

BSc_Biotechnology

Title of the Course	English	Jish										
Course Code	AECI[T]	भाग										
Part A												
			1st	Credits	L	Т	Р	С				
Year	1st	1st Semester	ist	Credits	2	0	0	2				
Course Type	Theory only	eory only										
Course Category	Ability Enhancemen	nt Courses										
Pre-Requisite/s	Student should know	w the interpersonal skills and be an effective go	al-oriented team player.	Co-Requisite/s	Communicative skills, workshop, Leadership development etc.							
Course Outcomes & Bloom's Level												
	Skill Development >											

Part B

SDG (Goals)

		Faitb					
Modules	Contents	Pedagogy					
Module 1	Introduction to Communication Definition, Process, Principles and Types • Forms & Grapevine Barriers & Noise	Classroom Lecture, Story telling, role play, group discussions	4				
Module 2	Language Know-how Common Errors Learning through examples Functional Grammar & Contemporary usage	Classroom Lecture, Story telling, role play, group discussions	6				
Module 3	Paragraph Development Techniques Principles & Methods Instruments for Cohesive Writing Creating Mind Maps/Infographic	Classroom Lecture, Story telling, role play, group discussions	8				
Module 4	Writing skills Introduction to writing skills. Tone, Orientation, Attitude, Formal vs Informal, general writing, technical writing Letter/Application/e-mail, Format, and content Indian isms in Email Writing Writing for the Web: Do's & Don'ts of Email Writing, Netiquette	Classroom Lecture, Story telling, role play, group discussions	6				
Module 5	Resume Writing - Concept, types, and Application Curriculum Vitae: difference between Resume and CV Interview Skills Group Discussion and Debate	Classroom Lecture, Story telling, role play, group discussions	6				

Part D(Marks Distribution)

Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18								
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
0	0	0	0	0	0						

Part E

	Books	Prasad, V., "Advanced Communication Skills", Atma Ram Publications, New Delhi				
Articles https://www.jotir.org/papers/JETIR2108373.pdf https://open.lib.umn.edu/communication-/chapter/1-2-the-communication-process/ https://www.iosrjournals.org/losr-jbm/papers/Vol22-issue8/Series-2/E2208024254.pdf						
	References Books	Madhukar, R., K. "Business Communication", Vikas Publishing House Pvt. Ltd.				
	MOOC Courses	https://nptel.ac.in/courses/109103020				
	Videos	https://hptel.ac.in/courses/109103020				

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	-	-	2	-	-	1	-	1
CO2	2	2	1	2	2	2	-	-	-	2	-	-	1	-	3
CO3	2	1	1	-	1	-	-	-	-	2	-	-	3	2	3
CO4	3	2	-	2	1	-	-	-	-	2	-	-	2	3	3
C05	3	2	-	2	1	-	-	-	-	2	-	-	2	2	3
CO6	-	-	_	_	_	_	-	_	_	-	-				



BSc_FoodTechnology

Title of the Course	Bakery & confection	& confectionery [T]											
Course Code	BSFT-0402 [T]												
			Part A										
Year	2nd	Semester	4th	Credits	L	T	P	С					
1641	Zild	Semester	401	Ciedita	3	0	1	4					
Course Type	Embedded theory a	edded theory and lab											
Course Category	Discipline Core	oline Core											
Pre-Requisite/s	Student must have s	studies Cereals, Pulses and Oilseeds in the	previous semesters	Co-Requisite/s	Knowledge of mar	Knowledge of manufacuring of bakery and confectionery products							
Course Outcomes & Bloom's Level	CO2- To understand CO3- To provide stu CO4- To apply the s	If the scientific principles in the processing to idents an experimental basis and a specializ- subject knowledge in future perspectives i.e.	echnologies, product specification and reg zed knowledge and understanding in the d such as in research and development in I	nfectionery products, various product faults and their remedies (fulations, hierarchy of bakery department and different working te everlopment and quality control of bakery and confectionery pro- bakery products (BL4-Analyze) skery and confectionery products (BL5-Evaluate)	emperatures for bake	ery products(BL2-Un	derstand)						
Coures Elements	Skill Development Entrepreneurship Employability Professsonal Ethics Gender Human Values Environment X		SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being)									

Part B Modules Contents Pedagogy Hours Bakery industry; Current status, growth rate, and economic importance of Bakery industry in India. Major bakery industries in India Role of Raw Materials Required for Bakery & Confectionery: Wheat flour, sugar, fat, eggs, Essential ingredients: Sindur, sugar, shortening, eggs, Optional ingredients: Saking prowder, milk, milk products, dy fruits, baking soda, dairy products, yeast etc used in bakery and confectionery. Role of yeast in bakery industry.

Small and large equipment used in manufacturing of bakery and confectionary products - Different types of ovens and other heating equipments, proding chamber, measuring tools, Preparatory tools, mixing tools, Cutting tools, baking pans and other tools. Bread-Introduction, Types of bread, Manufacturing techniques, faults and corrective measures, Quality Characteristics. Lecture method, industrial visit Lecture method, Quiz, Illustrate with analogies. Cakes: Introduction, Types of cake, Manufacturing: Sugar batter method, Flour batter method, Genoese. Blending, faults and corrective measures. Modified Bakery Products: Modification of bakery products for people with special nutritional requirements e.g., high fiber, low sugar, tow fat, gluten free bakery products Audion-video clips, Expert Lecture 10 12

Introduction to Confectionery: Scope of confectionery, Confectionery terms, technology for manufacture of flour, fruit, milk, sugar, chocolate, based confectionery products; cooler, flavor and texture of confectionery; standards and regulations Lecture method, Audio/Video clips, group discussion, quiz Sugar Confectionaries: Caramels, Chocolates, Fondant, Fudge, Hard candy(Iollipops, jawbreakers), Jelly candies, Marshmallow, Principles of production, Quality Characteristics Audio/Video clips, group discussion, lecture with ppt, quiz

Preparation of toffees

Part C Indicative-ABCA/PBL/ Experiments/Field work/ Internships Modules Bloom's Level To study the leavening action of baking powder, sodium- bicarbonate and ammonium-bicarbonate. Experiments BL2-Understand Determination dough rising capacity of yeast Experiments BL3-Apply Preparation of biscuits and cookies Experiments BL3-Apply Preparation of bread-different types Experiments BL3-Apply To identify the external and internal characteristics of bread PBL BL4-Analyze BL3-Apply Preparation of cake-different types Experiments Preparation of low fat cake and cookies

Part D(Marks Distribution)

Experiments

Experiments

BL3-Apply BL3-Apply

2

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	External Evaluation Min. External Evaluation		Min. Internal Evaluation							
100	40	60	18	40	0							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	0	60	30	40	0							

Part E

Books	Dubey, S. C. (1980, January 1). Basic Baking.
Articles	
References Books	Chopra, U. R. S. K. V. N. S. T. S. S. V. S. (2010, January 1) Basic Food Preparation: A Complete Manual Manay, N. S., & Shadaksharaswamy, M. (2008, January 1). Food: Facts and Principles. New Age International. Khan, R. (2012, December 6). Lovel-Foods and Food Ingedients. Springer Science & Business Media.
MOOC Courses	https://nptel.ac.in/courses/126105027
Videos	https://www.youtube.com/watch?v=Dm3yP7FF4nl

PO8 PO9 COs PO1 PO2 PO3 P04 PO5 P06 PO10 PO11 PO12 PS01 PS02 PSO3 CO1 CO2 CO3 2 2 3 CO4 2 CO5



MSc_FoodTechnology

Title of the Course	Fruits and Vegetable	es Technology [T]											
Course Code	FT-201 [T]												
Part A													
Year	1st	Semester	2nd	Credits	L	Т	Р	С					
1001	100	Selliestei	Zild	Ciedita	4	0	0	4					
Course Type	Theory only	ory only											
Course Category	Discipline Core	pline Core											
Pre-Requisite/s		ve a bachelor's degree in Food Technology or in a 60% marks in their graduation degree.	ny science stream. They should have	Co-Requisite/s	Students should have prior knowledge of fruits and vegetables, their parts and various preservation techniques								
Course Outcomes & Bloom's Level	CO2- To illustrate the CO3- To describe the CO4- Identify the m		ke juicesand pulps, concentrates and powder spices develop value added products from the BL4-Analyze)										
Coures Elements	Skill Development > Entrepreneurship × Employability ✓ Professsonal Ethics Gender × Human Values × Environment ×		SDG (Goals)	SDC3(Zaro hungar) SDC3(Zeod health and well-being) SDC3(Zeosd health and well-being) SDC3(Zeosponsible consuption and production)									

		Part B					
Modules	Contents	Pedagogy					
1	Status of production and processing of fruits and vegetables, Structural, compositional and nutritional aspects of fruits and vegetables. Physiological development Growth, Maturation, Ripening and Sonescence, climacteric and non-climacteric fruits, Per and post-harvest changes, pre-tharvest factors, affecting postharvest quality	Lecture methods, Group discussion, quiz	10				
2	Selection of fruits and vegetables for processing, Techniques of processing and preservation of fruits and vegetables by refrigeration and freezing, canning and bottling, drying and dehydration, spoilage of fruits and vegetables	Lecture methods,AudiolVideo clips,	10				
3	Manufacturing, related calculations and related defects of jam, jelly, marmalade, preserve and candy; tomato puree, paste, ketchup, sauce and soup; pickles, drying/ dehydration of fruits and vegetables	Lecture methods,Audio/Video clips, group discussion,	12				
4	Manufacturing and calculationsof beverages - fruit Juices, pulps, concentrates, powders, squashes, cordials and RTS, Critical points to consider in the production of different processed fruits and vegetable products and solving the associated problems	Lecture methods,Audio/Video clips, group discussion, quiz	12				
5	Possible causes of post-harvest losses and conservation of fruits and vegetable. Post-harvest handling including controlled and modified storage; use of novel packaging, hypobaric storage.	Lecture methods, Audio/Video clips, group discussion, quiz	6				

Part D(Marks Distribution) Total Marks Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation Min. Internal Evaluation Min. Internal Evaluation 100 40 0 8 4 0 0 Min. Internal Evaluation Min. Internal

	Part E										
Books	Preservation of Fruits and Vegetables- Lal G, Siddapa GS and Tandon GL										
Articles	https://ifst.onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2621.2001.00513.x										
References Books	Post-harvest Technology of Horticultural Crops by Kadar AA Preservation of Fruits and Vegetables by Lal G, Siddapa GS and Tandon GL Post-HarvestPhysiology, Handling and Utilization Officipical and Subtropical Fruits and Vegetables by Pantastico B Storage, Processing and Nutritional Quality of Fruits and Vegetables by Salurishe DK, Bolia HR and Reddy NR Post-Harvest Enchnology of Fruits and Vegetables by Thompson AK Post-Harvest Enchnology of Fruits and Vegetables by Salurishe DK, Bolia HR and Reddy NR Post-Harvest Enchnology of Fruits and Vegetables by Thompson AK										
MOOC Courses											
Videos											

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	2	-	-	-	-	-	1	3	1	1
CO2	3	3	2	3	2	3	1	-	-	1	1	2	3	1	1
CO3	3	3	2	2	3	3	-	-	-	-	=	-	3	1	1
CO4	3	3	2	2	2	2	-	-	-	-	=	1	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	1	1	3	3	3
CO6	-	1-	1.	_	-	_	_	-	_	-	_	_		-	1.



BSc_Biotechnology

Little of the Course	HINDIT									
Course Code	AEC II (T)									
			Part A							
Year	1st	Semester	2nd	Credits	L	Т	P	С		
Itali	100	Jeillestei	2110	Credits	2	0	0	2		
Course Type	Theory only	only								
Course Category	Ability Enhancement Courses									
Pre-Requisite/s	हिंदी भाषा का मूल गया ज्ञान होना आवश्यक है			Co-Requisite/s						
Course Outcomes & Bloom's Level	CO1- संपर्क भाषा के रूप में हिंदी को समझना। स CO2- ज्ञान को अर्थपूर्णता देने में भाषा एक सथक्त CO3- छात्र , भाषा को सुन कर अर्थ ग्रहण कर सकें CO4- हिंदी भाषा एवं नैतिक मूल्यों को समझना।(B	सांस्कृतिक, एवं राष्ट्रिय एकता बनाये रर ! आधार है।(BL2-Understand) हे ,शुद्ध -स्पष्ट लिख सकें एवं वक्ता के 3L4-Analyze)	खना भाषा के माध्यम से संम्भव है। पाठ्यक्रम में व्याकरण मनोभावों को समझकर भावानुभूति कर सकें। (BL3-Ap)	. एवं लेखन परम्परा का बोध करना (BL1-Remember) ply)						
Coures Elements	Skill Development ✓ Entrepreneurship × Employability ✓ Professonal Ethics × Gender × Human Values ✓ Environment ×		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)						

Part B

Modules	Contents	Pedagogy	Hours
I	स्वतंत्रता पुकारती (कविता)जयशंकर प्रसाद पुष्प की अभिलाषा (कविता) माखनलाल चतुर्वेदी वाक्य संरचना और अशुद्धियाँ (संकलित)	lecture method, group discussion, story telling,	8
II	एक थे राजा भोज { निबंध } – त्रिभुवननाथ शुक्त २ पर्यायवाची , विलोम , एकार्थी ,अनेकार्थी एवं शब्दयुग्म शब्द (संकलित } ३ वह तोड़ती पत्थर -सूर्यकान्त त्रिपाठी निराला ४ वर्ण -विचार (स्वर ,व्यंजन ,वर्गीकरण ,उच्चारण स्थान }	lecture method, group discussion, story telling, role play	6
III	१ भगवान् बुद्ध} { निबंध }स्वामी विवेकानंद २ लोकतंत्र एक धर्म है{ निबंधडॉ सर्वपल्ली राधा कृष्णन ३ पल्लवन	lecture method, group discussion, story telling, role play	6
IV	अफसर{ निबंध -शरद जोशी २ संक्षेपण {संकलित } ३ नारीत्व का अभिशाप ४ विराम -चिह्न {संकलित }	lecture method, group discussion, story telling, role play	6
V	नैतिक मूल्य परिचय एवं वर्गीकरण(आलेख)डॉ श्रथि राय २ अंतर्ज्ञान और नैतिक जीवन(लेखडॉ सर्वपल्ली राधाक ३ अप्प दीपोभव (लेख) -स्वामी श्रद्धा	lecture method, group discussion, story telling, role play	6

Part D(Marks Distribution)

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	ternal Evaluation Min. External Evaluation		Min. Internal Evaluation				
100	40	60	18	40					
	•	•	Practical	•	•				
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
0	0	0	0	0	0				

Part E

Books	हिंदी भाषा और नैतिक मूल्य : मध्य प्रदेश शासन
Articles	https://www.cvs.edu.in/upload/IMG-20200323-WA0003.pdf
References Books	
MOOC Courses	https://onlinecourses.swayam2.ac.in/cec20_lg05/preview
Videos	https://onlinecourses.swayam2.ac.in/ce20_lg05/preview

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	2	2	-	-	-	-	-	-	-	-	2	-
CO2	2	3	1	2	2	-	-	-	-	-	-	-	-	2	-
CO3	2	2	1	1	1	-	-	-	-	-	-	-	-	2	-
CO4	1	2	-	-	-	-	-	-	-	-	-	-	-	1	-
CO5	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-
CO6	-	-	-	-	i e	i i	-	i e	i	-	-	-	-	-	-



BSc_FoodTechnology

Title of the Course	Health and Welln	Ith and Wellness									
Course Code	AEC-1 [T]	C-1 [T]									
	Part A										
Year	1st	Semester	1st	Credits	L	T	P	С			
100	100	Comodo	100	Sidalis	2	0	0	2			
Course Type	Theory only	sory only									
Course Category	Ability Enhancem	ility Enhancement Courses									
Pre-Requisite/s	knowledge of cor	ncept and nature of health, wellness and	its various implications	Co-Requisite/s	knowledge of concep	ot and nature of health,	vellness and its various i	mplications			
Course Outcomes & Bloom's Level	CO2- To introduct CO3- To introduct	the the learners to the concept of health a the the learners to the relation between m the learners to health behavior and promote the adequate knowledge on well-being an	ind-body and its relevance.(BL2-Und tion of human strengths for well-being	erstand) g. (BL3-Apply)	•						
Coures Elements	Skill Development X Entrepreneurship X Employability \(\) Employability \(\) Professonal Ethics X Gender \(\) Human Values \(\) Environment X										

Part B

Modules	Contents	Pedagogy	Hours
1	INTRODUCTION TO HEALTH & WELLNESS -Definition of health- WHO definition; Importance of health in everyday life; Components of health- physical, social, mental, spiritual and its relevance	Lecture method	5
2	Concept of wellness;Mental Health & wellness Determinants of health behaviours Using the mass media for health promotion	Lecture method, quiz, seminar	8
3	MIND – BODY AND WELL-BEING- Mind- Body connection in health- concept and relation; pt and relation Implications of mind-body connections; Wellbeing- why it matters?	Lecture method, quiz, seminar, group discussion	8
4	Digital wellbeing; Understanding health beliefs, and perspectives of indigenous people pertaining to Assam and North East India	adudi/video lectures, seminars, expert lectures	6
5	Promoting Human strengths and life enhancement: Classification of human strengths and virtues; cultivating inner strengths: Hope and optimism	adudi/video lectures, seminars, expert lectures	6

Part D(Marks Distribution)

	Theory								
Total Marks	Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	40	60	18	40					
	Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				

Part E

Books	Carr, A. (2004). Positive Psychology: The science of happiness and human strength. UK: Routledge.					
Articles						
References Books Forshaw, M. (2003). Advanced psychology: Health psychology. London: Hodder and Stoughton.						
MOOC Courses						
Videos						

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	2	1	-	1	-	1	-	1	-	1	1	1
CO2	2	1	1	2	1	1	-	2	-	-	-	-	2	2	2
CO3	2	2	2	2	-	1	-	-	1	1	-	-	3	2	3
CO4	3	2	2	2	1	-	1	-	-	-	-	-	3	2	3
CO5	3	3	2	3	-	-	1	2	1	-	1	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_ComputerScience

Title of the Course	English-I	nglish-l									
Course Code	AEC0201[T]	:C0201[T]									
	Part A										
Year	1st	Semester	2nd	Credits	L	Т	Р	С			
	1			-11-11-1	2	0	0	2			
Course Type	Theory only										
Course Category	ourse Category Ability Enhancement Courses										
Pre-Requisite/s	The students have a b	pasic knowledge and understanding of the English lan	guage and communication.	Co-Requisite/s	Communication	on skills, Leade	ship developmer	nt etc.			
Course Outcomes & Bloom's Level	CO2- Elaborate creati CO3- Examine attitud CO4- Justify approach	personal skills and be an effective goal-oriented team vitly and lateral thinking(BL2-Understand) es, emotional intelligence and understand its influence nes to conflict resolution.(BL4-Analyze) etting, management, decision-making skills.(BL5-Eva	e on behavior(BL3-Apply)		•						
Cours Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professonal Ethics ✓ Gender X Human Values ✓ Environment X	,	SDG (Goals)	SDG4(Quality education)							

Part B

Modules	Contents	Pedagogy	Hours
Module 1	Where the Mind is Without Fear, The Tryst with Destiny The Hero, Indian Weavers The Portrait of a Lady The Solitary Reaper	Classroom Lecture, PPts, Videoes	10
Module 2	Basic Language Skills Synonyms, Antonyms, Homonyms, Word Formation, Prefix, Suffix	Classroom Lecture, PPts,	6
Module 3	Uncountable Noun, Verb, Tense, Adverb	Classroom Lecture, PPts,	6
Module 4	Trading Comprehension, Unseen Passage	Classroom Lecture, PPts, Videos	4
	Introduction to Report Writing, Major Objectives of Writing Reports, Significance of Business/Technical, Types and Forms of Reports, Sylves of Writing Reports – Printed format, Memo Format, Letter Format, Book/Letter Text Format, Layout and Structure of Reports, Components of Report Writing and Structure of Reports (Components of Report Writing).	Classroom Lecture, PPts, Videos	5

Part D(Marks Distribution)

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	40	12	60						
	Practical Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					

Part E

Books	Books C. Muralkirishna and S. Mishra (2011) Communication Skills for Engineers, Pearson education. ISBN: 9788131733844					
Articles	Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998.					
References Books Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.						
MOOC Courses	https://nptel.ac.in/courses/109103020					
Videos	https://hptel.ac.in/courses/109103020					

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	-	-	2	-	-	1	-	1
CO2	2	2	1	2	2	2	-	-	-	2	-	-	1	-	3
CO3	2	1	1	-	1	-	-	-	-	2	-	-	3	2	3
CO4	3	2	-	2	1	-	-	-	-	2		-	2	3	3
C05	3	2	-	2	1	-	-	-	-	2		-	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_PCM

Title of the Course	English-I									
Course Code	AEC0201[T]									
Part A										
Year	1st	Semester	2nd	Credits	L	Т	P	С		
1001	101	Semester	210	Credita	2	0	0	2		
Course Type	Theory only	ry only								
Course Category	Ability Enhancement	ility Enhancement Courses								
Pre-Requisite/s	The students have a l	pasic knowledge and understanding of the English lan	guage and communication.	Co-Requisite/s	Co-Requisite/s Communication skills, Leadership development etc.					
Course Outcomes & Bloom's Level	CO2- Elaborate creati CO3- Examine attitud CO4- Justify approact	CO1- Determine interpersonal skills and be an effective goal-oriented team player(BL1-Remember) CO2- Elaborate creativity and lateral thinking(BL2-Understand) CO3- Examine attitudes, embicinal intelligence and understand its influence on behavior(BL3-Appty) CO4- Justify approaches to conflict resolution, (BL4-Analyze) CO5- Evaluate goal setting, management, decision-making skills, (BL5-Evaluate)								
Cours Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics ✓ Gender X Human Values ✓ Environment X	,	SDG (Goals)	SDG4(Quality education)						

Part B

Modules	Contents	Pedagogy	Hours
Module 1	Where the Mind is Without Fear, The Tryst with Destiny The Hero, Indian Weavers The Portrait of a Lady The Solitary Reaper	Classroom Lecture, PPts, Videoes	10
Module 2	Basic Language Skills Synonyms, Antonyms, Homonyms, Word Formation, Prefix, Suffix	Classroom Lecture, PPts,	6
Module 3	Uncountable Noun, Verb, Tense, Adverb	Classroom Lecture, PPts,	6
Module 4	Trading Comprehension, Unseen Passage	Classroom Lecture, PPts, Videos	4
	Introduction to Report Writing, Major Objectives of Writing Reports, Significance of Business/Technical, Types and Forms of Reports, Styles of Writing Reports – Printed format, Memo Format, Letter Format, Book/Letter Text Format, Layout and Structure of Reports, Components of Report Writing	Classroom Lecture, PPts, Videos	5

Part D(Marks Distribution)

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	40	12							
			Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					

Part E

Books C. Muralikrishna and S. Mishra (2011) Communication Skills for Engineers, Pearson education. ISBN: 9788131733844					
Articles Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998.					
References Books Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.					
MOOC Courses	https://nptel.ac.in/courses/109103020				
Videos	https://hptel.ac.in/courses/109103020				

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	-	-	2	-	-	1	-	1
CO2	2	2	1	2	2	2	-	-	-	2	-	-	1	-	3
CO3	2	1	1	-	1	-	-	-	•	2	-	-	3	2	3
CO4	3	2	-	2	1	-	-	-		2		-	2	3	3
CO5	3	2	-	2	1	-	-	-		2		-	2	2	3
CO6	-	-	-	-	-	-	-	-		-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Molecular Biology	olecular Biology									
Course Code	BSBT 201(T)	JSBT 201(T)									
Part A											
Year	1st	Semester	2nd	Credits	L	Т	Р	С			
					03	0	1	4			
Course Type	Embedded theory and la	imbedded theory and lab									
Course Category	Disciplinary Major	Disciplinary Major									
Pre-Requisite/s	Molecular Biology is an	advance paper,therefore student must know about Gene	structure and gene regulation.	Co-Requisite/s Student must have background with Genetics.							
Course Outcomes & Bloom's Level	CO1- To understand the basic terms in contrast to genes, genome and their interactions(BL2-Understand) CO2- To identify and isolate the genomic DNA from the different samples (BL3-Appty) CO3- To compare and analyze the different DNA present among the various samples(BL4-Analyze) CO4- To evaluate the different fragments of DNA using restriction enzymes and molecular techniques(BL5-Evaluate) CO5- To apply the understanding of biomolecules in various fields in respect and and velocity ment (BL1-Remember)										
Skill Development X Enterpreneurship X Enterpreneurship X Emptoyability of Professional Efficia X Gender X Human Values X Environment X											

Part B

Modules	Contents	Pedagogy	Hours
1	Nature of gene concept, chemical nature of gene, genome, genome size, c-value paradox. Structure of DNA and their properties, A, BC, and Z types of DNA, Structure property and types of RNA, Nucleic acid as a genetic information carriers: experimental evidence	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
II	DNA replication in prokaryotes: Conservative and dispersive types, Experimental evidence for semi-conservative replication: DNA Replication: polymerase enzymes, other enzymes and protein factors involved in replication, Mechanism of replication	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
Ш	Transcription in prokaryotes: RNA polymerase, promoters, initiation, elongation, rho dependent and rho in dependent termination of RNA synthesis. Reverse transcription, post transcriptional processing of RNA	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	10
IV	Genetic code: basic features of genetic code, biological significance of degeneracy, wobble hypothesis, gene within gene and overlapping genes. Mechanism of translation in prokaryoites. Regulation of gene expression in prokaryoites: operon concept, lac operon, Try operon and Ara oper	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	10
v	Mutation: Molecular basis of Mutation, Physical and chemical mutagens types of mutation, e.g. transition, transversion, frame shift, insertion, deletion, suppressor sensitive, germinal and somatic, backward and forward mutations, spontaneous and induced mutations. DNA damage and repair: types of damage (dearniation, oxidative damage, alkylation and pyrimidine dimers), repair mechanism	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Qualitative test of DNA in given sample	Experiments	BL2-Understand	2
VII	To prepare standard curve of protein	Experiments	BL6-Create	2
VIII	Estimation of protein in given sample.	Experiments	BL5-Evaluate	2
IV	Quantitative test of RNA in given sample	Experiments	BL3-Apply	2
V	Spectrophotometric analysis of DNA	Experiments	BL4-Analyze	2
VI	Isolation of chromosomal DNA from E. coli cells	Experiments	BL3-Apply	2
VII	Isolation of DNA from leaves, fruits, onion etc.	PBL	BL4-Analyze	4
VIII	Quantification of DNA extracted from various samples	PBL	BL5-Evaluate	7

Part D(Marks Distribution)

	Theory										
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation										
100	40	60	18	40							
	Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	30	40							

Part E

Books	Albert B,Molecular Biology of the cell James D. Watson, Tania A. Baker, Slephen;Molecular Biology of the Gene. Seventh Edition (2013).				
Articles https://www.researchgate.net/publication/378498325_Innovations in _Molecular_Biology-Cutting-Edge_Breakthroughs_in_Molecular_Genetics					
Freidfelder D'Microbial Genetics References Books Watson and Baser; Molecular Biology of Gene; 5th Edition lar Biology. Aberts B, Johnson A, Lewiss, J.Molecular Biology of the Cell. Sixth Edition (2014).					
MOOC Courses Refer to Neptel Linkhittps://nptel.ac.in/courses/102103341					
Videos https://hptel.ac.in/courses/102103341					

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	2	2	-	-	-	2	-	-	1	1	1
CO2	3	3	2	2	2	2	-	-	-	2	-	-	1	1	3
CO3	3	1	1	-	1	-	-	-	-	-	-	-	3	2	3
CO4	3	2	-	2	1	-	-	-	-	-	-	-	2	3	2
CO5	3	1	-	1	1	-	-	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	=	-	-



BSc_Biotechnology

Title of the Course	Analytical Chemistry	ical Chemistry								
Course Code	BSBT 203 (T)	33(T)								
			Part A							
Year	1st	Semester	2nd	Credits		Т	Р	С		
154	150	- Company		ordato	3	0	1	4		
Course Type	Embedded theory and lab									
Course Category	Interdisciplinary Minor									
Pre-Requisite/s	Knowledge of Fundament	als of Analytical Chemistry		Co-Requisite/s						
Course Outcomes & Bloom's Level	CO3- To use/apply the bas CO4- To Analyse Qualitati	concept and principle of analytical techniques(BL1-Remember, ifference between the analytical techniques(BL2-Understand) sic statistical treatment of the analytical data for getting a correct ve and Quantitative aspects(BL4-Analyze) to obtained from the analysis(BL5-Evaluate)	t result and analytical methods(BL3-Apply)		·					
Skill Development Enterpreneurship Coures Elements Coures Elements Coures Elements Enterpreneurship Professoonal Ethics × Gender X Human Values × Environment ×		SDG (Goals)	SDG4(Quality education)							

_ ._

Modules	Contents	Pedagogy	Hours
Module 1	General purification techniques Purification of solid organic compounds, recrystallization, use of miscible solvents, use of drying agents and their properties, sublimation. Purification of liquids. Different types of extraction: use of immiscible solvents solvent extraction, efficiency of extraction, selectivity of extraction, liquid phase and solid phase extraction systems, methods of extraction, applications. Chemical methods of purification and test of purity	Problem solving sessions, Experienced examples, Quizzes Summartzing, Leaving Questions Hand on Experience .Tutorials	8
Module 2	Titrimetric Methods of Analysis General Introduction General principle. Types of titrations. Requirements for titrimetric Analysis. Concentration systems: Molarity, formality, normality, wt % ppm, milliequivalents and millimoles-problems Primary and secondary Standards, criteria for primary standards, preparation of standard solutions, standardization of solutions. Limitation of volumetric analysis, end point, equivalence point	Learn by doing, Simulations/ Virtual labs, Videos	8
Module 3	Chromatography, Introduction, Principle of chromatography, Classifications of chromatography, Techniques of paper and column chromatography, Thin Layer Chromatography(TLC) Partition chromatography, Ion exchange chromatography	Tutorials, Virtual labs, Demonstrations, Experiments	8
Module 4	Thermal Analysis Thermal analytical methods, principle involved in thermogravimetric analysis differential gravimetric analysis and differential scanning calorimeter, discussion of various components with block diagram, characteristics of TG and DTA, Tactors affecting TG, DTA and DSC Curve.	Problem solving sessions, Expelenced examples,	8
Module 5	Evaluation and procession of analytical data, Precision and accuracy, Types of errors, Normal distribution curve, Standard debution, Confidence limit, Graphical presentation of result-method of average, Method of linear list square, Significant figures, Statistical aid to hypothesis testing; 1-east & F-lest, Correlation coefficient, Rejection of data	. Problem solving sessions, Expeienced examples,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Complexometric titration	Experiments	BL3-Apply	4
VIII	Qualitative Analysis using Thin Layer Chromatography	PBL	BL4-Analyze	6
IX	Purification of sample by Crystallization technique	PBL	BL6-Create	7
IV	To determine the Percentage of Copper in copper alloy solution	Experiments	BL3-Apply	2
V	To determine the percentage of Chromium in chrome alloy	Experiments	BL3-Apply	2
VI	To purify the given sample Ammonium Chloride	Experiments	BL3-Apply	
VII	Qualitative Analysis using Paper, Chromatography	PBL	BL4-Analyze	6

Part D(Marks Distribution)

	Theory						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation		
100	40	60	18	40			
	Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation		
100	50	60	30	40			

Part E

Books Y Anjaneyulu Textbook of Analytical Chemistry 2008				
Articles https://nptel.ac.in/courses/104105084				
References Books Skoog D.A. and West D.M. Saunders Fundamental of Analytical Chemistry Ninth Edition				
MOOC Courses https://nptel.ac.in/courses/104105084				
Videos https://hplet.ac.in/courses/104105084				

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	-	-	3	3	2
CO2	3	3	1	-	-	-	-	-	-	-	-	-	3	2	1
CO3	3	1	-	2	-	-	-	-	-	-	-	=	1	1	2
CO4	2	3	-	-	-	-	-	-	-	-	-	=	1	1	2
CO5	2	2	-	-	-	-	-	-	-	-	-	-	2	2	1
CO6	-		-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	NCC*									
Course Code	BSBT 204 (T)	24 (T)								
		Par	tA							
Year	1st	Semester	2nd	Credits		Т	Р	С		
						0	2	4		
Course Type	Theory only									
Course Category	Generic Elective	ic Elective								
Pre-Requisite/s	Should be acquainted with t	build be acquainted with the basics knowledge of General Awareness about Leadership Quality, Personality Development, Defense system etc. Co-Requisiters								
Course Outcomes & Bloom's Level	CO2- To think critically about CO3- Think divergently and	Define Pinking, reasoning, critical thinking and creative Pinking (BL1-Remember) To chickly about different bine elaied issues (BL2-Understand) Third defined by about different bine elaied issues (BL2-Understand) Third defined by the control of t								
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professonal Ethics X Gender X Human Values ✓ Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG8(Decent work and economic growth)						

Part B

Modules	Contents	Pedagogy	Hours
Unit 1. Personality Development-I	Thinking-Meaning and Concept of thinking, Reasoning, Process of thinking. Critical Thinking-Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 2. Personality Development-II	Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 3. Leadership Development-I	Leadership capsule. Important Leadership traits, Indicators of leadership and evaluation.	Whiteboard, PPT, Video Case Study, Project Based Activity, Application Based Activity	5
Unit 4. Leadership Development-II	Motivation- Meaning & concept, Types of motivation. Factors affecting motivation. Ethics and Honor codes.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 5. Social Service and Community Development	(i) Protection of Children & Women Safety. (ii) Road/Rail Safety. (iii) New Government Initiatives. (iv) Cyber and mobile Security Awareness.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5

Part D(Marks Distribution)

	Theory						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation		
0	0 0		0	0	0		
	Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation		

Part E

Books R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.				
Articles https://indiancc.mygov.in/activity/snehahoro/article-on-noc-camp-and-training/				
References Books Cadets training handbook common subjects (2017), D.G NCC Dehi-110030				
MOOC Courses				
Videos https://www.youtube.com/watch?v=N7nNupMdS6c				

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-		-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Molecular Biology II	folecular Biology II								
Course Code	BSBT 301 (T)	38BT 301 (T)								
	Part A									
Year	2nd Semester		3rd	Credits	L	Т	P	С		
	Ziid Guindstei			3	0	1	4			
Course Type	Embedded theory a	nbedded theory and lab								
Course Category	Disciplinary Major	sciplinary Major								
Pre-Requisite/s	Basic Knowledge of	Basic Knowledge of structure of DNA RNA gene , nucleotide and nucleoside Co-Requisite/s gain knowledge of Gene expression and there regulation system						n		
Course Outcomes & Bloom's Level	CO2- To understand CO3- To understand CO4- To provide ex	CO1- To remember the structure of biomolecules DNA, RNA & Protein(BL1-Remember) CO2- To understand DNA & RNA and its relation to the formation of Protein(BL2-Understand) CO3- To understand the importance of Molecular editing tools in the cell(BL2-Understand) CO3- To understand the importance of Molecular editing tools in the cell(BL2-Understand) CO4- To provide experimental basis, and to enable students to analyze the isolation of nucleic acid in various fields such as research and industries(BL5-Evaluate) CO5- To evaluate the applications of nucleic acid in various fields such as research and industries(BL5-Evaluate)								
Skill Development X Enterpreneurship X Employability 4 Employability 4 Employability 4 Engloyability 4 Professional Ethics X Gender X Human Values X Emvironment X			SDG4(Quality education)							

Part B

Modules	Contents	Pedagogy	Hours
1	DNA Replication: General features of chromosomal replication: DNA Replication machinery in prokaryotes and its comparison with eukaryotes, prokaryotes, Enzymology of DNA replication, Regulation of DNA replication.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
2	Transcription in eukanyotes: Initiation, elongation and termination, Structure and function of eukanyotic/prokryotic promoters, RNA polymerases Types and properties of transcription factors, types and properties; Enhancers/silencers structure and properties. Post transcriptional processing, Autocatalytic RNA.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
3	Translation: Translation machinery of prokaryotes, Successive stages of protein synthesis in prokaryotes and its comparison with eukaryotes, Translational factors- Types and properties Post- translational Modification: Types and Significance.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
4	Regulation of Gene Expression in Eukaryotes: cis – acting DNA elements; Chromatin Organization and regulation of gene expression; regulation at the level of processing of transcripts, RNA editing; Gene Alteration; DNA methylation and gene regulation; Regulation of gene expression by hormones.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
5	DNA libraries; Genomic and C-DNA Library, Transposable elements in prokaryotes and Eukaryotes: Types and Significance. Oncogenes and Tumor Suppressor Genes: Properties and Significance	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Isolation of Genomic DNA and restriction Digestion	Experiments	BL3-Apply	2
2	Quantitation of DNA	Experiments	BL4-Analyze	2
3	Determination of max of purified DNA fragments	Experiments	BL3-Apply	2
4	Determination of Tm of nucleic acid	Experiments	BL3-Apply	2
5	Isolation of RNA	Experiments	BL5-Evaluate	2
6	Comparative analysis of DNA isolation from different tissue of plants. Student will understand about the foundational scientific principles and findings in current molecular biology	PBL	BL4-Analyze	8

Part D(Marks Distribution)

	Theory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	40	60	18	40				
	Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	50	60	30	40				

Part E

Books	Nelson, Cox and Lehninger, principles of Blochemistry, 8 edition		
Articles	https://idmic.net/wp-content/uploads/2016/10/molecular-diagnostic-techniques.pdf		
References Books Amold Berk, Chris A. Kaiser, Harvey Lodish, Molecular Cell Biology, 3rd Edition			
MOOC Courses	https://nptel.ac.in/courses/102103038		
Videos	https://hptel.ac.in/courses/102103038		

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	-	-	1	1	-	-	-	-	1	3	1
CO2	1	2	-	-	-	-	2	1	-	-	-	-	2	3	2
CO3	1	2	-	-	-	-	2	2	-	-	-	-	2	2	2
CO4	1	2	-	-	-	-	2	3	-	-	-	-	3	2	1
CO5	1	2	-	-	-	-	-3	3	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Flatit tissue culture	ant assue caraire								
Course Code	BSBT 302 (T)									
		Part A								
Year	2nd	Semester	3rd	Credits	L T P C 3 0 1 4					
Course Type	Embedded theory and lab	ded theory and lab								
Course Category	Disciplinary Major									
Pre-Requisite/s	Should be acquainted with the basic knowledge of plants, cell biology, botany and genetics.									
Course Outcomes & Bloom's Level										
Skil Development ✓ Entroprenuship X Employability ✓ Professonal Ethics X Gendor X Human Values X Environment X		SDG (Goals)	SDG4(Quality education)							

Part B

Modules	Contents	Pedagogy	Hours
1	History: Important events and landmarks in the history of plant tissue culture. Introduction to cell and tissue culture, terms and definitions. Cellular Tolepotency: Introduction cytodifferentiation, organ genic differentiation. Laboratory requirements and general techniques.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
П	Tissue culture media: Introduction, media constituents, types, selection, media preparation. Callus culture and its maintenance. Plant growth regulators. Cell and Suspension cultures, Somatic embryogenesis: Technique and application	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
Ш	Micropropagation in Plants, Acclimatization: Process and challenges. Haploid production:: Anther culture and embryo culture: Introduction, techniques, culture requirements and applications. Protoplast Culture: Protoplast isolation, culture and regeneration. Soma cional Variations.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
IV	Somatic hybridization: technique and application Elicitors, Secondary metabolites and their production. Cryopreservation: technique and application	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
V	Plant cloning vectors and their applications. Agrobacterium mediated transformation in plants. Transgenic plants: technique and application. Application of plant tissue culture in agriculture and forestry. Concept of Intel	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Plant tissue culture: Applications and commercial importance	Experiments	BL2-Understand	2
II	Laboratory design and set up of plant tissue culture unit.	Experiments	BL2-Understand	2
III	Preparation of culture media.	Experiments	BL3-Apply	2
IV	Surface sterilization, sealing of culture, sources of contamination and their check measures	Experiments	BL3-Apply	3
V	Sterilization of media and apparatus.	Experiments	BL3-Apply	2
VI	Collection and preparation of explants	Experiments	BL4-Analyze	2
VII	Preparation of MS media for the inoculation of seeds.	Experiments	BL3-Apply	2
VIII	To establish seeds cultures	PBL	BL6-Create	2

Part D(Marks Distribution)

	Theory							
Total Marks Minimum Passing Marks		External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	40	60	18	40				
	Practical							
Total Marks	Total Marks Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	50	60	30	40				

Part E

Books	Razdan M.K.:An Introduction to Plant Tissue Culture:3rd Edition Smith.R, Plant Tissue Culture: Techniques and Experiments. Academic Press, 2012
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7356144/ https://link.springer.com/article/10.1007/s11627-022-10301-9
References Books	Bholywani, S. S. & Razdan, M.K.Plant Tissue Culture; 5th Edition Kole, C., Michier, C., Abbott, A.G., Hall, T.C. (Eds.) Transgenic Crop Plants: Volume 1: Principles and Development. Springer; 2010. Kole, C., Michier, C., Abbott, A.G., Hall, T.C. (Eds.) Transgenic Crop Plants: Volume 2: Utilization and Biosafety. Springer; 2010.
MOOC Courses	https://nptel.ac.in/courses/102103016
Videos	https://nplel.ac.in/courses/102103016

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	2	2	-	-	-	2	-	-	1	1	1
CO2	3	3	2	2	2	2	-	-	-	2	-	-	1	-	3
CO3	3	1	1	-	1	1	-	-	-	-	-	-	3	2	3
CO4	2	2	-	2	1	1	-	-	-	-	-	-	2	3	3
CO5	3	2	-	2	1	-	-	-	-	-	-	-	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	NCC*											
Course Code	BSBT 304 (T)											
		Part A										
Year	2nd	Semester	3rd	Credits	L T P C 2 0 2 4							
Course Type	Theory only											
Course Category	Generic Elective											
Pre-Requisite/s	Should be acquainted with the b	build be acquainted with the basics knowledge of General Awareness about Leadership Quality, Personality Development, Defense system etc Co-Requisite/s										
Course Outcomes & Bloom's Level	CO2- To think critically about diff CO3- Think divergently and will CO4- Creatively in their real-life CO5- Understand the organizati	try to break functional fixedness.()										
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professonal Ethics X Gender X Human Values ✓ Environment ✓		SDG (Goals)	SDG4(Quality education) SDG6(Clean water and sanitation) SDG13(Climate action) SDG15(Life on land)								

	F	Part B	
Modules	Contents	Pedagogy	Hours
Unit 1. Personality Development	(i) Group Discussions - Change your Mindset (ii) Public Speaking.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 2. Leadership Development	Case Studies – APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 3. Disaster management	(i) Disaster Management Capsule. (ii) Organisation. (iii) Types of Disasters. (iv) Essential Services. (v) Assistance. (vi) Civil Defence Organisation.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 4. Border & Coastal Areas	History, Geography & Topography of Border/ Coastal Areas.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 5. Adventure	Adventure activities.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5

Part D(Marks Distribution)

	Theory												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
0	0 0		0	0	0								
	Practical												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								

Part E

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.
Articles	
References Books	Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher
MOOC Courses	
Videos	https://www.youtube.com/watch?v=kvdDHFALpTw

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	=	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	=	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Genetic Engineering												
Course Code	BSBT 401 (T)												
			Part A										
Year	Year 2nd Semester 4th Credits L T P												
122					3	0	1	4					
Course Type	Embedded theory and	pedded theory and lab											
Course Category	Disciplinary Major	olpilnary Major											
Pre-Requisite/s	Student must have the detailed knowledge of Gene expression and hereditary information Co-Requisite/s Detailed study of genomics, proteomics and metabolomics tool												
Course Outcomes & Bloom's Level	CO2- To understand t CO3- To understand t CO4- To evaluate the	ne role of all the enzymes used in the DNA ed the method of creating new molecules such a the importance Nucleic acid editing tools(BL2 applications of in various fields such as rese- derstanding of creation of new DNA, RNA &	s DNA & RNA(BL2-Understand) :- Understand) arch. Agriculture. Pharmaceutical industries(BL5-Evaluate) pply)									
Coures Elements	Skill Development Entrepreneurship Employability Professonal Ethics Gender Human Values Environment	,	SDG (Goals)	SDG4(Quality education)									

Part B

Modules	Contents	Pedagogy	Hours
1	introduction to gene cloning and its necessity: DNA modifying enzymes: Restriction enzymes (RE)-structure function and types, polymerase, kinases, ligase, alkaline phosphatase, exonuclease etc Cloning methods. linkers and adaptors.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
2	Methods of introduction of DNA into living cells, E.coli, plant and animal cells, Genetic transformation in plants.Agrobacteriun mediated transformation in plants, structure and features of Ti and Ri plasmids.Genomic libraries and cDNA libraries.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
3	Cloning vectors: Plasmids and Bacteriophages, Phagemids, Cosmids, Artificial chromosomes (BAC and YAC) for E.coli, yeast. Strategies for identification of recombinant clones containing cloned genes: Nucleic acid hybridization, immune screening etc. Expression vectors for E.coli and Yed	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
4	Tools for RDT: Restriction mapping, Southern and northern blotting, Forensic application of biotechnology: DNA fingerprinting and its applications, forensic medicine Molecular Pharming: Application	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
5	Applications of RDT, Production of recombinant protein (Insulin, Growth hormone), production of Recombinant vaccine. Golden rice, Artifical seed production, biofertilizers and biopesticide production GM crops and GM food	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preparation of stock and buffer solutions for DNA isolation	Experiments	BL3-Apply	2
2	Isolation of DNA from yeast cells.	Experiments	BL3-Apply	2
3	Isolation of DNA from Plant cell.	Experiments	BL3-Apply	2
4	Isolation of plasmid DNA	Experiments	BL3-Apply	2
5	Agarose gel electrophoresis of Genomic DNA	Experiments	BL4-Analyze	2
6	Isolation of RNA	Experiments	BL4-Analyze	2
7	Quantification of DNA by spectrophotometer(260/280nm)	Experiments	BL4-Analyze	2
8	To isolate the Auxotrophic mutants from the mixed culture sample of Microorganism	PBL	BL5-Evaluate	3 days

Part D(Marks Distribution)

	Theory												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
100	40	60	18	40									
	Practical												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
100	50	60	30	40									

Part E

Books	TA Brown, Gene cloning 4 edition
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3078015/
References Books	James D watson.Molecular Biology Of gene, 4 edition
MOOC Courses	https://mptel.ac.in/courses/102103074
Videos	https://nptel.ac.in/courses/102103074

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	-		2	-	-	-	-	-	-	1	-	3
CO2	1	2	3	-		1	-	-	-	-	-	-	1	-	2
CO3	1	2	3	-		-	3	-	-	-	-	-	3	1	-
CO4	1	2	3	-		-	-	-	-	-	-	-	2	-	-
CO5	1	2	3	-		2	-	-	-	-	-	-	-	-	1
CO6	-		-	=		-	i.	-	-	-	i	i	-	-	-



BSc_Biotechnology

Title of the Course	Bioprocess Enginee	loprocess Engineering										
Course Code	BSBT 402 (P)	SBT 402 (P)										
Part A												
Year	2nd	Semester	4th	Credits	L	Т	P	С				
					3	0	1	4				
Course Type	Theory only	heory only										
Course Category	Discipline Core	scipline Core										
Pre-Requisite/s	The student should different metabolites	have basic understanding of units, use of	living organisms for the production of	Co-Requisite/s	The student should have basic understanding of basic concepts of bioprocesses for the benefit of society							
Course Outcomes & Bloom's Level	CO2- The subject B CO3- The course ai CO4- The course ai	ioprocess Engineering is designed for unc ms to provide experimental basis, and to e ms to provide basis of analyzing the appli	der graduate students of biotechnology f enable students to acquire a specialized cations of Bioprocess Engineering in val	Its applications and future prospects (BL1-Remember) or uplications and future prospets of each and every division of knowledge and understanding (BL2-Understand) flous fields of research and industries (BL3-Apply) it through research and in industries (BL3-Apply)	the subject along wil	th its applications in o	her fields. (BL2-Und	derstand)				
Coures Elements	Skill Development Entrepreneurship Employability Professsonal Ethics Gender Human Values Environment X		SDG (Goals)	SDG4(Quality education)								

		Part B						
Modules	Contents	Pedagogy						
Unit I	Units and dimensions: dimensional analysis, stlochiometric and composition relationship, Newton's law of viscosity and its measurement. Introduction to Bioprocess technology	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8					
Unit-II	Kinetics of microbial growth, death and product synthesis; Air and media sterilization, Types of bioreactor. Kinetics of batch and continuous reactor.	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8					
Unit-III	Transport phenomenon in biochemical engineering: Mass transfer, heat transfer, rheology Product recovery processes, centrifugation, chromatography, extraction process, crystallization, drying.	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8					
Unit-IV	Microbial Production of Vitamin B12, amino acids (Glutamic acid), Microbial production of Organic acids (Citric acid), solvents (Ethanol)	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8					
Unit-V	Aeration and agitation, Immobilization techniques and their applications, Microbial production of food-SCP, Product recovery	Class room teaching (chalk-board). Power Point Presentations. Online Classes. Interactive Videos	8					

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Media balancing experiments	Experiments	BL2-Understand	2
1	Isolation of industrially important microbes from the environment.	Experiments	BL3-Apply	2
3	Production of alcohol using different substrates and its downstream process	PBL	BL3-Apply	2
4	Microbial production of citric acid using Aspergillus niger	Experiments	BL3-Apply	2
5	Microbial production of acetic acid.	Experiments	BL3-Apply	2
6	9. Organic Solvent production	PBL	BL3-Apply	2
7	Microbial production of different biological products.	PBL	BL6-Create	30 days

	Part D(Marks Distribution)											
Theory												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	40	12	60								
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	40	20	60								

FallE									
Books	Bioprocess Engg. Principles, P.M. Doran, Elsevier								
Articles https://www.frontiersin.org/journals/bioengineering-and-biotechnology/sections/bioprocess-engineering									
References Books Principles of Fermentation Technology, Peter F. Stanbury, Allan Whitaker, Stephen Hall, Pergamon.									
MOOC Courses	https://nptel.ac.in/courses/102106022 https://nptel.ac.in/courses/102106048								
	https://hptela.ci.in/courses/10/2106022 https://hptela.cii.in/courses/10/2106048								

Course Articulation Matrix Cos P01 P02 P03 P04 P05 P06 P07 P08 P09 P010 P011 P012 PS01 PS02 PS03															
CO1	1	2	. 00		. 00	. 00	. 0.	. 00	1	1		. 0.12	1001	1 002	1.000
	1	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	1	1	-	-	-	-	-
CO3	1	1	-	-	-	=	-	-	1	1	-	-	=	-	-
CO4	1	2	-	-	-	-	-	-	1	2	-	-	-	-	-
CO5	1	2	-	-	-	-	-	-	1	2	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Bioprocess Enginee	ioprocess Engineering										
Course Code	BSBT 402(T)	SBT 402(T)										
Part A												
Year	2nd	Semester	4th	Credits	L	Т	P	С				
100.	2.10	Comostor		o.ca.co	3	0	1	4				
Course Type	Theory only	neory only										
Course Category	Disciplinary Major	sciplinary Major										
Pre-Requisite/s	The student should different metabolites	have basic understanding of units, use of	iving organisms for the production of	Co-Requisite/s	The student should have basic understanding of basic concepts of bioprocesses for the benefit of society							
Course Outcomes & Bloom's Level	CO2- The subject B CO3- The course ai CO4- The course ai	sioprocess Engineering is designed for und ims to provide experimental basis, and to e ims to provide basis of analyzing the applic	er graduate students of biotechnology f nable students to acquire a specialized ations of Bioprocess Engineering in var	is applications and future prospects (BL1-Remember) or understanding of basic concepts of each and every division of knowledge and understanding (BL2-Understand) ious fields of research and industries (BL3-Apply) through research and in industries (BL3-Apply)	the subject along w	ith its applications in o	ther fields. (BL2-Und	erstand)				
Skill Development ✓ Entrepreneurship ✓ Entrepreneurship ✓ Employabiti ✓ Employabiti ✓ Professonal Ethics × Gender × Human Values × Environment ×												
			5.45	*								

Part B

Modules	Contents	Pedagogy	Hours
	Units and dimensions: dimensional analysis, stiochiometric and composition relationship, Newton's law of viscosity and its measurement. Introduction to Bioprocess technology	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8
	Kinetics of microbial growth, death and product synthesis; Air and media sterilization, Types of bioreactor. Kinetics of batch and continuous reactor.	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8
Unit-III	Transport phenomenon in biochemical engineering: Mass transfer, heat transfer, rheology Product recovery processes, centrifugation, chromatography, extraction process, crystallization, drying.	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8
Unit-IV	Microbial Production of Vitamin B12, amino acids (Glutamic acid), Microbial production of Organic acids (Citric acid), solvents (Ethanol)	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8
Unit-V	Aeration and agitation, Immobilization techniques and their applications, Microbial production of food-SCP, Product recovery processes.	Class room teaching (chalk-board), Power Point Presentations, Online Classes, Interactive Videos	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Media balancing experiments	Experiments	BL2-Understand	2
1	Isolation of industrially important microbes from the environment.	Experiments	BL3-Apply	2
3	Production of alcohol using different substrates and its downstream process	PBL	BL3-Apply	2
4	Microbial production of citric acid using Aspergillus niger	Experiments	BL3-Apply	2
5	Microbial production of acetic acid.	Experiments	BL3-Apply	2
6	Organic Solvent production	PBL	BL3-Apply	2
7	Microbial production of different biological products.	PBL	BL6-Create	21 days

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40								
	Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	60	30	40								

Part E

Books	Bioprocess Engg. Principles, P.M. Doran, Elsevier					
Articles	https://www.frontiersin.org/journals/bioengineering-and-biotechnology/sections/bioprocess-engineering					
References Books Principles of Fermentation Technology, Peter F. Stanbury, Allan Whitaker, Stephen Hall, Pergamon.						
	https://nptel.ac.in/courses/102106022 https://nptel.ac.in/courses/102106048					
	https://nptel.ac.in/courses/102106022 https://nptel.ac.in/courses/102106048					

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	-	-	-	-	1	1	-	-	1	2	-
CO2	2	1	-	-	-	-	-	-	1	1	-	-	1	2	-
CO3	1	1	-	-	-	-	-	-	1	1	-	-	2	1	-
CO4	1	2	-	-	-	-	-	-	1	2	-	-	1	2	-
CO5	1	2	-	-	-	-	-	-	1	2	-	-	1	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Enzymology									
Course Code	BSBT 403 (T)									
		Part A								
Year					L 3	T 0	P 1	C 4		
Course Type	Embedded theory and lab	and lab								
Course Category	Disciplinary Major	ajor								
Pre-Requisite/s	Should be acquainted with the h	a acquainted with the historical aspects and concepts of enzymes and catalysis Co-Requisite/s								
Course Outcomes & Bloom's Level	CO2- Student will understand th CO3- Differentiate between equ CO4- To define and describe the	e role of co-enzyme cofactor in enzyme catalyzed reaction (BL2-U) illibrium and steady state kinetics and analyzed simple kinetic data e properties of enzymes in and regulates biochemical pathways (in	nderstand) and estimate important parameter (Km. Vmax, Kcat etc); (BL2-L hibition, allosterism)(BL3-Apply)	· Understand)						
Coures Elements	Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X		SDG (Goals)	SDG4(Quality education)						

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to enzymes. Historical aspect of enzymes. Chemical nature and properties of enzymes. Classification and nomenclature of enzymes. Enzyme Commission Number. Enzyme Models: Fischer's Lock and key and Koshland's Induced fit hypothesis. Factors affecting enzyme activity.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
Ш	Mechanism of enzyme action (active site, chemical modification) and regulation (Zymogens, Isozymes). Enzyme specificity, Coenzymes and Cofactors Allosterism: Allosteric regulation of enzymes, Enzyme catalysis	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
Ш	Enzyme Catalysis and types. Free energy of activation and effect of catalyst. Enzyme kinetics: Kinetics of enzyme catalysed Reactions: The Michaelis Menten Equation. Line Weaver Burk Plot. Significance of Km and Vmax	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
IV	Enzyme purification, Isolation of enzymes, Homogenization techniques. Purification and large-scale production of enzymes, Stable storage of enzymes.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
v	Immobilization of enzymes, Methods, Advantages and disadvantages. Applications of enzymes in food and beverage industries, leather industries, textile industries. Abzymes and Plastic enzymes	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To understand the various enzymes present in the different types of fruits and vegetbales	Experiments	BL2-Understand	3
II	To analyses the effect of substrate concentration on the enzyme activity	Experiments	BL4-Analyze	2
III	To determine the effect of temperature on the reaction rate of peroxidase enzyme	Experiments	BL5-Evaluate	2
IV	To determine the effect of pH on the reaction rate of peroxidase enzyme.	Experiments	BL5-Evaluate	2
V	To prepare the standard curve of protein using Folin Lowry method	Experiments	BL6-Create	2
VI	Immobilization of yeast cells by gel entrapment method	Experiments	BL6-Create	2
VII	To assay the activity of Urease enzyme in the legumes.	Experiments	BL5-Evaluate	2
VIII	Isolation and immobilization of various enzymes from natural resources	Internships	BL5-Evaluate	45 days

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	External Evaluation Min. External Evaluation		Min. Internal Evaluation						
100	40	60	18	40							
	Practical Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	30	40							

Part E

Books	Prasad.N.K.;Enzyme Technology: Pacemaker of Biotechnology.2nd Edition Palmer;Enzymes; Horwcod Publishing Series. 2001
Articles	https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/enzyme-activity https://www.jc.orgindrice/50021-2958/20034049-7/httdt https://www.ncbi.nim.nih.gov/pmc/articles/PMC3169242/ https://www.ncbi.nim.nih.gov/pmc/articles/PMC3169242/ https://pubs.asc.orgido/10.1021/actiones/pac.orgido/10.202
References Books	Biocatalysts and enzyme technology, Buchholz KKasche V, Bonscheuer U.V. Published by Wiley-VCH. 2005. Wiseman, A. Handbook of Enzyme Biotechnology, 3rd Edition, Ellis Horwood Publication, 2010 Buchholz KKasche, V Bonnscheuer U.T. Blocatalysts and enzyme technology, Published by Wiley-VCH, 2005. Palmer, F. Enzymes. Blochemistry, Biotechnology, Clinical Chemistry, Horwood Publishing House, Chichester, England, 2001. Bisswanger, H. Practical enzymology. Wiley Publishing J. and Edition, 2011
MOOC Courses	https://hptel.ac.in/courses/102103097
Videos	https://nptel.ac.in/courses/102103097

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	1	2	2	2	-	-	-	-	-	-	2	-	1
CO2	3	1	1	2	2	2	-	-	-	-	-	-	1	2	2
CO3	2	1	1	2	1	1	-	-	-	-	-	-	2	3	1
CO4	3	-	-	1	1	1	1	-	-	-	-	-	1	2	2
CO5	-	-	-	-	1	-	1	-	-	-	-	-	2	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the course	NGC /WIGGG				
Course Code	BSBT 404 (T)				
		Part A			
Year	2nd	Semester	4th	Credits	L T P C 2 0 2 4
Course Type	Theory only				
Course Category	Generic Elective				
Pre-Requisite/s	Should be acquainted with the ba	asics knowledge of General Awareness about Leadership Quality, F	ersonality Development, Defense system etc	Co-Requisite/s	
Course Outcomes & Bloom's Level	CO1- Develop the qualities of so CO2- Imbibe leadership qualities CO3- Be motivated to serve the CO4- Contribute in environments CO5- Keep abreast of current aff CO6- Effectively contribute in ma	s. () nation by joining Armed forces. () al awareness and conservation activities() fairs & general awareness.()			
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values ✓ Environment ✓		SDG3(Good health and well-being) SDG4(Quality education) SDG4(Quality water and sanitation) SDG4(Guan water and sanitation) SDG15(Life on land)		

	Part B										
Modules	Contents	Pedagogy	Hours								
Unit 1. Personality Development	Group Discussions – Social Skills & Time management.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5								
Unit 2. Leadership Development	Case Studies – Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5								
Unit 3. Disaster management	(i) Initiative Trg, Organising Skills. (ii) Dos and Don'ts. (iii) Natural Disasters. (iv) Man Made Disasters. (v) Fire Services and Fire Fighting.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5								
Unit-4.Environmental Awareness	Adventure Environmental Awareness and Conservation, Local and global approaches to conserve nature.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5								
Unit 5. General Awareness & Armed Forces	General Awareness, Army, Navy, Air Force and Central Armed Police Forces.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5								

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
0	0	0	0	0	0						
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						

Part E

Books	pta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.						
Articles	https://indiancc.mygov.in/						
References Books Singh, Neeraj; A Hand Book of NCC; Kantil Prakashan Publisher Cadet training hand book specialised subjects (2017)							
MOOC Courses							
Videos	https://www.youtube.com/watch?v=eBA54iepAA						

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Bioinformatics											
Course Code	BSBT 501 (T)	T 501 (T)										
				Part A								
Year	3rd	Semester	5th	Credits	L	Т	P	С				
Teal	Sid	Seniestei	Sai	Greats	3	0	1	4				
Course Type	Embedded theor	dded theory and lab										
Course Category	Disciplinary Majo	inary Major										
Pre-Requisite/s		ar with the basics of bioinformatics, its on the property of t		Co-Requisite/s	The subject bioinformatics is designed to under graduate students of biotechnology for understanding of basic concepts of computational tools, their designing, applications, and their uses in industry and research.							
Course Outcomes & Bloom's Level	CO3- The course	e prepares the student to understand the e aims to provide experimental basis, a e aims to provide basis of analyzing the e the analytical efficiency of each algori	applications of Bioinformatics in va	its applications and future prospects.(BL1-Remember) specialized knowledge and understanding(BL2-Understand) rious fields of research and industries.(BL3-Apply)								
Coures Elements	Skill Developmer Entrepreneurship Employability ✓ Professsonal Eth Gender X Human Values X Environment X	p X nics X	SDG (Goals)	SDG4(Quality education)								

Modules	Contents	Pedagogy	Hours
Unit-I	Overview of Bioinformatics, divisions, scope, tasks and future prospects of bioinformatics, bioinformatics as multidisciplinary domain,	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
Unit-2	Databases and search tools: Types of Databases and their applications, National Centre for Biotechnology Information (NCBI), European Bioinformatics Institute (EBI), DNA Databank of Japan (DDBJ), PDB and SWISSPROT.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
Unit-3	Sequence alignment: Types of sequence alignment, Pairwise sequence alignment and its softwares, BLAST, Types and versions of BLAST, FASTA: Types and versions of FASTA	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
Unit-4	Matrices and algorithms: Dot matrix, BLOSUM, PAM, BLAST algorithm, Needlemann Wunsch algorithm, Smith Watermann algorithm, Fitch Margoliash algorithm.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
Unit-5	Multiple sequence alignment methods and its softwares, Phylogenetic prediction , Maximum parsimony method, Distance method, Maximum likelihood method	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

	Par	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Retrieval of DNA/ sequences from NCBI.	Experiments	BL2-Understand	2
8	Accessing protein sequence from NCBI	Experiments	BL4-Analyze	2
3.	Pairwise alignment and analysis of protein sequences using BLASTp software	Experiments	BL3-Apply	2
4.	Pairwise alignment and analysis of protein sequences using FASTA software	Experiments	BL3-Apply	2
5.	Alignment of protein sequences using dot matrix	Experiments	BL3-Apply	2
6.	Multiple sequence alignment and analysis of protein sequences using CLUSTALW software	Experiments	BL4-Analyze	2
7	Phyologenetic prediction of given set of sequences	Experiments	BL2-Understand	2

	Part D(Marks Distribution)										
	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40							
	•	•	Practical	•	•						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	30	40							

	Part E							
Books	Introduction to bioinformatics by Cynthia Gibas							
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1122955/							
References Books	Developing bioinformatics Skills: Hoomann H Rashidi							
MOOC Courses	https://inptel.ac.in/courses/102106065 https://inptel.ac.in/courses/102106065							
Videos	https://nptel.ac.in/courses/102106065 https://nptel.ac.in/courses/102106065							

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	-	-	-	-	1	1	-	-	1	2	-
CO2	1	2	-	-	-	-	-	-	1	2	-	-	1	2	-
CO3	1	2	-	-	-	-	-	-	1	2	-	-	2	1	-
CO4	1	2	-	-	-	-	3	-	1	2	-	-	1	2	-
CO5	-	-	-	-	-	-	-	-	-	=	=	=	-	=	=
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Bsc_Microbiology

Title of the Course	Bioinformatics											
Course Code	BSBT 501 (T)	JT 501 (T)										
				Part A								
Year	3rd	Semester	5th	Credits	L	Т	P	С				
100.	0.0	Comedia	out .	ordans	3	0	1	4				
Course Type	Embedded theor	bedded theory and lab										
Course Category	Discipline Core	cipline Core										
Pre-Requisite/s		ar with the basics of bioinformatics, its onment, homology modeling and evolution		Co-Requisite/s	The subject bioinformatics is designed to under graduate students of biotechnology for understanding of basic concepts of computational tools, their designing, applications, and their uses in industry and research.							
Course Outcomes & Bloom's Level	CO2- The course CO3- The course	e aims to provide experimental basis, a	nd to enable students to acquire a sapplications of Bioinformatics in va	its applications and future prospects.(BL1-Remember) specialized knowledge and understanding(BL2-Understand) arious fields of research and industries.(BL3-Apply)								
Coures Elements	Skill Developmer Entrepreneurshing Employability of Professsonal Eth Gender X Human Values > Environment X	p X nics X	SDG (Goals)	SDG4(Quality education)								

		Part B					
Modules	Contents	Pedagogy					
Unit-I	Overview of Bioinformatics, divisions, scope, tasks and future prospects of bioinformatics, bioinformatics as multidisciplinary domain,	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8				
Unit-2	Databases and search tools: Types of Databases and their applications, National Centre for Biotechnology Information (NCBI), European Bioinformatics Institute (EBI), DNA Databank of Japan (DDBJ), PDB and SWISSPROT.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8				
Unit-3	Sequence alignment: Types of sequence alignment, Pairwise sequence alignment and its softwares, BLAST, Types and versions of BLAST, FASTA: Types and versions of FASTA	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8				
Unit-4	Matrices and algorithms: Dot matrix, BLOSUM, PAM, BLAST algorithm, Needlemann Wunsch algorithm, Smith Watermann algorithm, Fitch Margoliash algorithm.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8				
Unit-5	Multiple sequence alignment methods and its softwares, Phylogenetic prediction , Maximum parsimony method, Distance	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8				

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Retrieval of DNA/ sequences from NCBI.	Experiments	BL2-Understand	2
2	cessing protein sequence from NCBIAc	Experiments	BL3-Apply	3
3.	Pairwise alignment and analysis of protein sequences using BLASTp software	Experiments	BL3-Apply	2
4.	Pairwise alignment and analysis of protein sequences using FASTA software	Experiments	BL3-Apply	2
5.	Alignment of protein sequences using dot matrix	Experiments	BL3-Apply	2
6.	Multiple sequence alignment and analysis of protein sequences using CLUSTALW software	Experiments	BL4-Analyze	5
7	Phylogenetic prediction of given set of sequences	Experiments	BL2-Understand	2

	Part D(Marks Distribution)										
	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	40	12	60							
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	40	20	60							

Part E							
Books	Introduction to bioinformatics by Cynthia Gibas						
Articles	https://www.nobi.nim.nih.gov/pmc/articles/PMC1122955/						
References Books	Developing bioinformatics Skills: Hoomann H Rashidi						
MOOC Courses	https://inptel.ac.in/courses/102106065 https://inptel.ac.in/courses/102106065						
Videos	https://mptel.ac.in/courses/102106065						

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	-	-	-	-	1	1	-		1	2	-
CO2	1	2	-	-	=	-	-	-	1	2	=	=	1	2	=
CO3	1	2	-	-	-	-	-	-	1	2	-	-	2	1	-
CO4	1	2	-	-	-	-	3	-	1	2	-	-	1	2	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Cellular Metabolism	Illular Metabolism											
Course Code	BSBT 502 (T)	502 (T)											
	Part A												
Year	3rd	Semester	5th	Credits	L	Т	P	С					
1-1-1					4	0	0	4					
Course Type	Theory only	ry only											
Course Category	Disciplinary Major	plinary Major											
Pre-Requisite/s	Knowledge about basics	of biomolecules		Co-Requisite/s									
Course Outcomes & Bloom's Level	CO2- To comprehend the CO3- To estimate the rela	e on structural, functional and dynamic aspects of biologica understanding of the metabolic pathways involving the four tition of biological material to living matter and elaborate the ous biomolecules in biological samples(BL4-Analyze) clications of biomolecules in various fields (BL5-Evaluate)	major metabolic compounds:(BL2-Understand)	Apply)									
Coures Elements	Skill Development X Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goale)	SDG4(Quality education)									

D--4 F

Modules	Contents	Pedagogy	Hours
1	Basic Concepts of Intermediary metabolism, Carbohydrate metabolism: Glycolysis, Kreb's Cycle, glycogenolysis, glycogenesis, pentose phosphate pathway, gluconeogenesis, glyoxolate pathway, Cori cycle. Metabolic disorders	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	7
2	Biosynthesis and degradation of fatty acids, Biosynthesis of lipids, Degradation of lipids, Regulation of lipid metabolism. Formation of ketone bodies Ketosis. Metabolic disorders	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, Experiments,	7
3	Transamination, Oxidative deamination, decarboxylation, Biosynthesis of amino acids, Degradation of amino acids, Regulation of amino acids metabolism. Nitrogen Metabolism - Assimilation of inorganic Nitrogen sources; Urea cycle	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, ABL Experiments,	7
4	Biosynthesis and degradation of purine nucleotides, Biosynthesis and Degradation of Pyrimidine nucleotide, regulation of purine and pyrimidine metabolism.	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, Experiments, Video lectures	10
5	Photosynthetic microorganisms, photosynthetic pigments, and generation of reducing power by cyclic and non-cyclic photophosphorylation, Electron transport chain in photosynthetic bacteria. Carbon dioxide fixation pathways. Respiration: Components of electron transport, chain, fee energy changes and electron transport, oxidative phosphorylation, ATP synthase and theories of ATP formation.	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Estimation of Blood Glucose by Coupled Enzyme Assay	Experiments	BL4-Analyze	3
II	Sugar Fermentation by Microorganisms	PBL	BL3-Apply	3 DAYS
III	Demonstration of Starch Digestion by Salivary Amylase	Simulation	BL2-Understand	3
IV	Isolation and Fractionation of Egg Lipids by TLC and their Estimation	PBL	BL5-Evaluate	6

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	60							
	Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	30	40							

Part E

Books	David L. Nelson, Michael M. Cox, W. H. Freeman; Lehninger Principles of Biochemisty, Fifth Edition., 2008, th Edition
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7545035/
References Books	C Zubay Blochemistry 3 mt Edition Styper Blochemistry 9 th Edition DVoet and J.G. Voet , J Wiley and Sons. Biochemistry 5 th Edition DVoet and J.G. Voet , J Wiley and Sons. Biochemistry 5 th Edition David Plummer Practical Blochemistry Volume 3 Company, S. Philadelphia, Stipanuk, P.A. (4th edition) (2019) Blochemical, physiological, and molecular aspects of human nutrition. Second Edition, Murray, R., Mayes, P., Rodwell, V., Granner, D. (2006) Harper's Illustrated biochemistry. 26th edition, McGraw-Hill Companies, Columbus, OH.
MOOC Courses	https://nptel.ac.in/courses/104105139
Videos	https://inptel.ac.in/courses/104105139

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	2	2	-	-	-	2	-	-	1	-	1
CO2	2	3	2	2	2	1	-	-	-	2	-	-	1	-	3
CO3	3	1	1	2	1	-	-	-	-	-	-	-	3	2	3
CO4	3	2	1	1	1	-	-	-	-	2	-	-	2	3	2
CO5	2	1	1	2	1	-	-	-	-	2	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-		-	-



BSc_Biotechnology

Title of the Course	Genomics & Froteomics	III.OS & FI OLEOTIILOS									
Course Code	BSBT 503 (T)										
		Part	A								
Year	3rd	Semester	5th	Credite	L	Т	Р	С			
100	0.0	Communication		Siculo	3	0	1	4			
Course Type	Embedded theory and lab										
Course Category	Disciplinary Major	ciplinary Major									
Pre-Requisite/s	Should be acquainted with ba	asic knowledge of genes, genomes and proteins.		Co-Requisite/s							
Course Type Embedded theory and lab Course Category Disciplinary Major											
Coures Elements	Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X		SDG (Goals)	SDG4(Quality education)							

Part B

Modules	Contents	Pedagogy	Hours
1	Genome evolution and structure: Forward genetics and Reverse genetics. Genomics history, Types of genomes. Chromosomal models, Chromosome structure and organization of genome. Genome sequencing methods, Tools of genomics.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
II	Comparative Genomics: Orthologous and Paralogous genes, Speciation: Types and advantages, Genomic and c-DNA libraries, Selection and screening of gene library	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
Ш	Microarrays tools and analysis: Process and Application of Microarrays, DNA and RNA microarray and its differences, PCR and its variants, Real Time PCR: Probes and application, Genome annotation	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	10
IV	Genomics techniques and applications: Genetic and physical mapping: Introduction to molecular markers- Single nucleotide polymorphisms, RFLP, RAPD, AFLP, FISH for genome analysis, Human Genome Project, Pharmacogenomics: An introduction. DNA barcoding for rapid assessment of genetic diversity	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
V	Fundamentals of Proteomics: Proteomics Basics and 2D Gel Electrophoresis, Protein Identification and Analysis: Protein preparation and Separation, HRT, HART, MALDI-TOF: Instrumentation and applications	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To understand the genome organization	Internships	BL2-Understand	2
XI	Molecualr characterization of a plant using RAPD Markers	Experiments	BL4-Analyze	1 month
VI	To isolate plasmid DNA using alkaline lysis method and Quick method and its visualization by agarose gel electrophoresis	Experiments	BL5-Evaluate	5
VII	To perform restriction digestion using kit and its visualization using agarose gel electrophoresis	Experiments	BL3-Apply	5
VIII	To perform Native -PAGE.	Experiments	BL3-Apply	6
IX	To perform SDS-PAGE	PBL	BL3-Apply	6
Х	Comparitive analysis of genomes of various plants and preparation of phylogentic tree	PBL	BL4-Analyze	2 months

Part D(Marks Distribution)

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	External Evaluation Min. External Evaluation		Min. Internal Evaluation					
100	40	60	18	40						
	Practical Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	60	30	40						

Part E

Videos	https://inptel.ac.in/courses/102101072
MOOC Courses	https://nptel.ac.in/courses/102101072
	Twyman.R.M.:Principles of Proteomics; 2nd Edition Ahmed,N;Microbial Genomics And Proteomics; 2016
Articles	https://www.frontlersin.org/articles/10.3398/fmed.2021.747333/full https://www.rdb.irim.nil.gov/pmc/articles/PMc2652400/ https://www.rdb.irim.nil.gov/pmc/ar
Books	Gupla PK, Biotechnology and Genomics 3rd Edition MiR A. Shall S. M and Zargar S.M Principles of Genomics and Proteomics; Elsevier;2023 MiR A. Shall S.M and Zargar S.M Principles of Genomics and Proteomics; Elsevier;2023

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	1	2	2	2	-	-	-	-	-	-	2	-	1
CO2	3	1	1	2	2	2	-	-	-	-	-	-	1	1	2
CO3	2	1	1	2	1	-	2	-	-	-	-	-	3	2	1
CO4	3	1	2	1	1	-	1	-	-	-	-	-	1	3	2
CO5	1	-	-	-	1	-	1	-	-	-	-	-	2	2	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Animal Tissue Culture	al Tissue Culture										
Course Code	BSBT 601 (T)	o1 (T)										
Part A												
Year	3rd	Semester	6th	Credits	L	Т	Р	С				
					3	0	1	4				
Course Type	Embedded theory and lab	ndded theory and lab										
Course Category	Disciplinary Major	plinary Major										
Pre-Requisite/s	Student must be aware of co	udent must be aware of cell,tissues, culture media for the in vitro regeneration of cell organs. Co-Re										
Course Outcomes & Bloom's Level	CO1- To understand the Animal tissue culture: and how does it interact with living and non-living molecules (BL2-Understand) CO2- To Understand modia constituents and modia formulation strategies for mamalian cell culture (BL2-Understand) CO3- Develop basic seepiles kills for mammalian cell culture and their applications (BL3-Apply) CO4- To Develop proficiency in mammalian cell culture and the maintenance of cell lines (BL3-Apply) CO5- To Apply cell and melocular techniques to in vitro studiency, BL3-Apply) CO5- To Apply cell and melocular techniques to in vitro studiency, BL3-Apply) CO5- To Apply cell and melocular techniques to in vitro studiency, BL3-Apply)											
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Entrepreneurship ✓ Entrepreneurship ✓ Employability Professorial Ethics ✓ Gender X Human Values ✓ Environment ✓			SDG3(Good health and well-being) SDG4(Quality education)								

D--+ D

Modules	Contents	Pedagogy	Hours	
1	Introducción: History Cell culture enchiques, Equipment, and sterilization methodology. Introduction to animal cell cultures: Nutritional and physiological: Growth factors and growth parameters	Lecture methods, demonstrations, experiments, field visit, Activity based learning		
II	Primary cell cultures, Establishment and maintenance of primary cell cultures of adherent and non-adherent cell lines, fibroblasts, endothelia colls, embryonic cell lines and stem cells. Organ culture: Methods, behavior of organ explants and utility of organ culture, whole embryo culture.	Lecture methods, demonstrations, experiments, field visit, Activity based learning, Project based learning	9	
Ш	Secondary cell cultures, □Establishment and maintenance of secondary mammalian and insect cell lines, Characterization of cell lines, □Karyotyping, biochemical and genetic characterization of cell lines	Lecture methods, demonstrations, experiments, field visit, Activity based learning, Project based learning	8	
IV	Production of the vaccine in animal cells: □use of Hybridoma for production of monoclonal antibodies Cell cloning and selection. Transfection 8 transformation of cell. Commercial scale production of animal cells, stem and their application. Application of animal cell culture for in vitro testing of drugs; Testing of toxicity of environmental pollutions in cell.	Lecture methods, demonstrations, experiments, field visit, Activity based learning, Project based learning	9	
v	Scale-up: Scale-up in suspension: Rotating chambers; Perfused suspension cultures; Fluidized bed reactors for suspension culture. Scale-up in monolayers: Multisurface propagators, Multiarray disks, spirals, and tubes; Roller culture, Microcarriers; Perfused monolayer cultures; Membrane perfusion; Hollow fiber perfusion; Matrix perfusion; Microencapsulation; Growth monitoring	Lecture methods, demonstrations, experiments, field visit, Activity based learning, Project based learning	9	

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Introdcution to animal tissue culture lab.	Experiments	BL2-Understand	2
II	Prerparation of Hank's Balanace salt solution	Experiments	BL3-Apply	2
III	To culture the animal tissue in the prpeared media	Experiments	BL3-Apply	3
IV	To check the viability of the cell and count the cell number	Experiments	BL4-Analyze	3
V	Observation of polymorpho nuclear monocytes	Experiments	BL4-Analyze	2
VI	To perform skin grafting	Internships	BL6-Create	1 month
VII	To observed the various cell lines and tissues under culture media for its growth and development	PBL	BL4-Analyze	1 week

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40							
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	30	40							

Part E

Videos	https://hptel.ac.in/courses/102106081			
MOOC Courses https://hptel.ac.in/courses/102106081				
References Books Culture of Animal Cells: A Manual of Basic Technique (6th Edition) R. Ian Freshney. REQUIRED. It is in your best interest to bring this book or the required chapters to class.				
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7325846/			
Books	Freshney, Wiley-Liss, Culture of Animal Cells, 5th Edition-2005			

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	3	-	2	2	3	-	-	-	-	-	1	2	2
CO2	2	2	1	1	3	2	-	-	-	-	-	-	-	3	2
CO3	3	2	-	1	3	2	1	-	-	-	-	2	1	1	1
CO4	1	1	1	1	1	1	3	-	-	-	-	-	2	3	2
CO5	1	1	2	1	1	1	3	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Nanobiotechnology												
Course Code	BSBT 602 (T)												
			Part A										
Year	3rd	Semester	6th	Credits	L	Т	Р	С					
1001	5.0	Comostor	041	ordana -	3	0	0	3					
Course Type	Theory only												
Course Category	Disciplinary Minor	nary Minor											
Pre-Requisite/s	student should have th	ne knowledge of biochemical molecules and there ex	traction , DNA RNA attachment and structures	Co-Requisite/s	Co-Requisite/s nanomaterials and there synthesis and nanoparticle synthesis								
Course Outcomes & Bloom's Level	CO2- To understand a CO3- To apply the use CO4- To identify the ar	ne Basis and History of Nanobiotechnology(BL1-Ren nd apply the working principles of nanostructures (Bi s of nanostructures in Biological cells and its product pplication of nanosystem(BL4-Analyze) iotechnological application in health, medicine & envi	L2-Understand) t(BL3-Apply)		•								
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment ✓		SDG (Goals)	SDG4(Quality education)									

Part B

Modules	Contents	Pedagogy	Hours
1	Development of nanobiotechnology - timelines and progress, overview. Fundamentals of Nanoscience & Nanotechnology Introduction, classifications and definition	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
2	Types of nanomaterials and their classifications (1D, 2D and 3D) Nanocrystal, Nanoparticle, Nano tubes, Quantum dot, Quantum Wire and Quantum Well	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
3	Properties & characterization of nanomaterials -Optical (UV-Vis/Fluorescence) X-ray diffraction Imaging and size (Electron microscopy, light scattering) Biosensors: different classes - molecular recognition elements, transducing elements.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
4	Applications of Nano-Materials in Biosystems Nanomaterials and Diagnostics/Drug Delivery. Biological nanoparticles production - plants and microbial. Nano materials and Toxicity Evaluation Cyto-toxicity, Geno-toxicity In vivo tests/assays etc.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
5	Nanobiotechnological applications in health and disease - infectious and chronic. Nanobiotechnological applications in Environment and food - detection and mitigation.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Title Experiments/Field work/ Internships		Hours	
I	Synthesis Methods of Nanomaterials	PBL	BL6-Create	1 week	
П	Metal Nanoparticles : Synthesis of plasmonic silver nanoparticles	PBL	BL6-Create	1 week	
III	Characterization of nanoparticles	Internships	BL4-Analyze	15 DAYS	

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40							
	•	•	Practical	•	•						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	30	40							

Part E

Books	Tuan Vo-Dinh Nanotechnology in Biology and Medicine: Methods, Devices, and Applications. 4rd Edition
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9865684/
	Christof M.Niemeyer, Chad A. Mirkin, Wiley VCH. 1 Nanobiotechnology: Concepts Applications and Perspectives (2004) 3rd Edition 2. Chad A Mirkin and Christof M. Niemeyer (Eds), Wiley VCH. Nanobiotechnology - II more concepts and applications. (2007) 4rd Edition
MOOC Courses	https://mptel.ac.in/courses/118107015
Videos	https://mptel.ac.in/courses/118107015

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	1	-	-	-	-	-	-	-	2	-	3
CO2	1	2	3	2	2	2	1	-	-	-	-	-	1	2	3
CO3	1	2	3	2		2	1	-	-	-	-	-	2	3	3
CO4	1	2	3	3	2	1	-	-	-	-	-	-	1	3	3
CO5	1	2	-	3-	2	1	-	-	-	-	-	-	1	3	3
CO6	-	-	-	=		-	=	i.	-	-	-	-	1	i	-



BSc_Biotechnology

Title of the Course	Drug designing										
Course Code	BSBT 701 (T)										
			Part A								
Year 4th Semester 7th Credits L T P C											
100.	741	oomester.	7.01	orealis .	2	0	1	3			
Course Type	Embedded theory	edded theory and lab									
Course Category	Discipline Specific	ipline Specific Elective									
Pre-Requisite/s	The students will b different drug desig molecules.	e highly motivated to this branch of biotechnol on processes, strategies to design and develop	ogy and will be acquainted with the o some important industrial lead	Co-Requisite/s	The students should be familiar with the basics of drug design, its databases, softwares, strategies adopted for drug design as well as the different methods used for drug design						
Course Outcomes & Bloom's Level	CO2- They unders CO3- The course p	orepares the student to understand the basic of tand the different CADD techniques and their provides various strategies to design and deve e aware about the working with molecular mo	applications(BL2-Understand) lop new drug like molecules (BL3-Apply)	•						
Coures Elements	Skill Development Entrepreneurship 3 Employability ✓ Professsonal Ethic Gender X Human Values ✓ Environment ✓	<	SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)							

		Part B										
Modules	Contents	Pedagogy	Hours									
Unit-I	Introduction to Drug Discovery and Development: Stages of drug discovery and development Lead discovery and Analog Based Drug Design Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipilous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation	lecture method, collaborative learning, Field visits, ABL	8									
Unit-II	Quantilative Structure Activity Relationship (QSAR) SAR versus QSAR, History and development of QSAR. Types of physiocohemical parameters, experimental and theoretical approaches for the determination of physiocohemical parameters such as partition coefficient. Hammet's substitution constant and Tafts steric constant, 3D QSAR approaches like COMFA and COMSIA.	lecture method, collaborative learning, Field visits, ABL, softwares, PBL	8									
Unit-III	Molecular Modeling and virtual screening techniques Virtual Screening techniques: Drug likeness screening, Concept of pharmacophron eaplog and pharmacophron based Screening, Molecular docking: Rigid docking, flexible docking, manual docking. Docking based screening. De novo drug design.	lecture method, collaborative learning, Field visits, ABL, softwares, PBL	8									
Unit-IV	Informatics & Methods in drug design Introduction to Bioinformatics, Chemoinformatics, ADME databases, chemical, biochemical and pharmaceutical databases	lecture method, collaborative learning, Field visits, ABL, softwares, PBL	8									
Unit-V	Molecular Modeling: Introduction to molecular mechanics and quantum mechanics. Energy Minimization methods and Conformational Analysis, global conformational minima determination.	lecture method, collaborative learning, Field visits, ABL, softwares, PBL	8									

Part C Indicative-ABCA/PBL/ Experiments/Field work/ Internships Stages of drug discovery Case Study BL2-Understand Analog based drug design and its applications Case Study BL2-Understand Quantitative structure activity relationship (QSAR)
Methods of drug design Case Study
Case Study BL3-Apply BL3-Apply Molecular modeling approaches

Molecular Docking BL3-Apply Case Study Case Study BL3-Apply

Part D(Marks Distribution) Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation 100 4 0 2 0 0 3 0 Total Marks Minimum Passing Marks External Evaluation Internal Evaluation Internal Evaluation Min. Internal Evaluation 100 5 4 0 2 0 0 0 0 0

	Part E								
Books	1. Computational and structural approaches to drug discovery, Robert M Stroud and Janet.F Moore, RCS Publishers. 2. Introduction to Quantitative Drug Design by Y.C. Martin, CRC Press, Taylor & Francis group.								
Articles	https://onlinecourses.niptel.ac.in								
References Books 1. Drug Design by Ariens Volume 1 to 10, Academic Press, 1975, Elsewier Publishers. 2. Principles of Drug Design by Smith and Williams, CRC Press, Taylor & Francis. 3. The Organic Chemistry of the Drug Design and Drug active Silverman, Elsewier Publishers.									
MOOC Courses	https://onlinecourses.niptel.ac.in https://onlinecourses.niptel.ac.in/courses/102106070								
Videos	https://inptel.ac.in/courses/102106070 https://inptel.ac.in/courses/nitel.ac.in.								

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	-	-	-	-	-	-	-	-	-	-	1	2
CO2	1	2	2	1	-	-	-	=	-	-	-	-	-	1	1
CO3	1	1	2	2	-	-	-	-	-	-	-	-	-	3	1
CO4	1	2	1	2	-	-	-	-	-	-	-	-	-	2	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	=	=	-	-	-	-	-	ů.	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Research Methodology										
Course Code	BSBT 702 (T)										
	Part A										
Year	4th Semester	7th	Credits	L	Т	P	С				
				4	0	0	4				
Course Type	Theory only										
Course Category	Discipline Core	Discipline Core									
Pre-Requisite/s	Student should have some basic knowle	dge of statistics	Co-Requisite/s	Should have understanding of the basic concepts of different types of research and their purposes							
Course Outcomes & Bloom's Level	CO2- The subject Research Methodolog CO3- The course aims to provide experii CO4- The course aims to provide basis of	y is designed for post gradua mental basis, and to enable a of analyzing the applications	epts of Research Methodology, its applications in experimental cate students of Blotechnology for describing the basic concepts students to acquire a specialized knowledge and understanding of Research Methodology in various fields of research and industre applications and use of statistical tools in research and industre applications.	of each and every division of of data and its applications i stries.(BL3-Apply)	the subject along with its appl		derstand)				
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professonal Ethics ✓ Gender X Human Values X Environment X	SDG (Goals)	IG (Goals) SDG4(Quality education)								

_ ._

Modules	Contents	Pedagogy	Hours
1	Introduction: Definition of Research, Qualities of Researcher, Components of Research Problem, Various Steps in Scientific Research, Types of Research; Hypotheses Research Purposes - Research Design - Survey Research, Research Reports.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
2	Data Collection: Sources of Data: Primary Data, Secondary Data; Procedure Questionnaire - Sampling Merits and Demerits - Experiments - Kinds - Procedure; Control Observation.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
3	Introduction to Statistics - Probability Theories - Conditional Probability, Point and Interval Estimates of Means and Proportions; Hypothesis Tests, One Sample Test - Two Sample Tests / Chi-Square Test, t-lest - Standard deviation.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
4	Statistical Applications: Analysis of Variance, Completely Randomized Design, Randomized Complete Block Design, Latin Square Design	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
5	Report Writing, Computer application: Use of computers for preparing and presenting Documents. Appropriate Statistical and other relevant packages, internet. Use of MS-Office	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Steps in scientific research methodology	Case Study	BL2-Understand	2
2	Sampling process	Case Study	BL2-Understand	2
3	Developing Hypothesis	Case Study	BL2-Understand	2
4	Data collection	Case Study	BL3-Apply	2
5	Analysis of Variance	Case Study	BL3-Apply	2
6	Randomized Block Design	Case Study	BL4-Analyze	2

Part D(Marks Distribution)

Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	40	40	12	60	30				
Practical Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
	0								

Part E

Books Research methodology, C. R. Kothari, 6th Edition						
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5037945/					
References Books Research methodology, Panneerselvam, R., Prentice Hall of India, New Delhi						
MOOC Courses	https://nptel.ac.in/courses/121106007					
Videos	https://nptel.ac.in/courses/121106007					

	Course / Maria														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	-	-	-	1	2	-	-	-	-	-
CO2	1	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO3	1	2	-	-	-	-	-	-	1	2	-	-	-	-	-
CO4	1	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO5	1	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	=	-	-



BSc_Biotechnology

Title of the Course	Proteomics and Protein Int	eraction										
Course Code	BSBT 801 (T)	37 801 (T)										
	Part A											
Year	4th	Semester	8th	Credits	L	Т	Р	С				
					3	0	0	3				
Course Type	Embedded theory and lab	nbedded theory and lab										
Course Category	Disciplinary Major	isciplinary Major										
Pre-Requisite/s	Student must be aware wi	th the proteins, their sturcture and fucntions and protein isolal	ion techniques	Co-Requisite/s								
Course Outcomes & Bloom's Level				•								
Coures Elements	Skill Development X Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructure)								
			D-+D									

Modules	Contents	Pedagogy			
I	An introduction to proteomics: Basics of protein structure and function, An overview of systems biology, Evolution from protein chemistry to proteomics	Lecture methods, demonstrations, experiments, ABL, PBL	8		
II	Abundance-based proteomics: Sample preparation and prefractionation steps, Gel-based proteomics - two-dimensional gel electrophoresis (2-DE), two-dimensional fluorescence difference in-gel electrophoresis (DIGE), Staining techniques	Lecture methods, demonstrations, experiments, ABL, PBL	8		
Ш	Short-range interactions, electrostatic forces, van der waal interactions, hydrogen bonds, Hydrophobic interactions., Mass Spectrometry,	Lecture methods, demonstrations, experiments, ABL, PBL	8		
IV	Mass spectrometry based methods for protein identification. De Novo sequencing using mass spectrometric data. HRT and HART.	Lecture methods, demonstrations, experiments, ABL, PBL	8		
V	Protein interactions: Yeast-two hybrid method, GFP Tags, proteome wide interaction maps, Analysis of protein structures and sequence data, Application of proteomics to health and agriculture	Lecture methods, demonstrations, experiments, ABL, PBL	8		

	Par	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To study the protein structures and function	Experiments	BL2-Understand	2
II	Isolation of proteins	PBL	BL3-Apply	7
III	To perform protein interactions using homology modeling	PBL	BL4-Analyze	2

Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	60		40						
	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					

Part E							
Books	Genes IX by Benjamin Lewin, Johns and Bartlett Publisher, 2006 Modern Blotechnology, 2nd Edition, S.B. Pirmose, Blackwell Publishing, 1987. Molecular Blotechnology, Principles and Applications of Recombinant DNA, 4th Edition						
Articles	https://archive.nptel.ac.in/courses/102/105/102105089/						
References Books	Principles of Gene Manipulation 6th Edition, S.B. Primrose, R.M.Twyman and R.W. Old. Blackwell Science, 2001. Principles of Gene Manipulation 6th Edition, S.B. Primrose, R.M.Twyman and R.W. Old. Blackwell Science, 2001.						
MOOC Courses	https://archive.nptel.ac.in/content/syllabus_pdf/102101082.pdf https://archive.nptel.ac.in/courses/102/105/102105089/						
Videos	https://archive.nptel.ac.in/occurses/10/21/05/10/21/05/08/91 https://archive.nptel.ac.in/occurses/10/21/05/10/21/05/08/91 https://archive.nptel.ac.in/occurses/10/21/05/21/05/29/91 https://archive.nptel.ac.in/occurses/10/21/05/21/05/29/91						

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Bsc_Microbiology

Title of the Course	Animal Diversity	imal Diversity									
Course Code	BSBT GE I [T]	3BT GE [T]									
Part A											
Year	1st	Semester	1st	Credits	L	Т	Р	С			
1641	101	Semester	101	Oredita	3	0	1	4			
Course Type	Embedded theory an	bedded theory and lab									
Course Category	Discipline Electives	pline Electives									
Pre-Requisite/s	Based on Animal Dive	ersity classication taxonomy so create basic knowlad	ge of animal identification and classification.	Co-Requisite/s Create basic platform to all other animal based subject/course.							
Course Outcomes & Bloom's Level											
Coures Elements	Skill Development ✓ Entrepreneurship × Employshillity ✓ Professsonal Ethics × Gender × Human Values × Environment ×			SDG4(Quality education) SDG15(Life on land)							
			Part B								

		Part B			
Modules	Contents	Pedagogy			
1	Principle and Concepts of Taxonomy. Characteristics & classification of non-chordates phylums up to sub-classes according to Parker and Haswell. Chordata: Classification of Phylum up to order according to Parker and Haswell	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8		
2	Phylum – Protozoa, porifera, and Coelentarata Type study of paramecium and plasmodium Protozoa and human diseases type study of Sycon and type study of Obelia.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8		
3	Phylum platyhelminthes and Nemetahelminthes Annelida-Type study of Taenia, Ascaris and Nereis Phylum Arthropoda: Type study of Prawn Economic importance of insects social insects & their life cycle.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8		
4	Phylum Mollusca and Echinodermata Type study of Pila External Features of star fish different larva of Echinodermata	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8		

Hemichordate- External features and affinities of Balanogiossous. Urochordata- Type study of Herdmania (excluding Development). Cephalochordate- Type study of Amphioxus. Affinities of Amphioxus.

	Part C											
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours								
1	Identification of & taxonomy of animals	Field work	BL2-Understand	8								
VII	To collect the local vertebrate fauna and study them.: This project will help in understanding the vertebrates and their varieties	PBL	BL4-Analyze	8								
3	Identification of Helminthes and annelids	Experiments	BL4-Analyze	4								
4	Identification of Molluscan and arthropods	Experiments	BL4-Analyze	4								
5	Identification of echonoderms and vertebrates	Experiments	BL5-Evaluate	8								
VI	To collect the local Invertebrate fauna and study them.: This project will help in understanding the invertebrates and their varieties.	PBL	BL4-Analyze	8								

	Part D(Marks Distribution)										
Theory											
Total Marks	Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	40	12	60	0						
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	40	20	60	0						

Part E								
Books	Text Book of Zoology by: S. Chand							
Articles	https://www.nature.com/articles/ncomms12718							
References Books	ed Zoology by: V.K. Tiwari Invertebrate and Vertebrate zoology by: Veerbala Rastogi							
MOOC Courses	https://hptel.ac.in/courses/102104042							
Videos	https://nptel.ac.in/courses/102104042							

Course Articulation Matrix															
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	2	2	-	-	-	-	-	-	-	1	2	3
CO2	2	3	1	2	2	-	-	-	-	-	-	-	2	2	3
CO3	1	2	2	1	1	-	-	-	-	-	-	-	2	1	3
CO4	1	2	2	3	1	-	-	-	-	-	-	-	1	1	2
CO5	1	2	3	1	3	-	-	-	-	-	=	-	1	1	2



BSc_Biotechnology

Title of the Course	Plant Ecology											
Course Code	BSBT GE II (T)											
	Part A											
Year	1st	Semester	2nd	Credits	L 2	T 0	P 1	C 3				
Course Type	Embedded theo	nedded theory and lab										
Course Category	Generic Elective	eneric Elective										
Pre-Requisite/s	Understand plan	nt communities and ecological adaptation	ons in plants	Co-Requisite/s	The interaction	The interactions among plants and between plants and other organisms.						
Course Outcomes & Bloom's Level	CO1- Understand plant communities and ecological adaptations in plants (BL1-Remember) CO2- Learn about bloidwersity and its conservation (BL2-Understand) CO3- Study bodnaical regions of India and different vegetation types (BL3-Appty) CO4- Understand bioremediation, global warming and climate change(BL4-Analyze) CO5- The interactions among plants and otherworp plants and other plants and											
Coures Elements	Skill Developme Entrepreneursh Employability ✓ Professsonal Et Gender X Human Values : Environment ✓	ip X thics X	SDG (Goals)	SDG4(Quality education) SDG5(Gender equality)								

Part B

Modules	Contents	Pedagogy	Hours
1	Concept of ecology. Approaches to ecology: its main divisions & development facets. Relation to other sciences. Ecology in India. Man-Environment relationship.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
2	Environment factors, Climatic factors: Composition and stratification of atmosphere, global climate, precipitation temperature, light, wind. Topographic factors: Edaphic factors (soil): Biotic factors: Interaction between plants and animals, positive and negative interactions, alleopathy.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	7
3	Levels of Organisation, Population and Communities: concepts of autecology, synecology; concept of biological diversity; habitat and ecological inche. Distribution and characteristics of populations; population dynamics, Ecological Speciation, Ecotione and edge effect; methods of studying vegetation; dynamics of communities; plant succession, processes, type; primary and secondary succession; critimax concepts.	Tutorials, Collaborative, Demonstrations, Project methods Experiments, field work	8
4	Ecosystems: Structure, biotic and the abiotic components, trophic organization, source of energy, authorophy, heterotophy, parasitism; food chains and webs; ecological pryamids. Energy flow, principles, grazing and defit	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
5	Diversity of Ecosystems: Aquatic: fresh water (lotic and lentic), marine (Pelagic and benthic) estuarine: major terrestrial biomes: tundra, temperate and topical. Principles of phytogeography; phytogeographical divisions of India. Endemism; hotspots, Vegelation of Gwaiion: Conservation of natural resources. Wild Life Management.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Analysis of soil: 1. pH 2. organicmatter 3. Water holdingcapacity, 4. Texture of soil.	Experiments	BL2-Understand	2
3	Study of vegetation by quadrat: 8. Frequency, 9. density 10. Abundance. 11. Minimum size of quadrat	Experiments	BL2-Understand	2
2	Analysis of water: 5. Turbidity, 6. conductivity, 7. Dissolved Oxygen.	Experiments	BL2-Understand	2

Part D(Marks Distribution)

	Theory									
Total Marks	otal Marks Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	60	18	40						
	•	•	Practical	•	•					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	60	30	40						

Part E

Books Sharma, P.D. (2010) Ecology and Environment, (8th Ed.) Rastogi Publications, Meerut					
Articles https://academic.oup.com/jpe					
References Books Singh, J.S. singh, S.P. and Gupta, S. (2006) Ecology Environment and Resource Conservation. Anamaya Publications, NewDelhi					
MOOC Courses	https://hptel.ac.in/courses/109105203				
Videos	Wilkinson, D.M. (2007). Fundamental Processes in Ecology. An Earth System Approach Oxford.				

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	1	-	-	-	-	-	-	2	2	3
CO2	2	1	2	1	2	3	-	-	-	-	-	-	2	1	1
CO3	1	2	1	1	2	1	3	-	-	-	-	-	3	2	1
CO4	1	1	1	1	1	3	-	-	-	-	-	-	3	1	1
CO5	2	2	2	2	1	3	3	-	-	-	-	-	2	2	3
C06	-	i.	-	i.		-	i.	-	-	-	1	-	-	-	-



BSc_Biotechnology

Title of the Course	Organic Chemis	organic Chemistry									
Course Code	BSBT GE III (T)	1									
	Part A										
Year	2nd	Semester	3rd	Credits	L	T	P	С			
1001	Liid	Comostor	0.0	Sidala	3	0	1	4			
Course Type	Embedded the	mbedded theory and lab									
Course Category	Interdisciplinary	terdisciplinary Minor									
Pre-Requisite/s	Students should	d know the basic principles of cher	nistry	Co-Requisite/s	Students must know the	basic chemical reactions	of organic compounds				
Course Outcomes & Bloom's Level	CO2- To unders CO3- To apply CO4- To analyz	nber the Stereochemistry and read stand the basic principles of Chem the basic chemical test on natural te the presence of functional group ate the applications of organic read	istry(BL2-Understand) organic compounds(BL3-Apply) is in an organic compounds(BL4		ts , Synthetic dyes etc(BL	5-Evaluate)					
Coures Elements	Skill Developme Entrepreneursh Employability V Professsonal E Gender X Human Values Environment X	nip X thics X	SDG (Goals)	SDG4(Quality education)							

_ ._

Modules	Contents	Pedagogy	Hours
Unit -I	Effects and Steroochemistry: Electronic effects (resonance, inductive, hyperconjugation) and steric effects and its applications (calcidase property); opical siomerism in compounds with and without any seterocenters (allenes, biphenyls); conformation of acyclic systems (substituted ethane/n-propanein-butane) and cyclic systems (mono- and di-substituted cyclohexanes).	tecture method, collaborative learning, Field visits, ABL	8
Unit -II	Chemistry of Intermediate and Synthetic Applications-I: Chemistry of reactive intermediates (carbocations, carbanions, free radicals, carbones, niternes, benzynes etc) Hoffmant-Outlies-Lossen rearrangement, Wolff rearrangement, Simmons-Smith reaction, Reimer-Themann reaction, Mitchael reaction, Darzens reaction, Mittge reaction and McMurry reaction	lecture method, collaborative learning, Field visits, ABL	8
Unit -III	Chemistry of Intermediale and Synthetic Applications-II: Pinacol-pinacolone, Favorskii, benzilic acid rearrangement, dienone-phenol rearrangement, Baeyer-Villiger reaction, solidation and reduction reactions in organic chemistry, organometallic reagents in organic synthesis (Grignard, organolithium and organocopper); Diles-Alder, electrocyclic and Sigmatropic reactions; functional group inter-conversions and structural problems using chemical reactions.	tecture method, collaborative learning, Field visits, ABL	8
Unit -IV	Natural Products Chemistry: Chemistry of alkaloids, steroids, terpenes, carbohydrates, amino acids, peptides and nucleic acids.	lecture method, collaborative learning, Field visits, ABL	8
Unit -V	a)Aromatic and Heterocyclic Chemistry. Monocyclic, bicyclic and tricyclic aromatic hydrocarbons, and monocyclic compounds with one hetero atom: synthesis, reactivity and properties. b) Applications of Artificial Intelligence in Organic Chemistry Introduction of IA, ii or Organic Intelstry, Knowledge-based Expert System in an organic chemistry Industry, Fuzzy Logic Technique in Industry, ANN Technique in the Folndustry, Machine Learning Techniques	lecture method, collaborative learning, Field visits, ABL	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit - I	To check the presence of Carbohydrates in various organic products	Experiments	BL3-Apply	2
Unit -II	To check the presence of Proteins in various food products	PBL	BL3-Apply	2
Unit -III	To check the presence of Lipids/Fats in various food products	Experiments	BL3-Apply	2
Unit -IV	To separate Casein protein from milk sample	PBL	BL4-Analyze	4
Unit -V	To separate Nicotine from dry tea leaves	PBL	BL4-Analyze	4

Part D(Marks Distribution)

	Theory									
Total Marks	ks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation		Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40	0					
	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	60	30	40	0					

Part E

Books	Reaction mechanism in organic Chemistry, O.P. Agarwal
Articles	Laboratory Techniques in Organic Chemistry :A.I.Vogel
References Books	Advanced Organic Chemistry, Jerry March
MOOC Courses	https://mptel.ac.in/courses/104103111
Videos	https://notel.ac.in/courses/104101115

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	3	3	-	-	-	-	-	-	-	1	2	2
CO2	2	2	1	3	2	-	-	-	-	-	-	-	1	1	1
CO3	1	2	3	2	2	-	-	-	-	-	-	-	1	2	2
CO4	2	2	2	3	3	-	-	-	-	-	-	-	1	2	3
CO5	2	1	3	3	2	-	-	-	-	-	-	-	1	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	CILIDATING SHARN										
			Sy	llabus-20	23-2024						
				BSc_Biotech	inology						
	Title of the Course	Inorganic Chemistry									
	Course Code	BSBT GE III (T)									
				Part A							
	Year	2nd Semester			3rd	Credits	L T 3 0	P C 1 4			
	Course Type	Embedded theory and lab									
	Course Category	Interdisciplinary Minor									
	Pre-Requisite/s	Knowledge of coordination bond	ding in complexes, Transition elements their propert	ties		Co-Requisite/s					
	Course Outcomes & Bloom's Level CO3- To remember Knowledge of Transition elements, Acids and Bases, Oxidation and reduction, Complexes, Lanthanides, Actinides (BL1-Remember) CO3- To Apply the Transition elements, Complexes, Lanthanides, Actinides (BL2-Understand) CO3- To Apply the Transition elements, Complexes, Lanthanides, Actinides in the different application (BL3-Apply) CO4- To Analyze the Structure, Bonding, Magnetic Properties of Transition elements, Complexes (BL4-Analyze) CO5- To Evaluate the results analyze (BL5-Evaluate)										
	Skill Development ✓ Entrepreneurship × Entrepreneurship × Entrepreneurship × Entrepreneurship × Entrepreneurship × Entrepreneurship × Professsonal Entric × Gender × Human Values × Entrepreneur ×				SDG (Goals)	SDG4(Quality education)					
	I			Part B							
Modules		Contents			Peda	gogy		Hours			
Module 1		pounds such as Carbides, Oxides	of d-block elements Properties of the elements of and Sulphides Complexes illustrating relative	Stoy telling activity Mnemonics Experienced examples, Quizzes Summarizing, PPT's							
Module 2			eneral characteristics, comparative treatment with vior, spectral properties and stereochemistry	Mnemonics , Experienced examples , , Videos , PPT's							
Module 3	UNIT – III: A. Co-ordination Compounds Wermer's co-ordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of co-ordination compounds, isomerism in co-ordination compounds, valance bond theory of transition related complexes Review of transition metal complexes Review of transition of elements and the review of the Re										
Module 4	Chemistry of Lanthanide Elements Electronic structure, oxidation states, ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds. B. Chemistry of Actinides General features and chemistry of actinides, chemistry of separation of Np. Pu and Am from U, similarities between the later actinides and the later anthanide			Interactive videos PPT's Experienced examples				8			
UNIT – V A. Acids and Bases Arrhenius, Bronsted-Lowny, the Lux-Flood, solvent system and lewis concepts of acids and bases B. Non-aqueous Solvents Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to legical MS12 and legical SO2.				Interactive videos , PPT's Experienced examples, Seminar							
				Part C	:						

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 3	Synthesis of Complex and Double salt	PBL	BL3-Apply	6
Experiment	To determine Acid Radical Nitrate Sulphate	Experiments	BL3-Apply	2
Experiment	To determine Acid radical Sulphide Nitrite	Experiments	BL3-Apply	2
Experiment	To determine th Basic Radical Group Zero	Experiments	BL3-Apply	2
Experiment	To determine the Basic Radical Group One	Experiments	BL3-Apply	2
Experiment	To determine Basic Radical Group 2	Experiments	BL3-Apply	2
Experiment	To determine the Basic Radical Group 3	Experiments	BL3-Apply	2
Experiment	o determine the Basic Radical Group 4	PBL	BL3-Apply	2

Part D(Marks Distribution)

	Theory									
Total Marks	ks Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	60		40						
	Practical Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	60	30	40						

Part E

Books	M.N.N Tandon Unified Chemistry 2010
Articles	
References Books	J.D.Lee Concise Inorganic Chemistry Fifth edition
MOOC Courses	https://nptel.ac.in/courses/104101093
Videos	https://nptel.ac.in/courses/104101093

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	=	-		=	-	-	-	1	3	3	2	-
CO2	3	2	1	-	-	-	-	-	-	-	-	3	3	2	-
CO3	2	2	1	-	-	-	-	-	-	-	-	2	2	1	-
CO4	2	3	1	-	-	-	-	-	-	-	-	1	1	2	-
CO5	2	2	2	-	-	-	-	-	-	-	-	1	1	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Bsc_Microbiology

Title of the Course	Organic Chemis	stry								
Course Code	BSBT GE III (T)	S8T GE III (T)								
	PartA									
Year 2nd Semester 3rd Credits				Т	P	С				
1001	Liid	Comostor	514	Sidalis	3	0	1	4		
Course Type	Embedded the	imbedded theory and lab								
Course Category	Disciplinary Mir	Disciplinary Minor								
Pre-Requisite/s	Students shoul	d know the basic principles of cher	nistry	Co-Requisite/s	Students must know the basic chemical reactions of organic compounds					
Course Outcomes & Bloom's Level	CO2- To under	nber the Stereochemistry and reac stand the basic principles of Chem the basic chemical test on natural ze the presence of functional group ate the applications of organic reac	istry(BL2-Understand)		s , Synthetic dyes etc(BL:	5-Evaluate)				
Coures Elements	Skill Developm Entrepreneursh Employability • Professsonal E Gender X Human Values Environment X	nip X / ithics X X	SDG (Goals) SDG4(Quality education)							

Part B Modules Pedagogy Contents Hours Effects and Stereochemistry: Electronic effects (resonance, inductive, hyperconjugation) and steric effects and its applications (acid/base property); optical isomerism in compounds with and without any stereocenters (allenes, biphenyls); conformation of acyclic systems (substituted ethanein-propanein-butane) and cyclic systems (mono- and di-substituted cyclohexanes). Unit -I lecture method, collaborative learning, Field visits, ABL Chemistry of Intermediate and Synthetic Applications I: Chemistry of reactive intermediates (carbocations, carbanions, free radicals, carbones, nitrones, benzynes etc...); Hofmann-Curtius-Lossen rearrangement, Wolff rearrangement, Simmons-Smith reaction, Reimer-Tiermann reaction, Michael reaction, Darzens reaction, Wittig reaction and McMurry reaction Unit -II lecture method, collaborative learning, Field visits, ABL Chemistry of Intermediate and Synthetic Applications-II: Pinacol-pinacolone, Favorskii, benzilic acid rearrangement, dienone-phenol rearrangement, Basyer-Villiger reaction; oxidation and reduction reactions in organic chemistry, organometallic reagents in organic synthesis (Grignard, organolithium and organocoper); Diels-Alder, electrocyclic and Signatropic reactions; functional group inter-conversions and structural problems using chemical reactions Unit -III lecture method, collaborative learning, Field visits, ABL Natural Products Chemistry: Chemistry of alkaloids, steroids, terpenes, carbohydrates, amino acids, peptides and nucleic acids. Unit -IV lecture method, collaborative learning, Field visits, ABL a)Aromatic and Heterocyclic Chemistry: Monocyclic, bicyclic and tricyclic aromatic hydrocarbons, and monocyclic composition hetero atom: synthesis, reactivity, and properties, b) Applications of Artificial Intelligence in Organic Chemistry Introduction of AI, AI in Organic Industry, Knowledge-based Expert System in an organic chemistry Industry, Fuzzy Logic Technique in Industry, ANN Technique in the Folindustry, Machine Learning Techniques

Part C

lecture method, collaborative learning, Field visits, ABL

Unit -V

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit - I	To check the presence of Carbohydrates in various organic products	Experiments	BL3-Apply	2
Unit -II	To check the presence of Proteins in various food products	PBL	BL3-Apply	2
Unit -III	To check the presence of Lipids/Fats in various food products	of Lipids/Fats in various food products Experiments BL3-Apply		2
Unit -IV	To separate Casein protein from milk sample	PBL	BL4-Analyze	4
Unit -V	To separate Nicotine from dry tea leaves	PBL	BL4-Analyze	4

Part D(Marks Distribution)

	Theory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	40	60	18	40				
	Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	50	60	30	40				

Part E

Videos	https://nptel.ac.in/courses/104101115
MOOC Courses	https://nptel.ac.in/courses/104103111
References Books	Advanced Organic Chemistry; Jerry March
Articles	Laboratory Techniques in Organic Chemistry :A.I.Vogel
Books	Reaction mechanism in organic Chemistry; O.P. Agarwal

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	3	3	-	-	-	-	-	-	-	1	2	2
CO2	2	2	1	3	2	-	-	-	-	-	-	-	1	1	1
CO3	1	2	3	2	2	-	-	-	-	-	-	-	1	2	2
CO4	2	2	2	3	3	-	-	-	-	-	-	-	1	2	3
CO5	2	1	3	3	2	-	-	-	-	-	-	-	1	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Plant Physiology	ant Physiology									
Course Code	BSBT GE IV (T)	SBT GE IV (T)									
	Part A										
Year	2nd	Semester	4th	Credits	L	Т	Р	С			
Total	Liid	Still Stori		5754113	3	0	1	4			
Course Type	Embedded theory and lab	pedded theory and lab									
Course Category	Generic Elective	ric Elective									
Pre-Requisite/s				Co-Requisite/s							
Course Outcomes & Bloom's Level	CO1- To remember the basic concepts and view of physiology of plants(BL1-Remember) CO2- To understand the mechanisms of photosynthesis, photophosphorylation and Light and dark reactions. (BL1-Remember) CO2- To understand the mechanism of active and passers absorption(BL9-Beautries) CO4- To social the mechanism of active and passers absorption(BL9-Beautries) CO4- To evaluate the growth and development of different plants across geological periods (BL5-Evaluate) CO5- To evaluate the growth and development and further in system in plants (BL5-Evaluate) CO6- To payly the understanding of growth and development and further in system in plants (BL5-Evaluate) CO6- To payly the understanding of growth and development and further in system in plants (BL5-Evaluate)										
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment ✓		SDG (Goals)	SDG4(Quality education)							

Part B

Modules	Contents	Pedagogy	Hours
1	Water Relations: Importance of water to plants, Permeability – related theories, diffusion, osmosis, imbibition, plasmolysis, and mechanism of absorption – (active and passive). Ascent of sap. Transpiration, kinds of transpiration, mechanisms of transpiration. Mechanisms of Stomatal movement, plant Anti Transpiration, storage and an active and active and active and active and active and active and active active and active active active active and active	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
II	Photosynthesis: Photosynthetic pigments, mechanisms of photosynthesis, photophosphorylation, Light and dark reactions, C3 (Calvin cycle), C4 (Hatch and Slack cycle), Factors affecting the rate of photosynthesis	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
ш	Respiration: Significance of respiration, types of respiration, respiration quotient, Aerobic and Anaerobic respiration, Glycotysis, Kreb's cycle, Electron transport system. Oxidative phosphorylation, perilose phosphate pathway. Factors affecting the rate of respiration.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
IV	Mineral nutrition – Essential micro and macro nutrients, role of essential elements, their deficiency and toxicity symptoms. Assimilation of mineral nutrients. Stress physiology: Plant responses to water stress, temperature stress, and salt stress.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
v	Growth and Development: Phases of growth and kinetics of growth Plant movement: Photoperiodism. Senescence, vermalization. Seed domaincy, phytochrome and plant nutrients. Organic translocation: phisem sap, P-grotein, phisem loading and unloading, mass flow hypothesis and its critical evaluation.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	To demonstrate the process of osmosis (Potato and Egg. Membrane)	Experiments	BL2-Understand	2
II	To demonstrate the process of Plasmolysis	Experiments	BL4-Analyze	2
III	To prove that chlorophyll, light and CO2 are necessary for photosynthesis	PBL	BL4-Analyze	5
IV	Experiment to show anaerobic respiration.	PBL	BL4-Analyze	8
V	To determine the value of R. Q.	Experiments	BL4-Analyze	2
VI	To demonstrate the process of transpiration among green plants.	Case Study	BL4-Analyze	5
VII	Enzymes specificity: effect of temperature, heavy metals.	PBL	BL5-Evaluate	5 days

Part D(Marks Distribution)

	Theory							
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation								
100	40	60	18	40				
	Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	50	60	20	40				

Part E

Books	1. Hopkins, W.G. and Huner, P.A. 2008 Introduction to Plant Physiology. John Wiley and Sons.		
Articles	https://www.nature.com/subjects/plant-physiology		
2. Nelson, D.L., Cox, M.M. 2004. Lehniger Principles of Biochemistry, 4th edition, W.H. Freeman and Company, New York, USA. 3. Sallisbury, E.B. and Ross, C.W.1991 Plant Physiology, Wadsworth Publishing Co. Ltd. 4. Taiz.			
MOOC Courses	https://nptel.ac.in/courses/102107075		
Videos	https://nplel.ac.in/courses/102107075		

COs	PO1	PO2	PO3	PO4	P05	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	3	-	-	-	-	-	-	-	-	2	3	3
CO2	1	1	2	2	1	2	1	-	-	-	-	-	2	3	2
CO3	1	3	2	2	2	3	1	-	-	-	-	-	3	2	2
CO4	1	3	2	2	2	2	2	-	-	-	-	-	3	1	1
CO5	3	3	1	1	1	1	2	-	-	-	-	-	3	2	1
CO6	1	-	-	1	-	-	-	-	-	-	-	-	-	-	2



BSc_Biotechnology

Title of the Course	Animal Physiology	J Physiology						
Course Code	BSBT GE IV (T)							
		Par	rt A					
Year	2nd	Semester	4th	Credits	L	Т	Р	С
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Generic Elective							
Pre-Requisite/s	Pre-Requisite/s basic concepts of physiology and the organ systems physiology of animals determine and understand working and functioning of different systems with their anatomical and biochemical aspects describe the system physiology of mammals					with o	ganic in biolog	у
Course Outcomes & Bloom's Level	CO2- To understand the detaile CO3- To understand the import CO4- To provide experimental CO5- To evaluate the application	knowledge of animal physiology(BL1-Remember) dd concepts of digestion respiration excretion the functioning of r anoe of Physiology and its applications(BL3-Apply) basis, and to enable students to basic concept of physiology(BL nos of Physiology in various fields such as research and develop ng of Physiology in their future perspective fields i.e. Medical and	4-Analyze) ment as well as in various industries(BL5-Evaluate)	tand)				
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG1(Zero hunger) SDG14(Life below water) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
1	Animal Nutrition-Nutrients and their Functions Physiology of Digestion Hormonal control of digestion absorption of Food and disorders.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
2	Physiology of Respiration in Mammals Respiratory Pigments Regulation of Respiration Osmo-regulation in animals. Circulatory System: Heart Cardiac Cycle Blood pressure Blood Vessels ECG – its principle and significance	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
3	Immune System In Mammals : An overview. Excretory System & Physiology of Excretion in Mammals Counter current theory Thermoregulation in Animals Hibernation Aestivation.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
4	Nervous tissue- Structure, Properties Function and Physiology of nerve Impulse Conduction EEG: its principle and significance Muscular Tissue -Types structure Muscular Physiology Chemical Changes during muscular physiology	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
5	Endocrine gland- Pituitary gland Thyroid and Parathyroid gland Adrenal gland Thymus gland Pancreas and other glands Mechanism of Hormonal action Physiology of Reproduction in mammals	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Spotting vis permanent slides of digestivesystem and experiments based onmetabolism	Experiments	BL2-Understand	8
VI	Detection of Carbohydrates, Protein and fats in given samples	PBL	BL4-Analyze	6
III	determination of Blood group Bloodpressure and study of Immune organs	Experiments	BL4-Analyze	4
IV	Spotting Muscular and nervouse tissue	Experiments	BL2-Understand	4
V	Study of harmonal action and study ofgonads	Experiments	BL4-Analyze	4

Part D(Marks Distribution)

	Theory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	40	60	18	40				
			Practical					
Total Marks	Total Marks Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	50	60	30	40				

Part E

Books	Prasad.N.K.;Enzyme Technology; Pacemaker of Biotechnology,2nd Edition Palmer,Enzymes; Horwood Publishing Series. 2001
Articles	https://www.sciencedirect.com/hopica/agricultural-and-biological-sciences/enzyme-activity https://www.pcignafricels/2002/1-258/2013/4034-7/fullexd https://www.ncbi.nlm.nih.gov/pm/carticles/PMC8169242/ https://www.ncbi.nlm.nih.gov/pm/carticles/PMC8169242/ https://pubs.acs.org/doi/10.1021/acscempag.2c075600 https://pubs.acs.org/doi/10.1021/acscempag.2c075600
References Books	Biocatalysts and enzyme technology, Buchholz K/Kascha V, Bornscheuer U.V, Published by Wiley-VCH, 2005. Wiseman, A: Handbook of Enzyme Biotechnology, 3rd Edition, Ellis Horwood Publication, 2010 Buchholz K/Kasche V,Bornscheuer U.T, Biocatalysis and enzyme technology, Published by Wiley-VCH, 2005. Wiley-VCH, 2009. Palmer, T, Enzymes: Biochenisty, Biotechnology, Clinical Chemistry, Horwood Publishing House, Chichester, England, 2001. Biswangest H-Parciacial enzymology. Wiley Publication. 2rd Edition, 2011.
MOOC Courses	https://mplet.ac.in/courses/102103097
Videos	https://hptel.ac.in/courses/102103097

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	1	2	2	2	-	-	-	-	-	-	2	-	1
CO2	3	1	1	2	2	2	-	-	-	-	-	-	1	2	2
CO3	2	1	1	2	1	1	-	-	-	-	-	-	2	3	1
CO4	3	-	-	1	1	1	1	-	-	-	-	-	1	2	2
CO5	-	-	-	-	1	-	1	-	-	-	-	-	2	-	1
CO6	-	2	-	=	1	=	=	i.	-	-	-	i	1	-	-



BSc_Biotechnology

Course Type Embedded theory and lab Course Category Generic Elective Pre-Requisite/s Should be acquainted with the basics knowledge of Principle of Anatomy and histology of chordate Zoology CO1- To describe basic concepts of anatomy and anatomical structure of the organs of animals (BL1-Remember) CO2- To understand the Anatomy, histology, and comparative anatomy in different vertebrates(BL2-Understand) CO3- To understand the Anatomy, histology, and comparative anatomy in different vertebrates(BL2-Understand) CO3- To understand the importance of Anatomy and its applications(BL3-Apply) CO3- To understand the importance of Anatomy and its applications(BL3-Apply) CO3- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and its applications of Anatomy and histology in various fields such as research and industries(BL8-Create) Skill Development X Entrepreneurship X Employability /	eral and comparitive anomitomy of vertebrates								
Vear	я сен п								
Course Category Generic Elective Pre-Requisite/s Should be acquainted with the basics knowledge of Principle of Anatomy and histology of chordate Zoology Co-Requisi CO1- To describe basic concepts of anatomy and anatomical structure of the organs of animals (BL1-Remember) CO2- To understand the Anatomy, histology, and comparative anatomy in different vertebrates(BL2-Understand) CO3- To understand the Anatomy, histology, and comparative anatomy in different vertebrates(BL2-Understand) CO3- To understand the importance of Anatomy and its applications(BL3-Apply) CO3- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and its applications of Anatomy and histology in various fields such as research and industries(BL8-Create) Skill Development X Entrepreneurship X Employability /									
Course Category Generic Elective Pre-Requisite/s Should be acquainted with the basics knowledge of Principle of Anatomy and histology of chordate Zoology CO1- To describe basic concepts of anatomy and anatomical structure of the organs of animals (BL1-Remember) CO2- To understand the Anatomy, histology, and comparative anatomy in different vertebrates(BL2-Understand) CO3- To understand the importance of Anatomy and its applications of Index-Depty) CO4- To provide experimental basis, and to enable students to acquire a specialized anatomy and index-particular of the control of the cont	Credits	Т	P	С					
Course Category Generic Elective Pre-Requisite/s Should be acquainted with the basics knowledge of Principle of Anatomy and histology of chordate Zoology Co-Requisite Course Quitcomes & Bloom's Level Course Outcomes & Bloom's Level CO3- To understand the Anatomy, histology, and comparative anatomy in different verberbards (BL2-Understand) CO3- To understand the importance of Anatomy and its applications (BL3-Apopto) CO4- To provide experimental basis, and to easily a specialized knowledge and understanding in advanced the field of Anatomy and histology(BC05- To evaluate the applications of genetics in various fields such as research and development, medical science genetic engineering etc(BL5-Evaluate) CO6- To evaluate the applications of genetics in various fields such as research and industries(BL6-Create) Skill Development X Entrepreneurship X Employability /	3	0	1	4					
Pre-Requisite/s Should be acquainted with the basics knowledge of Principle of Anatomy and histology of chordate Zoology Co-Requisi Cot- To describe basic concepts of anatomy and anatomical structure of the organs of animals (BL1-Remember) Co2- To understand the Anatomy, histology, and comparative anatomy in officer were breatened by the Co2- To understand the Anatomy, histology, and comparative anatomy in officer were breatened by the Co2- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and the applications (BL3-Apply) CO3- To evaluate the applications of genetics in various fields such as research and development, medical science genetic engineering etc(BL5-Evaluate) CO4- To evaluate the applications of genetics in various fields such as research and industries (BL6-Create) Skill Development X Entrepreneurship X Employability /									
CO1- To describe basic concepts of anatomy and anatomical structure of the organs of animals (BL1-Remember) CO2- To understand the Anatomy, histology, and comparative anatomy in different vertebrates (BL2-Understand) CO3- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and its applications (BL3-Apply) CO3- To understand the importance of Anatomy and Its applications of Anatomy and Its applic	eneric Elective								
CO2- To understand the Anatomy, histology, and comparative anatomy in different vertebrates(BL2-Understand) CO3- To understand the importance of Anatomy and its applications(BL3-Apply) CO3- To understand the importance of Anatomy and its applications(BL3-Apply) CO4- To provide experimental basis, and to enable students to acquire a specialized knowledge and understanding in advanced the field of Anatomy and histology(B-CO4-To evaluate the applications of genetics in various fields are research and development, medical science genetic engineering stot(BL4-Evaluate) CO4- To apply the understanding of analysing the applications of Anatomy and histology in various fields such as research and industries(BL4-Greate) Skill Development X Entrepreneurship X Employability V Employability V	Co-Requisite/s create basic knowladge about physiology GEIV-A								
Entrepreneurship × Employability ✓	CO2- To understand the Anatomy, histology, and comparative anatomy in different vertebrates(BL2-Understand) CO3- To understand the importance of Anatomy and its applications(BL3-Apply) CO4- To provide experimental basis, and to enable students to acquire a specialized knowledge and understanding in advanced the field of Anatomy and histology(BL4-Analyze) CO3- To revaluate the applications of genetics in various fields such as research and development, medical science genetic engineering etc/BL5-Evaluate)								
Course Elements Professional Ethics X Gender X Human Values X Environment X									

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to General Anatomy Animal Tissues - Epithelium Connective tissue skeletal tissue circulatory tissue and nervous tissue	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
2	Structure of Heart of mammals Structure of Brain Sense organs & their Structure Skeletal system Blood vessels, Mammals Kidney and Reproductive organs of mammals	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
3	Comparative account of integument of vertebrates (Amphibia Reptiles Birds and Mammals) Comparative account of Digestive system of Vertebrates (Amphibia Reptiles Birds and Mammals) Comparative account of limb bones and girdles of vertebrates Amphibia Reptiles Birds and Mammal	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
4	Comparative account of Respiratory system of Vertebrates (Amphibia Reptiles Birds, and Mammals) Comparative account of Brain vertebrates (Amphibia Reptiles Birds and Mammals)	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
5	Comparative account of Aortic & Heart of vertebrates (Amphibia Reptiles Birds and Mammals). Comparative account of urinogenital system of vertebrates (Amphibia Reptiles Birds & mammals).	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Spotting: based on histology	Experiments	BL2-Understand	8
2	Spotting: Visceral Organs	Experiments	BL2-Understand	8
3	Study of human visceral organs as per syllabus	Experiments	BL4-Analyze	4
4	Osteology and study of fethers	Experiments	BL4-Analyze	4
5	Study of organ system	Experiments	BL5-Evaluate	4
VI	Determination of Blood group and ABH factor in own blood sample	PBL	BL4-Analyze	6

Part D(Marks Distribution)

	Theory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	40	60	18	40				
	•	•	Practical	•				
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	50	60	30	60				

Part E

E	Books	Jordan E.L. & Verma P.S. (2003). Chordate Zoology. S. Chand & Company Ltd. New Delhi. Chaki K.K. Kundu G. & Sarkar S. (2005). Introduction to General Zoology. Vol. 1. New Central Book. Agency (P) Ltd. Kolkata B.D.Chaurasia: handbook of General Anatomy Parker T. J. & Haswell W. (1972). Text Book of Zoology Volume II: Marshall and William (Eds.) 7th Ed. Macmillan Press London
А	rticles	https://www.nature.com/articles/152088a0
	ferences Books	G.J.Tortora & N.P.anagnostakos: Principal of aaanatomy and Physiology
	OUrses	No courses found for given search
٧	/ideos	https://www.google.com/search? sca_esv=e2da99de12d3bb4c&sca_upv=1&rtz=1C1NMEO_eniN999lN999&q=General.+Anatomy+in+animals&ibm=vid&source=inms&prmd=ivsnbmtz&sa=X&ved=2ahUKEwikibTijlqGAxVw8jgGHU1kBEoQpQJegQIDBAB&biv=1366&bih=625&dpr=1#jpstate=ive&vld=cid.bbd064e4,vid:T8pCS4rdm38,st0

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	2	2	-	-	-	-	-		-	1	2	3
CO2	2	3	1	2	2	-	-	-	-	-		-	2	2	3
CO3	2	2	2	1	1	-	-	-	-	-	-	-	2	1	3
CO4	1	2	2	1	1	-	-	-	-	-		-	1	1	2
CO5	1	2	1	1	2	-	-	-	-	-	=	=	1	1	2
CO6	1	2	2	_	_	_	_	_	_	_	_	_		_	2



BSc_Biotechnology

Title of the Course	Biostatistics & Com	Sostatistics & Computer applications											
Course Code	BSBT SEC III (T)	SBT SEC III (T)											
			Part A										
Year	2nd	Semester	3rd	Credits	L	Т	P	С					
					2	0	0	2					
Course Type	Theory only	Theory only											
Course Category	Skill Enhancement Courses												
Pre-Requisite/s	Understanding of bapplications of Bios	asic concepts of Computers, operating statistics in research and development.	ystems, their designing, and	Co-Requisite/s	Basic concepts of Biostatistics and Computer Applications, its applications and future prospects in research and analysis using statistical tools.								
Course Outcomes & Bloom's Level	CO1- The course prepares the student to understand the basic concepts of Fundamentals of Biostatistics and Computer Applications, its applications and future prospects (BL1-Remember) CO2- The subject Fundamentals of Biostatistics and Computer Applications is designed for under graduate students of biostatistics and concepts of each and every division of the subject along with its applications in other fields. (BL2-understand) CO3- The course aims to provide basis of analyzing the applications of Fundamentals of Biostatistics and Computer Applications in various fields of research and industries (BL3-Apply) CO3- The course aims to provide basis of analyzing the applications of Fundamentals of Biostatistics and Computer Applications in various fields of research and industries (BL3-Apply)												
Coures Elements	Skill Development V Entrepreneurship X Employability V Professonal Ethica X Gender X Human Values X Environment X												

Part E

Modules	Contents	Pedagogy						
1	Introduction to Computer Systems – Basics of Computer Systems, various Hardware Components – Data Storage and various Memory Units – Central Processing Unit, Introduction to Software and its life cycle.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8					
2	DOS, MS-Offices and its application, Operating System: types of operating system, application, process and its characteristics. WWW, web browser, E-mail.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8					
3	DOS, MS-Offices and its application, Operating System: types of operating, Topologies & Technologies – LAN, WAN, MAN, PAN, Wireless LAN.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8					
4	Introduction to Biostatistics common terms, notions and Applications, Statistical population and Sampling Methods, Classification and statement on Of Bata, Diagrammatic and graphical presentation, Frequency Distribution, Measures of central value, Measures of variability; Standard deviation, standard Error, Range, Mean Deviation, Coefficient Variation, Analysis of Variation, Coefficient	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8					
5	Basic tests, tests of significance, Hest, chi-square test, Regression, Basis of regression, regression analysis, Estimation, testing, Prediction, Checking residual analysis. Multivariate Analysis. Design of Experiments, randomization, replication, local control, complementary randomized, anadomized both design	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8					

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Methods of Sampling	Case Study	BL2-Understand	2
2	Diagrammatic and graphical presentation of data	Case Study	BL3-Apply	2
3	Calculation of Standard deviation	Case Study	BL5-Evaluate	2
4	Analysis of variance	Field work	BL3-Apply	2
5	Tests of significance: t-test	Case Study	BL3-Apply	2
6	Tests of significance: Chi Square test	Case Study	BL3-Apply	2

Part D(Marks Distribution)

Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40	20						
	Practical Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
	0		0		0						

Part E

Books	Computer fundamentals, P.K. Sinha
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3469943/
References Books	Working in MS-Office, Ron Mansfield, TMH
MOOC Courses	https://mptel.ac.in/courses/102101056
Videos	https://nptel.ac.in/courses/102101056

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	-	-	-	-	1	2	-	-	1	2	-
CO2	1	2	-	-	-	-	-	-	1	1	-	-	2	1	-
CO3	1	2	-	-	-	-	-	-	1	1	-	-	1	2	-
CO4	1	2	-	-	-	-	-	-	1	2	-	-	2	1	-
CO5	1	2	-	-	-	-	-	-	1	2	-	-	1	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Bioethics and	ics and Biosafety										
Course Code	BSBT SEC IV											
				Part A								
Year	2nd	Semester	4th	Credits	L	Т	P	С				
100	Liid	Comotor	741	o.ca.co	2	0	0	2				
Course Type	Theory only	ry only										
Course Category	Skill Enhance	nhancement Courses										
Pre-Requisite/s	scientific com	munication approaches for Bioe	thics and Biosafety	Co-Requisite/s	concept of containment level and Good Laboratory Practices (GLP) and Good Manufacturing Practices (GM							
Course Outcomes & Bloom's Level	CO2- To under biotechnology CO3- To desc CO4- To provi Analyze) CO5- To apple	erstand the Introduction to science in international relations, globa tribe comprehensive understand ide Theoretical basis, and to ena	ce, technology and society, is ization and development and ing of Challenges for the Indi- ble students to analyze the b or, quality control, and legal fra	ific communication approaches for Binethics and Binsately (BL) used a decay-case studies/experiences from developing and c their analysis. (BL-2-Understand) an Biotechnological research and industries Bioethics – Necessi asic concepts of the concept of containment level and Good Lab meworksthat impact biotechnology and ethical behaviors that for	developed countries. Owner ty of Bioethics, different par oratory Practices (GLP) and	adigms of Bioethics – Nation d Good Manufacturing Practi	al & International.(BL3-Appl ces (GMP). Cartagena Protoc	ly) col for biosafety (BL4-				
Coures Elements	Skill Developr Entrepreneurs Employability Professsonal Gender X Human Values Environment	ship X ✓ Ethics X	SDG (Goals)	SDG4(Quality education)								

		Part B					
Modules	Contents	Pedagogy					
1	Biotechnology And Society: Introduction to science, technology and society, issues of access-Case studies/experiences from developing and developed countries. Ownership, monopoly, traditional knowledge, biotechnes/tyb, benefit sharing, environmental sustainability, public vs. private funding, biotechnology in international relations, globalization, and development divide.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	6				
2	Public acceptance issues for biotechnology: Biotechnology and hunger: Challenges for the Indian Biotechnological research and industries Bioethics - Necessity of Bioethics, different paradigms of Bioethics - National & International. Ethical issues against the molecular technologies	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8				
3	Biosafety—Introduction to biosafety and health hazards concerning biotechnology. Introduction to the concept of containment level and Good Laboratory Practices (GLP) and Good Manufacturing Practices (GMP). Cartagena Protocol for biosafety	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	6				
4	Biosafety assessment procedures in India and abroad. International dimensions in biosafety, bioterrorism, and convention on biological weapons. Social and ethical implications of biological weapons.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	6				
-	Principles of bioethics: Legality, morality and ethics, autonomy, human rights, beneficence, privacy, justice, equity etc. The	Table Office of the Property of the Control of the					

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40							
	•	•	Practical	•	•						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
0	0	0	0	0	0						

Part E

Books	Thomas J.ABiotechnology and Safety Assessment Thomas J.A., Fuch R.L. Academic Press 3rd Edition 2002-ASM Press 3rd. ed. 2000		
	https://www.ndcebios.in/v1n1/2021010110.pdf https://www.researchgate.net/publication/353346609_ON_BIOETHICS_AND_BUSINESS_ETHICS		
References Books Fleming D.A., Hunt DBiological safety Principles and practices-ASM Press 3rd. ed. 2000			
MOOC Courses	https://hptel.ac.in/courses/109106092		
Videos	https://hptel.ac.in/courses/109106092		

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	1	3	3	3	1	2	3	1	3	2	3
CO2	1	1	2	3	1	3	3	3	2	1	3	2	1	1	2
CO3	3	3	2	1	3	3	3	2	1	1	3	2	2	3	2
CO4	3	3	3	3	2	2	3	3	1	1	3	2	3	3	2
CO5	3	3	2	2	1	3	3	3	1	1	3	2	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	=	-	-



BSc_Biotechnology

Title of the Course	Disaster Management	ent											
Course Code	BSBT VAC III												
			Part A										
Year	2nd	Semester	3rd	Credits	L	Т	Р	С					
					2	0	0	2					
Course Type	Theory only	y only											
Course Category	Community Enganement and	Finganement and Service											
Pre-Requisite/s	To be familiar with the basics	familiar with the basics of natural disasters as well as anthropogenic factors and various approaches for disaster managements. Co-Requisite/s											
Course Outcomes & Bloom's Level	CO2- To understand the cause CO3- To learn about risk redu CO4- To understand the cond	ters and its profile in India(BL1-Remember) ses and impacts of disasters on environment and related cass action approaches of disasters with safety issues in mitigating cept of Disaster Management Cycle and its Risk Reduction M cts and policies for mitigating disasters, Role of Army, Police,	industrial disasters.(BL3-Apply) easures(BL4-Analyze)	•	Ÿ								
Coures Elements	Skill Development ✓ Entrepreneurship × Employability ✓ Professsonal Ethics ✓ Gender × Human Values × Environment ✓		SDG (Goals)	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Cushiy education) SDG4(Cushiy education) SDG4(Cushiy education) SDG4(Cesh water and sanitation) SDG4(Cesh work and economic growth) SDG4(Such section and production) SDG1(Such section and section and production) SDG3(Climate action) SDG15(Lime on land) SDG17(Partnerships for the goals)									

Modules	Contents	Pedagogy	Hours
1	Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks, Capacity buildings) Factors of disasters, Global trends in disaster: urban disasters, pandemics, complex emergencies, Climate change	lecture method, collaborative learning, group dicussions, field visit,	8
2	Classification of disaster: geophysical, hydrological, climatological, meteorological, biological and technological or man-made hazards. Causes, impacts including social, economic, political, environmental, health, psychosocial, etc. Differential impacts-in terms of caste, class, gender, age, location, disability.	lecture method, collaborative learning, group dicussions, field visit,case studies	8
3	Disaster management cycle – Phases, Culture of safety, prevention, mitigation and preparedness community based DRR. Structural- nonstructural measures, Roles and responsibilities of community, Panchayati Ra institutions/	lecture method, collaborative learning, group dicussions, field visit,case studies	8
4	Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources	lecture method, collaborative learning, group dicussions, field visit,case studies	8
5	Disaster Management Indien scenario, Indies vulnerability profile, Disaster Management Act 2005 and Policy guidelines. Environmental Legislation for Disaster Risk Management in India. Role of Information Letenhoogy in protecting environment and health. Role of NGOs Cases Studies: Bhopal Gas Disaster, Gujarat Earth Quake, Orissa Super-cyclone, South India Tsunarni, Bihar Hoods, Plague Suria, COVID-19 pandemic	lecture method, collaborative learning, group dicussions, field visit, case studies	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Contemporary Disaster Issues in India & World	Case Study	BL4-Analyze	4
2	Disaster Mitigation Methods & Involvement of Technologies	Seminar	BL3-Apply	4

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40							
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
0	0	0	0	0	0						

Part E

Videos	https://nptel.ac.in/courses/124107010
MOOC Courses	https://nptel.ac.in/courses/124107010
References Books	- Coppole P Damon, 2007. Introduction to International Disaster Management, Carler, Nick 1991. Disaster Management Carler, Ostor University Press. Document on World Summit on Sustainable Development 2002. Cov. of India: Disaster Management Carler, Ostor Microbia Carler, Nick 1991. Disaster Management Nick 1
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3105552/
Books	• Singhar J.P. Disaster Management, Laxmi Publications, 2010. ISBN-10: 9380388427 ISBN-13: 978-9380386423 • Tushar Bhattacharya, "Disaster Science and Management," McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007367 Gupta Amit, Ksepa Sa. Nair, Environmental Knowledge for Disasster Kisk Management, NIDM, New Delhi, 2011 • Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010. • Kapur, Anu & others, 2005: Disasters in India Studies of grim reality, Rawat Publishers, Jaipur.

	Godisc Artifoliation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	1	3	3	3	1	2	3	1	3	2	3
CO2	1	1	2	3	1	3	3	3	2	1	3	2	1	1	2
CO3	3	3	2	1	3	3	2	1	1	3	2	2	3	2	2
CO4	3	3	3	3	2	2	3	3	1	1	3	2	3	3	2
CO5	3	3	2	2	1	3	3	3	1	1	3	2	3	3	3
C06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Environemental Issues and Sustainable De	ronemental Issues and Sustainable Development										
Course Code	BSBT VAC IV											
	Part A											
Year	2nd Semester	4th	Credits	L	Т	P	С					
1001	Z.id Gellioster		Sidalo	2	0	0	2					
Course Type	Theory only											
Course Category	Community Enganement and Service	ommunity Enganement and Service										
Pre-Requisite/s	Basic Knowledge of Environmental Issues Development	and Sustainable	Co-Requisite/s	Goals and Targets of Sustainable Development Goals. Strategies for the implementation of Sustainable Development goals								
Course Outcomes & Bloom's Level	CO2- CO2. To acquire analytical skills/met CO3- CO3. Ability to design sustainability CO4- CO4. Acquire expertise and skills to	hods in assessing environme performance metric to assess evaluate feedback systems t	mental challenges and concept of sustainable development (BL: ntal impacts through a multidisciplinary approach; (BL4-Analyze the limpact on community's sustainable development (BL5-ba) hat can readjust the pathways of processes and procedures to emplement the sustainable development project to achieve miles	a) luate) ensure success in implement	ing sustainable development	initiatives.(BL1-Remember)						
Coures Elements	Skill Development Entrepreneurship × Employability Professonal Ethics × Gender × Human Values Environment Environment	SDG (Goals)	SDG4(Quality education) SDG3(Gender equality) SDG12(Responsible consuption and production) SDG13(Climate action)									

Modules	Contents	Pedagogy	Hours
1	History and emergence of the concept of Sustainable Development, Environmental issues and crisis. Resource degradation, greenhouse gases and Effects, desertification, social insecurity, industrialization, Globalization and Environment. Dimensions of Sustainable Development, Phinciples of Su	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, discussion (questions & answers section)	8
2	Sustainable Development Goals: Capacity Building for Sustainable Environment, Sustainable Land Management. Global and regional progress on SD, Individual and collective actions for SD, Sustainable Mountain development, Clean air for Climate Mitigation and Human Health, Sustainable Corporate Practices, Sendal Framework for Disaster Risk Reduction, Conservation and Management of Global Forest Ecosystem	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
3	Society, environment, culture and economy; current challenges - natural, political, socio-economic imbalance; sustainable development initiatives and policies of various countries; global, regional, national, local; needs of present and future generation - political, economic, and environmental.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
4	GSD-2019, GSD 2023. Implementation Progress: SDG Progress report, Sustainability and development indicators and SDGs, UN's outlook of sustainable development and efforts	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
5	Case Studies & Projects on Rural Stutainable Development (Indian Village perspectives). Village resources (troad perspectives), current challenges and thematic areas; village social interactry, village social interactives, village social interactry, village social present and future generation; conflicts and was proward.	Lecture with ppt_Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion. Field visits. Industrial Visit (MSW/BMW/STP/ETF)	8

	F	aitC		
Modules	Title	Bloom's Level	Hours	
	Sustainable development aims to use natural resources and the environment to raise the standard of living while preserving future generations' capacity to meet their own needs	PBL	BL3-Apply	2 MONTHS
П	Analyze the current situation to identify specific challenges and opportunities in the targeted area or community in order to Assess environmental, economic, and social factors.	Internships	BL4-Analyze	1 MONTHS
III	Monitor energy production and savings, and assess environmental impact.	Field work	BL4-Analyze	1 MONTHS
IV	Plan a community solar farm where residents can buy or lease solar panels	Field work	BL3-Apply	2 MONTHS

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40								
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
	0											

Part E

Books	1. Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future 10th edition, Upper Saddle River, N. J. Benjamini/Cummins/Pearson. 2. John W. Twidell and Anthony D. (2015). Renewable Energy Sources, 3rd Edition, Weir Publisher (ELBS) 3. William P.Cunningham and Mary A. (2015) Cunningham Environmental Science: A Global Concern, Publisher (Mc-Graw Hill, USA)
Articles	1. Nhamo, Godwell, and Vuyo Mjimba. Sustainable Development Goals and institutions of higher education. Springer, 2020. 2. Bell, Simon, and Stephen Morse. Sustainability indicators: measuring the immeasurable?. Routledge, 2012. 3. Sevensen, Bent. Energy, Resources and Welfare: Euphorisation of Social Frameworks for Sustainable Development. Academic Press, 2016. 4. Dent, David, Otiver Dubois, and Barry Dalak-Clayton. Rural planning in developing countries: supporting natural resource management and sustainable invellenceds. Routledge, 2013. 4. Sala, Sevenental, Balgaio Cluffo, and Peter Nijlagma." A systemic framework for sustainability laysessment? Ecological Economics 19 (2015): 344-325.
References Books	1. Elliott, Jennifer. 2012. An Introduction to Sustainable Development. 4th Ed. Routledge, London. 2. Rogers, Peter P., Kazi F. Jalal, and John A. Boyd. "An introduction to sustainable development." (2012).
MOOC Courses	https://hptel.ac.in/courses/109106200
Videos	https://nptel.ac.in/courses/109106200

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-1	3	2	-	-	-	1	-	1	-	-	-	2	2	3
CO2	1	3	2	-	-	•	2	-	1	-	-	-	1	2	3
CO3	3	2	1	-	-	•	3	-	2	-	-	-	1	2	-
CO4	2	3	1	-	-	-	3	-	2	-	-	-	-	3	1
C05	2	3	1	-	-	-	3	-	3	-	-	-	1	-	-
CO6	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

litle of the Course	Fundamentals of Biochem	istry							
Course Code	BSBT101[T]								
			Part A						
Year	1et	Samaetar	1et	Cradite	L	Т	Р	С	
1641	101	Selliestei	150	Ciedita	3	0	1	4	
Course Type Embedded theory and lab Course Category Disciplinary Major Pro-Requisiters Knowledge about basic chemistry and science Co-Requisiter's CO1- To remember the structure of various biomolecules like carbohydrates, fats, amino acids, etc(BL1-Remember)									
Part A Year 1st Semester 1st Credits 1st Credits 1st T P 3 0 1 Course Type Embedded theory and lab Course Category Disciplinary Major Pre-Requisitels Knowledge about basic chemistry and science Course Outcomes & CO1- To remember the structure of various biomolecules like carbohydrates, fats, amino acids, etc(BL1-Remember) CO2- To comprehend the biological material; and its relation to living material and laborate the structure and functions of different biomolecules (BL2-Understand) CO2- To comprehend the biological material; and its relation to living material and laborate the structure and functions of different biomolecules (BL2-Understand) CO2- To comprehend the biological material; and its relation to living material and laborate the structure and functions of different biomolecules (BL2-Understand) CO2- To comprehend the biological material; and its relation to living material and laborate the structure and functions of different biomolecules (BL2-Understand) CO2- To comprehend the biological material; and its relation to living material and laborate the structure and functions of different biomolecules (BL2-Understand) CO2- To comprehend the biological material; and its relation to living material and laborate the structure and functions of different biomolecules (BL2-Understand) CO2- To comprehend the biological material; and its relation to living material and laborate the structure and functions of different biomolecules (BL2-Understand) CO2- To comprehend the biological material; and its relation to living material and laborate the structure and functions of different biomolecules (BL2-Understand) CO3- To remember the structure of various biomolecules (BL2-Understand)									
Pre-Requisite/s	Knowledge about basic ch	nemistry and science		Co-Requisite/s					
Course Outcomes & Bloom's Level	CO2- To comprehend the CO3- To understand the in CO4- To provide experime	biological material; and its relation to living matter and elabora moortance of biophysical chemistry and its applications. (BL3- ental basis, and to enable students to analyze the various bion	ate the structure and functions of different biomolecules(Apply) notecules in food samples (BL4-Analyze)	BL2-Understand)	•				
Coures Elements	Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X		SDG (Goals)	SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours
1	Bonds in biological system: Principles of biophysical chemistry (ph2Henderson Hasselback equation) Buffers and its role in biological systems. Solution and its types. Osmosis, diffusion and its significance in biological systems	Tutorials, Collaborative, Demonstrations, Project methods Experiments	8
2	Carbohydrates: Monosaccharide: Classification, Common Disaccharides, Structure and occurrence of storage and structural polysaccharides	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, Experiments	9
3	Lipids: Classification, structure-function, role in biological membrane, Lipoprotein, structure and functions. Prostaglandins and its role in biological systems	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, ABL Experiments,	9
4	Amino Acids: structure, nomenciature and general properties, Peptide bond, Classification of amino acids Proteins; Levels of organization Primary, Secondary structure, domains, motif and folds), tertiary and Quaternary Conformation of proteins (Ramachandran plot, Stability of Proteins	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, Experiments, Video lectures	9
5	Composition, structure and function of nucleic acids. Conformation of nucleic acids (helix (A, B, Z), I-RNA, micro-RNA). Vilaminis: Classification: source and biochemical function, RDA, Nucleic acids: DNA, RNA-basic structure (nucleosides and nucleotides); double helical structure of DNA (Watson - Cinck Model), yes of DNA, B, A- and Z-DNA.	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, Experiments, Video lectures	9

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Quantitative analysis of sugar in the given plant sample	PBL	BL4-Analyze	4
2	Qualitative analysis of sugars.by Molisch's Test	Experiments	BL4-Analyze	2
3	Qualitative analysis of reducing sugars by Fehling's Test	Experiments	BL4-Analyze	2
4	Qualitative analysis of sugars.by Barfoed's Test	Experiments	BL4-Analyze	2
5	Qualitative analysis of ketose sugars by Seliwanoff Test.	PBL	BL4-Analyze	2
6	Qualitative analysis of amino acids by ninhydrin Test.	Experiments		2
7	Qualitative analysis of peptide bond by Biuret Test	Experiments	BL5-Evaluate	2
8	Qualitative analysis of protein by Xanthoproteic Test.	Experiments	BL5-Evaluate	2

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	40	12	60							
	•	•	Practical	•	•						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	40	20	60							

Part E

Books	U Satyanarayan, U Chakrapani Blochemistry 3rd Edition
Articles	https://www.mdpi.com/1422-0067/22/22/12219
References Books	G.Zubay Biochemistry 3rd Edition
MOOC Courses	https://hptel.ac.in/courses/104105076
Videos	https://nptel.ac.in/courses/104105076

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	2	2	-	-	-	2	-	-	1	-	1
CO2	2	3	2	2	2	2	-	-	-	2	-	-	1	-	3
CO3	3	1	1	-	1	-	-	-	-	-	-	-	3	2	3
CO4	3	2	-	2	1	-	-	-	-	-	-	-	2	3	3
CO5	3	1	-	2	1	-	-	-	-	-	-	-	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	General Microbiolo	eneral Microbiology										
Course Code	BSBT102[T]	SBT102[T]										
			Part A									
Year	1st	Semester	1st	Credits	L	Т	P	С				
					3	0	1	4				
Course Type	Embedded theory	nbedded theory and lab										
Course Category	Disciplinary Major	sciplinary Major										
Pre-Requisite/s	the basic concepts settings	and view of professional and scientific comm	nunication approaches for microbiology	Co-Requisite/s	comprehensive understanding of sterilization processes and media preparation pipelines							
Course Outcomes & Bloom's Level	CO2- To understar CO3- To describe CO4- To provide e	e basic concepts and view of professional an d the gene transfer mechanisms and a detail comprehensive understanding of sterilization xperimental basis, and to enable students to a oraise the current regulatory, quality control, a	led insight into mutations and their analys processes and media preparation pipeline analyse the basic concepts of microbial e	is (BL2-Understand)	al genetics(BL4-Ana nteractions in diverse	alyze) e microbiology and bi	iotechnology settings.	(BL5-Evaluate)				
Coures Elements	Skill Development Entrepreneurship : Employability ✓ Professsonal Ethic Gender X Human Values X Environment X	×	SDG4(Quality education)									

Dort D

Modules	Contents	Pedagogy	Hours
1	History and scope of microbiology, modern development of microbiology, Classification of microorganism: Haeckel's; three kingdom concepts, Whitlaker, five kingdom concepts. Introduction and general characteristic of bacteria, fungi. Algae and virus and their physiological characteristics	Tutorials, Collaborative, Demonstrations, Project methods Experiments	8
2	Concept of Sterilization - Definition of sterilization, methods of sterilization; dry and moist heat, pasteurization, tantalization; radiation, filtration, distribution, staintion. Stains and staining techniques -Mechanism of gram staining, acid fast staining, negative staining, capsule staining, flagella staining.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
3	Culture media: Type of media and their uses, pure culture techniques. Microbial growth: growth curve, measurement of growth and factor affecting the growth, Microbial natifion. Nutritional classification of microorganism. Cultivation of microorganism: carebic and anaerobic culture and preservation of microbial culture. Oxygen toxicity: Study of catalase, perioxidase, supervioxidase, demonstrate, mechanism of oxygen toxicity.	Tutorials, Collaborative, Demonstrations, Project methods, Hands on experience, Experiments,	9
4	Gene transfer mechanisms: transformation, transduction, conjugation and transfection, Mechanism and applications, genetic analysis of microbes- bacteria and yeast. Plasmids: characteristics and their uses.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
5	Genetic analysis of bacteria: Importance and uses of Mutation analysis. Inheritance in bacteria, types of mutations, spontaneous and induced mutagenesis.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preparation of broth and liquid culture media to grow the test bacterial culture.	Experiments	BL2-Understand	2
х	To isolate bacteria flora from the different location of the university campus.	PBL	BL5-Evaluate	7 days
III	Perform the simple staining of the given test organisms to observe their shape.	Experiments	BL2-Understand	2
IV	Perform the negative staining of the given test organisms to observe their shape.	Experiments	BL2-Understand	2
V	Perform the Gram's staining of the given test organism	Experiments	BL2-Understand	2
VI	Perform the Endospore staining of the given test organisms.	Experiments	BL3-Apply	2
VII	Check the effect of UV radiation on the growth of microorganisms.	Experiments	BL3-Apply	2
VIII	Demonstrate the acid and gas production by the organisms.	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	40	12	60							
	Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	40	20	60							

Part E

Books	Nancy Trun and Janine Trempy-Fundamental Bacterial Genetics-1st Edition				
Articles	https://bmcmicrobiol.biomedoentral.com/articles				
References Books U.N. Streips and R.E. Yasbin-Modern Microbial Genetics-2nd Edition					
	https://nptel.ac.in/courses/102105087 https:el.ac.in/courses/102103015//n				
	https://pipela.cin/courses/102105087 https://pipela.cin/courses/102105087				

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	3	1	3	-	-	-	-	-	-	1	2	3
CO2	2	3	3	2	1	3	1	-	-	-	-	-	2	3	3
CO3	3	3	1	1	3	3	-	-	-	-	-	-	3	3	3
CO4	1	3	1	3	1	3	-	-	-	-	-	-	1	3	3
CO5	2	1	3	3	3	2	2	-	-	-	=	-	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Cell Structure and Dynamics	s						
Course Code	BSBT103[T]							
		Par	tA					
Year	1st	Semester	1st	Credits	L	Т	Р	С
1641	101	Selliester	150	Oredita	3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Student must have basic kn	udent must have basic knowledge of cell, its structure and functions Co-Requisite/s						
Course Outcomes & Bloom's Level	CO2- Students will understa CO3- Students will recogniz CO4- Students will apply th	elop the concept of the structures and purposes of basic components and how these cellular components are used to generate and utilize te the cellular components underlying mitotic cell division(BL3-Appl eli knowledge of cell biology to selected examples of changes or los model by using cell biology basics(BL8-Crael).	energy in cells(BL2-Understand) v)	les, membranes, and organelles(BL1-Remember)				
Coures Elements	Skill Development X Entrepreneurship X Employability Y Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
I	Introduction of Cell Structure: Prokaryotic and Eukaryotic cell Bio membrane: Composition and Models, fluid mosaic model and movement of lipids Diffusion potential and Nernst Equation Transport across cell membrane and Types and Function	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
	Intracellular compartments and protein sorting, Compartmentalization Protein sorting and its types, Co translational translocation of protein and its types, Protein sorting into Golgi body and Lysosomes, Protein sorting into nucleus and mitochondria	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
	Cytoskeleton Structure: Types of Filaments and its working mechanism, Microtubules, Intermediate filaments, Actin Filaments, Cell contraction and Locomotion (Sliding Filament Theory)	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
	Cell –Cell interaction: Extra cellular matrix: Composition and Function Cell-cell junction (anchoring. Occluding and Gap junctions). Proteins involved in junctional complex: structure and function	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9
v	Cell- Cell communication and Physiological function of the cell Mechanism of cell signalling and its types, Signalling molecule and receptors: types and functions, Comparison in Apoptosis and Necrosis with Examples	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	9

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Introduction to chromosome preparation: Pre-treatment, Fixation, Staining, Squash and Smear preparation. Preparation of permanent slides	Experiments	BL2-Understand	2
II	Determination of miotic index and frequency of different mitotic stages in pre-fixed root tips of Allium cepa	Experiments	BL4-Analyze	2
III	Study of mitotic chromosome: Metaphase chromosome preparation	Experiments	BL2-Understand	2
IV	The determine osmolarity in RBCs.	Experiments	BL4-Analyze	2
V	The fractionation of rat Liver	Experiments	BL5-Evaluate	2
VI	Estimation of chlorophyll content in spinach leaves.	Experiments	BL4-Analyze	2
VII	Isolation of chlorophyll types by TLC.	Experiments	BL4-Analyze	2
VIII	Differential Centrifugation of various organalles	PBL	BL4-Analyze	8

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	40	12	60							
	Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	40	20	60							

Part E

Books Molecular Biology of the Gene. Seventh Edition (2013). James D. Watson, Tania A. Baker, Stephen Molecular Cell Biology, Eighth Edition (2013). Harvey Lodish, Arnold Berk. W. H. Freeman Co.,			
Articles	https://training.seer.cancer.gov/anatomy/cells_tissues_membranes/cells/structure.html		
References Books	Molecular Biology of the Cell. Sixth Edition (2014). Bruce Alberts, Alexander Johnson, Julian Lewis		
MOOC Courses	https://hptel.ac.in/courses/102103012		
Videos	https://hptel.ac.in/courses/102103012		

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	2	3	-	-	-	-	-	-	-	3	2
CO2	1	2	3	1	2	1	1	-	-	-	-	-	3	2	2
CO3	1	1	1	1	-	1	-	-	-	-	=	=	3	2	1
CO4	3	1	1	3	-	-	1	-	-	-	-	-	2	1	1
CO5	1	1	2	3	1	2	-	-	-	-	-	-	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	=	=	-	-	-



BSc_Biotechnology

Title of the Course	Immunology									
Course Code	BSBT202(T)									
				Part A						
Year	1st	Semester	2nd	Credits	L	Т	P	С		
					3	0	1	4		
Course Type	Embedded the	ory and lab		·						
Course Category	Disciplinary Ma	iplinary Major								
Pre-Requisite/s	This course will and diagnosis	introduce to the applied aspects of im	munology in disease detection	Co-Requisite/s	The students should be well versed with different types of immune responses which show different types of changes.					
Course Outcomes & Bloom's Level	CO2- To unders CO3- To unders CO4- To apply	nber the structure of various Immunolo stand the Different cells & proteins invo- stand the connection of immune syster the use of Proteins & receptors in antitate the applications of Antigens & Antib	olved in Immune system(BL2-Under in failure & disorders.(BL2-Unders body formation(BL3-Apply)	erstand) tand)						
Skill Development Entrepreneurship X Employability Professional Ehinica X Gender X Human Values X Entrepreneurship X Entrepreneurship X SDG (Goals) Gender X Human Values X Entrepreneur X				SDG3(Good health and well-being) SDG4(Quality education)						

		Part B				
Modules	Contents	Pedagogy				
1	Introduction to the immune system, Cells and organs of the immune system, Hematopoietic development and mediators of the process. Sign and symptoms and mechanism involved in inflammatory response.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8			
2	Innate and Adaptive immune responses: Anatomical and Physiological barriers of the innate immunity. Receptors of Innate Immune system. Connection between innate and adaptive immune response and its mechanism. Antigens& immunogens and its properties. Epilopes and CDRS	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8			
3	Structure, classification and functions of Antibody, Antigen-antibody reactions :Precipitation and agglutination reactions, Organization and expression of Immunoglobulin genes, Monoclonal antibodies: production and application	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8			
4	Major histocompatibility complex (MHC), Types of MHC and Display of antigenic peptide, Role of MHC in antigen processing and presentation. Complement system: component, activation pathway, Complement deficiency diseases	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8			
5	Hypersensitivity: Allergens and its types, types of hypersensitivity and There mechanism, Introduction to Autoimmune disorders/Central and peripheral Tolerance). Immunization: active and passive immunization, types of vaccines and their production statetagy.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8			

Part C Indicative-ABCA/PBL/ Experiments/Field work/ Internships Modules Bloom's Level Hours Experiments
Internships
PBL
Experiments
Experiments
Experiments
Experiments
PBL Anatomical view of mammalian thymus and various immune organs

Study about Covaxin vaccine administration in local area and effect visualized BL3-Apply 15 DAYS BL3-Apply To perform Double immuno diffusion BL3-Apply Haemoglobin detection by given Blood Sample

Detection of Hb% of human population in locality and relate to their nutrition diet. BL3-Apply BL4-Analyze 5

	Part D(Marks Distribution)									
	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	60	18	40						
			Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	60	30	40						

	Part E							
Books	Immunology by Kindt, Goldsby, Osborne, 4th Edition							
Articles	https://njms.rutgers.edu/sgs/olc/mci/prot/2009/Hypersensitivities09.pdf							
References Books	Essentials Immunology, Ivam M Roitt, 12th Edition							
MOOC Courses	https://hptel.ac.in/courses/104108055							
Videos	https://nptel.ac.in/courses/104108055							

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	2	2	-	1	-	-	-	-	-	1	2	2
CO2	1	2	2	3	1	3	1	-	-	-	-	-	1	2	2
CO3	1	2	1	2	1	2	2	-	-	-	-	-	1	2	2
CO4	1	2	1	2	1	2	2	-	-	-	-	-	3	3	3
CO5	1	2	2	1	2	-	2	-	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_Biotechnology

Title of the Course	Genetics	anetics							
Course Code	BSBT303(T)	BT303(T)							
Part A									
Year	2nd	Semester	3rd	Credits	L	Т	P	С	
1					3	0	1	4	
Course Type	Embedded theory ar	idded theory and lab							
Course Category	Generic Elective	neric Elective							
Pre-Requisite/s	Knowladge about Fu techniques.	indamentals and principles about genetics als	o provide knowladge about Genetic	Co-Requisite/s	Relate all Biotech and microbiology engeneering techniques like RDT PTC ATC etc.				
Course Outcomes & Bloom's Level	CO2- To understand CO3- To understand CO4- To provide exp CO5- To evaluate the	201- To describe basic principles and concepts of genetics (BL1-Remember) 202- To describe basic principles and concepts of genetics (BL1-Remember) 202- To understand the Mendalian and non Mendalian inheritance (BL2-Understand) 202- To understand the Mendalian and non Mendalian inheritance (BL2-Understand) 202- To provide experimental basis, and to enable students to acquire a specialized knowledge and understanding in advanced the field of genetics (BL4-Analyze) 202- To evaluate the applications of genetics in various fields such as research (BL5-Evaluate) 202- To apply the understanding of heredity and variation and genetic disorders and mulations and others in various fields or industries (BL5-Create)							
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics Gender X Human Values X Environment X		SDG (Goals)	SDG1(No poverty) SDG4(Quality education) SDG11(Sustainable cities and economies) SDG14(Lie below water) SDG16(Lie below water)					
	I		Part B	1					
			raitb						

Modules	Contents	Pedagogy	Hours
1	Chromosomes: Transmitters of heredity structure, types and special type of chromosomes Mendalism: Law of Inheritance Concept of gene x-like, Multiple alleles ABO System and fix factor importance of Blood Groups in Blood transfusion Extensions of Mendalism: Co-chominance, incomplete dominance gene interaction: Epistasis	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
2	Sex determination and sex linkage: Sex chromosomes mechanism of sex determination Sex linked inheritance (Color blindness and Hemophila) Linkage and crossing over gene expression Chromosome mapping: Gene mapping methods	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
3	Gamete formation: Spermatogenesis and Oogenesis Mitosis & Meiosis: Stages and significance differences. Nucleic Acids, DNA Replication Introduction to Genetic Engineering in brief Fine structure of gene genetic Code Split gene overlapping and pseudo gene.	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
	Extra chromosomal inheritance in Mitochondrial and Chloroplast effect Maternal inheritance Nucleo-cytoplasmic interaction Genetic disorders: Human Syndromes	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8
	Mutation: Types causes and detection Types of mutants – lethal, conditional, biochemical, loss of function gain of function, germial verses somatic mutants Gene mutation: Causes, insertion mutagenesis Chromosomal aberrations: variation in chromosome number Change in chromosome number	Tutorials, Collaborative, Demonstrations, Project methods Experiments,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Identification of chromosomes and spotting as per theory syllabus	Experiments	BL2-Understand	4
2	Study of Linkage and sex linked inheritance	Experiments	BL3-Apply	4
3	Study of Mitosis and meiosis	Experiments	BL3-Apply	4
4	Study of Nucleic acids	Experiments	BL2-Understand	4
5	study of syndroms and other mutation	Field work	BL4-Analyze	8

Part D(Marks Distribution)

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	40	60	18	40					
	Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	50	60	30	40					

Part E

Books	Principles of genetics By P K Gupta
Articles	https://www.nature.com/scitable/topicpage/gregor-mendel-and-the-principles-of-inheritance-593/
References Books	Genetics BY B D singh Genetics By: A G Gardner
MOOC Courses	https://hptel.ac.in/courses/102104052
	https://www.google.com/search? sca_esp=e2/de9/ds123b4c-68ca_upv=18rlz=1C1NMEO_enlN999IN9998q=Principles+of+Genetics&tbm=vid&source=inms&prmd=ivsnbmtz&sa=X&ved=2ahUKEwIHpqq9ioqGAxVG4zgGHcRzAgkQ0pQJegQIDBAB&biw=1366&bih=625&dpr=1#fpstate=ivve&vid=cid:d538888b,vid=Pbdd_GarkxG123b4c-8sca_upv=18rlz=1C1NMEO_enlN999IN9998q=Principles+of+Genetics&tbm=vid&source=inms&prmd=ivsnbmtz&sa=X&ved=2ahUKEwIHpqq9ioqGAxVG4zgGHcRzAgkQ0pQJegQIDBAB&biw=1366&bih=625&dpr=1#fpstate=ivve&vid=cid:d538888b,vid=Pbdd_GarkxG123b4c-8sca_upv=18rlz=1C1NMEO_enlN999IN9998q=Principles+of+Genetics&tbm=vid&source=inms&prmd=ivsnbmtz&sa=X&ved=2ahUKEwIHpqq9ioqGAxVG4zgGHcRzAgkQ0pQJegQIDBAB&biw=1366&bih=625&dpr=1#fpstate=ivve&vid=cid:d53888bb,vid=Pbdd_GarkxG123b4c-8sca_upv=18rlz=1C1NMEO_enlN999IN9998q=Principles+of+Genetics&tbm=vid&source=inms&prmd=ivsnbmtz&sa=X&ved=2ahUKEwIHpqq9ioqGAxVG4zgGHcRzAgkQ0pQJegQIDBAB&biw=1366&bih=625&dpr=1#fpstate=ivve&vid=cid:d53888bb,vid=Pbdd_GarkxG123b4c-8sca_upv=18rlz=1C1NMEO_enlN999IN9998q=Principles+of+Genetics&tbm=vid&source=inms&prmd=ivsnbmtz&sa=X&ved=2ahUKEwIHpqq9ioqGAxVG4zgGHcRzAgkQ0pQJegQIDBAB&biw=1366&bih=625&dpr=1#fpstate=ivve&vid=cid:d53888bb,vid=Pbdd_GarkxG123b4c-8sca_upv=18rlz=1C1NMEO_enlN999IN998q=Principles+of+Genetics&tbm=vid&source=inms&prmd=ivsnbmtz&sa=X&ved=2ahUKEwIHpqqiioqGAxVG4zgGHcRzAgkQ0pQJegQIDBAB&biw=1366&bih=625&dpr=1#fpstate=ivve&vid=cid:d5388bb,vid=Pbdd_GarkxG123b4c-8sca_upv=18rlz=18rl

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	2	-	-	-	-	-	-	-	-	1	2	3
CO2	2	3	1	2	-	-	-	-	-	-	-	-	2	2	3
CO3	2	2	2	1	-	-	-	-	-	-	-	-	2	1	3
CO4	1	2	2	1	-	-	-	-	-	-	-	-	1	1	2
CO5	1	2	1	1	-	-	-	-	-	-	-	-	1	1	2
CO6	-	1	-	2	-	-	-	-	-	-	-	-	-	1	1



BSc_PCM

Title of the Course	Fundamental of Chemistry	of Chemistry-I								
Course Code	BSCH0101[T]									
			Part A							
Year	1st	Semester	1st	Credits	L	Т	Р	С		
1001	100	Connector.	100	ordans	3	0	1	4		
Course Type	Embedded theory and lab	ad theory and lab								
Course Category	Discipline Core	pline Core								
Pre-Requisite/s	Knowledge of periodic tal	ole and atomic structure		Co-Requisite/s						
Course Outcomes & Bloom's Level	CO1- To remember basic knowledge of Atomic Structure, Chemical bonding(BL1-Remember) CO2- To understand Properties of Inorganic Compounds(BL2-Understand) CO3- To Apply the compounds in the application(BL3-Apply) CO4- To Analyse the Structure and Properties of Inorganic Compounds(BL4-Analyze) CO5- To Evaluate the results analyzed(BL5-Evaluate) Sobject of Cost of C									
Coures Elements	Skill Development V Entrepreneurship X Employability V Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG4(Quality education)						

_ ._

Modules	Contents	Pedagogy	Hours
Module 1	Dual Nature of matter das of de Broglic matter waves. Heisenberg uncertainty principle, atomic orbitals, Schrodinger wave equation, significance of Y and Y, quantum numbers, radial and nagular wave functions and probability distribution curves, shapes of s, p and d orbitals. Aufbau and Pauli exclusion principles, Hund's multiplicity rule, Electronic configuration of the elements, effective nuclear charge. B. Periodic Properties Afornic and lonic radii, ionization energy, electron affility and electro negativity-definition, methods of determination or evaluation, Trends in periodic table and applications in predicting and explaining this chemical behavior.	Stoy telling activity Experienced examples, Quizzes Summarizing, PPT's Leaving Questions	8
Module 2	UNIT – II: Chemical Bonding – part I (A) Covalent Bond-valence bond theory and its limitations. Directional characteristics of covalent bond, various types of hydridization and shapes of simple inorganic molecules and lone. Valence shell electron par repulsion (VSEPR) theory to NH3,1450 SF4. CIF3 and H20 M0 theory, homo nuclear and hetero nuclear (CO and NO)4 diatomic molecules, multicenter bonding in electron deficient molecules, bond strength and bond energy.		8
Module 3	UNIT — III: Chemical Bonding — part II (A) Ionic Solids-Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, latitoe defects, semiconductors, latitice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ionis. Fajan's rule. Metallic bond-free electron, balance bond and band theories. (B) West Interaction—Friogen bonding, van der waals forces : Chemistry of nobles gases	Demonstrations, Videos, PPT's Quizes, Group discussions	8
Module 4	S-Block Elements Comparative study Li and Mg. diagonal relationship, salient features of hydrides, solvation and complexation tendencies including their function in bio systems an introduction to alkyls and anyls, p-Block Elements part – I Comparative study Be and Al (including diagonal relationship) of groups 13-17 elements. Compounds like hydrides. Oxides, oxyacids and halides of groups 13-16	Interactive videos PPT's Experienced examples, Quizzes', Seminar	8
Module 5	p-Block Elements Part – II Hydrides of boron-diborane and higher boranes, borazine, boroydrides, Fullerenes, fluorocarbons, silicates (structural principle), tetra-sulphur tetra-nitride, basic properties of halogens, interhalogens and Polyhalides.	Interactive videos , PPT's Experienced examples, Quizzes',	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 4	Anionic Radical Testing	Experiments	BL3-Apply	8
Module 4	Cationic Radical Testting	Experiments	BL3-Apply	8
Module 4	To study the structure of lonic solids	PBL	BL3-Apply	6
Experiment	To Identify the Acid Radical(Acetate)	Experiments	BL3-Apply	2
Experiment	To Identify the Acid Radical (Sul hide)	Experiments	BL3-Apply	2
Experiment	To Identify the Acid Radical(Carbonate)	Experiments	BL3-Apply	2
Experiment	To Identify the Acid Radical (Oxalate)	Experiments	BL3-Apply	2
Experiment	To Identify the Ammonium Basic Radical	Experiments	BL3-Apply	2

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	External Evaluation Min. External Evaluation		Min. Internal Evaluation						
100	40	40	12	60							
	Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	40	20	60							

Part E

Books	M.N.N Tandon Unified Chemistry 2010 O.P. Tandon Chemistry Third Edition
Articles	
References Books	J.D.Lee Concise Inorganic Chemistry Fifth Edition J.E. Huheey Inorganic Chemistry Fourth Edition Cotton Wilkinson Advanced Inorganic Chemistry Third Edition Cotton Wilkinson Advanced Inorganic Chemistry Third Edition
MOOC Courses	https://hptel.ac.in/courses/104103069
Videos	https://nptel.ac.in/courses/104103089

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	-	-	3	2	2
CO2	3	3	1	-	-	-	-	-	-	-	-	-	3	2	1
CO3	3	3	1	-	-	-	-	-	-	-	-	-	2	2	1
CO4	3	3	1	-	-	-	-	-	-	-	-	-	1	2	2
CO5	3	2	1	-	-	-	-	-	-	-	-	-	1	1	2
CO6	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-



BSc_PCM

Title of the Course	Analytical Chemistry							
Course Code	BSCH0201[T]							
			Part A					
Year	1st	Semester	2nd	Credits	L	Т	Р	С
Teal	150	Jeniestei	Zild	Oredita	3	0	1	4
Course Type	Embedded theory and lab						•	•
Course Category	Discipline Core							
Pre-Requisite/s Knowledge of Fundamentals of Analytical Chemistry Co-Requisite/s Co-Requisite/s								
Course Outcomes & Bloom's Level	CO3- To use/apply the ba CO4- To Analyse Qualitati	concept and principle of analytical techniques(BL1-Remember difference between the analytical techniques(BL2-Understand) sist statistical treatment of the analytical data for getting a corrective and Quantitative aspects(BL4-Railyze) a obtained from the analysis(BL4-Railyze)) It result and analytical methods(BL3-Apply)					
Coures Elements	Skill Development / Entropreneurship × Employability ✓ Employability ✓ Professional Efficis × Gender × Human Values × Emvironment ×							
·		·	Part B	·				

Modules	Contents	Pedagogy	Hours
Module 1	General purification techniques Purification of solid organic compounds, recrystallization, use of miscible solvents, use of drying agents and their properties, sublimation. Purification of liquids. Different types of extraction: use of immiscible solvents solvent extraction, efficiency of extraction, selectivity of extraction, liquid phase and solid phase extraction systems, methods of extraction, applications. Chemical methods of purification and test of purity	Problem solving sessions, Experienced examples, Quizzes Summartzing, Leaving Questions Hand on Experience .Tutorials	8
Module 2	Titrimetric Methods of Analysis General Introduction General principle. Types of titrations. Requirements for titrimetric Analysis. Concentration systems: Molarity, formality, normality, wt % ppm, milliequivalents and millimoles-problems Primary and secondary Standards, criteria for primary standards, preparation of standard solutions, standardization of solutions. Limitation of volumetric analysis, end point, equivalence point	Learn by doing, Simulations/ Virtual labs, Videos	8
Module 3	Chromatography, Introduction, Principle of chromatography, Classifications of chromatography, Techniques of paper and column chromatography, Thin Layer Chromatography(TLC) Partition chromatography, Ion exchange chromatography	Tutorials, Virtual labs, Demonstrations, Experiments	8
Module 4	Thermal Analysis Thermal analytical methods, principle involved in thermogravimetric analysis differential gravimetric analysis and differential scanning calorimeter, discussion of various components with block diagram, characteristics of TG and DTA, Tactors affecting TG, DTA and DSC Curve.	Problem solving sessions, Expelenced examples,	8
Module 5	Evaluation and procession of analytical data, Precision and accuracy, Types of errors, Normal distribution curve, Standard deviation, Confidence limit, Graphical presentation of result-method of average, Method of linear list square, Significant figures, Statistical aid to hypothesis testing: 1-leaf 8-feat, Correlation coefficient, Rejection of data	. Problem solving sessions, Experienced examples,	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Complexometric titration	Experiments	BL3-Apply	4
VIII	Qualitative Analysis using Thin Layer Chromatography	PBL	BL4-Analyze	6
IX	Purification of sample by Crystallization technique	PBL	BL6-Create	7
IV	To determine the Percentage of Copper in copper alloy solution	Experiments	BL3-Apply	2
V	To determine the percentage of Chromium in chrome alloy	Experiments	BL3-Apply	2
VI	To purify the given sample Ammonium Chloride	Experiments	BL3-Apply	
VII	Qualitative Analysis using Paper, Chromatography	PBL	BL4-Analyze	6

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	40	12	60							
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	40	20	60							

Part E

Books	Y Anjaneyului Textbook of Analytical Chemistry 2008			
Articles	https://nptel.ac.in/courses/104105084			
References Books Skoog D.A. and West D.M. Saunders Fundamental of Analytical Chemistry Ninth Edition				
MOOC Courses	https://nptel.ac.in/courses/104105084			
Videos	https://mptel.ac.in/courses/104105084			

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	-	-	3	3	2
CO2	3	3	1	-	-	-	-	-	-	-	-	-	3	2	1
CO3	3	1	-	2	-	-	-	-	-	-	-	=	1	1	2
CO4	2	3	-	-	-	-	-	-	-	-	-	=	1	1	2
CO5	2	2	-	-	-	-	-	-	-	-	-	-	2	2	1
CO6	-		-	-	-	-	-	-	-	-	-	-	-	-	-



			;	Syllabus-202	23-2024					
				BSc_PC	М					
	Title of the Course	Inorganic Chemistry								
	Course Code	BSCH0301[T]								
				Part A						
	Year	2nd	Semester		3rd	Credits	L 3	T 0	P 1	C 4
	Course Type	Embedded theory and lab	II.		T.					
	Course Category	Discipline Core								
	Pre-Requisite/s	knowledge of Coordination bond	ding in complexes Transition elements and their	properties		Co-Requisite/s				
	Course Outcomes & Bloom's Level	CO2- To understand Properties CO3- To Apply the Transition ele	and uses of Transition elements, Coordination of ements, Complexes, Lanthanides, Actinides in the Bonding, Magnetic Properties of Transition elem-	compounds, Acids a	Complexes, Lanthanides, Actinides(BL1-Remember) and Bases , Non aqueous solvents Lanthanides, Actinides(BL2- lon(BL3-Apply) 3L4-Analyze)					
	Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professonal Ethics X Gender X Human Values X Environment X			SDG (Goals)	SDG4(Quality education)				
				Part B						
Modules		Contents			Pedag	gogy			Но	urs
Module 1	Chemistry of Elements of First Transition Series: Characteristic properties of d-block elements Properties of the elements of the first transition series, their binary compounds such as Carbides, Oxides and Sulphides Complexes illustrating relative stability of their oxidation states, co-ordination number and geometry.			of Stoy telling activity Mnemonics Experienced examples, Quizzes Summarizing, PPT's Leaving Questions						
Module 2	UNIT – II: Chemistry of Elements of second and Third Transition Series: General characteristics, Periodic Properties Atomic Radii Ionicalion Energy comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states, magnetic behavior, spectral properties and stereochemistry			Mnemonics , Experienced examples , , Videos , PPT's Quizes					8	
Module 3	UNIT – III: A. Co-ordination Compounds We number concept, chelates, nomenclature of theory of transition metal complexes theory data: analysis of redox cycle, redox stability extraction of element	co-ordination compounds, isomeri- of transition metal complexes B. O	sm in co-ordination compounds, valance bond xidation and Reduction Use of redox potential	Demonstrations,	Videos, PPT's Quizes, Virtual labs Group discussions				8	

Part C

Interactive videos , PPT's Experienced examples, Quizzes', Seminar

UNIT – V.A. Acids and Bases Arrhenius, Bronsted-Lowry, the Lux-Flood, solvent system and lewis concepts of acids and bases B. Non-aqueous Solvents Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH3 and legical SO2

Module 5

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 3	Synthesis of Complex and Double salt	PBL	BL3-Apply	6
Module 5	Non Aqueous Titration	PBL		8
Experiment	Identify the Acid Radical in given inorganic mixture	Experiments	BL3-Apply	2
Experiment	Identify the Acid Radical (Sulphate)in the given inorganic sample	Experiments	BL3-Apply	2
Experiment	Identify the Acid Radical (Sulphite)in a given inorganic sample	Experiments	BL3-Apply	2
Experiment	Identify the Acid Radical (Nitrite)in the given inorganic sample	Experiments	BL3-Apply	2
Experiment	Identify the Basic Radical (Zero group) in the given sample	Experiments	BL3-Apply	2
Experiment	Identify the Basic Radical (First Group) in the given sample	Experiments	BL3-Apply	2

Part D(Marks Distribution)

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation Min. External Evaluation Internal Evaluation			Min. Internal Evaluation					
100	40	40	12	60						
	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	40	20	60						

Part E

M.N.N Tandon Unified Chemistry 2010
J.D.Lee Concise Inorganic Chemistry Fifth Edition
https://nptel.ac.in/courses/104101121
https://nptel.ac.in/courses/104101121

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	-	-	2	2	1
CO2	3	3	1	-	-	-	-	-	-	-	-	-	3	2	2
CO3	3	3	1	-	-	-	-	-	-	-	-	-	2	2	1
CO4	2	3	1	-	-	-	-	-	-	-	-	-	1	2	2
CO5	3	2	-	-	-	-	-	-	-	-	-	-	1	1	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_PCM

Title of the Course	Organic Chemistr	ganic Chemistry										
Course Code	BSCH0401[T]											
				Part A								
Year	2nd	Semester	4th	Credits	L	Т	P	С				
Teal	Zilu	Semester	401	Ciedita	3	0	1	4				
Course Type	Embedded theor	Embedded theory and lab										
Course Category	Disciplinary Majo	Disciplinary Major										
Pre-Requisite/s	The students should have basic knowledge of organic chemistry Co-Requisite/s The student must have studied organic chemistry in B.Sc. Certificate course							e				
Course Outcomes & Bloom's Level												
Coures Elements	Skill Developmer Entrepreneurship Employability ✓ Professsonal Eth Gender X Human Values X Environment X	o X nics X	SDG (Goals)	SDG4(Quality education) SDG9(industry Innovation and Infrastructure)								

Part R

Modules	Contents	Pedagogy	Hours
Unit 1	Substitution Reactions: Aliphatic Nucleophilic Substitution : Introduction, the SN1, SN2 and SNi mechanisms, neighbouring group participation, effect of substrate, nucleophile, leaving group and reaction medium. Aliphatic Electrophilic Substitution : Elementary treatment	Lecture methods, short vedios, ABCA	8 hrs
Unit 2	Addition and Elimination Reactions Addition Renctions: Introduction, reactions involving addition of nucleophile, electrophile and free radiates, regio-selectivity and cheme-selectivity, centration and reactivity, Markonivition and Anti-Markonivition's addition. Elimination Reactions: Introduction, E.1.E2 and ElcB mechanisms, effect of substrate, attacking species, leaving group and reaction medium, crientation Saytzeff and Hofmann rule	Audio∿ideo clips, group discussion, lecture with methods	8 hrs
Unit 3	Reagents and Catalysts (Mechanisms and Applications) Reagents and Catalysts : Preparation, properties and applications of important reagents and catalysts in organic synthesis with mechanistic details : Grignard reagent, N	Summarizing, PBL (small working models), Quiz, Virtual Lab, Tutorials sessions, Expert Lecture, lecture methods	8 hrs
Unit 4	Oxidation Reactions: Introduction, metal based and non-metal based oxidations, oxidation of alcohols to carbonyls (chromium, manganese, and silver based reagents), alkenes to be positives (peroxides Peracides based, alkenes to dois (manganese and osmium based), alkenes to carbonyls with bond cleavage (manganese and lead based), Oppenauer oxidation	Lecture methods, short vedios, ABCA	8 hrs
Unit 5	Photochemical Reactions: Introduction to photochemistry, electronic excitations, Jablonski diagram, Norrish type I and II reactions and cis-trans isomerization	Summarizing, PBL (small working models), Virtual Lab, Tutorials sessions, Expert Lecture	8 Hrs

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Qualitative analysis: Separtion of binary organic micture, Systematic identificationof separated organic compounds.	Experiments	BL4-Analyze	8 hrs
2	Oxidation of benzaldehyde to benzoic acid by KMnO4	Experiments	BL5-Evaluate	2hrs
3	Oxidation of cyclohexanone to adipic acid by HNO3	Experiments	BL5-Evaluate	2hrs
4	(4+2) Cycloaddition reaction of antracene and maleic anhydride	Experiments	BL4-Analyze	4hrs
5	Preparation and purification of product and determination of melting point of Acetanilide to p-nitro acietanilide to para nitroaniline	Experiments	BL6-Create	4 hrs
6	Preparation and purification of product and determination of melting point o azo dyesf	PBL	BL6-Create	8hrs
7	Application of Substitution reactions	Seminar	BL2-Understand	1hr
8	To see the use of reagents in organic synthesis	Industrial Visit	BL2-Understand	5hrs
9	To study the conversion of alkenes to diols (manganese and osimium based	Research Paper Presentation	BL3-Apply	5hrs

Part D(Marks Distribution)

	Theory									
Total Marks	Minimum Passing Marks	Passing Marks External Evaluation Min. External Evaluation Internal Evaluation		Min. Internal Evaluation						
100	40	60	18	40						
	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	60	30	40						

Part E

Books	Unified Chemistry by MMN tondon
Articles	
References Books	Claydon. J., Greeves, N. and Warren S. Organic Chemistry, Oxford University Press, India, 1012, Second Edition Jerry March Advanced Organic Chemistry "John Wiley and Sons (Asia) Homback, 1. M. "Organic Chemistry" Thomson Learning, Singapore, 2006, Second Edition. Ahluwalia, V. K. and Parashar R. K. "Organic Reaction Mechanisms", Narosa Publication, India, 2010, Fourth Edition. Goswamit, C. "Shatkottar Prakash Rasayan even Thos Avsaths Rasayan", Hindi Granthi Academy, Bhopal, Madhya Pradesh, 2019.
MOOC Courses	https://nptel.ac.in/courses/104/101/10401115/ https://nptel.ac.in/courses/104/103/10403111/ https://nptel.ac.in/courses/104/103/10403111/ https://nptel.ac.in/courses/104/103/10403077/
Videos	http://www.mphindigranthacademy.org/

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	3	2	3	3	3
CO2	3	2	2	2	-	-	-	-	-	-	2	2	2	2	2
CO3	3	2	2	1	-	-	-	-	-	-	1	2	2	2	1
CO4	3	3	1	1	-	-	-	-	-	-	1	2	1	1	1
CO5	3	2	1	1	-	-	-	-	-	-	1	1	1	1	1
COS															



			\$	Syllabus	-2023-2024					
				BSc	:_PCM					
	Title of the Course	Physical Chemistry								
	Course Code	BSCH0501[T]								
				Pi	art A					
	Year	3rd	Semester		5th	Credits	L 3	T 0	P 1	C 4
	Course Type	Embedded theory and lab								1
	Course Category	Discipline Core								
	Pre-Requisite/s	Knowledge of Quantum Me	chanics Plank Theory of Radiation			Co-Requisite/s				
	Course Outcomes & Bloom's Level	CO2- To understand Mecha CO3- To Apply the concept	dge of Quantum Mechanics, Spectroscopy, Photoch nism of Quantum Mechanics, Spectroscopy, Photoci in the different application(BL3-Apply) all Pope ties of compounds(BL4-Analyze) is analyzed(BL5-Evaluate)	emistry(BL1-F hemistry(BL2	Remember) -Understand)					
Skill Development ✓ Entrepreneurship × Entrepreneurship × Employability ✓ Coures Elements Professonal Ethica × Gendra × Human Values × Environment ×				SDG (Goals)	SDG4(Quality education)					
				P	art B					
Modules		Contents				Pedagogy				Hours
Module 1		n) and its defects. Compton E	law, photoelectric effect, heat capacity of solids, :ffect. De-Broglie hypothesis, the Heisenberg's rordinger wave equation and its importance, nics, Particle in a one- dimensional	Story telling	g Experienced examples, Quizzes Summarizing, PPT's Leav	ring Questions Interactive videos			8	i
Module 2	statement of the Born-Oppenheimer approxi levels of a rigid rotor (semi-classical principle (Maxwell-Boltzmann distribution) determinat Vibrational Spectrum: Infra-red spectrum: Er	mation, Degrees of freedom F as), selection rules, spectral in ion of bond length, qualitative lergy levels of simple harmoni constant and qualitative relation	ic oscillator, selection rules, pure Vibrational n of force constant and bond energies, effect of an	Demonstrat	tions, Tutorials Experienced examples, , Videos , PPT's Quiz	zzes', Group discussions		8 8 8		
Module 3	Selection rules. Electronic Spectrum: Conce qualitative description of selection rules and	pt of potential energy curves f Franck- Condon principle. Qu	ational Raman spectra of diatomic molecules, or bonding and anti bonding molecular orbitals, salitative description of $\sigma_{a\pi}$ and n M. O. their energy n, elementary idea of instrument used. Application	Demonstral	tions, Videos, PPT's Quizzes', Virtual labs				8	

Part C

nteractive videos PPT's Experienced examples, Quizzes' Seminar

nteractive videos , PPT's Experienced examples, Quizzes', Seminar

Module 4

Module 5

V. Physical Properties and Molecular Structure Optical activity, Polarisation (Clausius – Mossotti equation), Oriented of dipoles in an electric field, dipole moment, induced dipole moment measurement of dipole moment, temperature method and refractive method, dipole moment and structure of molecules, magnetic properties – paramagnetism, diamagnetism and ferromagnetism.

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 2	Determination of Concentration of the solution using colorimetry	Experiments	BL3-Apply	6
Module 3	Determination of wavelength maxima using UV-Visible spectroscopy	PBL	BL3-Apply	6
Module 2	Determination of functional groups using IR Spectroscopy	PBL	BL3-Apply	6
Experiment	Deterime the strength of NaOH using N/10 HCl BY PH Metric titration	Experiments	BL3-Apply	2
Experiment	Determine the strength of NaOH using N/10 Acetic Acid	Experiments	BL3-Apply	2
Experiment	Determine the strength of Base using Acid BY Conductometric titration	Experiments	BL3-Apply	2
Experiment	Determine the strength of Strong Base with weak acid by Conductometric titration	Experiments	BL3-Apply	2
Experiment	Verify Lambert - Beer Law by Colorimetric method	Experiments	BL3-Apply	2

Part D(Marks Distribution)

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	l Evaluation Min. External Evaluation Internal Evaluation		Min. Internal Evaluation					
100	40	40	12	60						
			Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	40	20	60						

Part E

Books	M.N.N Tandon Unified Chemistry 2010
Articles	
References Books	Puri Sharma Pathania Physical Chemistry Fourth Edition
MOOC Courses	https://hptel.ac.in/courses/104101126
Videos	https://nptel.ac.in/courses/104101126

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	-	-	3	2	2
CO2	3	3	1	-	-	-	-	-	-	-	-	-	2	1	1
CO3	3	3	1	-	-	-	-	-	-	-	-	-	2	2	1
CO4	3	3	1	-	-	-	-	-	-	-	-	-	1	2	2
CO5	3	2	-	-	-	-	-	-	-	-	-	-	1	1	2
CO6	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-



			BSc_Comp	uterSci	ence						
Title of the Cours	е	Programming in C									
Course Code		BSCS0101[T]									
			Pa	rt A							
Year		1st	Semester	1st		Credits	L	Т	P	С	
							3	0	1	4	
Course Type		Embedded theory and lab									
Course Category	Course Category Disciplinary Major										
Pre-Requisite/s		Basic knowledge of compute	er fundamental, algorithm and flowchart		Co-Requisite/s						
Course Outcome & Bloom's Level	s	CO2- To Understand debug CO3- To apply the various to CO4- To analysis modular p	sics of Computer Knowledge, (BL1-Remember) ging and testing, implementation and maintenance, (BL2-Understa schniques for C Programming, (BL3-Apply) rogramming(BL4-Analyze) will learn to withe algorithm for solutions to various real-life problem		ivaluate)						
Coures Elements	3	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professonal Ethics X Gender X Human Values X Environment X		SDG (Goals) SDG4(Quality education)							
			Pa	rt B							
Modules			Contents			Pedagogy			Hours		
1	Structured programmi Problem solving using	ng concepts: modular prograi	il languages, problem oriented languages, non-procedural languag mming: top-down analysis, bottom-up analysis, structured program in and analysis, problem design, coding, compilation, debugging ar nance.	ming.	White Board, Group Discussion						

Modules	Contents	Pedagogy	Hours
1	Classification of programming language: procedural languages, problem oriented languages, non-procedural languages. Structured programming concepts: modular programming: top-down analysis, bottom-up-analysis, structured programming. Problem solving using computers: problem definition and analysis, problem design, coding, compilation, debugging and testing, documentation, implementation and maintenance.	White Board, Group Discussion	8
2	Introduction to C language: constants, variables, keywords, data types, operators, expressions, operator precedence and associativity. Structure of C program: variable declaration of variable as constant.	White Board, Group Discussion	8
3	Managing input/output operators: formatted and unformatted. Control statements: branching, jumping & looping, scope rules, and storage classes.	White Board, Group Discussion	8
4	Arrays (one and two dimensional), Functions: user defined function, standard function, categories in functions, passing arguments to a function, recursion. Pointers: operators, declaration, pointer to arithmetic, array of pointers. Structures: declaring, accessing, initializing, array of structures:	White Board, Group Discussion	8
5	File handling in C: opening and closing a data file, inserting data to data file. Graphics programming-introduction, functions, stylish lines, drawing and filling images, palettes and colours, justifying text, bit of animation.	White Board, Group Discussion	8

Part C Modules Title Bloom's Level Hours Write a program to print digits of entered number in reverse order. Experiments BL2-Understand Experiments

Experiments Write a program to print sum of two matrices. BL2-Understand Write a program to print subtraction of two matrices. Write a program to print multiplication of two matrices Experiments BL2-Understand Experiments BL2-Understand Write a program to demonstrate concept of structure.

Part D(Marks Distribution) Theory Minimum Passing Marks Total Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation 40 60 18 40 22 Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation 50 60 30 40 20

Part E										
Books	Let us C by Yashwant Kanetkar ANSI C by Balagurusamy									
Articles										
References Books	Introduction to Algorithms by Cormen, PHI Programming in C: Denis Richie									
MOOC Courses										
Videos										

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	=	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	=	-	-
CO3	-	=	-	-	3	-	-	-	-	-	=	-	=	-	-
CO4	-	4	-	-	-	-	-	-	-	-	-	-	=	-	-
CO5	-	-	-	5	-	-	-	-	-	-	-	-	=	-	-
CO6	-	-	-	-	-	-	-	i.	-	-	-	-	i		-



BSc_ComputerScience

Title of the Course	basics of Computer and mic	ormation technology											
Course Code	BSCS0102[T]												
		Pa	rt A										
Year	1st	Semester	1st	Credits	L	Т	Р	С					
					3	0	1	4					
Course Type	Embedded theory and lab	d theory and lab											
Course Category	Disciplinary Major												
Pre-Requisite/s	Preliminary knowledge of co	nary knowledge of computer, their operations and applications. Co-Requisite/s											
Course Outcomes & Bloom's Level	CO2- To understand the get CO3- To describe comprehe CO4- To provide experimen	oncepts and view of professional and scientific communication appine transfer mechanisms and a detailed insight into mutations and the service understanding of sterilization processes and media preparat lat basis, and to enable students to analyse the basis, concepts of current regulatory, quality control, and legal frameworksthat impac	neir analysis (BL2-Understand) ion pipelines (BL3-Apply) nicrobial evolution, phylogeny, nutritional aspects, and elemen	. Ints of microbial genetics(BL4-Analyze) I productive interactions in diverse microbiology and biotechnole	ogy sett	ings.(BL :	5-Evalua	ite)					
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X	Entreprendurship X Employability \(\frac{1}{2} \) Professoonal Entries \(\frac{1}{2} \) SDG (Goals) SDG4(Quality education) Gender \(X \) Human Values \(X \)											
	•	Pa	rt B										

	Pai	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	MS Word Text Editing and formatting using Word 2007 & onwards versions and Formatting documents	Experiments	BL2-Understand	2
2	MS Power point Creating presentation using slide master and template in various themes & variants.	Experiments	BL2-Understand	2
3	MS Excel Working with slides: New slide, move, copy, delete, duplicate, slide layouts, presentation views.	Experiments	BL2-Understand	2

 Part D(Marks Distribution)

 Theory

 Total Marks
 Minimum Passing Marks
 External Evaluation
 Min. External Evaluation
 Internal Evaluation
 Min. Internal Evaluation

 10
 4
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0
 0

Part E										
Books	PC Software for Windows by R. K. Taxali Fundamental of Computers by P. K. Sinha									
Articles										
References Books	Internet Security by Kenneth Einart-limma, 207 Computer Today by Suresh K. Basandra									
MOOC Courses										
Videos	https://www.youtube.com/watch?v=q3rpiCwtvU0									

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	2	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	3	-	-	-	-	-	-	-
CO4	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-
CO5	5	-	-	-	5	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



							BSc	_ComputerS	cience									
	Title of the C	ourse	Operat	ing System														
	Course C	ode	BSCSC	0201[T]														
			,					Part A										
	Year		1st			Semester		2nd					Credits		L 3	T 0	P 0	C 3
	Course T	ype	Theory	/ only													-	
	Course Cat	egory		linary Major														
	Pre-Requis	site/s	Must h	ave knowledge the	computer archi	itecture.			Co-Requisite/s									
	Course Oute & Bloom's		CO1- To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1-Remember) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Inderstand) CO3- To describe comprehensive understanding of sterilization processes and media preparation pipelines (BL3-Apply) CO4- To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolutional aspects, and elements of microbial evolutions of microbial evolutions and the control of microbial evolutions of microbial evolutions and the control of microbial evolutions of microbial evolutions aspects, and elements of microbial evolutions of microbial evolutions are controlled to the control of microbial evolutions are controlled to the controlled of the co											d biotechnolo	gy settings.	(BL5-Ev	aluate)	
	Coures Eler	nents	Entrep Emplo Profes Gende Humar	evelopment reneurship X yability ssonal Ethics X r X n Values X nment X					SDG (Go	als)		SDG4(Quality edi	ucation)					
								Part B										
	Modul	es				Cor	ntents					Ped	lagogy			Hour	\$	
							Part	D(Marks Dist Theory	ribution)									
Total M	arks	Minir	num Passing N	Marke		External Evaluati	ion		Min. External Evalu	ation		Intern	nal Evaluation		Min Int	ernal Evalu	uation	
100	4		num rassing n	nai ko	60	External Evaluati	11		IIII. External Evalu	iation	40			22			auon	
100	-				00			Practical				40						
Total M	arks	Minir	num Passing N	Marks		External Evaluati	ion		Min. External Evalu	ation		Intern	nal Evaluation		Min. Int	ernal Evalu	ation	
								Part E										
	Books	i	Operal An Intr	ting System Conce oduction to Operat	pts ing System			Tarte										
	Article	s																
	References	Books	Gavlin Deitel,	P, .L. Abraham Silb H M	erschatz.													
	MOOC Cou	irses																
	Videos	i	https://	www.youtube.com/	watch?v=vBUR	Tt97EkA												
			,															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	rse Articulation	n Matrix PO9	PO10		PO11	PO12	PSO1	PSO2		PSO3	
CO1	1		-	-	-	-	-	-	-	-		-	-	-	-		- 503	
CO2	-	-	2	1-	1-	2	-	-	-	ļ			-	_	-		-	
CO3	-	-	-	-	3	-	-	-	3	-		-	-	-	-		-	
CO4	-	4	-	-	-	-	-	= -	-	4		-	-	-	-		-	
CO5	-	-	-	5	. 5													
CO6	-	-		-														



BSc_ComputerScience

Title of the Course	DBMS											
Course Code E	BSCS0202[T]											
		Part A										
Year	1st	Semester			Credits	L T P C 3 0 1 4						
Course Type	Embedded theory and lab	ied theory and lab										
Course Category	Disciplinary Major	ny Major										
Pre-Requisite/s	Basic understanding of software product and discrete mathemati	e and programming language. Basic data manipulation operations, file handics.	Co-Requisite/s									
Course Outcomes & Bloom's Level	CO2- To understand the gene to CO3- To describe comprehensing CO4- To provide experimental by	pepts and view of professional and scientific communication approaches for transfer mechanisms and a detailed insight into mutations and their analysis we understanding of sterilization processes and media preparation pipeline because and to enable students to analyse the basic concepts of microbial ever rent regulatory, quality control, and legal frameworkshata impact biotechnol	(BL2-Understand) s (BL3-Apply) olution, phylogeny, nu	tritional aspects, and elements of microbial gen		and biotechnology settings.(BL5-E	Evaluate)					
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professonal Ethics X Gender X Human Values X Environment X		SDG4(Quality education)									
		Part B										
Modules	Modules Contents Pe											

modulos	Contains					
	Par	tC				
Modules	Title	Indi Expe	cative-ABCA/PBL/ riments/Field work/	Bloom's	Level	Hours

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	WAQ to insert some new records in emp table.	Experiments	BL2-Understand	2
2	WAQ to list the number of employees whose name is not "ford", "jams" or "jones"	Experiments	BL2-Understand	2
3	WAQ to list the name and salary and sort them in descending order of their salary	Experiments	BL2-Understand	2
4	WAQ to list the details of employees whose name is starts from "a"	Experiments	BL2-Understand	2
5	WAQ to delete all records form emp table	Experiments	BL2-Understand	2
6	WAQ to list the student name having "d" as second character.	Experiments	BL2-Understand	2
7	WAQ to list the name and salary and sort them Id descending order of their salary	Experiments	BL2-Understand	2
8	WAQ in employee table find all the manager who earns between 1000 and 2000	Experiments	BL2-Understand	2

Part D(Marks Distribution)

	Theory													
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation									
100	40	60	18	40	22									
			Practical											
Total Marks Minimum Passing Marks		External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation									
100 50		40	20	60	30									

Part E

	Database System Concepts by Henry Korth and A. Silberschatz Simplification approach to DBMs, Pratest Rhatia, Gurvinder Singh Kalyani Publication
Articles	
References Books	An Introduction to Database System by Bipin Desai An Introduction to Database System by C.J. Date.
MOOC Courses	
Videos	https://www.youtube.com/playlist?fist=PLxCzCOWd7alFAN6l8CuViBuCdJgiOkT2Y

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-		-		-	-	-	1	1	-	i	-
CO2	-	-	-	-		-	-	2	-	-	-	-	-	-	-
CO3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	4	-	-		-	-	-	-	-	-	4	-	-	-
CO5	-	-	5	-	5	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_ComputerScience

Title of the Course	Computer Networks								
Course Code	BSCS0301[T]								
		Part A							
Year	Credits	L T P C 3 0 1 4							
Course Type	Embedded theory and lab								
Course Category	Disciplinary Major								
Pre-Requisite/s	Study of computer networks providetc	des basic knowledge of Computer system architecture and various techn	Co-Requisite/s						
Course Outcomes & Bloom's Level	CO2- To understand the gene tran CO3- To describe comprehensive CO4- To provide experimental bas	ts and view of professional and scientific communication approaches for sifer mechanisms and a detailed insight into mutations and their analysis understanding of sterilization processes and media preparation pipeline sis, and to enable students to analyse the basic concepts of microbial even in regulatory, quality control, and legal frameworksthat impact biotechnol	s (BL2-Understand) s (BL3-Apply) olution, phylogeny, nutritional aspects, and elements of microbial gen	hetics(BL4-Analyze) tions in diverse microbiology and biotechnology settings. (BL5-E	Evaluate)				
Coures Elements	Skill Development Entrepreneunship / Entrepreneunship / Employability / Professional Eltric X Gender X Human Values X Errivronment X								

 Part B

 Modules
 Contents
 Pedagogy
 Hours

	Pai	t C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Configure to DNS Server	Experiments	BL2-Understand	2
2	Configure to DHCP Server	Experiments	BL2-Understand	2
3	Configure IP routing with RIP using CISCO Packet Tracer	Experiments	BL2-Understand	2
4	Configure to router for one network	Experiments	BL2-Understand	2
5	Configure to two different router	Evperimente	BL 2 Understand	2

Part D(Marks Distribution)

	Theory													
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation									
100	40	60	18	40	22									
			Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation									
100	50	60	30	40	20									

Part E

Books	Behrouz A.; Data Communications and Networking. ForouzanMcGraw-Hill. Andrew S. Tanenbaum; Computer Networks; Pearson Prentice Hall
Articles	
References Books	William J. Beyda Data Communication Prentice Hall William Stallings Data and Computer Communications Pearson Prentice Hall
MOOC Courses	
Videos	

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	5	-	-	-	-	-	=	=	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_ComputerScience

	Title of the	Course		Data Strue	cture																
	Course	Code		BSCS030	2[T]																
				•					Par	t A											
																		L	т	Р	С
	Yea	ar		2nd			Seme	ster		3rd					Cre	edits		3	0	1	4
	Course	Туре		Embedde	d theory and lab	•							•								•
	Course C	ategory		Disciplina	ıry Major																
	Pre-Requ	uisite/s		Basic und	derstanding of com	puter fundamenta	ls and programmin	ng in 'C'.							Co-Re	quisite/s					
	Course Or & Bloom	utcomes 's Level		CO2- To 0	understand the ge describe comprehe provide experimen	ne transfer mecha ensive understand tal basis, and to e	nisms and a detaile ing of sterilization p nable students to a	ed insight into mu processes and me analyse the basic	tations and the dia preparation concepts of m	oaches for microbiolog eir analysis (BL2-Unde on pipelines (BL3-App icrobial evolution, phyl biotechnology and eth	rstand) y) ogeny, nutr	ritional aspects	, and elements of	microbial gene uctive interact	etics(BL4-Ana ions in divers	alyze) se microbiology a	and biotechn	nology set	tings.(E	BL5-Eva	luate)
	Coures E	lements		Employat	subship <																
									Par	t B											
	Mod	ules					Con	itents					ı	Pedagogy					Hours		
				•					Par	1.0											
Modules Title								1 61	Indicative-ABCA/PBL/ Experiments/Field work/ Internships					Bloom's Level				Hours			
1		Write a program to	find the fa	actorial of a	given no using rec	ursion.				Experiments					BL2-Under	stand			2		
2		Write a program for	r bubble s	orting.						Experiments					BL2-Under	stand			2		
3		Write a program fo	r linear sea	arch.				Experiments					BL2-Under	stand			2				
4		Write a program fo	r binary se	earch.						Experiments					BL2-Under	stand			2		
5		Write a program fo								Experiments					BL2-Under	stand			2		
								Pa	art D(Marks	Distribution)					1						
									The	ory											
Total Ma	arks	м	inimum P	assing Mar	ks		External Evaluation	on		Min. External Eva	luation		Int	ernal Evalua	tion		Min. Internal Evaluation				
100		40				60			18				40			12					
									Prac	tical											
Total Ma	arks	м	inimum P	assing Mar	ks		External Evaluation	on		Min. External Eva	luation		Int	ernal Evalua	tion		Min.	Internal	Evalua	tion	
100		40				40			20				60			30					
									Par	t E											
	Воо	ks		Data Stru Data Stru	cture: By Lipschul cture through C (A	tz (Schaums Outlin A Practical Approac	ne Series) ch) by G.S. Baluja														
	Artic	les																			
	Reference	s Books		Fundame	ntal of Data Struct	ure by S. Sawhney	& E. Horowitz														
	MOOC C	ourses																			
	Vide	ios																			
Course Arti							ourse Articu	lation Matrix													
COs	PO1	PO2	PO3		PO4	PO5	PO6	P07	PO8	P09	PO10		P011	PO12	F	PS01	PSO2	2		PSO3	
CO1	1	-	-		-	-	-	-	-	-	-		-	-			-			-	
CO2	-	-	2		-	-	1-	-	1-	-	-		-	-	1.		-			-	
CO2 - 2								1		+											



BSc_ComputerScience

Title of the Course	Object Oriented Programming Co	ncept using C++										
Course Code	BSCS0401[T]	40:ITI										
		Part A										
Year	2nd	Semester 4th Credits										
Course Type	Embedded theory and lab	ded theory and lab										
Course Category	Disciplinary Major											
Pre-Requisite/s	Students should have basic as w	rell as practical knowledge of Programming and should be familiar wit	h the concept of C.		Co-Requi	site/s						
Course Outcomes & Bloom's Level	CO2- To understand the gene tra	pts and view of professional and scientific communication approache insfer mechanisms and a detailed insight into mutations and their and e understanding of sterilization processes and media preparation pipe sists, and to enable students to analyse the basic concepts of microbio for regulatory, quality control, and legal frameworkshaft impact biotice.	llysis (BL2-Understand)		al genetics(BL4-Analyze) nteractions in diverse microbiology	and biotechnology settings.(I	BL5-Eval	uate)				
Coures Elements	Skill Development ✓ Entepreneurship ✓ Employability ✓ Professonal Etnics × Gender × Human Values × Environment ×											
		Part B										
Modules	Modules Contents Pedagogy Hours											
		Part C										

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1		Experiments	BL2-Understand	
2		Experiments	BL2-Understand	
3		Experiments	BL2-Understand	
4		Experiments	BL2-Understand	
5		Experiments	BL2-Understand	
6		Experiments	BL2-Understand	
7		Experiments	BL2-Understand	
8		Experiments	BL2-Understand	
			<u> </u>	

Part D(Marks Distribution)

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	60	18	40	22					
	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	60	30	40	20					

	Part E
Books	Object Oriented Programming C++ C++
Articles	
References Books	R. Lafore E. Balguruswamy
MOOC Courses	

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	4	-	4	-	-	-	-	-	-	-	4	-	-	-
CO5	-	-	-	-	5	-	-	-	-	-	-	-	5	-	-
COS															



BSc_ComputerScience

Title of the Course	Computer system organization									
Course Code	BSCS0402[T]	CS0402[T]								
	PartA									
Year	2nd	Semester 4th Credits 1 3 3 3								
Course Type	Theory only									
Course Category	Course Category Disciplinary Major									
Pre-Requisite/s	An Attendee of this course must be familiar with the following 💠 Digital Logic Gates 💠 Basic Computer Architecture 💠 Computer Number Systems Co-Requisite									
Course Outcomes & Bloom's Level	CO2- To understand the gene tra CO3- To describe comprehensive CO4- To provide experimental ba	ots and view of professional and scientific communication approaches fi risfer mechanisms and a detailed insight into mutations and their analys- understanding of settilization processes and media preparation picelli sis, and to enable students to analyse the basic concepts of microbial int regulatory, quality control, and legal frameworksthat impact biotechn	sis (BL2-Understand) es (BL3-Apply) evolution, phylogeny, nu	tritional aspects, and elements of microbial	genetics(BL4-Analyze) ractions in diverse microbiology	and biotechnology settings.(BL5	5-Evalua	e)		
Coures Elements	Skill Development V Entrepreneurship V Entrepreneurship V Professonal Efficis X Gender X Human Values X Environment X									
	Part B									
Modules	Contents Pedagogy Hours									



Project Base Learning Computer System Organization BCA 301

S.no	Activity Details	Outcomes of the Activity
1	Overview of Register Transfer Language &	This activity help to study for
	micro-operations, Classification of Micro	better understanding of
	operations,	computer hardware operation.
2	Design of arithmetic, Logic and shift micro-	This activity help to
	operations.	understanding of Logic and
		Shift micro-operations.
3	Architecture of a Processor, Concept of ALU,	This activity help to
	Control Unit, Registers Instruction Register,	understanding various function
	Control Word, Program Counter,	of Computer Hardware.
	Stack Organization, instruction set,	
	instruction formats, addressing modes,	
	instruction cycle, Interrupt and	
	Interrupt cycle	
4	Data Transfer Mode, Program Controlled,	This activity will help to
	Interrupt driven, DMA (Direct Memory	understanding the various
	Access).	Activity perform by Data
		Transfer and DMA.
5	Memory organization, Concept of	This activity will help to
	Associative memory, cache memory	understanding the Memory
	organization, virtual memory organization	Management in Computer
		Hardware etc.

Part D(Marks Distribution)

	Theory									
Total Marks	Marks Minimum Passing Marks External Evaluation Min. External Evalua-		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	40	60 18		40	12					
	Practical Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					

	I dit L
Books	Hayes, J. P. (2017). Computer System Architecture. McGraw Hill. Stallings, W. (2022). Computer Organization and Architecture. Prentice Hall.
Articles	
References Books	
MOOC Courses	
Videos	

								noo , a acaiaacin							
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2	=	2
CO2	1	2	-	-	2	-	-	-	-	-	-	-	2	3	3
CO3	3	1	-	-	2	-	-	-	-	-	-	-	3	3	3
CO4	-	1	1	2	1	-	-	-	-	-	-	-	2	2	3
CO5	-	1	-	-	1	-	-	-	-	-	-	-	2	2	2
CO6	3	1	-	-	-	-	-	-	-	-	-	-	2	-	-



BSc_ComputerScience

Title of the Course	Web Designing with PHP	b Designing with PHP								
Course Code	BSCS0501[T]	3CS0501[T]								
			Part A							
Year	3rd	Semester	5th	Credits	L	Т	Р	С		
real	Sid	Selliester	Sui	Credits	3	0	1	4		
Course Type	Embedded theory and lab	b								
Course Category	Disciplinary Major									
Pre-Requisite/s			Co-Requisite/s							
Course Outcomes & Bloom's Level	CO2- To understand the g CO3- To describe compre CO4- To provide experime	c concepts and view of professional and scientific commun gene transfer mechanisms and a detailed insight into muta shensive understanding of sterilization processes and med ental basis, and to enable students to analyse the basic co the current regulatory, quality control, and legal frameworks	tions and their analysis (BL2-Understand) lia preparation pipelines (BL3-Apply) procepts of microbial evolution, phylogeny, nutr	BL1-Remember) tional aspects, and elements of microbial genetics(BL4-Analyze) urs that foster positive and productive interactions in diverse microbiolo	gy and biote	echnology se	ttings.(BL5-E	valuate)		
Coures Elements	Skill Development Entrepreneurship / Entrepreneurship / Employability / Professonal Ethics X Gender X Human Values X Environment X									
	Part B									
Modules		Contents		Pedagogy		Hours				

PBL TOPICS

PHP

1. Simple CMS (Content Management System):

- Build a basic CMS using PHP where users can create, edit, delete, and manage content (e.g., articles, blog posts).
- Include features like user authentication, role-based access control, and a WYSIWYG editor for content creation.

2. Online Quiz System:

- Develop an online quiz application where users can take quizzes on various topics.
- Implement features such as user registration, quiz creation, multiplechoice questions, scoring, and result display.

3. Online Task Management System:

- Create a task management application where users can create tasks, assign them to others, set deadlines, and track progress.
- Include features like user authentication, task categorization, priority levels, and status updates.

4. E-commerce Website:

- Build a simple e-commerce platform using PHP where users can browse products, add them to cart, and make purchases.
- Implement features like user registration, product catalog, shopping cart functionality, and payment integration (e.g., PayPal).

5. OnlineStudent Information System:

- Develop a student information system for managing student records, course details, grades, and attendance.
- Include features such as user authentication, student enrolment, course registration, and grade management.

Part D(Marks Distribution)

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation Min. Internal Evaluation						
100	40	60	18	40	12					
			Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	60	30	40	20					

Part E

	Turc
Books	VIKRAM VASWANI PHP A Beginner's Guide Tata McGraw-Hill
Articles	Steven Holzner The PHP Complete Reference – Tata McGraw-Hill
References Books	
MOOC Courses	
Videos	

							COL	irse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	1	2	-	-	-	-	-	-	-	1	2	1
CO2	2	2	-3	2	1	-	-	-	-	-	-	-	2	2	2
CO3	2	1	1	1	3	-	-	-	-	-	-	=	1	2	1
CO4	1	2	-1	2	2	-	-	-	-	-	-	-	2	2	1
CO5	2	2	2	1	2	-	-	-	-	-	-	-	1	2	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_ComputerScience

Title of the Course	Software Enineering										
Course Code	BSCS0601[T]	[T]									
	PartA										
Year	3rd	Semester	Credit	rs	L T P C 3 0 1 4						
Course Type	Embedded theory and lab										
Course Category	Disciplinary Major						-				
Pre-Requisite/s	student must have knowledge a	dent must have knowledge about basic data structures , computer organization & programming language concepts. Co-Requisite/s									
Course Outcomes & Bloom's Level	CO1- To identify the basic concepts and view of professional and scientific communication approaches for microbiology sattings (BL1-Remember) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO2- To apply Appraise the current regulatory, quality control, and legal frameworksthat impact biotechnology and ethical behaviours that foster positive and productive interactions in diverse microbiology and biotechnology settings (BL5-Evaluate) CO3- To apply Appraise the current regulatory, quality control, and legal frameworksthat impact biotechnology and ethical behaviours that foster positive and productive interactions in diverse microbiology and biotechnology settings (BL5-Evaluate) CO3- To apply Appraise the current regulatory, quality control, and legal frameworksthat impact biotechnology and ethical behaviours that foster positive and productive interactions in diverse microbiology and biotechnology settings.										
Coures Elements	Skill Development X Entrepreneurship ✓ Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)		SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)						
	Part B										
Modules		Contents		Pedag	ogy	Hours					

Case Study Software Engineering (402)

- 1. Analysing the challenges and solutions for software maintenance: Students are required to identify the challenges appeared during software maintenance using various types of information gathering tools and must propose a systematic and feasible maintenance plan with output showing growth with respect to following points
 - User Satisfaction level
 - Software periodic update
 - o Software Licence renewable
 - Software upgradability.
- 2. Perform automated testing and design customized test cases on any project modules. Also report the bugs encountered during testing phase and compute time incurred in rectifying bugs during testing phase. Compare the time involved in rectifying bugs at development phase and at testing phase.
- 3. You are required to build a Inventory management system for a departmental store, Prepare a logical design as well as use case and system flowcharts for the same.
- 4. You are required to build a Student information system for a departmental of school of Engineering, Prepare a logical design as well as use case and system flowcharts for the same.

5.

- 6. Compute the following using any project/modules of your choice
 - Product Metrics
 - o Process Metrics
 - Project Metrics
- 7. Prepare a complete SRS report of a software that is not in existence as well as software that is already is being used but needs to be updated.

Part D(Marks Distribution)

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	40	60	18	40	12				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	50	60	30	40	20				

Part E

Books	Pressman, R. S., & Dr, B. R. M. (2014, January 23). Software Engineering: A Practitioner's Approach. McGraw-Hill Education. http://books.google.ie/books?
Articles	
References Books	Pressman, R. S., & Dr, B. R. M. (2014, January 23). Software Engineering: A Practitioner's Approach. McGraw-Hill Education. http://books.google.ie/books?
MOOC Courses	
Videos	https://onlinecourses.nptel.ac.in/noc20_ce68/preview

								noo , a acaiaacin							
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	-	-	-	1	-	2
CO2	1	-	-	-	1	2	-	-	-	-	-	-	1	2	3
CO3	2	1	-	-	1	-	-	-	-	-	-	-	3	2	3
CO4	2	2	-	3	1	-	-	-	-	-	-	-	3	2	3
CO5	2	2	-	2	1	-	-	-	-	-	-	-	3	2	3
CO6	1	1	2	3	2	2	-	-	-	2	=	=	3	3	3



BSc_ComputerScience

	Title of the	Course	Python	programming															
	Course	Code	BSCS0	602[T]															
								Part	A										
	V	_	3rd			0		6th				0		L	Т	Р	С		
	Yea	r	3rd			Semester		otn				Credits		3	0	1	4		
	Course	Туре	Embed	ded theory and lab															
	Course Ca	ategory	Discipl	nary Major															
	Pre-Requ	isite/s										o-Requisite/s							
	Course Ou & Bloom's	atcomes s Level	CO2-1 CO3-1 CO4-1	To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1- fo understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Unhorestand). To describe comprehensive understanding of sterilization processes and media preparation pipelines (BL3-Apply). To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolution, phylogeny, nutritions for apply Appraise the current regulatory, quality control, and legal frameworkshaft impact blockerhology and ethical behaviours to							aspects, and elements of microbial genetics(BL4-Analyze)								
	Coures Ele	ements	Entrep Employ Profes Gende Humar	evelopment ✓ reneurship ✓ reability ✓ ssonal Ethics X r X values X rment X				SDG (Goals)			SDG1(No povertry) SDG2(Zero hunger) SDG4(Quelly education)								
								Part	В								i		
	Modu	ules				Con	itents				Pedagogy Hours								
								Part	С										
Modu	les				Title					Indicative-A Experiments Intern	s/Field work/			Bloom's Leve	el	н	lours		
unit 1-5		PBL							PBL			4							
							Pai	rt D(Marks I											
Total Ma	arks	Mini	imum Passing N	arks		External Evaluation	on		Min. External E	valuation	Internal Evaluation Min. Internal Evaluation				aluation				
100		40			60			18			40		22						
								Practi	cal										
Total Ma	arks	Mini	imum Passing N	arks	- 1	External Evaluation	on		Min. External E	valuation	Inter	nal Evaluation	1		Min. Internal E	aluation			
100		50			60			30			40			20					
					•			Part	E		•		•						
	Book	ks	Gonda	liya, V. (2019, Augus	t 30). Programmin	g With Python. Vai	bhav Gondaliya.	-						-					
	Articl	les																	
	References Books Hetland, M. L. (2006, November 7). Beginning Python. Apress																		
	MOOC Co																		
	Video	os																	
							_		etien Medele										
COs	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PO12	PSO1		PSO2	PSO3			
CO1	3	1	-	-	2	2	-	-	-	-	1	-	1		-	1			
CO2	1	1	-	2	2	2	-	-	-	2	-	-	1		2	3			
CO3	-	2	-	-	-	-	-	-	-	-	-	-	3		2	3			



BSc_ComputerScience

Title of the Course	Environmental Stu	nental Studies							
Course Code	BSFC0201[T]	0201円							
			Part A						
Year	1st	Semester	2nd	Credits	L	T	P	С	
1001	15t Semeste	Comester	210	ordana	2	0	2	4	
Course Type	Theory only								
Course Category	Interdisciplinary M	fajor							
Pre-Requisite/s				Co-Requisite/s					
Course Outcomes & Bloom's Level	CO2- To understa CO3- To describe	nd the gene transfer mechanisms and a d comprehensive understanding of sterilizat	etailed insight into mutations and their a ion processes and media preparation p		icrobial genetics(BL4	-Analyze)			
Coures Elements	Skill Development ✓ Entrepreneurship × Employability ✓			SDG3(Good health and well-being) SDG5(Gender equality) SDG5(Gender equality) SDG5(Gender advantage)					
			Part B						

Jur	Pedagogy	Contents	Modules

Dort	D/Marks	Dictribution	1

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation Internal Evaluation		Min. Internal Evaluation					
100		40	12	60	30					
	Practical Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
	0									

Part E

Books	B. S. Chauhan Environmental Science 2008 First Richards T. Wright & Dorothy F. Boorse Environmental Science: Toward a Sustainable Future 2016 S. K. Dhameja Environmental Engg. & Management 2000
Articles	
References Books	Gilbert M. Masters Introduction to Environmental Engineering and Science 1991 Stanley Manahan & Stanley E. Manahan Environmental Chemistry 2009
MOOC Courses	
Videos	

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	-	-	1	-	-	-	-	-	1	2	3
CO2	1	-	-	-	-	-	1	-	-	-	-	-	1	-	1
CO3	1	2	-	-	-	-	1	-	-	-	-	-	1	2	-
CO4	1	2	-	2	-	-	-	2	-	-	-	-	1	2	3
CO5	1	2	-	-	-	-	-	2	-	-	-	-	1	-	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	=	-	=



						BSc_PC	М						
Title of ti	he Course	Environmental Studie	es										
Cours	e Code	BSFC0201[T]											
						Part A							
v	ear	1st		Semester	2nd			Credits		L	T	P	С
,,	eai	Tot.	`	Jeniestei	Zilu		· ·	Sieulis		2	0	2	4
Cours	ве Туре	Theory only											
Course	Category	Interdisciplinary Majo	iplinary Major										
Pre-Re	quisite/s		Co-Requisite/s										
	Outcomes n's Level	CO2- To understand	To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1-Remember) To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) To describe comprehensive understanding of sterilization processes and media preparation pipelines (BL3-Apply) To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolution, phytogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze)										
Coures		Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics √ Gender X Human Values X Environment ✓			SDG (G	oals)	SDG3(Good health and wel SDG5(Gender equality) SDG6(Clean water and san SDG7(Affordable and clean SDG9(Industry Innovation a SDG11(Sustainable cities a SDG12(Responsible consu SDG13(Climate action) SDG14(Life below water) SDG15(Life below water)	itation) energy) ind Infrastructur nd economies)					
						Part B							
Mo	dules				Contents				Pe	edagogy		Hou	ırs
					Pa	art D(Marks Dis	stribution)						
			,			Theory					,		
Total Marks Minimum Passing Marks External Evaluation				Min. External Evaluation		Inte	rnal Evaluation		Min. Internal Eval	luation			
100			40			12			60		30		
						Practica	l						
Total Marks	Minimum Pa	ssing Marks		External Evalu	uation		Min. External Evaluation		Inte	rnal Evaluation		Min. Internal Eval	luation

Р	0	r	٠	F

Books	B. S. Chauhan Environmental Science 2008 First Richards T. Wright & Dorothy F. Boorse Environmental Science: Toward a Sustainable Future 2016 S. K. Dhameja Environmental Engg. & Management 2000
Articles	
References Books	Gilbert M. Masters Introduction to Environmental Engineering and Science 1991 Stanley Manahan & Stanley E. Manahan Environmental Chemistry 2009
MOOC Courses	
Videos	

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	=	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	=	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	=	-	-	-	2	-
CO4	1	-	-	-	-	-	-	-	-	=	-	-	-	2	3
CO5	1	-	-	-	-	-	-	-	-	=	-	-	-	-	3
CO6	-	-	-	-	-	ů.	ů.	ů.	1	i	-	ı	i	-	-



BSc_FoodTechnology

Title of the Course	Introduction To Food To	Judion To Food Technology [T]										
Course Code	BSFT-0101[T]											
	Part A											
Year	Year 1st Semester 1st Credits L T P C											
122			1		3	0	1	4				
Course Type	Embedded theory and	ded theory and lab										
Course Category	Discipline Core	scipline Core										
Pre-Requisite/s	Students must have po Science as compulsor	assed class 12 or equivalent from a recognised board of subjects	with Physics, Chemistry, and Biology/Home	Co-Requisite/s	Students sho chemistry and		knowledge of ph	owledge of physics,				
Course Outcomes & Bloom's Level	CO2- To understand the CO3- To describe come CO4- To provide expensions.		o mutations and their analysis (BL2-Understand) and media preparation pipelines (BL3-Apply) asic concepts of microbial evolution, phylogeny, nu			d biotechnolog	y settings.(BL5-	Evaluate)				
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG8(Clean water and sanitation) SDG12(Responsible consuption and production)								

 Part B

 Modules
 Contents
 Pedagogy
 Hours

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Familiarization with Food Technology Lab and general laboratory guidelines	Experiments	BL2-Understand	2
2	To determine moisture content in given food sample	Experiments	BL4-Analyze	2
3	To determine ash content in given food sample	Experiments	BL4-Analyze	2
4	To determine crude fat content in given food sample	Experiments	BL4-Analyze	2
5	To determine crude protein content in given food sample	Experiments	BL4-Analyze	2
6	To determine crude fibre content in given food sample	Experiments	BL4-Analyze	2
7	To determine Total Soluble Solids (TSS), pH, and titratable acidity in given samples	Experiments	BL4-Analyze	2
8	To determine physical properties of food grains	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40	0							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40	0							

Part E

Books	Potter, N. N., & Hotchkiss, J. H. (2012, December 6). Food Science. Springer Science & Business Media.					
Articles https://www.it.org/news-and-publications/flood-lechnology-magazine						
References Books Vaclavík, V. A., & Christian, E. W. (2007, December 3). Essentials of Food Science. Springer Science & Business Media.						
MOOC Courses	https://hptel.ac.in/courses/128105013					
Videos	https://youtu.be//s5VwdkggtWU					

	COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CC	1	3	2	1	1	1	1	-	-		-	-		3	1	1
CC	2	3	3	2	3	2	1	1	-		-	1		3	1	1
CC	3	3	2	3	3	2	1	1	-		-	1		3	1	1
CC	4	3	2	1	1	1	1	-	-		-	-		3	3	3
CC	5	3	2	2	2	1	1	1	-	-	-	1		3	3	3
CC	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_FoodTechnology

Title of the Course	Food Microbiole	Microbiology [T]										
Course Code	BSFT-0102[T]											
	Part A											
Year	1st	Semester	1st	Credits	L	Т	P	С				
100.	100	Comester	100	Sidalo	3	0	1	4				
Course Type	Embedded the	dded theory and lab										
Course Category	Discipline Core	pline Core										
Pre-Requisite/s	Students must compulsory sul	have studied Physics, Chemistry, and bjects	Biology/Home Science as	Co-Requisite/s	Students should have basic knowledge of microorganisms and their classifications and structures (as studied in biology)							
Course Outcomes & Bloom's Level	CO2- To under CO3- To descri CO4- To provide	stand the gene transfer mechanisms a fibe comprehensive understanding of st de experimental basis, and to enable st	and a detailed insight into mutation terilization processes and media p tudents to analyse the basic conce	on approaches for microbiology settings (BL1-Remember) s and their analysis (BL2-Understand) eparation pielines (BL3-Apgen), nutritional aspects, and ele pisco finicrobial evolution, phylogeny, nutritional aspects, and ele impact biotechnology and ethical behaviours that foster positive	ements of microbial gene	tics(BL4-Analyze) ons in diverse microbiolo	gy and biotechnology setti	ings.(BL5-Evaluate)				
Coures Elements	Skill Developm Entrepreneursi Employability • Professsonal E Gender X Human Values Environment X	hip X / Ethics X	SDG (Goals)	SDG3(Good health and well-being) SDG6(Clean water and sanitation)								

 Part B

 Modules
 Contents
 Pedagogy
 Hours

	Par	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Introduction to Microbiology Laboratory Safety, use of equipment and perform sterilization techniques	Experiments	BL2-Understand	2
2	To study different parts of microscope and its working	Experiments	BL2-Understand	2
3	To prepare culture media (Nutrient broth and agar)	Experiments	BL3-Apply	2
4	To perform simple and Gram's staining	Experiments	BL3-Apply	2
5	To perform different streaking techniques	Experiments	BL5-Evaluate	2
6	To evaluate microbiological quality of water	Experiments	BL5-Evaluate	2
7	To enumerate Lactic acid bacteria from fermented foods	Experiments	BL5-Evaluate	2
8	To examine the microbial load of different food samples	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

	Theory							
Total Marks	Minimum Passing Marks	External Evaluation	External Evaluation Min. External Evaluation Internal Evaluation					
100	40	60	18	40				
			Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	40	60	18	40				

Part E

Books Frazier, W. C. (1967, January 1), Food Microbiology, McGraw-Hill Companies.					
Articles https://agsci.psu.edu/global/fisiukraine-food-safety-short-course-materials/fisc-case-studies/food-microbiology-case-study.pdf					
References Books	Khetarpaul, N. (2006, January 1). Food Microbiology. Daya Books.				
MOOC Courses https://hptel.ac.in/courses/105107173					
Videos https://www.youtube.com/watch?v=zlRXDi-6j-Y&t=2s					



BSc_FoodTechnology

Title of the Course	Technology of F	chnology of Food Processing and Preservation [T]								
Course Code	BSFT-0201 [T]	SFT-0201 [T]								
				Part A						
Year	1st	Semester	2nd	Credits	L	Т	P	С		
					3	0	1	4		
Course Type	Embedded thed	ory and lab								
Course Category	Discipline Core	1								
Pre-Requisite/s	Students must I previous semes	have studies Introduction to Food Tester	chnology and Basic chemistry in	Co-Requisite/s	Knowledge of chemica extend the shelf-life of	preservatives used in dif product	ferent foods and processin	g parameters applied to		
Course Outcomes & Bloom's Level	CO2- To unders CO3- To descrit CO4- To provide	stand the gene transfer mechanisms be comprehensive understanding of e experimental basis, and to enable	and a detailed insight into mutatio sterilization processes and media students to analyse the basic cond	ation approaches for microbiology settings (BL1-Remember) ns and their analysis (BL2-Understand) preparation pipelines (BL3-Apply) propertion of microbial evolution, phylogeny, nutritional aspects, and at impact biotechnology and ethical behaviours that foster positi	elements of microbial ger	etics(BL4-Analyze) tions in diverse microbiole	ogy and biotechnology sett	tings.(BL5-Evaluate)		
Coures Elements	Skill Development V Entrepreneurshy X Entrepreneurshy X Professacral Ethics X Gender X Human Values X Environment V			SDC3(Zero hunger) SDC3(Zero hunger) SDC3(Good health and well-being) SDG6(Clean water and sanitation)						

	Pall B		
Modules	Contents	Pedagogy	Hours

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Familiarization with Food Technology Lab and general laboratory guidelines	Industrial Visit	BL2-Understand	3
2	Study the blanching process and determine catalase/peroxidase activity	Experiments	BL2-Understand	2
3	Study the effect of blanching on vitamin C content in given food sample	Experiments	BL3-Apply	2
4	Examination of the enzymatic browning in fruits and vegetables.	Experiments	BL3-Apply	2
5	Determination of Total Soluble Solids (TSS), pH, and titratable acidity in given samples	Experiments	BL3-Apply	2
6	Preparation of osmotic dehydrated fruits and vegetables	Experiments	BL3-Apply	2
7	Preservation of seasonal fruits/vegetables by natural preservatives	PBL	BL4-Analyze	3
8	Estimation of sodium benzoate in food sample (qualitative and quantitative determination)	Experiments	BL3-Apply	2

Part D(Marks Distribution)

	Theory							
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Min. Internal Evaluation							
100	40	60	18	40	0			
			Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	50	60	18	40	0			

Part E

Books	Khader, V. (2004) Text book on Food Storage and preservation. Ludhiana: Kalyani Publishers.
Articles	
	DESROSIER, N.W. (2018) Technology of Food Preservation. ED-TECH. Fennema, O.R. (1976) Principles of Food Science. New York: Dekker.
MOOC Courses	https://mptel.ac.in/courses/127105231
Videos	https://www.youtube.com/watch?v=vznRdbiDf5w&t=1s

COs	PO1	PO2	PO3	PO4	P05	P06	P07	P08	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
CO1	3	2	1	1	1	-	1	-	1	1	-	-	3	1	1
CO2	3	2	1	1	1	1	2	1	2	1	-	-	3	1	1
CO3	3	2	2	1	1	-	1	-	-	-	-	-	3	2	2
CO4	3	2	2	2	2	1	1	1	-	1	-	-	3	2	2
CO5	3	2	2	2	2	1	1	-	1	1	-	-	3	2	2
CO6	-	i.	-	-		-	-	i.	-	-	-	1	-	-	-



BSc_FoodTechnology

Title of the Course	Food Additives [T]	od Additives [T]							
Course Code	BSFT-0202 [T]								
			Part A						
Year	1st	Semester	2nd		Credits	L	Т	Р	С
1641	101	Semester	210		Credits	4	0	0	4
Course Type	Theory only								
Course Category	Discipline Core								
Pre-Requisite/s	Candidates must	have studied food chemistry and food micr	obiology in previous semesters.	Co-	-Requisite/s	Students should ha	ve prior knowledge of	preservatives, chemical	compounds etc.
Course Outcomes & Bloom's Level	CO2- To understa CO3- To describe CO4- To provide of	he basic concepts and view of professional and the gene transfer mechanisms and a d a comprehensive understanding of sterilizat experimental basis, and to enable students opraise the current regulatory, quality contro	etailed insight into mutations and their a ion processes and media preparation pi to analyse the basic concepts of microt	nalysis (BL2-Understand) pelines (BL3-Apply) pial evolution, phylogeny, nut	tritional aspects, and elements of mi	crobial genetics(BL4- tive interactions in div	Analyze) erse microbiology and	biotechnology settings	.(BL5-Evaluate)
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professonal Ethics ✓ Gender X Human Values X Environment ✓								
			Part B						
Modules			Contents		Pe	dagogy		Hou	rs

		Part	C		
	Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
	1	To detect different gums and thickeners in food samples	Experiments	BL4-Analyze	2
_	,		•	•	,

	Theory						
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation						
100	40	60	18	40	0		
			Practical				
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation		
100	0	40	20	60	0		

	Part E				
Books	Food Additives by Branen AL, Davidson PM & Salminen S				
Articles	Articles https://www.researchgate.net/publication/221925228_Food_Additive				
References Books	Encylopedia of Food and Color Additives by Gerorge AB Food Antioxidants: Technological, Toxicological and Health Perspective by Madhavi DL, Deshpande SS & Salunkhe DK. Food Flavours: Part A by Morton ID & Madeed AI Food Proleins:Processing Applications by Shuryo Nakai Food Polysacchardes and Thier Applications by Supple AM				
MOOC Courses https://mplel.ac.in/courses/126105027					
Videos	https://youtu.be/Dm3yP7FF4n1?si=55vFo027nUaRB6jy				

Course Articulation Matrix															
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	1	1	-	-	-	-	-	-	3	1	1
CO2	3	3	2	2	3	2	-	-	-	-	-	-	3	1	1
CO3	3	3	2	3	3	2	-	-	-	-	-	-	3	1	1
CO4	3	2	2	3	3	3	1	-	-	-	1	-	3	3	3
CO5	3	3	3	2	2	2	1	-	-	-	1	2	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_FoodTechnology

Title of the Course	Processing of Fr	sing of Fruits and Vegetables[T]										
Course Code	BSFT-0203 [T]	2203 円										
Part A												
Year	Year 1st Semester 2nd Credits											
Total	100	Comedei	Liid	Sidalo	3	0	1	4				
Course Type	Embedded theo	ded theory and lab										
Course Category	Discipline Core	cipline Core										
Pre-Requisite/s	Student must ha semesters	udent must have studies Post-Harvest technology and food preservation in previous mesters Study of nutritional composition of fruits and vegetables and preparation of value added products										
Course Outcomes & Bloom's Level	CO2- To undersi CO3- To describ CO4- To provide	tand the gene transfer mechanisms and a e comprehensive understanding of sterilia experimental basis, and to enable stude	detailed insight into mutations and the zation processes and media preparations to analyse the basic concepts of m	roaches for microbiology settings (BL1-Remember) eiir analysis (BL2-Understand) on pipelines (BL3-Apply) icrobial evolution, phylogeny, nutritional aspects, and elements biotechnology and ethical behaviours that foster positive and pr	of microbial genetics(E oductive interactions in	IL4-Analyze) n diverse microbiology a	nd biotechnology setting	s.(BL5-Evaluate)				
Coures Elements	Skill Development V Entrepreneurship X Employability V Professoral Efficis X Gender X Human Values X Environment X											
			_									

 Part B

 Modules
 Contents
 Pedagogy
 Hours

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preparation of jam/ jelly/ marmalade from selected fruit	Experiments	BL3-Apply	2
2	Preparation of RTS beverage	Experiments	BL3-Apply	2
3	Preparation of squash	Experiments	BL3-Apply	2
4	Preparation of grape raisins	Experiments	BL3-Apply	2
5	Preparation of dried fig / banana fig	Experiments	BL3-Apply	2
6	Preparation of fruit candy	Experiments	BL3-Apply	2
7	Osmotic dehydration of fruit slices	Experiments	BL4-Analyze	2
8	Preparation of fruit leather	Experiments	BL3-Apply	2

Part D(Marks Distribution)

	Theory										
Total Marks	al Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation										
100	40	60	18 40 0								
			Practical								
Total Marks Minimum Passing Marks External Evaluation			Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	0	60	18	40	0						

Part E

Books	Lal, G., Siddappa, G. S., & Tandon, G. L. (1986, January 1). Preservation of Fruits and Vegetables.
Articles	
References Books	Manay, N. S., & Shadaksharasewamy, M. (2008, January 1), Food: Facts and Principles. New Age International. Rangama, S. (1986, January 1), Harabook of Analysis and Oslapit Control for Fruit and Vegetable Products. Tata McGraw-Hill Education Vere Cruess, W. (1938, January 1), Commercial Fruit and Vegetable Products. Tata McGraw-Hill Education Vere Cruess, W. (1938, January 1), Commercial Fruit and Vegetable Products. Vere Cruess, W. (1938, January 1), Commercial Fruit and Vegetable Products. Tata McGraw-Hill Education Vere Cruess, W. (1938, January 1), Commercial Fruit and Vegetable Products.
MOOC Courses	https://nptel.ac.in/courses/126105015
Videos	https://www.youtube.com/watch?v=k1a2PSEXahM&t=1s

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1			1	=	1	•	1	-	-	3	1	1
CO2	2	1	1	-	1	1	1	1		-	1		3	1	2
CO3	2	2	2	1	1	1	1	1	1	1	1		3	2	2
CO4	2	2	2	2	2	1	1	1		-	1		3	2	3
CO5	2	2	2	1	1	1	-	-	1	-	1		3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



								Sc_FoodTechn									
	Title of the Co	nurse	Unit C	peration [T]													
	Course Co			0302 [T]													
						1		Part A				т	P	С			
	Year		2nd	Ser	nester	3rd		Cı	redits	-	4 0 0 4						
	Course Ty	ре	Theor	only													
	Course Cate	gory	Discip	e Electives													
	Pre-Requisi	te/s	Basic	concepts of Physics,	Chemistry & Ma	athematics		Co-Re	equisite/s		To be familiar with the basi	ic concepts of technologic	ogy of processing of fru	its and vegetables			
	Course Outco & Bloom's L	omes evel	CO2- CO3-	To understand the ge To describe compreh	ene transfer med ensive understa	ew of professional and hanisms and a detailed nding of sterilization pro enable students to an ory, quality control, and	d insight into muta ocesses and med	tions and their ana	lysis (BL2-Unders	tand)	member) spects, and elements of mit foster positive and productions.	icrobial genetics(BL4- tive interactions in div	Analyze) erse microbiology and	biotechnology settings	.(BL5-Evaluate)		
	Coures Elem	ents	Entre Emplo Profe Gend Huma	Ill Development X trepreneurship X ployability / tesssonal Ethics X and values X viconment X													
								Part B									
	Module	s				Conte	ents				Pe	dagogy		Hou	rs		
							Par	t D(Marks Distri	ibution)								
Total Ma	nrke	Mini	num Passing	Marke		External Evaluation			in. External Evalu	ation	Inter	rnal Evaluation		Min. Internal Eval	uation		
100	40		nam r assing	iiu iiu	60	External Evaluation		18	40			mai Evaluation		mini mornai zvai	auton		
								Practical									
Total Ma	arks	Minimum Passing Marks				External Evaluation	n	м	in. External Evalu	ation	Inter	rnal Evaluation		Min. Internal Eval	uation		
								Part E									
	Books		Unit C	perations of Chemic	al Engineering: I	McCabe, Smith and Ha	rriot, TMH, 5th ed										
	Articles																
	References B	ooks	Transp Unit o	ort Processes and U	nit operations: 0	Seankopolis, PHI, 3rd e neers and Biologists; B	dition	and C. M. Narava	nan: Khanna Puhli	cations Delhi							
	MOOC Cour	ses		nptel.ac.in/courses/1													
	Videos																
1			-														
			I	T		1		urse Articulation			1	T	T	T	1		
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3		
CO1	1	1	1	1 - 1 1				-	-	1	1	1-	1	1	1		
CO2	2	1	2	-	1	2	-	1	-	1	-	+	2	1	2		
CO3	2	2	2	-	1	2	-	1	1-	1	1	-	2	2	2		
CO5	3	2	2	1	+	1	-	1	-	1	2	+	3	2	3		
C06	3	-	-	1'	+		-		-		-	+	3	-	3		
000	1-	-	-	1-	ļ-	1-	-	ļ-	ļ-	-		-	ļ-	ļ-	-		



BSc_FoodTechnology

Title of the Course	Processing of spices and	ing of spices and plantation crops [T]										
Course Code	BSFT-0303 [T]	[1] 103 [T]										
			Part A									
Year	2nd	Semester	3rd	Credits	L	Т	P	С				
Ioai	Zild	Selliester	Sid	Ofedita	3	0	1	4				
Course Type	Embedded theory and lal	b										
Course Category	Course Category Disciplinary Major											
Pre-Requisite/s	candidates must have pa Science as compulsory s	ndidates must have passed class 12 or equivalent from a recognised board with Physics, Chemistry, and Biology/Home indicates must have passed class 12 or equivalent from a recognised board with Physics, Chemistry, and Biology/Home Co-Requisite/s Student should have basic knowledge about plants, their morphology and anatomy.										
Course Outcomes & Bloom's Level	CO2- To understand the CO3- To describe compre	c concepts and view of professional and scientific com gene transfer mechanisms and a detailed insight into n ehensive understanding of sterilization processes and ental basis, and to enable students to analyse the bas	nutations and their analysis (BL2-Understand) media preparation pipelines (BL3-Apply)	BL1-Remember) ional aspects, and elements of microbial genetics(BL4-Analyze)								
Skill Development ✓ Entrepreneurship × Professsonal Ethics × Gender X Human Values × Environment ×												
			Part B									

 Part B

 Modules
 Contents
 Pedagogy
 Hours

	Par	t C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To estimate 1000 kernel weight, bulk density, true density and porosity of given sample of grains	Experiments	BL2-Understand	2
2	To determine coefficient of friction and angle of repose of given grain samples	Experiments	BL4-Analyze	2
3	To determine the caffeine content in given samples of tea and coffee	Experiments	BL5-Evaluate	2
4	To prepare decaffeinated tea	Experiments	BL6-Create	2
5	To determine the adulteration of spices	Experiments	BL4-Analyze	2
6	To prepare the essential oil from spices	Experiments	BL6-Create	2
7	To prepare masala pre-mix for culinary uses	Experiments	BL6-Create	2
8	To perform grading of different kind of tea	Experiments	BL5-Evaluate	2
9	To prepare chocolate based food product	Experiments	BL6-Create	2
10	To visit a related industry	Industrial Visit	BL4-Analyze	2

Part D(Marks Distribution)

	Theory										
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation										
100	40	60	18	40							
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	30	40							

Part E

Books	Spices, condiments and seasonings-Kenneth T. Farrell
	https://www.researchgate.net/profile/Gangaiah-Bandla/publication/349075652_AN_OVERVIEW_OF_INTEGRATED_FARMING_SYSTEMS_OF_COASTAL_INDIA/links/6020d8a7299bf1cc26ae8793/AN-OVERVIEW-OF-INTEGRATED-FARMING-SYSTEMS-OF-COASTAL_INDIA/pdf#page=25
References Books	Tea Production and Processing-Baneripee B. Spice Science and Technology-Kenij Hirasa and MitsnoTakemasa Chocolate, Cocoo and Confectionery Technology. Minifie BW Handbook on Spices. National Institute of Industrial Research Board, -NIIR Coffee Processing Technology-Shetz M & Footel HE
MOOC Courses	https://onlinecourses.nptel.ac.in/noc22_ag13/preview
Videos	https://www.youtube.com/watch?v=-NyDCWuAGfi&embeds_referring_euri=https%3A%2F%2Fonlinecourses.nptel.ac.in%2F&source_ve_path=Mjg2N)Y&feature=emb_logo

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	1	1	-	-	-	1	1	3	1	1
CO2	3	3	3	2	2	2	-	-	-	-	-	2	3	1	1
CO3	3	2	3	3	3	1	-	-	-	-	-	1	3	1	1
CO4	2	2	2	2	3	3	-	-	-	-		3	3	3	3
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	=	=	=	=	ı.	-	-	-	i	1	-	-



BSc_FoodTechnology

Title of the Course	Beverage Technology [T]												
Course Code	BSFT-0401 [T]	M01[T]											
	Part A												
Year 2nd Semester 4th Credits L T P C													
1001	Liid	odinosta.		Siculo	3	0	1	4					
Course Type	Embedded theory and la	b											
Course Category Disciplinary Major													
Pre-Requisite/s	Student must have studi	ent must have studies food microbiology and introduction to food technology in previous semester Co-Requisite/s knowledge of food fermentation and preservation											
Course Outcomes & Bloom's Level	CO2- To understand the CO3- To describe compr CO4- To provide experin	ic concepts and view of professional and scientific or gene transfer mechanisms and a detailed insight int ehensive understanding of sterilization processes an tental basis, and to enable students to analyse the b the current regulatory, quality control, and legal fram	o mutations and their analysis (BL2-Understand) and media preparation pipelines (BL3-Apply) asic concepts of microbial evolution, phylogeny, no	s (BL1-Remember) utritional aspects, and elements of microbial genetics(BL4-Analy viours that foster positive and productive interactions in diverse r	ze) nicrobiology an	d biotechnolog	y settings.(BL5-	Evaluate)					
Skill Development Entrepreneurship Employability Employability Employability Employability Fortlessconial Ethics × Gender × Human Values × Entrepreneurship Entrepreneurship SDG (Goals) SDG3(Zoro hunger) SDG3													
Part B													

Modules Contents Pedagogy Hours Part C Indicative-ABCA/PBL/ Experiments/Field work/ Internships Modules Title Bloom's Level Experiments Experiments Determination of Quality parameters of bottled water BL2-Understand Brewing perfect French press coffee from roasted coffee beans BL2-Understand Experiments
Experiments Preparation of nectar and cordials BL3-Apply Determination of TSS, pH and titratable acidity of different beverages Experiments BL3-Apply Determination of the caffeine level in stimulating beverages
Preparation of Alcoholic beverages
Preparation of coconut water energy drink Experiments BL3-Apply

Part D(Marks Distribution)

Experiments Experiments

BL3-Apply BL3-Apply

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation Min. External Evaluation		Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40	0							
	Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	60	30	40	0							

Part E Manay, N.S. and Shadaksharaswamy, M. (2008) Foods: Facts and principles. New Delhi: New Age International Ltd. Books Articles Mudgil, D. and Barak, S. (2018) Beverages: Processing and technology. Jodhpur, India: Scientific Publishers. Varnam, A.H. and Sutherland, J.R. (2009) Beverages: Technology, Chemistry and Microbiology. Londos €tc.: Chapman and Hall. References Books MOOC Courses https://nptel.ac.in/courses/126105020 https://www.youtube.com/watch?v=h5NpTku5BGc Videos

Course Articulation Matrix
P08 P09 COs PO1 PO2 PO3 PO4 PO5 P06 P07 PO10 PO11 PO12 PSO1 PS02 PSO3 CO1 CO2 CO3 3 2 2 3 CO4 2 1 3 2 3 2 CO5 2 3



BSc_FoodTechnology

Title of the Course	Livestock product technology [7	ock product technology [T]											
Course Code	BSFT-0403 [T]	ο3[Π]											
	Part A												
Year	2nd	Semester	4th	Credits	L	Т	Р	С					
					3	0	1	4					
Course Type	Embedded theory and lab	dded theory and lab											
Course Category	Discipline Core	е Соге											
Pre-Requisite/s	Students must have studied for	od processing and preservation, food nutrition and related subject	Co-Requisite/s										
Course Outcomes & Bloom's Level	CO2- To understand the gene t CO3- To describe comprehensi CO4- To provide experimental	repts and view of professional and scientific communication approransfer mechanisms and a detailed insight into mutations and the understanding of sterilization processes and media preparatio basis, and to enable students to analyse the basis concepts of miterit regulatory, quality control, and legal frameworksthat impact	ir analysis (BL2-Understand) n pipelines (BL3-Apply) crobial evolution, phylogeny, nutritional aspects, and elements	of microbial genetics(BL4-Analyze) oductive interactions in diverse microbiology and biotechnology	settings.(BL5-E	/aluate	e)					
Cours Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being)									
		Part	В										

Modules Contents Pedagogy Hours

	Par	t C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To study the structure of an egg	Experiments	BL2-Understand	2
2	To determine the specific gravity of eggs	Experiments	BL5-Evaluate	2
3	To study the process of osmosis by the removal of egg shell	Experiments	BL4-Analyze	2
4	To determine the exterior and interior quality (breakout method) of table eggs.	Experiments	BL4-Analyze	2
5	To determine egg quality using candling	Experiments	BL4-Analyze	2
6	Preparation of an egg/chicken pickle and its sensory evaluation	Experiments	BL6-Create	2
7	Determination of water holding capacity of meat	Experiments	BL5-Evaluate	2
8	Determination of extract release volume (ERV) of meat	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation Min. External Evaluation		Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40								
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	60	30	40								

Part E

Books	Outlines of meat science and technology by B.D Sharma			
Articles				
References Books Poultry Meat and Egg Production by Parkhurst and Mountney				
MOOC Courses	https://nptel.ac.in/courses/127106236			
Videos https://www.youtube.com/watch?v=i5VwdkggtWU				

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	2	1	-	-	-	-	-	-	3	1	1
CO2	3	3	2	1	2	1	-	-	1	-	-	1	3	1	1
CO3	2	3	3	2	2	2	1	-	1	-	1	2	3	1	1
CO4	1	2	3	2	2	3	1	-	1	-	1	1	3	3	3
CO5	1	3	2	-	2	1	-	-	1	-	-	-	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_FoodTechnology

Title of the Course	Dairy Technology [T]	echnology [T]										
Course Code	BSFT-0501 [T]											
		Part	A									
Year	3rd	Semester	5th	Credits	L	Т	Р	С				
					3	0	1	4				
Course Type	Embedded theory and lab	ided theory and lab										
Course Category	Discipline Core	е Соге										
Pre-Requisite/s	candidates must have passe and an overall grade of at lea	didates must have passed class 12 or equivalent from a recognised board with Physics, Chemistry, and Biology/Home Science as compulsory subjects an overall grade of at least 50%										
Course Outcomes & Bloom's Level	CO2- To understand the general CO3- To describe comprehenced CO4- To provide experimental CO4- To provi	ncepts and view of professional and scientific communication appre te transfer mechanisms and a detailed insight into mutations and the siste understanding of sterilization processes and media preparation at basis, and to enable students to analyse the basic concepts of mit current regulatory, quality control, and legal frameworksthat impact	eir analysis (BL2-Understand) n pipelines (BL3-Apply) crobial evolution, phylogeny, nutritional aspects, and elements	of microbial genetics(BL4-Analyze) roductive interactions in diverse microbiology and biotechnology	/ setting	s.(BL5 -	Evaluat	te)				
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDC2(Zuro hunger) SDC3(Zero hunger) SDC3(Zero haalth and well-being) SDC3(Zero haalth and well-being) SDC3(Zero haalth and well-being)								

Part B Pedagogy Hours

	Par	t C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To perform platform tests in milk.	Experiments	BL2-Understand	2
2	To estimate milk protein by Folin method.	Experiments	BL4-Analyze	2
3	To estimate milk fat by Gerber method.	Experiments	BL5-Evaluate	2
4	Preparation of flavored milk.	Experiments	BL6-Create	2
5	Pasteurization of milk	Experiments	BL3-Apply	2
6	To prepare casein and calculate its yield	Experiments	BL6-Create	2
7	Learning objective To prepare yoghurt from different sources of milk and conduct its sensory evaluation. Learning This project will help students to learn the preparation of yoghurt and also the principle of sensory evaluation	PBL	BL6-Create	2
8	Significance of lactose in industry	Seminar	BL4-Analyze	2

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	Minimum Passing Marks External Evaluation		Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40	0						
	•	•	Practical	•	•						
Total Marks	Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	18	40	0						

Part E

Books	
Articles	https://www.frontiersin.org/articles/10.3389/fanim.2021.760310/full
References Books	De Sukumar Outlines of Dairy Technology, Oxford University Press, Oxford. 2007. Webb and Johnson, Fundamentals of Dairy Chemistry
MOOC Courses	https://onlinecourses.nptel.ac.in/noc24_ag15/preview
Videos	https://www.youtube.com/watch?v=8MCm0-ncgos&t=4s

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	1	1	-	1	-	1	1	3	1	1
CO2	1	1	2	1	-	-	1	1	-	1	-	-	3	1	1
CO3	2	1	1	1	-	1	-	-	1	-	1	-	3	1	1
CO4	3	2	1	1	1	-	1	1	-	1	-	-	3	3	3
CO5	3	2	2	2	2	2	1	1	1	-	2	-	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_FoodTechnology

Title of the Course	Sensory Evaluation [T]										
Course Code	BSFT-0502 [T]										
			Part A								
Year	3rd	Semester	5th	Cred	Credits		Т	Р	С		
100	0.0	Semester Still Credits				3	0	1	4		
Course Type	Embedded theory and lab										
Course Category	Discipline Core	line Core									
Pre-Requisite/s	Students should have stud	died food additives and food chemistry	Co-Requ	uisite/s							
Course Outcomes & Bloom's Level	CO2- To understand the g CO3- To describe compre CO4- To provide experime	concepts and view of professional and scientific communic gene transfer mechanisms and a detailed insight into mutatic hensive understanding of sterilization processes and media ental basis, and to enable students to analyse the basic com- ne current regulatory, quality control, and legal frameworksth	ns and their analysis (BL2-Understand) preparation pipelines (BL3-Apply) pepts of microbial evolution, phylogeny, nutrition	al aspects, and elements of microbial gen	netics(BL4-Analyze) ctions in diverse microbiology	and biotechn	ology settin	gs. (BL5-Ev	raluate)		
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG1(No poverty) SDG3(Good health and well-being) SDG6(Clean water and sanitation)							
			Part B								
Modules		Contents		Pedagogy			Н	ours			

	Pai	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Use nine-point hedonic scale for sensory evaluation	Experiments	BL2-Understand	2
3	Preparation of dilution sample for sensory evaluation	Experiments	BL3-Apply	2
4	Threshold test in different food products	Experiments	BL3-Apply	2
5	Estimation of crude fibre in the food sample	Experiments	BL4-Analyze	2
6	Estimation of color properties in food sample	Experiments	BL4-Analyze	2
7	Determination of textural changes by different unit operations	Experiments	BL4-Analyze	2
8	Extraction of pomace from fruits	Experiments	BL3-Apply	2
9	Extraction of pigments from fruits and vegetables	Experiments	BL3-Apply	2

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40	0							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	60	30	40	0							

rait c	
cience & Business Media.	
its and Vegetables.	

Books	Potter, N. N., & Hotchkiss, J. H. (2012, December 6). Food Science. Springer Science & Business Media.
Articles	
References Books	Lal, G., Siddappa, G. S., & Tandon, G. L. (1986, January 1). Preservation of Fruits and Vegetables. Sanjeev, SR. P. K., & Kumar, S. (2002, November 30). Fruit and Vegetable Preservation.
MOOC Courses	https://nptel.ac.in/courses/126103017
Videos	https://www.youtube.com/watch?v=F8jhoaV-nsE&t=1s

								rse Articulation							
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	-	1	-	1	-	1	-	-	3	1	1
CO2	3	1	1	-	-	1	-	-	-	-	1	-	3	1	1
CO3	3	2	1	1	-	1	1	-	-	-	-	-	3	1	2
CO4	3	1	3	-	-	1	-	1	-	1	-	-	3	1	2
CO5	3	2	3	-	-	1	-	-	-	-	1	-	3	2	-



BSc_FoodTechnology

Title of the Course	Food product/processing waste	oroduct/processing waste management [T]									
Course Code	BSFT-0601 [T]										
		Part A									
Year	3rd	Semester	6th	Credits	L T P C 3 0 1 4						
Course Type	Embedded theory and lab	theory and lab									
Course Category	Discipline Core	Core									
Pre-Requisite/s	Student should have studied s	hould have studied subjects- processing of cereals and pulses, fruits and vegetables, technology of flesh foods, dairy technology in the previous semesters Co-Requisite/s									
Course Outcomes & Bloom's Level	CO2- To understand the gene CO3- To describe comprehens CO4- To provide experimental	cepts and view of professional and scientific communication approach transfer mechanisms and a detailed insight into mutations and their view understanding of sterilization processes and media preparation pipping basis, and to enable students to analyse the basic concepts of mirror trent regulatory, qualify control, and legal frameworksthat impact bioter	alysis (BL2-Understand) elines (BL3-Apply) al evolution, phylogeny, nutritional aspects, and elements of micro	. bbial genetics(BL4-Analyze) e interactions in diverse microbiology and biotechnology settings	s.(BL5-Evaluate)						
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professonal Ethics X Gender X Human Values X Environment ✓		SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG6(Clean water and sanitation)							
		Part B									

Hours Part C Indicative-ABCA/PBL/ Experiments/Field work/ Internships Modules Title Bloom's Level Hours Experiments
Experiments
Experiments
Experiments
Experiments Production of Banana fiber from banana pseudo-stem BL3-Apply 2 Production of ethyl alcohol from molasses BL4-Analyze Extraction of polyphenols from fruit and vegetable peels Isolation of starch from mango kernels BL4-Analyze Extraction of pectin from fruit waste BL4-Analyze Extraction of oil from citrus peel
Preparation of candied orange peel
Preparation of fiber rich cookies BL4-Analyze Experiments PBL BL3-Apply

Part D(Marks Distribution)

BL3-Apply

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	40	60	18	40	0						
	Practical Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	60	18	40	0						

Part E

Books	Wang, L. K., Hung, Y. T., Lo, H. H., & Yapijakis, C. (2005, September 29). Waste Treatment in the Food Processing Industry.					
Articles						
References Books Green, J. H., & Kramer, A. (1979, January 1). Food Processing Waste Management. A V I Publishing Company.						
MOOC Courses	https://hptel.ac.in/courses/105105350					
Videos	https://www.youtube.com/watch?v=Ee8RqLKgGUg8L=1s					

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	-	1	1	2	1	1	1	-	3	1	1
CO2	2	1	1	1	1	-	1	-	1	-	-	-	3	1	2
CO3	3	1	1	-	-	1	-	2	1	1	-	-	3	1	2
CO4	3	2	1	1	1	2	1	-	-	-	2	-	3	2	3
CO5	3	2	1	1	1	2	-	1	-	1	1	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	÷	-	-	-	-	-



							В	Sc_FoodTechn	ology							
	Title of the	Course	Food Law	s and Regulations [тј											
	Course C	ode	BSFT-060													
			1					Part A								
			3rd				6th			Credits		L	Т	P	С	
	Year		310		Semester		otn			Credits		4	0	0	4	
	Course 1	уре	Theory or	nly					•			•	•	•		
	Course Car	egory	Discipline	Core												
	Pre-Requi	site/s	Knowledg	ge of food laws and	regulations		Co-Requisite/s									
	Course Out & Bloom's	comes Level	CO2- To 0 CO3- To 0 CO4- To 1	understand the gene describe compreher provide experimenta	e transfer mechanism sive understanding on Il basis, and to enable	ns and a deta of sterilization le students to	iled insight into mut processes and me analyse the basic of	ations and their and dia preparation pipe concepts of microbia	alysis (BL2-Underst elines (BL3-Apply) al evolution, phyloge	ny, nutritional aspects	s, and elements of mic	robial genetics(BL4-A	inalyze) irse microbiology an	d biotechnology settings	.(BL5-Evaluate)	
	Coures Ele	ments	Skill Development X Entrepreneurship X Emptoyability ✓ Professonal Effice ✓ Gender X Human Values X Environment X SDG (Goals) SDG (Goals) SDG (Goals) SDG (Goals) SDG (Goals) SDG (Goals) SDG (Quality education) SDG (Quality education) SDG (Quality education)													
Part B Modules Contents Pedagogy Hours																
	Modu	es				Co	ntents				Ped	lagogy		Hou	rs	
								rt D(Marks Distr Theory	•							
Total Ma			mum Passing Mar	ks		ernal Evaluat				Internal Evaluation			Min. Internal Evaluation			
100	4	0			60			18			40					
								Practical								
Total Ma	irks	Mini	mum Passing Mar	ks	Exte	ernal Evaluat	ion	м	lin. External Evalua	ition	Interi	nal Evaluation		Min. Internal Evaluation		
	Book		Detricio A	Custin Food Lauren	and Regulations by	Diselevell auth	slicker	Part E								
	Article		Patricia A	. Curus, rood Laws	and Regulations by	blackwell put	nisitet									
	References		Kiron Prai	bhakar; A Practical (CP & ISO-22000. IS	Guide to Food Laws a	and Regulation	ins									
	MOOC Co	urses	IOA, FIAO	5. Q 100-22000. IC	-00000-01											
	Video															
								Audious of the								
COs	PO1	PO2	PO3	PO4	PO5 P	06	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	1	1	1	1	1 1		1	1	1	1	1	-	1	2	1	
CO2	1	2	1	2	1 1		2	1	2	1	-	-	1	2	1	
CO3	2	2	2	2	2 1		2	2	2	1	1	-	2	3	2	
CO4	2	3	2	2	2 2		1	1	2	1	-	-	2	3	2	
C05	3	3	3	2	3 2		1	2	1	1	1	-	3	3	3	
CO6	-	-	-	-						-	-	-	-	-	-	



BSc_FoodTechnology

Title of the Course	Food Packaging [T]									
Course Code	BSFT-0603 [T]									
		F	Part A					-		
Year	3rd	Semester	6th	Credits	L	Т	Р	С		
					3	0	1	4		
Course Type	Theory only									
Course Category	Discipline Core	re								
Pre-Requisite/s	Student must have studied a	about different food products, and their physiochemical properties	s	Co-Requisite/s						
Course Outcomes & Bloom's Level	CO2- To understand the ger CO3- To describe comprehe	oncepts and view of professional and scientific communication a ne transfer mechanisms and a detailed insight into mutations and ensive understanding of sterilization processes and media prepar tal basis, and to enable students to analyse the basic concepts o	their analysis (BL2-Understand)	nents of microbial genetics(BL4-Analyze)	•					
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Entrepreneurship ✓ Employability ✓ Coures Elements Professsonal Ethics × Gender × Human Values × Environment ×			SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being)						

	Parl	C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Identification of different types of packaging and packaging materials	Experiments	BL3-Apply	2
2	To perform different destructive tests for glass containers	Experiments	BL4-Analyze	2
3	Measurement of thickness of packaging materials	Experiments	BL4-Analyze	2
4	Determination of water-vapour transmission rate	Experiments	BL4-Analyze	2
5	Testing of chemical resistance of packaging materials	Experiments	BL4-Analyze	2
6	To perform sterilization of different packaging materials	Experiments	BL4-Analyze	2
7	To determine leakage of plastic pouches	Experiments	BL4-Analyze	2
8	To determine the basis weight, density and grammage of paper and paper board	Experiments	BL4-Analyze	2
9	To determine the wax content in given sample of wax paper	Experiments	BL4-Analyze	2
10	Visit to relevant industries	Industrial Visit	BL3-Apply	2

Part B

Pedagogy

Hours

Modules

Part D(Marks Distribution) Theory

Min. External Evaluation Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation 100 40 60 18 Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation

	Part E											
Books	Paine, F. A., & Paine, H. Y. (2012, December 6). A Handbook of Food Packaging. Springer Science & Business Media.											
Articles												
References Books	Sacharow, S., & Griffin, R. C. (1980, January 1), Principles of Food Packaging, Avi Publishing Company.											
MOOC Courses	https://nptel.ac.in/courses/127108237											
Videos	https://www.youtube.com/watch2v=0h3de10Hvk8											

Course Articulation Matrix															
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	1	-	1	-	1	-	3	1	1
CO2	3	1	1	1	1	-	1	-	-	1	-	-	3	1	1
CO3	3	1	1	=	-	-	2	1	-	2	2	-	3	1	2
CO4	3	2	1	1	1	-	2	-	1	-	-	-	3	1	2
C05	3	2	1	-	-	1	2	1	2	1	2	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_FoodTechnology

Title of the Course	Product Development and F	ormulation [T]										
Course Code	BSFT-0701 [T]											
		P	art A									
Year	4th	Semester	Zib	Credite	L	Т	Р	С				
100.	401	Comosion	741	Sidalo	3	0	1	4				
Course Type	Embedded theory and lab											
Course Category	Disciplinary Major	ary Major										
4th Semester 7th Cradits 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1												
	CO2- To understand the get CO3- To describe comprehe CO4- To provide experimen	ne transfer mechanisms and a detailed insight into mutations and ensive understanding of sterilization processes and media prepara tal basis, and to enable students to analyse the basic concepts of	their analysis (BL2-Understand) ation pipelines (BL3-Apply) microbial evolution, phylogeny, nutritional aspects, and elem	ents of microbial genetics(BL4-Analyze) nd productive interactions in diverse microbiology and biotechno	logy set	ings.(BL	.5-Evalu	ate)				
Coures Elements			SDG (Goals)	SDG2(Zwo hunger) SDG3(Good health and well-being) SDG12(Responsible consuption and production)								

Part B Modules Contents Pedagogy Hours

	Par	IC .		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preparation of high fibre bread.	Experiments	BL6-Create	2
2	Preparation of high fibre biscuits	Experiments	BL6-Create	2
3	Preparation of high fibre cake	Experiments	BL6-Create	2
4	Preparation of nutritious beverages	Experiments	BL6-Create	2
5	Preparation of functional foods for obese person.	Experiments	BL6-Create	2
6	Preparation of functional foods for aged persons	Experiments	BL6-Create	2
7	Preparation of hypocholesterolmic foods	Experiments	BL6-Create	2
8	Preparation of low sodium foods	Experiments	BL6-Create	2
9	Preparation of foods for underweight persons	Experiments	BL6-Create	2
10	Preparation of fortified atta	PBL	BL6-Create	2

Part D(Marks Distribution)

	Theory													
Total Marks	Total Marks Minimum Passing Marks		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation									
100	40	60	18	40	12									
			Practical											
Total Marks	Total Marks Minimum Passing Marks External Eva		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation									
100	50	60	30	40	20									

Part E

Books	New food product development: From concept to market placeGordon W. Fuller
Articles	https://www.sciencedirect.com/science/article/abs/pii/0924224494900175
References Books	Basic Food Preparation-A complete Manual-Raina et.al. Foods: Facts and Principles-Manuy, S. and Shadaksharsawami, M. Bradfast Certals and How They are Made/-R.B. Fast and E.F.Caldwell
MOOC Courses	https://nptel.ac.in/courses/126105015
Videos	https://www.youtube.com/watch?v=k1a2PSEXahM

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	2	2	1	-	1	-	-	1	1	3	1
CO2	3	3	2	3	3	3	-	-	1	-	-	-	2	3	1
CO3	3	2	2	3	3	2	-	-	1	-	-	-	2	3	1
CO4	2	2	3	3	3	3	2	-	1	-	2	3	3	3	3
CO5	2	3	3	2	2	2	2	-	1	-	2	3	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_FoodTechnology

Title of the Course	Fermentation technology	П											
Course Code	BSFT-0702 [T]	m											
			Part A										
Year	4th	Semester	7th	Credits	L	Т	Р	С					
					3	0	1	4					
Course Type	Embedded theory and la	b											
Course Category	Disciplinary Minor	plinary Minor											
Pre-Requisite/s	Student must have studie	ed food microbiology and dairy technology in previous seme	ester.	Co-Requisite/s									
Course Outcomes & Bloom's Level	CO2- To understand the CO3- To describe compre CO4- To provide experim	ic concepts and view of professional and scientific communi gene transfer mechanisms and a detailed insight into mutat ehensive understanding of sterilization processes and medi nental basis, and to enable students to analyse the basic co the current regulatory, quality control, and legal frameworks	tions and their analysis (BL2-Understand) a preparation pipelines (BL3-Apply) ncepts of microbial evolution, phylogeny, nutritional asp	·	y and bio	technology s	ettings.(BL5	-Evaluate)					
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment ✓		SDG (Goals)	SDG3(Good health and well-being) SDG5(Diean water and sanitation) SDG9(Industry Innovation and Infrastructure)									
			Part B										

 Part B

 Modules
 Contents
 Pedagogy
 Hours

	Par	t C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preparation of Yoghurt	Experiments	BL4-Analyze	2
2	Preparation of whey based fermented beverage	Experiments	BL4-Analyze	2
3	Preparation of pickles	Experiments	BL4-Analyze	2
4	Preparation and maintenance of starter cultures	Experiments	BL4-Analyze	2
5	Preparation of Sauerkraut	Experiments	BL4-Analyze	2
6	Preparation of Bread	Experiments	BL4-Analyze	2
7	Preparation of wine	PBL	BL5-Evaluate	3
8	Preparation of Cheese	PBL	BL5-Evaluate	3
9	Preparation of tofu	Experiments	BL4-Analyze	2
10	Preparation of vinegar	Eyneriments	RI 4-Analyze	2

Part D(Marks Distribution)

			Theory		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	40 60 1		18	40	
			Practical		
Total Marks Minimum Passing Marks External Evaluation		External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	40	60	30	40	

Part E

Books	Industrial Microbiology by A. H. Patel
Articles	https://www.sciencegate.app/document/10.1016/b978-0-12-821292-9.00026-1
	Microbial Biotechnology: Fundamentals of Applied Microbiology - A. N. Glazer and H. Nikaido Principles of Fermentation Technology by PF Stanbury Dr Whitaker
MOOC Courses	https://hptel.ac.in/courses/102105087
Videos	https://youtu_be/m27ouF6x/Zg?si=ywlB2EI/JDIUFuCek

COs	PO1	PO2	PO3	PO4	P05	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	-	1	-	1	-	-	-	2	1	1
CO2	2	2	1	1	1	-	1	-	-	-	-	-	2	2	2
CO3	2	2	2	2	1	1	-	1	-	1	1	-	3	2	3
CO4	3	3	2	2	1	-	1	-	-	-	-	-	3	2	3
CO5	3	3	2	2	1	-	1	-	1	-	-	-	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



							В	Sc_FoodTechno	ology						
	Title of the Co	urse	Food r	frigeration and cold	storage [T]										
	Course Co	de	BSFT-	703a [T]											
								Part A							
	Year		4th			Semester	7	'th			Cre	edits	L 4	T P 0 0	C 4
	Course Typ	DB	Theor	only						II.					l
	Course Categ	gory	Discip	ine Specific Elective											
	Pre-Requisit	ie/s	Stude	t must have studied	food processing an	d preservation in p	revious semester				Co-Rec	quisite/s			
	Course Outco & Bloom's Lo		CO2- CO3- CO4-	To understand the ge To describe compreh To provide experime	ne transfer mechan ensive understandin tal basis, and to en	isms and a detaile ng of sterilization po able students to ar	d insight into muta rocesses and med nalvse the basic co	itions and their anal lia preparation pipel oncepts of microbial	lysis (BL2-Unders lines (BL3-Apply) I evolution, phylogi	env. nutritional aspec	ts. and elements of mic	crobial genetics(BL4-A	.nalyze) rse microbiology and	biotechnology settings.	(BL5-Evaluate)
Entre Emp Coures Elements Profe Gener Hum				evelopment X reneurship X yability ✓ ssonal Ethics X r X i Values X inment ✓				SDG3(Good health and well-being) SDG7(Microtable and clean energy) SDG12(Responsible consuption and product							
	Part B														
	Modules Contents										Ped	lagogy		Hour	s
	Ded Distribution National														
Part D(Marks Distribution) Theory															
Total Ma	rke	Mini	num Passing I	larke		xternal Evaluatio			n. External Evalu	ation	Inter	nal Evaluation		Min. Internal Evalu	ation
100	40		ilulii rassiily i	idiko	60	.xterriai Evaluatio		18	III. EXCEITIAI EVAIG	ation	40	iai Evaluation		wiii. iiiteriiai Evait	auon
100	40				00			Practical 40							
Total Ma	rks	Mini	num Passing I	larks		xternal Evaluatio	n	Min. External Evaluation Internal Evaluation			nal Evaluation	Min. Internal Evaluation			
								mil. External Evaluation internal Evaluation mill. Internal							
								Part E							
	Books		Raym	nd R. Gunther- Refr	igeration, Air Condit	tioning and Cold St	orage	Talti							
	Articles														
	References B	ooks	Clive I	.J. Dellino- Cold and kundwar & Subhash	Chilled Storage Te	chnology	na Tachnology								
	MOOC Cour	ses		nptel.ac.in/courses/1		e a i reezer otoraș	ge reciliology								
	Videos		https://	outu.be/Y1oM3AYh	tyA?si=5ZBDE0ow5	5kMWDExx									
ļ					-										
			1	1	1	ı		urse Articulation	T .	T		T			
COs	P01	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	-	-	-	-	-	-	2	2	2	-
CO2	1	1	1	1	-	1	1	-	-	1	-	2	2	2	-
	2	2	2	1	1	1	-	1	-	-	-	3	2	2	-
	2	2	2	1				-	-	3	2	3	-		
CO5	3	2	2	1	1	-	1	1	-	1	1	3	2	3	-
CO6	-	-	-	-	-	-	-	-	-	=	-	-	-	-	-



							E	SSc_FoodTechi	nology								
	Title of the	Course	No	vel food processing	techniques	s [T]											
	Course	Code	BS	FT-0802 [T]													
								Part A									'
	Yea		41			Semeste		8th				Credits		L	T	P	С
	166		41			Semeste		oui				Credits		4	0	0	4
	Course	Туре	Т	neory only													
	Course C	ategory	D	sciplinary Major													
	Pre-Requ	uisite/s	s	udents must have st	ents must have studied food processing and preservation in previous semester Co-Requisite/s												
	CO1- To identify the basic concepts and view of professional and scientific corm Course Outcomes CO2- To understand the gene transfer mechanisms and a detailed insight into m CO3- To describe comprehensive understanding of sterilization processes and n CO4- To provide experimental basis, and to enable students to analyse the basis CO5- To apply Appraise the current regulatory, quality control, and legal framew.								nalysis (BL2-Unde	erstand)	•	s of microbial genetics(BL4 productive interactions in di	I-Analyze) iverse microbiolo	ogy and biot	echnology se	ttings.(BL5-E	valuate)
Entrepreneurship Employability ✓				nployability √ ofesssonal Ethics X ender X uman Values X	SDG3(Good health and well-being)												
								Part B									
	Modules Contents											Pedagogy				Hours	
	Part D(Marks Distribution) Theory																
Total M	arks		nimum Pass	ng Marks		External Evaluation Min. External Evaluation				aluation	Internal Evaluation			Min. Internal Evaluation			
100		40			60	0		18			40						
								Practical				Internal Evaluation					
Total M	arks	Mi	nimum Pass	ng Marks		External Eva	luation	'	Min. External Ev	aluation				Min. Internal	Evaluation		
	,							Part E					•				
	Boo	ks	D	a-Wen Sun- Emergir	g Technolo	gies for Food Processing		Tarte									
	Artic	les															
	Reference	s Books				Novel Food Processing											
	MOOC C	ourses	ht	ps://nptel.ac.in/cours	es/126105	i015											
	Vide	os	ht	ps://youtu.be/k1a2P	SEXahM?s	i=5fmJz3BaChiLsDGr											
							0.										
Course Articulation Matrix Cos P01 P02 P03 P04 P05 P06 P07 P08 P09 P010 P011 P012 PS6									PSO1	F	°SO2	PSO	3				
CO1	1	1	2	1	1	-	-	-	-	1	1	-	2	2		2	
CO2	2	1	2	1	-	1	1	-	1	-	-	-	2	2	!	2	
CO3	3	2	2	2 1 1 1 1 1					-	1	-	-	3	2		3	
CO4	3	2	2	2		-	-	-	-	-	-	-	3	3		3	



BSc_FoodTechnology

Title of the Course	Legumes and oilseeds Te	egumes and oilseeds Technology [T]										
Course Code	BSFT-0803a [T]											
			Part A									
Year	4th	Semester	8th	Credits	L	Т	P	С				
					3	0	1	4				
Course Type	Embedded theory and lab											
Course Category	Hscipline Specific Elective											
Pre-Requisite/s	Students must have stud	ied processing of cereals, pulses and oilseeds in previous	Co-Requisite/s									
Course Outcomes & Bloom's Level	CO1- To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1-Remember) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO3- To describe comprehensive understanding of settinization processes and media preparation pipelines (BL3-Apply) CO4- To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolution, phylogony, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO4- To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolution, phylogony, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO5- To apply Appraise the current requisatory, quality control, and legal reameworkshalt impact biotechnology and ethical behaviours that foster positive and productive interactions in diverse microbiology and biotechnology settings (BL5-Evaluate)											
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG12(Responsible consuption and production)								
			Part B									
Modules		Contents	Pedagogy	tagogy Hours								

Part C												
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours								
1	To determine the physical properties of legumes and oil seeds.	Experiments	BL4-Analyze	2								
2	To determine the nutritional quality of selected pulses and oilseeds.	Experiments	BL4-Analyze	2								
3	To study the preconditioning of pulses and oilseeds before milling	Experiments	BL4-Analyze	2								
4	To study the removal of anti-nutritional compounds from selected pulses and oilseeds	Experiments	BL4-Analyze	2								
5	To study the cooking quality of dhal	Experiments	BL5-Evaluate	2								
6	To develop a composite legume mix and prepare a value added product.	Experiments	BL5-Evaluate	2								
7	To prepare soya milk and groundnut milk	PBL	BL6-Create	3								
8	To prepare soya sauce	PBL	BL6-Create	3								
9	To prepare value added food products from deciled cake	PBL	BL6-Create	3								
10	To extract oil using solvent extraction method from oilseeds	Eyneriments	BI 5-Evaluate	2								

Part D(Marks Distribution) Theory Min. External Evaluation External Evaluation Internal Evaluation Min. Internal Evaluation Total Marks Minimum Passing Marks 40 60 40 Practical Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Total Marks 40 60 40

Part E										
Books	Chakraverty A., Post harvest technology of cereals: pulses and oilseeds									
Articles										
References Books	Kay DE, Food Legumes									
MOOC Courses	https://hptel.ac.in/courses/103105460									
Videos	https://youtu.be/eJB EjnH4eo?si=vulZ7dqrs1UU0Mc7									

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	1	-	1	1	-	-	1	1	-	3	2	1
CO2	2	2	1	1	1	-	1	1	-	-	-	-	3	2	1
CO3	2	2	1	1	1	1	1	1	-	1	-	-	3	3	2
CO4	3	3	2	1	1	-	1	-	1	-	-	-	3	3	3
CO5	3	3	2	1	-	1	1	1	1	1	1	-	3	3	3
CO6	1-	-	-	-	_	-	-	_	_	_	-	-	-	-	-



BSc_FoodTechnology

	1												
Title of the Course	Food Chemistry [T]												
Course Code	BSFT0103[T]												
	Part A												
Year	1st	Semester	1st		Credits	L	T	Р	С				
Tear	151	Semester	151		Credits	3	0	1	4				
Course Type	Embedded theory and lab						•	•					
Course Category	Discipline Core	cipline Core											
Pre-Requisite/s	Student must have the bas	sic knowledge of Physical ,Inorganic and Organic chemistry		Co-Requisite/s									
Course Outcomes & Bloom's Level	CO2- To understand the gr CO3- To describe compret CO4- To provide experime	concepts and view of professional and scientific communication encursed mechanisms and a detailed insight into mutations a enensive understanding of sterilization processes and media prep into basis, and to enable students to analyse the basic concepts e current regulatory, quality control, and legal frameworksthat in	nd their analysis (BL2-Understand) paration pipelines (BL3-Apply) s of microbial evolution, phylogeny, nul	ritional aspects, and	elements of microbial genetics(BL4-Analyze) ve and productive interactions in diverse microbiology a	and biotechnolog	y settings.	BL5-Eval	luate)				
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)		SDG3(Good health and well-being)								
Part B													

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To get familiarize with Food Technology Laboratory glasswares, instruments and general laboratory guidelines	PBL	BL2-Understand	3
2	To prepare and standardize the chemical solutions	Experiments	BL2-Understand	2
3	To determine moisture content in given food sample	Experiments	BL3-Apply	2
4	To determine ash content in given food sample	Experiments	BL3-Apply	2
5	To determine crude fat content in given food sample	Experiments	BL3-Apply	2
6	To determine crude protein content in given food sample	Experiments	BL3-Apply	2
7	To determine crude fibre content in given food sample	Experiments	BL3-Apply	2
8	To determine the titratable acidity and pH in given food sample	Experiments	BL3-Apply	2

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40	0							
	Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	60	18	40	0							

Part E

Books	Osgood, M., Ocorr, K.A. and Lehninger, A.L. (2000a) The absolute, utilimate guide to lehninger's principles of Biochemistry, third edition: Study guide and solutions manual. New York: Worth Publishers.
Articles	https://network.bepress.com/life-sciences/food-sciences/fo
References Books	Harpers Illustrated Blochemistry (2015a). Erscheinungsort nicht ermittelbar: McGraw-Hill Professional. Stryer, L., Tymoczko, J.L. and Berg, J.M. (2002) Blochemistry. New York: W.H. Freeman.
MOOC Courses	https://nptel.ac.in/courses/126105027
Videos	https://www.youtube.com/watch?v=Dm3yP7FF4nil&t=1s

COs	PO1	PO2	PO3	PO4	P05	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	1	-	1	1	-	1	-		1	1	1
CO2	2	1	1	1	-	1	-	1	1	1	-	-	1	1	1
CO3	2	2	2	1	1	1	1	1	1	1	-	-	1	1	2
CO4	3	2	2	2	1	2	1	1	2	1	-	-	1	2	2
CO5	3	2	2	2	1	1	2	1	1	1	-	-	1	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BSc_PCM

Title of the Course	Calculus and Diffe	rential Equations											
Course Code	BSMA0101[T]												
			Part A										
Year	1st	Semester	1st		Credits	L T	Г	P	С				
Itali	100	Selliestei	101		Oreans	4 0)	0	4				
Course Type	Theory only												
Course Category	Disciplinary Minor												
Pre-Requisite/s	calculus, and ana	rential equations include a strong foundation lytical geometry. Understanding of functions, d integrals is essential for success in these	limits, and basic calculus concepts	calculus and differential ed Understanding of function subjects.	quations include a strong foundation s, limits, and basic calculus concept	in algebra, trigonometry, pre-calculus s like derivatives and integrals is esse	, and analytical geometry. ntial for success in these	Co- Requisite/s	l				
Course Outcomes & Bloom's Level	CO1- To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1-Remember) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO3- To describe comprehensive understanding of scientization processes and media preparation picelines (BL3-Apply) CO4- To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolution, phylogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO3- To apply Appraise the current regulatory, quality control, and legal frameworkshaft unipact biotechnology and ethical behaviours that foster positive and productive interactions in diverse microbiology and biotechnology settings. (BL5-												
Coures Elements	Skill Development Entrepreneurship Employability ✓ Professsonal Ethi Gender X Human Values X Environment X	×	SDG (Goals)	SDG4(Quality education)									
	Part B												
Modules		Ci	ontents		Pe	dagogy	Hours						

Part	D/Marke	Dietribution)	

			Theory		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	40	60	18	40	22
			Practical		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

Part E

Books	G. F. Simmons Differential Equations Tata McGraw Hill, 1972.
Articles	
References Books	H. T. H. Piaggio Elementary Treatise on Differential Equations and their Application C.B.S. Publisher & Distributors, Delhi, 1985
	https://onlinecourses.nptel.ac.in/noc24_ma12/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview
	https://onlinecourses.nptel.ac.in/noc24_ma12/preview https://onlinecourses.nptel.ac.in/noc24_ma20/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	1		-			1	-	1
CO2	3	3	1	3	3	2	-	1		1			2	-	2
CO3	3	2	-	1	3	-	-	-		-			1	3	2
CO4	3	2	-	2	-	-	-	-		-			-	3	1
CO5	2	2	-	1	-	-	-	-	-	-	-	-	-	2	-
CO6	-	-	-	i.	i.	-	=	=	•	-	-	-	-	-	-



BSc_ComputerScience

Little of the Course	Calculus and Differential Equation	ons			
Course Code	BSMA0101[T]				
		Part A			
Year	1st	Semester	1st	Credits	L T P C 4 0 0 4
Course Type	Theory only				
Course Category	Disciplinary Minor				
Pre-Requisite/s	calculus and differential equation calculus concepts like derivative	ons include a strong foundation in algebra, trigonometry, pre-calculus, and a es and integrals is essential for success in these subjects.	nalytical geometry. Understanding of functions, limits, and basic	Co-Requisite/s	
Course Outcomes & Bloom's Level	CO2- To understand the gene to CO3- To describe comprehensing CO4- To provide experimental by	repts and view of professional and scientific communication approaches for mechanisms and a detailed insight into mutations and their analysis we understanding of sterilization processes and media preparation pipelines pasis, and to enable students to analyse the basic concepts of microbial ever rent regulatory, qualify control, and legal frameworksthat impact biotechnoic	(BL2-Understand) (BL3-Apply) ilution, phylogeny, nutritional aspects, and elements of microbial gen	. etics(BL4-Analyze) tions in diverse microbiology and biotechnology settings.(BL5-E	Evaluate)
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG4(Quality education)	
		Part B			

Part B Pedagogy Hours

		Pi	art D(Marks Distribution)		
			Theory		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	40	60	18	40	12
			Practical		•
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

	Part E
Books	G. F. Simmons Differential Equations Tata McGraw Hill, 1972.
Articles	
References Books	H. T. H. Plaggio Elementary Treatise on Differential Equations and their Application C.B.S. Publisher & Distributors, Delhi, 1985
	https://onlinecourses.nptel.ac.in/noc24_ma12/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview
	https://onlinecourses.nptel.ac.in/noc24_ma12/preview https://onlinecourses.nptel.ac.in/noc24_ma20/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	1	-	-	-	-	1	=	1
CO2	3	3	1	3	3	2	-	1	-	1	-	-	2	=	2
CO3	3	2	-	1	3	-	-	-	-	-	-	-	1	3	2
CO4	3	2	-	2	-	-	-	-	-	-	-	-	-	3	1
CO5	2	2	-	1	-	-	-	-	-	-	-	-	-	2	-
COS															



								ı	3Sc_Compute	rScience							
	Title of t	he Course		Abstract Algebra	a												
	Cours	se Code		BSMA0201[T]													
									Part A								
	Y	ear		1st			Sem	ester		2nd				Credits		L T	P C 0 4
	Cour	ве Туре		Theory only													
	Course	Category		Disciplinary Mir	nor												
	Pre-Re	quisite/s					nderstanding of eler						c	o-Requisite/s			
		Outcomes m's Level		CO2- To under	stand the gene he comprehen	transfer mech	anisms and a detai	led insight into mu	Itations and their	analysis (BL2-Unde ninelines (BI 3-∆nn	lv)		microbial genetics(BL4-A luctive interactions in dive	.nalyze) rse microbiology a	and biotechnology setti	ings.(BL5-	Evaluate)
	Coures	Elements		Skill Developm Entrepreneursh Employability v Professsonal E Gender X Human Values Environment X	nip X thics X						SDG (Goals)		SDG4(Quality education	n)			
				T					Part B								
	Mo	odules					Co	ntents					Pedagogy			Hours	
								Р	art D(Marks D								
Total N			Minimum Da	assing Marks			External Evaluat	lan.	Theory	Min. External Ev	Mustian	la la	ternal Evaluation		Min. Internal E		
100	ndi K5	40	Millimum Pa	issiliy marks		60	External Evaluat	ion	18	WIII. EXIÐINAI EV	iluation	40	terrial Evaluation	22	Min. Internal E	valuation	
100		-10				00			Practica	al		40					
Total N	Marks		Minimum Pa	assing Marks			External Evaluat	ion		Min. External Ev	aluation	In	ternal Evaluation		Min. Internal E	valuation	
0		0				0			0			0		0			
		1							Part E					•			
	Во	ooks		I. N. Herstein, 7	lopics in Algebi	ra Wiley Easte	rn Ltd. New Delhi,										
	Art	icles															
		ces Books		Shantinarayan	A Text Book of	Modern Abstra	act Algebra S. Chan	d and Company, I	New Delhi								
		Courses		https://onlineco													
	Vie	deos		https://onlineco	urses.nptel.ac.i	in/noc24_ma0	6/preview										
									ourse Articulat	tion Matrix							
COs	PO1	PO2	PO3	PO4		PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSC	13
CO1	2	-	-	3		-	-	-	-	1	-	-	-	-	-	-	
CO2	1	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	
CO3	-	2	-	-		1	-	-	-	-	2	-	-	-	-	-	
CO4	2	-	1	-	-	-	-	-	2	-	-	-	-	P	-	-	
CO5	1	-	-	2		-	-	-	2	-	-	-	-	-	-	-	
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



									BSc_PC	М									
	Title of the	e Course		Abstract A	lgebra														
	Course	Code		BSMA020	1[T]														
									Part A										
									FaltA								L	T F	» с
	Yea	ar		1st			Seme	ster		2nd					Credits		4	0 (4
	Course	Туре		Theory or	nly												1		
	Course C	ategory		Disciplina	ry Minor														
	Pre-Req	uisite/s		Basic Kno	owledge of Set theor	ry and Basic und	erstanding of elem	entary mathemati	cs.						Co-Requisite/s				
	Course O			CO3- To d	tescribe compreher	isive understandi	na of sterilization r	arnesses and me	dia preparation r	hes for microbiology s analysis (BL2-Unders ipelines (BL3-Apply) ibial evolution, phylog- technology and ethica			elements of n	nicrobial genetics(BL4-)	Analyze) erse microbiolog	y and biotechnology se	ettings.(E	BL5-Eval	uate)
	Coures E	lements		Entrepren	onal Ethics X alues X						SDG (Goz	oals)		SDG4(Quality educatio	n)				
				•					Part B										
	Mod	lules					Con	tents					Р	edagogy			Hours		
								Pa	rt D(Marks Di	stribution)									
									Theory	•									
Total M	arks	Mi	inimum Pa	ssing Mar	ks	ı	External Evaluation	on		Min. External Evalu	ation		Inte	ernal Evaluation		Min. Interna	l Evaluat	tion	
100		40				60			18			40			22				
	ı					1		1	Practica	l .		1							
Total M			inimum Pa	ssing Mar	ks		External Evaluation	on		Min. External Evalu	ation		Inte	ernal Evaluation		Min. Interna	I Evaluat	tion	
0		0				0			0			0			0				
				I					Part E										
	Boo			I. N. Hers	tein, Topics in Algeb	ra Wiley Eastern	Ltd. New Delhi,												
	Artic																		
	Reference				ayan A Text Book of			l and Company, N	ew Delhi										
	MOOC C				inecourses.nptel.ac														
	Vide	905		nttps://onli	inecourses.nptel.ac.	in/noc24_mau6/j	oreview												
								Co	ourse Articulati	ion Matrix									
COs	PO1	PO2	PO3		PO4	PO5	P06	P07	PO8	PO9	PO10	PO1	1	PO12	PSO1	PSO2		PSO3	
CO1	2	-	-		3	-	-	-	-	1	-	-		-	-	-		-	
CO2	1	-	-		2	-	-	-	-	1	-	-		-	-	-		-	
CO3	-	2	-		-	1	-	-	-	-	2	-		-	-	-		-	
CO4	2	-	1		-	-	-	-	2	-	-	-		-	-	-		-	
CO5	1	-	-		2	-	-	-	2	-	-	-		-	-	-		-	
CO6	-	-	-		-	-	-	-	-	-	-	-		-	-	-		-	



							BS	Sc_ComputerS	Science								
	Title of the	Course	Vector 4	Analysis & Linear Al	nehra												
	Course		BSMA0		goora												
								Part A						1.	1-	Р	С
	Yea	r	2nd			Semester		3rd				Credits		4	0	0	4
	Course	Tyne	Theory	only										*	U	U	4
	Course Ca			nary Minor													
	Pre-Requ			nowledge of Matrix	& vectors							Co-Requisite/s					
	Course Ou & Bloom's	tcomes s Level	CO2- To CO3- To CO4- To	to identify the basic of understand the get of describe comprehes of provide experiments of apply Appraise the	ene transfer mecha ensive understand ntal basis, and to e	inisms and a detail ling of sterilization nable students to	ed insight into muta processes and med analyse the basic of	ations and their ar dia preparation pip oncepts of microb	nalysis (BL2-Unders pelines (BL3-Apply) ial evolution, phylog	stand)) jeny, nutritional asp	ects, and elements of	microbial genetics(BL4- luctive interactions in div	-Analyze) verse microbiolo	ogy and bio	etechnology se	ettings.(BL5-	Evaluate)
	Coures Ele	ements	Entrepr Employ Profess Gender Human	evelopment ✓ reneurship X rability ✓ ssonal Ethics X r X i Values X mment X					SDG (Goals)		5DG4(Quality education	on)					
								Part B									
	Modu	ıles				Cor	itents					Pedagogy				Hours	
			•											•			
							Pai	rt D(Marks Dist	tribution)								
							1	Theory									
Total M		40 40	imum Passing M	arks	60	External Evaluati		18	Min. External Evalu	iation	Internal Evaluation 40			Min. Internal Evaluation			
100		40			60			Practical			40	22					
Total M	arke	Min	imum Passing M	arks		External Evaluati	on		Min. External Evalu	uation	Int	ternal Evaluation			Min. Internal	Evaluation	
0		0	un r ubbing in		0	External Evaluati		0	min. External Evan	aution .	0	terriar Evariation	0		min. meerica	LVUIGGEOII	<u>'</u>
		-															
								Part E									
	Book	re	1. K.B.	Datta, Matrix and L	inear Algebra, Prat	ice Hall of India Pv	t. Ltd. New Delhi, 2	2000 2. K. Haffima	n and R. Kunze, Lir	near Algebra, 2nd E	dition. Prentice Hall Er	nglewood Cliffs. New Je	rsey,1971				
	500.		N. Sara	an and S. N. Nigam,	Introduction to Vec	tor Analysis,Pothis	hala Pvt. Ltd. Allah	abad									
	Articl	es															
	References	Books						College Publishing	g (Springer – Verlag) 2001 2. S, Kumars	aran, Linear Algebra,	A Bermetric Approach P	Prentice Hall of	India, 2000			
	MOOC Co			Narayan, A Text Boo onlinecourses.nptel.			New Delhi										
	Video		https://o	onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.onlinecourses.nptel.	ac.in/noc24_ma04. ac.in/noc24_ee48/	/preview preview											
			1 - 1														
								urse Articulatio									
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	ı	PSO2	PSC	O3
CO1	2	-	-	1-	2	2	-	1	-	-	1-	-	-		-	-	
		3	1	3	3	2	-	-	-	-	-	-	-		-	-	
CO2	3					1.	1-	-	-	1-	-	-	-	-	-	- 1-	
CO2 CO3	3	2	-	1	3		-									_	
CO2 CO3 CO4	3	2	-	2	-	-	-	-	-	-	-	-	-		-	-	
	3	2		1 2 1	-	-	-	-	-	-	-	-	-		=	-	



									BSc_PCI	1							
	Title of the	e Course	Ve	ector Analys	sis & Linear Algeb	ora											
	Course	Code	В	SMA0301[T]	7												
									Part A								
	Ye	ar	2	nd			Semester		3rd				Credits	l 4	T 0	P 0	C 4
	Course	Туре	т	heory only										, , , , , , , , , , , , , , , , , , ,		- 1	
	Course C	ategory	D	isciplinary N	Minor												
	Pre-Req	uisite/s	В	asic knowle	edge of Matrix & v	vectors							Co-Requisite/s				
	Course O & Bloom	utcomes 's Level	C	O2- To unde O3- To desc O4- To prov	lerstand the gene cribe comprehen vide experimenta	transfer mecha sive understand I basis, and to e	nisms and a detaile ing of sterilization p nable students to a	ed insight into mu processes and me malyse the basic	tations and their a dia preparation pi concepts of microl	nalysis (BL2-Un pelines (BL3-Ap pial evolution, ph	oply) nylogeny, nutritional	aspects, and elements	s of microbial genetics(BL4-Ana roductive interactions in diverse	alyze) e microbiology	and biotechnolo	y settings.(E	BL5-Evaluate)
	Coures E	lements	E E P G	kill Developi ntrepreneur mployability rofesssonal ender X uman Value nvironment	rship X y ✓ I Ethics X es X					SDG (Goal	s)	SDG4(Quality educ	cation)				
									Part B								
	Mod	lules					Con	tents					Pedagogy			Hours	
								Pa	art D(Marks Dis	tribution)							
									Theory								
Total M	arks		nimum Pass	ing Marks			External Evaluation	on		Min. External E	valuation		Internal Evaluation	Min. Internal Evaluation			tion
100		40				60			18			40		22			
						ı			Practical						T		
Total M	arks		nimum Pass	ing Marks			External Evaluation	on		Min. External E	valuation		Internal Evaluation Min. Internal Evaluation				
0		0				0			0			0		0			
									Part E								
	Boo	dra	1	K.B. Datta,	, Matrix and Line	ar Algebra, Prati	ce Hall of India Pv	t. Ltd. New Delhi,	2000 2. K. Haffim	an and R. Kunze	e, Linear Algebra, 2n	nd Edition. Prentice Ha	Il Englewood Cliffs. New Jersey	y,1971			
	Вос	iks	N	. Saran and	d S. N. Nigam,Inti	roduction to Vec	tor Analysis,Pothis	hala Pvt. Ltd. Alla	habad								
	Artic	cles															
	Reference	e Rooks	1.	Marc Lipso	on and Seymour I	Lipschutz, Schau	um'S Outline Of Lin	ear Algebra, Key	College Publishin	g (Springer – Ve	rlag) 2001 2. S, Kur	marsaran, Linear Algeb	ora, A Bermetric Approach Prent	tice Hall of Indi	a, 2000		
							s,S. Chand & Co. N	New Delhi									
	MOOC	ourses			courses.nptel.ac.												
	Vide	908	ht	tos://onlined	courses.nptel.ac. courses.nptel.ac. courses.nptel.ac.	in/noc24 ee48/t	review										
								C	ourse Articulation	on Matrix							
COs	PO1	PO2	PO3	PC	04	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12 F	PS01	PSO2		PSO3
CO1	2	-	-	-		2	2	-	1	-	-	-			-		-
CO2	3	3	1	3	:	3	2	-	-	-	-	-			-		-
CO3	3	2	-	1		3	-	-	-	-	-	-			-		-
CO4	3	2	-	2		-	-	-	-	-	-	-			-		-
CO5	2	2	-	1		-	-	-	-	-	-	-			-		-
CO6	-	-	-	-			I	-	1-	-	-	-	<u> </u>		-		-



BSc_ComputerScience

	Title of th	e Course	Adva	ince Calculus and Dif	ferential equations	1									
	Course	e Code	BSM	A0401[T]											
								Part A							
	Ye	ar	2nd				Semester	rain	4th				Credits		L T P C 4 0 0 4
	Cours	е Туре	The	ory only								*			
	Course	Category	Disc	iplinary Minor											
	Pre-Rec	quisite/s	Bas	cs Differentiation , Int	tegrations, , Contin	Continuity ,convergence and divergence of Sequence and Series ,partial differentiation Co-Requisite/							te/s		
	Course C & Bloom		CO2	 To understand the g To describe compre To provide experiment 	gene transfer mech ehensive understar ental basis, and to	iw of professional and scientific communication approaches for microbiology settings (BL1-Remember) hankinsm and a detailed insight into mulations and their analysis (BL2-Understand) inding of sterilization processes and media preparation pipelines (BL3-Apph)) ending of sterilization processes and media preparation pipelines (BL3-Apph)) ending of sterilization processes and media preparation pipelines (BL3-Apph)) ending of sterilization processes and media preparation pipelines (BL4-Analyze) ending of sterilization processes and media preparation pipelines (BL4-Analyze) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and elements of microbial genetics (BL4-Analyze) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and media preparation pipelines (BL3-Apph) ending of sterilization processes and media preparation processes and media preparation processes and media preparation processes and media preparation processes and media processes and media preparation processes and media preparation processes and media preparation processes and media preparation processes and media processes and media preparation processes and media preparation processes and media processes						e) crobiology an	nd biotechnology settings	s.(BL5-Evaluate)	
	Skill Development / Entrepreneurship X Employability / Professonal Ethics Gender X Human Values X Environment X			epreneurship X sloyability ✓ esssonal Ethics X der X nan Values X					SDG (Goals)			SDG4(Quality education)			
								Part B							
	Modules Contents						ntents				Pedag	ogy		Hou	irs
							Pa	art D(Marks Distrib	oution)						
Total I	Marks	Min	imum Passing	Marks		External Evaluat	ion		n. External Evaluation		Internal	Evaluation		Min. Internal Eva	luation
100		40			60						40				
								Practical							
Total I	Marks	Mini	imum Passing	Marks		External Evaluat	ion	Mir	n. External Evaluation		Internal	Evaluation		Min. Internal Eva	luation
0		0			0			0			0		0		
								Part E							
	Во	oks		. Goldbeg,Real Analy rma and Gupta ,Integ		-									
	Arti	cles													
	D. Soma Sundaram and B. Choudhary, A first Course in Mathematical An D. A. Murray, Introductory Course in Differential Equation, Orient Longman						-	e, New Delhi, 1997							
	MOOC														
	Vid	eos													
							0	auraa Artiaulatian	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	ourse Articulation	PO9 PO10	n	PO11 P	012 PS0	1	PSO2	PS03

CO1 CO2 CO3 CO4 CO5 CO6

3



BSc_PCM

Title of th	e Course	Advance Calculus and Different	ial equations									
Course	e Code	BSMA0401[T]										
				Part A								
Ye	ar	2nd	Semester		4th			Credits		L T P C		
Cours	е Туре	Theory only	11.				U.					
Course	Category	Disciplinary Minor										
Pre-Rec	quisite/s	Basics Differentiation , Integration	ons, , Continuity ,convergence and divergence of	Sequence and Series	partial differentiation			(Co-Requisite/s			
Course C & Bloom		CO2- To understand the gene to CO3- To describe comprehensing CO4- To provide experimental by	epts and view of professional and scientific comm ransfer mechanisms and a detailed insight into m ve understanding of sterilization processes and m wasis, and to enable students to analyse the basic rent regulatory, quality control, and legal framewo	utations and their anal- ledia preparation pipel concepts of microbial	sis (BL2-Understand) nes (BL3-Apply) evolution, phylogeny, nut	ritional aspects, and eleme	nts of microbia d productive in	I genetics(BL4-Analyze) teractions in diverse mice	robiology and biotechnology s	ettings.(BL5-Evaluate)		
Coures E	Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals) SDG4(Quality education)					1)			
	Part B											
Mo	dules		Contents	3			Pedagog	ıy		Hours		
			P	art D(Marks Distrib	oution)							
Total Marks	Minimum Pa	aning Marks	Theory External Evaluation Min. External Evaluation Inter				Internal F	valuation.	Min Intern	Min. Internal Evaluation		
100	40	-	60	18	i. External Evaluation	40	Internal Evaluation		22	II Evaluation		
100	40			Practical		40						
Total Marks	Minimum Pa	ssing Marks	External Evaluation		n. External Evaluation		Internal Ev	valuation	Min. Interna	I Evaluation		
0	0	•	0	0		0			0			
	!	<u> </u>		Part E				·				
Bo		R. R. Goldbeg,Real Analysis,Ox	ford & I. B. H. Publishing Co. New Delhi									
50		Sharma and Gupta ,Integral Tra	nsform,Pragati, Prakashan Meerut									
Arti												
Referenc	es Books		udhary,A first Course in Mathematical Analysis,Na e in Differential Equation,Orient Longman, India, 1		e, New Delhi, 1997							
MOOC	Courses											
Vid	eos											
			c	Course Articulation	Matrix							

3

CO1 CO2 CO3 CO4 CO5 CO6



BSc_ComputerScience

Title of the Course	Computer Oriented Statistical Me	ethods										
Course Code	BSMA0501[T]											
		Part A										
Year	3rd	Semester	5th			Credits	L T P C 4 0 0 4					
Course Type	Theory only											
Course Category	Course Category Disciplinary Minor											
Pre-Requisite/s	Understanding of algebra, basic calculus, and probability theory. Familiarity with descriptive statistics, such as measures of central tendency and dispersion, is necessary. Basic computer skills are helpful for using statistical software like R or Python. Critical thinking, problem-solving, and logical reasoning skills are essential for analyzing data and drawing valid conclusions. Confluence are rucal in 1 statistics due to its dynamic nature. Co-Requisite/s											
Course Outcomes & Bloom's Level	CO2- To understand the gene tra CO3- To describe comprehensive CO4- To provide experimental ba	pts and view of professional and scientific communication approaches for narsfer mechanisms and a detailed insight into mutations and their analysis e understanding of steritization processes and media preparation pipelines said to enable students to analyse the basic concepts of microbial evo- ent regulatory, quality control, and legal frameworksthat impact biotechnology.	(BL2-Understand) (BL3-Apply) ution, phylogeny, nut	ritional aspects, and elements of microbial gen	etics(BL4-Analyze) tions in diverse microbiology	and biotechnology settings.(BL5-Ev	valuate)					
Skill Development ✓ Entrepreneurship × Employability ✓ Course Elements Professional Elinics × Gender × Human Values × Environment ×												
		Part B			•							
Madulas		Contents		Dedonomi		Hause						

	Part D(Marks Distribution)											
			Theory									
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation												
100	40	60	18	40	22							
	Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

Part E

0

0

0

0

Books	H. C. Saxena and J. N. Kapoor Mathematical Statistics S. Chand and sons Co.
Articles	
References Books	M. Ray Statistical Methods Ram Prasad Publication
MOOC Courses	https://onlinecourses.nptel.ac.in/noc24_ec03/preview
Videos	https://enlinecourses.nptel.ac.in/noc24_ec03/preview

	COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	-	-	-	2	2	-	-	-	-	-	-	1	-	1
CO2		3	3	1	3	3	2	-	-	-	1	-	-	2	-	2
CO3		3	2	-	1	3	-	-	-	-	-	-	-	1	3	2
CO4		3	2	-	2	-	-	-	-	-	-	-	-	-	3	1
CO5		2	2	-	1	-	-	-	-	-	-	-	-	-	2	-
CO6		-	-	-	-	-	-	-	-	-	-	-	-	=	-	-



BSc_PCM

Title of the Course	Title of the Course Computer Oriented Statistical Methods											
Course Code	BSMA0501[T]											
		Part A										
Year	3rd	Semester	5th			Credits	L T P C 4 0 0 4					
Course Type	Theory only											
Course Category	Course Category Disciplinary Minor											
Understanding of algebra, basic calculus, and probability theory. Familiarity with descriptive statistics, such as measures of central tendency and dispersion, is necessary. Basic computer skills are helpful for using statistical software like R or Python. Circlical thinking, problem-colving, and logical reasoning skills are essential for analyzing data and drawling valid conclusions. Continuous learning and practice are crucial in statistics due to its dynamic nature. Co-Requisite/s												
Course Outcomes & Bloom's Level	CO2- To understand the gene tra CO3- To describe comprehensiv CO4- To provide experimental ba	ppts and view of professional and scientific communication approaches for ransfer mechanisms and a detailed insight into mutations and their analysis e understanding of sterilization processes and media preparation pipelines said and to enable students to analyse the basic concepts of microbial evo estimated and the properties of the properties of the properties of the properties of the properties of the properties of the properties of the properties of said the properties of the properties of the properties of the properties of properties of the properties of the properties of the properties of the properties of the properties of the properties of the properties of the properties of the properties of the properti	(BL2-Understand) (BL3-Apply) ution, phylogeny, nut	ritional aspects, and elements of microbial gen	etics(BL4-Analyze) tions in diverse microbiology	and biotechnology settings.(BL5-E	Evaluate)					
Skill Development ✓ Entreprenourship X Employability ✓ Coures Elements Professional Ethics X Gender X Human Values X Environment X												
	Part B											

	Theory											
Total Marks	Min. Internal Evaluation											
100 40		60	18	40	22							
	Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

Part E

Books	H. C. Saxena and J. N. Kapoor Mathematical Statistics S. Chand and sons Co.
Articles	
References Books	M. Ray Statistical Methods Ram Prasad Publication
MOOC Courses	https://onlinecourses.nptel.ac.in/noc24_ec03/preview
Videos	https://enlinecourses.nptel.ac.in/noc24_ec03/preview

	COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PS03
C	:01	2	-	-	-	2	2	-	-	-	-	-	-	1	-	1
C	:02	3	3	1	3	3	2	-	-	-	1	-	-	2	-	2
C	:03	3	2	-	1	3	-	-	-	-	-	-	-	1	3	2
C	04	3	2	-	2	-	-	-	-	-	-	-	-	-	3	1
C	:05	2	2	-	1	-	-	-	-	-	-	-	-	-	2	-
C	:06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Bsc Microbiology

			200_11110										
Title of the Cou	urse	mmunology											
Course Cod	de E	3SMB 202(T)											
			Pa	art A									
Year	1	1st	Semester	2nd			Credits	L	Т	Р	С		
							0	1	4				
Course Typ	Course Type Embedded theory and lab												
Course Categ	Course Category Discipline Core												
Pre-Requisite	Pre-Requisite/s This course will introduce to the applied aspects of immunology in disease detection and diagnosis Co-Requisite/s												
	CO1- To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1-Remember) Course Outcomes & Bloom's Level CO3- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO3- To describe comprehensive understanding of sterilization prosess and media preparation pipelines (BL3-Appty) CO4- To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolution, phylogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO5- To apply Appraise the current regulatory, cuality control, analyse the basic concepts of microbial evolution, phylogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO5- To apply Appraise the current regulatory, cuality control, analyse the basic concepts of microbial evolution, phylogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO5- To apply Appraise the current regulatory, cuality control, analyse in the basic concepts of microbial evolution, phylogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO5- To apply Appraise the current regulatory, cuality control, analyse in the basic concepts of microbial evolution, phylogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO5- To apply Appraise the current regulatory, cuality control, and their analysis (BL5-Evaluate)												
Coures Eleme	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Coures Elements Professonal Ellnics × Gender × Human Values ✓ Environment ×												
·			Pa	art B									
Modules	3		Contents			Pedagogy			Hou	rs			
			Pa	art C									
			.,		stive ARCA/RRI /								

	Pa	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Anatomical view of mammalian thymus and various immune organs	Experiments	BL3-Apply	2
VIII	Study about Covaxin vaccine administration in local area and effect visualized	Internships	BL4-Analyze	15 DAYS
4	To perform Radial immune diffusion	Experiments	BL3-Apply	2
5	To perform Double immuno diffusion	Experiments	BL3-Apply	2
6	Haemoglobin detection by given Blood Sample	Experiments	BL3-Apply	2
VII	Detection of Hb% of human population in locality and relate to their nutrition diet.	PBL	BL4-Analyze	5

Part D(Marks Distribution) Theory

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40								
	Practical Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	60	30	40	20							

Part E

Books	Immunology by Kindt, Goldsby, Osborne, 4th Edition			
Articles https://nijms.rutgers.edu/sgs/olc/mci/prot/2009/i+/ppersensitiv/tiles09.pdf				
References Books Essentials Immunology, Ivam M Roltt, 12th Edition				
MOOC Courses	https://hptel.ac.in/courses/104108055			
Videos https://mptel.ac.in/courses/104108055				

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	2	2	-	1	-	-	-	-	-	1	2	2
CO2	1	2	2	3	1	3	1	-	-	-	-	-	1	2	2
CO3	1	2	1	2	1	2	2	-	-	-	-	-	1	2	2
CO4	1	2	1	2	1	2	2	-	-	-	-	-	3	3	3
CO5	1	2	2	1	2	-	2	-	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



			Syllabu	s-2023-2024						
			Bsc_M	licrobiology						
Title of the	Course	Analytical Chemistry								
Course	Code	BSMB 203 (T)								
<u> </u>				Part A						
Yea	ır	1st	Semester	2nd		C	redits	L T	P 1	C 4
Course	Туре	Embedded theory and lab								
Course Ca	ategory	Discipline Core								
Pre-Requ	uisite/s	Knowledge of Fundament	als of Analytical Chemistry			Co-Re	equisite/s			
Course Ou & Bloom's		CO2- To understand the g	concepts and view of professional and scientific communication one transfer mechanisms and a detailed insight into mutations are nensive understanding of sterilization processes and media preparation that basis, and to enable students to analyse the basic concepts et current regulatory, quality control, and legal frameworksthat im	d their analysis (BL2-Understand)		l elements of microbial genetic tive and productive interaction	s(BL4-Analyze) s in diverse microbiology and b	oiotechnology setting	s.(BL5-Eval	iluate)
Coures El	ements	Skill Development Entrepreneurship X Employability Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)		SDG4(Quality education)				
				Part B						
Mode	ules		Contents			Pedagogy		Ho	urs	
				Part C						
Modules			Title		dicative-ABCA/PBL eriments/Field wor Internships		Bloom's Lev	rel	Но	ours
I	Complexometric titration			Experiments			BL3-Apply		4	
VIII	Qualitative Analysis using Th	in Layer Chromatography		PBL			BL4-Analyze		6	
IX	Purification of sample by Cry	stallization technique		PBL			BL6-Create		7	
IV	To determine the Percentage	of Copper in copper alloy s	olution	Experiments			BL3-Apply		2	
V	To determine the percentage	of Chromium in chrome allo	y	Experiments			BL3-Apply		2	
VI	To purify the given sample Ar	nmonium Chloride	·	Experiments			BL3-Apply			
VII	Qualitative Analysis using Pa	per, Chromatography	·	PBL			BL4-Analyze		6	
			Port D/M	urka Distribution)						

i neory											
Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
40 40		12									
Practical											
Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
50	40	20	60								
	40 Minimum Passing Marks	Minimum Passing Marks External Evaluation	40 40 12 Practical Practical Minimum Passing Marks External Evaluation Min. External Evaluati	Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation 40 12 60 60 Fractical Fractical Minimum Passing Marks External Evaluation Min. Exte							

Part E

Books	Y Anjaneyulu Textbook of Analytical Chemistry 2008			
Articles https://inplet.ac.in/courses/104105084				
References Books Skoog D.A. and West D.M. Saunders Fundamental of Analytical Chemistry Ninth Edition				
MOOC Courses	https://hptel.ac.in/courses/104105084			
Videos https://hptel.ac.in/courses/104105084				

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	-	-	3	3	2
CO2	3	3	1	-	-	-	-	-	-	-	-	-	3	2	1
CO3	3	1	-	2	-	-	-	-	-	-	-	-	1	1	2
CO4	2	3	-	-	-	-	-	-	-	-	-	-	1	1	2
CO5	2	2	-	-	-	-	-	-	-	-	-	-	2	2	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Bsc_Microbiology

Title of the Course E	Bacteriology, mycology and Viro	<i>5</i>											
Course Code E	BSMB 601(T)												
		Part A											
Year	3rd	Semester	6th		Credi	its	L T P C 3 0 1 4						
Course Type	Embedded theory and lab	bedded theory and lab											
Course Category	Disciplinary Major	inary Major											
Pre-Requisite/s	characteristics of bacterial cells,	, cell organelles, cell wall composition and various appendages like cap	Co-Requi	isite/s									
Course Outcomes & Bloom's Level	CO2- To understand the gene to CO3- To describe comprehension CO4- To provide experimental by	CO1- To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1-Remember) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO3- To describe comprehensive understanding of settingization processes and media preparation pipelines (BL3-Appty) CO4- To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolution, phylogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO5- To apply Appraise the current regulatory, quality control, and legal frameworksthat impract biotechnology and ethical behaviours that foster positive and productive interactions in diverse microbiology and biotechnology settings (BL5-Evaluat)											
Coures Elements	Skill Development \(\) Entrepreneurship \(\times \) Employability \(\) Professonal Ethics \(\times \) Gender \(\times \) Human Values \(\times \) Environment \(\)			SDG (Goals)	SDG4(Quality education)								
		Part B											
Modules		Contents		Pedago	gy	Hours							

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	40	60	18	40								
	Practical Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	60	30	40								

Part E

Books	Pelczar,M.J.Chan,E.C.S. and Krieg,N.R.(1986).Microbiology, Vth Eds.,Mc. Graw Hill.				
Articles https://www.researchgate.net/publication/313745331_Plant_Pathogenic_Fungi					
References Books Modern Microbial Genetics by U.N.Streips and R.E. Yasbin, 2nd edition; Wiley Publishers; 2002.					
MOOC Courses https://hptel.ac.in/courses/102105087					
Videos https://aptel.ac.in/courses/102105087					

	Source / Recordant Made /														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	1	1	3	3	1	2	1	3	1	2	2	3
CO2	2	1	2	2	1	3	3	2	1	1	3	1	2	3	2
CO3	1	2	1	1	1	3	3	2	1	2	3	2	3	2	3
CO4	2	3	2	3	3	1	1	1	2	1	1	2	2	1	2
CO5	2	3	2	3	3	2	2	1	1	1	1	1	2	1	2
CO6		_		-	-				_		-	-	_	-	



Bsc_Microbiology

Title of the Course	Food and Dairy Microbiology	· · · · · ·										
Course Code	BSMB 602 (T)	B 602 (T)										
		Part A										
Year	3rd	Semester	6th	Credits	L T P	P C						
Course Type	Embedded theory and lab											
Course Category	Disciplinary Major	ciplinary Major										
Pre-Requisite/s	Explain the interactions betwee	n microorganisms and the food environment, and factors influencing the	Co-Requisite/s									
Course Outcomes & Bloom's Level	CO1- To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1-Remember) CO2- To understand the gene transfer mechanisms and a detailed insight into mutations and their analysis (BL2-Understand) CO3- To describe comprehensive understanding of settilization processes and media preparation polenties (BL3-Appti) CO4- To provide experimental basis, and to enable students to analyse the basic concepts of microbial evolution, phylogeny, nutritional aspects, and elements of microbial genetics(BL4-Analyze) CO5- To apply Appraise the current regulatory, quality control, and legal frameworkstank impact biotechnology and ethical behaviours that foster positive and productive interactions in diverse microbiology and biotechnology settings (BL5-Eva											
Coures Elements	Skill Development ✓ Entrepreneurship × Employability ✓ Professsonal Ethics × Gender × Human Values × Environment ×		SDG (Goals)	SDG4(Quality education)								

 Part B

 Modules
 Contents
 Pedagogy
 Hours

	Par	t,C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Staining of microorganisms	Experiments	BL3-Apply	2
2	Composition, preparation and sterilization of media	Experiments	BL3-Apply	2
3	Demonstration of techniques for pure culture of microorganisms	Experiments	BL4-Analyze	2
4	Streak plate method	Experiments	BL3-Apply	2
5	Pour plate method.	Experiments	BL3-Apply	2
6	Serial dilution agar plate method	Experiments	BL4-Analyze	2
7	Microbiology testing of milk	PBL	BL4-Analyze	2
8	Serial dilution agar plate method	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

	Theory												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
100	50	60	18	40									
			Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
100	50	60	30	40									

Part E

Books	Virendra Kumar Pande Textbook of Food Microbiology 1st Edition
Articles	https://academic.oup.com/jimb
References Books	John C. Ayres Microbiology of Foods 2nd Edition Fraziler, W.C. Food Microbiology 4th edition Fraziler, W.C. Food Microbiology 5th edition Petzar, H.J. and Rober, D. Microbiology 5th edition
MOOC Courses	https://onlinecourses.nplela.cin/noc24.ag03/preview https://onlinecourses.nplela.cin/noc23.ag02/preview https://onlinecourses.nplela.cin/noc23.ag02/preview https://onlinecourses.nplela.cin/noc24.ag07/preview
Videos	https://nptel.ac.in/courses/102105058

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	2	2	1	-	-	-	-	-	2	3	1	2
CO2	2	2	1	3	1	3	2	-	-	-	-	2	1	2	1
CO3	1	1	2	2	2	1	2	3	-	-	-	1	3	3	2
CO4	3	2	3	3	1	1	3	2	-	-	-	1	2	3	1
CO5	2	3	3	2	3	2	1	2	-	-		3	1	2	3
CO6	-	-	-	=	-	-	-	-	-	-	-	-	-	-	-



			Bsc_Micro	biology						
Title of th	e Course	Microbial Genetics								
Course	Code	BSMB 701 (T)								
			Pari	A						
Ye	Course Code SMR 701 (T) Part A 4th Semester 7th Semester 7th Course Type Embedded theory and lab Course Category Disciplinary Major Pr-Requisitely S Course Category Disciplinary Major Course Category Disciplinary Major Pr-Requisitely S Course Outcomes A Bloom's Level CO-1 To identify the basic concepts and view of professional and scientific communication approaches for microbiology settings (BL1-Remember) CO-2- To understand the penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL2-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) CO-2- To understand penetransfer mechanisms and a detailed insplit nitro mutations and their analysis (BL3-Apphy) SDG (Goale) S			L 3	T P					
Course	Туре	Embedded theory and lab	ı	'				ı		
Course C	ategory	Disciplinary Major								
Pre-Req	uisite/s	Students should be aware abo	out the cell structures of microrganisms, thier growth and developm	nent process and genetic beha	viour	Co-Req	uisite/s			
		utritional aspects, and elements of microbial	genetics(BL4-Analyze) eractions in diverse microbiology	and biotechnology setting	s.(BL5-E	Evaluate)				
Coures E	Elements	Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X			SDG (Goals)	SDG4(Quality education)				
			Part	В						
Mod	fules		Contents		Pedagog	у	Hou	ırs		
			Part	C						
Modules		1	Title .		eriments/Field work/	Bloom*	s Level		Hours	
I	Study of different types of DNA	A and RNA using micrographs a	and model / schematic representations.	Experiments		BL2-Understand		2		
П	Study of semi-conservative rep	plication of DNA through microg	graphs / schematic representations.	Experiments		BL2-Understand		2		
III	Resolution and visualization of	f DNA by Agarose Gel Electropi	horesis	Experiments		BL4-Analyze		6		
IV	Resolution and visualization of	f proteins by Polyacrylamide Ge	el Electrophoresis (SDS-PAGE).	PBL		BL3-Apply		6		
V	Study the effect of chemical (F	HNO2) and physical (UV) mutag	ens on bacterial cells.	PBL		BL4-Analyze				
VI	Study survival curve of bacteri	ia after exposure to ultraviolet (l	UV) light	PBL		BL4-Analyze	BL4-Analyze			
VII	Demonstration of Bacterial Tra	ansformation and calculation of	transformation efficiency.	PBL		BL2-Understand	BL2-Understand			

Da	rt	

External Evaluation

External Evaluation

Total Marks

Total Marks

Minimum Passing Marks

Minimum Passing Marks

Part D(Marks Distribution)
Theory
Min. External Evaluation

Min. External Evaluation

Min. Internal Evaluation

Min. Internal Evaluation

Internal Evaluation

Internal Evaluation

Books	Sambrook J and Russell DW. (2001). Molecular Cloning: A Laboratory Manual. 4th Edition, Cold Spring Harbour Laboratory press
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9315481/
References Books	Watson JD, Baker TA, Bell SP, Gann A, Levine M and Losick R (2008) Molecular Biology of the Gene, 6th edition, Cold Spring Harbour Lab. Press, Pearson Publication Becker WM, Kleinsmith LJ, Hardin J and Bertoni GF (2009) The World of the Cell, 7th edition, Pearson Benjamin Cummings Publishing, San Francisco. Karp G (2010) Cell and Molecular Biology. Concepts and Experiments, Biol He edition, John Wiley & Sons. Inc. (See The Concept Concepts of the Cell Concepts of th
MOOC Courses	https://onlinecourses.swayam2.ac.in/cec22_bt05/preview
Videos	https://onlinecourses.swayam2.ac.in/cec22_bt05/preview

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
CO1	2	2	1	1	2	2	-	-	-	-	-	-	2	2	1
CO2	2	1	3	2	1	2	1	-	-	-	-	-	1	1	1
CO3	1	1	3	1	1	2	3	-	-	-	-	-	1	1	1
CO4	1	2	1	2	2	1	3	-	-	-	-	-	3	2	3
CO5	2	2	1	1	3	1	-	-	-	-	-	-	2	2	3
COS			_	_		_	_	_	_		-	-	_	_	_



Bsc_Microbiology

Title of the	Course	Research Methodology												
Course	Code	BSMB 702 (T)												
			F	Part A										
Yes	ar	4th	Semester	7th			Credits	L	Т	Р	С			
								4	0	0	4			
Course	Туре	Theory only												
Course C	ategory	Discipline Core												
Pre-Req	uisite/s	Student should have some	basic knowledge of statistics				o-Requisite/s							
Course O		CO2- To understand the ge	concepts and view of professional and scientific communication a ne transfer mechanisms and a detailed insight into mutations an ensive understanding of sterilization processes and media prepa tal basis, and to enable students to analyse the basic concepts current regulatory, quality control, and legal frameworkshat imp	their analysis (BL2-Understand)	•	elements of microbial gene ve and productive interact	etics(BL4-Analyze) ions in diverse microbiology and	l biotechnology	settings.	BL5-Eva	aluate)			
Coures E		Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics ✓ Gender X Human Values X Environment X		SDG (Goals) SDG4(Quality education)										
			F	Part B										
Mod	ules		Contents	Pedagogy					Hours					
			F	Part C										
Modules			Title		cative-ABCA/PBL/ riments/Field work/ Internships		Bloom's Le	vel	Но		ours			
1	Steps in scientific research me	ethodology		Case Study			BL2-Understand		2	!				
2	Sampling process			Case Study		·	BL2-Understand		2					
3	Developing Hypothesis			Case Study			BL2-Understand		2	!				
4	Data collection			Case Study			BL3-Apply							
5	Analysis of Variance	·	·	Case Study	-		BL3-Apply		2					
6	Randomized Block Design			Case Study			BL4-Analyze							

Part D(Marks Distribution)

	Theory												
Total Marks	Minimum Passing Marks	Minimum Passing Marks External Evaluation		Internal Evaluation	Min. Internal Evaluation								
100	40	40	12	60	30								
	•	•	Practical	•	•								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
	0												

Part E

Books	Research methodology, C. R. Kothari, 6th Edition
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5037945/
References Books	Research methodology, Panneerselvam, R., Prentice Hall of India, New Delhi
MOOC Courses	https://mptel.ac.in/courses/121108007
Videos	https://hptel.ac.in/courses/121108007

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	-	-	-	1	2	-	-	-	-	-
CO2	1	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO3	1	2	-	-	-	-	-	-	1	2	-	-	-	-	=
CO4	1	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO5	1	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Bsc_Microbiology

Title of the Course	Microbial Quality Control in	uality Control in Food and Pharmaceutical Industries									
Course Code	BSMB 801 (T)										
			Part A								
Year	4th	Semester	8th	Credits	L	Т	Р	С			
					3	0	0	3			
Course Type	Theory only										
Course Category	Disciplinary Major	nary Major									
Pre-Requisite/s	Student must be aware wi	th the basic laboratory rules and regulations, safety measures	and bioethics.	Co-Requisite/s							
Course Outcomes & Bloom's Level	CO2- To understand the g CO3- To describe comprel	concepts and view of professional and scientific communication ene transfer mechanisms and a detailed insight into mutations hensive understanding of sterilization processes and media pre intal basis, and to enable students to analyse the basic concep	and their analysis (BL2-Understand) paration pipelines (BL3-Apply)								
Skill Development ✓ Entrepreneurship X Entrepreneurship X Employability ✓ Professonal Ethics X Gender X Human Values ✓ Environment ✓		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth)								

Part B

Modules Contents Pedagogy Hours

	Pa	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Design of a quality control Laboratory	PBL	BL3-Apply	3
II	SOP designing and hands on Practice	PBL	BL3-Apply	7
III	Bioburden test, sterility test, environmental monitoring, detection of specific pathogens, personal hygiene Monitoring	PBL	BL4-Analyze	15 days
IV	To learn Good Laboratory Practice (GLP), Major drug and food regulatory agencies	Industrial Visit	BL2-Understand	5

Part D(Marks Distribution)

	Theory							
Total Marks	Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Mir		Min. Internal Evaluation					
100	40	60	18	40				
			Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			

Part E

Books	Harrigan WF (1998)Laboratory Methods in Food Microbiology, 3rd ed. Academic Press. Garg N, Garg KL and Mukerji KG (2010) Laboratory Manual of Food Microbiology I K International Publishing House Pvt. Ltd.
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3624724/#:~-text=Quality%20controt%20(QC)%20in%20diagnostic,identification%20andt%20antibacterial%20susceptibility%20testing.
References Books	Jay JM, Loessner MJ, Golden DA (2005) Modern Food Microbiology, 7th edition. Springer Baird RM, Hodges NA and Denyer SP (2005) Handbook of Microbiological Quality control in Pharmaceutical and Medical Devices, Taylor and Francis Inc.
MOOC Courses	https://mptel.ac.in/courses/112107259
Videos	https://hptel.ac.in/courses/112107259

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	-	-	2	2	-	-	-	-	-	1	2	2
CO2	1	2	3	2	2	1	-	-	-	-	-	-	2	2	1
CO3	1	1	1	1	2	1	1	-	-	-	-	-	-	-	1
CO4	2	-	1	1	1	1	-	-	-	-	-	-	1	1	3
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	Bsc_Microbiology								
Title of the Course	Hindi I								
Course Code	BSMB AECII (T)								
			Part A						
Year	1st	Semester	2nd		Credits	L	Т	P	С
	1					2	0	0	2
Course Type	Theory only								
Course Category	Foundation core	Foundation core							
Pre-Requisite/s	हिंदी भाषा का मूल गया ज्ञान होना	। आवश्यक है		Co-Requisite/s					
Course Outcomes & Bloom's Level									
Course Elements	Skill Development V Entrepreneurship X Employability V Professonal Ethics X Gender V Human Values V Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)					
			Part B						
Modules Contents Pedagogy							Hours		
			Part D(Marks Distribution) Theory						
Total Marks Minimum	Passing Marks	External Evaluation	Min. External Evalua	tion	Internal Evaluation		Min. In	ternal Evaluation	n

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	40	40	12	60					
	Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
0	0	0	0	0	0				

Part E

Books	हिंदी भाषा और नैतिक मूल्य : मध्य प्रदेश शासन
Articles	https://www.cvs.edu.in/upload/iMG-20200323-WA0003.pdf
References Books	
MOOC Courses	https://onlinecourses.swayam2.ac.in/cec20_lg05/preview
Videos	https://onlinecourses.swayam2.ac.in/cec20_lg05/preview

	COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	3	1	2	2	-	-	-	-	-	-	-	-	2	-
CO2		2	3	1	2	2	-	-	-	-	-	-	-	-	2	-
CO3		2	2	1	1	1	-	-	-	-	-	-	-	-	2	-
CO4		1	2	-	-	-	-	-	-	-	-	-	-	-	1	-
CO5		-	1	-	-	-	-	-	-	-	-	-	-	-	1	-
CO6		•	-	-	-	-	-	=	=	-	-		-	-	-	-



Bsc_Microbiology

Title of the Course	English II							
Course Code	BSMB AECIII (T))						
			Part A					
Year	2nd	Semester	3rd		Credits	L 2	T P C 0 0 2	
Course Type	Theory only					"		
Course Category	Ability Enhancer	ment Courses						
Pre-Requisite/s	Co- Requisite/s							
Course Outcomes & Bloom's Level								
Coures Elements	Skill Developme Entrepreneurshi Employability ✓ Professsonal Ett Gender X Human Values ✓ Environment X	p × hics ×	SDG (Goals)					
	Part B							
Modules	Contents Pedagogy Hours							
	Part D/Marks Distribution)							
			Theory					

	Theory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	40	60	18	40				
		•	Practical	•	•			
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			

Part E

Books	Fluency in English - Part II, 2006, Oxford University Press. • Business English, 2008, Pearson Publication.
Articles	https://www.frontiersin.org/articles/10.3389/feduc.2019.00087/full https://www.cli.co.uk/media/6158020/a-useful-guide-to-swot-analysis.pdf http://www.mmmut.ac.in/News_content/35141tpnews_10142020.pdf
References Books	- Language, Literature and Creativity, 2013, Orient Blackswan John E Warriner, Harcourt, Brace, Jovanovich, Warriner's English Grammar and Composition: Complete Course, 1973.
MOOC Courses https://www.edx.org/learn/leadership/catalyst-leading-with-effective-communication-inclusive-leadership-training?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing?hs_analytics_source=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing/university-of-californ	
Videos	https://www.youtube.com/watch?v=lqg8P9N9Hbg https://www.youtube.com/watch?v=uA5YeqgsjmYhttps://www.youtube.com/watch?v=eBSeCp_xhl

	COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
(01	2	-	1	2	3	-	-	3	2	=	2	3	2	2	-
(002	-	2	2	3	-	2	-	2	3	=	-	-	-	-	-
(033	2	-	3	-	2	2	2	3	2	=	-	-	-	2	1
(004	2	-	3	-	2	-	3	-	2	=	3	2	-	2	3
(005	2	-	2	-	-	•	•	•	•	-	-	-	-	-	-
(06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Bsc_Microbiology

Title of	he Course	Plant Physiology												
Cour	se Code	BSMB GE IV (T)												
					Par	tA								
	'ear	2nd	Semester		4th		Credits			L	Т	P	С	
Cou	se Type													
Course	Category													
Pre-R	quisite/s	Co-Requi												
Course & Bloo	Outcomes m's Level													
Coures	Elements					SDG (Goals)								
Part B														
M	odules			Contents		Pedagogy				Hours				
Part D(Marks Distribution) Theory														
Total Marks	Minimum P	assing Marks	External	Evaluation Min. External Evaluation				Internal Evaluation			Min. Internal Evaluation			
Practical														
Total Marks	Minimum P	assing Marks	External	Evaluation Min. External Evaluation				Internal Evaluation			Min. Internal Evaluation			
Part E														
Books														
Articles														
References Books														
MOOC Courses														
Videos														
Course Articulation Matrix														
COs PO1	PO2 PO3	PO4	PO5 PO6	P07	PO8	PO9 PO	10	PO11	PO12	PSO1	D	502	PSO3	



Title of th	ne Course	Animal F	Physiology													
Course	e Code	BSMB 0	GEIV (T)													
							Part A									
Ye	ar	2nd				Semester	4th				Credits		L	Т	Р	С
Course	е Туре				•											
Course C	Category															
Pre-Req	uisite/s		Co-Requ	isite/s												
Course O & Bloom	Outcomes n's Level															
Coures E	žlements							SDG (Gd	oals)							
_							Part B									
Mod	dules				Cor	ntents				Pe	dagogy			Ho	urs	
			Part D(Marks Distribution) Theory Min. External Evaluation Internal Evaluation Min. Internal Evaluation													
Total Marks	Minim	num Passing M	arks	Ex	ternal Evaluati	ion			ation	Inter	mal Evaluation		Mir	. Internal Eva	aluation	
Total Marks		num Passing Ma	t		ternal Evaluati		Practica	Min. External Evalu			mal Evaluation			. Internal Ev		
TOTAL MAIKS		ium rassing m	diks	EX	terrial Evaluati	ion		MIII. External Evalu	ation	inter	ilai Evaluation		mii	i. IIIterriai Ev	aiuation	
							Part E									
							Books									
							Articles									
							References B									
							MOOC Cour									
							Videos									
						Cou	urse Articulati	ion Matrix								
COs PO1	PO2	PO3	PO4	PO5 F	PO6	P07	PO8	PO9	PO10	PO11	P012	PSO1	PSC	12	PSO3	



	Title of th	e Course	India ir	21st Century														
	Course	Code	BSMB	VAC II (T)														
								Par	rt A									
	Ye	ar	1st				Semester		2nd			Credits		L	Т	P	С	
	Course	Туре																
	Course C	ategory																
	Pre-Req	uisite/s		Co-Re	quisite/s													
	Course O & Bloom	utcomes 's Level																
	Coures E	lements							SDG (Go	als)								
								Par	t B									
	Mod	lules				Co	ontents				Р	edagogy			Но	urs		
					Part D(Marks Distribution)													
					Theory													
Total I	Marks	Mi	nimum Passing N	larks	E	xternal Evalua	ition		Min. External Evalua	tion	Inte	ernal Evaluation		Mir	n. Internal Eva	aluation		
								Prac			_							
Total I	Marks	Mi	nimum Passing N	larks	E	xternal Evalua	ntion		Min. External Evalua	tion	Inte	ernal Evaluation		Mir	n. Internal Eva	aluation		
								Par	rt E									
								Вос	oks									
								Artic	cles									
								Reference	es Books									
								MOOC	Courses									
								Vide	eos			·						
COs	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	ulation Matrix PO9	PO10	PO11	PO12	PSO1	PSC	20	PSO3		
COS	PUI	PU2	PU3	PU4	PUS	PUB	PU/	PUB	PU9	PUIU	PUTT	PUIZ	PSUI	PSC	JZ	PS03		



	Title of th	e Course	Disaste	er Management													
	Course	e Code	BSMB	VACIII (T)													
			•					Pari	٠.٨								
	Ye	ar	2nd				Semester		3rd			Credits		L	т	Р	С
	Course	е Туре				1					Į.			- 1			1
	Course 0	Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C	Outcomes n's Level				1											
	Coures E	Elements							SDG (Go	als)							
								Pari	B								
	Mor	dules				Co	ontents					Pedagogy			Н	ours	
							Par	rt D(Marks	Distribution)								
Total N	larks	Minim	ım Passing N	Marks	Exten	nal Evalua	ition		Min. External Evalu	ation		nternal Evaluation		м	in. Internal Ev	aluation	
								Pract	ical		-						
Total N	larks	Minim	ım Passing M	Marks	Exten	nal Evalua	ition		Min. External Evalu	ation	1	nternal Evaluation		М	in. Internal Ev	aluation	
							1	Part	t E				,				
								Воо	ks								
		<u> </u>						Artic	les								
								Reference	s Books								
								MOOC C									
								Vide	os								
							Cou	urse Articu	lation Matrix								
CO+	DO1	DO2	202	DO4	DOE DO	e	DO7	000711100	DO0	DO10	DO11	DO12	DCO1	De	-02	DCO2	



tile Course	runuan	ieritais or blocher	iisuy												
rse Code	BSMB1	01[T]													
						Part A									
Year	1st				Semester	1st				Credits		L	Т	Р	С
rse Type									•			•		•	
e Category															
equisite/s		Co-Re	quisite/s												
Outcomes om's Level															
Elements							SDG (G	oals)							
						Part B									
lodules				(Contents					Pedagogy			Но	urs	
			Part D(Marks Distribution)												
			Part D(Marks Distribution) Theory												
Mini	num Passing M	arks		External Evalu	uation	N.	Min. External Evalu	ation	In	ternal Evaluation		Mir	n. Internal Eva	aluation	
						Practical									
Mini	num Passing M	arks		External Evalu	uation	N.	Min. External Evalu	ation	In	ternal Evaluation		Mir	n. Internal Eva	aluation	
						Part F									
						Books									
						Articles									
						References Bo	oks								
						MOOC Cours	es								
						Videos									
	·					·				_					
DO2	DO2	DO4	DOE	DOS	Co	urse Articulatio	n Matrix	DO10	DO11	DO12	DCO1	nec		DCO2	
R	Mini	Year 1st Year 1st Year 1st Inse Type te Category Requisite/s to Outcomes om's Level se Elements Minimum Passing M Minimum Passing M	rse Code BSMB101[T] Year 1st rrse Type 1st to Category Requisite/s Co-Re o Outcomes om's Level 1st se Elements Minimum Passing Marks Minimum Passing Marks	rse Code BSMB101[T] Year 1st	Year 1st	ree Code BSMB101[T] Year 1st Semester rise Type to Category Requisite/s Co-Requisite/s Contents Modules Contents Pa Minimum Passing Marks External Evaluation Minimum Passing Marks External Evaluation Code	rese Code BSMB101[T] Part A Year 1st Semester 1st rese Type te Category Requisite/s © Outcomes om's Level se Elements Part B Modules Contents Part D(Marks Dist Theory Minimum Passing Marks External Evaluation Practical Minimum Passing Marks External Evaluation I Part E Books Articles References Bo MOOC Course Videos Course Articulation Course Articulation References Bo MOOC Course Videos	res Code BSMB101[T] Part A Year 1st Semester 1st res Type to Category Requisite/s Co-Requisite/s Contents Part B Modules Contents Part D(Marks Distribution) Theory Minimum Passing Marks External Evaluation Min. External Evaluation Min. External Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix	Part A	Part A	Part A	Part Part	Part Part	SAME SAME	Part Part



	Title of th	ne Course	Genera	al Microbiology													
	Course	e Code	BSMB1	102[T]													
								Par	rt A								
	Ye	ear	1st				Semester		1st			Credits		L	Т	Р	С
	Course	е Туре														1	
	Course 0	Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Ge	oals)							
			•					Par	t B								
	Mod	dules				Co	ontents					Pedagogy			Н	ours	
							Pa	art D(Marks	Distribution)								
Total N	Marks	Minim	um Passing N	Marks	Exter	nal Evalua	ntion		Min. External Evalu	ation		Internal Evaluation		N	fin. Internal Ev	aluation	
								Prac	tical								
Total N	Marks	Minim	um Passing N	Marks	Exter	nal Evalua	ntion		Min. External Evalu	ation		Internal Evaluation		N	Min. Internal Ev	aluation	
								Par	rt E								
								Вос	oks								
	-		-		-			Artie	cles								
								Reference	es Books								
								MOOC									
								Vide	eos								
							Co	ourse Artica	ulation Matrix								
COn	DO1	DOS	DO2	DO4	DOE DO	c	DO7	DOS	DOO	DO10	DO11	DO12	DCO1	Di	202	DCO2	



Title of	the Course	Molecular Biology -I											
Cou	se Code	BSMB201(T)											
					Part A								
	'ear	1st		Semester	2nd			Credits		L	Т	Р	С
Cou	se Туре				<u>'</u>		"						
Cours	Category												
Pre-R	equisite/s	Co-Re	quisite/s										
Course & Bloo	Outcomes m's Level												
Coure	Elements				SDG (Goa	ls)							
					Part B								
N	odules			Contents				Pedagogy			н	lours	
Total Marks	Minimu	m Passing Marks	Externa	al Evaluation	Theory Min. External Evalua	ion	in	nternal Evaluation		Mi	n. Internal E	valuation	
			1		Practical								
Total Marks	Minimu	m Passing Marks	Externa	al Evaluation	Min. External Evalua	ion	In	nternal Evaluation		Mi	n. Internal E	valuation	
					Part E								
					Books								
					Articles								
					References Books								
					MOOC Courses								
					Videos								
				Co	ourse Articulation Matrix								
COs PO1	PO2 F	O3 PO4	PO5 PO6			PO10	PO11	PO12	PSO1	PSC	no	PSO3	



Title of the Course Course Code SAMSONITO SAMS																			
Part A 2nd Semester 3nd Credits L T P C		Title of th	e Course	Molecu	ılar Biology-II							·			·				
Your 2nd Semester 3nd Cordition L T P C Course Category Fre-Requisite's Course Outcomes and Bloom's Level SDG (Goals)		Cours	e Code	BSMB3	301(T)														
Cours Category Cours Category Pra-Requisitors Co-Requisitors Co-Requisitors Co-Requisitors Cours Category Cours Category Pra-Requisitors Cours Category Facility Cours Category Facility Facili				,						Pa	rt A								
Course		Ye	ar	2nd					Semester	•	3rd				Credits	L	L T	Р	С
Pre-Requilate/ Co-Requisite/s Co-Requisite/s Course Out-one Report Pre-Requisite Report Pre-Requisite Report Pre-Requisite Report Pre-Requisite Report Pre-Requisite Pre-Requis		Cours	е Туре					•			•						•		
Course Curse Course Cou		Course	Category																
SDG (Goals		Pre-Red	quisite/s		Co-	Requisite/s													
Part B Part D Pedagogy		Course C & Bloom	Outcomes n's Level																
Modules Contents Pedagogy Hours Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix		Coures I	Elements								SDG	(Goals)							
Modules Contents Pedagogy Hours Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix										Pa	rt B		•						
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles Feferences Books WOOC Courses Videos Course Articulation Matrix		Мо	dules					Conten	its					Р	edagogy			Hours	
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles Feferences Books WOOC Courses Videos Course Articulation Matrix																			
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles Articles Videos Course Articulation Matrix									F	Part D(Mark	s Distribution)								
Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books Videos Course Articulation Matrix										The	eory								
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books WOOC Courses Videos Course Articulation Matrix	Total	Marks	Minim	m Passing N	Marks		External	Evaluation			Min. External Ev	aluation		Inte	ernal Evaluation		Min. Interr	al Evaluation	
Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix										Pra	ctical		•						
Books Articles References Books MOCC Courses Videos Course Articulation Matrix	Total	Marks	Minim	m Passing N	Marks		External	Evaluation			Min. External Ev	valuation		Inte	ernal Evaluation		Min. Interr	al Evaluation	
Books Articles References Books MOCC Courses Videos Course Articulation Matrix																			
Articles References Books MOC Courses Videos Course Articulation Matrix																			
References Books MOCC Courses Videos Course Articulation Matrix																			
MOCC Courses Videos Course Articulation Matrix																			
Videos Course Articulation Matrix																			
Course Articulation Matrix																			
										Vic	leos								
		1	Tana I		1	1	1						T					1	



	Title of the	e Course	Plant T	issue Culture														
	Course	Code	BSMB:	I02(T)														
								Part	t A									
	Ye	ar	2nd				Semester		3rd			Credits		L	Т	Р	С	
	Course	Туре													1			
	Course C	ategory																
	Pre-Req	uisite/s		Co-Re	quisite/s													
	Course O & Bloom	utcomes 's Level																
	Coures E	lements							SDG (Go	als)								
								Part	t B		•							
	Mod	lules				Co	ontents		-			Pedagogy			Но	ours		
					Part D(Marks Distribution)													
							Pa											
					Theory													
Total M	larks	Mi	nimum Passing N	larks	E	xternal Evalua	ition		Min. External Evalua	ation	Int	ernal Evaluation		М	in. Internal Ev	aluation		
								Pract			1							
Total M	larks	Mi	nimum Passing N	larks	E	xternal Evalua	ition		Min. External Evalua	ation	Int	ernal Evaluation		М	in. Internal Ev	aluation		
								Part	. =									
								Boo										
								Artic	les									
								Reference	s Books									
								MOOC C	ourses									
								Vide	ios									
				,			- I		lation Matrix		,		,					
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3		



Title of the Course Course Code SSM8303(T)															
Part A Semester 3rd Credite L T P C	T	itle of the C	Course	Genetics											
Year		Course Co	ode	BSMB303(T)											
Year							P	art A							
Course Category Per-Requisitories Course Outcomes A Shoom's Level SDG (Goale) Course Elements SDG (Goale) Part B For D(Marks Distribution) Total Marks Minimum Passing Marks External Evaluation Minimum Passing Marks External Evaluation Minimum Passing Marks Minimum Passing Marks Minimum Passing Marks External Evaluation Minimum Passing Marks Minim		Year		2nd		Semeste				Credits		L	Т	Р	С
Per-Requisitals Co-Requisites Course Outcomes A Bloom's Level SDG (Goals) Course Elements Feart B Modules Contents Pert D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. Internal Evaluation Min. E		Course Ty	уре						1				ı		
Course Dutcomes & Bloom's Level Course Elements SDG (Goals) Part B Modules Contents Part B Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix	(Course Cate	egory												
A Bloom's Level Course Elements SDG (Goals) Fart B Part D(Marks Distribution) Fart D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Fart L(Easternal Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Fart E Books Articles References Books MOOC Courses Videos Course Articulation Matrix		Pre-Requis	site/s	Co-Rec	uisite/s										
Part B Part D Pedagogy Pe	C	Course Outo & Bloom's I	comes Level												
Nodules Contents Pedagogy Hours	C	Coures Eler	ments					SDG (Goals)							
Nodules Contents Pedagogy Hours				•			Pa	art B							
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books WOOC Courses Videos Course Articulation Matrix		Module	es			Contents				Pedagogy			н	ours	
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books WOOC Courses Videos Course Articulation Matrix								B1 (11 (1)							
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Min. Internal Evaluation Min. Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books WIGOC Courses Videos Course Articulation Matrix															
Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix	Total Marks		Minimum D	aasina Marka	Eutomo	I Eveluation	- "			Internal Evaluation			Min Internal Fr	.aluation	
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books WIGOC Courses Videos Course Articulation Matrix	TOTAL MAIKS		Millillulli P	assing marks	Externa	Evaluation	D.			IIIterriai Evaluation			WIII. IIILEITIAI EV	/aiuation	
Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix	Total Marke		Minimum D	seeina Marke	Externa	I Evaluation	Fia			Internal Evaluation			Min Internal Ex	valuation	
Books Articles References Books MOCC Courses Videos Course Articulation Matrix	iotai marks		Milliniani F	assing marks	Externa	Lvaidation		mini. External Evaluation		Internal Evaluation			min. miternar Ex	valuation	
Books Articles References Books MOCC Courses Videos Course Articulation Matrix							Pa	art F							
References Books MOCC Courses Videos Course Articulation Matrix															
MOOC Courses Videos Course Articulation Matrix							Ar	ticles							
Videos Course Articulation Matrix							Referen	ces Books							
Course Articulation Matrix							MOOC	Courses							
		-	·				Vi	deos				-			
	COs PO		PO2 PO3	PO4	PO5 PO6	P07	Course Artic		 PO11	PO12	PSO1	- 1-		PSO3	



Title of t	he Course	Genetic Engineering, Tools and	d applications							
Cours	se Code	BSMB401(T)								
					Part A					
Y	'ear	2nd		Semester	4th	Credits	L	Т	Р	С
Cour	se Type							ı.	1	
Course	Category	1								
Pre-Re	quisite/s	Co-Requis	site/s	1						
Course & Bloo	Outcomes m's Level	 								
Coures	Elements				SDG (Goals)					
					Part B					
M/	odules		-	Contents	rarb	Pedagogy		н	ours	
Total Marks	Minimum Pa	ssing Marks	External	Evaluation	Min. External Evaluation	Internal Evaluation	м	lin. Internal E	valuation	
					Practical					
Total Marks	Minimum Pa	ssing Marks	External	Evaluation	Min. External Evaluation	Internal Evaluation	м	lin. Internal Ev	/aluation	
					Part E					
					Part E Books					
					Books					
					Books Articles					
					Books Articles References Books					
					Books Articles References Books MOOC Courses					



Ti	Title of the C	Course	Bioproce	ess Engineering													
	Course C	ode	BSMB40	02(T)													
								Part A	١								
	Year		2nd				Semester	4th				Credits		L	Т	Р	С
	Course T	уре				•		•							•	•	
C	Course Cat	egory															
	Pre-Requis			Co-Requ	uisite/s												
C	Course Outo	comes Level															
C	Coures Eler	ments							SDG (Gd	als)							
								Part B	3								
	Modul	es				Co	ntents				Pe	dagogy			Ho	urs	
							Par	rt D(Marks Di Theory									
Total Marks		Minim	um Passing Ma	arks	Ex	ternal Evaluat	tion		Min. External Evalu	ation	Inter	nal Evaluation		Mir	n. Internal Eva	aluation	
								Practica									
Total Marks		Minim	um Passing Ma	arks	Ex	ternal Evaluat	tion		Min. External Evalu	ation	Inter	nal Evaluation		Mir	n. Internal Eva	aluation	
								Part E	<u> </u>								
								Books	3								
								Articles	s								
								References I									
								MOOC Cou									
								Videos	8								
							Co	urse Articulat	tion Matrix								
COs PO	01	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	P011	PO12	PSO1	PSC	02	PSO3	



	Title of th	e Course	Enzymo	ology													
	Course	Code	BSMB4	03(T)													
								Pa	rt A								
	Ye	ar	2nd				Semester		4th			Credits		L	Т	Р	С
	Course	е Туре				- 1					I				II.	1	- I
	Course 0	Category															
	Pre-Rec	juisite/s		Co-Re	quisite/s												
	Course C & Bloom	utcomes 's Level															
	Coures E	Elements							SDG (Go	als)							
			•					Pa	rt B		*						
	Mod	dules				Co	ontents					Pedagogy			Но	ours	
				Part D(Marks Distribution) Theory arks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation													
Total N	Marks	Minim	um Passing M	arks	Exter	nal Evalua	ition			ition	Ir	ternal Evaluation		м	in. Internal Ev	aluation	
								Prac					T				
Total N	Marks	Minim	um Passing M	arks	Exter	nal Evalua	ntion		Min. External Evalua	ation	Ir	ternal Evaluation		М	in. Internal Ev	aluation	
								Pa	rt E								
								Во	oks								
							·	Arti	icles			·					
							·	Referenc	es Books			·					
								MOOC									
								Vid	eos								
							Col	urse Artici	ulation Matrix								
CO+	DO1	DOS	DO3	DO4	DOE DO	c	000	DO0	DO0	DO10	DO11	DO12	DCO1	DC	-02	DCO2	



	Title of the	Course	Plant E	cology													
	Course	Code	BSMBC	SE II (T)													
								Pa	rt A								
	Yea	r	1st				Semester		2nd			Credits		L	Т	P	С
	Course	Туре															
	Course C	ategory															
	Pre-Req	iisite/s		Co-Re	quisite/s												
	Course O	itcomes s Level															
	Coures E	ements							SDG (Go	als)							
								Pa	rt B								
	Mod	ules				Co	ontents					Pedagogy			Но	ours	
							Pa		Distribution)								
	1							The	eory		1						
Total M	larks	Mi	nimum Passing N	arks	E	xternal Evalua	ition		Min. External Evalua	ation	In	ternal Evaluation		М	in. Internal Eva	aluation	
								Prac			1						
Total M	larks	Mi	nimum Passing N	arks	E	xternal Evalua	ntion		Min. External Evalua	ation	In	ternal Evaluation		М	in. Internal Eva	aluation	
								Po	rt E								
									oks								
								Arti	cles								
								Reference	es Books								
								моос	Courses								
								Vid	leos								
							0.	ourco Artic	ulation Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1		iO2	PSO3	



Title of the Course Course Code BSMBGE II (T) Part A Year 1st Semester 2nd Credits L Course Type Course Category Pra-Requisite's Co-Requisite's Co-Requisite's Course Elements SDG (Goals) Part B Modules Contents Pedagogy Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles References Books MOOC Courses ROOC Courses Videos																		
Part A 1st Semester 2nd Credits L		Title of the	Course	Gene	al anatomy & compa	rative anatomy of Ve	rtebrates											
Year		Course C	Code	BSME	GE II (T)													
Year									Pari	t A								
Course Category Pre-Requisite/s Co-Requisite/s Co-Requisite/s Course Outcomes SDG (Goals)		Year		1st				Semester					Credits		L	Т	P	С
Pre-Requisite/s Co-Requisite/s Co-Requisite/s Course Course Selevents SDG (Goals) SDG (Goals) <th< td=""><td></td><td>Course 1</td><td>Гуре</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		Course 1	Гуре															
Course Cutromes & Bloom's Level Course Elements SDG (Goals)		Course Ca	tegory															
& Bloom's Level SDG (Goals) Coures Elements Part B Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation		Pre-Requi	site/s		Co-Re	quisite/s												
Part B Module Contents Pedagogy		Course Out & Bloom's	comes Level															
Modules Contents Pedagogy Part D (Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical For E Books Articles References Books MOOC Courses		Coures Ele	ments							SDG (Goa	als)							
Modules Contents Pedagogy Part D (Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical For E Books Articles References Books MOOC Courses				•					Pari	t B		•						
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles References Books MOOC Courses		Modu	les														urs	
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles References Books MOOC Courses																		
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles References Books MOOC Courses								Pa										
Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles References Books MOOC Courses		-							Theo									
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles References Books MOOC Courses	Total Marks	ks	Mir	nimum Passing	Marks	E:	xternal Evalu	ation			tion	Inte	ernal Evaluation		Mi	in. Internal Ev	aluation	
Part E Books Articles References Books MOOC Courses									Pract			T						
Books Articles References Books MOOC Courses	Total Marks	ks	Mi	nimum Passing	Marks	E:	xternal Evalu	ation		Min. External Evalua	tion	Inte	ernal Evaluation		Mi	in. Internal Eva	aluation	
Books Articles References Books MOOC Courses									Dovi	• -								
References Books MOOC Courses																		
MOOC Courses									Artic	cles								
									Reference	es Books								
Videos									MOOC C	Courses								
									Vide	908								
Course Articulation Matrix												1		,	ı			
COs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01	COs PC	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3	



	Title of the	e Course	Inorgai	ic Chmeistry													
	Course	Code	BSMB	GEIII (T)													
								Pa	art A								
	Ye	ar	2nd				Semester		3rd			Credits		L	Т	P	С
	Course	Туре															
	Course C	Category															
	Pre-Req	uisite/s		Co-Re	quisite/s												
	Course O & Bloom	utcomes 's Level															
	Coures E	lements							SDG (Go	als)							
								Pa	ırt B								
	Mod	iules				Co	ontents	edagogy			Но	ours					
							Pa		s Distribution)								
								The	eory		1						
Total N	larks	Mi	nimum Passing N	larks	E	xternal Evalua	ition		Min. External Evalua	ition	Inte	ernal Evaluation		Mi	n. Internal Ev	aluation	
								Pra	ctical		Т						
Total N	larks	Mi	nimum Passing N	larks	E	kternal Evalua	ition		Min. External Evalua	ition	Inte	ernal Evaluation		Mi	n. Internal Ev	aluation	
								Do	ırt E								
									ooks								
								Art	icles								
								Reference	ces Books								
								моос	Courses								
								Vic	ieos								
	1		ı	1					ulation Matrix				_				
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSC	02	PS03	



	Title of th	e Course	Environ	mental Issues and S	Sustainable Develop	ment											
	Course			ACIV (T)													
								5									
	Ye		2nd				Semester	Part A 4th				Credits		L	т	Р	С
			ZIIU				Semester	401				Credits		L	- 1'	F	C
	Course																
	Course 0																
	Pre-Rec			Co-Req	juisite/s												
	Course C & Bloom	lutcomes i's Level															
	Coures E	lements							SDG (Go	als)							
			•					Part B									
	Mod	dules		Contents Pedagogy Hours											ours		
					Contents Pedagogy Hours												
							Pa	rt D(Marks Dis	tribution)								
		1						Theory									
Total N	Marks	Mini	num Passing M	arks	E	xternal Evalua	tion		Min. External Evalua	ition	Inte	rnal Evaluation		Mir	n. Internal Ev	aluation	
								Practical									
Total N	Marks	Mini	num Passing M	arks	E	xternal Evalua	tion		Min. External Evalua	ition	Inte	rnal Evaluation		Mir	n. Internal Ev	aluation	
								Part E Books									
								Articles									
								References B									
								MOOC Cour	ses								
								Videos									
							C	ourse Articulation	on Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSC)2	PSO3	
					1						1						



	Title Of th	ie Course	IVIE	atantics													
	Cours	e Code	BSF	PH0101[T]													
								Pa	art A								
	Ye	ear	1st				Semeste	r	1st			Credits		L	Т	Р	С
	Cours	е Туре									•			•	•	•	
	Course	Category															
	Pre-Red	quisite/s		Co-R	equisite/s												
	Course 0 & Bloom	Outcomes n's Level															
	Coures I	Elements							SDG (G	oals)							
								Pa	art B								
	Мо	dules				(Contents				ı	Pedagogy			Но	urs	
Total N	larks		inimum Passin	g Marks		External Evalu			s Distribution) eory Min. External Eval	ation	Int	ernal Evaluation		Min. I	Internal Eva	aluation	
				,				Pra	ctical		-						
Total N	larks	М	inimum Passin	g Marks	E	xternal Evalu	uation		Min. External Eval	ation	Int	ernal Evaluation		Min. I	Internal Eva	aluation	
									art E								
									ticles								
								Referen	ces Books								
								моос	Courses								
								Vie	deos								
-																	
COs	PO1	PO2	PO3	PO4	P05	P06	P07	PO8	po9	PO10	PO11	PO12	PSO1	PSO2		PSO3	
008	101	1 02	1 03	1 04	100	1 00	101	1.00	1 09	1010	1.011	1012	1001	1.302		1 303	



BSc_ComputerScience

	Title of th	e Course	Proper	ties of Matter													
	Course	e Code	BSPHO)101[T]													
								Par	1A								
	Ye	ar	1st				Semester		1st			Credits		L	Т	Р	С
	Course	е Туре									1					1	
	Course 0	Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Go	als)							
								Pari	B								
	Mod	dules				Co	ontents					Pedagogy			Но	ours	
							Par	rt D(Marks	Distribution)								
								The	ory								
Total N	larks	Minim	ım Passing M	Marks	Exter	nal Evalua	ition		Min. External Evalua	ation		nternal Evaluation		м	in. Internal Ev	aluation	
					·			Pract	ical								
Total N	larks	Minim	ım Passing M	Marks	Exter	nal Evalua	ition		Min. External Evalua	ation	ı	nternal Evaluation		М	in. Internal Ev	aluation	
								Part	ιE								
								Воо	ks								
								Artic	les								
		<u> </u>						Reference	s Books								
		<u> </u>						MOOC C	ourses								
								Vide	os								
							Co	urse Articu	lation Matrix								
CO+	DO1	DO2	202	DO4	DOE DO	e	007	000711100	DO0	DO10	DO11	DO12	DCO1	DC	-02	DCO2	



Title of	the Course	Properties of Matter											
Cou	se Code	BSPH0102[T]											
					Part A								
	Year	1st		Semester	1st			Credits		L	Т	P	С
Cou	rse Type												
Cours	Category												
Pre-R	equisite/s	Co-Rec	uisite/s										
Course & Blo	Outcomes om's Level												
Coure	Elements				SDG (Goal	5)							
					Part B								
N	odules			Contents				Pedagogy			н	lours	
Total Marks	Minimu	n Passing Marks	Externa	I Evaluation	Theory Min. External Evaluati	on	Int	ternal Evaluation		Mi	n. Internal E	valuation	
	T		1		Practical		1						
Total Marks	Minimu	n Passing Marks	Externa	I Evaluation	Min. External Evaluati	on	Int	ternal Evaluation		Mi	n. Internal Ev	valuation	
					Part E								
					Books								
					Articles								
					References Books								
					MOOC Courses								
					Videos								
				Co	urse Articulation Matrix								
COs PO1	PO2 P	03 PO4	PO5 PO6	P07		O10	PO11	PO12	PSO1	PSC	72	PSO3	



	Title of th	ne Course	Statisti	cal physics														
	Course	e Code	BSPHO	1202[T]														
								Par	t A									
	Ye	ear	1st				Semester		2nd			Cre	edits		L	Т	Р	С
	Course	е Туре														-1	1	1
	Course 0	Category																
	Pre-Rec	quisite/s		Co-F	tequisite/s													
	Course C & Bloom	Outcomes n's Level																
	Coures E	Elements							SDG (G	oals)								
			•					Pari	t B		•							
	Mod	dules				Co	ontents		-			Pedagogy				Но	urs	
Total I	Marks	Minin	um Passing N	larks	Exte	mal Evalua		rt D(Marks The	Distribution) ory Min. External Evalu	ation		Internal Evalua	ation		Min.	Internal Eva	aluation	
							J.	Pract	ical		- I			I				
Total I	Marks	Minin	um Passing N	larks	Exte	rnal Evalua	ition		Min. External Evalu	ation		Internal Evalua	ition		Min.	Internal Eva	luation	
								Pari	tE									
								Воо	ks									
								Artic	les									
								Reference	s Books									
								MOOC C										
								Vide	ios									
							Co	ourse Articu	lation Matrix									
CO.	DO1	DO2	DO3	DO4	DOE DO	20	DO7	DOS	DO0	DO10	DO11	DO12	DCO1		DEOC		DCO2	



BSc_ComputerScience

	Title of th	ne Course	Optics														
	Course		BSPH03	n1ITI													
	Course	e code	DOI 1103	ni[1]													
								Par	1A								
	Ye	ar	2nd				Semeste	r :	3rd			Credits		L	Т	P	С
	Cours	е Туре															
	Course (Category															
	Pre-Rec	quisite/s		Co-Req	uisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (G	oals)							
								Pari	D								
	Mo	dules				Cor	ntents	raii			Pi	edagogy				lours	
			- 1														
								Part D(Marks	Distribution)								
								The	ory								
Total Ma	arks	Mini	mum Passing Ma	rks	E	xternal Evaluati	ion		Min. External Evalu	ation	Inte	rnal Evaluation		Mir	n. Internal E	valuation	
								Pract	ical		•						
Total Ma	arks	Mini	mum Passing Ma	rks	E	xternal Evaluati	ion		Min. External Evalu	ation	Inte	rnal Evaluation		Mir	n. Internal E	valuation	
								Part									
								Воо	ks								
								Artic	les								
·			·	·				Reference	s Books				·				
								MOOC C	ourses								
								Vide	os								
								Course Articu	lation Matrix								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12 F	PSO1	PSC	02	PSO	13



BSc_PCM

Title of														
	the Course	Optics												
Cou	rse Code	BSPH0301	1[T]											
							Part A							
	Year	2nd				Semester	3rd			Credits	L	Т	Р	С
Cou	irse Type						<u>'</u>							
Cours	e Category													
Pre-F	Requisite/s		Co-Requ	uisite/s										
Course & Blo	om's Level													
Coure	s Elements						SDG (Goal	s)						
							Part B							
,	Modules				Conte	ents				Pedagogy		Но	ours	
Total Marks	Minir	um Passing Mark	ks	Ext	ernal Evaluatio	n	Theory Min. External Evaluati	on	In	nternal Evaluation	Mir	n. Internal Ev	aluation	
							Practical							
Total Marks	Minir	um Passing Mark	ks	Ext	ernal Evaluatio	n	Practical Min. External Evaluati	on	In	nternal Evaluation		n. Internal Ev	aluation	
Total Marks	Minir	um Passing Mark	KS	Ext	ernal Evaluatio	n		on	In	nternal Evaluation		n. Internal Ev	aluation	
Total Marks	Minir	um Passing Mark	KS	Ext	ernal Evaluation	n	Min. External Evaluati	on	İri	nternal Evaluation		n. Internal Ev	aluation	
Total Marks	Minir	um Passing Mark	ks	Ext	ernal Evaluatio	n	Min. External Evaluati	on	In	nternal Evaluation		n. Internal Ev	aluation	
Total Marks	Minin	num Passing Mark	ΚS	Ext	ernal Evaluatio	Re	Min. External Evaluati Part E Books Articles ferences Books	on	In	nternal Evaluation		n. Internal Ev	aluation	
Total Marks	Minir	um Passing Mark	XS	Ext	ternal Evaluatio	Re	Min. External Evaluati Part E Books Articles oferences Books MOOC Courses	on	In	nternal Evaluation		n. Internal Ev	aluation	
Total Marks	Minir	num Passing Mark	KS	Ext	ternal Evaluatio	Re	Min. External Evaluati Part E Books Articles ferences Books	on	ln	nternal Evaluation		n. Internal Ev	aluation	
Total Marks	Minir	num Passing Mark	KS	Ext	ternal Evaluatio	Re	Min. External Evaluati Part E Books Articles oferences Books MOOC Courses	on	İr	nternal Evaluation		n. Internal Ev	aluation	



	Title of th	ne Course	Oscilla	tions of Waves													
	Course	e Code	BSPHO	0302[T]													
								Par	t A								
	Ye	ear	2nd				Semester		3rd			Credits		L	Т	Р	С
	Cours	е Туре						I			1				l.		II.
	Course	Category															
	Pre-Rec	quisite/s		Co-R	quisite/s												
	Course C & Bloom	Outcomes n's Level				,											
	Coures E	Elements							SDG (Go	als)							
								Par	t B		•						
	Mo	dules				Co	ontents					Pedagogy			н	lours	
								rt D(Marks The									
Total N	Marks	Minim	um Passing N	Marks	Exter	mal Evalua	ition		Min. External Evalua	ition		Internal Evaluation			Min. Internal Ev	valuation	
					_		_	Pract									
Total N	Marks	Minim	um Passing N	Marks	Exter	mal Evalua	ition		Min. External Evalua	ition		Internal Evaluation			Min. Internal Ev	valuation	
								Par	tE								
								Boo	ks								
								Artic	les								
								Reference	s Books								
								MOOC C									
								Vide	os								
							Co	ourse Articu	lation Matrix								
CO.	DO1	DO2	DO2	DO4	DOE DO	ve.	DO7	DO0	DO0	DO10	DO11	DO12	DCO1	-	2000	DCO2	



	Title of the	Course	Electricity	and Magnetism													
	Course	Code	BSPH04	01{T]													
								Part A									
	Yea	ar	2nd				Semester	4th				Credits		L	Т	Р	С
	Course	Туре												'	- I	1	- I
	Course C	ategory															
	Pre-Requ	uisite/s		Co-Req	uisite/s												
	Course Or & Bloom	utcomes 's Level															
	Coures E	lements							SDG (Ge	als)							
			•					Part B									
	Mod	ules				Con	ntents				Pe	edagogy			Н	ours	
Total Ma	rks	Mini	mum Passing Ma	rks	E	xternal Evaluati		Theory Practical	Min. External Evalu	ation	Inte	rnal Evaluation		Mi	in. Internal Ev	aluation	
Total Ma	rks	Mini	num Passing Ma	rks		xternal Evaluation	on		Min. External Evalu	ation	Inte	rnal Evaluation		Mi	in. Internal Ev	aluation	
								Part E Books					•				
								Articles									
								References B									
								MOOC Cour									
								Videos									
							Co	ourse Articulation	on Matrix								
COs	PO1	PO2	PO3	PO4	P05	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3	



BSc_ComputerScience

Title of	the Course	Electricity ar	d Magnetism											
Cour	se Code	BSPH0401{	1											
							Part A							
,	'ear	2nd			Sei	mester	4th			Credits	L	Т	P	С
Cour	se Type										1			
Course	Category													
Pre-R	equisite/s		Co-Requi	site/s										
Course & Bloo	Outcomes m's Level													
Coures	Elements						SDG (G	Goals)						
							Part B		•					
M	Modules						Tures			Pedagogy			Hours	
Total Marks	Minim	ım Passing Marks		Extern	al Evaluation		Theory Min. External Eval	uation		Internal Evaluation	Mi	in. Internal E	Evaluation	
							Practical							
Total Marks	Minim	ım Passing Marks		Extern	al Evaluation		Min. External Eval	uation		Internal Evaluation	Mi	in. Internal E	valuation	
							Part E							
							Books							
							Articles							
						Refe	rences Books							
						МО	OC Courses							
							Videos							
							urticulation Matrix							



	Title of the C	Course	Electrom	gnetic Theory													
	Course C	ode	BSPH040	04[T]													
								Part A									
	Year		2nd				Semester	4th				Credits		L	Т	Р	С
	Course T	ype				l.								-	- I	1	- I
	Course Cat	egory															
	Pre-Requis	site/s		Co-Req	uisite/s												
	Course Outo	comes Level															
	Coures Eler	ments							SDG (Go	oals)							
								Part B			•						
	Modul	es				Con	itents	ranto			Pe	dagogy			Н	ours	
Total Marks	s	Minir	num Passing Ma	rks		External Evaluati	on	Theory N	Min. External Evalu	ation	Inte	rnal Evaluation		Mi	in. Internal Ev	aluation	
Total Marks	s	Minir	num Passing Ma	rks		External Evaluation	on		Min. External Evalu	ation	Inte	rnal Evaluation		Mi	in. Internal Ev	aluation	
			Part E Books Articles References Books														
								MOOC Cours	es								
								Videos									
							С	ourse Articulation	n Matrix								
COs P	201	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3	



Title of	the Course	Elementry quantum mecha	nics										
Cou	se Code	BSPH0502[T]											
					Part A								
	Year	3rd		Semester	5th			Credits		L	Т	P	С
Cou	rse Type				<u>'</u>								
Cours	Category												
Pre-R	equisite/s	Co-Rec	uisite/s										
Course & Blo	Outcomes om's Level												
Coure	Elements				SDG (G	oals)							
		_			Part B								
N	odules			Contents			F	Pedagogy			н	lours	
Total Marks	Minimu	n Passing Marks	Externa	I Evaluation	Theory Min. External Eval	ation	Int	ernal Evaluation		Min	n. Internal E	valuation	
	T				Practical								
Total Marks	Minimu	n Passing Marks	Externa	I Evaluation	Min. External Eval	ation	Int	ernal Evaluation		Mir	n. Internal Ev	valuation	
					Part E								
					Books								
					Articles								
					References Books								
					MOOC Courses								
					Videos								
				Co	ourse Articulation Matrix								
COs PO1	PO2 P	03 PO4	PO5 PO6	P07	PO8 PO9	PO10	PO11	PO12	PSO1	PSC	72	PSO3	



BSc_ComputerScience

Title o	f the Course	Java	a Programing												
Соц	ırse Code	BSF	PH0502[T]												
		,				Р	art A								
	Year	3rd			Semes		5th			Credits		L	Т	Р	С
Cou	urse Type								1				1		
Cours	se Category														
Pre-F	Requisite/s		Co-Re	quisite/s											
Cours & Blo	e Outcomes oom's Level														
Coure	es Elements		-				SDG (Goa	s)							
		•				Р	art B								
	Modules						urt D			Pedagogy			н	lours	
Total Marks	Min	imum Passin	g Marks	Extern	al Evaluation		heory Min. External Evalua	ion		Internal Evaluation		Mi	n. Internal E	valuation	
						Pra	actical				ı				
Total Marks	Min	imum Passin	g Marks	Extern	al Evaluation		Min. External Evalua	on		Internal Evaluation		Mi	n. Internal E	valuation	
							art E								
							ooks								
							rticles								
							nces Books								
							Courses								
						V	ideos								
						Course Arti	culation Matrix								
COs PO1	PO2	PO3	PO4	PO5 PO6	PO7	PO8		2010	PO11	PO12	PSO1	PSC	n2	PSO3	



Tit	itle of the Cou	irse	Classical	Mechanics													
	Course Code	e	BSPH060)1[T]													
								Part A									
	Year		3rd				Semester	6th				Credits		L	Т	Р	С
	Course Type)															
С	Course Catego	ory															
F	Pre-Requisite	/s		Co-Req	uisite/s												
Cc &	ourse Outcon & Bloom's Lev	nes /el				•											
C	oures Elemei	nts							SDG (Go	als)							
								Part B			•						
	Modules					Con	itents				Pe	dagogy			Н	ours	
Total Marks		Minir	num Passing Ma	rks	ı	External Evaluation		art D(Marks Dist	Min. External Evalu	ation	Inte	rnal Evaluation		Mi	in. Internal Ev	aluation	
Total Marks		Minir	num Passing Ma	rks		External Evaluation	on		Min. External Evalu	ation	Inte	mal Evaluation		Mi	in. Internal Ev	aluation	
			Part E Books Articles References Books														
								MOOC Cours Videos	00								
								Videos									-
							С	ourse Articulation	n Matrix								
COs PO1	1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3	



	Title of the	Course	Enzyme	Technology													
	Course	Code	BT 202 (T)													
								Part A									
	Yea	ır	1st				Semester	2nd				Credits		L	Т	Р	С
	Course	Туре				l l					1						1
	Course C	ategory															
	Pre-Req	uisite/s		Co-Requ	uisite/s												
	Course O	utcomes 's Level															
	Coures E	lements							SDG (Go	als)							
								Part B									
	Mod	ules				Co	ontents				Pe	dagogy			Но	urs	
	Part D(Marks Distribution) Theory																
Total I	Marks	Mini	mum Passing Ma	ırks	E:	xternal Evalua	tion		Min. External Evalua	ation	Inter	nal Evaluation		Min	. Internal Eva	luation	
								Practical									
Total I	Marks	Mini	mum Passing Ma	ırks	E:	xternal Evalua	tion		Min. External Evalua	ation	Inter	nal Evaluation		Min	. Internal Eva	luation	
								Part E									
								Books									
								Articles									
								References B									
								MOOC Cour	ses								
								Videos									
							Co	urse Articulation	on Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO	12	PSO3	



Title of	the Course	Immunotechnology												
Cour	se Code	BT 204 (T)												
					Part	Δ								
,	/ear	1st		Semester		nd			Credits		L	Т	Р	С
Cour	se Type			1										
Course	Category													
Pre-R	equisite/s	Co-Rec	uisite/s											
Course & Bloo	Outcomes m's Level													
Coures	Elements					SDG (Goa	ils)							
				_	Part	В		·						
M	odules			Contents					Pedagogy			H	Hours	
Total Marks	Minimun	Passing Marks	Externa	al Evaluation	Theor	Min. External Evalua	ion		Internal Evaluation		Mi	in. Internal E	valuation	
					Praction					,				
Total Marks	Minimun	Passing Marks	Externa	l Evaluation		Min. External Evalua	ion		Internal Evaluation		Mi	in. Internal E	valuation	
					Part	E								
					Book	is								
					Article	es								
					References									
					MOOC Co									
					Video	os								
					Course Articula	ation Matrix								
COs PO1	PO2 PC	3 PO4	PO5 PO6	P07	PO8		PO10	PO11	PO12	PSO1	PS		PSO3	



Title of t										
	he Course	Open Elective 1 : Bioinformation	cs							
Cour	se Code	BT 205 (T)								
					Part A					
١	ear	1st		Semester	2nd	Credits	L	Т	P	С
Cour	ве Туре				·					-
Course	Category									
Pre-Re	quisite/s	Co-Requis	site/s							
Course & Bloo	Outcomes m's Level									
Coures	Elements				SDG (Goals)					
					Part B					
М	odules			Contents		Pedagogy		н	lours	
Total Marks	Minimum Pa	issing Marks	External	Evaluation	Theory Min. External Evaluation	Internal Evaluation	N	Min. Internal E	valuation	
					Practical					
			I .			 				
Total Marks	Minimum Pa	ssing Marks	External	Evaluation	Min. External Evaluation	Internal Evaluation	W	Min. Internal E	valuation	
Total Marks	Minimum Pa	issing Marks	External	Evaluation		Internal Evaluation	N	Min. Internal E	valuation	
Total Marks	Minimum Pa	issing Marks	External	Evaluation	Min. External Evaluation Part E Books	Internal Evaluation	N	Min. Internal E	valuation	
Total Marks	Minimum Pa	nssing Marks	External	Evaluation	Part E	Internal Evaluation	N	Min. Internal E	valuation	
Total Marks	Minimum Pc	assing Marks	External	-	Part E Books	Internal Evaluation	N	Min. Internal E	valuation	
Total Marks	Minimum P:	assing Marks	External	F	Part E Books Articles	Internal Evaluation	N	Ain. Internal E	valuation	
Total Marks	Minimum P.	assing Marks	External	F	Part E Books Articles References Books	Internal Evaluation	N	in. Internal E	valuation	
Total Marks	Minimum P.	assing Marks	External	F	Part E Books Articles References Books MOOC Courses	Internal Evaluation	N	fin. Internal E	valuation	



	Title of the	e Course	Geneti	c Engineering													
	Course	Code	BT 301	(T)													
								Pari	t A								
	Ye	ar	2nd				Semester		3rd			Credits		L	Т	P	С
	Course	е Туре									1						1
	Course C	Category															
	Pre-Req	uisite/s		Co-R	equisite/s												
	Course O & Bloom	lutcomes 's Level				•											
	Coures E	Elements							SDG (Ge	als)							
			•					Pari	t B								
	Mod	dules				Co	ontents					Pedagogy			Н	ours	
Total Ma	ata.		um Passing N	•	-	mal Evalua		rt D(Marks Theo	Distribution) ory Min. External Evalu			Internal Evaluation			lin. Internal Ev		
Iotal Ma	irks	Minim	ım Passıng N	Marks	Exter	mai Evalua	ition	Pract		ation		Internal Evaluation			lin. Internal Ev	raluation	
Total Ma	arke	Minim	ım Passing N	Aarke	Extor	mal Evalua	tion	Pract	Min. External Evalu	ation		Internal Evaluation			lin. Internal Ev	aluation	
- Total ma	iiko		ani rassing i	nai ko	LXIO	iiai Evaiua	ition		MIII. External Evalu	ation		internal Evaluation			IIII. IIILEIIIIAI EV	aluation	
								Part	t E								
								Воо	ks								
								Artic	les								
								Reference	s Books								
								MOOC C									
								Vide	ios								
							Col	urse Articu	lation Matrix								
CO+	DO1	DO2	203	DO4	DOE DO	ve.	000	DO0	DO0	DO10	DO11	DO12	DCO1	D	202	DEO2	



	Title of th	e Course	Plant E	Biotechnology													
	Course	e Code	BT 302	2(T)													
			•					Par	t A								
	Ye	ar	2nd				Semester		3rd			Credits		L	Т	Р	С
	Course	е Туре				1								ı	II.		1
	Course 0	Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Go	als)							
								Par	t B								
	Mod	dules				Co	ontents					Pedagogy			Но	ours	
							Par	rt D(Marks	Distribution)								
								The									
Total	Marks	Minim	um Passing N	Marks	Exte	rnal Evalua	ation		Min. External Evalua	ation		nternal Evaluation		М	in. Internal Ev	aluation	
								Prac	tical								
Total	Marks	Minim	um Passing N	Marks	Exte	rnal Evalua	ation		Min. External Evalua	ation	- 1	nternal Evaluation		М	in. Internal Ev	aluation	
								Par	+ C								
								Boo									
								Artic	cles								
								Reference	es Books								
								MOOC	ourses								
								Vide	eos								
CO.	DO1	DO3	003	DO4	DOE DO		Co	ourse Articu	lation Matrix	DO10	DO11	BO42	DCO1	1	202	DEO2	



Title of	f the Course	Anim	al Biotechnology												
Cou	irse Code	BT 30	03 (T)												
						P	art A								
	Year	2nd			Semes		3rd			Credits		L	Т	Р	С
Cou	ırse Type						•								
Cours	se Category														
Pre-F	Requisite/s		Co-Re	quisite/s											
Course & Blo	e Outcomes om's Level														
Coure	s Elements						SDG (Goa	s)							
						Pa	art B								
	Modules			Contents					Pedagogy			н	Hours		
Total Marks	Mini	num Passing	j Marks	Extern	al Evaluation		Min. External Evaluat	on		Internal Evaluation		Mi	n. Internal E	valuation	
	_					Pra	ctical								
Total Marks	Mini	num Passing	Marks	Extern	al Evaluation		Min. External Evaluat	on		Internal Evaluation		Mi	n. Internal E	valuation	
						Pa	art E								
						В	ooks								
							ticles								
							ces Books								
							Courses								
						Vi	deos								
						Course Artic	culation Matrix								
COs PO1	PO2	PO3	PO4	PO5 PO6	PO7	PO8		PO10	PO11	PO12	PSO1	PSC	N2	PSO3	



Ti	itle of the Cou	ırse	Agricultur	e Biotechnology ar	nd IPR												
	Course Code	е	BT 305 (T	Γ)													
								Part A									
	Year		2nd				Semester	3rd				Credits		L	Т	P	С
	Course Type	9									I.						1
C	Course Catego	ory															
	Pre-Requisite	e/s		Co-Req	uisite/s												
C	ourse Outcon & Bloom's Lev	nes vel															
c	Coures Elemei	nts							SDG (Gd	als)							
								Part B									
											Hou	rs					
	notures contents reagyly nous																
							Par	t D(Marks Distri	bution)								
					,		,	Theory									
Total Marks		Minir	num Passing Mar	rks	E	xternal Evaluatio	on		n. External Evalua	ation	Inter	nal Evaluation		Mi	lin. Internal Eval	uation	
								Practical									
Total Marks		Minir	num Passing Mar	rks	E	xternal Evaluatio	on	Mi	n. External Evalua	ation	Inter	nal Evaluation		Mi	lin. Internal Eval	uation	
								Part E Books									
								Articles									
								References Boo	ks								
								MOOC Course									
								Videos	-								
							Cou	urse Articulation	Matrix								
COs PO	1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PS	602	PS03	



	Title of the	e Course	Biophysic	s and Biochemistr	,	·									-		
	Course	Code	BT-101[T]													
								Part A									
	Ye	ar	1st				Semester					Credits		L	Т	Р	С
	Course	е Туре												-1		1	1
	Course C	Category															
	Pre-Req	uisite/s		Co-Req	uisite/s												
	Course O & Bloom	utcomes 's Level															
	Coures E	Elements							SDG (G	oals)							
								Part B									
Modules Contents Pedagogy Hours																	
Total Ma	ırks	Minir	num Passing Ma	rks	E	xternal Evaluation		Part D(Marks Dis	Min. External Evalu	ation	Inte	rnal Evaluation		Mir	n. Internal Ev	aluation	
Total Ma	ırks	Minir	num Passing Ma	rks	E	xternal Evaluation	on		Min. External Evalu	ation	Inte	rnal Evaluation		Mir	n. Internal Ev	aluation	
								Part E Books Articles References B MOOC Cour	Books								
								Videos									
								Course Articulati	ion Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSC	02	PSO3	



	Title of th	ne Course	General	Microbiology and M	icrobial Genetics												
	Cours	e Code	BT-102[T]													
								Part A									
	Ye	ear	1st				Semester	1st				Credits		L	Т	Р	С
	Cours	е Туре														1	
	Course	Category															
	Pre-Rec	quisite/s		Co-Requ	uisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures I	Elements							SDG (Go	als)							
								Part B									
	Мо	dules				Cont	tents	raitb	,		Р	edagogy			Но	ours	
1										· ·							
							Par	t D(Marks Di	istribution)								
								Theory	'								
Total I	Marks	Mini	mum Passing M	arks	E	kternal Evaluation	on		Min. External Evalua	ition	Inte	ernal Evaluation		Mi	n. Internal Ev	aluation	
								Practica	al								
Total I	Marks	Mini	mum Passing M	arks	Ex	kternal Evaluation	on		Min. External Evalua	ition	Inte	ernal Evaluation		Mi	n. Internal Ev	aluation	
								Part E									
								Books									
								Articles									
								References E									
								MOOC Cou									
								Videos	i								
							_		dan Marketo								
COs	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS	23	PSO3	
508	101	1 02	1 03	1 04	100	100	101	1 00	100	1010	1011	1012	1001	For	J2	1 303	



Title o	of the Course	Cell Bio	logy																		
Cou	urse Code	BT-103	П																		
							Part A														
	Year	1st				Semester	1st			Credits		L	Т	P	С						
Coi	urse Type							i i													
Court	se Category																				
Pre-f	Requisite/s		Co-Re	quisite/s																	
Cours & Blo	se Outcomes com's Level																				
Coure	es Elements						SDG (Goals)														
							Part B														
1	Modules				Conte	ents			Р	edagogy			Но	ours							
Total Marks	Mini	num Passing M	arks	Ex	ternal Evaluation	1	Theory Min. External Evaluation		Inte	ernal Evaluation		Mir	ı. Internal Ev	aluation							
Total Marks	Mini	num Paccina M	arke	E	tornal Evaluation							Practical									
Total marks		Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation																			
							Min. External Evaluation		Inte	ernal Evaluation		Mir	. Internal Ev	aluation							
							Part E		Inte	ernal Evaluation		Mir	. Internal Ev	aluation							
									Inte	ernal Evaluation		Mir	ı. Internal Ev	aluation							
							Part E		Inte	ernal Evaluation		Mir	ı. Internal Ev	aluation							
							Part E Books		Inte	emal Evaluation		Mir	ı. Internal Ev	aluation							
						Ref	Part E Books Articles ferences Books OOC Courses		inte	emal Evaluation		Mir	ı. Internal Ev	aluation							
						Ref	Part E Books Articles ferences Books		inte	rmal Evaluation		Mir	ı. Internal Ev	aluation							
						Ref	Part E Books Articles ferences Books OOC Courses		Inte	emal Evaluation		Mir	ı. Internal Ev	aluation							



Title of the Course	Bioanalytical Techniques													
Course Code	BT-104[T]													
					Part A									
Year	1st			Semester	1st				Credits		L	т	P	С
Course Type														
Course Category	1													
Pre-Requisite/s	Co-Req	uisite/s												
Course Outcomes & Bloom's Level														
Coures Elements						SDG (Go	als)							
					Part B									
Modules Contents Pedagogy Hours														
				Pai	rt D(Marks Dist	ribution)								
		T		T	Theory			1						
Total Marks Minimum I	assing Marks	Ex	kternal Evaluati	ion		Min. External Evalu	ition	Inte	ernal Evaluation		М	in. Internal Ev	aluation	
					Practical									
Total Marks Minimum I	assing Marks	Ex	kternal Evaluati	ion	,	Min. External Evalu	ition	Inte	ernal Evaluation		М	in. Internal Ev	aluation	
					Part E Books									
					Articles References Bo	-1								
					MOOC Cours	05								
					Videos									
				Co	Videos urse Articulatio	n Matrix								



Title of	he Course	Stem cell biology											
Cour	se Code	BT-205 (T)											
					Part A								
1	ear	1st		Semester	2nd			Credits		L	т	P	С
Cour	ве Туре				<u>'</u>								
Course	Category												
Pre-Re	quisite/s	Co-Req	uisite/s										
Course & Bloo	Outcomes m's Level												
Coures	Elements				SDG (Go	ils)							
					Part B								
м	odules			Contents				Pedagogy			н	lours	
Total Marks	Minimur	n Passing Marks	Externa	I Evaluation	Theory Min. External Evalua	ion	In	nternal Evaluation		Mir	n. Internal E	valuation	
			1		Practical		_						
Total Marks	Minimur	n Passing Marks	Externa	I Evaluation	Min. External Evalua	ion	In	nternal Evaluation		Mir	n. Internal Ev	valuation	
					Part E								
					Books								
					Articles								
					References Books								
					MOOC Courses								
					Videos								
				Co	ourse Articulation Matrix								
COs PO1	PO2 PO	03 PO4	PO5 PO6	P07		PO10	PO11	PO12	PSO1	PSC	72	PSO3	



Title of t	he Course	Biog	process Engineering											
Cour	se Code	BT?	304 (T)											
							F	Part A						
1	'ear	2nd	d			Semest		3rd		Credits	L	Т	P	С
Cour	se Type							-1						
Course	Category													
Pre-Re	quisite/s		Co-F	Requisite/s										
Course & Bloo	Outcomes m's Level													
Coures	Elements							SDG	(Goals)					
	_					·	F	Part B	· · · · · ·					
M	odules					Contents				Pedagogy		H	Hours	
Total Marks	Mi	nimum Passin	ng Marks	E	xternal Eval	luation		heory Min. External Ev	aluation	Internal Evaluation	М	in. Internal E	valuation	
	1						Pr	actical						
Total Marks	Mi	nimum Passin	ig Marks	E:	xternal Eval	luation		Min. External Ev	aluation	Internal Evaluation	М	in. Internal E	valuation	
							F	Part E						
								Books						
							А	rticles						
							Refere	nces Books						
							MOO	C Courses						
							V	ideos						
							Course Art	iculation Matrix						



Title o	of the Course		Research	Project												
Cor	urse Code		BT401													
								Par	1 A							
	Year		2nd				Semeste		4th			Credits	L	Т	Р	С
Co	urse Type															
Cour	se Category															
Pre-	Requisite/s			Co-Rec	quisite/s											
Cours & Blo	se Outcomes oom's Level															
Court	es Elements								SDG (Goals)						
								Part	В							
	Modules					Co	ntents					Pedagogy		Н	ours	
Total Marks		Minimum	n Passing Ma	rks	1	External Evalua	tion	Theo	Min. External Eva	uation		Internal Evaluation	Mi	in. Internal Ev	raluation	
					1			Pract			1					
Total Marks		Minimum	n Passing Ma	rks		External Evalua	tion		Min. External Eva	uation		Internal Evaluation	Mi	in. Internal Ev	raluation	
								Pari	ŧΕ							
								Воо	ks							
								Artic	les							
								Reference								
								MOOC C								
								Vide	os							
								Course Articu	lation Matrix							
COs PO1			03	PO4	PO5			PO8			_		 			



	Title of th	e Course	Enviro	nemntal Microbiolo	ду												
	Course	Code	DSEI	(T)													
								Par	t A								
	Ye	ar	3rd				Semester		5th			Credits		L	Т	Р	С
	Course	Туре												I .		1	II.
	Course C	Category															
	Pre-Req	uisite/s		Co-R	equisite/s												
	Course O & Bloom	utcomes 's Level															
	Coures E	lements							SDG (Go	als)							
								Par	t B								
	Modules Contents Pedagogy Hours																
							Par		Distribution)								
								The									
Total Ma	arks	Minim	ım Passing M	Marks	Exter	nal Evaluat	ition		Min. External Evalua	ition	Ir	nternal Evaluation		Mi	in. Internal Ev	aluation	
								Prac	tical								
Total Ma	arks	Minim	ım Passing N	Marks	Exter	nal Evaluat	ition		Min. External Evalua	ition	Ir	nternal Evaluation		Mi	in. Internal Ev	aluation	
								Par	t E								
								Boo	oks								
								Artic	cles								
								Reference	es Books								
								моос	Courses								
								Vide	eos								
							Cou	urse Artici	ılation Matrix								
COn	DO1	DO2	202	DO4	DOE DO		DO7	DO0	DO0	DO10	DO11	DO12	DCO1	DC	00	DCO2	



	Title of th	e Course	Enviror	nmental Biotechno	logy												
	Course	e Code	DSE I ((T)													
								Par	t A								
	Ye	ar	3rd				Semester		5th			Credits		L	Т	Р	С
	Course	е Туре				-		1						I			1
	Course 0	Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Go	als)							
			•					Par	t B								
Modules Contents Pedagogy Hours																	
Total N	Marks	Minim	um Passing N	Marks	Exten	nal Evalua		rt D(Marks The	Distribution) ory Min. External Evalu	ation		nternal Evaluation		M	lin. Internal Ev	aluation	
		I						Prac	tical								
Total N	Marks	Minim	um Passing N	Marks	Exten	nal Evalua	ition		Min. External Evalu	ation		nternal Evaluation		N	lin. Internal Ev	aluation	
							1	Par	t E								
								Вос	oks								
								Artic	cles								
								Reference	es Books								
								MOOC									
								Vide	eos								
							Cou	urse Articu	ılation Matrix								
CO.	DO1	DOS	DO2	DO4	DOE DO	e	DO7	DOS	DOO	DO40	DO11	DO12	DCO1	DC	202	DCO2	



Title of the Course Course Code DSE I (T) Part A Year 3rd Semester 5th Credits Course Type Course Category Pre-Requisite/s Co-Requisite/s Course Dutcomes A Bloom's Level Course Elements SDG (Goals) Part B Modules Contents Pedagogy Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	se Co 'ear Cate quis Outc m's I	rype tegory site/s tcomes Level	DSE I (T)		site/s	Semi					Credits		L	Т	P	С
Part A Year 3rd Semester 5th Credits Course Type Course Category Pre-Requisitor's Co-Requisite/s Course Outcomes & Bloom's Level Course Elements SDG (Goals) Part B Modules Contents Part B Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	Cate Cate Quis Outc m's I	r Fype tegory sisite/s tcomes Level	1	Co-Requis	site/s	Sem					Credits		L	Т	P	С
Year	Cate quis Outc m's I	Type tegory isite/s tcomes Level	3rd	Co-Requis	site/s	Semo					Credits		L	Т	Р	С
Year	Cate quis Outc m's I	Type tegory isite/s tcomes Level	3rd	Co-Requis	site/s	Semi					Credits		L	Т	Р	С
Course Category	Cate quis Outo m's I	tegory isite/s tcomes Level		Co-Requis	site/s	_										
Pre-Requisite/s Course Sutromes & Bloom's Level Course Elements SDG (Goals) Part B Modules Contents Pedagogy Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	quis Outc m's I	isite/s tcomes Level		Co-Requis	site/s											
Course Outcomes & Bloom's Level Course Elements Part B Part B Modules Contents Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	Outo m's l	tcomes Level		Co-Requis	Co-Requisite/s											
& Bloom's Level Course Elements SDG (Goals) Part B Modules Contents Pert B (Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	m's l	Level														
Part B Modules Contents Pedagogy Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles		ements	& Bloom's Level													
Modules Contents Pedagogy Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical For the Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	dule							SDG (Goals	is)							
Modules Contents Pedagogy Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical For the Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	dule						F	art B								
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles		les				Contents				Pe	dagogy			Но	urs	
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles																
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles																
Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	_						Т			1						
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles	Ł	Minimum	Passing Marks		Externa	I Evaluation			on	Inte	mal Evaluation		Min	Internal Eva	lluation	
Part E Books Articles	_				T		Pr			1						
Books Articles	L	Minimum	Passing Marks		Externa	I Evaluation		Min. External Evaluation	on	Inte	mal Evaluation		Min	Internal Eva	lluation	
Books Articles							-	tost E								
	_															
	_						A	rticles								
References Books	_						Refere	nces Books								
MOOC Courses							MOO	Courses								
Videos	_						v	ideos								
	_															
Course Articulation Matrix							Course Art	culation Matrix								
COs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01			PO	O4 P	PO5 PO6	P07	PO8	PO9 P	PO10	PO11	PO12	PSO1	PSO:	2	PSO3	



	Title of th	e Course	Enviro	nmental Biotechno	ogy												
	Course	e Code	DSEI	(T)													
								Par	rt A								
	Ye	ar	3rd				Semester		5th			Credits		L	Т	Р	С
	Course	е Туре				-								I .		1	II.
	Course 0	Category															
	Pre-Rec	quisite/s		Co-R	quisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Go	als)							
			•					Par	t B								
	Modules Contents Pedagogy Hours																
		Т						rt D(Marks The									
Total M	larks	Minim	ım Passing N	Marks	Exter	nal Evalua	ition		Min. External Evalua	ition	'	nternal Evaluation		Mi	in. Internal Ev	aluation	
		ı			T		1	Prac									
Total M	larks	Minim	um Passing N	Marks	Exter	nal Evalua	ition		Min. External Evalua	ition	ı	nternal Evaluation		Mi	in. Internal Ev	aluation	
								Par	t E								
								Boo	oks								
		<u> </u>					<u> </u>	Artic	cles								
		<u> </u>					<u> </u>	Reference	es Books								
								MOOC	Courses								
								Vide	eos								
							Cou	urse Articu	ulation Matrix								
CO.	DO1	DOS	202	DO4	DOE DO	^	DO7	DOS		DO10	DO11	DO12	DCO1	DC	00	DEO2	



BSc_FoodTechnology

	Title of the		D	lan of fish and March	D t t. ITI												
	Title of th			ing of fish and Mari	ne Products [T]												
	Course	Code	DSE I- E	3SFT-0504b													
								Part A									
	Ye	ar	3rd				Semester	5th				Credits		L	Т	P	С
	Course	е Туре				•					•				•	•	
	Course C	Category															
	Pre-Req	juisite/s		Co-Req	uisite/s												
	Course O & Bloom	lutcomes s's Level															
	Coures E	lements							SDG (Go	als)							
								Part B									
	Mod	dules				Co	ntents	Taltb			Pe	edagogy			Но	ours	
							Pa	rt D(Marks Dis	stribution)								
								Theory									
Total N	larks	Mini	mum Passing Ma	arks	E	xternal Evalua	tion		Min. External Evalua	ition	Inte	rnal Evaluation		Mir	n. Internal Ev	aluation	
							,	Practical	I		·						
Total N	larks	Mini	mum Passing Ma	arks	E	xternal Evalua	tion		Min. External Evalua	ition	Inte	rnal Evaluation		Mir	n. Internal Ev	aluation	
								Part E									
								Books									
								Articles									
								References B									
								MOOC Cour	ses								
								Videos									
	1	1		T	1			ourse Articulation			T	1					
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSC	02	PSO3	



	Title of th	e Course	Agricul	lure Microbiology													
	Course	e Code	DSE II	(T)													
								Par	rt A								
	Ye	ar	3rd				Semester		6th			Credits		L	Т	P	С
	Course	е Туре				-1								I .		1	1
	Course 0	Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level				,											
	Coures E	Elements							SDG (Go	als)							
								Par	t B								
	Mor	dules				Co	ontents	1 41	(6			Pedagogy			Н	ours	
							Part	t D(Marks	Distribution)								
								The	ory								
Total M	arks	Minim	um Passing N	Marks	Exten	nal Evalua	ition		Min. External Evalua	ition	In	ternal Evaluation		Mi	in. Internal Ev	aluation	
					·		·	Prac	tical								
Total M	arks	Minim	ım Passing M	Marks	Exten	nal Evalua	ition		Min. External Evalua	ition	In	ternal Evaluation		Mi	in. Internal Ev	aluation	
								Par	rt E								
								Вос	oks								
								Artic	cles								
								Reference	es Books								
	-		-	-				MOOC	Courses		-						
								Vide	eos					-			
							Cou	ırse Articı	ulation Matrix								
COn	DO1	DO2	202	DO4	DOE DO	,		DO0		DO10	DO11	DO12	DCO1	DC	00	DEO2	



Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. External Evaluation Min. Extern																		
Part A Year 3rd Semester 6th Credits L Course Category Pre-Requisitors Co-Requisiters Course Category Pre-Requisitors Co-Requisiters Course Category Part B Modules Song (Goals) Part B Modules Contents Pedagogy Part D(Marks Distribution) Theory Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Part E Books Articles References Books MOOC Courses Vidoos Course Articulation Matrix		Title of the	Course	Agricu	tlure Microbiology													
Year 3rd Semester 6th Credits L		Course	Code	DSE I	I (T)													
Year									Pa	rt A								
Course Category Pre-Requisitors Course Detunents Course Selmonts Levels S Biolom's		Yea	ır	3rd				Semester					Credits		L	Т	P	С
Pre-Requisite/s Course Outcomes & Bibom's Level Course Elements SDG (Goals) Part B Modules Contents Part B Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. External Evaluation		Course	Туре															
Course Dutcomes & Bloom's Level Course Elements Part B Part B Modules Contents Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. E		Course C	ategory															
A Bloom's Level Course Elements Part B Modules Contents Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evalua		Pre-Requ	uisite/s		Co-Re	quisite/s												
Part B Contents Pear D(Marks Distribution) Flat D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix		Course Or & Bloom	utcomes 's Level															
Modules Contents Pedagogy Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix		Coures E	lements							SDG (Go	als)							
Modules Contents Pedagogy Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix									Pa	rt B								
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix		Mod	ules														ours	
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix																		
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. External Evaluation Internal Evaluation Min. External Evaluation Min. External Evaluation Internal Evaluation Min. External Evaluation Min. External Evaluation Internal Evaluation Internal Evaluation Min. External Evaluation Internal							Pa											
Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix									The			T						
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix	Total N	Marks	Mi	nimum Passing	Marks	Е	ternal Evalua	ation			tion	Inte	ernal Evaluation		Mi	n. Internal Ev	aluation	
Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix						1		1	Prac			T						
Books Articles References Books MOOC Courses Videos Course Articulation Matrix	Total N	Marks	Mi	nimum Passing	Marks	Ex	ternal Evalua	ation		Min. External Evalua	tion	Inte	ernal Evaluation		Mi	n. Internal Eva	aluation	
Books Articles References Books MOCC Courses Videos Course Articulation Matrix									р.									
Articles References Books MOOC Courses Videos Course Articulation Matrix																		
MOCC Courses Videos Course Articulation Matrix																		
Videos Course Articulation Matrix									Reference	es Books								
Course Articulation Matrix									моос	Courses								
									Vid	leos								
								Co	ourse Artic	ulation Matrix								
COS PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO	COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3	



	Title of th	ne Course	Agricul	Iture Biotechnology	and Intellectual property	rights											
	Course	e Code	DSE II	(T)													
								Par	rt A								
	Ye	ear	3rd				Semester		6th			Credits		L	Т	Р	С
	Cours	е Туре				1								I .		1	
	Course	Category															
	Pre-Rec	quisite/s		Co-R	quisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Goa	ıls)							
								Par	t B		•						
	Мо	dules				Co	ontents					Pedagogy			Но	ours	
Total N	Marks	Minim	um Passing N	Marks	Exte	mal Evalua		rt D(Marks The	Distribution) ory Min. External Evalua	tion	li li	nternal Evaluation		Mi	in. Internal Ev	aluation	
		!						Prac	tical								
Total N	Marks	Minim	um Passing N	Marks	Exte	rnal Evalua	ation		Min. External Evalua	tion	li	nternal Evaluation		Mi	in. Internal Ev	aluation	
								Par	t E				·				
								Вос	oks								
								Artic	cles								
								Reference	es Books								
								MOOC									
								Vid	eos								
							Co	urse Articu	ulation Matrix								
CO.	DO1	DOS	DO3	DO4	DOE DO	20	DO7	DOS		DO10	DO11	DO12	DCO1	DC	00	DEO2	



	Title of the	Course	1	Agriculture Biot	technology and	i Intellectual prop	erty rights											
	Course	Code	1	OSE II (T)														
									Part A									
	Yea	nr	:	3rd				Semeste					Credits		L	Т	Р	С
	Course	Туре													I .	1	1	- I
	Course C	ategory																
	Pre-Requ	uisite/s			Co-Requi	site/s												
	Course O	utcomes 's Level																
	Coures E	lements								SDG (Goals)							
									Part B									
	Mod	ules			Contents Pedagogy Hours												urs	
									Part D(Marks Dis	tribution)								
						_			Theory									
Total Mar	rks	,	linimum Pas	sing Marks		E	External Evalua	ation		Min. External Eva	uation	ı	nternal Evaluation		Min. I	nternal Eva	aluation	
									Practical									
Total Mar	rks	,	linimum Pas	sing Marks		E	xternal Evalua	ation		Min. External Eva	uation	- 1	nternal Evaluation		Min. I	nternal Eva	aluation	
									Part E									
									Books									
									References B									
									MOOC Cour	ses								
									Videos									
									Course Articulation	n Matrix								
COs	PO1	PO2	PO3	PO4	4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		PSO3	



BSc_FoodTechnology

Title	of the Course	Flavor 1	Technology [T]													
C	urse Code	DSE II-	BSFT-0604a													
		•					Part	ι Δ								
	Year	3rd				Semester		6th			Credits		L	т	Р	С
С	ourse Type				-								- I		1	1
Cou	rse Category															
Pre	-Requisite/s		Co-Req	uisite/s												
Cou & B	se Outcomes oom's Level															
Cou	res Elements							SDG (Go	als)							
							Part	B								
	Modules				Con	ntents					Pedagogy			Но	ours	
Total Marks	Mini	um Passing M	lauko	Eutom	al Evaluati		t D(Marks Theo	Distribution) ory Min. External Evalu	dian		nternal Evaluation			in. Internal Ev	alvation	
Iotal Marks	Mini	ium Passing M	arks	Extern	ai Evaiuati	ion	Pract		ition		itemai Evaluation		м	in. internal EV	aluation	
Total Marks	Mini	um Passing M	arks	Extern	al Evaluati	ion	Flace	Min. External Evalu	tion		nternal Evaluation		м	in. Internal Ev	aluation	
							Part	tΕ								
							Boo	ks								
							Artic									
							Reference									
							MOOC C									
							Vide	os								
						Cou	ırea Articu	lation Matrix								
COn DO1	DO2	DO2	DO4	DOE DOS			DO0	DO0	DO10	DO11	DO12	DCO1		202	DCO2	



BSc_FoodTechnology

	Title Of th	ie Course	vegeta	Die & dally lat lic	ar product [1]												
	Cours	e Code	DSE II-	BSFT-0604b													
								Part	A								
	Ye	ear	3rd				Semester	6	th			Credits		L	Т	Р	С
	Cours	е Туре				•		•			•			•	•	•	
	Course	Category															
	Pre-Red	quisite/s		Co-l	Requisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures I	Elements							SDG (G	oals)							
								Part	В								
	Мо	dules				-	Contents					Pedagogy			Но	urs	
							Pa	art D(Marks D	Distribution)								
								Theor									
Total	Marks	Mini	num Passing N	larks		External Evalu	uation		Min. External Evalu	ation	In	ternal Evaluation		Mir	n. Internal Eva	aluation	
		•			·			Practio	cal								
Total	Marks	Mini	num Passing N	larks		External Evalu	uation		Min. External Evalu	ation	In	ternal Evaluation		Mir	n. Internal Eva	aluation	
								Part	-								
								Book									
								Article									
								References									
								MOOC Co									
								Video	s								
								ourse Articula									
000	DO4	DO2	DO2	DO4	DOE	DOG	DO7	DOG	DO0	DO10	DO11	DO12	DCO1	Dec	2	DCO2	



	Title of ti	ie Course		Organic ii	Wechanishis in Dio	iogy												
	Cours	e Code		DSE III (T	Γ)													
									P	art A								
	Ye	ear		3rd				Semes	ter	6th			Credits		L	Т	P	С
	Cours	е Туре													•	•	•	
	Course	Category																
	Pre-Red	quisite/s			Co-Req	uisite/s												
	Course C & Bloom	Outcomes n's Level																
	Coures I	Elements								SDC	(Goals)							
									Р	art B								
	Мо	dules					(Contents					Pedagogy			Но	ours	
Total Ma	arks		Minimum F	Passing Ma	rks	E	external Eval	uation		Min. External E	valuation		Internal Evaluation		Min.	. Internal Ev	aluation	
Total Ma	arks		Minimum F	Passing Mai	rks	E	xternal Eval	uation		Min. External E	valuation		Internal Evaluation		Min	Internal Eva	aluation	
										art E ooks								
									A	rticles								
									Refere	nces Books								
									моо	Courses								
									v	ideos			<u>-</u>					
									Course Arti	culation Matrix								
COs	PO1	PO2	PO3		PO4	PO5	PO6	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO:	2	PSO3	



Title of	f the Course	Wa	aste Management												
Cou	irse Code	DS	E III (T)												
						P	art A								
	Year	3rc	i		Semest		6th			Credits		L	Т	P	С
Cou	ırse Type														
Cours	se Category														
Pre-F	Requisite/s		Co-R	equisite/s											
Course & Blo	e Outcomes om's Level														
Coure	s Elements						SDG (Goa	ls)							
						Pi	art B								
,	Modules				Contents					Pedagogy		T	н	lours	
Total Marks	Mi	nimum Passir	ng Marks	Extern	al Evaluation		Min. External Evalua	ion		Internal Evaluation		Mir	n. Internal E	valuation	
						Pra	actical		,						
Total Marks	Mi	nimum Passir	ng Marks	Exterr	al Evaluation		Min. External Evalua	ion		Internal Evaluation		Mir	n. Internal E	valuation	
						Pi	art E								
							ooks								
						Ar	ticles								
						Referen	ices Books								
							Courses								
						Vi	deos								
						Course Artic	culation Matrix								
COs PO1	PO2	PO3	PO4	PO5 PO6	P07	PO8		PO10	PO11	PO12	PSO1	PSC	n2	PSO3	



	Title of th	e Course	Organic	Mechanisms in Bio	ology												
	Course	Code	DSE III	(T)													
								Part A									
	Ye	ar	3rd				Semester	6th				Credits		L	Т	Р	С
	Course	е Туре															- 1
	Course 0	Category															
	Pre-Rec	uisite/s		Co-Rec	quisite/s												
	Course C & Bloom	lutcomes 's Level															
	Coures E	Elements							SDG (Go	als)							
			•					Part B									
	Mod	dules		Contents Pedagogy Hours													
							Pa	rt D(Marks Dis									
Total N	Marke	Mini	mum Passing M	arke	-	xternal Evalua	tion		Min. External Evalua	tion	Into	rnal Evaluation		Mir	n. Internal Ev	aluation	
Total	nai ko	-	illulli r assiliy m	aino		Atemai Evalua	uon	Practical		ition	inte	mai Evaluation			II. IIIteriiai Ev	aluation	
Total N	Marks	Mini	mum Passing M	arks	E	xternal Evaluat	tion		Min. External Evalua	ition	Inte	rnal Evaluation		Min	n. Internal Ev	aluation	
								Part E									
								Books									
								Articles									
								References B									
								MOOC Cour	ses								
								Videos									
							0.		M-4-4-b-								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSC	72	PSO3	
		1 -	l					1			1					1	



	Title of th	e Course	Molecu	ılar Diagnostics													
	Course	e Code	DSE IV	/ (T)													
								Pa	ırt A								
	Ye	ar	3rd				Semester		6th			Credits		L	Т	P	С
	Course	е Туре							Į.								
	Course 0	Category															
	Pre-Rec	quisite/s		Co-R	quisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Goa	als)							
			•					Pa	rt B		•						
	Mod	dules				Co	ontents					Pedagogy			Но	ours	
							Pai	rt D(Marks	s Distribution)								
									eory								
Total I	Marks	Minim	ım Passing N	Marks	Exter	nal Evalua	ation		Min. External Evalua	tion	In	ternal Evaluation		Mi	in. Internal Ev	aluation	
		•			*			Prac	ctical								
Total I	Marks	Minim	ım Passing M	Marks	Exter	nal Evalua	ation		Min. External Evalua	tion	In	ternal Evaluation		Mi	in. Internal Ev	aluation	
								Pa	rt E								
									oks								
								Arti	icles								
								Referenc	es Books								
									Courses					-		-	
								Vid	leos								
							Co	nurse Artici	ulation Matrix								
CO.	DO1	DO2	202	DO4	DOE DO	c	DO7	000		DO10	DO11	DO12	DCO1	DC	02	DCO2	



	Title of th	ne Course	Molecu	ılar Diagnostics													
	Course	e Code	DSE IV	/ (T)													
								Par	rt A								
	Ye	ear	3rd				Semester		6th			Credits		L	Т	P	С
	Cours	е Туре				-					I			ı	II.	1	ı
	Course (Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Go	als)							
			•					Par	rt B								
	Мо	dules				Co	ontents					Pedagogy			Но	ours	
								t D(Marks The									
Total I	Marks	Minim	ım Passing M	Marks	Exten	nal Evaluat	ition		Min. External Evalua	tion	li	nternal Evaluation		М	in. Internal Ev	aluation	
								Prac									
Total I	Marks	Minim	ım Passing N	Marks	Exten	nal Evaluat	ition		Min. External Evalua	tion	li	nternal Evaluation		М	in. Internal Ev	aluation	
								Par	rt E								
								Boo	oks								
								Artic	cles			<u> </u>					
								Reference	es Books			<u> </u>					
								MOOC									
								Vide	eos								
							Cou	urse Articu	ulation Matrix								
COn	DO1	DO2	202	DO4	DOE DO	e	000	DO0		DO10	DO11	DO12	DCO1	De	-02	DCO2	



Title of	he Course	Frontie	rs in Biotechnology	& Microbiology												
Cour	se Code	DSE IV	(T)													
		•					Par	t A								
,	ear	3rd				Semester		6th			Credits		L	Т	P	С
Cour	ве Туре				1		I.			1			I	l .		
Course	Category															
Pre-R	quisite/s		Co-Re	quisite/s												
Course & Bloo	Outcomes m's Level				,											
Coures	Elements							SDG (Go	als)							
							Par	t B								
м	odules				Co	ontents					Pedagogy			Н	ours	
						Par	rt D(Marks	Distribution)								
							The	ory								
Total Marks	Minim	m Passing N	larks	Exte	rnal Evalua	ition		Min. External Evalua	tion		Internal Evaluation		М	lin. Internal Ev	aluation	
							Pract	tical								
Total Marks	Minim	m Passing N	larks	Exte	rnal Evalua	ition		Min. External Evalua	tion		Internal Evaluation		М	lin. Internal Ev	aluation	
							Par									
							Boo									
							Artic									
							Reference									
							MOOC C									
							Vide	eos								
						0	umaa Ant'	ılation Matrix								
COn DO1	DO3	102	DO4	DOE DO		DO7	DO9		DO10	DO11	DO12	DEO1	1-0	202	DEO2	



	Title of ti	ie Course		Wedical	siotecrinology														
	Cours	e Code		DSE V (T)														
									F	Part A									
	Y	ear		4th				Semes	ster	7th				Credits		L	Т	P	С
	Cours	е Туре								•		•				•	•	•	
	Course	Category																	
	Pre-Re	quisite/s			Co-Req	uisite/s													
	Course 0 & Bloor	Outcomes n's Level																	
	Coures	Elements								s	DG (Goals)								
									F	Part B									
	Mo	dules		Contents Pedagogy Hours															
Total Ma	arks		Minimum P	Passing Ma	rks	E	External Eval	uation		Min. Externa	Evaluation		Inte	rnal Evaluation		Min	. Internal Ev	aluation	
Total Ma	arks		Minimum P	Passing Mai	rks	E	External Eval	uation		Min. Externa	Evaluation		Inte	rnal Evaluation		Min	Internal Eva	aluation	
										Part E									
										Books									
										rticles									
										nces Books									
										C Courses									
									,	rideos									
									Course Art	iculation Matrix									
COs	PO1	PO2	PO3		PO4	PO5	P06	P07	PO8	PO9	PO10		PO11	PO12	PSO1	PSO:	2	PSO3	



	Title Of th	ie Course	ivieuica	al Microbiology														
	Cours	e Code	DSE V	(T)														
									Part A									
	Ye	ear	4th					Semester	7th				Credits		L	Т	P	С
	Cours	е Туре				•			•						·			•
	Course	Category																
	Pre-Red	quisite/s		Co-l	Requisite/s													
	Course C & Bloom	Outcomes n's Level																
	Coures I	Elements								SDG (G	oals)							
									Part B									
	Мо	dules		Contents Pedagogy Hours														
Total	Marks	Mini	num Passing N	Marks		External Ev	valuatio		D(Marks Di Theory Practica	Min. External Evalu	ation		Internal Evaluation			Min. Internal E	Evaluation	
Total	Marks	Mini	num Passing N	Marks		External Ev	valuatio	n		Min. External Evalu	ation		Internal Evaluation			Min. Internal E	valuation	
					-				Part E Books									
									References E									
									MOOC Cou									
									Videos									
									se Articulat									
000	DO1	DO2	DO3	DO4	DOE	DOG		DO7	DO0	DO0	DO10	DO11	DO42	DCO1	-	2000	DEOS	



	Title Of th	ie Course	Wedica	ii bioteciiiology													
	Cours	e Code	DSE V	(T)													
									Part A								
	Ye	ear	4th				S	Semester	7th			Credits		L	Т	Р	С
	Cours	е Туре													•	•	•
	Course	Category															
,	Pre-Red	quisite/s		Co-F	Requisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures I	Elements							SDG (Goals)							
				-					Part B								
	Мо	dules		Contents Pedagogy Hours													
Total	Marks	Mini	mum Passing N	larks		External Eva	aluation	Part D(N	Marks Distribution) Theory Min. External Eva Practical	uation	Int	ernal Evaluation		Mir	n. Internal Eva	aluation	
Total	Marks	Mini	mum Passing N	Marks		External Eva	aluation		Min. External Eva	uation	Int	ernal Evaluation		Mir	n. Internal Eva	aluation	
									Part E Books				ı I				
									Articles								
								Ref	erences Books								
								M	OOC Courses								
									Videos								
								Course	Articulation Matrix								
CO.	DO1	DO2	DO3	DO4	DOE	DOG	DO3	7 00	P.O.O.	DO10	DO11	DO12	DCO1	Dec		DCO2	



Title of t	ne Course	Medical	Microbiology													
Cours	e Code	DSE V (T)													
							Part A									
Y	ar	4th				Semester	7th				Credits		L	Т	Р	С
Cours	е Туре				•								•			
Course	Category															
	quisite/s		Co-Requ	iisite/s												
Course 6 & Bloom	Outcomes n's Level															
Coures	Elements							SDG (Gd	als)							
							Part B									
Mo	dules		Contents Pedagogy Hours													
	Part D(Marks Distribution)															
				_			Theory									
Total Marks	Minim	um Passing Ma	arks	Ext	ernal Evaluation	on		Min. External Evalu	ition	Inter	nal Evaluation		Mir	. Internal Eva	aluation	
	I						Practical			T						
Total Marks	Minim	um Passing Ma	arks	Ext	ernal Evaluation	on		Min. External Evalu	ition	Inter	nal Evaluation		Mir	ı. Internal Eva	iluation	
							Part E									
							Books									
							Articles									
							References B									
							MOOC Cour	ses								
							Videos									
	Course Articulation Matrix															
COs PO1	PO2	PO3	PO4	PO5 F	PO6	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSC	12	PSO3	



Title of t	he Course	Industria	al Biotechnology													
Cour	se Code	DSE VI	(T)													
							Part A									
,	ear	4th				Semester	7th				Credits		L	Т	Р	С
Cour	ве Туре				•											
Course	Category															
Pre-Re	quisite/s		Co-Requ	isite/s												
Course & Bloo	Outcomes m's Level															
Coures	Elements							SDG (Ge	oals)							
			-	-			Part B									-
м	odules		Contents Pedagogy Hours													
	Part D(Marks Distribution)															
							Theory									
Total Marks	Minin	num Passing M	arks	Ext	ternal Evaluati	ion		Min. External Evalu	ation	Inter	mal Evaluation		Mir	n. Internal Eva	aluation	
	-						Practical									
Total Marks	Minin	num Passing Ma	arks	Ext	ternal Evaluati	ion		Min. External Evalu	ation	Inter	mal Evaluation		Mir	n. Internal Eva	aluation	
							Part E									
							Books									
							Articles									
							References B	ooks								
<u>-</u>							MOOC Cour	ses			<u> </u>					
							Videos									
						Coi	urse Articulation	on Matrix								
COs PO1	PO2	PO3	PO4	PO5 F	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSC	02	PSO3	



	Title of the		Industr	al Microbiology													
	0																
	Course	Code	DSE V	(T)													
								Pa	irt A								
	Yea	r	4th				Semester		7th			Credits		L	Т	Р	С
	Course	Туре							Į.								
	Course C	ategory															
	Pre-Requ	uisite/s		Co-Re	quisite/s												
	Course Or & Bloom	itcomes s Level															
	Coures E	ements							SDG (Go	als)							
								Pa	rt B								
	Mod	ules		Contents Pedagogy Hours													
							Pa		s Distribution)								
	-							The	eory		1						
Total Ma	arks	Mi	nimum Passing N	larks	E	kternal Evalua	tion		Min. External Evalua	ition	Int	ernal Evaluation		Mir	n. Internal Ev	aluation	
								Prac			1		Т				
Total Ma	arks	Mi	nimum Passing N	larks	E	kternal Evalua	tion		Min. External Evalua	ition	Int	ernal Evaluation		Mir	n. Internal Eva	aluation	
								Do	rt E								
									oks								
								Arti	icles								
								Reference	ces Books								
								MOOC	Courses								
								Vid	leos								
		PO2		PO4					ulation Matrix				,	1		,	
COs	PO1		PO3		PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSC		PSO3	



Title o	of the Course		Industria	I Microbiology													
Cor	urse Code		DSE VI (T)													
								Part	А								
	Year		4th				Semeste		7th			Credits		L	Т	P	С
Co	urse Type															1	
Cour	se Category																
Pre-	Requisite/s			Co-Rec	quisite/s												
Cours & Blo	se Outcomes oom's Level																
Court	es Elements								SDG (Goals)							
								Part	В								
	Modules			Contents Pedagogy Hours													
Total Marks		Minim	um Passing Ma	nrks	Е	External Evalua	ition	Theo	Min. External Eva	uation		Internal Evaluation		М	in. Internal Ev	raluation	
Total Marks			D			External Evalua		Practi	Min. External Eva			Internal Evaluation			in. Internal Ev		
Iotal Marks		Minim	um Passing Ma	Irks		external Evalua	ition		Min. External Eva	uation		internal Evaluation		м	in. internai Ev	raiuation	
								Part	E								
								Bool	ks								
								Artic	les								
								Reference									
								MOOC C									
								Vide	os								
								Course Articul	ation Matrix								



Title of t	he Course	Industrial Biotechn	ology												
Cours	se Code	DSE VI (T)													
		•			Part A										
Y	'ear	4th		Semeste					Credits		L	Т	Р	С	
Cour	se Туре			<u>'</u>											
Course	Category														
Pre-Re	quisite/s		Co-Requisite/s												
Course & Bloo	Outcomes m's Level														
Coures	Elements					SDG (Goals)									
					Part B										
Me	odules		Contents Pedagogy Hours												
Total Marks	Minimu	m Passing Marks	Exte	rnal Evaluation		Min. External Evaluation		Int	ternal Evaluation		Mi	in. Internal E	valuation		
	1		ı		Practical										
Total Marks	Minimu	m Passing Marks	Exte	rnal Evaluation	,	Min. External Evaluation		Int	ternal Evaluation		Mi	in. Internal E	valuation		
					Part E										
					Books										
					Articles										
					References Bo	oks									
					MOOC Cours	es									
					Videos										
					Course Articulatio	n Matriy									
COs PO1	PO2 F	O3 PO4	PO5 PO		PO8	PO9 PO1		PO11	PO12	PSO1	PS		PSO3		



	Title of the	Course	Pharmac	eutical Biotechnolo	gy												
	Course	Code	DSE VII (T)													
								Part A									
	Yea	r	4th				Semester					Credits		L	Т	Р	С
	Course	Туре						<u>'</u>						1			
	Course Ca	itegory															
	Pre-Requ	isite/s		Co-Req	uisite/s												
	Course Ou & Bloom's	tcomes s Level															
	Coures Ele	ements							SDG (C	Goals)							
								Part B									
	Modu	ıles		Contents Pedagogy Hours													
								Part D(Marks Dis	tribution)								
								Theory									
Total Ma	rks	Mini	num Passing Ma	rks	E	External Evaluat	ion	1	Min. External Eval	uation	Inter	nal Evaluation		Min	n. Internal Ev	aluation	
								Practical									
Total Ma	rks	Mini	num Passing Ma	rks	E	External Evaluat	ion	1	Min. External Eval	uation	Inter	nal Evaluation		Min	n. Internal Ev	aluation	
								Part E									
								Books									
								Articles									
								References Bo									
								MOOC Cours	ses								
								Videos									
								0									
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	Course Articulation	PO9	PO10	P011	PO12	PSO1	PSO	72	PSO3	



Title of	the Course	Pha	rmaceutical Biotechn	logy												
Cour	se Code	DSE	VII (T)													
							Par	t A								
١	'ear	4th				Semester		8th			Credits		L	Т	Р	С
Cour	se Type															
Course	Category															
Pre-Re	equisite/s		Co-R	quisite/s												
Course & Bloo	Outcomes m's Level															
Coures	Elements							SDG	(Goals)							
							Par	t B								
м	odules		Contents Pedagogy Hours													
Total Marks	Mini	mum Passin	g Marks	Exte	ernal Evaluat	tion	The	Min. External Ev	aluation		Internal Evaluation		Mi	in. Internal E	valuation	
	_						Prac					1				
Total Marks	Mini	mum Passin	g Marks	Exte	rnal Evaluat	tion		Min. External Ev	aluation		Internal Evaluation		Mi	in. Internal E	valuation	
							Par	t F								
							Вос									
							Artic	les								
							Reference	s Books								
							MOOC									
							Vide	108								
						,	Course Articu	lation Matrix								
COs PO1	PO2	PO3	PO4	PO5 PI		P07	PO8	PO9	PO10	PO11	PO12	PSO1	PS		PSO3	



	litle of the	Course	Food an	Dairy Microbiolog	IY .												
	Course	Code	DSE VII	(T)													
								Part A									
	Yea	r	4th				Semester	8th				Credits		L T	Р	С	
	Course	Туре									•				•		
	Course C	ategory															
	Pre-Requ	uisite/s		Co-Req	uisite/s												
	Course Or & Bloom	itcomes s Level															
	Coures E	ements							SDG (G	oals)							
								Part B									
	Mod	ules		Contents Pedagogy Hours													
							Р	Part D(Marks Distri	bution)								
Total M	arks	Min	imum Passing Ma	rks	E	External Evaluati	ion	Mi	n. External Evalu	ation	Inter	nal Evaluation		Min. Internal	Evaluation	1	
	•				'			Practical									
Total M	arks	Min	imum Passing Ma	rks	E	External Evaluati	ion	Mi	n. External Evalu	ation	Inter	nal Evaluation		Min. Internal	Evaluation	1	
								Part E									
								Books									
								Articles									
								References Boo									
								MOOC Courses	i								
								Videos									
							c	Course Articulation	Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS	03	



	Title of the	a Course	FUUU a	nd Dairy Microbic	biogy														
	Course	Code	DSE VI	I (T)															
									Part A										
	Yea	ar	4th				s	emester	8th				Credits		L	Т		Р	С
	Course	Туре																	
	Course C	ategory																	
	Pre-Req			Co-F	Requisite/s														
	Course O	utcomes 's Level																	
	Coures E	lements							SDG	(Goals)									
·	·			·					Part B					·					
	Mod	lules		Contents Pedagogy Hours															
			Contents Pedagogy Hours Part D(Marks Distribution)																
									Theory										
Total N	Marks	Mini	num Passing N	larks		External Eva	aluation		Min. External Ex	aluation		Inte	rnal Evaluation			Min. Inter	rnal Evalu	uation	
									Practical										
Total N	Marks	Mini	num Passing N	larks		External Eva	aluation		Min. External Ex	aluation		Inte	rnal Evaluation			Min. Inter	rnal Evalu	uation	
									Part E										
									Books										
		<u>-</u>							Articles				<u> </u>						
		<u>-</u>						Refe	erences Books				<u> </u>						
								MC	OOC Courses										
									Videos										
								Course	Articulation Matrix										
COn	DO1	DO2	DO2	DO4	DOE	DOS	DO7			DO10	DO11		DO12	DCO1	-	DCO2		DCO2	



BSc_ComputerScience

		ne Course	Cloud Co														
	Course	e Code	DSE060	I[T]													
								Part A									
	Ye	ear	3rd				Semester	6th				Credits		L	Т	P	С
	Cours	е Туре				•									•	•	
	Course (Category															
	Pre-Rec	quisite/s		Co-Req	uisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (G	oals)							
								Part B									
	Mo	dules				Con	itents				Pe	dagogy			Ho	urs	
Total Ma	arks	Mini	num Passing Ma	rks	E	xternal Evaluati		Part D(Marks Dis	Min. External Evalu	ation	Inte	rnal Evaluation		Mi	n. Internal Eva	aluation	
Total Ma	arks	Mini	num Passing Ma	rks	E	xternal Evaluati	on		Min. External Evalu	ation	Inte	rnal Evaluation		Mi	n. Internal Eva	luation	
								Part E									
				Books													
								Articles									
								References B									
								MOOC Cour	ses								
								Videos									
							(Course Articulati	on Matrix								
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSC	02	PSO3	



BSc_ComputerScience

	Title of the Course Mobile Application Development Course Code DSE0603[T]																
	Course C	ode	DSE0603	I[T]													
								Part A									
	Year		3rd				Semester	6th				Credits		L	Т	P	С
	Course T	уре												-	1		ı
	Course Cat	tegory															
	Pre-Requis	site/s		Co-Req	uisite/s												
	Course Out & Bloom's	comes Level															
	Coures Ele	ments							SDG (Gd	als)							
								Part B									
	Modul	les				Cont	tents	rans			Per	dagogy			Hour	rs	
					Part D(Marks Distribution)												
							Par		bution)								
					1			Theory			1		T				
Total Mar	rks	Minir	num Passing Ma	rks	Е	xternal Evaluation	on		in. External Evalu	ation	Inter	nal Evaluation		Mi	lin. Internal Evalu	uation	
								Practical									
Total Mar	rks	Minir	num Passing Ma	rks	E	xternal Evaluation	on	М	in. External Evalu	ation	Inter	nal Evaluation		Mi	lin. Internal Evalu	uation	
								Dort F									
				Part E Books													
				Articles													
								References Boo	ks								
								MOOC Course	s								
								Videos									
							Cou	rse Articulation	Matrix								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS	502	PSO3	



BSc_PCM

Title of	he Course	Electro	nics													
Cour	se Code	DSE1[ŋ													
							Par	rt A								
	'ear	3rd				Semester		5th			Credits		L	Т	Р	С
Cou	se Type									I.			J.	II.	1	
Course	Category															
Pre-R	quisite/s		Co-Re	quisite/s												
Course & Bloo	Outcomes m's Level				,											
Coures	Elements							SDG (Go	als)							
							Par	rt B								
W	odules				Co	ontents					Pedagogy			Но	ours	
						Part	t D(Marks	Distribution)								
Total Marks	Minim	ım Passing N	larke	Exton	nal Evaluat	ation	THE	Min. External Evalua	tion	т .	nternal Evaluation		м	in. Internal Ev	aluation	
TOTAL MAIKS	Million	IIII Fassiiig w	Idiks	Exteri	idi Evalua	ition	Prac		tion		itemai Evaluation			III. IIILEITIAI EV	aluation	
Total Marks	Minim	ım Passing N	larks	Exten	nal Evaluat	ntion	1100	Min. External Evalua	tion		nternal Evaluation		м	in. Internal Ev	aluation	
				Part E												
			Books													
							Artic	cles								
							Reference	es Books								
			MOOC Courses													
							Vide	eos								
						Con	una Autiau	ulation Matrix								
COn DO1	DO2	202	DO4	DOE DO			DO0		DO10	DO11	DO12	DCO1	200	.02	DCO2	



BSc_ComputerScience

		All and its Application DSE1[T] 3rd Sem Co-Requisite/s Contents Contents External Evaluation												
Title of	the Course	Al and its Application												
Cour	se Code	DSE1[T]												
					Part	Δ								
,	'ear	3rd		Semester		5th			Credits		L	Т	P	С
Cour	se Type													
Course	Category													
Pre-R	equisite/s	Co-Re	quisite/s											
Course & Bloo	Outcomes m's Level			•										
Coures	Elements					SDG (Goa	s)							
		*			Part	В		•						
M	odules			Contents	, un				Pedagogy			H	Hours	
Total Marks	Minimu	m Passing Marks	Externa	al Evaluation	Theo	Min. External Evaluat	ion		Internal Evaluation		Mi	n. Internal E	valuation	
					Practi					1				
Total Marks	Minimu	m Passing Marks	Externa	I Evaluation		Min. External Evaluat	ion		Internal Evaluation		Mi	n. Internal E	valuation	
					Part	E								
					Book									
					Articl									
					References									
					MOOC Co									
					Video	os								
				(Course Articul	lation Matrix								
COs PO1	PO2 F	03 PO4	PO5 PO6	P07	PO8		2010	PO11	PO12	PSO1	PSC		PSO3	



BSc_PCM

		Condence Matter Physics DSPH0601[T] 3rd Semi Co-Requisite/s Contents Contents External Evaluation num Passing Marks External Evaluation												
Title of	the Course	Condence Matter Physic	s											
Cou	rse Code	DSPH0601[T]												
					Part A									
	Year	3rd		Semester					Credits		L	Т	Р	С
Cou	rse Type													ı
Cours	e Category													
Pre-R	equisite/s	Co-F	tequisite/s											
Course & Blo	Outcomes om's Level													
Coure	s Elements					SDG (Goa	s)							
					Part E	3		·						
N	lodules			Contents					Pedagogy			H	Hours	
Total Marks	Minimu	m Passing Marks	Extern	al Evaluation	Theory	Min. External Evaluat	ion		Internal Evaluation		Mi	in. Internal E	valuation	
Total Marks	W-i	- Deceles Made	E-t	-1.F11	Practic	al Min. External Evaluat			Internal Evaluation			in. Internal E	Sandara Maria	
Total Marks	Minimu	m Passing Marks	Extern	ai Evaluation		Min. External Evaluat	on		internal Evaluation		MI	in. Internal E	valuation	
					Part E	=								
					Books									
			Articles											
			References Books											
					MOOC Co.									
					Videos	8								
				c	Course Articula	tion Matrix								
COs PO1	PO2 F	O3 PO4	PO5 PO6		PO8		2010	PO11	PO12	PSO1	PS		PSO3	



BSc_PCM

		Atomic and Molecular Physics DSPH0602[T] 3rd S Co-Requisite/s Contents um Passing Marks External Evaluation um Passing Marks External Evaluation							
Title of	the Course	Atomic and Molecular Physics	3						
Cour	se Code	DSPH0602[T]							
					Part A				
,	/ear	3rd		Semester	6th	Credits	L	Т	P
Cour	se Type			1	<u>'</u>				
Course	Category								
Pre-R	equisite/s	Co-Requit	site/s						
Course & Bloo	Outcomes m's Level								
Coures	Elements				SDG (Goals)				
					Part B				
м	odules			Contents		Pedagogy		н	lours
Total Marks	Minimum P	assing Marks	External	Evaluation	Theory Min. External Evaluation	Internal Evaluation	Mi	in. Internal Ev	valuation
					Practical				
Total Marks	Minimum P	assing Marks	Externa	Evaluation	Min. External Evaluation	Internal Evaluation	Mi	in. Internal Ev	valuation
					Part E				
					Books				
					Articles				
					Articles References Books				
					References Books				
				C	References Books MOOC Courses				



Bsc_Microbiology

	little of th	te of the Course Field Project/Internship Course Code FP/In I															
	Course	Code		FP/In I													
									Part A								
	Ye	ar		4th			s	emester	7th			Credits		L	Т	P	С
	Cours	е Туре												•			
	Course (Category					_										
	Pre-Rec	juisite/s			o-Requisite/s												
	Course C & Bloom	utcomes 's Level															
	Coures E	lements							s	OG (Goals)							
									Part B								
	Мо	dules					Contents					Pedagogy				Hours	
Total I	Marks		Minimum Pa	ssing Marks		External	Evaluation	Part D	(Marks Distribution) Theory Min. External	Evaluation		Internal Evaluation			Min. Interna	al Evaluation	
									Practical								
Total I	Marks		Minimum Pa	ssing Marks		External	Evaluation		Min. External	Evaluation		Internal Evaluation			Min. Interna	al Evaluation	
		1			•			"	Part E		Ų.		Į.				
									Books								
									Articles								
									eferences Books								
									MOOC Courses								
									Videos								
								Course	e Articulation Matrix								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	. Р	O8 PO9	PO10	PO11	PO12	PSO1		PSO2	PSO:	3



BSc_Biotechnology

	Course Code FP/In I																		
	Cours	e Code		FP/In I															
	Part A Year 4th Semester 7th Credits Course Type Course Category Pre-Requisite/s Co-Requisite/s Co-Requisite/s Co-Requisite/s Co-Requisite/s Course Outcomes & Bloom's Level Course Outcomes & Bloom's Level Course Outcomes Course Outc																		
	Y	ar		4th				Semes	ster	7th				Credits		L	Т	Р	С
	Cours	е Туре					•											•	
	Course	Category																	
	Pre-Re	quisite/s			Co-Req	uisite/s													
	Course 0 & Bloor	Outcomes n's Level																	
	Coures	Elements									SDG (Goals)								
									F	Part B									
	Mo	dules						Contents					P	edagogy			Но	urs	
Total Ma	arks	N.	linimum Pas	ssing Mar	rks	E	external Eval	uation		Min. Extern	nal Evaluation		Inte	ernal Evaluation		Min	. Internal Ev	aluation	
Total Ma	arks	N.	linimum Pas	ssing Mar	rks	E	xternal Eval	uation		Min. Exteri	nal Evaluation		Inte	ernal Evaluation		Min	. Internal Ev	aluation	
					ing Marks External Evaluation					Part E Books									
			Articles																
References Books MOOC Courses																			
									\	/ideos									
									Course Art	ticulation Matrix									
COs	PO1	PO2	PO3		Marks External Evaluation Po4 Po5 Po6 Po7 Po4 Po5 Po6 Po7 Po6 Po6 Po7 Po6 Po7 Po6 P					PO9	PO1	10	PO11	PO12	PSO1	PSO	2	PSO3	



Bsc_Microbiology

Title of th	ne Course	Field Pro	oject/Internship													
Cours	e Code	FP/In II														
				Part A Semester 8th Credits L T P C												
Ye	ear	4th				Semester					Credits		L	Т	Р	С
Cours	е Туре												•	•		
Course	Category															
Pre-Rec	quisite/s		Co-Requ	isite/s												
Course C & Bloom	Outcomes n's Level															
Coures I	Elements							SDG (Go	als)							
	_	·					Part B	-			_	·				
Мо	dules				Co	ntents				Pe	dagogy			Но	urs	
Total Marks	1				ernal Evaluat		t D(Marks Di Theory	,			nal Evaluation			n. Internal Eva		
Iotal Marks	Minin	um Passing M	arks	Ext	ernal Evaluat	tion	Practica	Min. External Evalua	ation	Inter	nal Evaluation		Mir	n. Internal Eva	iluation	
Total Marks	Minim	um Passing Ma	nutro.	Eut	ernal Evaluat	Non		Min. External Evalua	ntian.	Inter	nal Evaluation			n. Internal Eva	duation	
Total marks		um rassing in	iiko	LX	erriar Evaluat	iioii		Mill. External Evalua	ation	inter	iiai Evaluatioii			i. iliterilai Eve	iluation	
			Books													
			Articles													
							References E									
							MOOC Cou									
							Videos									
						Coi	urse Articulat	ion Matrix								
COs PO1	PO2	PO3	PO4	P05 P	06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSC)2	PSO3	



BSc_Biotechnology

	Course Code FP/In II																
	Cours	e Code	FP/li	Ш													
								P	art A								
	Ye	ear	4th				Semeste	r	8th			Credits		L	Т	P	С
	Cours	е Туре												•	•	•	-
	Course	Category															
	Pre-Red	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures I	Elements							SDG (C	oals)							
								Pi	art B								
	Мо	dules				(Contents				1	Pedagogy			Но	ours	
Total N	larks	М	inimum Passing	Marks		External Evalu			is Distribution) Beory Min. External Eval	uation	Int	ternal Evaluation		Min.	Internal Ev	aluation	
							Pra	ctical									
Total N	larks	м	inimum Passing	Marks	ı	External Evalu	ation		Min. External Eval	uation	Int	ternal Evaluation		Min.	Internal Ev	aluation	
		•							art E								
									ticles								
								Referen	ces Books								
									Courses								
								Vi	deos								
COs	PO1	PO2	PO3	PO4	P05	PO6	P07	PO8	culation Matrix PO9	PO10	PO11	PO12	PSO1	PSO2	,	PSO3	
CUS	FUI	FU2	F-U3	FU#	FU3	F-U0	FU/	208	F-09	FUIU	FUII	FUIZ	raui	P502	:	PS03	



			Principles of Food Processing [T]											
Title of	the Course	Prir	nciples of Food Proc	essing [T]										
Cour	se Code	FT-	101[T]											
							Par	t A						
,	/ear	1st				Semester		1st		Credits	L	Т	Р	С
Cour	se Type													
Course	Category													
Pre-R	equisite/s		Co-	Requisite/s										
Course & Bloo	Outcomes m's Level													
Coures	Elements							SDG	(Goals)					
			· ·	_			Par	t B						
м	odules				c	Contents				Pedagogy		H	Hours	
Total Marks	N	linimum Passin	ng Marks	Ex	ternal Evalu	uation	The	Min. External E	valuation	Internal Evaluation	м	lin. Internal E	valuation	
				T			Prac							
Total Marks	N	linimum Passin	ig Marks	Ex	ternal Evalu	ation		Min. External E	raluation	Internal Evaluation	М	lin. Internal E	valuation	
							Par	t E						
							Вос	ks						
							Artic	les						
							Reference							
							MOOC							
							Vide	ios						
							Course Articu	lation Matrix						



		Fundamentals of Food Chemistry [T] FT-102[T] 1st Co-Requisite/s														
Title of the 0	Course	Fundame	entals of Food Cher	mistry [T]												
Course C	Code	FT-102[T]													
							Part A									
Year	r	1st				Semester	1st				Credits		L	Т	Р	С
Course T	Туре				l .									l .	- I	1
Course Cat	itegory															
Pre-Requi	isite/s		Co-Req	uisite/s												
Course Out & Bloom's	tcomes Level															
Coures Ele	ements							SDG (G	oals)							
							Part B									
Modul	iles				Cor	ntents					Pedagogy			Н	ours	
						_										
						Pa	rt D(Marks Dist Theory	tribution)								
Total Marks	Minir	num Passing Ma	ırke		External Evaluati	ion		Min. External Evalu	ation	In	ternal Evaluation			lin. Internal Ev	aluation	
				-			Practical			-						
Total Marks	Minir	num Passing Ma	ırks	E	external Evaluati	ion		Min. External Evalu	ation	In	ternal Evaluation		N	lin. Internal Ev	aluation	
				-								l l				
							Part E									
			Books													
							Articles									
							References Bo									
							MOOC Cours	ies								
							Videos									
						Co	urse Articulatio	n Matrix								



	Title of the	e Course	Food Add	ditives [T]													
	Course	Code	FT-103[T]													
								Part A									
	Yea	ar	1st				Semester	1st				Credits		L	Т	Р	С
	Course	Туре															
	Course C	ategory															
	Pre-Req	uisite/s		Co-Req	uisite/s												
	Course O	utcomes 's Level				•											
	Coures E	lements							SDG (Go	als)							
								Part B									
	Part 8 Modules Contents Pedagogy Hours																
							Par	t D(Marks Dist	ribution)								
					_			Theory			1						
Total N	Marks	Mini	mum Passing Ma	rks	Е	xternal Evaluation	on		Min. External Evalua	ation	Inter	nal Evaluation		Mir	n. Internal Eva	uation	
								Practical									
Total N	Marks	Mini	mum Passing Ma	rks	E	xternal Evaluation	on	N.	Min. External Evalua	ation	Inter	nal Evaluation		Mir	n. Internal Eva	uation	
								Part E									
								Books									
								Articles									
								References Bo	oks								
								MOOC Cours	es								
								Videos									
				,	1			urse Articulatio	T			1				1	
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSC	02	PS03	



	Title of the	Course	Food M	icrobiology [T]													
	Course	Code	FT-104[TJ													
								Part A									
	Yea	r	1st				Semester	1st				Credits		L	Т	Р	С
	Course	Туре												-			
	Course C	ategory															
	Pre-Requ	isite/s		Co-Req	uisite/s												
	Course Ou & Bloom	tcomes s Level				,											
	Coures El	ements							SDG (Go	oals)							
			•					Part B									
	Mod	ules				Co	ontents				Pe	dagogy			Но	urs	
Total M	larks	Mir	nimum Passing M	arks	E	External Evalua		t D(Marks Dis	tribution) Min. External Evalu	ation	Inte	mal Evaluation		Mir	n. Internal Ev	aluation	
1012111	uno		unr acomg m	uno	+ -	-xtornar E varau		Practical		ution	into	nui Evaluation					
Total M	arks	Mir	nimum Passing M	arks	E	External Evaluat	tion		Min. External Evalu	ation	Inter	mal Evaluation		Mir	n. Internal Eva	luation	
-	,				-		"	Part E Books					'				
								Articles									
								References Bo	noke								
								MOOC Cours									
								Videos									
							Со	urse Articulatio	on Matrix				•				
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSC	02	PS03	



	Title of the	e Course	Sensory	Evaluation and Foo	od Waste Managem	nent [T]											
	Course	Code	FT-105[T]													
								Part A									
	Yea	ar	1st				Semester	1st				Credits		L	Т	Р	С
	Course	Туре															
	Course C	ategory															
	Pre-Req	uisite/s		Co-Req	uisite/s												
	Course O	utcomes 's Level				•											
	Coures E	lements							SDG (Go	als)							
								Part B									
	Part B Modules Contents Pedagogy Hours																
										•							
							Par	t D(Marks Dist	ribution)								
								Theory			T						
Total N	larks	Mini	mum Passing Ma	rks	E	External Evaluation	on		fin. External Evalua	ation	Inter	nal Evaluation		Mir	n. Internal Eva	luation	
								Practical			1						
Total N	larks	Mini	mum Passing Ma	rks	Е	external Evaluation	on	N	Min. External Evalua	ation	Inter	nal Evaluation		Mir	n. Internal Eva	luation	
								Part E									
								Part E Books									
								Articles									
								References Bo	oks								
								MOOC Cours	es								
								Videos									
							Co	urse Articulatio	n Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSC	02	PSO3	



Tielo of										
ritle of	the Course	Processing of Cereals, Pulses,	, Oilseeds and Sugar Cro	ps [T]						
Cour	se Code	FT-202 [T]								
					Part A					
-	'ear	1st		Semester	2nd	Credits	L	т	Р	С
Cour	se Type								- 1	
Course	Category	1								
Pre-R	equisite/s	Co-Requis	site/s]						
Course & Bloc	Outcomes m's Level			1						
Coures	Elements				SDG (Goals)					
					Part B					
M	odules			Contents		Pedagogy		F	lours	
Total Marks	Minimum Pa	assing Marks	External	Evaluation	Theory Min. External Evaluation	Internal Evaluation	1	Min. Internal E	valuation	
					Practical					
	1									
Total Marks	Minimum Pa	assing Marks	External	Evaluation	Min. External Evaluation	Internal Evaluation	1	Min. Internal E	valuation	
Iotal Marks	Minimum Pa	essing Marks	External	Evaluation	Min. External Evaluation	Internal Evaluation		Min. Internal E	valuation	
lotal Marks	Minimum Pa	assing Marks	External	Evaluation		Internal Evaluation		Min. Internal E	valuation	
lotal Marks	Minimum Pa	assing Marks	External	Evaluation	Part E	Internal Evaluation		Min. Internal E	valuation	
Iotal Marks	Minimum Pi	assing Marks	External		Part E Books	Internal Evaluation		Min. Internal E	valuation	
Iotal Marks	Minimum Pi	assing Marks	External	R	Part E Books Articles	Internal Evaluation		Min. Internal E	valuation	
Iotal Marks	Minimum Pi	assing Marks	External	R	Part E Books Articles eferences Books	Internal Evaluation		Min. Internal E	valuation	
Iotal Marks	Minimum Pi	assing Marks	External	R	Part E Books Articles eferences Books MOOC Courses	Internal Evaluation		Min. Internal E	valuation	



Title of	he Course	Processing of Milk and Milk F	Products [T]										
Cour	se Code	FT-203 [T]											
					Part A								
١	'ear	1st		Semester	2nd			Credits		L	Т	P	С
Cour	se Type						I				ı		
Course	Category												
Pre-Re	quisite/s	Co-Requ	isite/s										
Course & Bloo	Outcomes m's Level												
Coures	Elements				SDG (Ge	als)							
					Part B								
м	odules			Contents			-	Pedagogy			н	lours	
Total Marks	Minimum	Passing Marks	Externa	I Evaluation	Theory Min. External Evalu	ation	Int	ternal Evaluation		Mir	n. Internal E	valuation	
			T		Practical		_						
Total Marks	Minimum	assing Marks	Externa	I Evaluation	Min. External Evalu	ation	Int	ternal Evaluation		Mir	n. Internal Ev	valuation	
					Part E								
					Books								
					Articles								
					References Books								
					MOOC Courses								
					Videos								
				Co	ourse Articulation Matrix								
COs PO1	PO2 PO3	PO4	PO5 PO6	P07	POS POS	PO10	PO11	PO12	PSO1	PSC	20	PSO3	



1	Title of the Co	urse	Livestock	products Technolo	gy [T]												
	Course Cod	de	FT-204 [T]													
								Part A									
	Year		1st				Semester	2nd				Credits		L	Т	Р	С
	Course Typ	90															
	Course Categ	gory															
	Pre-Requisite	ie/s		Co-Req	uisite/s												
(Course Outco & Bloom's Le	omes evel															
	Coures Eleme	ents							SDG (Gd	als)							
								Part B									
	Modules Contents Pedagogy Hours																
			,														
							Par	D(Marks Distri	bution)								
								Theory			_						
Total Marks		Minir	num Passing Mar	rks	Е	xternal Evaluatio	n		in. External Evalu	ation	Inter	nal Evaluation		М	lin. Internal Eval	uation	
	,						,	Practical									
Total Marks		Minir	num Passing Mar	rks	Е	xternal Evaluatio	n	Mi	in. External Evalu	ation	Inter	nal Evaluation		М	lin. Internal Eval	uation	
								Part E Books									
								Articles									
								References Boo	ks								
								MOOC Course									
								Videos	-								
							Cou	rse Articulation	Matrix								
COs PC	D1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PS	602	PSO3	



Tit	tle of the Cou	urse	Beverag	e Technology [T]											
	Course Cod	le	FT-301	[T]											
			•					Par	t A						
	Year		2nd				Semester		3rd		Credits	L	Т	Р	С
	Course Type	ie													
C	Course Categ	jory													
P	Pre-Requisite	e/s		Co-Rec	quisite/s										
Co &	ourse Outcor & Bloom's Le	mes vel													
Co	oures Eleme	ents							SDG (G	oals)					
			*					Par	t B						
	Modules	ı				Co	ontents				Pedagogy		н	lours	
Total Marks		Minir	num Passing M	arks	E	xternal Evalua	ition	The	Min. External Eval	ation	Internal Evaluation	М	lin. Internal E	valuation	
								Prac							
Total Marks		Minii	num Passing M	arks	E	xternal Evalua	ition		Min. External Eval	iation	Internal Evaluation	М	lin. Internal E	valuation	
								Par	t E						
								Вос	ks						
								Artic	eles						
								Reference							
								MOOC C	ourses						
								Vide	90S						
							(Vide							—



	Title of the	Course	Food a	analysis and Instrume	ntation [T]												
	Course	Code	FT-30	2 [T]													
								Part	Δ								
	Yea	ar	2nd				Semester		rd			Credits		L	Т	Р	С
	Course	Туре						,									
	Course C	ategory															
	Pre-Requ	uisite/s		Co-Req	uisite/s												
	Course O	utcomes 's Level															
	Coures E	lements							SDG (Ge	als)							
								Part	В								
	Mod	ules				Co	ntents					Pedagogy			Н	ours	
Total Marks		Minin	um Passing	Marke	Evi	ternal Evaluat		rt D(Marks I Theo	Distribution) ry Min. External Evalu	ation		Internal Evaluation			lin. Internal Ev	valuation	
TOTAL MAIK		***************************************	um r assing	marko	LA	terriar Evaluat	lion	Practi		ation		Internal Evaluation			IIII. III(erriai Ev	valuation	
Total Marks	s	Minin	um Passing	Marks	Ext	ternal Evaluat	tion	7 1404	Min. External Evalu	ation		Internal Evaluation		N	lin. Internal Ev	aluation	
								Part	E								
								Book	is								
								Articl	es								
								References	Books								
								MOOC Co									
								Video	os								
							Col	ourse Articula	ation Matrix								
COn D	201	DO2	DO3	DO4	DOE I	206	DO7	DO9	DOO	DO10	DO11	DO12	DCO1	DC	202	DCO2	



	Title of t	ie Course		FOOU Fac	akaging [1]													
	Cours	e Code		FT-304 [T	Ŋ													
									Pa	art A								
	Y	ear		2nd				Semest	er	3rd			Credits		L	Т	P	С
	Cours	е Туре															•	
	Course	Category																
	Pre-Re	quisite/s			Co-Rec	juisite/s												
	Course 6 & Bloom	Outcomes n's Level																
	Coures	Elements								SDG (Goals)							
									Pa	ırt B								
	Modules Contents Pedagogy Hours																	
Total Ma	arks		Minimum F	Passing Mai	rks	E	External Evalu		Th	s Distribution) eory Min. External Eva	uation		Internal Evaluation		Min.	Internal Ev	aluation	
Total Ma	arks		Minimum F	Passing Mai	rks	E	External Evalu	uation		Min. External Eva	uation		Internal Evaluation		Min.	Internal Eva	luation	
						•				ırt E		•		•				
										ooks								
										icles								
										ces Books Courses								
										leos								
									VIC	1602								
									Course Artic	ulation Matrix								
COs	PO1	PO2	PO3		PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	2	PSO3	



Title of	he Course	Resear	ch Project [P]													
Cour	se Code	FT-401	[P]													
		•					Par	t A								
,	ear	2nd				Semester		4th			Credits		L	Т	P	С
Cour	ве Туре												1	1	1	l .
Course	Category															
Pre-R	quisite/s		Co-Re	quisite/s												
Course & Bloo	Outcomes m's Level				,											
Coures	Elements							SDG (Go	ıls)							
							Par	t B								
м	odules		Part B Contents Pedagogy Hours													
						Part	t D(Marks	Distribution)								
							The	ory								
Total Marks	Minim	m Passing N	larks	Exten	nal Evaluat	ition		Min. External Evalua	tion	li	nternal Evaluation		м	lin. Internal Ev	aluation	
							Prac	tical								
Total Marks	Minim	m Passing N	larks	Exten	nal Evaluat	ition		Min. External Evalua	tion	l	nternal Evaluation		м	lin. Internal Ev	aluation	
							Par									
							Boo									
							Artic									
							Reference									
							MOOC									
							Vide	eos								
						Cau	una Antinu	ılation Matrix								
COn DO1	DO2	102	DO4	DOE DO			Irse Articu		DO10	DO11	DO12	DCO1	DC.	202	DCO2	



Title of	the Course	Research Report and Preser	tation [P]											
Cour	se Code	FT-402 [P]												
					Part /	Δ								
١	'ear	2nd		Semester					Credits		L	Т	Р	С
Cour	se Type			"				1						
Course	Category													
Pre-Re	equisite/s	Co-Requ	isite/s											
Course & Bloo	Outcomes m's Level													
Coures	Elements					SDG (Go	als)							
					Part f	3								
м	odules			Contents					Pedagogy			н	lours	
Total Marks	Minimum	Passing Marks	Externa	l Evaluation	Theor	Min. External Evalua	tion		Internal Evaluation		Mi	n. Internal E	valuation	
					Practic					,				
Total Marks	Minimum	Passing Marks	Externa	l Evaluation		Min. External Evalua	tion		Internal Evaluation		Mi	n. Internal E	valuation	
					Part I	-								
					Books									
					Article	s								
					References	Books								
					MOOC Co	urses								
					Video	s								
				c	Course Articula	tion Matrix								
COs PO1	PO2 PO	PO4	PO5 PO6	P07	PO8	T	PO10	PO11	PO12	PSO1	PSC		PSO3	



	Title of th	ne Course	Tools a	nd techniques for	food [T]												
	Course	e Code	GE-II [ŋ													
								Par	t A								
	Ye	ear	1st				Semester		2nd			Credits		L	Т	P	С
	Cours	е Туре				I		I						l .	1		- I
	Course	Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Ge	oals)							
			•					Par	t B								
	Мо	dules				Co	ontents		-			Pedagogy			Н	ours	
Total N	Marks	Minin	um Passing N	larks	Exte	rnal Evalua		art D(Marks The	Distribution) ory Min. External Evalu	ation		Internal Evaluation		,	Min. Internal Ev	aluation	
		ı						Pract	tical								
Total N	Marks	Minin	um Passing N	larks	Exte	rnal Evalua	ition		Min. External Evalu	ation		Internal Evaluation		,	Min. Internal Ev	aluation	
								Par	tE				1				
								Boo	ks								
								Artic									
								Reference	s Books								
								MOOC C									
								Vide	ios								
							Co	ourse Articu	lation Matrix								
CO.	DO1	DO2	DO2	DO4	DOE DO	26	DO7	000	DO0	DO10	DO11	DO12	DCO1	ь	602	DCO2	



	litle of the	Course	F000	and Business Man	agement												
	Course	Code	GE-III														
								F	Part A								
	Yea	ır	2nd				Semester		3rd			Credits		L	T	P	С
	Course	Туре														•	
	Course C	ategory															
	Pre-Requ	uisite/s		Co-R	tequisite/s												
	Course Or & Bloom	itcomes s Level															
	Coures E	ements							SDG (Go	als)							
								F	Part B								
	Mod	ules					Contents					Pedagogy			Ho	urs	
							F		rks Distribution)								
Total N	Marke	Mi	nimum Passing	Marke		External Eva	luation	1	Min. External Evalua	tion	1	nternal Evaluation		Min In	iternal Eva	luation	
								P	ractical								
Total N	Marks	Mi	nimum Passing	Marks	1	External Eva	luation		Min. External Evalua	tion		nternal Evaluation		Min. In	iternal Eva	luation	
					1						1		-				
									Part E								
				Books Articles													
									nces Books								
									C Courses								
									/ideos								
									iculation Matrix							_	
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		PSO3	



Title of	the Course	Entrep	reneurship Develop	ment [T]												
Cou	se Code	GE-IV	[1]													
							Pari	ı A								
	'ear	2nd				Semester		4th			Credits		L	Т	Р	С
Cou	se Type				- I					ı			I	l .		1
Cours	Category															
Pre-R	equisite/s		Co-Re	quisite/s												
Course & Blo	Outcomes m's Level															
Coure	Elements							SDG (Go	als)							
		•					Pari	В								
N.	odules				Co	ontents		. 5			Pedagogy			Н	ours	
									,							
						Par	rt D(Marks	Distribution)								
							The	ory								
Total Marks	Minim	ım Passing N	Marks External Evaluation					Min. External Evalua	tion		nternal Evaluation		м	lin. Internal Ev	aluation	
							Pract	ical								
Total Marks	Minim	ım Passing N	Marks	Exte	rnal Evalua	ition		Min. External Evalua	tion		nternal Evaluation		м	lin. Internal Ev	aluation	
							Par									
			Books													
							Artic									
							Reference									
							MOOC C									
							Vide	os								
COn DO1	DO2	202	DO4	DOE DO		COL	urse Articu	lation Matrix	DO10	DO11	DO12	DCO1	1-0	202	DCO2	



	Title of the	e Course	Intellectu	al Property Rights	y Rights [T] Part A												
	Course	Code	GE-IV [T														
								Part A									
	Yea	ar	2nd				Semester	4th				Credits		L	T	P	С
	Course	Туре													•		
	Course C	ategory															
	Pre-Req	uisite/s		Co-Req	uisite/s												
	Course O	utcomes 's Level															
	Coures E	lements							SDG (G	oals)							
								Part B			'						
	Mod	lules				Co	ntents	FaitB			Pe	dagogy				Hours	
					Park Political Distributions												
					Part D(Marks Distribution) Theory												
								Theory									
Total M	arks	Min	mum Passing Ma	rks	E	xternal Evaluat	ion		Min. External Eval	ation	Inter	nal Evaluation		N	Min. Internal	Evaluatio	on
								Practical			•						
Total M	arks	Min	mum Passing Ma	rks	E	xternal Evaluat	ion	1	Min. External Eval	ation	Inter	nal Evaluation		N	Min. Internal	Evaluation	on
								Part E									
				Books													
				Articles													
				References Books													
				MOOC Courses													
								Videos									
	1			Course Articulation Matrix													
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS	SO2	P	SO3



BSc_Biotechnology

	Title of th	ie Course		Allilla Di	iversity		Part E Contents Part D(Marks D Theory External Evaluation Practice External Evaluation Part E Books												
	Cours	e Code		GEI[T]															
										Part A									
	Y	ear		1st				Seme	ster	1st				Credits		L	Т	P	С
	Cours	е Туре								•			•			•	•	•	
	Course	Category																	
	Pre-Re	quisite/s			Co-Req	uisite/s													
	Course 0 & Bloor	Outcomes n's Level																	
	Coures	Elements									SDG (G	oals)							
									1	Part B									
	Mo	dules						Contents						Pedagogy			Но	ours	
Total Ma	arks		Minimum P	Passing Ma	rks	External Evaluation				Min. Ex	ternal Evalu	ation	li	nternal Evaluation		Min.	. Internal Eva	aluation	
Total Ma	arks		Minimum P	Passing Mai	rks	E	xternal Eval	luation		Min. Ex	ternal Evalu	ation	l	nternal Evaluation		Min	Internal Eva	aluation	
															·				
					Articles														
					References Books MOOC Courses														
					Videos														
										videos									
									Course Ar	rticulation Mat	rix								
COs	PO1	PO2	PO3		PO4	PO5	PO6	P07	PO8	POS		PO10	PO11	PO12	PSO1	PSO:	2	PSO3	



	Title of the	Course	Industr	rial training													
	Course	Code	IAPC I														
			•					Pai	rt A								
	Yea	ar	3rd				Semester		5th			Credits		L	т	Р	С
	Course	Туре				- 1		,			Į.			- 1			1
	Course C	ategory															
	Pre-Req	uisite/s		Co-R	equisite/s												
	Course O	utcomes 's Level															
	Coures E	lements							SDG (Go	als)							
								Pai	rt B								
=	Mod	ules				Co	ontents					Pedagogy			Но	ours	
Total Mar	dia.		um Passing N			rnal Evalua		rt D(Marks The	Distribution) ory Min. External Evalua	**		nternal Evaluation			in. Internal Ev	-1	
lotai mar	rks	MINIM	um Passing i	warks	EXTO	mai Evalua	ation	Prac		tion	'	nternal Evaluation		м	in. internal EV	aluation	
Total Mar	etro.	Minim	um Passing N	darke.	Euto	rnal Evalua	ntion.	Prac	Min. External Evalua	diam.		nternal Evaluation			in. Internal Ev	aluation	
TOTAL MAI	IKS	Million	uiii rassiiiy ii	warks	Exte	ilidi Evalua	ation		MIII. EXTERNAL EVALUA	LIOII		Internal Evaluation		m	III. IIILEITIAI EV	aluation	
								Pai	rt E								
				Books													
								Arti									
				References Books													
								MOOC									
								Vid	eos								
							Col	uree Artico	ulation Matrix								
COn	DO1	DO2	002	DO4	DOE DO	20	000	DO0		DO10	DO11	DO12	DCO1	DO.	.00	DCO2	



				Co-Requisite/s Contents Contents Part D(Ma External Evaluation P External Evaluation											
Title o	f the Course	Indi	ustrial training												
Соц	ırse Code	IAP	PC II												
						Ps	art A								
	Year	3rd			Semeste		6th			Credits		L	Т	Р	С
Cou	urse Type				I				1				1		
Cours	se Category														
Pre-F	Requisite/s		Co-R	equisite/s											
Cours & Blo	e Outcomes oom's Level														
Coure	es Elements		-				SDG (Goa	ls)							
						Pa	art B		•						
	Modules				Contents					Pedagogy			н	lours	
Total Marks	Mir	nimum Passin	ng Marks	Exter	nal Evaluation		Min. External Evalua	ion		Internal Evaluation		Mi	n. Internal E	valuation	
						Pra	ectical		,						
Total Marks	Mir	nimum Passin	ig Marks	Exter	nal Evaluation		Min. External Evaluat	ion		Internal Evaluation		Mi	n. Internal E	valuation	
							art E								
							ooks								
							ticles								
			References Books MOOC Courses												
						Vi	deos								
						Course Artic	culation Matrix								
COs PO1	PO2	PO3	PO4	PO5 PC	6 PO7	PO8		PO10	PO11	PO12	PSO1	PS	no	PSO3	



Title	or the Cou	1156	IAPC III	[-]													
С	ourse Code	9	IAPC III	[P]													
								Part	A								
	Year		4th				Semeste	r 71	h			Credits		L	Т	P	С
C	Course Type)														•	
Cor	urse Catego	ory															
Pro	e-Requisite	/s		Co-Req	uisite/s												
Cou & E	ırse Outcon Bloom's Lev	nes /el															
Cou	ures Elemei	nts							SDG (C	ioals)							
								Part I	В								
	Modules					C	ontents					Pedagogy			Но	ours	
Total Marks		Mini	mum Passing Ma	ırks	Е	xternal Evalua	ation	Theor	Min. External Eval	uation	Int	ternal Evaluation		Min.	. Internal Ev	aluation	
Total Marks		Mini	mum Passing Ma	ırks	E	xternal Evalua	ation		Min. External Eval	uation	Int	ternal Evaluation		Min.	. Internal Ev	aluation	
								Part I									
				BOOKS Articles													
				References Books													
								MOOC Co	urses								
								Video	s								
								Course Articula	stion Matrix								
COs PO1		PO2	PO3	PO4	PO5				PO9	PO10	PO11	PO12	PSO1	PSO2	2	PSO3	



Title of	he Course	IAPC IV [P]	[P] Part A											
Cou	se Code	APC IV [P] Part A												
		-1			Ps	art A								
	'ear	4th		Semeste		8th			Credits		L	Т	Р	С
Cou	se Type													
Cours	Category													
Pre-R	quisite/s	Co-Requi	site/s											
Course & Blo	Outcomes m's Level													
Coure	Elements					SDG (Goals)								
					Pa	art B			·	•				
N	odules			Contents				1	Pedagogy			1	Hours	
Total Marks	Minimum F	assing Marks	External	Evaluation		s Distribution) eory Min. External Evaluation		In	ternal Evaluation		м	in. Internal E	valuation	
					Pra	ctical								
Total Marks	Minimum F	assing Marks	External	Evaluation		Min. External Evaluation		In	ternal Evaluation		М	in. Internal E	valuation	
					Pa	art E				·				
		Books												
			Articles References Books											
						Courses								
					Vic	deos								
					Course Artic	culation Matrix								
COs PO1	PO2 PO3	PO4	Course Art			PO9 PO	10	PO11	PO12	PSO1	PS	:02	PSO3	



	Title of ti	ie Course		NCC-2															
	Cours	e Code		NCC-2															
									Р	art A									
	Ye	ar		1st				Semest	er	2nd				Credits		L	Т	P	С
	Cours	е Туре										•						•	
	Course	Category																	
	Pre-Red	quisite/s			Co-Req	juisite/s													
	Course C & Bloom	Outcomes n's Level																	
	Coures I	lements								SE	G (Goals)								
									P	art B									
	Мо	dules					(Contents					Pe	edagogy			Но	urs	
Total Ma	arks		linimum Pa	assing Mar	rks	Е	Part D(Mar T External Evaluation Pr				Evaluation		Inte	rnal Evaluation		Min.	Internal Eva	aluation	
Total Ma	arks	1	linimum Pa	assing Mar	rks	E	xternal Evalu	uation		Min. External	Evaluation		Inte	rnal Evaluation		Min.	Internal Eva	luation	
										art E									
					Articles														
					References Books														
							моос	Courses											
									Vi	ideos									
									Course Arti	culation Matrix									
COs	PO1	PO2	PO3		PO4	PO5	PO6	P07	P08	PO9	PO10	Р	PO11	PO12	PSO1	PSO	2	PSO3	



Title	f the Course	NCC-I														
Co	irse Code	NCC-I														
		'					Part A									
	Year	1st				Semester	1st				Credits		L	Т	P	С
Co	ırse Type															1
Cour	se Category															
Pre-	Requisite/s		Co-Requ	isite/s												
Cours & Bi	e Outcomes om's Level															
Cour	s Elements							SDG (Go	oals)							
							Part B									
	Modules				Cor	ntents				Pe	dagogy			Ho	ours	
						Par	t D(Marks Dist	tribution)								
				T External Evaluation						1						
Total Marks	Min	mum Passing M						Min. External Evalu	ation	Inte	rnal Evaluation		Mir	n. Internal Eva	aluation	
				1		1	Practical			1						
Total Marks	Min	mum Passing M	arks	Ext	ternal Evaluat	ion	,	Min. External Evalu	ation	Inte	rnal Evaluation		Mir	n. Internal Eva	aluation	
							Part E									
			Books													
			Articles													
			References Books													
							MOOC Cours	ses								
							Videos									
						Co	urse Articulatio	n Matrix								



BSc_PCM

Title of the Course NCC																		
Part Semester 1st Semester 1st Credits L T P C		Title of th	e Course	NCC														
Year		Course	e Code	NCC010	1													
Year									Part A									
Course Category Pre-Requisitative Co-Requisitative Co-Requisitative Co-Requisitative Course Statements SDG (Goals)		Ye	ar	1st				Semester					Credits		L	Т	P	С
Pre-Requisite/s Course Outcomes & Bloom's Level Course Elements Part B Modules Confients Pert D(Marks Distribution) Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. External Evaluation Min. Internal Evalua		Course	е Туре									I					1	
Course Cytromes & Bloom's Level Course Elements SOBG (Goals) Part B Modules Contents Part B Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix		Course 0	Category															
A Bloom's Level Course Elements SDG (Goals) Part B Nodules Contents Part B Part D(Mark's Distribution) Factors Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Fractical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books FAIT E Articles Faferences Books Course Articulation Modernal Evaluation Modernal		Pre-Rec	quisite/s		Co-Rec	quisite/s												
Part B Part D(Marks Distribution)		Course C & Bloom	Outcomes n's Level				·											
Modules Contents Pedagogy Hours Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix		Coures E	Elements							SDG (G	oals)							
Modules Contents Pedagogy Hours Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix									Part B			*						
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix		Mod	dules				Co	ntents				P	edagogy			Но	ours	
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix																		
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix								Pa		tribution)								
Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix	Total M	larke	Min	mum Passing Ma	arks External Evaluation					Min Eyternal Evalu	ation	Int	ernal Evaluation		M:	in Internal Fv	aluation	
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix												-						
Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix	Total M	larks	Min	mum Passing Ma	ırks		External Evaluat	ion		Min. External Evalu	ation	Inte	ernal Evaluation		M:	in. Internal Ev	aluation	
Books Articles References Books MOOC Courses Videos Course Articulation Matrix				-														
Articles References Books MOOC Courses Videos Course Articulation Matrix									Part E									
References Books MOOC Courses Videos Course Articulation Matrix					Books													
MOOC Courses Videos Course Articulation Matrix																		
Videos Course Articulation Matrix																		
Course Articulation Matrix										es								
									Videos									
									Autioulatie	.m Matrix								
	COs	PO1	PO2	PO3	PO4	PO5	PO6				PO10	PO11	PO12	PSO1	PS	02	PSO3	



BSc_ComputerScience

	Title of the	Course	NCC														
	Course	Code	NCC010	D1[T]													
								Part A									
	Yea	r	1st				Semester	1st				Credits		L	Т	P	С
	Course	Туре									1			-			
	Course Ca	ategory															
	Pre-Requ	isite/s		Co-Requ	uisite/s												
	Course Ou & Bloom's	tcomes s Level				ľ											
	Coures Ele	ements							SDG (Go	als)							
								Part B									
	Modu	ules				Co	ntents				Pe	dagogy			Ho	ours	
Total Ma	larke	Min	imum Passing M	arke	5	vtomal Evaluat		t D(Marks Dis Theory		ation	Inter	nal Evaluation		Mir	ı. Internal Ev	aluation	
TOTAL MA	diks	MIII	illiulii rassiliy m	n Marks External Evaluation Min. External Evaluation Practical						ition	inter	iiai Evaluatioii		MIII	i. internal Ev	aluation	
Total Ma	arks	Min	imum Passing Ma	arks	Ex	xternal Evaluat	tion		Min. External Evalua	ation	Inter	nal Evaluation		Mir	. Internal Ev	aluation	
				Part E													
				Books Articles													
				Attures References Books													
								MOOC Cour									
								Videos									
COs	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	on Matrix	PO10	PO11	PO12	PSO1	PSC		PSO3	



BSc_PCM

Title of	the Course	NCC (optional)									
Cour	se Code	NCC0201[T]									
					Part A						
١	'ear	1st		Semester	2nd		Credits	L	Т	P	С
Cour	se Type				<u>'</u>						
Course	Category	1									
Pre-Re	equisite/s	Co-Requis	site/s]							
Course & Bloo	Outcomes m's Level										
Coures	Elements				SDG (Goals)						
			-		Part B	•					
м	odules			Contents			Pedagogy		F	lours	_
Total Marks	Minimum P	assing Marks	External	Evaluation	Theory Min. External Evaluation		Internal Evaluation		Min. Internal E	valuation	
					Practical						
Total Marks	Minimum P	assing Marks	External	Evaluation	Min. External Evaluation		Internal Evaluation		Min. Internal E	valuation	
					Part E						
					Books						
					Books						
					Books Articles						
					Books Articles References Books						_ _ _
					Books Articles References Books MOOC Courses						



BSc_ComputerScience

	Title of th	ne Course	NCC (op	ional)													
	Course	e Code	NCC020	I[T]													
								Part A									
	Ye	ear	1st				Semester					Credits		L	Т	P	С
	Course	е Туре				l l									I .	1	
	Course (Category															
	Pre-Rec	quisite/s		Co-Req	uisite/s												
	Course C & Bloom	Outcomes n's Level				•											
	Coures E	Elements							SDG (G	oals)							
								Part B									
	Mor	dules				Con	itents	ranto			Pe	edagogy			Но	ours	
Total M	arks	Minir	num Passing Ma	rks	E	xternal Evaluati		Part D(Marks Dis		ation	Inte	mal Evaluation		М	in. Internal Ev	aluation	
					•			Practica	ı								
Total M	arks	Minir	num Passing Ma	rks	E	xternal Evaluati	on		Min. External Evalu	ation	Inte	rnal Evaluation		М	in. Internal Ev	aluation	
								Part E Books									
								Articles									
								References B									
								MOOC Cour									
								Videos									
								Course Articulati	on Matrix								
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PS	102	PS03	



Title of the Course SECIT Senester Part																		
Part A		Title of th	e Course	Bioinst	rumentation													
Your		Course	e Code	SECI	[T]													
Your				•					Par	t A								
Course Category Pre-Requisite's Co-Requisite's Co-Requisite's Co-Requisite's Course Outcomes & Bloom's Level Course Date		Ye	ar	1st				Semester					Credits		L	Т	Р	С
Pre-Requisite's Co-Requisite's Course Ottomes a Bloom's Level		Course	е Туре				I		I			ı				I		-1
Course Elements SDG (Goals) Part B Nodules Contents Part B Pedagogy Hours Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books Videos Course Articulation Matrix		Course 0	Category															
A Biloom's Level Course Elements SDG (Goals)		Pre-Rec	quisite/s		Co-R	equisite/s												
Part B Part D(Marks Distribution)		Course C & Bloom	Outcomes n's Level															
Modules Contents Pedagogy Hours		Coures E	Elements							SDG (Go	als)							
Modules Contents Pedagogy Hours Part D(Marks Distribution) Theory Total Marks Minimum Passing Marks External Evaluation Min. Internal Evaluation Min. Internal Evaluation Total Marks Minimum Passing Marks External Evaluation Min. Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books Wideos Course Articulation Matrix									Par	t B								
Theory Total Marks Minimum Passing Marks External Evaluation Minimum Passing Marks External Evaluation Minimum Passing Marks Practical Total Marks Minimum Passing Marks External Evaluation Minimum Passing Marks External Evaluation Minimum Passing Marks Part E Part E Books Articles References Books WOOC Courses Videos Course Articulation Matrix		Mor	dules				Co	ontents					Pedagogy			н	lours	
Theory Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books WOOC Courses Videos Course Articulation Matrix																		
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Min. External Evaluation Min. Internal Evaluation Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books Videos Course Articulation Matrix								Pa	rt D(Marks	Distribution)								
Practical Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books WOOC Courses Videos Course Articulation Matrix									The	ory								
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation Part E Books Articles References Books WOOC Courses Videos Course Articulation Matrix	Total N	Marks	Minim	um Passing M	Marks	Exte	rnal Evalua	ation		Min. External Evalua	tion		nternal Evaluation		N	lin. Internal Ev	valuation	
Part E Books Articles References Books MOOC Courses Videos Course Articulation Matrix									Pract	tical								
Books Articles References Books MOCC Courses Videos Course Articulation Matrix	Total N	Marks	Minim	um Passing N	Marks	Exte	rnal Evalua	ation		Min. External Evalua	tion		nternal Evaluation		N	lin. Internal Ev	valuation	
Books Articles References Books MOCC Courses Videos Course Articulation Matrix																		
Articles References Books MOC Courses Videos Course Articulation Matrix																		
References Books MOOC Courses Videos Course Articulation Matrix																		
MOOC Courses Videos Course Articulation Matrix																		
Videos Course Articulation Matrix																		
Course Articulation Matrix																		
									Vide	908								
CO	CO+	DO1	DO3	DO2	DO4	DOE DO	20	Co	ourse Articu		DO10	DO11	DO12	DCO1	P/	200	DEO2	



	itle of the Co	urse	Cooperat	ion Marketing & Fir	nance											
	Course Coo	de	SEC V							<u>-</u>				·		
								Part A								
	Year		3rd				Semester	5th				Credits		L T	Р	С
	Course Typ	90														
C	Course Categ	gory														
I	Pre-Requisit	e/s		Co-Req	uisite/s											
C	Course Outco & Bloom's Le	omes evel														
C	Coures Eleme	ents							SDG (Gd	oals)						
								Part B								
	Modules	3				Con	tents				Ped	dagogy		Hou	rs	
							Pa	rt D(Marks Distri	oution)							
								Theory			Т					
Total Marks		Minir	num Passing Ma	rks	E	xternal Evaluation	on		n. External Evalu	ation	Intern	nal Evaluation		Min. Internal Eval	uation	
					_			Practical								
Total Marks		Minir	num Passing Ma	rks	E	xternal Evaluation	on	Mi	n. External Evalu	ation	Intern	nal Evaluation		Min. Internal Eval	uation	
								Part E								
								Books								
								Articles								
								References Boo	ks	<u>-</u>				·		
								MOOC Courses	•	<u>-</u>				·		
								Videos								
							Co	urse Articulation	Matrix							
COs PO)1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3	



	Title of th	ie Course		Organic F	anning													
	Cours	e Code		SEC V (T))													
									Р	art A								
	Y	ear		3rd				Semes	ter	5th			Credits		L	Т	P	С
	Cours	е Туре										•			•	•	•	
	Course	Category																
	Pre-Re	quisite/s			Co-Rec	uisite/s												
	Course 0 & Bloor	Outcomes n's Level																
	Coures	Elements								SDG	(Goals)							
									Р	art B								
	Mo	dules						Contents					Pedagogy			Ho	ours	
Total Ma	arks		Minimum Pa	assing Mar	rks	E	xternal Eval	uation		Min. External E	valuation		Internal Evaluation		Min	. Internal Eva	aluation	
Total Ma	arks		Minimum Pa	assing Mar	rks	E	xternal Eval	uation		Min. External E	valuation		Internal Evaluation		Min	Internal Eva	aluation	
										art E								
										ticles								
										nces Books								
										Courses								
										ideos								
						·h				culation Matrix	1							
COs	PO1	PO2	PO3		PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO:	2	PSO3	



	Title of th	e Course	Marine	Microbiology													
	Course	e Code	SEC V	(T)													
								Par	†A								
	Ye	ar	3rd				Semester		5th			Credits		L	Т	P	С
	Cours	е Туре														1	
	Course	Category															
	Pre-Rec	quisite/s		Co-Re	quisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Go	als)							
								Par	t B								
	Мо	dules				Co	ontents					Pedagogy			Ho	ours	
							Pari		Distribution)								
								The									
Total I	Marks	Minim	ım Passing I	Marks	Exterr	nal Evaluat	tion		Min. External Evalua	ation	lı	nternal Evaluation		М	in. Internal Eva	aluation	
								Prac									
Total I	Marks	Minim	ım Passing I	Marks	Exterr	nal Evaluat	tion		Min. External Evalua	ation	li	nternal Evaluation		М	in. Internal Eva	aluation	
								Par	t E								
				·				Boo	oks		·		·				
					-			Artic	cles		-			-			
		·						Reference	es Books			<u> </u>					
								MOOC									
								Vide	eos								
							Cou	urse Articu	ılation Matrix								
CO.	DO1	DO2	202	DO4	DOE DOS	,	000	DO0	DO0	DO10	DO11	DO12	DCO1	De	02	DCO2	



Title of	the Course	Organi	c Farming													
Cou	se Code	SEC V	(T)													
							Par	t A								
	Year	3rd				Semester		5th			Credits		L	Т	P	С
Cou	rse Type									I			I	l .		
Cours	Category															
Pre-R	equisite/s		Co-Re	quisite/s												
Course & Blo	Outcomes m's Level				,											
Coure	Elements							SDG (Goa	ils)							
							Par	t B								
N	odules				Co	ontents					Pedagogy			Н	ours	
						Par	rt D(Marks	Distribution)								
							The	ory								
Total Marks	Minin	um Passing N	Marks	Exter	rnal Evaluat	ntion		Min. External Evalua	ion		nternal Evaluation		м	lin. Internal Ev	raluation	
							Prac	tical								
Total Marks	Minin	um Passing N	Marks	Exter	rnal Evaluat	ntion		Min. External Evalua	ion		nternal Evaluation		м	lin. Internal Ev	raluation	
							Par									
							Boo									
							Artic									
							Reference									
							MOOC C									
							Vide	eos								
						_		detien Martin								
COn DO1	DO3	DO3	DO4	DOE DO		COI	urse Articu	lation Matrix	DO10	DO11	DO12	DCO1	1-0	202	DEO3	



Title of the	ne Course	Marine I	Microbiology													
Cours	e Code	SEC V (T)													
							Part A									
Ye	ear	3rd				Semester	5th				Credits		L	Т	Р	С
Cours	е Туре				•								•	•		
Course	Category															
	quisite/s		Co-Requ	iisite/s												
Course 0 & Bloom	Outcomes n's Level															
Coures	Elements							SDG (Gd	als)							
							Part B					•				
Mo	dules				Cor	ntents				Pe	dagogy			Ho	urs	
Total Marks	Minim	um Passing M	arke	Eve	ernal Evaluat		t D(Marks Di		ation	Inter	nal Evaluation		Mir	n. Internal Ev	uluation	
Total marks		um rassing m	airo	LA	emai Evaluat	.1011	Practica		ation	inter	nai Evaluation			i. iiiterriai Evi	iluation	
Total Marks	Minim	um Passing Ma	arks	Ext	ernal Evaluat	ion		Min. External Evalu	ation	Inter	nal Evaluation		Mir	n. Internal Eva	aluation	
	-						Part E Books			1		"				
							Articles	i								
							References E	Books								
							MOOC Cou	rses								
							Videos	i								
·				·		Coi	urse Articulati	ion Matrix		·						
COs PO1	PO2	PO3	PO4	P05 P	06	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSC)2	PSO3	



	Title of th	e Course	Food S	Supply chain Mana	gement [T]												
	Course	e Code	SEC V	П													
								Par	t A								
	Ye	ar	3rd				Semester		5th			Credits		L	Т	Р	С
	Cours	е Туре				1					I			J.	II.		1
	Course	Category															
	Pre-Rec	quisite/s		Co-R	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Go	als)							
								Par	t B		*						
	Мо	dules				Co	ontents					Pedagogy			Но	ours	
Total N		Minin	um Passing N	Marke	Evto	rnal Evalua		art D(Marks The	Distribution) ory Min. External Evalua	ition		Internal Evaluation			in. Internal Ev	aluation	
Total II	nai Ko		um r assing i	nai Ko	LAG	IIIai Evalua	ition	Prac		ition		Internal Evaluation			III. IIIterriai EV	aluation	
Total N	Marks	Minim	um Passing N	Marks	Exte	rnal Evalua	ation		Min. External Evalua	ition		Internal Evaluation		м	in. Internal Ev	aluation	
		I .						Par	t E								
								Вос	oks								
								Artic	cles								
								Reference	es Books								
								MOOC									
								Vide	eos								
							Co	ourse Articu	ılation Matrix								
CO.	DO1	DO2	DO2	DO4	DOE DO	26	DO7	000	DO0	DO10	DO11	DO12	DCO1	DC	-02	DCO2	



	litle of the	Course	Introd	uction to CAD and	CAM												
	Course	Code	SEC \	Л													
								F	Part A								
	Yea	r	3rd				Semester		6th			Credits		L	Т	Р	С
	Course	Туре							•					•	•	•	
	Course C	ategory															
	Pre-Requ	iisite/s		Co-R	Requisite/s												
	Course Or & Bloom	itcomes s Level															
	Coures E	ements							SDG (Go	als)							
			•					F	Part B								
	Mod	ules					Contents					Pedagogy			Ho	urs	
							F		rks Distribution)								
Total I	Marks	Mi	nimum Passing	Marks		External Eval	luation		Min. External Evalua	tion	Ir	nternal Evaluation		Min. Ir	nternal Eva	luation	
								P	ractical								
Total I	Marks	Mi	nimum Passing	Marks	1	External Eva	luation		Min. External Evalua	tion	Ir	nternal Evaluation		Min. Ir	nternal Eva	luation	
									Part E								
									Books								
									Articles								
									nces Books								
									C Courses								
								١	/ideos								
							(Course Art	ticulation Matrix								
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	P09	PO10	PO11	PO12	PSO1	PSO2		PSO3	



	Title of the	Course	Introduc	ion to Good Labor	atory practices											
	Course	Code	SEC VI	T)												
								Part A								
	Yea	r	3rd				Semester	6th				Credits		L T	P	С
	Course	Туре														
	Course Ca	itegory														
	Pre-Requ	isite/s		Co-Rec	juisite/s											
	Course Ou & Bloom's	tcomes Level														
	Coures El	ements							SDG (G	oals)						
			•					Part B								
	Mod	ıles				Cor	ntents				Pe	dagogy			Hours	
							Pa	art D(Marks Distr	bution)							
Total Ma	arks	Min	imum Passing Ma	rks		External Evaluat	ion	M	in. External Evalu	ation	Inter	nal Evaluation		Min. Interna	I Evaluatio	n
							l	Practical								
Total Ma	arks	Min	imum Passing Ma	rks	1	External Evaluat	ion	М	in. External Evalu	ation	Inter	nal Evaluation		Min. Interna	I Evaluatio	n
								Part E								
								Books								
								Articles								
								References Boo								
								MOOC Course	S							
								Videos								
							C	ourse Articulation	Matrix							
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS	303



	Title of th	ne Course	Introd	uction to Good Lab	oratory practices												
	Course	e Code	SEC \	(T) I'													
								Part	Α.								
	Ye	ar	3rd				Semester		5th			Credits		L	Т	Р	С
	Cours	е Туре															
	Course	Category															
	Pre-Rec	quisite/s		Co-R	tequisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (G	oals)							
								Part	В								
	Mo	dules				Co	ontents					Pedagogy			н	ours	
Total Ma	arks	М	nimum Passing	Marks	E	xternal Evalua	ition	Theo	Min. External Eval	ation		Internal Evaluation		Mi	n. Internal Ev	/aluation	
Total Ma	arks	м	nimum Passing	Marks		xternal Evalua	ntion	Fracti	Min. External Eval	ation		Internal Evaluation		Mi	n. Internal Ev	aluation	
								Part	E								
								Book	ks								
								Articl									
								References									
								MOOC Co									
								Video	os								
							(Course Articul	lation Matrix								
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3	



	Title of th	e Course	Entre	oreneurship devel	opment												
	Course	e Code	SEC	/I (T)													
								Par	t A								
	Ye	ar	3rd				Semester		6th			Credits		L	Т	P	С
	Cours	е Туре														•	
	Course (Category															
	Pre-Rec	quisite/s		Co-	Requisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	lements							SDG (G	oals)							
								Part	t B								
	Mo	dules				С	Contents					Pedagogy			н	ours	
Total Ma	arks	N	inimum Passing	Marks	E	External Evalua	ation	Theo	Min. External Eval	uation		Internal Evaluation		Mi	n. Internal Ev	aluation	
Total Ma	arke		inimum Passing	Marks		External Evalua	ation	Fidel	Min. External Eval	uation		Internal Evaluation		Mi	n. Internal Ev	valuation	
			· · · · · · · · ·					Pari									
								Воо									
								Artic									
								Reference									
								MOOC C									
								Vide	os								
							c	Course Articu	lation Matrix								
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3	



	little of th	e Course		Entrepreneurship de	velopment													
	Course	Code		SEC VI (T)														
									Part A									
	Ye	ar		3rd			5	Semester	6th				Credits		L	Т	P	С
	Cours	е Туре					•		•						•	·		
	Course (Category					_											
	Pre-Rec	juisite/s		C	o-Requisite/s	•												
	Course C & Bloom	utcomes 's Level																
	Coures E	lements								SDG (Goals)								
									Part B									
	Мо	dules					Contents						Pedagogy				Hours	
								Part D	(Marks Distribution Theory)								
Total M	larks		Minimum Pa	ssing Marks		External	Evaluation		Min. Exte	rnal Evaluation			Internal Evaluation			Min. Inter	nal Evaluation	
									Practical									
Total M	larks	ı	Minimum Pa	ssing Marks		External	Evaluation		Min. Exte	rnal Evaluation			Internal Evaluation			Min. Inter	nal Evaluation	
									Part E									
									Books									
									Articles									
									eferences Books									
								1	MOOC Courses									
									Videos									
								Cours	e Articulation Matrix	κ								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO	7 P	O8 PO9	PO10)	PO11	PO12	PSO1		PSO2	PSC	3



	Title of th	a Cauraa	Lhuman	Health and Vaccino	lomi												
					iogy												
	Course	Code	SEC VII	(T)													
								Part A									
	Ye	ar	4th				Semester	8th				Credits		L	Т	P	С
	Course	е Туре				•								•	•	•	
	Course C	Category															
	Pre-Req	uisite/s		Co-Req	juisite/s												
	Course O & Bloom	lutcomes 's Level				*											
	Coures E	Elements							SDG (Go	als)							
								Part B			4						
	Mod	dules				Co	ontents	Falto			P	edagogy			Н	ours	
										l l							
							Pa	rt D(Marks Dis	tribution)								
								Theory	,								
Total M	larks	Mini	mum Passing M	arks	E	xternal Evalua	ition		Min. External Evalu	ation	Inte	ernal Evaluation		Mir	n. Internal Ev	aluation	
		ļ.						Practical									
Total M	arks	Mini	mum Passing M	arks	E	xternal Evalua	ition		Min. External Evalu	ation	Inte	ernal Evaluation		Mir	n. Internal Ev	aluation	
		ļ.															
								Part E									
								Books									
								Articles									
			·					References B	ooks				·				
								MOOC Cour	ses								
								Videos									
							Co	ourse Articulation	on Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSC)2	PSO3	



	Title of th	ie Course		nyuroporii	ics Cultivation														
	Cours	e Code		SEC VII (1	T)														
									F	Part A									
	Y	ar		4th				Seme	ster	8th				Credits		L	Т	P	С
	Cours	е Туре					·			•							•	•	
	Course	Category																	
	Pre-Re	quisite/s			Co-Req	uisite/s													
	Course 0 & Bloor	Outcomes n's Level																	
	Coures	Elements									SDG (G	oals)							
			•						F	Part B									
	Mo	dules						Contents						Pedagogy			Но	ours	
Total Ma	arks	,	linimum Pas	ssing Mar	ks	E	xternal Eva	luation	1	rks Distributio Theory Min. Ex	ternal Evalu	ation		Internal Evaluation		Min	Internal Eva	aluation	
Total Ma	arks	,	linimum Pa	ssing Mar	ks	E	xternal Eva	luation		Min. Ex	ternal Evalu	ation		Internal Evaluation		Min	Internal Eva	aluation	
						•				Part E			,						
										Books									
										Articles									
										ences Books									
										OC Courses									
									'	Videos									
									Course Art	ticulation Mat	rix								
COs	PO1	PO2	PO3		PO4	PO5	PO6	P07	P08	POS)	PO10	PO11	PO12	PSO1	PSO	2	PSO3	



	Title of th	ne Course	Introduct	on to food analysis	i [P]			·									
	Cours	e Code	SEC-IV [P]													
								Part A									
	Ye	ear	2nd				Semester					Credits		L	Т	Р	С
	Cours	е Туре				ı									II.	1	1
	Course	Category															
	Pre-Rec	quisite/s		Co-Req	uisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures I	Elements							SDG (G	oals)							
								Part B			1						
	Мо	dules				Cor	ntents	Fall D			P	edagogy			Но	ours	
							F	Part D(Marks Dis	stribution)								
								Theory									
Total M	arks	Minir	num Passing Ma	rks	Е	xternal Evaluati	on		Min. External Evalu	ation	Inte	rnal Evaluation		М	in. Internal Ev	aluation	
		-						Practica	l .								
Total M	arks	Minir	num Passing Ma	rks	Е	xternal Evaluati	on		Min. External Evalu	ation	Inte	rnal Evaluation		М	in. Internal Ev	aluation	
								•			•						
								Part E									
								Books									
								Articles									
								References B									
								MOOC Cour	ses								
								Videos									
						1		Course Articulati		1	1		_				
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	PO11	PO12	PSO1	PS	02	PSO3	



	Title of the	Course	Bioinst	umentation													
	Course	Code	SECI[T]													
								Pa	rt A								
	Ye	ar	1st				Semester		1st			Credits		L	Т	P	С
	Course	Туре				•									•	•	•
	Course C	ategory															
	Pre-Req	uisite/s		Co-Re	quisite/s												
	Course O & Bloom	utcomes 's Level															
	Coures E	lements							SDG (Go	als)							
								Pa	rt B								
	Mod	ules				Co	ontents					Pedagogy			Но	urs	
							Pa		Distribution)								
								The			1						
Total M	Marks	Mi	nimum Passing N	larks	E	xternal Evalua	tion		Min. External Evalua	ition	In	ternal Evaluation		Mi	in. Internal Eva	aluation	
								Prac			1						
Total M	Marks	Mi	nimum Passing N	larks	E	xternal Evalua	tion		Min. External Evalua	ition	In	ternal Evaluation		Mi	in. Internal Eva	aluation	
								Po	rt E								
									oks								
								Arti	cles								
								Referenc	es Books								
								MOOC	Courses								
								Vid	eos								
			1	1			_		ulation Matrix		I					T	
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PS		PSO3	



	litle of th	e Course	India in 2	1st Century													
	Course	Code	VAC II (T)													
								Part A									
	Ye	ar	1st				Semester	2nd				Credits		L	Т	P	С
	Course	Туре												•			•
	Course 0	Category															
	Pre-Rec	uisite/s		Co-Req	uisite/s												
	Course C & Bloom	utcomes 's Level															
	Coures E	lements							SDG (Ge	oals)							
								Part B									
	Modules Contents Pedagogy Hours																
Total Ma	arks	Min	imum Passing Ma	rks		External Evaluation	on	Theory M Practical	in. External Evalu	ation	Inter	nal Evaluation		Min.	Internal Eva	luation	
Total Ma	arks	Min	imum Passing Ma	rks		External Evaluation	on	М	in. External Evalu	ation	Inter	nal Evaluation		Min.	Internal Eva	luation	
								Part E Books Articles									
								References Boo	ks								
								MOOC Course	s								
								Videos									
							Co	ourse Articulation	Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	PO11	PO12	PSO1	PSO2		PSO3	



	Title of th	ie Course		Hulliall IV	iutition [1]														
	Course	e Code		VAC-III [T	7														
									F	art A									
	Ye	ar		2nd				Semest	ter	3rd				Credits		L	T	P	С
	Cours	е Туре															•	•	•
	Course (Category																	
	Pre-Rec	quisite/s			Co-Req	uisite/s													
	Course C & Bloom	Outcomes n's Level																	
	Coures E	lements								SD	Goals)								
									F	art B									
	Мо	dules						Contents					Pedago	ogy			Но	urs	
Total Ma	rks	ı	finimum P	assing Mar	rks	Е	external Eval	uation		Min. External E	valuation		Internal E	Evaluation		Min.	Internal Eva	aluation	
Total Mai	rks	1	Minimum P	assing Mar	rks	E	xternal Eval	uation		Min. External E	valuation		Internal E	Evaluation		Min.	Internal Eva	luation	
										art E									
									А	rticles									
									Refere	nces Books									
									MOO	Courses									
									v	ideos									
									Course Art	culation Matrix									
COs	PO1	PO2	PO3		PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PC	012 PS	01	PSO2		PSO3	



	Title of th	ne Course	Enviro	nmental Science													
	Course	e Code	VACI[T]													
								Par	t A								
	Ye	ear	1st				Semester		1st			Credits		L	Т	Р	С
	Course	е Туре									l .						
	Course 0	Category															
	Pre-Rec	quisite/s		Co-F	equisite/s												
	Course C & Bloom	Outcomes n's Level															
	Coures E	Elements							SDG (Goa	ıls)							
			•					Par	t B								
	Mod	dules				Co	ontents					Pedagogy			Н	ours	
							Pa	rt D(Marks	Distribution)								
								The	ory								
Total I	Marks	Minim	um Passing M	Marks	Exte	rnal Evalua	ation		Min. External Evaluat	ion		nternal Evaluation		М	lin. Internal Ev	aluation	
								Pract	tical								
Total I	Marks	Minim	um Passing M	Marks	Exte	rnal Evalua	ation		Min. External Evaluat	ion		nternal Evaluation		М	lin. Internal Ev	aluation	
								Par									
								Boo									
								Artic									
								Reference									
								MOOC C									
								Vide	90S								
CO+	DO1	PO3	003	DO4	DOE DO		Co	ourse Articu	lation Matrix	DO10	DO11	DO42	DCO1		202	DEO3	