



# THE MADURA COLLEGE

An Autonomous Institution affiliated to Madurai Kamaraj University

Re-accredited (3<sup>rd</sup> cycle) with 'A' grade by NAAC

Vidya Nagar, T.P.K. Road, Madurai – 625 011

## DEPARTMENT OF BOTANY

### Course Outcomes mapped with POs

PROGRAMME : B.Sc. (Botany)

Course Code	Course Title	CLO	Mapping of CO with PO				
			PO1	PO2	PO3	PO4	PO5
20U1TLA1	இக்கால இலக்கியம்	கவிதைகள் வெளிப்படுத்தும் மனித அன்பு, பெண்நிலைகள், மொழியின்சிறப்பு, தொழிலாளர் நிலை போன்றவற்றை அறியச் செய்தல்.	-	1	1	2	2
		கவிதைகளின் கருத்துப் பரிமாற்றம், உயர்மனிதச் செயல்பாடுகளை ஊக்குவித்து நடைமுறையில் பின்பற்றல்.	-	2	2	3	2
		கதையின் உள்ளடக்கம்,வடிவம் -மாந்தர் எண்ணம், உணர்வு, நடத்தை, சமூகப் பண்பாட்டுச் செயல்பாட்டில்- ஈடுபடுதல்.	-	3	1	-	2
		இலக்கிய வரலாற்றை நிரல்படுத்திப் படைப்பாளிகளின் அறிவுத்திறத்தில் ஈடுபடச்செய்தல்.	3	-	1	-	2
		மொழியின் சிறப்புகளைத் தொகுத்தல். படைப்பூக்கத்துடன் பிழை நீக்கித் தனித்துவமாக எழுதத் தூண்டல்.	-	-	3	-	2
20U1HLA1	Hindi 1	Use of singular, plural, numbers	-	1	1	2	2
		Use of sentences and choosing the right answer	-	2	2	3	2
		Able to translate and correct the sentences	-	3	1	-	2
		Able to write answers questions from prose	3	-	1	-	2
		Able to identify directions and seasons	-	-	3	-	2
20U1SLA1	Sanskrit I	Gain basic knowledge about Devanagari Script and understand Male/ Female/ Neuter Gender Words	-	1	1	2	2
		Identify Person/Number/Tense	-	2	2	3	2
		Know to substitute word without affecting Number / Tense/ Grammar and to enhance students attitude towards good behaviour through Subhashitani (Good says)	-	3	1	-	2
		Understand the Sanskrit Literature like Vedas, Vedangas and Epic Literature	3	-	1	-	2
		Translate from Sanskrit to English in Present / Future Tense	-	-	3	-	2

20U1NEN1	English-I	Use proper Parts of Speech while framing simple sentences	-	2	3	2	-
		Express practical skills of various types of writing dialogues and comprehend content in English	-	2	3	3	-
		Use proper tense forms in sentences and Classify kinds of sentences; convert from one type to another.	-	2	2	2	-
		Fill different challans , issue cheques, fill railway form in real life contexts and prepare advertisements on their own.	-	2	2	2	-
		Appreciate a literary work for its genre and evaluating ideas. To use language skills necessary for social,academic and professional purposes	-	2	3	3	-
20U1VEN1	Value Education and Professional Ethics	Describe the various value system and its familiarity	3	-	2	2	3
		List forty virtues and eighty values	3	-	2	2	3
		Outline the foundations on value oriented moral values	3	-	2	2	3
		Focus on relevance of various religion values and its similarities	2	-	2	2	3
		Build a value system and ethics in Education, Business and Teaching	3	2	2	2	3
20U1BMC1	Algae, Fungi and Lichens	Understand the morphological characteristics and identification of lowerplants.	2	1	3	2	3
		Discuss the classification and its application on plant identification.	2	1	2	1	3
		Explain the patterns of lifecycle and the critical stages involved in it.	2	2	2	1	1
		Critically think about the origin and evolution of lower plants.	1	3	1	1	2
		Utilize the plant resources for the betterment of living organisms.	1	3	1	3	1
20U1BMC2	Bryophytes and Pteridophytes	Comprehend the vegetative and reproductive structure of primitive landplants.	3	2	2	1	3
		Understand the concepts of classification and their necessity.	3	1	3	2	1
		Explain the critical stage of plant lifecycle	2	1	2	1	2
		Compare the morphology across plant divisions.	2	3	3	3	1
		Use the knowledge for utilization and conservation aspects.	1	2	1	2	3
20U1BMP1	Major Practical I	Analyze the morphology, anatomy and reproductive structures of Algae,Fungi and Lichens.	3	2	3	3	3
		Examine the morphology, anatomy and reproductive characters in bryophytes and pteridophytes.	3	2	3	1	2
		Demonstrate the anatomy and embryology of vascular plants.	2	3	1	2	3
		Identify the characteristic features of gymnosperms both living and fossiltaxa.	2	1	2	1	2
		Acquired the knowledge on fossil and fossilization process to explorebioresources.	1	1	1	1	1
20U1CAC1	Ancillary Chemistry - I	To discuss atomic models, and occupancy of electrons on various quantum levels.	3	2	-	-	-

		To develop the overlapping of orbitals and hybridization of simple molecules	3	2	-	-	-
		To find the importance of organic compounds in daily life and to describe the types of organic reactions	3	2	-	-	-
		To inspect the types of adsorption and factors affecting the process	3	2	-	-	-
		To the characteristics of catalyst and to explicate the types of catalysis	3	2	-	-	-
<b>20U1CAP1</b>	<b>Volumetric analysis</b>	To get domain knowledge in estimation of inorganic compounds	3	2	-	-	-
		To design the basic laboratory techniques of volumetric analysis	3	2	-	-	-
		To develop the skills for doing any titrations and recording data	3	2	-	-	-
		To make scientific claims that is supported by their data and other observations	3	2	-	-	-
		To communicate the finding	3	2	2	2	-
<b>20U2TLA2</b>	<b>இடைக்கால இலக்கியமும் உரைநடையும்</b>	சுற்றிலக்கியங்கள் குறித்த அடிப்படைக் கருத்துகளைப் பெறுவர்.	1	-	3	-	2
		பக்தி இலக்கியங்கள் வெளிப்படுத்தும் சமயம் சார்ந்த செய்திகளைப் புரிவர்.	-	-	2	-	3
		சைவ வைணவ சித்தாந்த இறை தத்துவக் கருத்துகளைத் தெரிந்து நடைமுறைப்படுத்திக்கொள்வர்.	1	-	3	1	2
		இலக்கிய வரலாறு தரும் வாழ்வியல் கருத்துகளைப் பொருத்திப் பார்க்கும் திறன் பெறுவர்.	2	1	3	1	3
		மொழியின் நுட்பங்களின் மூலமாக ஆளுமைத் திறனை வளர்த்துக் கொள்வர்.	-	-	3	1	1
<b>20U2HLA2</b>	<b>Hindi 2</b>	Write stories and draft letter	1	-	3	-	2
		Use of proverbs and phrases in communication	-	-	2	-	3
		Learning morals from great Indian leaders	1	-	3	1	2
		Writing essays with creativity	2	1	3	1	3
		Using proverbs in speech and having knowledge of days in Hindi	-	-	3	1	1
<b>20U2SLA2</b>	<b>Sanskrit II</b>	Gain basic knowledge about the origin of Sanskrit Kavya Literature	1	-	3	-	2
		Understand Sanskrit Poetic Literature and Style of Writing Poems	-	-	2	-	3
		Compare Poetic Literature with Modern Life and to classify and discuss the importance of early literature	1	-	3	1	2
		Practice creativity and demonstrate different aspects of life as portrayed in Sanskrit Literature	2	1	3	1	3
		Learn Sanskrit Bhakti Literature and Tamil Chemmozhi Literature at basic levels	-	-	3	1	1
<b>20U2NENF2</b>	<b>English-II</b>	Use linkers to compose a coherent paragraph and to examine language skills through core subjects	-	2	3	2	-

		Use singular, plural, present and past tenses. 'will' and 'going to' to engage in meaningful conversations and writing tasks	-	2	3	3	-
		Classify appropriate pronunciation for "c" as "s", "k" and "ch" and classify letters / sound "p, b, th, v, w, tion" appropriately.	-	2	2	2	-
		Demonstrate practical skills of various types of media writing and reports Use appropriate expressions, ask for favor, offer suggestions and engage in meaningful telephonic conversations	-	2	2	2	-
		Appreciate a literary work for its genre and evaluating ideas.	-	2	3	3	-
<b>20U2EVS1</b>	<b>Environmental Science &amp; Gender studies</b>	Able to list out various ecosystems and their interactions	2	-	-	1	3
		To appreciate the nuances behind food webs and food chains	2	-	2	1	3
		Able to differentiate the importance of Hotspots and mega diversity centres.	2	3	-	1	3
		Able to identify different types of pollutions and provide solutions	2	-	-	3	3
		To analyze and identify the behavioral problems among student community with reference to gender.	2	3	-	3	3
<b>20U2BMC3</b>	<b>Gymnosperms and Palaeobotany</b>	Understand the concept of identification, classification and economic importance of Gymnosperms and fossils	3	3	2	3	2
		Analyze the phylogeny of Gymnosperms	3	3	2	3	3
		Recall the structure and life cycle of cycadales	2	2	1	-	2
		Critically analyze the structure and reproduction in conifers and Gnetales	1	1	2	2	1
		Evaluate the concepts of geological time scale and fossilization processes	1	1	1	2	1
<b>20U2BMC4</b>	<b>Plant Anatomy and Embryology</b>	Develop and understanding of concepts and fundamentals of plant anatomy.	3	1	3	2	3
		Examine the internal anatomy of plant systems and organs.	2	3	2	3	2
		Develop critical understanding on the evolution on concepts of organizations of shoot and root apex.	2	3	2	3	1
		Analyze the composition of different parts of plants and their relationships.	1	3	2	1	1
		Critically analyze the development of male and female reproductive system and their functions.	1	1	1	1	1
<b>20U2BMP2</b>	<b>Major Practical -II</b>	Analyze the morphology, anatomy and reproductive structures of Algae, Fungi and Lichens.	3	2	3	3	3
		Examine the morphology, anatomy and reproductive characters in bryophytes and pteridophytes.	3	2	3	1	2
		Demonstrate the anatomy and embryology of vascular plants.	2	3	1	2	3
		Identify the characteristic features of gymnosperms both living and fossil taxa.	2	1	2	1	2
		Acquired the knowledge on fossil and fossilization process to explore bioresources.	1	1	1	1	1

20U2CAC2	Allied Chemistry – II	To explain the applications of common ion effect and buffer action	3	2	-	-	-
		To indicate structure of carbohydrates and figure out the configuration of glucose	3	2	-	-	-
		To describe the preparation, properties and uses of glycine and alanine	3	2	-	-	-
		To classify proteins, vitamins and to explain the sources, functions and deficiency of vitamins A, B, C, D, E & K and to identify the role of various elements in plant growth	3	2	-	-	-
		To explain the types of polymers, corrosion and its control	3	2	-	-	-
20U2CAP2	Semi-micro qualitative analysis	To demonstrate the basic laboratory techniques of qualitative analysis.	3	2	-	-	-
		To demonstrate mastery of basic semi-micro qualitative analysis of simple salts containing one anion and one cation.	3	2	-	-	-
		To identify the interfering acid radical, eliminate interfering anion and to perform a systematic analysis	3	2	-	-	-
		To systematically analyse the general group cations.	3	2	-	-	-
		To infer analytical data and make scientific claims that is supported by their results and other observations.	3	2	2	2	1
20U2NCC1	Introduction to NCC	Understand the structure, organization of NCC and armed forces.	2	1	1	2	2
		Develop leadership qualities and general knowledge from current affairs.	2	1	1	1	2
		Involve in social service activities and act in the emergency situation.	2	1	1	2	1
		Develop qualities like character, comradeship and discipline through regular training and field work.	2	1	1	1	2
		Improve secular outlook, spirit of adventure, ethics and ideals of selfless service.	2	1	1	1	2
20U2NPN	Introduction to National Service Scheme	To understand the aims and principles of NSS , the duties and responsibilities of an NSS volunteer to the society.	2	1	2	3	3
		To know the administrative structure of NSS, its plans and its execution.	2	1	2	3	3
		To acquire leadership qualities and democratic attitudes through the participation in various social activities	2	1	2	3	3
		To aid in character building and develop qualities like comradeship and discipline through regular training and field work.	2	1	2	3	3
		To develop the spirit of humanity and ideals of selfless service.	2	1	2	3	3
20U2YRC1	Introduction to Youth Red Cross	Equip to conduct social and health awareness programmes.	2	1	1	2	3
		Making awareness regarding red cross service and social activities	2	1	1	2	3

		Encourage and to youth members and other students to contribute in red cross activities.	2	1	1	2	3
		Develop qualities like compassion, kindness and caring sense through regular training and field work.	2	1	1	2	3
		Improve kind heartedness, spirit of humanity and ideals of selfless red cross service	2	1	1	2	3
20U2PED1	History of Physical Education	Know physical education in national and international level.	2	1	1	2	2
		Understand ancient Olympics, modern Olympics, first aid and yoga	2	1	1	1	2
		Comprehend games rules and ground measurements	2	1	1	2	1
		Develop their physique in good shape through regular work outs and exercises.	2	1	1	1	2
		Realize the need of physical education.	2	1	1	1	2
20U3TLA3	காப்பிய இலக்கியமும் நாவலும்	மனித அறம், அன்பு, செய்ந்நன்றி போன்றவற்றை அறியச் செய்தல்.	-	1	1	2	2
		அற மனப்பாங்கினை ஊக்குவித்துப் பின்பற்றல்.	-	2	2	3	2
		மனித அறம், பத்தி, உதவி செய்யும் மனப்பான்மை போன்றவற்றில் ஈடுபடுதல்.	-	3	1	-	2
		காவிய ஆசிரியர்களின் படைப்புதிறனை வெளிப்படுத்த வடிவ அமைப்பினை விளக்கி ஈடுபடச் செய்தல்.	3	-	1	-	2
		படைப்பின் பல் வடிவங்களை விளக்கிப் படைப்பாக்கத்தினை வெளிக் கொணரல்.	-	-	3	-	2
20U3HLA3	Hindi 3	Identify noun, pronoun and adjective in sentences	-	1	1	2	2
		Examine how a text interacts with a reader in the reading process for meaning and interpretation	-	2	2	3	2
		Classify rhymes, beats, sound pattern in a poem	-	3	1	-	2
		Explain various aspects of storytelling in terms of plot, character and form in One Act play	3	-	1	-	2
		Write simple sentences without committing errors of spelling and grammar	-	-	3	-	2
20U3SLA3	Sanskrit III	Gain knowledge of Indian Tradition through the origin of Popular Sanskrit Tales and Fables	-	1	1	2	2
		Achieve Moral Values through Sanskrit Fables – Pancatantra	-	2	2	3	2
		Comprehend Sanskrit Poetic Literature, Style of Writing Poems and Know the deepness of Indian Sanskrit Prose Literature	-	3	1	-	2
		Understand the Sanskrit Prosody through Alankaras	3	-	1	-	2
		Learn Sanskrit Prose Literature and Style of Writing Prose	-	-	3	-	2
20U3NENF3	English-III	Discover the deviant use of English both in written and spoken forms	-	2	3	2	-
		Explain the need for reference/study skills Make/take notes systematically in an organized manner	-	2	3	3	-

		Choose language for speaking with confidence in an intelligible and acceptable manner	-	2	2	2	-
		Develop an interest for reading and read independently unfamiliar texts with comprehension	-	2	2	2	-
		Examine and analyze a genre on their own	-	2	3	3	-
<b>20U3BMC5</b>	<b>Morphology and Taxonomy of Angiosperms</b>	The vegetative and reproductive morphology of angiosperms	3	3	2	1	1
		The artificial, natural and modern systems of classifications	3	1	3	2	2
		The ICN principles and modern methods of plant identification	2	2	2	3	3
		The morphological description and illustration of selected dicotyledonous families	3	3	3	2	2
		The morphological description and illustration of selected dicotyledonous and monocotyledonous families	1	2	1	2	2
<b>20U3BSM1</b>	<b>Horticulture</b>	Identify and classify the major divisions of horticulture and demonstrate the various types of gardens	3	2	2	2	3
		Demonstrate and apply the plant propagation methods to multiply stocks of vegetable, fruit and ornamental crops	3	2	2	2	3
		Identify the appropriate garden maintenance procedure (after care of plants) and apply the same suitably in different seasons	3	2	2	2	3
		Recall and demonstrate the techniques in floriculture and value addition to the yield	3	2	2	2	3
		Discuss, illustrate and design ornamental gardens for modern society	3	2	2	3	3
<b>20U3BSM1</b>	<b>Biofertilizers</b>	Understand the various concepts of biofertilizers.	2	3	1	2	3
		Explain the method of crop field application.	1	2	1	2	3
		Knowledge of the principles and practices of organic agriculture and its role in sustainable crop production.	1	2	1	1	3
		Inculcate biofertilizer preparation and get a train in formulating biofertilizer.	2	3	1	2	3
		Explore knowledge of the eco-friendly approach in farming.	2	3	1	2	3
<b>20U3BMP3</b>	<b>Major Practical -III</b>	The morphological aspects of various plant parts	3	2	2	2	1
		The dissection of the floral parts of dicotyledonous families and study their reproductive structures	3	3	3	3	3
		The dissection of the floral parts of monocotyledonous families and study their reproductive structures	3	3	3	3	3
		The utilization of economically important plants in daily life	2	2	2	2	2
		The preparation and maintenance of herbarium sheets	1	2	1	1	3
<b>20U3ZAC1</b>	<b>Essentials of Invertebrates &amp; Chordates</b>	Understand the systems of classification and nomenclature for animals.	2	2	1	2	2
		Predict the adaptations of animals with their mode of life.	2	2	2	3	
		Apply the knowledge to identify evolutionary relationship among Invertebrates and Chordates.	3	3	2	2	2

		Investigate the relations between unique behaviours of animals with their habitat.	1	3	2	3	3
		Examine the role of Invertebrate and Chordates in biological communities and ecological interactions.	2	2	3	3	2
20U3ZAP1	Zoology Ancillary Practical – I	Describe the diversity of Invertebrates and Chordates.	2	2	2	2	3
		Explain the structure and functions of the organism.	2	2	2	3	2
		Classify and identify the Invertebrate and Chordate fauna based on their unique characters.	2	3	2	3	2
		Examine the organs/systems and their role in Invertebrate and Chordates.	2	3	2	3	2
		Inspect the role of Invertebrates and Chordates in biological communities and ecological interactions.	3	3	2	3	2
20U4TLA4	பண்டைய இலக்கியமும் நாடகமும்	பண்டையகால மக்களின் அகம் மற்றும் புறம் சார்ந்த வாழ்வியல் நிலைகளை அறியச்செய்தல்.	-	1	1	2	2
		தனிமனித அறம், பொது அறம் ஆகியவற்றை நீதிநூல்களின் வாயிலாக அறியச்செய்தல்.	-	2	2	3	2
		நாடகம் தொடர்புடைய சிந்தனைகள், உணர்வுகள், உள்ளடக்கம், நடை போன்றவற்றைப் புரியவைத்தல். நாடகம் நடிக்கப் பழக்குதல்.	-	3	1	-	2
		தமிழ் இலக்கிய வரலாற்றையும் பண்பாட்டையும் அறியச்செய்தல்.	3	-	1	-	2
		மொழியின் சிறப்புகளுடன், அகப்பொருள் மற்றும் புறப்பொருள்களின் திணை, துறைகளை அறியச்செய்தல்.	-	-	3	-	2
20U4HLA4	Hindi 4	Apply speak, read and write Hindi at the basic level.	-	1	1	2	2
		Identify rhyme, beats, sound pattern in a poem.	-	2	2	3	2
		Analyse novel closely, paying attention to linguistic and stylistic variations.	-	3	1	-	2
		Use language for speaking with confidence in an Acceptable manner	3	-	1	-	2
		Write simple sentences without committing errors of grammar	-	-	3	-	2
20U4SLA4	Sanskrit IV	Learn about the Origin of Indian Sanskrit Drama Literature	-	1	1	2	2
		Achieve Moral Values through Indian Sanskrit Drama Literature – Karnabharam	-	2	2	3	2
		Realize Sanskrit drama Literature, method of Writing Dramas and the depth of Indian Sanskrit Drama Literature	-	3	1	-	2
		Understand the importance and role of Sanskrit drama Literature and know great Dramatists	3	-	1	-	2
		Learn Ethical Values of Human Life through Various Authors and their Dramas	-	-	3	-	2
20U4NEN4	English-IV	Examine their own ability to improve their own competence in using the language and Show their learnt useful interpersonal soft skills.	-	2	3	2	-



		Re-state a piece of text either orally or in writing with learnt soft skills	-	2	3	3	-
		Apply their useful creative skill in writing like CVs, drafting and reading	-	2	2	2	-
		Investigate the importance of writing in academic life, analyze graphs, charts, grids and other visual supports to understand a text.	-	2	2	2	-
		Apply connecting ideas to continue discussions and apply diagrammatic information – interpretations maps, graphs, pie-charts and note-taking. Communicate with others effectively.	-	2	3	3	-
<b>20U4BMC6</b>	<b>Cell Biology and Biochemistry</b>	Describe the cell and cell theory, ultra-structure of pro and eukaryotic cells, plant cell and its organelles	2	2	3	3	3
		Analyse, relate and compare the extra nuclear genome and their significance	2	3	3	3	3
		Explain and justify the cell cycle, cell divisions and significance	2	2	3	3	2
		Outline, explain, compare and differentiate the structure of an atom, and chemical bonds	2	2	2	2	2
		Identify, describe and differentiate the structure, properties and biological significance of biomolecules namely carbohydrates, proteins and lipids. Discuss and organise their thought on the enzymes, their importance and enzyme action.	3	3	3	1	3
<b>20U4ZAC2</b>	<b>Human Physiology, Microbiology &amp; Immunology</b>	Describe the structure and functions of specific organs in human.	2	3	2	3	2
		Explain the structure and functions of human physiological systems.	2	2	2	2	3
		Classify the types of culture medium, sterilization, handling, identification and assessing growth characters of microorganisms.	2	3	1	3	3
		Compare and contrast various microbial diseases, the causative organisms, symptoms and their preventive measures.	2	3	2	3	2
		Inspect the types of immunity and cellular components involved in immune response.	2	3	2	3	3
<b>20U4ZAP2</b>	<b>Zoology Ancillary Practical – II</b>	Understand the basic facts of animal physiology.	2	2	1	2	1
		Describe the structure and functions of the immune system.	2	2	2	1	2
		Apply the knowledge to identify and assess the microorganisms.	2	2	1	3	2
		Analyse the human blood groups and their functions and significance.	3	2	2	2	1
		Examine the role of immune system and cellular and molecular basis of immune response.	3	2	3	3	3
<b>20U4BSM2</b>	<b>Organic Farming</b>	Acquire familiarity on the various properties of soil	3	2	1	3	1
		Develop entrepreneur skills to practice organic farming	3	3	2	3	2

		Comprehend management practices suitable for organic farming	2	2	1	3	3
		Explore knowledge on the use of biofertilizers for crop improvement	3	2	3	3	2
		Understand the marketing and quality control aspects of organic products	3	3	3	3	3
<b>20U4BSM2</b>	<b>Biological Techniques</b>	Understand the working principles and components of various microscopy and microtome.	3	3	3	3	2
		Familiarize the knowledge on standard methodologies followed in colorimetry and photometry	3	3	2	3	2
		Demonstrate the operation protocols in most frequently used chromatography used in research studies.	3	3	1	1	2
		Evaluate the advanced scientific significances of electrophoresis.	2	1	2	1	1
		Synthesize by develop unique skills by hands-on-training on various centrifugation techniques.	3	3	3	2	1
<b>20U4BMP4</b>	<b>Major Practical IV</b>	The structure of plant cell types	3	3	1	2	2
		The extra nuclear genome structures	3	3	2	2	3
		Identify and record the cell structure and cell organelles	3	3	3	3	2
		Illustrate the cell division	2	2	2	2	3
		Estimate and distinguish the biomolecules	1	2	2	3	2
<b>20U4NCC2</b>	<b>Field Training in NCC</b>	Understand the geography, important world organizations and will do various drills with & without arms.	2	2	1	2	2
		Read maps and related sign systems.	2	1	1	2	1
		Comprehend the types of weapons, field crafts and battle crafts.	2	1	1	2	2
		Develop qualities like character, comradeship and discipline through regular training and field work.	2	1	1	1	2
		Improve secular outlook, spirit of adventure, ethics and ideals of selfless service.	2	1	1	1	2
<b>20U4NPN</b>	<b>Community Services</b>	To provide an opportunity to become responsible members of the society by taking part in community service.	2	2	1	3	2
		To enable students acquire life skills and knowledge, through the involvement in environmental awareness activities	2	2	1	3	2
		To understand gender difference and learn to give equal respect to members of the opposite gender, develop service spirit and participate collectively in community programmes.	2	2	1	3	2
		To develop qualities like compassion, kindness and caring sense through regular training and field work in health awareness programmes.	2	2	1	3	2
		To become responsible citizens with a sound knowledge of the Indian Constitution and Fundamental Rights and be prepared for selfless service to the community.	2	2	1	3	2
<b>20U4YRC4</b>		Equip to conduct social and health awareness programmes.	2	1	1	2	3

	<b>Introduction to Youth Red Cross</b>	Making awareness regarding red cross service and social activities	2	1	1	2	3
		Encourage and to youth members and other students to contribute in red cross activities.	2	1	1	2	3
		Develop qualities like compassion, kindness and caring sense through regular training and field work.	2	1	1	2	3
		Improve kind heartedness, spirit of humanity and ideals of selfless red cross service	2	1	1	2	3
<b>20U4PED2</b>	<b>Physical Education and Games</b>	Understand the meaning, benefits and essentials of yoga and meditation.	2	1	1	2	2
		Maintain good physical and mental health by doing exercises, yoga and by taking nutritive foods.	2	1	1	1	2
		Know the rules and regulations of games like boxing, fencing, judo, basketball, cricket, hockey.	2	1	1	2	1
		Develop their physique in good shape through regular work outs and exercises.	2	1	1	1	2
		Realize the need of physical education.	2	1	1	1	2
<b>20U5BSM3</b>	<b>Mushroom Cultivation</b>	Describe the mushroom and assess their use for human consumption.	3	1	3	2	3
		Gain knowledge about economic uses of mushroom	2	3	2	3	2
		Compare the uses of mushroom for materials, health and pleasure.	2	3	2	3	1
		Apply the medicinal value of the mushroom	1	3	2	1	1
		Utilization of mushroom in industries	1	1	1	1	1
<b>20U5BSM3</b>	<b>Algal Technology</b>	Describe the algae and assess their use for human consumption.	3	1	3	2	3
		Gain knowledge about economic uses of algae.	2	3	2	3	2
		Compare the uses of algae for materials, human health and pleasure.	2	3	2	3	1
		Apply the algae genomics and immobilization.	1	3	2	1	1
		Utilization of algae in environmental health.	1	1	1	1	1
<b>20U5BMC7</b>	<b>Plant Physiology</b>	Properties of water, water phenomena, mechanisms of water absorption and transpiration	2	2	1	1	1
		The significance of nutrients in plants, mechanisms of mineral transport and solute translocation.	2	2	1	1	1
		The carbon and nitrogen metabolism	2	2	1	1	1
		The respiration and its pathways	2	2	1	1	1
		Role of hormones in many growth and development processes	2	2	1	1	1
<b>20U5BMC8</b>	<b>Genetics and Biostatistics</b>	Concept, scope and importance of Genetics.	3	-	3	2	3
		Polygenic/qualitative inheritance with examples.	2	3	2	3	2
		Population genetics and sex-linked inheritance.	2	3	2	3	1
		Introduction, concept and significance of Biostatistics.	1	3	2	1	1
		Application of biostatistics.	1	1	1	1	1

<b>20U5BMC9</b>	<b>Ecology and Biodiversity</b>	The ecosystem, its components and the interaction of biotic and abiotic factors along with the stability of the ecosystem through organic and inorganic nutrient cycling.	3	2	2	3	2
		The energy flow in the ecosystem and various types of ecosystems and their successions and how their lifestyle and well-being are interconnected with those of diverse producers and consumers around the world, including impoverished communities.	3	2	2	3	1
		The Current Environmental Issues and predict how human activities may alter the effects of these forces, and reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.	3	2	3	2	2
		How the natural resources are used to produce what they consume, such as the food they eat, the water they drink, and the energy they use and conserve the same by applying ecological principles.	3	1	3	3	1
		The data to explain phytogeographic patterns of India, how the present-day continents have emerged, types of Endemism, Characters of Endemism and Factors influencing Endemism.	2	1	2	2	1
<b>20U5BMP5</b>	<b>Practical – V</b>	The experiments on water potential related phenomena	2	2	1	1	1
		The experiments to determine the rate of photosynthesis	2	2	1	1	1
		The procedure to determine the membrane permeability	2	2	1	1	1
		The technique of separation of plant pigments	2	1	1	1	1
		The physiological setups, images and graphs of physiological interest	1	1	1	1	1
<b>20U5BMP6</b>	<b>Practical – VI</b>	Students will be able to know, understand, apply and analyze the adaptations of plant groups	3	3	3	3	3
		The information to infer the various plant groups and their abundance	1	2	2	2	2
		The phytogeographical information	2	2	2	2	2
		The genetics problems related to the concepts provided in the theory paper	1	1	2	2	3
		Statistical aspects					
<b>20U5BIDC</b>	<b>Molecular Biology</b>	The structure, properties and various forms of DNA	3	3	2	3	1
		The DNA replication mechanism in prokaryotes	3	3	3	2	2
		The central dogma of life and RNA synthesis	3	3	2	2	2
		The genetic code and various steps in protein synthesis	3	3	2	2	2
		The general principles of gene regulation in prokaryotes	3	3	3	2	3
<b>20U5BME1</b>	<b>Nanobiology</b>	Concept, scope and importance of Nanoscience and Nanotechnology.	3	3	2	3	1

		Techniques to analyze bionanomaterials by SEM, TEM, UV-FTIR and XRD.	3	3	3	2	2
		Nanocarriers for drug delivery.	3	3	2	2	2
		Nanotechnology in fertilizers.	3	3	2	2	2
		Role of nano materials for environmental applications.	3	3	3	2	3
20U5BME2	Plant Breeding and Evolution	Understanding the various concept of plant breeding	3	3	3	3	2
		Explain the method of breeding and its application	2	3	2	3	2
		Application of tissue culture techniques in plant breeding	3	3	1	1	2
		Gain knowledge about various concept of Evolution	3	1	2	1	2
		Understanding the various patterns of evolution.	2	3	3	2	1
20U5BME2	Climate Change	To demonstrate understanding of the changing climate.	3	2	2	1	2
		To understand the interaction of atmosphere, climate and ecosystem.	2	2	2	1	2
		To examine the technological interventions for mitigating the climate change impacts.	3	3	1	1	2
		To make student awareness scenario of climate change	1	1	1	1	1
		To comprehend the carbon credits and carbon economics	1	1	3	2	1
20U6BSM4	Environmental Impact Assessment	The principles, purposes and involvement of EIA	2	2	2	2	2
		The EIA management and processes	2	2	2	2	2
		The techniques of EIA	2	2	2	2	2
		The public consultation and guidelines of EIA	2	2	2	2	2
		The new approaches and EIA India 2020	2	2	2	2	2
20U6BSM4	Renewable Energy	The facts and types of alternative energy resources	2	2	2	2	2
		The principles and methods of harnessing solar and wind energy	2	2	2	2	2
		The hydro and tidal energy	2	2	2	2	2
		The advantages and disadvantages of geothermal and bioenergy	2	2	2	2	2
		The approaches to the nuclear energy	2	2	2	2	2
20U6BMC10	Microbiology and Plant Pathology	The characteristics of bacteria, viruses and mycoplasma	1	2	2	1	1
		The control of microorganisms by various methods	2	1	2	1	1
		The utilization of microorganism in different industrial purposes	2	2	3	3	2
		The concept of plant pathology and plant diseases.	1	1	2	2	2
		The principles of plant disease management and their advantages	2	2	1	3	2
20U6BMC11	Biotechnology	Understand the basic concepts of <i>in vitro</i> plant regeneration techniques. Knowledge on different methods of micropropagation.	3	3	2	1	1
		Exposure on transgenic plants, herbicide, pest, fungal resistant and goldenrice and flavr savr tomato.	3	3	2	1	1
		Knowledge on biodegradation, bioremediation of marine oil spills, groundwater and land. Bioleaching, biofilms and methane production.	2	1	1	3	2

		Genetic improvement of microbial strains, batch culture, stages indownstream processing. Enzyme immobilization and biosensors.	1	1	2	1	1
		Understand the cloning of insulin gene, vaccines and its types, recombinant vaccines, hybridoma technology, DNA fingerprinting and gene therapy.	2	2	1	1	1
20U6BMC12	Genomics and Bioinformatics	The basic computer literacy and its role in bioinformatics	3	3	3	3	3
		The concept of genomics and its applications	3	3	2	2	3
		The information from biological databases available on the internet	2	3	2	1	3
		The tools used in bioinformatics for solving biological problems	2	3	2	1	3
		The elementary prediction of protein structure and function	2	2	3	2	3
20U6BMP7	Major Practical-VII	Students will be able to know, understand, apply, and analyse the stainingproperties and classification of bacteria	2	1	2	2	3
		The sterilization and microbial removal mechanisms for pure culture andwith microbial control agents.	3	2	2	2	2
		The knowledge on useful and harmful microorganisms with microbialproduction of value-added fermented products.	1	3	3	2	3
		The observation skills on pathological symptoms and causal organisms.	3	2	2	3	3
		The prepare the control measure for suitable pathological organisms by identification of plant diseases.					
20U6BMP8	Major Practical VIII	To understand the methodologies of plant tissue culture techniques	3	3	1	1	2
		To inculcate knowledge on isolation of genomic and plasmid DNA	2	2	2	1	1
		To familiarize DNA isolation and <i>Agrobacterium</i> plant transformation	2	1	2	3	2
		The basic components of computer and MS office	2	3	2	1	3
		The biological databases, sequence analysis and structure prediction	1	2	3	2	3
21U6BME3	Plant Genetic Engineering	To understand the basics of gene cloning, role of enzymes and vectors forgenetic engineering.	3	3	3	3	3
		To study PCR technique in medical and forensic science.	3	3	2	2	3
		To gain knowledge on diagnosis of Covid 19 and its variants using RTPCR.	2	3	2	1	3
		To inculcate the knowledge on blotting techniques	2	3	2	1	3
		Construction of c DNA and genomic library	2	2	3	2	3
20U6BME3	Bioprocess Technology	Identify and classify bioreactor components and various culture techniques.	3	2	3	1	2
		Discuss, illustrate the design, types and functions of bioreactors.	3	2	2	1	2

		Identify and familiarize the bioprocess control and monitoring of bioreactors.	3	2	2	2	1
		Recall and demonstrate the immobilization of cells for large scale production of useful products.	2	1	1	2	1
		Demonstrate and apply the downstream processing using microbial cells.	2	1	1	2	1
<b>20U6BME4</b>	<b>Ethnobotany and Pharmacognosy</b>	Explore importance ethnic knowledge on the uses of herbal plants.	3	3	3	3	2
		Document life style and traditional practices of the above tribes.	3	3	2	3	2
		Gain awareness on the commercial significance of traditional knowledge and benefit sharing mechanisms.	3	3	1	1	2
		Evaluate the scientific screening of medicinal plant for its purity of drugs and chemical principles	2	1	2	1	2
		Classify drugs and its vital importance in modern medicine,	3	3	3	2	1
<b>20U6BME4</b>	<b>Pharmacology &amp; Phytochemistry</b>	Concept, scope and importance of Pharmacology	3	3	3	3	2
		Pharmacological action of plant drugs.	3	3	2	3	2
		Phytochemistry of plant drugs.	3	3	1	1	2
		Plant products for alkaloid and phenolic constituents.	2	1	2	1	2
		Extraction methods for phytochemical screening	3	3	3	2	1

  
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