



THE MADURA COLLEGE

An Autonomous Institution affiliated to Madurai Kamaraj University

Re-accredited (3rd cycle) with 'A' grade by NAAC

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

DEPARTMENT OF MICROBIOLOGY

Course Outcomes mapped with POs

PROGRAMME : B.Sc. (Microbiology)

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
20U1LAC1	Concepts in Biotechnology	Relate tools and methods used in biotechnology	3	2	2	3	2
		Identify various types fermenters and fermentation process	3	2	2	2	2
		Dissect strategies and applications of animal and plant biotechnology	3	2	3	2	2
		Analyse significance of biotechnological principles in environmental protection	3	2	3	2	2
		Explain the patenting process and elaborate ethics related to biotechnology	3	3	3	2	2
20U1LAP1	Lab in Biotechnology-I	Demonstrate techniques to construct recombinant DNA	3	2	3	2	2
		Correlate the results and develop critical thinking skills	3	2	2	2	2
		Apply biotechnological concepts to develop 100% techniques	3	2	3	2	2
		Solve the problem associated with disease diagnosis strategies	3	2	3	2	2
		Elaborate principle behind the analytical methods	3	3	3	2	2
20U1RMC1	General Microbiology	Outline the contribution of different scientists in the development of microbiology.	1	1	1	1	1
		Define the basic concept in the field of microbiology	2	1	1	1	1
		Predict the different physiological adaptations during sporulation	2	2	1	1	1
		Interpret the structure & reproduction of bacteria , fungi, algae, protozoa	2	2	1	2	2
		Specify general characters and determine mode of action of various antimicrobial agents	3	2	2	2	2
20U1RMC2	Basic Techniques in Microbiology	Explain the principles and types of microscopes and staining techniques	2	1	1	2	1
		Elaborate various physical and chemical means of sterilization	1	2	1	1	2
		Prepare various culture media and microbial techniques for isolation of pure cultures of microorganisms	2	2	1	1	1

		Determine the different growth phases, growth kinetics and physiological adaptations of bacteria	3	2	2	1	1
		Categorize the principles and applications of the various instruments used in biology	3	2	2	2	1
20U1RMP1	Practical - I	Define the principles and application of instruments associated with microbiology.	2	2	3	1	2
		Describe the various methods for microbial control	1	3	1	1	2
		Elaborate the concepts of microbial cells in terms of growth, division, specialization, motility and interaction.	1	2	3	2	2
		Isolate and identify mutant colonies.	2	3	1	1	2
		Illustrate the mechanism of mitosis and meiosis. Isolate and estimate the genomic from bacterial cells.	1	2	1	1	2
20U2TLA2	இடைக்கால இலக்கியமும் உரைநடையும்	சிறுநிலக்கியங்கள் 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
20U2HLA2	Hindi 2	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
20U2SLA2	Sanskrit II	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
20U2NENF2	English-II	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	-
20U2EVS1	Environmental Science & Gender studies	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
20U2LAC2	Biotechnology in Human Welfare	Identify biological compounds produced using bioreactors in industries	3	2	2	2	2
		Plan strategies for the development of transgenic plants and animals	3	1	2	2	2
		Analyse various organisms for degradation waste in the environment	3	2	2	2	2
		Describe DNA based technologies for diseases diagnostic and treatment	3	2	2	2	2
		Survey 100% therapy methods and vaccines against various diseases	3	2	3	2	2
20U2LAP2	Lab in Biotechnology-II	Demonstrate the fermentation process	3	2	3	2	2
		Correlate the role of plant hormones in plant tissue culture	3	2	2	2	2
		Apply various techniques to isolate microbes	3	2	3	2	2
		Solve the problem associated with genetic disorders	3	2	3	2	2
		Elaborate principle behind the transgenesis	3	3	3	2	2
20U2RMC3	Microbial Taxonomy	Define the criteria used for classification of bacteria, fungi, algae and viruses.	1	2	2	1	3
		Discuss the pros and cons of various classification methods and Classify bacteria	1	2	1	2	2
		Discuss the characteristics used in nomenclature and classification of fungi with suitable examples.	2	1	3	1	3
		Compare and contrast the methods of classification of algae, structural organization and economic importance of algae.	2	1	3	1	3
		Analyse the various characteristics used in nomenclature and classification of animal, plant viruses and bacteriophage.	1	1	3	3	3
20U2RMC4	Cell and Molecular Biology	Explain the structure and functions of cell, cell organelles, biological membranes and intercellular communication	2	2	3	1	2
		Appraise the concepts of cells in terms of growth, division and gather an extempore knowledge on different phases of cell cycle	1	3	1	1	2

		Analyse the molecular basis of DNA replication and modes	1	2	3	2	2
		Interpret the transcription process of prokaryotic genomes	2	3	1	1	2
		Elaborate the process of translation in prokaryotes and eukaryotes.	1	2	3	3	2
20U2RMP2	Practical - II	Familiarize with the basic techniques associated with microbial taxonomy	2	2	3	2	2
		Develop and apply the protocols for basic experimental work in the field of cell and molecular biology	2	3	2	2	3
		Outline the most significant molecular and cell based methods used today to extend their knowledge of biology	3	2	3	3	2
		Illustrate the stages of mitosis and meiosis	2	3	2	2	3
		Isolate the genomic and plasmid DNA from bacteria.	2	2	2	2	2
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		மனித அறம், அன்பு, செய்ந்நன்றி போன்றவற்றை அறியச் செய்தல்.	-	1	1	2	2

	காப்பிய இலக்கியமும் நாவலும்	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	-
20U3CAC1	Allied Chemistry I	To discuss atomic models, and occupancy of electrons on various quantum levels.	3	2	2	1	1
		To illustrate the overlapping of orbitals and hybridization of simple molecules	3	2	2	-	1
		To find the importance of organic compounds in daily life and to describe the types of organic reactions	3	2	1	1	-
		To inspect the types of adsorption and factors affecting the process	3	2	1	2	1
		To identify the characteristics of catalyst and to explicate the types of catalysis	3	2	1	1	2

20U3CAP1	Volumetric analysis	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	-
20U3RSM1	Cosmetic Microbiology	Outline the history, need and scope of microbiology and microbial limits on cosmetic products.	2	2	3	2	2
		Explain the need of HACCP protocol in manufacturing cosmetics	2	2	3	2	2
		Determine Microorganisms in Cosmetics using various testing methods	2	3	2	2	3
		Apply precautions that prevent growth of Microorganisms	2	2	2	2	2
		Specify general characters and determine mode of action of various antimicrobial natural cosmetics.	3	2	2	2	2
20U3RMC5	Biochemistry	Acquaint with chemical and molecular foundations of life and appreciate the role of water in biological systems.	2	2	2	2	3
		Comprehend the structure, function and properties of carbohydrates, amino acids and lipids.	2	2	2	2	3
		Introduce the significance of carbohydrates, proteins and lipids in biological systems.	3	2	2	2	2
		Aware of the importance of vitamins in biological systems.	2	2	3	2	2
		Elaborate the mechanism of enzyme action.	3	2	2	2	2
20U3RMP3	Practical - III	Perform basic laboratory techniques in both chemistry and biology	2	2	3	2	2
		Prepare chemicals and buffers for biological reactions.	2	3	2	2	2
		Identify and quantify the amount of biomolecules present in the samples.	2	2	3	3	2
		Analyse Microbiological assay of antibiotics	3	3	2	2	3
		Perform testing of Cosmetics and Personal Care Products	2	2	2	2	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	-
20U4CAC2	Allied Chemistry II	To analyse the relative strength acids and bases and buffer action	3	2	1	-	-
		To indicate structure of carbohydrates and figure out the configuration of glucose	3	2	1	-	-
		To classify proteins, vitamins and to explain the sources, functions and deficiency of vitamins A, D, & B, C and illustrate the preparation, properties and uses of glycine	3	2	1	-	-
		To illustrate types of the polymers and to indicate types of the corrosion and its control measures	3	2	1	-	-
		To understand the role of various elements in plant growth and to classify the	3	2	1	-	-

		fertilizers						
20U4CAP2	Semi-micro qualitative analysis	To demonstrate the basic laboratory techniques of qualitative analysis.	3	2	-	-	-	
		To demonstrate mastery of basic semi0micro 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	1	1	
20U4RSM2	Immunology and Immunotechnology	Define the basic biology of the cells of the immune system, including their development and specific functions	2	1	1	2	1	
		Outline how the cells interact with each other in the formation of an immune response	1	2	1	1	2	
		Interpret the molecular basis by which the immune system identifies pathogens.	2	2	1	1	1	
		Perceive what occurs when there are failures of the immune system.	3	2	2	1	1	
		Become skilled at the experimental basis and reasoning that underlies the material in the course.	3	2	2	2	1	
20U4RMC6	Microbial Physiology	Outline the concept of microbial nutrition and energy flow.	1	2	3	2	3	
		Define the basic concept of microbial metabolism and photosynthesis.	2	3	2	2	2	
		Summarize the concept of catabolism and catabolic pathways in microbes.	2	2	3	3	3	
		Interpret the microbial anabolism and anabolic pathways	2	2	2	2	2	
		Illustrate biosyntheses pathways of microbes	2	3	2	3	2	
20U4RMP4	Major Practical – IV	Demonstrate an understanding of the key concepts in immunology	2	2	3	2	2	
		Illustrate the salient features of antigen antibody reactions and their uses in diagnostics and various other studies	2	3	2	2	2	
		Apply scientific principles in the interpretation of immunological responses and data	2	2	3	3	2	
		Analyse bacterial growth stages	3	3	2	2	3	
		Demonstrate the effects of factors affecting bacterial growth	2	2	2	2	2	
20U4NCC2	Field Training in NCC	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	
20U4NPN	Community Services	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
20U4YRC4	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
20U4PED2	Physical Education and Games	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
20U5RSM3	Diagnostic Microbiology and Haematology	Explain the methods of collection and processing of clinical specimens and presumptive identification of microorganisms	1	1	1	1	-
		Identify medically important microbes	2	1	1	-	1
		Demonstrate the basic principles of haematology and diagnostic microbiology instrumentation	2	2	-	1	1
		Explain the origin of blood cells and articulate the process of erythropoiesis and leukopoiesis as it relates to health and disease.	2	2	-	2	2
		Discuss the coagulation process and its role in maintaining hemostasis and to demonstrate current haematological procedures used to diagnose, monitor and evaluate disorders	3	-	2	2	2
20U5RMC7	Environmental Microbiology	Describe the role of microorganisms in soil	1	1	1	1	1
		Interpret the role of microbes in biogeochemical cycles	2	1	1	1	-
		Summarize the relationship between microbial interaction with plants	2	2	-	1	1
		Analyze the air and water quality	2	2	1	2	2

		Explain bioremediation and microbial leaching process	3	2	2	2	2
20U5RMC8	Medical Microbiology	Define the concept of infection, types and infectious disease process	-	1	1	-	1
		Classify the morphology, cultural characteristics, and pathogenesis of Gram positive and negative cocci	2	1	1	1	1
		Identify and classify the gram positive and negative rods	2	-	-	1	1
		Infer the morphology, cultural characteristics, and pathogenesis of viruses	-	2	1	2	2
		Gain the basic knowledge about fungal and parasitic infections	3	2	2	2	-
20U5RMC9	Microbial Genetics	Outline the history of genetics, bacterial inheritance and recombination.	2	2	3	2	2
		Explain the process involved in genetic changes and mutations	-	2	3	2	2
		Perceive and distinguish various gene transfer mechanisms.	2	3	-	2	3
		Sumarize the features of phages of genetical significance.	2	2	2	2	2
		Rationalize the bacterial operon concepts.	3	2	3	3	-
20U5RMP5	Major Practical - 5	Interpret diagnosis of infectious diseases by using various qualitative and quantitative tests	-	3	3	2	2
		Analyse clinical specimens microscopically for the presence of parasites	2	-	3	-	3
		Perform the blood collection process and normal cells/components of blood	2	2	-	2	3
		Learn the differential diagnosis and appropriate diagnostic evaluation of common hematologic abnormalities	2	2	3	2	2
		Perform various laboratory tests of Environmental Microbiology	3	2	-	2	2
20U5RMP6	Major Practical - 6	Identify the role and interaction of microbes in soil	3	2	3	3	-
		Perform the role of microbes in the soil and their sampling	-	3	2	3	2
		Demonstrate gene transfer mechanisms and gene regulation	3	1	-	2	2
		Obtain analytical knowledge to apply various statistical tools	3	3	3	3	3
		Monitor life science division of software and pharmaceutical industry	3	3	3	-	2
20U5RIDC	Major Interdisciplinary - Bioeconomics	Explain the basic concepts of bioeconomics, challenges, opportunities & regulations	2	2	3	-	3
		Discuss a broad perception of biobased resources, value chain, innovative use of biomass and biological knowledge to provide food, feed and industrial products	2	2	3	2	2
		Acquaint the distinguishing features among marine bioeconomy	0	3	3	2	3
		Apply the development and innovation in terms of bioeconomy towards sustainable development	2	2	2	3	3
		Explore the significance of environmental economics and its importance in conservation of biodiversity and ecosystems	3	3	3	3	-
20U5RME1	Parasitology and Entomology	Explain the basic concepts of parasitology and acquire the knowledge of host-parasite relationship	-	1	2	1	1
		Discuss a broad perception of epidemiology, transmission, control and treatment of parasitic disease	3	1	1	1	3

		Acquaint with the distinguishing features among cestodes, nematodes and trematodes	3	3	0	3	3
		Explore the diagnostic methods in parasitology	3	2	3	2	0
		Understand the significance of medical entomology and medically important insects	0	2	2	2	1
20U5RME1	Introduction to Genomics	Distinguish the structure and organization of genomes	1	1	1	1	3
		Compare and Analysis the various genomes	1	1	1	2	2
		Know the functional role of the genomes	1	2	1	1	3
		Articulate the genes for drug design and therapy	2	2	2	1	2
		Explain different tools involved in genomics	2	2	2	2	2
20U6RSM4	Entrepreneurship in Microbiology	Discuss the concept of entrepreneurship and its development	1	0	1	1	1
		Interpret the basic skills to become an entrepreneur	1	1	1	1	0
		Realize the concepts of management such as planning, decision making, leadership, organizations and authority	0	1	1	1	1
		Formulate the skills needed to manage the start-up and run an organization	1	2	2	0	2
		Designate the various entrepreneurial avenues in Microbiology	2	2	0	2	2
20U6RMC10	Food Microbiology	Elaborate the factors influencing food microflora and discuss the significance of microbes in food industries	3	0	3	1	2
		Correlate the most common microorganisms in food spoilage, their origin, mechanism and methods to control spoilage of food	3	2	2	2	3
		Explain the principle and apply the suitable technique to prevent microbial growth in food	3	3	2	1	3
		Differentiate the role of various microorganisms and their toxins in food borne diseases	2	2	0	2	3
		Evaluate the microbiological quality of food samples by qualitative and quantitative methods and comprehend various food safety guidelines	3	3	3	2	3
20U6RMC11	Principles of Gene Manipulation	Explain scope and importance of rDNA technology	2	2	3	2	2
		Outline the salient features of cloning vectors	2	0	3	2	2
		Describe the methods in molecular cloning	2	3	0	2	3
		Analyze DNA sequencing and genomic libraries	2	2	2	2	2
		Summarize the applications of gene manipulation	3	2	2	2	2
20U6RMC12	Pharmaceutical & Forensic microbiology	Define the pharmacology and pharmacognosy	1	1	1	1	1
		Classify the drug validation procedures	1	1	1	1	1
		Classify various administrative in forensic science	0	1	1	1	1
		Acquire the importance of forensic science in the present era	1	2	2	0	2
		Gain the basic knowledge on fingerprint analysis and DNA profiling	2	2	0	2	2
20U6RMP7	Major Practical-VII	Isolate and identify microorganisms found in different food specimen	3	2	3	3	3
		Determine the milk quality based on its microbiological characteristics	3	3	2	2	0

		Acquaint basic biotechnological tools and techniques involved in detection of protein and mutants	3	0	1	2	2
		Demonstrate ethanol and citric acid production by mold and yeasts	3	3	3	3	3
		Screen and select alpha amylase producer from environmental samples	3	3	3	2	1
20U6RMP8	Major Practical-VIII	Analyze the pharmaceutical products using chromatographic techniques	2	2	2	2	3
		Identify the fingerprints by various methods	2	2	2	2	3
		Analyze the digital photography of various forensic evidences	2	0	3	2	3
		Determine the material's structure and properties that are probed and measured	2	2	2	2	3
		Perform to produce different kinds of bio fertilizer	3	2	3	0	3
20U6RME2	FERMENTATION TECHNOLOGY	Outline basic fermentations processes and select industrially important microbes	2	2	3	0	3
		Identify and design various fermentors and application of fermentation in waste treatment.	2	2	3	2	2
		Classify different separation and techniques for purification of end products .	0	3	3	2	3
		Apply economics of the fermentation for the total cost of production.	2	2	2	3	3
		Explore modern trends in microbial fermentations in industries.	3	3	3	3	0
20U6RME2	Agricultural Microbiology	Summarize the concept and significance of soil microbiology	2	3	1	0	3
		Outline the mode of action of microbial insecticides	3	3	0	2	3
		Analyze various aspects of biofertilizers	0	2	3	2	3
		Explain the mechanisms of microbial plant diseases	3	2	3	3	0
		Describe the applications of microorganisms in agriculture	2	2	3	2	3
20U6RME3	Microbial Nanotechnology	Describe the physical and chemical aspects of nano materials.	3	1	2	1	1
		Explain the interaction between biomolecules and nanoparticle surface and its applications.	3	0	1	1	3
		Correlate properties of nanostructures with their size, shape and surface characteristics.	3	3	3	3	3
		Apply nanomaterials with novel optical behaviour.	3	2	3	2	3
		Analyze the safety and risk assessments involved in bio-nanomaterials.	1	2	2	2	0
20U6RME3	Veterinary Microbiology	Elaborate the mechanism of bacterial diseases of animals	3	2	2	0	3
		Examine various fungal diseases of animals	3	3	3	3	3
		Apprise the pathogenesis of animal viruses	3	0	2	3	0
		Explain the protozoan diseases of animals	3	3	3	3	3
		Describe the role of emerging and re emerging zoonoses	2	2	0	1	1


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