2. Programming in C by E. Balagurusamy TMH Publications.
3. C Programming – KernighenRitche
4. Programming with C – Y. Kanetkar.
5. C Programming – Holzner, PHI Publication.
6. Programming in C – Ravichandran.

Course outcome:

At the end of this course students will have ability to

1. Identify basic terms, concepts, functions, and operations of personal computer (PC) system components.
2. Complete installations of memory modules, system boards, processors, power supplies, adapter boards, storage devices, and multimedia devices.
3. Analyse common symptoms and problems associated with PC components and provide solutions to troubleshoot and isolate the problems. Identify the purpose of various types of preventive maintenance products and procedures.

Syllabus :

1. Introduction to PC Hardware: Study of basic I/O systems, Types of Memories- Static RAM and Dynamic RAM, ROM, PROM, EPROM, EEPROM, CPU (Central Processing Unit)- ALU and control unit.
2. Motherboard and Processor: Study of different types of Motherboards, Motherboard Configuration, Identifying Internal and External connectors, Types of data cables, Types of Processors- Intel Celeron, P4 family, Xeon dual core, quad core, core2 duo, i3, i5, i7 and AMD.
3. BIOS Configuration: Study of BIOS Set-up- Advance set-up, Boot configuration, Boot Menu. Installation of OS (Operating Software) Windows installation. Hard Disk: Formatting of Hard disk, Partitioning of Hard disk in different logical drives, Disk defragmentation, Disk clean up, Scan disk etc.
4. Troubleshooting: Motherboard drivers, LAN, Audio, and Video. Configuration of External devices: Printers, Scanner set-up, Webcam, Bluetooth device, Memory card reader etc. Diagnostic and troubleshooting of PC: POST (Power on Self-Test), identifying problems by Beep codes errors, checking power supply using Multi-meter, Replacement of components etc. Antivirus and Application Software

Books:

1. Troubleshooting, Maintaining and Repairing PCs by Stephen J. Bigelow
2. The Complete PC Upgrade and Maintenance Guide by Mark Minasi.

Unit-I:

Climate Change: Definition, scope and facts of climate change, Composition and thermal structure of atmosphere, weather and climate. Meteorological parameters – temperature, pressure, precipitation, humidity, wind speed and direction.

Monsoons: Definition, Indian monsoons – seasons: cold weather season (winter), the hot weather season (summer), season of advancing monsoon (rainy season) and season of retreating monsoon (the transition season), cyclones of the Indian region; El-Nino and La-Nina and their impacts.

Unit-II:

Air Pollution: types of air pollution. Air pollutants, Co-relation between air pollution and climate crisis. Impact of air pollution, Mitigation methods. Case studies of air pollution disasters. **Acid rain:** chemistry of acid rain, impacts of acid rain, mitigation measures of acid rain.

Greenhouse effect and global warming: Definition, impacts, major greenhouse gases, sources and sinks of greenhouse gases, global dimming and global warming potential, black carbon and carbon footprint.

Unit-III:

Impact of climate change: Influence on agriculture, climate change and food security, water stress and water insecurity, rise in sea levels, loss of biodiversity and extinction of species, vectorborne/zoonotic diseases, increase in floods and drought incidences.

Mitigation strategies of climate change: Carbon sequestration, carbon sink, carbon credit, carbon offsetting, carbon tax, geo-engineering.

Unit-IV:

Climate change and policy frameworks: United Nation Framework Convention on Climate Change (UNFCCC), The United Nation Conference on Environment and Development, Inter- governmental Panel on Climate Change (IPCC), The Kyoto Protocol, Paris Agreement.

India and Climate Change: Ministry of Environment, Forest and Climate Change (MoEF andCC), India's National Plan on Climate Change, The National Mission on Strategic Knowledge for Climate Change (NMSKCC), National Mission for Sustainable Agriculture (NMSA), National Bio-Energy Mission.

References :

1. Abhishek Tiwary and Jerem Colls.(2020). Air Pollution: Measurement, Modelling and Mitigation.III Edition, Routledge Publication.
2. Agarwal.K.M, Sikdar P.K and Deb S.C. (2002). A Text book of Environment MacMillerIndia Ltd., Culcutta.
3. Climate Change: Science and Politics. (2021). Centre Science and Environment, NewDelhi.
4. Donald Ahrens. C. (2008). Essential of Meteorology: An Invitation to the Atmosphere.Cengage Learning Publication.
5. Howard J. Critchfield.(1983). General Climatology (4th Edition), Phi Learning Pvt Ltd.

6. IPCC. (2006). Guidelines for National Green house gas Inventories. Published by the Institute for Global Environmental Strategies (IGES), Hayama, Japan on Behalf of the IPC.
7. John E. Oliver, John J Hidore. (2002). Climatology: An Atmosphere Science, Second Edition. Printice Hall Publication.
8. John T. Hardy. (2003). Climate Change: Causes, Effects and Solution. John Wiley andSons Publication.
9. Mann, M.E. (2021 The New Climate War: The Fight to take back our planet, HachetteUK.
10. Nicholas Stern.(2008). The Economics of Climate Change: The Stern Review.Cambridge University Press, Great Britain.
11. Rajit Sengupta and Kiran Pandey, (2021). State of India's Enironment 2021: In Figures.Centre Science and Environment, New Delhi.
12. Roger G. Barry and Richard J. Chorley. (2007). Atmosphere, Weather and Climate, 8th Edition, Routledge Publication.
13. Shankar IAS Academy (2016).Environment 4th Edition. Chennai (India).

Semester II

GE/OE (Forensic Science)

GE 1 (BGO2T03): Introduction to Forensic Auditing, Forensic Accounting and Fraud Assessment

Learning Outcomes: By the end of this Course, the learners will be able to:

1. Apply the principles of forensic auditing and understand the fundamental concepts of forensic auditing and its role in investigating financial irregularities.
2. Understand the different types of fraud, including financial statement fraud, employee embezzlement, and corruption schemes.
3. Utilize forensic accounting techniques, including data analysis, financial statement reconstruction, asset tracing, and forensic interviews.
4. Develop strong written and verbal communication skills to present their forensic audit findings and fraud assessment reports.
5. Collaborate effectively with other professionals, to gather evidence, analyze complex financial transactions, and build strong legal cases.

Unit-I: Basics of Forensic Auditing

Introduction to Forensic Auditing, the difference between a general audit and Forensic Audit, Legal and Regulatory Framework, Understanding the legal and ethical considerations in forensic auditing, Fraud Examination Techniques, Introduction to data analytics in forensic auditing, Investigative Procedures and Evidence Gathering, Fraudulent Financial Reporting, Case Studies and Real-World Applications, Ethical Considerations in Forensic Auditing

Unit-II: Basic of Forensic Accounting

Forensic Accounting, basics of Forensic Accounting, the difference between general and Forensic accounting, principles of Forensic Accounting and fraud examination, Roles of a forensic accountant, forensic accounting services, forensic accounting skills; critical thinking, reasoning and communication.

Unit-III: Fraud Assessment I

Introduction to fraud; definition of fraud, Role of fraud assessment in forensic auditing, Importance of proactive fraud risk management different types of frauds such as insurance frauds, management fraud, financial statement fraud (revenue and inventory related frauds), disclosure frauds (consumer fraud, identity theft, scams, money laundering), tax fraud, fraud in e-commerce.

Unit-IV: Fraud Assessment II

Nature of fraud, fraud cycle, fraud schemes and red flags. Fraud prevention and fraud detection, recognizing symptoms of fraud, fraud investigation, fraud risk assessment. Emerging Trends and Technologies in Fraud Assessment, Introduction to technological advancements in fraud assessment, Use of artificial intelligence, machine learning, and data mining in fraud detection Future challenges and opportunities in fraud assessment

GE/OE (Forensic Chemistry)

GE 1 (BGO2T03): Chemistry of Natural and Synthetic Molecules

Course Outcomes: By the end of this Course, the learners will be able to:

1. Examine the classification, structure, properties and biological importance of synthetic sugar and natural sugars and its significance in forensic science.
2. Recall and understand the fundamentals of dyes and paints along with their nature, classification, composition use and significance in forensic science.
3. Understand the nature, structure and physical properties of fats and oils.
4. Understand the structure, types, properties, preparation, and application of polymers and its significance in forensic science.

Unit I: Sugars

Introduction, Classification, Properties and Biological importance. Natural and synthetic sugars, structures of glucose, reducing and non-reducing sugars, significance in forensic science

Unit II: Dyes and Paints

Dyes & Paints: Introduction, Nature, classification, composition, uses. Paints. Components of paint: binders, pigments, solvents, additives; Role and properties of each component in paint formulation; Common types of paints and their distinguishing features. Forensic significance of Dyes and Paints.

Unit III: Oils and fats

Introduction, Structures of Fats and Oils, Physical Properties of Fats and Oils, Physical Properties of Fats and Oils, Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils. Analytical constants: Acid value, Saponification value, Iodine value, significance and principle involved in their determination.

Unit IV: Polymers

Introduction, General idea of structures, types of polymerization processes, properties of polymers, Structure, preparation and applications of Polyethylene, Teflon, PVC, Polystyrene, etc. Significance in Forensic Science

GE/OE (Forensic Physics)

GE 1 (BGO2T03): Instrumentation Aids

Course Outcomes: By the end of this Course, the learners will be able to:

1. Remember the basic principles of electromagnetic radiation and its properties.
2. Apply the appropriate electromagnetic radiation sources such as UV, visible and IR rays etc. for specific forensic analysis.
3. Understand the basic structure and basic concept of optical fiber and remembering different types of optical fibers used in forensic physics.
4. Understanding the working mechanisms of various transducers and their applications.
5. Understand the principles of detection and signal processing and the working mechanisms of different detectors and their applications.

Unit I: Electromagnetic Radiation Sources

Conventional Sources for UV, Visible and Infrared Rays, Sources of Radiations for X-Rays, Laser (Ruby, He-Ne, CO₂, Dye Laser, Semi-Conductor Laser).

Unit II: Optical Fibres

Importance of Optical Fiber, Propagation of Light Waves in Optical Fiber, Basic Structure, Stepped Index Monomode Fiber, Graded Index Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Fiber Losses and their Units (Basic Concept), Electrical and Optical Band Width, Bandwidth Length Product, Dispersion in Optical Fiber.

Unit III: Transducers

Strain Gauge, Resistance Thermometer, Thermocouple, Thermistors and its Applications, Microphone & Loudspeaker, Photo-Electric Transducers, LVDT

Unit IV: Detectors

Photographic Detectors, Thermal Detectors, Photoelectric Detectors, PMT and Semiconductor Detectors. Construction and Working Principle of Ionization Chamber, Proportional Counter, Geiger Muller Counter, Scintillation Counter, Solid State Detectors.

GE/OE (Forensic Biology)

GE 1 (BGO2T03): Basics in Microbial Forensics

Course Outcomes: By the end of this Course, the learners will be able to:

1. Understand the concept of microbiology, bioterrorism, bio-surveillance, biodefence, biotoxin and their aspect in forensic science.
2. Recall and understand the structure of bacteria and viruses along with their different culturing techniques.
3. Gain a comprehensive understanding of the functioning of Recombinant DNA technology and its significance in forensic science, Polymerase Chain Reaction, its history and development, different types of vectors and restriction enzymes.
4. Examine the growth curve of bacteria and analyze concepts such as reproduction of bacteria, control of bacteria and different staining technique.

Unit-I: Introduction to Microbiology

Introduction of Microbiology, History, and Development of Microbiology; Whittaker Classification system; General structure of Bacteria and Viruses; Types of culture media (basal, selective, differential, enriched, enrichment); Culturing techniques of microorganisms (Streak plate and pour plate method).

Unit-II: Bacterial Reproduction, Control, and Culture Techniques

Reproduction of bacteria; Control of microorganisms (Chemical and Physical); Growth curve of bacteria; continuous culture and synchronous culture of bacteria; Staining of bacterial cells (Simple and differential).

Unit-III: Recombinant DNA Technology and Forensic Applications

Introduction to Recombinant DNA technology (RDT): History and development; Types of vectors (Plasmid, Cosmid, YAC, BAC); Restriction enzymes; Joining of DNA molecules; Introduction to PCR; Forensic significance of RDT.

Unit-IV: Microbial Forensics, Bioterrorism, and Biological Toxins

Introduction to microbial forensics, the critical elements, the sample collection methods and guidelines, the various detection methods and the result interpretation. Bioterrorism; Types of biological agents (Category-A, B, C); Bio surveillance; Biodefence; Forensic aspects of biological toxins (Ricin, Botulin).

B.Sc. Sem-II (Forensic Science - Major)

GE/OE (Psychology)

GE 1 (BGO2T03): Basics of Clinical Psychology

Course Outcomes: By the end of this Course, the learners will be able to:

1. Understand the fundamentals and characteristics of clinical psychology
2. Explore the activities of clinical psychologists, such as assessment, treatment, research, teaching, consultation, and administration.
3. Evaluate the scope and advancements in clinical psychology, including evidence-based practice, training, and different models of treatment delivery in the healthcare environment.
4. Analyze the ethical standards in clinical psychology, including principles of honesty, lack of bias, responsible caring, professional competence, and integrity in professional relationships.

Unit-I Basics of Clinical Psychology

Introduction and definition of clinical psychology, Historical overview of clinical psychology, characteristics of clinical psychology, Role of clinical psychologist, Legal, Educational, and Ethical Requirements to Be a Clinical Psychologist, Clinical Psychology and the Related Mental Health Professions. Qualification for clinical psychologist.

Unit-II: Clinical Psychologists at Work

Activities of Clinical Psychologists (Assessment, Treatment, Research, Teaching, Consultation, Administration, Employment Settings of Clinical Psychologists. Working with children and Family, working with adult, Working with people having disability and serious health issues and working with person of dementia.

Unit-III: Clinical Psychology in the 21st Century

Scope of clinical psychology, Evidence based practice, Clinical Psychology Training, Eclecticism and Integration, The Health Care Environment, Managed Care, Models of Treatment Delivery.

Unit-IV: Ethics in Clinical psychology

Ethical standards in clinical psychology, General principle, Value statement, honesty, lack of Bias, Responsible caring, professional competence and responsibility/ honesty and integrity in professional relationships.

GE/OE (Digital & Cyber Forensics)

GE 1 (BGO2T03): Office Automation

Course Outcomes: By the end of this Course, the learners will be able to:

1. Remember the basic functions of word processing software, such as creating, editing, and formatting documents.
2. Understand the basic features of MS Word, MS office, MS excel, MS power point and Open Office Writer, calc., base, and impress respectively. for collaboration and version control.
3. Apply the MS PowerPoint and OpenOffice Impress to create visually engaging presentations of forensic findings.
4. Evaluate the effectiveness of different document formats for preserving metadata and maintaining data integrity in forensic analysis.
5. Create the design and templates for forensic reports, data analysis, or presentation purposes using MS Word, MS Excel, MS PowerPoint, or OpenOffice applications.

Unit I: Introduction to MS Office - MS Word and Open Office – Writer

MS Word - Working with Documents -Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help, **Formatting Documents** - Setting Font styles, Font selection-style, size, colour etc, Type face - Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering. **Setting Page style** - Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes – Shortcut Keys; Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page. **Creating Tables**- Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, **Drawing** - Inserting Clip Arts, Pictures/Files etc., **Tools** – Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature. **Printing Documents**– Shortcut keys. **Free Open Source Software: OPEN OFFICE - WRITER: Introduction to Open Office Suite** - Selecting the application package, working with Documents- Formatting Documents - Setting Page style- Creating Tables - Drawing- Tools - Printing Documents - Operating with MS Word documents.

Unit II: Introduction to MS Office – MS Excel and Open Office – Calc

MS Excel: Spread Sheet & its Applications, Opening Spreadsheet, Menus - main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets-opening, Saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing - Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys. **Entering & Deleting Data**- Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks, **Setting Formula** - finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), Using other Formulae. **Formatting Spreadsheets**- Labelling columns & rows, Formatting- Cell, row, column & Sheet, Category - Alignment, Font, Border & Shading, Hiding/ Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width, Visibility - Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Colour etc, Borders &

Shading – Shortcut keys. **Working with sheets** – Sorting, Filtering, Validation, Consolidation, and Subtotal. **Creating Charts** - Drawing. **Printing, Using Tools** – Error checking, Spell Checks, Formula Auditing, Creating & Using Templates, Pivot Tables, Tracking Changes, Security, Customization.

OpenOffice-Calc - Introduction – Introduction to Spreadsheets, Overview of a Worksheet, Creating Worksheet & Workbooks, Organizing files, Managing files & workbooks, Functions & Formulas, Working with Multiple sheets, Creating Charts & Printing Charts – Operating with MS Excel documents, which are already created and saved in MS Excel.

Unit III: Introduction to MS Office-MS Access and Open Office-Base

MS Access: Introduction, Planning a Database, Starting Access, Access Screen, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview – Importing data from other databases viz. MS Excel etc.

OpenOffice-Base – Introduction- Database Concepts – Creating a New Database, Creating Tables, Working with Forms, creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing and Printing preview – Operating with other databases i.e. MS Access etc.

Unit IV: Introduction to MS Office-MS Power Point and Open Office-Impress

MS Power point: Introduction to presentation – Opening new presentation, Different presentation templates, setting backgrounds, selecting presentation layouts. **Creating a presentation** – Setting Presentation style, Adding text to the Presentation. **Formatting a Presentation** - Adding style, Colour, gradient fills, arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation- Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw. **Adding Effects to the Presentation-** Setting Animation & transition effect. **Printing Handouts**, Generating Standalone Presentation viewer.

OpenOffice-Impress - Introduction – Creating Presentation, Saving Presentation Files, Master Templates & Re-usability, Slide Transition, Making Presentation CDs, Printing Handouts – Operating with MS Power Point files / slides.

B.Sc. Sem-II (Forensic Science - Major)

GE/OE (Law)

GE 1 (BGO2T03): Criminal Law I

Learning Outcomes: By the end of this Course, the learners will be able to:

1. Understand the criminal law by interpreting and explaining the provisions of IPC 1860 related to offenses affecting the human body, offenses against property, and offenses relating to coins and government stamps.
2. Apply their knowledge of criminal law to practical scenarios.
3. Analyze legal provisions and case laws related to offenses affecting the human body, offenses against property, and offenses relating to coins and government stamps.
4. Synthesize their knowledge and skills to propose legal strategies and solutions in criminal law cases.
5. Evaluate the ethical considerations, legal principles, and forensic evidence in the investigation, prosecution, and adjudication of these offenses.

Unit I: Introduction to Indian Penal Code, 1860

Historical background, Jurisdiction under the Code, Definitions, Punishments, General Exceptions.

Unit II: Offences affecting the Human Body

Culpable homicide and Punishment for culpable homicide not amounting to murder. Murder and Punishment for murder. When culpable homicide is not murder. Punishment for murder by life-convict. Causing death by negligence. Dowry death. Abetment of suicide. Attempt to murder. Hurt and Grievous hurt. Sexual offences, Unnatural Sexual offences.

Unit III: Offences against Property

Theft, Extortion, Robbery and Dacoity. Criminal Misappropriation of Property. Criminal Breach of Trust. Receiving of Stolen Property. Cheating. Fraudulent Deeds and Dispositions of Property.

Unit IV: Offences relating to Coins, Government Stamps, etc.

Counterfeiting of coin, Government Stamps. Offences relating to Weights And Measures. Offences relating to Documents. Offences relating to Property Marks and other marks. Offences relating to Currency-Notes and Bank-Notes.

SEMESTER - II

Paper I: Introduction to Landforms (BGO2T03)

Unit I

From of Earth; atmosphere; hydrosphere; biosphere; weathering and erosion; differential weathering; products of weathering

Unit II

Concept of diastrophism; types of diastrophism – epeirogenic movements (continental building movements), orogenic movements (mountain building movements); sudden movements, slow and secular movements; evidences for upliftment of land; evidences for subsidence of land

Unit III

Development of (drainage) rivers system; identification and naming of streams; concept of drainage area, altitude, volume, slope, profiles of the land and drainage basin characteristics; stream order, stream length, mean stream length, stream length ratio.

Unit IV

River profiles; sea profiles; types of coast lines; coral reefs; ice sheets; glaciers; desertic lands.

Recommended Books

1. Arthur Holmes (1978) Principles of Physical Geology
2. Emmons, Thiel, Staffer and Allison: Geology principles and Processes.
3. Hamblin, Kenneth: The Earths' Dynamic System.
4. Sawkins, Chase, Darby and Rapp: The Evolving Earth: A Text Book in Physical Geology.
5. Mallory and Cargo: Physical Geology.
6. Judson Kauffman and Leet: Physical Geology.
7. Skinner and Porter: The Dynamic Earth: An introduction to Physical Geology.
8. Tarbuck and Lutgens: The Earth: An introduction to Physical Geology.
9. Manroe and Wicander: Physical Geology: Exploring the Earth

SEMESTER II

2. BUSINESS STATISTICS –I

Course Outcomes: This course will enable the students to

1. Translate the real word problems through appropriate statistical modelling.
2. Explain the concepts and use equations, formulae and statistical expression and relationship in a variety of context.
3. Analyze and demonstrate the statistical skill require in intensive areas in economics and business.

UNITS	TOPICS	HOURS
Unit 1	Permutations and combinations, Set theory, Logarithm, Binomial theorem, Compound interest, Annuities	8
Unit 2	Charts & Diagrams, Collection, Classification & Presentation of business statistical data	8
Unit 3	Frequency Distribution, Frequency Curve and Analysis of data	7
Unit 4	Measure of central tendency and Measure of dispersion	7
	TOTAL	30 HRS

Recommended Books:

1. Fundamental of Mathematical Statistics, B L Agarwal, S. Chand
2. Business mathematics of Statistics., N.G. Das, J. K. Das, Mc Graw Hill
3. Statistical Methods, Gupta S. P.: Sultan Chand and Sons, New Delhi.
4. Fundamental of Mathematical Statistics, S.C. Gupta, V. K. Kapoor, Sultan Chand & Sons

B.Sc. Semester-II Subject: MICROBIOLOGY Course Code: BGO2T03 MICROBIAL WORLD			
GE/OE	Hours: 2Hours/Week	Marks:80+20= 100	Credit: 2
Unit-I			
Prokaryotic microbes	1. General characters of a) Proteobacteria, b) Mycoplasma 2. Cyanobacteria: Characteristics of anabena and applications of cyanobacteria 3. Actinomycetes: Characteristics of Streptomyces and their applications 4. Archae bacteria:Types of archaeobacteria (Brief description), Methanogenic bacteria and their importance	7.5 Hrs	
Unit-II			
Eukaryotic microbes	1. Fungi and yeast:General characters, Asexual and sexual mode of reproduction, 2. Algae:-General characters and industrially important algal cells 3. Protozoans: General characters and life cycle of <i>Entamoeba histolytica</i>	7.5 Hrs	
UnitIII			
Acellular microbes: Viruses.	1. Discovery of viruses, General structure, symmetry and classification 2. Cultivation: Animal inoculation, chick embryo & tissue culture method 3. Detection of viral growth 4. T4-Bacteriophages-lyticcycle, 5. Lambdaphage-Lysogenic cycle.	7.5 Hrs	
UnitIV			
Microbial interaction	1. Positive and negative interaction:Commensalism, synergism, syntropism, mutualism, parasitism, predation, antagonism, competition 2. Protist-Plant interaction:Root nodule bacteria 3. Protist-Animal interaction: Rumen bacteria, insect midgut bacteria, luminescent bacteria	7.5 Hrs	

Reference Books:

1. Prescott,Hurley. Klein-Microbiology, 7th edition, International edition, McGraw Hill.
2. Stanier. Ingrahametal, General Microbiology 4th & 5th Ed. 1987, Macmillan Education Ltd
3. Microbiology An Introduction .6th Edition. Tortora, Funke and Case.Adisson Wesley LongmanInc. 1998.
4. Powar C .B. and Daginawala H. I.(2005). General microbiology Volume I .Himalaya Publishing House Private Limited, Pune, India.

5. Powar C. B. and Dagainawala H. I. (2005). General microbiology Volume II. Himalaya Publishing House, Private Limited, Pune, India
6. Madigan M. T, Martinko J M, Dunlap P V and Clark. D P. 2008. Brock Biology of Microorganisms. 12th Ed. Pearson/ Prentice Hall
7. Arora B. and Arora D. R. (2020). Practical Microbiology. CBS Publishers and Distributors, New Delhi, India.
8. Tortora G. J., Funke B. R. and Case C. L. (2016). Microbiology: an Introduction. Twelfth edition. Pearson, London

Sr.No.	Course outcome
1.	After completing this course students will be able to acquire basic knowledge about the importance of Microbiology
2.	Students will learn about basic characteristics features of microorganisms
3.	Students will be able to study the classification of bacteria
4.	Students will gain insights into the important characters, classification & life cycle of viruses.

FYUGP Semester-II
Generic Elective / Open Elective Course (GE/OE-2) (BGO2T03)
(Energy Sources)

GE/OE-2 THEORY	Hours: 04 Hours /Week	Marks: 80 + 20 = 100	Credit: 02
Unit-I			
Conventional and Non-conventional energy Sources, Solar Energy	Conventional and Non-conventional energy Sources: Fossil fuels and Nuclear Energy, their limitation, need of renewable energy, Solar Energy: Solar energy, its importance, storage of solar energy, solar pond, non-convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems. Solar energy utilization by Solar roof panels.		7.5 Hrs
Unit-II			
Ocean Energy, Tidal energy, Geothermal Energy	Ocean Energy: Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices. Tidal energy, Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy, Osmotic Power. Geothermal Energy: Geothermal Resources, Geothermal Technologies. (02 L)		7.5 Hrs
Unit -III			
Hydro Energy, Biomass energy, Wind Energy	Hydropower resources, hydropower technologies, environmental impact of hydro power sources. Biomass, biochemical conversion, biogas generation, Ocean biomass Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies		7.5 Hrs
Unit -IV			
Piezoelectric Energy, Electromagnetic Energy	Physics and characteristics of piezoelectric effect, materials and mathematical description of piezoelectricity, Piezoelectric parameters and modeling piezoelectric generators, Piezoelectric energy harvesting applications, Human power Linear generators, physics mathematical models, recent applications, Carbon captured technologies, cell, batteries, power consumption Environmental issues and sustainability of renewable energy sources.		7.5 Hrs

Reference Books:

1. Non-conventional energy sources - G.D Rai - Khanna Publishers, New Delhi
2. Solar energy - M P Agarwal - S Chand and Co. Ltd.
3. Solar energy - Suhas P Sukhatme Tata McGraw - Hill Publishing Company Ltd.
4. Godfrey Boyle, "Renewable Energy, Power for a sustainable future", 2004, Oxford University Press, in association with The Open University.
5. Solar Energy: Dr. P Jayakumar, Resource Assesment Handbook, 2009
6. Photovoltaics, J.Balfour, M.Shaw and S. Jarosek, Lawrence J Goodrich (USA).

Course outcomes

After the completion of this course students will be able

Sr. No	Course outcome
1.	To impart knowledge of basic concepts of Conventional and Non-conventional Energy Sources.
2.	To get the knowledge and methodology necessary for Solar, Ocean, geothermal, Hydro and Biomass energy resources.
3.	To learn the efficiency of the technology available for using source of energy and the environmental impact of using that source.
4.	To apply the knowledge of Energy Sources to real life problems.
5.	To create scientific temperament related to Energy Sources.

	Semester II (GE/OE)
	Name of the Paper - Statistical Methods And Psychological Testing
	Paper code – (BGO2T03) 2 Credits (2 hrs Theory per week)
	Course Objectives
	To introduce basic statistical methods, psychological testing and qualitative methods and their uses.
	Course Outcomes (CO)
	Statistical methods play a critical role in the field of psychology by helping researchers to draw meaningful conclusions from their data. It is important for psychologists to have a solid understanding of statistical methods so that they can design effective studies and accurately interpret their findings. After the successful completion of the course, the students will have knowledge of different psychological testing and qualitative methods and their uses.
	CONTENTS
	Unit 1 (15 Hrs)
(A)	Data: Ungrouped and grouped, frequency distribution. Graphical representation of data: Histogram and Frequency Polygon. Primary and Secondary data,; Tabulation of data; Graphs and charts; Frequency distributions;
(B)	Application: Diagrammatic presentation of data ,Graphical representation
(C)	Data analysis Measures of central tendency: Mean, Median, Mode (Properties and Computation of grouped & ungrouped data) Application: Computation of statistical problems.
(D)	Measures of Dispersion Meaning and objectives of measures of dispersion. Essentials of a good measure of dispersion, absolute and relative measures of dispersion. Types of measures of dispersion- Range, Quartile deviation, Mean deviation and standard deviation with relative measures – definition, merits and demerits. Properties of Standard deviation, simple problems on ungrouped and grouped data. Computation of standard deviation
(E)	Correlation: Meaning & types: Spearman’s Rank Correlation Pearson’s Product Moment correlation , Normal Probability Curve (NPC): Properties
	Unit II (15 Hrs)
(A)	Test of Significance: All applications of Chi Square test , All applications of ‘t’ test.
(B)	Psychological Testing: Introduction to psychological testing, characteristics of Psychological test, Reliability, Validity, Norms and standardization. Types of tests.
(C)	Qualitative methods: Methods of data collection - Interview, observation, case study.
(D)	Application: Use of psychological test in day to day life
	References
1	Chadha, N. K. (1991): Statistics for Behavioral and Social Sciences. Reliance Pub. House: New Delhi.
2	Garrett, H. E. & Woodworth, R. S. (1987): Statistics in Psychology and Education. Mumbai, Vakils, Feffer & Simons Pvt. Ltd.
3	Gregory, R. J. (2006): Psychological Testing: History, Principles, and Applications (4th Ed.) New Delhi: Pearson Education
4	King, B. M. & Minium, E. W, (2007): Statistical Reasoning in the behavioral Sciences USA: John Wiley & Sons

Credit: 2

Course outcomes: After completion of the course, students will able to-

- Understand, describe and explain the Mulberry sericulture
- Understand, describe and explain Tasar sericulture.
- Understand, describe and explain Eri sericulture
- Understand, describe and explain lac culture.
- Understand, describe and explain agricultural and medical pests.
- Understand, describe and explain apiculture.

Unit 1- Mulberry sericulture

1.1 Mulberry sericulture:- life history and rearing.

1.2 Silk gland of mulberry silkworm:- structure and silk synthesis.

1.3 Cocoon formation, cocoon harvesting and reeling.

1.4 Mulberry plantation and silkworm rearing house.

Unit 2- Tasar sericulture

2.1 Tasar silkworm biology and life cycle.

2.2 Mature tasar larvae, silk gland and silk proteins.

2.3 Hammock and cocoon formation, cocoon harvesting.

2.4 Natural host plants and predators of tasar silkworm.

Unit 3- Eri, lac culture , agricultural and medical pests

3.1 Eri silkworm biology and life cycle.

3.2 Lac insect- biology, lac cultivation and economic importance.

3.3 Agricultural pest: pest of paddy, pest of vegetables, pest of stored grain

3.4 Insect vectors spreading diseases in human (Malaria, Filarial, Kala- Azar).

Unit 4- Apiculture

4.1 Types of honey bees, *Apis dorsata*, *A. indica* and *A. mellifera*.

4.2 Colony formation and Apiary products.

4.3 Beekeeping techniques: moveable frame hive and bee rearing management.

4.4 Economic importance honey, wax and other apiary products.

Suggested reading:

K.K. Nayar, T. N. Ananthkrishan and B.V. Davis. General and Applied Entomology, Tata McGraw - Hill Co.Ltd., pp. 589.

D. B. Tembhare. Modern Entomology(Second edition):, Himalaya Publication House.

C. L. Metcalf, W. P. Flint and R. I. Metcalf . Destruction and Useful Insect, Their Habits and Control, , Mc Grow Hill Co. New York.

H. S. Dennis. Agriculture Entomology, , Timber Press Inc.

Alford V. David. Text Book of Agriculture Entomology, Blackwell Science.

Fashion Design/Textile Science
Four Year (Eight Semester Degree Course)
Semester - II
Computer Application in Design
GE/OE (BGO2 TO3)

Theory Marks :50	Practical : 50	Total Credits : 2
SEE :40	SEE : 25	Theory : 1
CIE :10	CIE : 25	Practical : 1

Time Required: 45 Hours

Theroy (15 Hours)

Objectives

1. To help student to understand the fundamentals and principle of CAD
2. To explain the structure, features and concept of Hardware and software.
3. To help student to learn basic presentation skill
4. To help students to learn basic e mail and web use

Learning outcomes: Students will be able to understand the basic uses of MS Office and develop assignments by using the software effectively. Students will be able to understand the concept of E mail basics and handling.

Unit I: (3 Hours)

In Put Device

- 1.1 CAD – Definition
- 1.2 Digitizers
- 1.3 Image Scanners
- 1.4 Bar Code Reader, OMR & OCR,

Unit II : (4 Hours)

Out Put Device

- 2.1 Printers
- 2.2 Classification of Printers
- 2.3 Plotters

Unit III: (4 Hours)

Communication System

- 3.1 Basic elements of a communication system, Simplex
- 3.2 Half Duplex
- 3.3 Full Duplex
- 3.4 Types of communication Channels

Unit IV: (4 Hours)

Internet

- 4.1 Internet working tools: Bridge
- 4.2 Routers
- 4.3 Gateways
- 4.4 Introduction to 2G, 3G, 4G, Technology
- 4.4 Search Engines

Practical:**(30 Hours)**

1. Introduction to Excel, Spreadsheet & its Applications, Menus, Toolbars, Working with Spreadsheets, Converting files to different formats, Computing data, Formatting spreadsheets, Working with sheets, Sorting, Filtering, Validation, Consolidation, Subtotal

2. Introduction to presentation, Formatting a presentation, Adding style, Color, gradient fills, Arranging objects, Slide Background, Slide layout, Adding Graphics to the presentation, Inserting pictures, movies, tables, etc into the presentation, Drawing Pictures using Draw, Adding effects to the presentation, Setting Animation & transition effect, Adding audio and Video.

Internet and web use, E-mail basics,

Reference:

1. Computer fundamentals-Sinha P.K.
2. Introduction to Computers-Peter Nartons
3. Computer for Beginners-Arora Pawan
4. Computer Network-Andrew Tanenbaum,
5. Fundamentals of Computer-V.rajaram

B.Sc. Semester – II
BGO2T03: Kitchen and Nutrition Chemistry
Theory: 2 credits

Course Outcomes

After the completion of this course, student will be able to

- 1. Understand the chemical composition of food, including macromolecules, nutrients, and additives, and their significance in cooking, nutrition, and medical applications*
- 2. Apply knowledge of macromolecules, cooking chemistry, and food additives to analyse and optimize cooking processes, ensuring the preservation of nutritional value and sensory quality in prepared foods.*
- 3. Evaluate the classification and sources of nutrients in food, considering macronutrients, micronutrients, and additives, to make informed dietary choices that support overall health and well-being.*
- 4. Critically analyse the role of food additives in food preservation and flavour enhancement, considering their chemical composition and potential impacts on human health and food quality.*

Unit - I: Nutrition in Food (7.5h)

Introduction to nutrition, definition of food, nutrients and nutrition, Relation of food and health, Balance diet, Food and its functions (Physiological, psychological and social function), Classification of nutrients (Micronutrients and macronutrients), Understanding the role of carbohydrates, proteins, fats and oils in food systems, Chemical structures and functions of macromolecules (carbohydrates, proteins, fats and oils).

Unit - II: Chemistry of Cooking (7.5 h)

Introduction and definition of cooking, Objective of cooking food, Methods of cooking- Dry heat method of cooking, moist heat method of cooking, cooking under pressure, microwave cooking, solar cooking and infrared cooking. Physical and Chemical changes during cooking (Caramelisation, crystallization, gelatinization, emulsification, coagulation and pyrolysis), Stability of nutrients during cooking. Food sterilization - pasteurization of milk, Safety protocols and best practices in kitchen chemistry.

Unit - III: Classification and sources of nutrients (7.5h)

Chemistry of spices and condiments- Definition, classification on the basis of active principles present in spices (Pungent spices, aromatic seeds and fruits, aromatic barks, phenolic spices and colour spices), function of spices and condiments in the cookery.

Carbohydrate- Definition, occurrence, sources and classification with examples.

Protein- Definition, occurrence, sources and classification with examples

Fat-Oil - Definition, occurrence, sources and classification of fatty acid with examples

Vitamins - Definition, occurrence, sources and classification(water soluble and fat soluble)

Unit – IV: Water and beverages (7.5h)

Water – Water contents of common foods (free water and bound water), Function of water in cookery, effect water content of food on the nutritive value, types of water (hard water and soft water), disadvantages of hard water.

Beverages – Introduction and definition, functions of beverages, classification of beverages with examples – cold and hot, alcoholic and non-alcoholic, Types of Tea (green tea, black tea and oolong tea), Cold beverages (carbonate drinks and alcoholic drinks), effect of beverages on human body.

References

1. The Science of Cooking: Understanding the Biology and Chemistry behind Food and Cooking; Joseph J. Provost, Keri L. Colabroy, Brenda S. Kelly, Mark A. Wallert.
 2. Dairy Chemistry and Animal Nutrition – M.M. Roy.
 3. Fundamentals of Dairy Chemistry -B.H. Webb, A.H. Hooson, J.A. Alford, CBB Publishers
 4. Milk and Milk Products-C.H. Eckles, H. Macy, Tata McGraw Hill Publishing Company
 5. Essential Guide To Food Additives by Victoria Emerton and Eugenia Choi <https://books.rsc.org/books/edited-volume/21/Essential-Guide-to-Food-Additives>
 6. Food Additives Data Book by Jim Smith and Lily Hong-Shum.
 6. Food Additives by A. Larry Branen, P. Michael Davidson, Seppo Salminen and John H. Thorngate III
 7. Food and Nutrition Handbook for Extension Workers by Ministry of Agriculture, Animal Industry and Fisheries.
 8. Textbook on Nutrition & Dietetics for Post Basic BSc Nursing Students by I. Clement.
 9. Food science and nutrition by Sunetra Roday, Oxford university, 3rd addition.
 10. Malik R. K. and K. C. Dhigra, Hand book of food industries, Small industry, Research institute.
 11. Fox B. A. and A. G. Cameron, Food science and chemical approach Hodder and Stoughton educational, 1982.
- Fitch and Francis, foods and principles of cookery, Prentice-Hall, Inc 1960.

Bachelor of Science (Honors / Research) 4 yr. 8 Semester Degree Program
B.Sc. Sem II (Interior Design – Major)
BGO2T03 MATHEMATICS II

AIM : To understand elementary principles of mathematics. To apply mathematics in practical problems. To obtain accuracy in calculations and results of various mathematical experiments.

UNIT I : Matrices

Addition, scalar multiplication and product of matrices, Elementary row operations, Rank and inverse of a matrix, Consistency and solution of a system of linear equations, Eigen values and eigen vectors

UNIT II : Curvature and radius of curvature (cartesian, parametric and polar form), centre of curvature and circle of curvature (cartesian form only)

UNIT III : Partial differentiation

Functions of several variables of first and higher order, Homogeneous functions, Euler's theorem on homogeneous functions

UNIT IV : Differential equations of first order and first degree

Variable separable form, homogeneous equations, linear equations and exact equations

UNIT V : Linear Differential Equations

Linear differential equations with constant coefficient, method of variation of parameters

REFERENCE BOOKS :

1. Higher Engineering Mathematics – Dr.B.S.Grewal
2. A Text Book of Engineering Mathematics – N.P.Bali, Manish Goyal
3. Engineering Mathematics – H.K.Das

S. No	Course Outcomes
CO1	Students will understand the concept of matrices.
CO2	Students will learn about Curvature and radius of curvature.
CO3	Students will learn about major concept of mathematics that is Partial Differential Equation.
CO4	Students will be able to solve problems related to Differential Equation Of 1 st order and 1 st degree and understand the concept of Linear Differential Equations.
CO5	Understand Definite Integrals

B. Sc (Applied Electronics & Software Technology) – Semester II (GE/OE)

BGO2T03

ENGINEERING MATHEMATICS II

Scheme of Examination (Theory)

SEE – 80

CIE - 20

Total - 100

Course Outcomes:

- 1) Understand Limits
- 2) Understand first order Derivatives
- 3) Understand second order Derivatives
- 4) Understand Integration by parts and Partial fractions
- 5) Understand Definite Integrals.

Unit I :

- Limits
 - Definition , Standard forms
 - Special Cases as : Limit tends to Infinity

Unit II :

- Derivatives (I)
 - Derivatives from definition , Standard forms , Product rule, Quotient rule , Parameter form, Logarithmic derivatives , Implicit functions

Unit III :

- Derivatives (II)
 - Rate measuring , Maxima-minima

Unit IV :

- Integration (I)
 - Standard forms , Substitution Method, Integration by parts
 - Algebraic forms, Partial fractions

Unit V :

- Integration (II)
 - Definite Integrals , Area by definite integration

Reference Books :

1. Differential Calculus by Gorakh Prasad
2. Integral Calculus by Gorakh Prasad

GE/OE Basket Semester II
Faculty of Science and Technology

Semester	Course Category		Name of Course	BoS	Course code
II	GE/OE	1	Hydroponics and Plant Growth Regulators	Botany	BGO2T04
		2	Antimicrobial Resistance	Biochemistry	
		3	Bioethics and Biosafety in Biotechnology	Biotechnology	
		4	Web Technologies	Computer Science/ Computer Application	
		5	Home Automation	Electronics	
		6	Environmental Disaster and Management	Environmental Science	
		7	A. Forensic Gemology / B. Chemistry of Drugs / C. Introduction to Forensic Ballistics / D. Basics of Biostatistics and Bioinformatics/ E. Basics of Psychology (Psychology)/ F. Internet & Web Development/	Forensic Science	
		8	Tools and Techniques in Geology	Geology	
		9	Business statistics II	Mathematics	
		10	Statistics for Economics	Statistics	
		11	Fish farming	Zoology	
		12	Organic Chemistry	Cosmetic Technology	
		13	Chemical Processing-II	Fashion Design	
		14	Chemical Processing-II	Textile Science	
		15	Basics of Environmental Pollution	Chemistry	
		16	Biomolecules	Microbiology	
		17	Cultural Anthropology II	Interior Design	
		18	Social Science II	Applied Electronics & Software Technology	

B. Sc. Semester-II			
GE / OE-4 Botany (BGO2T04)			
Hydroponics & Plant Growth regulators.			
GE/OE-IV Theory	Hours: 2 Hours/Week	Marks: 80+20=100	Credit: 2
Unit-I			
1. Hydroponics: Introduction, Scope and Importance of Hydroponics, Different types of hydroponic systems, NFT and DWC 2. Methods of hydroponic farming in tomato, spinach and cucumber. 3. Commercial Aspects of Hydroponics- Concept and importance of post-harvest management including cooling, cleaning, sorting, grading and packaging 4. Advantages and disadvantages of Hydroponics.			7.5 Hrs.
Unit-II			
1. Mineral nutrition –sources and types (Macro and Micronutrients) 2. Role and deficiency symptoms of Macronutrients – Nitrogen, Phosphorus, Potassium and Calcium. 3. Role and deficiency symptoms of Micro nutrients – Iron, Manganese, Boron and Zinc. 4. Government Schemes for hydroponics			7.5 Hrs.
Unit-III			
1. Plant growth regulators (Phyto-hormones) – i. Definition, Natural and synthetic, Auxins- Discovery, occurrence, Distribution, Structure. ii. Synthetic auxins – IPA, IBA, NAA, 2,4-D, 2,4,5-T iii. Effect of auxins on plant growth and development. (cell elongation and cell division, apical dominance, phototropism, geotropism and sex expression) iv. Uses of auxin in rooting, seedless production, promotion of flowering and tissue culture. 2. Gibberellins – History, types, structure, GAs, regulation by environment and its role in seed development and other physiological functions.			7.5 Hrs.
Unit-IV			
1. Cytokinins- History, structure, function, mode of action and uses. 2. Ethylene - History, structure, properties, function, properties and production. 3. Abscisic acid (ABA) – Discovery, structure, function, location and timing of biosynthesis, effect.			7.5 Hrs.

Suggested Readings:

1. How to Hydroponics 4th Edition by Keith Roberto
2. Hydroponic Grower Books Varieties
3. Hydroponics for the Home Grower by Howard M. Resh
4. Hydroponic Tomatoes by Howard M. Resh
5. Commercial Hydroponics by John Mason
6. Plant Factory: An Indoor Vertical Farming System for Efficient Quality Food Production by OyokiKozai
7. The Hydroponics Gardening Guide to Growing Your Own Vegetables, Fruits and HerbsRiley Brown
8. The Ultimate Beginner's Guide to Container Gardening in Urban Settings. Roger Grant
9. Plant Growth Regulators Signaling Under Stress Conditions (Hb 2021) by Aftab T , Springer
10. Plant Growth Regulators Bio-stimulants and Chemicals on Horticultural Crops by Rajangam, J, A Subbiah, C Rajamanickam, K S Vijai Selvaraj, P Balasubramanian, T Sivakumar & K Balakrishnan, Satish Serial Publishing House
11. Plant Growth Regulators in Fruit Science by J.S. BAL
12. Plant Physiology by Ross, Salisbury (1999) CBS
13. Biochemistry- Plummer (1989) Mc Graw hills Publication
14. Plant Biochemistry - Day and Harborne (2000)
15. Introductory Plant Physiology Glenn Ray Noggle, George John Fritz

GE / OE- 4 - (Biochemistry)

Semester 2

ANTIMICROBIAL RESISTANCE (AMR) – (BGO2T04)

COURSE OBJECTIVES

After completion of the course students will be able to:

1. Learn about the global health challenge called Antimicrobial resistance(AMR)
2. Describe the role and importance of antibiotics, their sources and learn to categorize them on the basis of mechanism of action.
3. Enumerate and describe how bacteria can become resistant and the mechanisms that may be involved in that process
4. Describe how antimicrobial resistance emerges and spreads around the world
5. Understand the need for alternative therapeutics and global scenario on AMR.

UNIT 1

Antimicrobials and their action: Definition, natural sources, Antibiotics and antibiotic resistance in the pre-antibiotic era, Modern antibiotic era, classes of antibiotics, Antibiotic resistance(AMR): origin and current status. AMR in Agriculture, AMR in animals

UNIT 2

Mechanism of action of antibiotics: Inhibition of cell wall synthesis, Inhibitors of protein synthesis, Inhibitors of membrane function, Inhibitors of nucleic acid synthesis, antimetabolites

UNIT 3

Mechanism of resistance development: Drug resistant mutations in bacteria, antibiotic target modification, modifying cell wall permeability, Acquired resistance from gene transfer, antimicrobial efflux pumps, Bacterial biofilms, metabolic modifications, ESKAPE pathogens, Concept of MDR.

UNIT 4

AMR Challenges and threat, Sources of Antibiotic Resistance: Zoonotic, Human and Environment, causes of the antibiotic resistance crisis (drug related, patient related, environment related etc.), Strategies to overcome AMR, New approaches for alternatives to antibiotics, Role of WHO in AMR awareness.

List of Books:

1. Antimicrobial Resistance-Underlying Mechanisms and Therapeutic Approaches by Vinay Kumar, Varsha Shriram, Atish Paul, Mansee Thakur, Springer Singapore, Published: 03 January 2022
2. Antibiotics: Targets, Mechanisms and Resistance, Editor(s):Claudio O. Gualerzi, Letizia Brandi, Attilio Fabbretti, Cynthia L. Pon, Wiley-VCH Verlag GmbH & Co. KGaA, First published:4 October 2013
3. The End of an Antibiotic Era,Bacteria's Triumph Over a Universal Remedy By Rinke van den Brink · 2021 3 April 2019,
4. Antimicrobials, Antibiotic Resistance, Antibiofilm Strategies and Activity Methods; Publisher: IntechOpen, Editor:Sahra Kırmusaoglu
5. Antimicrobial Stewardship: Principles and Practice 1st Edition,by K. LaPlante (Editor), Cheston Cunha (Editor), H. Morrill (Editor), Louis Rice (Editor), Eleftherios Mylonakis (Editor)

Open Elective Courses

SEMESTER – II

BIOETHICS AND BIOSAFETY IN BIOTECHNOLOGY

Course Code: BGO2T04

Total Contact Hours: 30

Course Outcomes:

After successful completion of this Course, students will be able to:

CO 1. Give an insight about the morals and principles while working in the field of biology.

CO 2. Make the students aware of the issues arising per while handling and developing genetically engineered organisms and laboratory animals.

CO 3. Understand the risks involved and the regulations to be followed when experimenting with biological samples.

CO 4. Develop a perception about the practices to be followed in a biotechnology laboratory and the management of the laboratory waste.

UNIT I

7 hours

An introduction to Bioethics; Medical ethics and environmental ethics; Concepts of Bioethics: Autonomy, Justice, Beneficence, Non-Maleficence; Control, resolution, and enforcement of regulations; Ethical committees and constitution

UNIT II

8 hours

Bioethics in health care: patient confidentiality, informed consent, euthanasia, artificial reproductive technologies, prenatal diagnosis, genetic screening, gene therapy, transplantation; Bioethics in research: cloning and stem cell research, Human and animal experimentation, animal rights/welfare; Genetically engineered food, environmental risk, labelling and public opinion

UNIT III

7 hours

Introduction to biosafety and biosecurity; Biological hazards: types; primary containment for biohazards; introduction to biological safety cabinets; Risk assessment: HACCP and management (Assessment, Mitigation and Performance), International Guidelines regarding Biosafety and Biosecurity: OIE, WHO, NIH, CDC

UNIT IV

8 hours

Biosafety Levels: High risk micro-organisms and their management; Good Laboratory Practices (GLPs) and Good Manufacturing Practices (GMPs); Bio-waste Management; Plant biosafety, Principles of safety assessment of transgenic plants – sequential steps in risk assessment

References:

- Kuhse, H. (2010). *Bioethics: an Anthology*. Malden, MA: Blackwell
- Karen F. Greif, Jon F. Merz - *Current Controversies in the Biological Sciences_ Case Studies of Policy Challenges from New Technologies (Basic Bioethics)*-The MIT Press (2007)

- V. Sreekrishna - Bioethics and Biosafety in Biotechnology-to New Age International Pvt Ltd Publishers (2007)
- Padma Nambisan (Auth.) - An Introduction to Ethical, Safety and Intellectual Property Rights Issues in Biotechnology- Academic Press (2017)
- Kshitij Kumar Singh (auth.) - Biotechnology and Intellectual Property Rights_ Legal and Social Implications-Springer India (2015)
- David Castle - The Role of Intellectual Property Rights in Biotechnology Innovation (2011)
- Goel, D., & Parashar, S. (2013). *IPR, Biosafety and Bioethics*. Pearson Education India.15. Guidelines for Safety Assessment of Foods Derived from Genetically Engineered Plants. 2008.
- Alonso, G. M. (2013). *Safety Assessment of Food and Feed Derived from GM Crops: Using Problem Formulation to Ensure “Fit for Purpose” Risk assessments*

B.Sc. Sem-II (Computer Science/ Computer Application)
BGO2T04

WEB TECHNOLOGIES

Credits : 2

Duration : 30 Hours

Course Objectives:

1. To comprehend and analyse the basic concepts of web programming and internet protocols.
2. To describe how the client-server model of Internet programming works.
3. To demonstrate the uses of HTML and DHTML.

Course Outcome:

After completing this course satisfactorily, a student will be able to:

1. Differentiate web protocols and web architecture.
2. Apply HTML and DHTML effectively to create websites.

UNIT I :

Introduction to Internet, History of Internet, Internet users, Internet working, Information on Internet, Requirements for connecting to Internet, Basic Internet Terms, Introduction to world wide web, Evaluation of world wide web, basic features, web browsers, popular web browsers, web servers, HTTP, URL, Search Engines, Search Engines categories, how to use Search Engines, Searching criterion.

UNIT II :

HTML: Introduction, Objective, HTML Browsers, Windows Switching, HTML Command Tags, URLs, links, new web page creation, main body of the text, putting headers, adding paragraph, formatting text in HTML and font mechanism, Color settings, superscripts and subscripts and other manipulations on text and paragraphs, using directory and menu lists, creation of links, inserting graphics, using images, all manipulations on tables and its display, Detailed working with forms, allowing visitors to upload files, active images, working with frames & framesets, Frames handling, scroll bars, alternatives to frames,

UNIT III :

Introduction to browsers, Working with e-mail, Parts of e-mail text, working with messages.

DHTML: using DHTML in internet explorer, heading and horizontal line, hidden message, the message at the center of the page, moving boxes, changeable box.

UNIT IV :

Cascading style sheets

Introduction to css, creating style sheets, common tasks with CSS, Colors, the font -family, font metrics, length units, absolute units, relative units, the pixel unit, percentages as values, keywords as values, various properties such as the font -size property, font -size property etc, Assigning classes, tags and attributes for applying classes, applying classes to an HTML tag, applying classes to other document parts, the layer tag, CSS Tags

Books

1. Internet and web design by R Bangia, Second edition, Firewall Media
2. Multimedia and Web technology by R Bangia
3. Internet and web designing by ITEL (Macmillan)
4. Web Enabled Commercial Application Development Using HTML, DHTML, JS, Perl by Ivan Bayross
5. Deitel, Deitel & Nieto, Internet and Worldwide Web how to Program, Pearson Education, PHI.
6. Internet Programming with VBScript and JavaScript. Kathleen Kalata, (Thomson Publication)
7. Programming the World Wide Web By. Robert W. Sebesta. (Pearson)
8. Web Technology Theory and Practice By: M Srinivasan (Pearson Publication)

Semester – 2; OE2: Home Automation

Course outcome:

At the end of this course students will have ability to

1. Understand concept of Home automation
2. Able to deploy modules of Home Automation
3. Explain the connectivity issue associated with home automation4 Describe the tools and products used in home automation

Syllabus:

1. Concept & Need of Home automation, Historical Review of development, Current concepts in home automation, Basics of IoT, Sectors & types of control, Surveillance
2. Home automation & connectivity, WiFi, Cloud/ Bluetooth/ Cellular, Alexa ecosystem, Lights/appliances/climate control,
3. Video, cameras, Security/locks, entry system, fluid & Gas control, Sensors 4 Development Boards, Modules, Cyber/security, Designing of typical systems.

Books :

The Smarthome Book: Simple ideas to assist with your smarthome renovation by Andrew Howe

Smart Smart Home Handbook: Connect, control and secure your home the easy way: Control Your Home With Your Voice by Adam Juniper

The Smart Home Manual: How To Automate Your Home To Keep Your Family Entertained, Comfortable, And Safe by Marlon Buchanan

Alexa User Manual: The Illustrated Alexa User Guide - Hacks, Tips & Skills for All Amazon Alexa Devices, Including Other Smart Home Integrations by Gregory McGuire

GE/OE -4: Environmental Disaster and Management

Unit: I:

Natural Disasters: Meaning and nature of natural disaster, their types, causes and effects, Hydrological disasters (Flood, Flash flood, Drought and Cloud burst), Geological disasters (Earthquake, Volcanic eruption, Landslides, Avalanches, Tsunami and Mud flow).

Man-made Disaster: Man-made Disaster: Meaning and nature of man-made disaster, their types, causes and effects, Chemical, Biological, Radiological and Nuclear disaster, Fire (Building fire, coal fire, forest fire and oil fire), Accidents (Road, rail, air and sea accidents).

Unit: II:

Risk Assessment: Risk concept, Elements of risk, Role of Science and Technology in Disaster Risk Reduction, Strategies of risk reduction, Decision making for risk reduction, Problems in risk assessment.

Vulnerability: Observation and perception, vulnerability identification, vulnerability types and dimensions, Vulnerability (social & economic factor). Physical and social infrastructure for vulnerability reduction, Hazard resistant design and construction, systematic management and strategic planning for vulnerability reduction.

Unit: III

Disaster preparedness: Concept and significance, Disaster preparedness measures, Institutional mechanism for disaster preparedness, Policy and programme of disaster preparedness. Role of Government, NGOs and Information technology in Disaster preparedness.

Disaster Response: Essential components of disaster response, Disaster Response Plan (Communication, Participation and Activation of Emergency preparedness Plan), Search, Rescue, Evacuation and Logistic management, Relief and Recovery, Rehabilitation and Reconstruction.

Unit: IV

Mitigation and Management Techniques: Mitigation and Management techniques of Disaster, Training, awareness program and project on disaster management Training and drills for disaster preparedness, Awareness generation program, Usages of GIS and Remote sensing techniques in disaster management, National and State Bodies for Disaster Management.

Global Initiatives for Disaster management : GDPRR- Global platform for Disaster Risk Reduction, , AMCDRR – Asian Ministerial Conference on Disaster Risk Reduction, SENDAI Framework, SDG 11.5 – Reduce the adverse Effects of Natural Disasters, CDRI – Coalition for Disaster Resilient Infrastructure.

Reference Books:

1. Textbook of Environmental studies by Benny Joseph , *McGraw-Hill Publishing Company Limited*.
2. Disaster Management by Mukesh Dhunna, *Vayu Education of India, New Delhi, 2009 First edition*.
3. Introduction to Environmental Science by G. Tyler Miller, Jr. *Scott Spoolman, Cengage Learning Publication*.
4. Environmental Science by S.C. Santra, *New Central Book agency Pvt. Ltd. Kolkata ,India*.
5. Environmental Management by H.P. Behera and M.S. Khan, *Himalaya Publication*.
6. Disaster Management Programmes And Policies by Siddhartha Gautam K Leelakrishna Rao, *Publication - Vista International*.
7. Introduction To Disaster Management ,by B.C. Bose 46 ,*Rajat Publishers*.
8. Global Disaster Management ,by Arun Kumar, *SBS Publishers*.
9. Handbook Of Disaster Management (2 Vol.set) , *Author : Reepunjaya Singh ,ABDPublishers*.

10. Handbook of Disaster Management *William L. Waugh 2005.*
11. Disaster Management : Text and Case Studies *D.B.N. Murthy Jain Book Agency 2000.*
12. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
13. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
14. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
15. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
Modh S. (2010) Managing Natural Disasters, Mac Millan Publications

GE/OE (Forensic Science)

GE 2/A (BGO2T04): Forensic Gemology

Learning Outcomes: By the end of this Course, the learners will be able to:

1. Recall and recognize the fundamental concepts and terminology of gemology, including gemstone types, properties, and classification.
2. Demonstrate comprehension of the various techniques and instruments used in gemstone analysis, such as microscopic examination, spectroscopy, and X-ray techniques.
3. Apply analytical skills to identify and differentiate gemstones, including natural gems, synthetic gems, and treated gemstones, using appropriate laboratory techniques and instruments.
4. Analyze and evaluate gemstone origin through the interpretation of geological processes, gemstone deposits, and advanced techniques like elemental analysis, stable isotope analysis, and inclusion analysis.
5. Evaluate the forensic applications of gemology in real-world scenarios, including the identification of stolen jewellery, gemstone fraud, smuggling cases, and the role of gemstone analysis in trace evidence analysis and expert testimony.

Unit 1: Introduction to Forensic Gemology

Introduction to forensic science and its application in gemstone investigations. Basics of gemology: gemstone types, properties, and classification. Legal and ethical considerations in forensic gemology. Introduction to gemstone identification methods and instruments.

Unit 2: Gemstone Analysis Techniques

Microscopic examination: magnification, gemstone inclusions, and identifying synthetic gems
Spectroscopy techniques: absorption, emission, and Raman spectroscopy. X-ray techniques: XRD (X-ray diffraction) and XRF (X-ray fluorescence). Advanced analytical techniques: FTIR (Fourier Transform Infrared Spectroscopy), UV-Vis (Ultraviolet-Visible Spectroscopy), and LIBS (Laser-Induced Breakdown Spectroscopy)

Unit 3: Gemstone Origin Determination

Geological processes and gemstone formation. Gemstone deposits and their characteristics. Geographic origin determination techniques: elemental analysis, stable isotope analysis, and inclusion analysis. Synthetic gemstone identification and differentiation.

Unit 4: Forensic Applications of Gemology

Gemstone identification in forensic investigations: stolen jewellery, gemstone fraud, and smuggling cases. Trace evidence analysis using gemstones. Expert testimony and legal considerations. Case studies and real-world examples of forensic gemology.

GE/OE (Forensic Chemistry)

GE 2/B (BGO2T04): Chemistry of Drugs

Course Outcome: By the end of this Course, the learners will be able to:

1. Recall and identify the key terms and concepts related to pharmaceutical drugs, including drug classification, drug dependence, and examples of common drugs.
2. Understand the principles, practices, and challenges of pharmaceutical drugs in contemporary society, including the differences between narcotic drugs, psychotropic substances, and plant drugs.
3. Apply the knowledge and skills required to properly classify and identify different types of pharmaceutical drugs, including understanding the chemical composition, characteristics, and therapeutic applications of specific plant drugs.
4. Analyze the mode of action of antibiotics, including the chemistry and classification of penicillin, chloramphenicol, streptomycin, and tetracyclines, and their importance.
5. Evaluate the risks and benefits of using pharmaceutical drugs, including the potential for drug dependence and the ethical considerations surrounding the use of certain types of drugs.

Unit I: Pharmaceutical Drugs

Introduction, Classification, Origin of Drugs, Natural Drugs, Synthetic Drugs, Drug Dependence - Physical Dependence, Psychological Dependence, Analgesic, Antipyretic, Antibiotics and anti-histamines (examples of common drugs).

Unit II: Narcotic drugs and Psychotropic Substances

Introduction, Classification, Sign and Symptoms, Tolerance, Drug Dependence - Physical Dependence, Psychological Dependence, depressants, stimulants, hallucinogens and sedatives.

Unit III: Plant drugs

Introduction to Plant Drugs: Definition and significance, Historical background and cultural uses, Importance in traditional medicine systems. Overview of medicinal plants and their classification, Characteristics and therapeutic applications of the following plant drugs – Tulsi, Turmeric, ginger, Giloy, Garlic, Aloe vera, etc.

Unit IV: Antibiotics

Definition, Introduction and significance of antibiotics, Historical background and discovery of antibiotics, Importance in medicine and healthcare, Classification of antibiotics based on chemical structure and mechanism of action. Chemistry and mode of action of penicillin, chloramphenicol, streptomycin and tetracyclines etc.

GE/OE (Forensic Physics)

GE 2/C (BGO2T04): Introduction Forensic Ballistics

Course Outcomes: By the end of this Course, the learners will be able to:

1. Remember the various types of firearms commonly used in forensic investigations.
2. Understand the principles of ballistics and firearm identification, including the concepts of rifling, bullet trajectories, and gunshot residue analysis.
3. Analyze ammunition-related evidence, such as cartridge cases, bullet fragments, and firearm markings, to determine the type of firearm used, the sequence of shots, propellants and potential links between firearms and crime scenes.
4. Recall the fundamental concepts and principles of internal ballistics, including the ignition of propellant, pressure development, and projectile acceleration inside a firearm barrel.
5. Understand the factors influencing terminal ballistics, such as bullet design, velocity, target composition, and angle of impact, and how they affect the behaviour of projectiles during a shooting incident.

Unit I: Firearms

Early Fire Arms, Hand Cannons, Matchlock, Wheel Lock, Snaphaunce, Flintlock, Percussion System, Cartridge System, Centre Fire System, Dreyse Needle, Smooth Bore Firearms, Rifling, Revolver, Pistols, Actions of Firearms, Shotgun, Sub Machine Gun, Machine Gun, Improvised Firearms.

Unit II: Ammunition

Propellants- Black Powder, Smokeless Powders, Primers- Berdan Primer, Boxer Primer, Primer Cap Types- Rim Fire, Centre Fire, Pin Fire. Caseless, Blank Ammunition, Tear Gas, Grenade Launcher, Dummy, Cartridge Cases - Rimless, Semi Rimmed, Rimmed, Belted. Bullets and Its Types, Components of Shotgun Ammunition.

Unit III: Internal Ballistics

Energy Considerations, Initiation, Combustion of Propellants, Density of Loading, Atmospheric Temperature, Shape of the Cartridge Case. Heat Problems, Barrel Pressure and Its Determination, Recoil, Measurement of Recoil, Vibration and Jump, Barrel Fouling.

Unit IV: Terminal Ballistics

Introduction, Stopping Power of Bullet, Shockwave and Cavitation Effect, Wounding Mechanism, Elements of Wound Ballistics; Nature of Target, Velocity of Projectile, Constructional Features of Projectile. Range.

GE/OE (Forensic Biology)

GE 2/D (BGO2T04): Basics of Biostatistics and Bioinformatics

Course Outcomes: By the end of this Course, the learners will be able to:

1. Gain a solid understanding of different types of sampling, data collection techniques and statistical techniques in reference with biostatistics.
2. Develop the understanding of concepts such as mean, median, mode, range, standard deviation, variance, probability, correlation and regression and distribution curves along with their significance.
3. Learn techniques to retrieve database and methods of deposition of database using different tools by understanding the formats and contents of data entries.
4. Gain a comprehensive understanding of Entrez, PubMed, DDBJ, DMBL.
5. Examine the properties of protein and nucleic acid sequence and understand the concept of comparative genomics along with their application.

Unit-I: Introduction to Biostatistics

Sampling techniques; Data collection; tabular and graphical representation of Data; Analysis of Mean, mode, median, range, variance, standard deviation and standard error (with examples).

Unit-II: Test of significance

Z-test, T-test and Chi-square test; Probability Distribution: Binomial Poisson and Normal distribution; Correlation and linear regression; Analysis of variance; ANOVA; One-way and two-way classification.

Unit-III: Databases

Introduction to databases with respect to organization of data; contents and formats of database entries; retrieval of data using text-based search tools; sources of data; method for deposition of data to databases; Introduction to Entrez, PubMed, DDBJ, EMBL.

Unit-IV: Proteomics and Genomics

Protein and nucleic acid sequences properties: Proteomics tools at the ExPASy server and GCG utilities and EMBOSS; Comparative genomics: Basic concepts and applications.

B.Sc. Sem-II (Forensic Science - Major)

GE/OE (Psychology)

GE 2/E (BGO2T04): Basics of Psychology

Learning Outcomes: By the end of this Course, the learners will be able to:

1. Define the fundamental concept of psychology, goals, types of psychological profession including its historical and modern perspective.
2. Analyse the structure and functioning of neurons, neurotransmitters, brain, central nervous system, peripheral nervous system etc.
3. Understanding the concept of learning, its definitions, and apply its knowledge to operant and classical conditioning along with their application and explanation with experiments.
4. Develop and implement the concept of memory and forgetting, types of memory, levels of processing theory and their physical aspects.

Unit I: The Science of Psychology

What is Psychology? definitions, goals, types of psychological professions, Historical perspectives in psychology: Structuralism, Functionalism, Gestalt, and Psychoanalysis. Modern perspectives in psychology: Behaviouristic, Humanistic, Bio-psychological, and Cognitive.

Unit II: Biological Foundation of Behaviour

Neuron: Structure, function, synapse, and neurotransmitters, Central Nervous System - Brain: Structure and function of brain; (ii) Cerebral hemispheres, Spinal cord- (i) Structure and function of brain, Peripheral Nervous System: Structure and function, Autonomic Nervous System, Somatic Nervous system, Glandular system.

Unit III: Learning

Learning: Definition, Classical Conditioning: Pavlov's experiment, extinction, spontaneous recovery, generalization, discrimination, higher-order conditioning. Operant Conditioning: Thorndike's Laws of learning, Skinner's experiment, positive reinforcer, negative-reinforcer, schedules of reinforcement, shaping. Cognitive Learning Theories Tolman's Latent Learning, Kohler's Insight Learning, Bandura's Observation Learning Theory., Application of classical and operant and classical conditioning to everyday life.

Unit IV: Memory

Memory: definition and Process, The information-processing model: Three stages of memory Sensory, Short-term, Long term. Types of long-term memory- Procedural, Declarative (episodic, semantic), Explicit and implicit. Levels of processing theory. Forgetting: Course of forgetting (Ebbinghaus' forgetting curve) Causes of forgetting (encoding failure, decay of memory traces, interference, motivated forgetting). Physical aspects of memory.

GE/OE (Digital & Cyber Forensics)

GE 2/F (BGO2T04): Internet and Web Development

Course Outcomes: By the end of this Course, the learners will be able to:

1. Demonstrate knowledge and understanding of the fundamental concepts, principles, and protocols of the internet, World Wide Web, HTML, and JavaScript.
2. Demonstrate a deeper understanding of the internet, World Wide Web, HTML, and JavaScript by interpreting and explaining concepts, protocols, and standards.
3. Apply their knowledge and skills in practical scenarios.
4. Develop the ability to analyze internet-based artifacts and web applications.

Unit I: Internet

History of internet, the early years, The global Internet, A global information infrastructure, Review of packet switching and its relevance to the internet, topologies, Routers, Dial-up access, IP address. Transmission Control Protocol (TCP), Domain names, Names and IP address, TCP/IP, Flexibility, Reliability and efficiency.

Unit II: World Wide Web (WWW)

Browsing the World Wide Web (WWW), HTML, Web page design with HTML, Features and importance of HTML, Advanced WEB technologies.

Unit III: HTML

General Introduction to Internet and WWW, Text tags, Graphics, Video and Sound Tags, Link and Anchor Tags, Table Tags, Frame Tags, Miscellaneous tags (layers, image maps etc), CSS, DHTML, HTML Forms and Fields.

Unit IV: JavaScript

Basic data types; control structures; standard functions; arrays and objects, event driven programming in Javascript; Example Applications.

Paper II: Tools and Techniques in Geology (BGO2T04)

Unit I

Thin section and polished section making; Sample etching, staining and model count techniques; heavy mineral analysis and paleocurrent interpretation; principle and geological application of X ray diffractometry.

Unit II

Use of MS WORD in writing geological texts for fields; use of MS Excel in computing mineral variations, mean, average, standard deviation, covariance; use of MS Power Point in preparing geological texts for presentation.

Unit III

Use of computers in inserting geological pictures in geological reports; use of computers in inserting clip arts in geological reports; use of computers for illustrations by shapes – lines, basic shapes, block arrows, basic charts, callouts and stars and banners; use of computers in inserting symbols, equations.

Unit IV

Use of computers in insertion of columns, line charts, pie charts, bar charts, area charts, scatter diagrams in geological reports; addition of page numbers in WORD file; word counts; setting of margins, page orientation, page-size selection; addition of line numbers.

Books Recommended:

No Textbook - only handouts and web pages

SEMESTER II

5. BUSINESS STATISTICS –II

Course Outcomes: This course will enable the students to

1. Integrate concept in international & national business concept with functioning of global trade.
2. Evaluate the legal, social and economic environment of business.
3. Apply decision-support tools to business decision making.
4. Will be able to apply knowledge of business concepts and functions in an integrated manner.

UNITS	TOPICS	HOURS
Unit 1	Moments- Central & Non-Central Moments, Beta & Gamma Coefficients, Skewness, Kurtosis.	8
Unit 2	Correlation and Regression, Bivariate Data, Covariance, Correlation Data, Rank Correlation.	8
Unit 3	Probability and Probability Distribution, Attributes	7
Unit 4	Interpolation, Finite Differences, Newton's Forward & Backward Interpolation Formulae, Index Numbers, Time series Analysis.	7
	TOTAL	30 HRS

Recommended Books:

1. Business mathematical Statistics., N.G. Das, J. K. Das
2. Business Mathematics and Statistics, N.G. Das &Dr. J.K. Das McGraw Hill, New Delhi.
3. Fundamentals of Business Mathematics, M. K. Bhowal, Asian Books Pvt. Ltd New Delhi
4. Fundamentals of Mathematical Statistics, Gupta S. C. and Kapoor V. K., Sultan Chand and Sons, New Delhi.
5. Statistical Methods, Gupta S. P.: Sultan Chand and Sons, New Delhi.
6. Applied Statistics, Mukhopadhyaya Parimal New Central Book Agency Pvt. Ltd., Calcutta.
7. Fundamentals of Statistics, Goon A. M., Gupta, M. K. and Dasgupta, B. World Press, Calcutta.
8. Fundamentals of Applied Statistics, S. C . Gupta and V. K. Kapoor, Sultan Chand and Sons, New Delhi.

	Semester II (GE/OE)
	Name of the Paper - Statistics for Economics
	Paper code – (BGO2T04) 2 Credits (2 hrs Theory per week)
	Course Objectives
	The objectives of this paper are to acquaint the students of economics with basic methods of data analysis in Economics using statistical tools/models. The paper aids the students of economics in understanding the importance of decision in determining the choice
	Course Outcomes (CO)
	After the successful completion of the course, the students will have knowledge of basic statistical tools required in Economics.
	CONTENTS
	Unit 1 (15 Hrs)
	Introduction to Statistics Statistics- Meaning, Scope, Importance and Limitations; Sources of Data-Primary and Secondary;
	Classification of Data Qualitative and Quantitative; Geographical ,cross sectional and time series data; discrete and continuous data; frequency and non-frequency data
	Scales of measurement - Nominal, Ordinal, Interval and Ratio;
	Frequency and Tabulation of Data. Ungrouped and grouped, frequency distribution. Graphical representation of data: Histogram and Frequency Polygon. Primary and Secondary data,; Tabulation of data; Graphs and charts; Frequency distributions; Diagrammatic presentation of data
	Measures of Central Tendency: Mean-Arithmetic, Harmonic and Geometric, Median and Mode;
	Unit 2 (15 Hrs)
	Measures of Dispersion: Range, Inter-quartile Range, Mean Deviation, Standard Deviation and Co-efficient of Variation
	Correlation- Meaning and Types-Simple, Partial and Multiple Correlation; . Measures of Correlation-Karl Pearson and Spearman"s Rank Correlation; Regression- Meaning and Types Simple Regression and Multiple Regression Analysis and its Applications
	References
1)	Gupta, S. P. (2012): Statistical Methods, S. Chand and Sons, Educational Publishers, New Delhi.
2)	2) Gupta, S.C. and Kapoor, V. K. (2016): Fundamentals of Applied Statistics, 3rd Edition, Sultan Chand & Sons, New Delhi.
3)	3) Monga, G. S. (2015): Mathematics and Statistics for Economics, Second Revised Edition, Vikas Publishing House, Pvt. Ltd. New Delhi.
4)	4) Salvatore, D. (2015): Mathematics and Statistics, Schaum"s Series, Tata McGraw Hill

GE/OE for B.Sc. II Fish Farming BGO2T04

Credit: 2

Course outcomes: After completion of the course, students will able to-

- Understand, describe and explain suitable aquaculture fish on specific criteria.
- Understand, describe and explain construction and management of fish pond.
- Understand, describe and explain breeding techniques.
- Comprehend the status of freshwater resources.
- Evaluate economically important freshwater biological resources for their commercial utilization.
- Adjudge different types of rearing process and steps along with procedure involve in preparation and management of nursery and rearing pond of fish culture.
- Understand, describe and explain the marketing of fish.
- Understand, describe and explain various diseases in fishes.

UNIT- I

- 1.1 Cultivable species of fish (Indian carps, exotic carps and other economic important fishes), Growth and fecundity.
- 1.2 Construction of fish farm: Selection of site, topography, layout of fish farm, Types of fish ponds (Nursery, rearing and stocking ponds), Construction of various ponds.
- 1.3 Management of fish pond: Pre-stocking management, fertilization of ponds, lining, liming, eradication of predatory and weed fishes, and control of aquatic insects.
- 1.4 Methods of fish cultivation: pond culture , cage culture, pen culture, Raceway culture, culture in recirculatory water system, monoculture and polyculture.

UNIT – II

- 2.1 Post stocking management of fish pond- Feeding, Thining, Harvesting.
- 2.2 Methods of collections of fish seed, resources (natural water bodies and hatcheries), Transport of fish seed
- 2.3. Induced breeding: Induced breeding of carps and other cultivable fishes.
- 2.4 Bundh breeding: dry and wet bundh breeding.

UNIT – III

- 3.1 Physical and chemical factors affecting fish culture.
- 3.2 Rearing of spawn, fry and fingerling.
- 3.3 Fishing crafts and gears- Spear, Harpon, Hooks and Lines, Types of fishing nets.
- 3.4 Preservation and processing of fish.

UNIT – IV

- 4.1 Fish marketing: Marketing practices, information, marketing channels and systems.
- 4.2 Fish diseases and its control: Biotic (Viral diseases, Bacterial diseases, Fungal, Protozoan, Helminthes, copepod) diseases and abiotic diseases (Air embolism, gas bubble diseases, acidosis, alkalosis)
- 4.3. Fishery Survey: Methods and techniques, Fish breeding centres of Maharashtra.

4.4. Fish products and by-products: i. Fish body oil, ii. Fish liver oil, iii. Fish meal, iv. Isinglass, v. Fish protein concentrate, vi. Fish glue, vii. Fish manure.

Suggested reading:

Pandey K and J.P. Shukla JP (2018). A Textbook of fish and fisheries Rastogi Publication, Meerut, pp. 588.

Khanna SS and Singh HR (2014). A text book of fish biology and fisheries. 3rd edition, Narendra Publishing House.

Gupta SK and Gupta PC (2006). General and applied Ichthyology (Fish and Fisheries). S. Chand and Company, pp. 1160.

Fashion Design/Textile Science
Four Year (Eight Semester Degree Course)
Semester - II
Chemical Processing – II
GE/OE (BGO2 TO4)

Theory Marks : 100

80

CIE : 20

Theory

Total Credits : 2 SEE

: 2

Time Required: 30Hours

Theory

(30 Hours)

Objectives

1. To study the chemical processing of
2. To make students aware about Textile Chemistry

Unit I:

(8 Hours)

- 1.1 Flow chart for manufacturing process of manmade fibre by
- Dry spinning – Acrylic
 - Wet spinning – Viscose
 - Melt spinning – Polyester and polypropylene
 - Introduction and terms used in the POY, FDY and Texturing process

Unit II :

(7 Hours)

Introduction to finishing of Fabric & Garment

- 2.1 Object of Finishing
- 2.2 Classification of Finishing
- 2.3 Mechanical Finishing
- Calendar Finishing
 - Dimensional Stability Finishing

Unit III:

(7 Hours)

- 3.1 Hot Air Stenter Finishing
- 3.2 Chemical Finishing
- Resin Finishing
 - Water Repellent Finishing

Unit IV:

(8 Hours)

Chemical Finishing

- 4.1 Fire Retardant Finishing
- 4.2 Enzyme Finishing
- 4.3 Back filling
- 4.4 Types of softener used in Finishing

References:

1. Technology of Textile Processing -Vol 1(Textile Fiber)-Dr. V.A. Shenoi
2. Technology of Textile Processing -Vol III (Technology of Bleaching)-V.A. Shenoi
3. Technology of Textile Processing -Vol IX (Fundamental Principal of Textile Processing) - V.A. Shenoi
4. Chemical technology of Fibre materials - F. Sadav
5. Textile scouring & Bleaching-E.R. Trotman

B.Sc. Semester – II
BGO2T04: Basics of Environmental Pollution
Theory: 2 credits

Course Outcomes:-

1. Evaluate the classification of pollutants and understand the sources and effects of noise pollution.
2. Explicate the importance of water and thermal pollution.
3. Learn the basics of solid waste management and soil pollution.
4. Understand the effects of air and radioactive pollutions.

Unit-I: Environmental Pollution (7.5h)

Environmental Pollution: Definition, types, Classification of Pollutants- on the basis of physical properties and forms of their existence, Primary and secondary pollutants, degradable and non-degradable pollutants.

Noise Pollution: Sources and effects, Decibel scale, control measures of noise pollution. Ambient noise level of monitoring.

Unit-II: Water Pollution (7.5h)

Water Pollution: sources, effect of water pollution on flora and fauna, human beings and materials, Eutrophication, Heavy metal pollution- Minamata episode, water, pollution control measures, water quality indices.

Thermal Pollution: Causes, effects and control measures.

Marine Pollution: sources, causes and mitigation of marine pollution.

Unit-III-Soil and Solid Pollution (7.5h)

Soil Pollution: Sources and types, soil pollutants- metals, inorganic ion and salts, organic substances, effects of soil pollution on soil health and productivity, effects of pesticides, soil pollution control measures,

Solid Waste Pollution: sources, Classification and characteristics of solid waste, segregation, collection and transportation and disposal of solid waste, Solid Waste management, **Biomedical Waste:** Categories of biomedical waste, types of container used for the disposal of biomedical waste, biomedical waste management.

Unit-IV: Air and Radiation Pollution (7.5h)

Air Pollution: Sources, Effects (Human health, vegetation and animals, Building material and structures), Indoor pollution, vehicular pollution, Bhopal gas tragedy, Air Quality Standards-

Radioactive Pollution: Types and sources of radiations, biological effects and control measures. of radiations, E-waste (sources and its health effect), recycling and disposal methods.

References

1. Text Book of Environment: K M Agrawal, P.K.Sikdar, and S.C.Deb, Mc'Millan Publication, Mumbai.
2. Man and Environment: M.C.Dash and P.C.Mishra, Mc'Millan Publication, Mumbai.
3. Environmental Science: S.C.Santra, New Central Book Pvt.Ltd, Kolkatta.
4. Environmental Problems and Solution: D.K.Asthana, S.Chand Publication, New Delhi.

5. A Text book of Environmental Chemistry and Pollution Control: S.S.Dara, S.Chand and Company Ltd,New Delhi.
6. Environmental Chemistry: B.K.Sharma, Goel Publication,Meerut.
7. Environmental Chemistry: A.K.Dey,New Age International Publishers,2001.
8. Man and Environment: P.R.Trivedi and Gurdeep Raj,Akashdeep Publishing House,New Delhi.
9. Fundamentals Concepts in Environmental Studies: Dr.D.D.Mishra, S.Chand Publication,New Delhi.
10. Environmental Pollution: Khitoliya,R.K. S.Chand Publication,New Delhi.
11. Air pollution and it's Control: Rao,M.N and Rao, H.V.N., Tata McGraw-Hill Publishing Company ,New Delhi.
12. Principles of Environmental Chemistry,3rd edition, J.E.Girard, Jones and Bartlett Learning Company, Burlington
13. The Science of Environmental Pollution,3rd edition, Frank.R.Spellman, CRC Press, Taylor and Francis Group.

B.Sc. Semester-II
Subject: MICROBIOLOGY
Course Code: BGO2T04
BIOMOLECULES

GE/OE	Hours: 2 Hours/Week	Marks: 80 +20 = 100	Credit: 2
Unit-I			
Carbohydrates and Lipids	<ol style="list-style-type: none"> 1. Definition and Classification of carbohydrates, 2. Structure of glucose, fructose, maltose, lactose, sucrose, starch, hyaluronic acid, glycogen, cellulose, 3. Classification of lipids, structure of triglyceride, compound lipids. 	7.5 Hrs	
Unit-II			
Amino acids and proteins	<ol style="list-style-type: none"> 1. Classification of amino acids, 2. Acidic ,basic and neutral amino acids, 3. Peptide bond theory, 4. Primary, secondary and tertiary structure of proteins. 	7.5 Hrs	
Unit-III			
Enzymology	<ol style="list-style-type: none"> 1. Definitions and nature of enzymes, classification, nomenclature, 2. Activation energy, transition state, ES complex, enzyme activity, katal, specific activity ,turnover number 3. Functional diversity such as holo enzyme, apoenzyme, coenzyme, cofactor, prosthetic group, isoenzymes, 4. Membrane bound enzymes, multi enzyme complex, zymogens 	7.5 Hrs	
Unit-IV			
Nucleic acid and Vitamins	<ol style="list-style-type: none"> 1. Structure of purines, pyrimidines, nucleosides, nucleotides, 2. Structure of DNA and RNA 3. Types of vitamins, Classification on the basis of solubility, functions of vitamins, 4. Hypervitaminosis–Definition, causes, symptoms, treatment of Vit. A and D 	7.5 Hrs	

ReferenceBooks:

1. Lehninger.Principles of Biochemistry. 4th Edition. D. Nelson and M .Cox. W .H. Freeman and Company. New York2005
2. Microbiology an Introduction .6th Edition. Tortora, Funke and Case. Adisson Wesley Longman Inc. 1998.
3. Prescott, Hurley. Klein-Microbiology 5th & 6th edition, International edition 2002 & 2006, McGraw Hill.
4. Garrett, R. H. and Grisham, C. M .(2004) Biochemistry .3rd Ed .Brooks /Cole Publishing Company, California.
5. ConnEric, Stumpf Paul K., Bruuening George, Doi Roy H. ,(1987) Outlines of Biochemistry 5th Ed , John Wiley and Sons, New Delhi.
6. Miller A. D. and TannerJ .(2013). Essentials of Chemical Biology: Structure and Dynamics of Biological Macromolecules. Germany: Wiley.
7. Powar C. B. and Daginawala H. I. (2005). General microbiology Volumel. Himalaya Publishing House Private Limited, Pune, India.

Sr.No.	Course outcome
1.	Students will learn about different types of biomolecules and their functions.
2.	Students will learn about the various disease s due to deficiency of vitamins.

Bachelor of Science (Honors / Research) 4 yr. 8 Semester Degree Program
B.Sc. Sem II (Interior Design – Major)
BGO2T04 CULTURAL ANTHROPOLOGY II

Students of design have to be sensitized to various cultural aspects such as traditions, fine arts and the performing arts of a particular country and have to understand the symbolism, patterns and forms that manifest themselves in the architecture of that place

UNIT I : Communication

- i) Meaning and Definition
- ii) Importance of Communication
- iii) Objectives of Communication
- iv) Principles of Effective communication
- v) Media of Communication

UNIT II : Industrial Sociology

- i) Meaning and Definition
- ii) Scope Industrial Sociology
- iii) Nature of Industrial Sociology

UNIT III : Work Organisation

- i) Meaning and Definition
- ii) Importance
- iii) Forms of industrial organization: Line Organization, Line and Staff Organization, Functional Organization
- iv) Authority – Meaning and definition
- v) Delegation of authority
- vi) Process of delegation

UNIT IV : Industrial culture in India

- i) Modernization : impact on Indian society
- ii) Industrialisation: impact on Indian society
- iii) Urbanization : impact on Indian society

UNIT V : Leadership in Industry

- i) Meaning and Definition
- ii) Characteristics of Leadership
- iii) Importance of Leadership
- iv) Leadership Styles

Reference Books

- 1) A new Outlook into Social Science – S. Shabbir, A. M. Sheikh, Jaya Dwadashiwar, S. Chand, Delhi
- 2) T. Ramasamy, 2012, Principles of Management, Himalaya Publishing House, Mumbai.
- 3) Dr. Pratibha M. Siriya, 2011, Principles of Business Management, Sai Jyoti Publication, Nagpur.
- 4) King's, Personnel management & Industrial Relations, Harsha Rastogi, Delhi.

Cultural Anthropology II

S. No	Course Outcomes
	The students will gain knowledge regarding
CO1	Industrial Sociology
CO2	Work organization
CO3	Industrial Culture & Leadership
CO4	Leadership Styles
CO5	Communication Skills

B. Sc (Applied Electronics & Software Technology) – Semester II (GE/OE)

BGO2T04

SOCIAL SCIENCE II

Scheme of Examination (Theory)

SEE – 80

CIE - 20

Total - 100

Course Outcome : The students will gain knowledge regarding

- Vastu Shastra
- Traditions in Arts & Crafts
- Evolution of forms and spaces
- Significance of cultural traditions

Unit I:

Vastu Shastra : History of Vastu Shastra , Scientificness of Vastu Shastra, Use of Vastu Shastra in Interior Design.

Unit II :

Traditions in arts & crafts – space, function and climate responsiveness

Unit III :

Evolution of forms and spaces during various eras and regions , influences etc.

Unit IV :

Symbolism, patterns and forms that manifest themselves in the architecture of that place

Unit V :

Significance of cultural aspects and traditions

Reference Books :

1.Nadeem Hasnain, 2011, Indian Anthropology

2. Mohd. Irfan, 2012 , Social Exclusion And Muslim Ethnograph, Neha Publishers & Distributors

GE/OE Basket Semester III
Faculty of Science and Technology

Semester	Course Category		Name of Course	BoS	Course code
III	GE/OE	1	Nutraceuticals	Botany	BGO3T05
		2	Sports Biochemistry	Biochemistry	
		3	Biotechnology in Forensic Science	Biotechnology	
		4	Chemistry in everyday life	Chemistry	
		5	Data Base Management System	Computer Science	
		6	Data Base Management System	Computer Application	
		7	Data Base Management System	Data Science	
		8	Basic Electronics for Life Science	Electronics	
		9	Modern Technologies for Environmental Management	Environmental Science	
		10	A. Forensic Meteorology/ B. Forensic Chemistry/ C. Forensic Physics/ D. Forensic Biology/ E. (Psychology)/ F. Digital & Cyber Forensic/ G. Criminal Law-II (Law)	Forensic Science	
		11	Paedology and Soil Testing	Geology	
		12	Data Base Management System	Information Technology	
		13	Financial mathematics	Mathematics	
		14	Digital systems	Physics	
		15	Animal husbandry	Zoology	
		16	Introductory Pharmacology & Toxicology	Cosmetic Technology	
		17	Hand Printing	Fashion Design	
		18	Textile Testing-I	Textile Science	
		19	Metabolism of Biomolecules	Microbiology	
		20	Environmental Psychology	Interior Design	
		21	Engineering Mechanics I	Applied Electronics & Software Technology	

GE/OE Basket Semester IV
Faculty of Science and Technology

Semester	Course Category		Name of Course	BoS	Course code
IV	GE/OE	1	Biofuels technology	Botany	BGO4T06
		2	Pharmacogenomics	Biochemistry	
		3	Biotechnology & Law	Biotechnology	
		4	Molecules of Life	Chemistry	
		5	Cyber security	Computer Science	
		6	Cyber security	Computer Application	
		7	Cyber security	Data Science	
		8	Mobile App development	Electronics	
		9	Biodiversity and Wildlife Conservation	Environmental Science	
		10	A. Forensic Photography/ B. Forensic Chemistry/ C. Forensic Physics/ D. Forensic Biology/ E. (Psychology)/ F. Digital & Cyber Forensic/ G. Criminal Law-III (Law)	Forensic Science	
		11	Engineering Properties of Rocks and Soil	Geology	
		12	Cyber security	Information Technology	
		13	Mathematics for Competitive Examinations	Mathematics	
		14	Applied Microbiology	Microbiology	
		15	Communication Systems	Physics	
		16	Bio-statistics	Zoology	
			Communicable diseases	Zoology	
		17	Introductory Pharmacology & Toxicology	Cosmetic Technology	
		18	Home Linen Designing	Fashion Design	
		19	Textile Testing-II	Textile Science	
		20	Green Building Technology	Interior Design	
21	Green Building Technology	Applied Electronics & Software Technology			

**RASHTRASANT TUKDOJI MAHARAJ NAGPUR UNIVERSITY
NAGPUR**



**Syllabus for B.Sc./ B.Sc. I.T/ B.C.A/ B.Sc. Data Science/AI. Semester II (NEP)
Gujrati Compulsory**

2024-25 Onwards

राष्ट्रसंत तुकडोजी महाराज नागपुर विद्यापीठ, नागपुर

Syllabus for Bachelor of Science/B.Sc [IT]/BCA/ B.Sc [Data Science]/B.Sc(AI)

GUJARATI

(To be implemented from the session 2024-25 and onwards)

(As per NEP 2020)

विज्ञान स्नातक सत्र 2


पाठ्यक्रम उद्देश्य [Course Objectives]

- गुजराती भाषाज्ञाननी समृद्धिथी वाकेफ थवु.
- गुजराती भाषा अने साहित्यनी योग्य माहिती मेळववी.
- विद्यार्थियोमां भाषाकीय संचारनी क्षमता विकसाववी.
- भाषाकीय संवर्धन अने अभिव्यक्त कौशल्यो द्वारा समग्र व्यक्तित्वनो विकास करवो.
- विद्यार्थियोने साहित्यना विविध स्वरूपोनो परिचय कराववो.
- विद्यार्थियोमां वैज्ञानिक चेतना, मानवीय संवेदनशीलता अने मानवीय मूल्योनो प्रोत्साहन आपवु.
- सर्जनात्मक लेखन तरफ प्रेरित करवा.
- भाषाकीय अने साहित्यिक क्षमता साथे रोजगारलक्षी दृष्टिने आत्मसात करवी.
- वैचारिक अने वैज्ञानिक लेखन द्वारा विद्यार्थियोने नवी विचारसरणी तरफ मार्गदर्शन आपीने वैज्ञानिक दृष्टि केळववी.

पाठ्यक्रम भाषावना परिणामों [Course Outcomes]

- गुजराती भाषा, साहित्य अने संस्कृतिनी ऐतिहासिक समझ.
- गुजराती भाषा उपर प्रभुत्व अने वक्तृत्व शैलीनो विकास.
- गुजराती व्याकरण अने गुजराती भाषाना संबंधमां भाषाना समझनी स्पष्टता.
- स्वतंत्र अने मूळ लेखन शैलीनो विकास.
- नैतिक मूल्योनो साथे वैज्ञानिक, सामाजिक अने राष्ट्रीय जवाबदारीनी भावना पैदा करवी.
- वैज्ञानिक चेतनाना साथे रोजगार अभिगमनो विकास.


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Bachelor of Science/B.Sc (IT)/ BCA/ B.Sc (Data Science)/ B. Sc(AI)

વિષય - ગુજરાતી દ્વિતીય સત્ર પાઠ્યક્રમ

પૂર્ણાંક (૫૦)

અનુક્રમણિકા

નિર્ધારિત પાઠ્યપુસ્તક - (ગદ્ય વિભાગ)

(૧૫ અંક)


- ૧) વિનોદની નજરે - લેખક: વિનોદભટ્ટ - (રેખાચિત્ર)
- ૨) સત્યના પ્રયોગો - લેખક: ગાંધીજી - (આત્મકથા)
- ૩) સરસ્વતીચંદ્ર ભાગ ૨- લેખક: ગો-મા. ત્રિપાઠી (નવલકથા)
- ૪) દ્વિરેફની વાતો- લેખક: રા.વિ.પાઠક - (કહાની)

નિર્ધારિત પાઠ્યપુસ્તક - (પદ્ય વિભાગ)

(૧૫ અંક)

- ૧) મીરાંના પદ - સં. કે.કા.શાસ્ત્રી
- ૨) પ્રેમાનંદ - સુદામાચરિત - પ્રેમાનંદ આખ્યાન
- ૩) કલાપીનો કાવ્યકલાપ - સં. અનંતરાય રાવલ.
- ૪) નર્મદના કાવ્યો - સં.જયંત પાઠક


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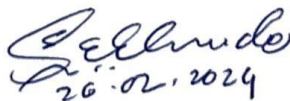

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A.I. Doshi
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१. प्रथम ईकाई- (गद्य विभाग)

(१५ अंक)

१) ईश्वर पटलीकर - (रेखाचित्र)

२) बचपन- (आत्मकथा)

३) गुणसुंदरी नु कुटुंबजाळ - (नवलकथा)

४) एक प्रश्न /लेखक : (कहानी)

२. द्वितीय ईकाई - (पद्य विभाग)

(१५ अंक)

१) मीरां - स्वजीवन ५ पद.

२) आख्यान लक्षण, प्रेमानंदनी खूबी-खामी.

३) वीणानो मृग / ग्राम्य माता

४) जय-जय गरवी-गुजरात/रणतो धीरानु.

३. तृतीय ईकाई - (प्रयोजनात्मक गुजराती)

(१० अंक)

१) गुजरातीमां अनुवाद - (अंग्रेजी अथवा हिंदी परिच्छेद)

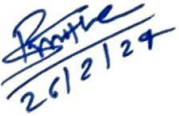
२) गद्यखंड विवरण अथवा संक्षिप्तकरण, स्वयं प्रश्न निर्माण

४. चतुर्थ ईकाई -(व्यवहारिक गुजराती)

(१० अंक)

१) रुढ़िप्रयोग / कहेवर्तों

२) पत्रलेखन / जाहिर खबर / अहेवाल / आमंत्रण पत्रिका अथवा स्वमत विचार अभिव्यक्ति.


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A.I. Dorkhan
26/02/2024


26.02.2024

Bachelor of Science/B.Sc (IT)/ BCA/ B.Sc (Data Science)/ B.Sc(AI)

વિષય - ગુજરાતી દ્વિતીય સત્ર

પ્રશ્નપત્ર પ્રારૂપ અને અંક વિભાજન

પૂર્ણાંક (૫૦)

પ્રશ્ન ૧. ગદ્ય વિભાગ ઉપર આધારિત ચાર પ્રશ્નોમાંથી કોઈ પળ ત્રણ પ્રશ્નોના ઉત્તર લખો ૫ x ૩ = (૧૫ અંક)

પ્રશ્ન ૨. પદ્ય વિભાગ ઉપર આધારિત ચાર કવિતામાંથી કોઈ પળ ત્રણ કવિતાના પ્રશ્નોના ઉત્તર લખો - ૫ x ૩ = (૧૫ અંક)

પ્રશ્ન ૩. પ્રયોજનાત્મક ગુજરાતી ઉપર આધારિત પ્રશ્નોના ઉત્તર લખો - ૫ x ૨ = (૧૦ અંક).

પ્રશ્ન ૪. વ્યાવહારિક ગુજરાતી ઉપર આધારિત પ્રશ્નોના ઉત્તર લખો.(૫ x ૨ = ૧૦ અંક)

કુલ અંક વિભાજન

પ્રથમ ઇકાઈ - (ગદ્ય વિભાગ) - (૧૫ અંક)

દ્વિતીય ઇકાઈ - (પદ્ય વિભાગ) - (૧૫ અંક)

તૃતીય ઇકાઈ - (પ્રયોજનાત્મક ગુજરાતી) - (૧૦ અંક)

ચતુર્થ ઇકાઈ - (વ્યાવહારિક ગુજરાતી) - (૧૦ અંક)

કુલ અંક - (૫૦ અંક)

આંતરિક મૂલ્યાંકન - ૫૦ અંક

સત્ર દ્વિતીય

૧. સમુહ ચર્ચા (Group Discussion) (૧૦ અંક)

૨. શ્રવન કૌશલ - (જેમાં પરિચ્છેદ સાંભળવો અને એના ઉપર પૂછેલા પ્રશ્નોના ઉત્તર દેવા. (૧૦ અંક)

૩. વાચન કૌશલ - (આમાં કોઈ પળ કહાની, કવિતા, કિસ્સા, જે વાચ્યું છે એને વ્યવસ્થિત રિતે ઉતાર, ચઢાવ, હાવ ભાવ અને
ઉચિત બોડી લેંગ્વેજ સાથે સંભળાવવું . (૧૦ અંક)

૪. સાક્ષાત્કાર - કોઈ વ્યક્તિ વિશેષનો સાક્ષાત્કાર. (૧૦ અંક)

૫. સંવાદ - (દિધેલા મુદ્દા પર સકારાત્મક સંવાદ) (૧૦ અંક)

પ્રત્યેક ઉપર ૧૦ અંક (૧૦x૫ = ૫૦)

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A. I. Doshi
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26.02.2024

राष्ट्रसंत तुकडोजी महाराज नागपुर विद्यापीठ, नागपुर
Syllabus for Bachelor of Science/B.Sc (IT)/BCA/B.Sc - Data Science/B.Sc. - AI
हिंदी

(To be implemented from the session 2024-25 and onwards)

Second Semester

विज्ञान स्नातक- सत्र 2

पाठ्यक्रम के उद्देश्य (Course Objectives)

- * हिंदी भाषाज्ञान की समृद्धि से अवगत कराना ।
- * हिंदी भाषा एवं साहित्य की सम्यक जानकारी प्राप्त करना ।
- * विद्यार्थियों में भाषिक सम्प्रेषण की क्षमता को विकसित करना ।
- * भाषिक समृद्धि एवं अभिव्यक्ति कौशल के माध्यम से व्यक्तित्व का समग्र विकास करना ।
- * विद्यार्थियों को साहित्य के विविध रूपों से परिचित करना ।
- * विद्यार्थियों में वैज्ञानिक चेतना, मानवीय संवेदनशीलता व मानवीय मूल्यों का संवर्धन करना ।
- * सृजनात्मक लेखन के प्रति प्रेरित करना ।
- * भाषिक साहित्यिक क्षमता के साथ-साथ रोजगाराभिमुख दृष्टि को आत्मसात करना ।
- * वैचारिक व वैज्ञानिक लेखन के माध्यम से विद्यार्थियों को नवीन चिंतन धारा की ओर अग्रसित कर वैज्ञानिक दृष्टि निर्माण करना ।

पाठ्यक्रम के परिणाम (Course Outcomes)

- * हिंदी भाषा, साहित्य और संस्कृति की ऐतिहासिक समझ ।
- * हिंदी भाषा पर प्रभुत्व एवं वक्तृत्व शैली का विकास ।
- * हिंदी व्याकरण और हिंदी भाषा के संबंध में भाषायी समझ की स्पष्टता ।
- * स्वतंत्र तथा मौलिक लेखन शैली का विकास ।
- * नैतिक मूल्यों के साथ वैज्ञानिक, सामाजिक और राष्ट्रीय उत्तरदायित्व की भावना निर्मित होना ।
- * वैज्ञानिक चेतना के साथ रोजगार दृष्टिकोण का विकास ।


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Bachelor of Science/B.Sc (IT)/BCA/B.Sc -Data Science/ B.Sc. - AI

द्वितीय सत्र पाठ्यक्रम
पाठ्य पुस्तक - पहल
प्रयोजनमूलक एवं व्यवहारिक हिंदी

अनुक्रमणिका

प्रथम इकाई (गद्य विभाग)

1	ढाई आखर प्रेम का	मालती जोशी	कहानी
2	ये कैसा न्याय	मधु शुक्ला	एकांकी
3	सर्व मंगल की भावना और विज्ञान की भूमिका	डॉ. कृष्णकुमार मिश्र	निबंध
4	वैज्ञानिक चेतना के वाहक: चंद्रशेखर वेंकटरमन	धीरंजन मालवे	जीवनी

द्वितीय इकाई (पद्य विभाग)

1	कबीर के दोहे	कबीर
2	सूर के पद	सूरदास
3	कोशिश करने वालों की हार नहीं होती	सोहनलाल द्विवेदी
4	विवशता का पारा	डॉ. मिथिलेश अवस्थी

तृतीय इकाई (प्रयोजनमूलक हिंदी)

अनुवाद - अर्थ, परिभाषा, स्वरूप, अनुवादक के गुण, सफल अनुवाद की विशेषताएँ, अनुवाद प्रक्रिया, प्रकार, अनुवाद की समस्या ।

साक्षात्कार - अर्थ, परिभाषा, उद्देश्य, विशेषताएँ, प्रकार ।

चतुर्थ इकाई (व्यावहारिक हिंदी)

- पारिभाषिक शब्दावली (विज्ञान संबंधित)
- वर्तनी संबंधी अशुद्धियाँ
- मुहावरे / लोकोक्तियाँ (पाठ्य पुस्तक में संकलित)
- उपसर्ग / प्रत्यय


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Bachelor of Science/B.Sc (IT)/BCA/B.Sc -Data Science/ B.Sc. - AI
द्वितीय सत्र
प्रश्नपत्र प्रारूप एवं अंक विभाजन

पूर्णांक : 50

- प्रश्न 1** प्रथम इकाई गद्य विभाग पर आधारित चार पाठों में से चार प्रश्न। चार में से तीन प्रश्नों के उत्तर अपेक्षित हैं। 5x3=15
- प्रश्न 2** द्वितीय इकाई पद्य पर आधारित चार कविताओं में से चार प्रश्न। चार में से तीन प्रश्नों के उत्तर अपेक्षित हैं। 5x3=15
- प्रश्न 3** तृतीय इकाई प्रयोजनमूलक हिंदी पर आधारित चार प्रश्न। चार में से दो प्रश्नों के उत्तर अपेक्षित। 5x2=10
- प्रश्न 4** चतुर्थ इकाई पर चार प्रश्न जिनमें से दो प्रश्नों के उत्तर अपेक्षित है। 5x2=10

कुल अंक विभाजन

प्रथम इकाई	-	गद्य	15 अंक
द्वितीय इकाई	-	पद्य	15 अंक
तृतीय इकाई	-	प्रयोजनमूलक हिंदी	10 अंक
चतुर्थ इकाई	-	अन्य पाठ्य सामग्री	10 अंक
कुल अंक			50 अंक

आंतरिक मूल्यांकन - 50 अंक

सत्र द्वितीय

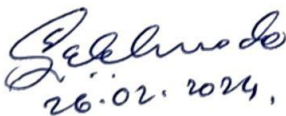
- समूह चर्चा (Group Discussion) 10 अंक
- कल्पना विस्तार (मौलिक सृजनात्मक लेखन) 10 अंक
- साक्षात्कार (किसी प्रसिद्ध, प्रेरक व्यक्तित्व का साक्षात्कार) 10 अंक
- किसी कविता, कहानी, लेखक आदि का हिंदी, मराठी, अंग्रेजी अनुवाद। 10 अंक
- आंतरिक मूल्यमापन परीक्षा। 10 अंक


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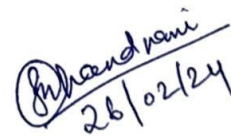

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राष्ट्रसंत तुकडोजी महाराज नागपूर विद्यापीठ, नागपूर
Syllabus for Bachelor of Science / B.Sc.(IT)/B.Sc.(Data Science)/ B.Sc.(AI)/BCA
MARATHI
(To be implemented from the session 2024-25 and onwards)

विज्ञान स्नातक, सत्र २

मराठी

अभ्यासक्रमाचा उद्देश (Course Objectives) :

- मराठी भाषेच्या समृद्धीची जाणीव करून देणे
- विद्यार्थ्यांमध्ये भाषा कौशल्याचा विकास करणे.
- भाषेचा जीवनव्यवहारात आणि रोजगारात योग्य पध्दतीने वापर करण्याचा प्रयास करणे.
- मराठी भाषेचे व्याकरण व तिची उपयोजितता स्पष्ट करणे.
- व्यावहारिक मराठीच्या माध्यमातून रोजगाराच्या संधीचा शोध घेणे.
- प्राचीन अर्वाचीन साहित्याच्या आकलन, आस्वाद व चिकित्सेतून विद्यार्थ्यांची मानवी संवेदनशीलता, चारित्र्यसंपन्नता, मूल्याधिष्ठितता जागृत करणे. त्यांच्यात सामाजिक सेवेची व राष्ट्रप्रेमाची जाणीव जागृती निर्माण करणे.
- विज्ञान आणि मानवी जीवनव्यवहाराची सांगड घालून विद्यार्थ्यांना रोजगाराभिमुख बनविणे.
- स्वतंत्र चिंतन व मननातून लेखनास प्रेरित करणे.

अभ्यासक्रमाचा परिणाम (Course Outcomes) :

- मराठी भाषा, साहित्य व संस्कृतीचे ऐतिहासिक आकलन होणे.
- मराठी भाषेवर प्रभुत्व निर्माण होउन वक्तृत्वशैली विकसित होणे.
- मराठी भाषेचे संवर्धन आणि संरक्षण होण्यास मदत होणे.
- मराठी व्याकरणासंदर्भात व भाषाविज्ञानासंदर्भात भाषिक समज स्पष्ट होणे
- व्यावसायिक कौशल्याची प्रेरक वाट गवसणे.
- नैतिक मूल्याचे, सामाजिक व राष्ट्रीय उत्तरदायित्वाचे सजग भान असणारा नागरिक निर्माण होणे.
- व्यावसायिक कौशल्य विकासनातून समाजाभिमुख वैज्ञानिक दृष्टिकोण विकसित होणे.
- स्वतंत्र लेखनशैली विकसित होणे.

(डॉ. कोमल ठाकरे)
26/2/24

A.I. Dorekhan
(डॉ. अमृता डोर्लेकर)
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राष्ट्रसंत तुकडोजी महाराज नागपूर विद्यापीठ, नागपूर
Syllabus for Bachelor of Science / B.Sc.(IT)/ B.Sc.(Data Science)/ B.Sc.(AI)/BCA
MARATHI

(To be implemented from the session 2024-25 and onwards)

विज्ञान स्नातक सत्र दुसरे
अभ्यासक्रम

१. पाठ्यपुस्तक — सृजन
२. उपयोजित मराठी : लेखनकौशल्य, संवादकौशल्य आणि संधी

अनुक्रमणिका

Unit -1 : गद्य विभाग

- १ ससीकरण — म्हाइंभट
- २ संयम — साने गुरूजी
- ३ उषःकाल — डॉ. सुबोध जावडेकर
- ४ भारतीय संविधानाची विज्ञाननिष्ठा — यशवंत मनोहर

Unit -II : पद्य विभाग

- १ संतवाणी — ज्ञानेश्वर, तुकाराम, राष्ट्रसंत तुकडोजी महाराज
- २ विद्यार्थ्यांप्रत — केशवसुत
- ३ दीपज्योतीस — बी
- ४ सुख — बबन सराडकर

Unit -III : लेखनकौशल्य आणि संधी

- १ प्रसारमाध्यमे आणि भाषिक कौशल्ये — डॉ. संजय भक्ते
- २ जाहिरातींची लेखनकौशल्ये — प्रा. वैशाली कार्लेकर
- ३ अनुवादप्रक्रिया — डॉ. नंदकुमार मोरे
- ४ ब्लॉग लेखन — डॉ. अजय देशपांडे

Unit -IV: मराठी भाषा आणि व्याकरण

- १ मराठी भाषाविचार
- २ मराठी शुध्दलेखन

Dr. Anand D. Karle
26/02/24

A.I. Darlikar
(डॉ. अमृता डोळीकर)
26/02/2024

Dr. Anand D. Karle
26/2/24

Dr. Anand D. Karle
26/2/24

Dr. Anand D. Karle
26/2/24

Dr. Anand D. Karle
26/02/2024

दुसरे सत्र (Semester -II)

विभाग एक गद्य (पहिल्या भागातील चार पाठ)	गुण १५
विभाग दोन पद्य (दुसऱ्या भागातील चार कविता)	१५
विभाग तीन उपयोजित मराठी : लेखनकौशल्य आणि संधी	१०
१ प्रसारमाध्यमे आणि भाषिक कौशल्ये — डॉ. संजय भक्ते २ जाहिरातींची लेखनकौशल्ये — प्रा. वैशाली कार्लेकर ३ अनुवादप्रक्रिया — डॉ. नंदकुमार मोरे ४ ब्लॉग लेखन — डॉ. अजय देशपांडे	
विभाग चार मराठी भाषा आणि व्याकरण	१०
१ मराठी भाषाविचार २ मराठी शुध्दलेखन	

एकूण गुण ५०

सूचना :-

अभ्यासक्रमात नेमलेल्या **सृजन** पुस्तकातील सर्व पाठ व सर्व कविता अभ्यासक्रमात समाविष्ट राहतील. प्रश्नपत्रिका ५० गुणांची राहिल. ५० गुण अंतर्गत मूल्यांकनावर (Internal Assessment) राहतील. विद्यार्थ्यांच्या सर्जनशील जाणीवा विकसित करण्यासाठी अभ्यासक्रमातील पाठ आणि कवितेवरील आपले स्वतंत्र विचार लिखित स्वरूपात मागण्यात येतील. याशिवाय विद्यार्थ्यांकडून साकार करावयाच्या व्यावसायिक कौशल्याधारित नव्या संकल्पना व प्रकल्पांतर्गत मूल्यांकनासाठीचे स्वातंत्र्य विषय शिक्षकाला असेल.


26/2/24

A. J. Dandekar
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प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी
द्वितीय सत्र

वेळ : तास

गुण : ५०

प्रश्न १ला— खालील प्रश्न (५० शब्दांत) सोडवा.

(चारपैकी तीन प्रश्न सोडवा —पहिल्या भागातील चार पाठातून)

(विभाग एक)

१५ (५X३)

प्रश्न २ रा— खालील प्रश्न (५० शब्दांत) सोडवा.

(चारपैकी तीन प्रश्न सोडवा — दुसऱ्या भागातील चार कवितांतून)

(विभाग दोन)

१५ (५X३)

प्रश्न ३ रा — खालील प्रश्न (५० शब्दांत) सोडवा.

(चारपैकी दोन प्रश्न सोडवा— तिसऱ्या भागातील चार लेखांतून)

(विभाग तीन)

१० (५X२)

प्रश्न ४ था— खालील प्रश्न (५० शब्दांत) सोडवा.

(तीनपैकी दोन प्रश्न सोडवा— चौथ्या भागातील दोन लेखांतून)

(विभाग चार)

१० (५X२)

अंतर्गत मूल्यांकनासाठी खालील घटकांप्रमाणे गुण विभागणी असेल.

१. अभ्यासक्रमावर आधारित गृहपाठ — १० गुण
२. वर्गपातळीवर गटचर्चा — १० गुण
३. कवितेचे रसग्रहण करणे — १० गुण
४. अनुवाद करणे — १० गुण
५. सुप्रसिध्द व्यक्तीचे चित्रण लिहिणे — १० गुण

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राष्ट्रसंत तुकडोजी महाराज नागपूर विद्यापीठ, नागपूर

Syllabus for Bachelor of Science/B.Sc. (IT)/BCA/B.Sc.-Data Science/
B.Sc. AI

SANSKRIT

विज्ञान स्नातक सत्र -2

(To be implemented from the session -2024-25)

❖ पाठ्यक्रमाची उद्दिष्टे (Course Objectives) :-

- संस्कृत भाषेच्या समृद्धतेची जाणीव करून देणे.
- विद्यार्थ्यांमध्ये भाषा कौशल्याचा विकास करणे.
- संस्कृत भाषेचा प्रायोगिक पद्धतीवर विकास करण्याचा प्रयास करणे.
- प्राचीन साहित्याच्या आकलन, रसग्रहण आणि चिकित्सा याद्वारा विद्यार्थ्यांची संवेदनशीलता, चारित्र्य संपन्नता आणि मूल्याधिष्ठितता जागृत करणे.
- संस्कृतभाषा, विज्ञान आणि मानवी जीवनव्यवहाराची सांगड घालणे.
- स्वतंत्र चिंतन आणि मननातून विद्यार्थ्यांना प्रेरित करणे.

❖ पाठ्यक्रमाचे परिणाम (Course Outcomes):-

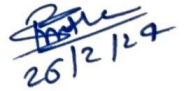
- संस्कृत भाषा, साहित्य व संस्कृतीचे ऐतिहासिक आकलन होणे .
- संस्कृत ग्रंथांच्या अध्ययनातून संस्कृत भाषेची वैज्ञानिकता प्रकट होणे.
- संस्कृत भाषेचे संवर्धन आणि संरक्षण होण्यास मदत होणे.
- संस्कृत संबद्ध वैज्ञानिक संशोधनाभिमुखता जागृत होणे.
- भारतीय संस्कृती तसेच मानवी मूल्यांचे संवर्धन होणे.

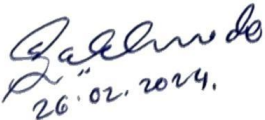

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राष्ट्रसंत तुकडोजी महाराज नागपूर विद्यापीठ, नागपूर

Syllabus for Bachelor of Science/B.Sc. (IT)/BCA/B.Sc.-Data Science/
B.Sc. AI

SANSKRIT

(To be implemented from the session -2024-25)

विज्ञान स्नातक सत्र -2

पाठ्यपुस्तक - संस्कृत- पुष्पहारः

❖ Unit I - गद्य - 1 ते 3

10 गुण

1. शिष्यानुशासनम्

2. इन्द्रियकथा

3. सहायः क्षेमकारकः

❖ Unit II गद्य - 4 ते 6

10 गुण

4. पितृपुत्रमेलनम्

5. सहायः क्षेमकारकः

6. दण्डनीतिः

❖ Unit III पद्य - 1-3

10 गुण

1. राम भरतयोः संवादः

2. चित्तैकाग्र्यम्

3. कौत्सस्य गुर्वर्धप्राप्तिः


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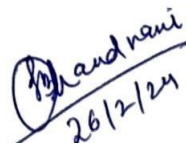

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❖ Unit IV पद्य - 4-5

10 गुण

4. नीतिविषयकम्

5. कलिविडम्बनम्

❖ Unit V--परिशिष्टम् - 1 ते 8

10 गुण

वाल्मीकी, व्यास, भास, अश्वघोष, कालिदास, भवभूती, भारवी, माघ

अन्तर्गत गुण - ५०

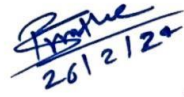
- | | |
|--------------------------------------|--------|
| ○ स्वाध्याय | 10 गुण |
| ○ घटक परीक्षा | 10 गुण |
| ○ पाठ्य प्रस्तुतीकरण | 10 गुण |
| ○ संभाषण कौशल्य | 10 गुण |
| ○ संगणक द्वारा परिशिष्ट प्रस्तुतीकरण | 10 गुण |


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राष्ट्रसंत तुकडोजी महाराज नागपूर विद्यापीठ, नागपूर

Syllabus for Bachelor of Science/B.Sc. (IT)/BCA/B.Sc.-Data Science
B.Sc.- AI
SANSKRIT

(To be implemented from the session -2024-25)

विज्ञान स्नातक सत्र -2

प्रश्नपत्रस्य स्वरूपम् -

पूर्णाङ्काः -50

प्र- 1] पाठाधृतः दीर्घोत्तरी प्रश्नः (सारांशः , व्यक्तिचित्रणम् , निसर्गवर्णनम् इत्यादयः) -
unit -1] -3 तः 1 -10

प्र- 2] कस्यचिद् एकस्य वाक्यस्य ससन्दर्भ स्पष्टीकरणं कुरुत [unit -2] - 2तः1 -10

कस्यचिद् एकस्य परिच्छेदस्य अनुवादं कुरुत - [unit -2] - 2 तः 1

प्र. 3] वाक्यद्वयं ससन्दर्भ स्पष्टयत [unit -3] - 3 तः 2 -10

प्र .4] श्लोकद्वयम् अनुसृत्य विविधाः प्रश्नाः - -10

यथा- श्लोकस्य अन्वयं लिखत, अनुवादं कुरुत,

रिक्तस्थानानि पूरयत, मेलनं कुरुत- [unit -4] - 4 तः 2


प्र. 5] द्वयोः टिप्पणीः लिखत - [unit -5] - 4 तः 2 -10



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B.Sc/B.Sc(IT)/BCA/B.Sc (Data Science)/B.Sc(AI) SEMESTER-2
SYLLABUS FOR SUPPLEMENTARY ENGLISH
(SECOND LANGUAGE)

(As per NEP 2020)

(To be implemented from the Academic Session 2024-2025 and onwards)

COURSE OUTCOMES:

- Students will be able to strengthen their language skills.
- The prescribed content will enhance students' awareness of different social and moral issues.
- Students will strengthen their critical thinking.
- Students will be able to confidently analyse and interpret the themes, emotions and literary elements.
- The assignments will strengthen the humanistic perspective of the students

Theory Exam: 50 Marks

Continuous Internal Evaluation (CIE): 50 Marks

Total : 100 Marks

Prescribed Text : *Symphony* - Board of Editors
(Published by Macmillan Education India Pvt. Ltd.)

SEMESTER - II

UNIT-1 (Prose)


1. My Greatest Olympic Prize - Jesse Owens
2. If You are Wrong, Admit It - Dale Carnegie
3. Mabel - W. Somerset Maugham

UNIT-2 (Prose)

4. Who Was the Happiest of Them All? - Sudha Murty
5. Father's Help - R. K. Narayan
6. The Lottery Ticket - Anton Chekov


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UNIT-3 (Poetry)

7. The Schoolboy - William Blake
8. The Education of Nature - William Wordsworth
9. Still I Rise - Maya Angelou
10. Ulysses - Alfred, Lord Tennyson

UNIT-4 (LANGUAGE SKILLS)

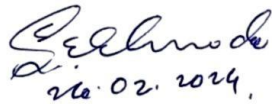
- Expansion of ideas
- Writing a film review
- Writing a book review

Continuous Internal Evaluation (CIE): 50 Marks


A Continuous Internal Assessment of 50 marks shall be based on the different activities regularly conducted by the Teacher in the classroom and the language competency exercises, written assignments/creative projects to be submitted by the students. The creative projects may include writing brief biographical sketches of eminent scientists, Nobel laureates or writing short pieces on how different innovations/enterprises/start-ups in recent times have impacted our lives.

The students are required to actively participate in these activities and mandatorily submit the written assignments/creative projects. The guidelines and some suggested items for the activities/assignments are given in the prescribed Text Book, 'Symphony'.


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**QUESTION PAPER PATTERN
THEORY EXAM
(50 MARKS)**

Q.1 Answer any Two (Out of Three) of the given questions in about 50 words each. (UNIT-1) (2 X 5 Marks = 10)

Q.2 Answer any Two (Out of Three) of the given questions in about 50 words each. (UNIT-2) (2 X 5 Marks = 10)

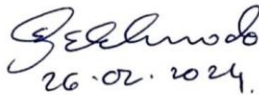
Q.3 (A) Five Very Short Answer Questions to be answered in one or two sentences each (UNIT-1) (5 X 1 Mark = 5)

(B) Five Very Short Answer Questions to be answered in one or two sentences each (UNIT-2) (5 X 1 Mark = 5)

Q.4 Answer any TWO (Out of Three) of the given questions in about 50 words each. (UNIT-3) (2 X 5 Marks = 10)

Q.5 Attempt any ONE (Out of Two) of the Questions based on the items prescribed in UNIT-4 (1 X 10 Marks = 10)


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**RASHTRASANT TUKDOJI MAHARAJ NAGPUR UNIVERSITY
NAGPUR**



Syllabus for B.Sc./ B.Sc. I.T/ B.C.A/ B.Sc. Data Science/AI. Semester II (NEP)

Urdu Compulsory

2024-25 Onwards

B.Sc/ B.Sc.IT/ B.Sc. Data Science/ A.I. , B.C.A Semester II (NEP)

URDU COMPULSORY

Objectives:

1. To Improve the knowledge about urdu stories and its origin.
2. To give the knowledge about some famous urdu story writers.
- 3 . To give the knowledge about some famous urdu stories.
4. To aware the Students about Indian Culture and their moral Values.

Outcomes:

- 1.Students will be able to understand about urdu stories and its origin.
2. Students will be able to understand about urdu story writers .
3. Students will be able to learn about Urdu stories .
- 4.Students will know very well about Indian Culture and their Moral Values

Unit I

افسانے

نیا قانون	سعادت حسن منٹو
پہلا پتھر	خواجہ احمد عباس
کایا کلپ	انتظار حسین
وہ	بران سینرا
اور کوٹ	غلام عباس

Unit II

مضامین

عمید کا دن	سر سید احمد
دیاسلائی	خواجہ حسن نظامی
حالی اور اردو تنقید	شارب رودلوی
قصہ ایک عظیم شاعر کا	سید صفدر (مزاحیہ)
قرض کی شان میں	محمد اسد اللہ



Dr. Azhar Abrar

Dr. Nosrat Minoo

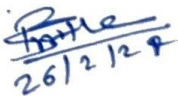




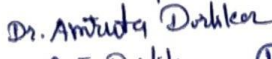


Mohammad Asrar

Kamal Thakur


26/12/24


Dr. Anil Kumar
A.T. Dorkhan


Dr. Anil Kumar
A.T. Dorkhan


26/12/24


26/12/24

Unit III

غزل

ند میں تیرے کوچے میں
اب آنکھوں میں خوں دم بدم دیکھتے ہیں
رفیع سودا
میر تقی میر
مرزا غالب
میر انیس
ناطق
صدا ہے فکر ترقی بلند بیٹوں کو
ہماری داستاں کے ساتھ روداد جہاں کیوں ہو

Unit IV

تقسیم

فقیروں کی صدا
دولت اور وقت کا مناظرہ
نظیر اکبر آبادی
حالی
اقبال
جوش ملیح آبادی
آئندہ نارا نین ملا
فلسفہ
مہاتما گاندھی
سرود جینی ٹائیڈو

Unit V

ناول

اردو ناول کی ابتداء و ارتقاء
اردو ادب میں ناول کے اولین نقوش
اردو ادب میں کردار نگاری کی اہمیت
اردو ناول میں منظر نگاری کی اہمیت

کتابیات:

انتظار حسین اور ان کے افسانے
مضامین سر سید
اردو مضامین
کلیات سودا
کلیات میر
دیوان غالب
مولانا ناطق گل اور غنوی
کلیات نظیر
کلیات آئندہ نارا نین ملا
مسکراتا کون ہے
صفر - تخلیقی و تنقیدی جہتیں
انتظار حسین
سر سید احمد خاں
سید ظہیر الدین مدنی
محمد رفیع سودا
میر تقی میر
مرزا غالب
ڈاکٹر سرور شہ نسرین قاضی
نظیر اکبر آبادی
خلیق انجم
مرتبہ توصیف احمد
شاہد رشید

کتاب: اردو کی مختلف امانت حاصل

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A.T. Durrani

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پبلشرز، لاہور، پاکستان

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Pattern of the Question Paper (Theory Examination)

- Q.1 (A) One out of two SAQs with internal choice to be answered in 75 Words from Unit I [5 Marks]
(B) Two out of three VSAQs with internal choice to be answered in 50 words from unit I [5 Marks]
- Q2. (A) Attempt any four SAQs out of eight with internal choice based on Unit II [8 Marks]
- Q3. (A) Explanation of couplets SAQs three out of five [12Marks]
- Q4. (A) Gist of poem SAQs one out of two [5 Marks]
(B) VSAQs two out of four [5 Marks]
- Q5. (A) Write short note SAQs one out of two [5 Marks]
(B) VSAQs two out of four [5 Marks]

Name of Book: Urdu ki Mukhtalif Asnaaf- Part-I

Publication House: Alfaaz Publication Kamptee

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Chaudhary
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A.I. Doshlen

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Evaluation Scheme for Urdu compulsory Second language (Urdu Ki Mukhtalif Asnaaf –part-I)
Theory Examination: 50 Marks/ ~~20 Marks~~
Internal Assessment: 50 Marks

Distribution of Marks (Theory Examination)			
UNITS	SAQs	VSAQs	Total Marks
Unit I	05	05	10
Unit II	04x2 (Two questions)		08
Unit III	04x3 (Three questions)		12
Unit IV	05	05	10
Unit V	05	05	10
			50

Internal Assessment will be done based on a continuous evaluation system. It should ideally follow the following marking scheme:

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Framework for Internal Evaluation		
Assessment Criteria	Units	Marks
Assignment	Based on the contents from all the units	10
Viva-voice	Based on the contents from all the units	10
Translation English to Urdu	Any English Paragraph	10
Classroom Projects (Seminars, Mini Projects, Discussion Forums and Elocution)	Unit I, III, IV	10
Essay Writing	Any one topic	10
		50

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 A.I. Doshika
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**RASHTRASANT TUKDOJI MAHARAJ NAGPUR UNIVERSITY
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Urdu Compulsory

2024-25 Onwards

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Syllabus for B.Sc. (Bachelor of Science)/B.Sc. (IT)/ BCA
B.Sc. Data Science/ B.Sc. AI

To be implemented from the Session 2024-2025

Semester II (2 Credits/ 30 Hours)

Urdu Compulsory Course

Title of the Course: Urdu ki Mukhtalif Asnaaf –Part -I

Introduction: The course titled, “Urdu Ki Mukhtalif Asnaaf-part-I” will address the Urdu language needs of the students at undergraduate level and will assist them to become confident, excellent Writer and an orator constitutes one of the essential features in today’s world. A course in “Urdu ki Mukhtalif Asnaaf-part-I” will eventually groom the learners to meet a variety of real life needs at the workplace. Students face day to day problems and they learn how to handle it through this course. This course will help the learners at undergraduate level to understand and use the concepts of life. The course is based on Bloom’s Taxonomy and directs the learners in the course of remembering, understanding, analyzing, and applying the acquired Urdu language skills.

Course Outcomes:

1. By the end of the course the students will get familiarize with the concepts of Urdu ki Mukhtalif Asnaaf
2. They will develop basic vocabulary and professional concepts in Urdu.
3. They will learn the required about basic knowledge of Urdu language.
4. The course will end with the learners getting knowledge about Urdu Literary figures.


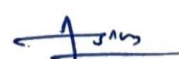

(Second Language Urdu)
Urdu ki Mukhtalif Asnaaf-part-I
Semester -II (2 Credits/ 30 Hours)

उद्देश्य:

1. उर्दू कहानी और उसके उत्पत्ति के प्रति ज्ञान बढ़ाना
2. विख्यात उर्दू कहानीकारों के प्रति जानकारी देना
3. उर्दू की मशहूर कहानिया विद्यार्थियों को बताना
4. विद्यार्थियों को भारतीय संस्कृति तथा उसमे दिए गए मूल्यों से अवगत कराना

परिणाम:

- 1-तिद्याथी उर्दू कहातनयों और उसकी उत्पत्ति के प्रति जानकारी प्राप्त करेंगे
- 2-तिद्याथी उर्दू कहानीकर के प्रति जागरूक ह पाएँगे
- 3-तिद्याथी उर्दू की कहानी पढ सकेंगे
- 4-तिद्याथी भारीय सोंस्कृति तथा उसमें तसखाए गए मूल्यों के प्रति जानकारी प्राप्त करेंगे

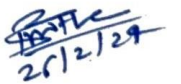






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Unit I: Afsaney:

(6 Hours)

अफसाने:

1-नया कानून	सआदत हसन मंटो
2-पहला पत्थर	ख्वाजा अहमद अब्बास
3-कायाकल्प	इंतेजार हुसैन
4-वो	बलराज मैनरा
5- ओवर कोट	गुलाम अब्बास

Unit II: Mazameen:

(6 Hours)

मज़ामीन:

1-ईद का दिन	सर सैय्यद अहमद
2-दिया सलाई	ख्वाजा हसन निजामी
3-हाली और उर्दू तनकीद	शारिब रुदूलवी
4- किस्सा एक अजीम शायर का	सैय्यद सफ़दर (मज़ाहियाह)
5-क़र्ज़ की शान में	मोहम्मद असदुल्लाह

Unit III: Ghazlein:

(6 Hours)

गज़लें:

ना में तेरे कूचे में	रफी सौदा
अब आंखों में खून दम ब दम देखते हैं	मीर तकी मीर
ता फिर ना इंतज़ार में नींद आए उम्र भर	मिर्ज़ा ग़ालिब
सदा है फिकरे तरक्की बलंद बीनों को	मीर अनीस
हमारी दास्तां के साथ रूदादे जहां क्यों हो	नातिक

Unit IV: Nazmein:

(6 Hours)

नज़में:

1- फ़कीरों की सदा	नज़ीर अकबराबादी
2- दौलत और वक्त का मुनाज़राह	हाली
3- फ़लसफ़ा	इकबाल
4- महात्मा गाँधी	जोश मलसियानी
5- सरोजिनी नायडू	आनंद नारायण मुल्ला

  
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नाविल:

- 1-उर्दू नाविल की इत्तेदा व इरतेका
- 2-उर्दू अदब में नाविल के अत्वलीन नुकुश
- 3-उर्दू नाविल में किरदार निगारी की अहमियत
- 4-उर्दू नाविल में मंज़र निगारी की अहमियत

Reference Books:

किताबियात:

- | | |
|---|-------------------------|
| 1- इंतज़ार हुसैन और उनके अफसाने | इंतज़ार हुसैन |
| 2- मज़ामीन ए सर सैय्यद | सर सैय्यद अहमद खान |
| 3- उर्दू मज़ामीन | सैय्यद ज़हीरुद्दीन मदनी |
| 4- कुल्लियात ए सौदा | मोहम्मद रफी सौदा |
| 5- कुल्लियात ए मीर | मीर तकी मीर |
| 6- दीवान ए ग़ालिब | मिर्ज़ा ग़ालिब |
| 7- मौलाना नातिक गलाउठवी हयात ओ अदबी ख़िदमात | डॉ सरोशा नसरीन काजी |
| 8- कुल्लियात ए नज़ीर | नज़ीर अकबराबादी |
| 9- कुल्लियात ए आनंद नारायण मुल्ला | खालिक अंजुम |
| 10- बीसवीं सदी में उर्दू नोवल | डॉ युसूफ सरमस्त |
| 11- उर्दू नोवल आज़ादी के बाद | डॉ असलम आज़ाद |
| 12- मुसकराता कौन है | तौसीफ अहमद |
| 13- सफ़दर तखलीकी व तन्कीदी जहतें | शाहिद रशीद |



  


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Evaluation Scheme for Urdu compulsory Second language (Urdu Ki Mukhtalif Asnaaf –part-I)
Theory Examination: 50 Marks/ ~~40 Marks~~
Internal Assessment: 50 Marks

Distribution of Marks (Theory Examination)			
UNITS	SAQs	VSAQs	Total Marks
Unit I	05	05	10
Unit II	04x2 (Two questions)		08
Unit III	04x3 (Three questions)		12
Unit IV	05	05	10
Unit V	05	05	10
			50

Internal Assessment will be done based on a continuous evaluation system. It should ideally follow the following marking scheme:

Assignment (10%), Viva-voice (10), Translation English to Urdu (10), Classroom Projects (Seminars, Mini Projects, Discussion Forums and Elocution) (10), Essay Writing (10).

Framework for Internal Evaluation		
Assessment Criteria	Units	Marks
Assignment	Based on the contents from all the units	10
Viva-voice	Based on the contents from all the units	10
Translation English to Urdu	Any English Paragraph	10
Classroom Projects (Seminars, Mini Projects, Discussion Forums and Elocution)	Unit I, III, IV	10
Essay Writing	Any one topic	10
		50

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Pattern of the Question Paper (Theory Examination)

- Q.1 (A) One out of two SAQs with internal choice to be answered in 75 Words from Unit I [5 Marks]
(B) Two out of three VSAQs with internal choice to be answered in 50 words from unit I [5 Marks]
- Q2. (A) Attempt any four SAQs out of eight with internal choice based on Unit II [8 Marks]
- Q3. (A) Explanation of couplets SAQs three out of five [12Marks]
- Q4. (A) Gist of poem SAQs one out of two [5 Marks]
(B) VSAQs two out of four [5 Marks]
- Q5. (A) Write short note SAQs one out of two [5 Marks]
(B) VSAQs two out of four [5 Marks]

Name of Book: Urdu ki Mukhtalif Asnaaf- Part-I

Publication House: Alfaaz Publication Kamptee

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Annexure – V
Basket of Co-curricular courses (CC)

Annexure – V

Basket for Co-Curricular Courses

Guidelines and Standard Operating Procedures for awarding credits for Co-Curricular Courses

Preamble:

The Government of Maharashtra vide its resolution no. एनईपी-2020/(67/23)/ताशि-2/ मंत्रालय मुंबई 400032 dated 4th July 2023 has provided guidelines for restructuring the undergraduate program structures for implementing National Education Policy 2020. In view of implementation of this the University has restructured all undergraduate programs incorporating Co-Curricular courses (referred as CC henceforth in this document) to ensure the holistic development of learners. This document prescribes the guidelines and standard operating procedures (SOPs) for students, teachers, and principals to facilitate smooth functioning of the scheme in larger interest.

Scope:

These guidelines and SOPs shall come into effect from the academic session 2024-25 and shall be applicable for all undergraduate programs having Co-Curricular Courses (CC) as a part of its scheme of examination offered by the Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

Definition of Co-Curricular Courses:

Co-Curricular courses are meant to bring social skills, intellectual skills, moral values, and character appeal in students. It refers to activities, programs, and learning experiences that compliment, in some way, what students are learning in the classroom – i.e. experiences that are connected to or mirror the academic curriculum. Co-Curricular courses are typically, but not always, defined by their separation from academic courses. Students enrolled for any UG program of the RTM Nagpur University will be allowed to opt for any of the following activities as a Co-Curricular Course:

CC Basket:

1. National Cadet Corps (NCC)
2. Extension Projects (Sanskar, Unnati and Sahayog) offered by the Department of Lifelong Learning and Extension, RTM Nagpur University, Nagpur
3. National Service Scheme (NSS)
4. Games and Sports Activities
5. Cultural Activities

Note: A student will not be allowed to opt any course outside this basket as a Co-Curricular Course

General Rules:

1. Each UG program has a component of CC in 1st and 2nd Semester. Each CC is a 2-credit practical and performance-based activity course and should have student engagement of minimum 60 hours (practice cum performance) in the corresponding semester.
2. Every college/institute affiliated to the RTM Nagpur University is required to designate a teacher as CC In-charge. It may also constitute a team of teachers for monitoring CC depending on the number of students.

3. A student is required to opt for any of the CC mentioned in the basket and inform the CC In-charge in the beginning of the semester (The college/institute shall devise a suitable student friendly mechanism to facilitate students to submit their choice/s).
4. A student may opt for one or more courses as CC in a semester. In this case, the credit will be awarded for the course in which the student had performed best. Moreover, a student will get 10 bonus marks for each additional CC activity he/she had opted for.
5. The CC In-charge or a team of teachers will be responsible for monitoring the attendance, participation, and performance of students in CC activity throughout the semester.
6. The CC In-charge or a team of teachers will also be responsible for objective evaluation of students based on their performance in CC activity.
7. The rubrics for objective evaluation mentioned in this document are required to be strictly followed by all the colleges/institutes and violation of the same in any manner may attract the disciplinary action against the person/s concerned.
8. Evaluation for CC is required to be completed before the commencement of the Session End Examination of the corresponding semester and the final marks (certified by the Principal) are required to be submitted to the university in a mode and manner as may be prescribed by the university from time to time.
9. The record of the CC activities and assessment shall be kept for review for 1 year and should be submitted to the University as and when called for or during the AAA review.
10. Since the NCC/NSS follows an annual calendar, the CC Marks as per below can be claimed under any ONE of the two semesters for the academic year depending upon the availability of full assessment data of the student. Thus NCC/NSS CC marks will be allotted during the CC falling in EVEN SEMESTERS. This also means that the NCC/NSS cadet must participate in any other activity from the basket i.e. from GAMES AND SPORTS or CULTURAL ACTIVITY or COURSES OFFERED BY DEPT. OF LIFELONG LEARNING AND EXTENSION simultaneously for claiming CC marks for a specific ODD semester.
11. NCC/NSS activities shall be conducted by the respective in-charges (NCC and NSS Officers) as per the activity calendar published by the respective offices.
12. The NCC/NSS officer must ensure that the students of NCC/NSS are also enrolled in other CC activities for claiming CC marks for a specific odd semester.
13. Ordinance No. 2 of 1996 is taken as base for this marking and it is modified suitably for student to get 100 Marks.
14. If a student fails to opt for a CC, his/her result for that semester shall be declared by marking 'ABSENT' against CC.
15. If a student opts a particular CC but fails to obtain minimum marks (50), he/she shall be declared 'FAIL' in CC. However, if such a student had opted for any other CC in the same semester, the provision of 'Bonus Marks' shall come into effect and the same should be taken into account.
16. If a student is declared 'FAIL' in CC, he/she can continue the same CC in the next semester to improve the performance.

Evaluation Rubrics for CC:

In order to attain objectivity and bring uniformity in evaluation of Co-Curricular Courses having different nature, the evaluation of performance of student needs to be quantified in marks having maximum 100 (Hundred) marks. The breakup of these maximum marks varies according to the CC and is elaborately explained hereunder:

1. National Cadet Corps (NCC):

This course can only be opted by the students of a college/institute having NCC unit.

Evaluation Rubrics

Criteria	MAXIMUM POSSIBLE MARKS	Rubric			
Participation in NCC in an academic year	30	Attendance Equal to or more than 75% = 30 Marks	Attendance 60% to 75% = 20 Marks	Attendance more than or equal to 50% = 10 Marks	Below 50% attendance = 0 Marks
Participation in Camps at Unit, GPs Dte and DG NCC level (eg. Annual Training Camp, National Integration Camp, Basic Leadership Camp, Advance Leadership Camp, Army Attachment Training, Hospital Attachment Training, RD selection Camps, Basic Leadership Selection Camps Delhi, Nau Sainik Camp, Vayu Sena Camp, International Youth Exchange Program etc.)	30	Participation in any three Camps = 30 Marks	Participation in any two Camps = 20 Marks	Participation in any one Camp = 10 Marks	No Participation in Camps = 0 Marks
Participation in Social Activities through NCC (Eg. Tree Plantation, Adult Education, Eye Donation, Skin donation, Organ donation, Village adoption, Anti Leprosy Drive, Medical Health Camp etc.)	20	Participation in any three Activities = 20 Marks	Participation in any two Activities = 10 Marks	Participation in any one Activity = 5 Marks	No Participation in Activity = 0 Marks
Participation in Adventure Activities: Army Cadets – Rock Climbing, Trekking, Mountaineering, cycling, para-Sailing, Para Jumping Naval Cadets - Sailing, Kayaking, boat Pulling Air Cadet – Solo Gliding	20	Participation in any one or more Activities = 20 Marks			No Participation in Activity = 0 Marks
RD Parade Participation	100	Participation at RD Parade New Delhi = 100 Marks irrespective of status of marks above.			
Passing 'C' Certificate Exam	Additional Max. 10 marks	Marks to be allotted such that the total Marks under all heads should not be more than 100			
Holder of rank not below the rank of Sgd. or an equivalent distinction achieved by the cadet	Additional Max. 5 marks	Marks to be allotted such that the total Marks under all heads should not be more than 100			
Bonus Marks for participation in any of the other CC activities in the SAME SEMESTER i.e. even semester	Additional Max 10 marks per CC Activity	Marks to be allotted such that the total Marks under all heads should not be more than 100			

Note: Since the NCC follows an annual calendar, the CC Marks as per the above can be claimed in **even semester** only. This also means that the NCC cadet must participate in GAMES AND SPORTS or CULTURAL ACTIVITY or any other Co-curricular courses available in the basket simultaneously for claiming CC marks for a specific odd semester.

2) Extension Projects (Sanskar, Unnati and Sahyog) offered by the Department of Lifelong Learning & Extension of RTM Nagpur University

Rules for Extension Project:

- There are three types of extension projects viz. Sanskar, Unnati and Sahyog having 1 credit each.
- A student of any affiliated college can opt for a course under this category.
- A student opting for 'Extension Project' as CC must opt any two projects one of which mandatorily has to be 'Unnati.'
- Details of the scope and other guidelines about these projects can be obtained from the official website of the Department.
- Attendance record for each extension project needs to be maintained separately and assessment for attendance to be made accordingly.

Evaluation Rubrics

Criteria	MAXIMUM POSSIBLE MARKS	Rubric			
Attendance and Participation in Sanskar, Unnati and Sahyog LLE activities	20	Attendance Equal to or more than 75% = 20 Marks	Attendance 60% to 75% = 15 Marks	Attendance more than or equal to 50% = 10 Marks	Below 50% attendance = 5 Marks
Sanskar Prkalpa Participation and submission of <i>Report on the life and works of Rashtrasant Tukadoji Maharaj</i>	40	Report evaluation in excellent grade = 40 marks	Report evaluation in satisfactory grade = 30 marks	Report evaluation in average grade = 20 marks	Report evaluation in below average grade = 10 Marks
Unnati participation and submission of case studies of the <i>beneficiaries of individual/common development schemes floated by the Central/State government.</i>	40	3 or more cases compiled = 40 marks	2 or more cases compiled = 25 marks	1 or more cases compiled = 15 marks	Participation but no case complied = 5 marks
Sahyog participation and submission of Sahyog project report <i>related to senior citizens issues and activities</i>	40	Detailed Report containing senior citizen related 3 or more activities = 40 Marks	Detailed Report containing senior citizen related 2 or more activities = 25 Marks	Detailed Report containing senior citizen related 1 or more activities = 15 Marks	Participation but no report submission = 5 Marks
Bonus Marks for First ten Students scoring maximum marks	Additional Max. 10 marks	Marks to be allotted such that the total Marks under all heads should not be more than 100			
Bonus Marks for participation in any of the other CC activities in the SAME SEMESTER	Additional Max 10 marks per CC Activity	Marks to be allotted such that the total Marks under all heads should not be more than 100			

3. NSS:

This course can only be opted by the students of a college/institute having NSS unit.

Evaluation Rubrics

Criteria	MAXIMUM POSSIBLE MARKS	Rubric			
Participation in NSS in an academic year	30	Attendance Equal to or more than 75% = 30 Marks	Attendance 60% to 75% = 25 Marks	Attendance more than or equal to 50% = 20 Marks	Below 50% attendance = 10 Marks
Participation in NSS Camp	40	Participation in National level Camp = 40 Marks	Participation in University level Camp = 30 Marks	Participation in College level Camp = 25 Marks	No Participation in Camps = 0 Marks
Participation in Social Activities through NSS (eg. Tree Plantation, Adult Education, Eye Donation, Skin donation, organ donation, Village adoption, Anti Leprosy Drive, Medical Health Camp etc.)	30	Participation in any three Activities = 30 Marks	Participation in any two Activities = 20 Marks	Participation in any one Activity = 10 Marks	No Participation in Activity = 0 Marks
RD Parade Participation	100	Participation at RD Parade New Delhi = 100 Marks irrespective of status of marks above.			
Bonus Marks for participation in any of the other CC activities in the SAME SEMESTER	Max 10 per CC Activity	Marks to be allotted such that the total Marks under all heads should not be more than 100			

Note: Since the NSS follows an annual calendar, the CC Marks as per above can be claimed in even semester only. This also means that the NSS cadet must participate in GAMES AND SPORTS or CULTURAL ACTIVITY or any other Co-curricular courses available in the basket simultaneously for claiming CC marks for a specific odd semester.

4. GAMES & SPORTS

Rules for Games and Sports:

- This course can be opted by a student of any affiliated college.
- The student will be required produce an authentic certificate of participation/medal.
- The CC In-charge shall verify the authenticity of the certificate regarding level of the tournament, participation/prize/medal, etc.
- The CC In-charge shall also verify whether the tournament was conducted in the corresponding semester or not.
- In case of Team Sports, each team member will be evaluated independently and no assessment for team as such shall be made.

Evaluation Rubrics																		
Sr. no	Event	College Level				Inter College/University Level				Zonal/State Level				National Level				World/International Level
1	Sports and Games	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation
	Any competition/tournament organized as per guidelines from DSO office and also from The Director Physical Education and Sports	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
2	Undergoing any one course offered by Dept. of Sports & Physical Education and approved by Rashtrasant Tukadoji Maharaj Nagpur University Ex.: CC in Yoga Education, CC in Health and Wellness etc.	<p style="text-align: center;">Maximum Possible Marks 100.</p> <p>As per assessment scheme approved by Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur</p>																

5. Cultural Activities

Rules for Cultural Activities:

- a. This course can be opted by a student of any affiliated college.
- b. The student will be required produce an authentic certificate of participation/medal.
- c. The CC In-charge shall verify the authenticity of the certificate regarding level of the tournament, participation/prize/medal, etc.
- d. The CC In-charge shall also verify whether the tournament was conducted in the corresponding semester or not.
- e. In case of group event, each group member to be assessed independently and no assessment for team as such shall be made.

Evaluation Rubrics

Sr. no	Event	College Level				Inter College/University Level				Zonal/State Level				National Level				World/International Level
		Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	
1	Music																	
	Indian Classical Vocal (Solo Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Indian Classical Instrumental Percussion	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Indian Classical Instrumental Non-Percussion (Swarvadya Solo Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Natyasangeet Vocal (Solo Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Indian Light Vocal (Solo Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Indian Group Song (Solo Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Folk Orchestra (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Western Vocal (Solo Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Western Instrumental (Solo Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Western Group Song (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	2	Dance																
Indian Classical Dance (Individual Event)		40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
Indian Folk Dance (Group Event)		40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
3	Literary																	
	Elocution (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Debate (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Quiz (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100

4	Theatre	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation
	Mimicry (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	One Act Play (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Skit (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Mime (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
5	Fine Art	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation	3 rd Prize	2 nd Prize	1 st Prize	Participation
	Painting (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Collage (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Poster Making (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Clay Modeling (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Cartooning (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Rangoli (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Spot Photography (Individual Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
	Installation (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
6	Short Film (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
7	Procession (Group Event)	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
8	Students Parliament	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100
9	Mock court	40	45	50	55	55	60	65	70	70	75	80	85	85	90	95	100	100

सुचना - AIU किंवा राजभवन द्वारा आयोजित स्पर्धा व्यतिरीक्त आंतर महाविद्यालयाच्या वरील सर्व स्पर्धा Inter College / University Level स्पर्धा म्हणून गुणांकन करावे.

