



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 BIOTECHNOLOGY

Course Outcomes mapped with POs

PROGRAMME : B.Sc. (Biotechnology)

| 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 | - |

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|-----------------|--|---|---|----|----|----|----|
| | | 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 |
| 20U1CAC1 | Allied 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 | - | - | - |
| 20U1CAP1 | 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 | - |
| 20U1LMC1 | Genetics | Identify the laws of inheritance | 3 | 3 | -- | 3 | 2 |
| | | Compare and contrast Mendelian inheritance and Non Mendelian Inheritance | 2 | -- | 1 | -- | 3 |
| | | Interpret the inheritance pattern in both plants and animals | 3 | 3 | 1 | 2 | 3 |
| | | Comprehensive and detailed understanding of Population Genetics | 1 | 2 | 2 | 2 | 1 |
| | | Apply reasoning skills to solve genetic problems | 3 | 2 | 2 | 2 | 3 |
| 20U1LMC2 | Basics of Biotechnology | Elaborate with the history of biotechnology and understand the gene concept | 3 | -- | 2 | 2 | -- |
| | | Develop knowledge on the principles and applications of essential biotechnological tools and methods | 3 | 3 | 2 | 2 | 3 |
| | | Dissect the methods and applications of microbial and animal biotechnology | 3 | 2 | 2 | -- | 3 |
| | | Identify the applications and values of plant and environmental biotechnology strategies | 3 | 2 | 2 | 3 | -- |
| | | Analyze the merits and demerits of biotechnological applications | 3 | 3 | 2 | 3 | -- |
| 20U1LMP1 | Major Practicals-I | Show hands-on techniques that will supplement and enrich the lecture part | 3 | 2 | 3 | 2 | 2 |
| | | Correlate the results and develop critical thinking skills | 3 | 2 | 3 | 2 | 2 |

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|-----------|--|--|---|---|---|---|---|
| | | Examine genetic inheritance pattern in both animals & Plants | 3 | 2 | 2 | 3 | 2 |
| | | Infer the physiological process in plants and animals | 3 | 2 | 3 | 1 | 1 |
| | | Categorize various genetic disorders | 3 | 2 | 3 | 2 | 2 |
| 20U2TLA2 | இடைக்கால இலக்கியமும் உரைநடையும் | சிற்றிலக்கியங்கள் 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 |
| 20U2NENG2 | 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 |

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| 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 |
| 20U2LMC3 | General Physiology | Illustrate the structural organization of various systems within an animal body | 3 | -- | 2 | -- | -- |
| | | Explain the functions of various organ systems | 3 | 2 | 2 | -- | -- |
| | | Classify the role of hormones in physiological processes | 3 | 2 | 2 | 3 | -- |
| | | Correlate interaction between various organ system | 3 | 2 | 2 | 3 | -- |
| | | Categorize the signal transduction mechanism | 3 | -- | 3 | 1 | -- |
| 20U2LMC4 | Bioinstrumentation | Explain the principle, components and application of different types of microscopes. | 3 | 2 | 2 | 2 | 3 |
| | | Infer the principle, working and applications of different centrifuges and pH meter | 3 | 2 | -- | 2 | 3 |
| | | Apply the concept of electromagnetic radiation, absorption spectrum, Beer's – Lambert's law and verification of the law. | 3 | 3 | 1 | -- | -- |
| | | Analyse various chromatographic techniques by its working principle and applications | 3 | 3 | 2 | -- | -- |
| | | Categorize the various electrophoretic techniques and radioactivity measurements | 3 | 3 | 2 | -- | -- |
| 20U2LMP2 | Major Practical-II | Show hands-on techniques that will supplement and enrich the lecture part | 3 | 2 | 3 | 2 | 2 |
| | | Correlate the results and develop critical thinking skills | 3 | 2 | 3 | 2 | 2 |
| | | Examine genetic inheritance pattern in both animals & Plants | 3 | 2 | 2 | 3 | 2 |
| | | Infer the physiological process in plants and animals | 3 | 2 | 3 | 1 | 1 |
| | | Categorize various genetic disorders | 3 | 2 | 3 | 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 |

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| | | 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 |

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|------------------|-------------------------------------|---|---|---|---|---|---|
| | | 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 |
| 20U3NENG3 | English-III | Discover the deviant use of English both in written and spoken forms | - | 2 | 3 | 2 | - |
| | | Explain the need for reference/study skills | - | 2 | 3 | 3 | - |
| | | Make/take notes systematically in an organized manner | - | 2 | 2 | 2 | - |
| | | 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 | - |
| | Basic Microbiology | Explain the fundamental concepts; describe the history and development of microbiology. | 3 | 1 | 1 | 1 | 1 |
| | | Apply various staining techniques to differentiate and identify the microorganisms. | 3 | 2 | 1 | 2 | 3 |
| | | Identify the basic growth requirements of bacteria and demonstrate the practical skills in isolation, cultivation and preservation of microorganisms. | 3 | 3 | 3 | 3 | 3 |
| | | Apply suitable methodologies to control the growth of microbes by various sterilization techniques and by the use of other chemical agents | 3 | 3 | 2 | 3 | 2 |
| 20U3RAP1 | Ancillary Practical I | Compare and contrast the structural organization and economic importance of fungi, algae, viruses and protozoa. | 3 | 3 | 2 | 3 | 1 |
| | | Demonstrate the practical skills in the use of tools, technologies and methods common to microbiology. | 3 | 2 | 3 | 1 | 3 |
| | | Prepare various culture media, brief various physical and chemical means of sterilization. General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae. | 2 | 3 | 2 | 1 | 2 |
| | | Experiment with microbial ecology and its interaction | 2 | 2 | 3 | 2 | 3 |
| | | Isolate and identify bacteria, fungi and algae | 3 | 3 | 2 | 1 | 2 |
| | | Determine the role of bacteria in environment and industrial processes. | 2 | 2 | 3 | 3 | 3 |
| 20U3LSM1 | Biophysics and Bioenergetics | Discuss about the energy transfer as applicable to biological system. | 3 | 2 | 2 | 1 | 2 |
| | | Interpret the concept of redox potential in living system. | 3 | 1 | 3 | 2 | 1 |
| | | Explain the concept of energy coupling in biological processes. | 3 | 2 | 2 | 2 | 2 |

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|-----------------|--|---|---|---|---|---|---|
| | | Apply the physical process of ligand binding to macromolecules. | 3 | 2 | 3 | 2 | 3 |
| | | Distinguish the various dynamics of bio molecules. | 3 | 1 | 2 | 2 | 1 |
| 20U3LMC5 | Biochemistry | Explain the chemical and molecular foundations of life and appreciate the role of water in biological systems. | 3 | 3 | 1 | 2 | 2 |
| | | Illustrate the structure, properties and roles of carbohydrates. | 3 | 2 | 2 | 2 | 1 |
| | | Analyse the structure, function and properties of amino acids, proteins and enzymes | 3 | 3 | 3 | 3 | 3 |
| | | Relate lipids with their biological roles | 3 | 1 | 2 | 2 | 1 |
| | | Distinguish the various components of nucleic acid and their significance. | 3 | 3 | 3 | 3 | 3 |
| 20U3LMP3 | Major Practicals-III | Associate the experimental results with normal biological range | 3 | 2 | 3 | 2 | 2 |
| | | Analyse biological samples and interpret the results. | 3 | 2 | 3 | 2 | 2 |
| | | Experiment with biochemical methods. | 3 | 2 | 2 | 3 | 2 |
| | | Apply basic principles of chemistry to biological systems. | 3 | 2 | 3 | 1 | 1 |
| | | Demonstrate biochemical analysis. | 3 | 2 | 3 | 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 | 2 | 1 | 1 | 2 | 3 |


| | | | | | | | |
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| | | training and field work. | | | | | |
| | | 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 |
| 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 | - |
| 20U4LSM2 | Food Processing and Preservation | Incur basic knowledge on food composition, nutrition and quality | 3 | 2 | 2 | 2 | 1 |
| | | identify food spoilage agents and select ideal preservation strategies | 3 | 2 | 2 | 2 | 1 |
| | | Explain the methods of handling and processing of different food materials and their applications. | 3 | 2 | 2 | 2 | 1 |
| | | analyse the merits & demerits of food additives and explain the materials & methods of food packaging | 3 | 2 | 2 | 2 | 1 |
| | | identify the food related hazards/risks and appreciate the importance government organisations/regulations on food safety | 3 | 2 | 2 | 3 | 1 |
| 20U4LMC6 | Cell and Molecular Biology | Illustrate the structure and function of plasma membrane and cell organelles | 3 | 2 | 3 | 2 | 2 |
| | | Interpret the importance of cell cycle with cancer | 3 | 2 | 3 | 2 | 1 |
| | | Compare and contrast the replication process in prokaryotes and eukaryotes | 3 | 2 | 3 | 2 | 1 |
| | | Explain gene expression and the roles of the promoter, coding and termination sequences | 3 | 2 | 2 | 2 | 1 |
| | | Analyze the role of enzymes, organelles and molecules involved in translation | 3 | 2 | 3 | 2 | 1 |
| 20U4LMP4 | Major Practicals -IV | Associate the experimental results with normal biological range | 3 | 3 | 2 | 2 | 2 |
| | | Analyse biological samples and interpret the results. | 3 | 3 | 3 | 3 | 3 |
| | | Experiment with food samples. | 3 | 2 | 3 | 3 | 1 |
| | | Apply basic principles of chemistry to biological samples. | 3 | 1 | 2 | 1 | 2 |
| | | Demonstrate biochemical analysis. | 3 | 3 | 3 | 2 | 2 |
| 20U4RAC2 | Applied Microbiology | Comprehend the concept of microbial contamination and spoilage of foods and their preservation and microbiological production of foods. | 3 | 3 | 1 | 2 | 3 |
| | | Discuss beneficial microbes in soil and control plant diseases. | 2 | 2 | 1 | 3 | 2 |
| | | Analyze the microbes in environment and water contamination. | 3 | 2 | 1 | 3 | 3 |
| | | Distinguish the production of biopharmaceuticals and antibiotics. | 3 | 2 | 2 | 2 | 3 |
| | | Categorize the microorganisms of industrial importance and industrial production of products. | 3 | 2 | 2 | 3 | 3 |
| 20U4RAP2 | Ancillary Practical II | Demonstrate the milk and water quality techniques. | 3 | 2 | 3 | 2 | 3 |
| | | Isolate and identify nitrogen fixing bacteria from root nodules. | 2 | 3 | 2 | 2 | 2 |
| | | Experiment with microbial ecology and its interaction | 2 | 2 | 3 | 2 | 3 |
| | | Isolate and identify bacteria, fungi and algae | 3 | 3 | 2 | 2 | 2 |
| | | Determine the role of bacteria in environment and industrial processes. | 2 | 2 | 3 | 3 | 3 |
| 20U5LSM3 | Bioethics, Biosafety | Relate various forms of IPR used in Biotechnology. | 3 | 1 | 3 | 2 | 1 |

| | | | | | | | |
|-----------------|-------------------------------------|---|---|---|---|---|---|
| | and IPR | Compare various biosafety levels used in biological research. | 3 | 1 | 3 | 2 | 1 |
| | | Discuss about national and international regulatory bodies for ethics, biosafety and IPR. | 3 | 1 | 2 | 1 | 2 |
| | | Point out the issues and conflicts related to Genetically Modified Organisms [GMOs] | 3 | 1 | 2 | 2 | 1 |
| | | Discuss about the case studies in IPR and biosafety issues | 3 | 1 | 2 | 1 | 2 |
| 20U5LMC7 | Immunology | Explain the historical perspectives and components of the immune system | 2 | 2 | 3 | 2 | 2 |
| | | Illustrate the structure, properties and functions of immunoglobulin and development of B and T Cells | 2 | 2 | 3 | 2 | 2 |
| | | Analyse the importance of MHC, complement system and hypersensitivity reactions | 2 | 2 | 3 | 2 | 2 |
| | | Relate various immune disorders with autoantibodies and graft rejection | 3 | 2 | 3 | 2 | 2 |
| | | Use the immunological concepts to understand the diagnostic techniques | 2 | 3 | 3 | 2 | 3 |
| 20U5LMC8 | Industrial Biotechnology | Explain the features of bioreactors and their development | 3 | 2 | 3 | 2 | 2 |
| | | Prepare the flow charts for various downstream processes | 3 | 2 | 3 | 2 | 2 |
| | | Correlate the organisms and their products through fermentation | 3 | 3 | 3 | 2 | 2 |
| | | Illustrate the role genetic engineering in microbial enzyme production | 3 | 3 | 3 | 2 | 2 |
| | | Relate the microbes with their applications in various fields. | 2 | 3 | 3 | 3 | 3 |
| 20U5LMC9 | Plant Biotechnology | Explain about the various methods of plant tissue culture practices | 2 | 2 | 2 | 2 | 1 |
| | | Illustrate about the production of haploid plants and their significance | 3 | 3 | 2 | 2 | 2 |
| | | Analyze about various methods of germplasm conservation | 2 | 1 | 3 | 2 | 3 |
| | | Illustrate the methods gene transfer techniques for production GM plants | 2 | 3 | 3 | 3 | 2 |
| | | Categorize various plant based DNA marker for screening process | 3 | 3 | 2 | 2 | 2 |
| 20U5LIDC | Computer-Aided Drug Design | Explain about various stages of drug discovery | 3 | 2 | 3 | 2 | 2 |
| | | Elaborate on the virtual screening and molecular docking of drugs | 3 | 2 | 3 | 2 | 2 |
| | | Outline the steps in molecular modelling | 3 | 2 | 3 | 2 | 2 |
| | | Describe various Linux Commands | 3 | 3 | 3 | 2 | 2 |
| | | Illustrate Linux commands in Cygwin tool. | 3 | 3 | 3 | 2 | 2 |
| 20U5LME1 | Biostatistics | Explain the various methods of collection and representation of data. | 2 | 2 | 2 | 2 | 2 |
| | | Illustrate the various measures of central tendency and deviation. | 1 | 1 | 2 | 2 | 2 |
| | | Relate the variables for correlation and regression analysis. | 2 | 2 | 3 | 1 | 2 |
| | | Illustrate the problems related to probability and theoretical distribution. | 3 | 2 | 3 | 2 | 1 |
| | | Solve problems in test of significances. | 2 | 2 | 2 | 2 | 2 |
| 20U5LME3 | Pharmaceutical Biotechnology | Describe the historical perspectives and future prospects of bio pharmaceuticals | 3 | 2 | 2 | 2 | 2 |
| | | Prepare a flowchart to explain the dates of drug design and development | 3 | 3 | 2 | 2 | 2 |
| | | Categorize drug with its mode of action | 2 | 2 | 2 | 2 | 2 |
| | | Illustrate about the drug abuse and toxicity | 3 | 2 | 2 | 2 | 2 |
| | | Outline the drug with its principle of therapy | 3 | 3 | 2 | 2 | 2 |
| 20U5LME4 | Forensic Biotechnology | Discuss about te various biological samples in forensics | 3 | 2 | 2 | 2 | 2 |
| | | Illustrate the methods of identification of biological samples | 3 | 2 | 2 | 2 | 2 |

| | | | | | | | |
|------------------|------------------------------------|--|---|---|---|---|---|
| | | Outline the various molecular markers used in forensics | 3 | 3 | 2 | 2 | 2 |
| | | Categories various proteomic analysis tools used in forensic science | 3 | 3 | 3 | 2 | 2 |
| | | Illustrate the toxic compound identification by various analytical techniques | 2 | 2 | 2 | 2 | 2 |
| 20U5LMP5 | Major Practicals-V | Explain the types of antigen and its complex formation | 3 | 2 | 3 | 2 | 2 |
| | | infer the results of various immunotechniques | 3 | 2 | 3 | 2 | 2 |
| | | solve the problems of biological data | 3 | 2 | 2 | 3 | 2 |
| | | calculate the measures of central dispersion , correlation and regression | 3 | 2 | 3 | 1 | 1 |
| | | interpret the biological data by the test of hypothesis | 3 | 2 | 3 | 2 | 2 |
| 20U5LMP6 | Major Practicals-VI | Convert waste into value products through fermentation | 3 | 2 | 3 | 2 | 2 |
| | | Analyse the microbial growth pattern | 3 | 2 | 3 | 2 | 2 |
| | | Experiment with different culture methods of plant tissues | 3 | 2 | 2 | 3 | 2 |
| | | Demonstrate the anther and pollen culture | 3 | 2 | 3 | 1 | 1 |
| | | Identify viability of animal cells using staining | 3 | 2 | 3 | 2 | 2 |
| 20U6LSM4 | Genomics and Proteomics | Discuss the genome organization and proteome of cells | 3 | 3 | 3 | 2 | 3 |
| | | Illustrate the various genetic mapping techniques | 3 | 2 | 3 | 2 | 1 |
| | | Analyse the genome sequencing strategies | 2 | 3 | 2 | 2 | 2 |
| | | Categories various proteomic tools used in biological research | 3 | 2 | 3 | 2 | 3 |
| | | Interpret the gene expression pattern in normal and diseased conditions | 3 | 3 | 3 | 2 | 3 |
| 20U6LMC10 | Environmental Biotechnology | Discuss about the various solid and hazardous waste and their management | 3 | 3 | 3 | 3 | 2 |
| | | Illustrate various methods of analysis and treatments of pollutant | 3 | 2 | 2 | 2 | 2 |
| | | Apply the various bioremediation process | 3 | 3 | 3 | 3 | 2 |
| | | Practice various methods to convert the waste to value products | 3 | 3 | 2 | 3 | 2 |
| | | Use the various treatments strategies for removal of pollution | 3 | 3 | 3 | 3 | 2 |
| 20U6LMC11 | Recombinant DNA Technology | Explain the various tools used in rDNA technology | 2 | 2 | 2 | 3 | 2 |
| | | Illustrate the gene cloning strategies | 3 | 2 | 2 | 2 | 3 |
| | | Analyse the manipulation of gene expression in prokaryotes | 2 | 3 | 2 | 1 | 2 |
| | | Relate site directed mutagenesis with protein engineering | 2 | 2 | 3 | 2 | 1 |
| | | Explain the various production of recombinant products | 2 | 2 | 3 | 2 | 2 |
| 20U6LMC12 | Medical Biotechnology | Use biotechnological principles and processes in the development of diagnostic tools | 3 | 3 | 3 | 2 | 3 |
| | | Illustrate the significance of gene therapy to treat various diseases. | 3 | 3 | 3 | 2 | 2 |
| | | Point out the processes for recombinant proteins production and its therapeutic use | 3 | 3 | 3 | 2 | 3 |
| | | Infer the principle behind the vaccine development and their mode of mechanisms | 3 | 3 | 3 | 2 | 3 |
| | | Describe the applications of stem cell technology | 3 | 2 | 3 | 2 | 2 |
| 20U6LME5 | Bioinformatics | Explain about the concepts in bioinformatics and various biological databases. | 3 | 3 | 2 | 2 | 3 |
| | | Illustrate various sequence alignments. | 3 | 2 | 2 | 2 | 2 |
| | | Analyse various phylogenetic analysis. | 3 | 3 | 2 | 2 | 3 |

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|-----------------|--------------------------------|---|---|---|---|---|---|
| | | Predict the structure with various prediction tools. | 3 | 2 | 3 | 2 | 2 |
| | | Outline the various stages in drug design. | 3 | 3 | 3 | 2 | 3 |
| 20U6LME6 | Animal Biotechnology | Describe the physio-chemical properties of animal cell culture medium | 2 | 1 | 2 | 1 | 3 |
| | | Illustrate the various techniques used for cell culture | 2 | 1 | 3 | 1 | 3 |
| | | Differentiate the growth parameters and kinetics of normal and cancer cells | 2 | 1 | 2 | 1 | 2 |
| | | Sketch the methods and techniques used for transgenic animal production | 1 | 2 | 2 | 2 | 3 |
| | | Appraise the importance of animal cells as bioreactors | 2 | 1 | 2 | 1 | 2 |
| 20U5LME7 | Microbial Biotechnology | Describe the molecular techniques to identify microorganisms | 3 | 2 | 3 | 2 | 2 |
| | | Illustrate the biotransformation process | 3 | 2 | 3 | 2 | 2 |
| | | Outline the methods to produce various fermentation products. | 3 | 3 | 3 | 3 | 2 |
| | | Prepare the flow chart for various fermentation process. | 3 | 3 | 3 | 3 | 2 |
| | | Illustrate the various microbial Biodeterioration and its control | 3 | 3 | 2 | 3 | 2 |
| 20U6LME8 | Nanobiotechnology | Explain about the basic concepts in nanobiotechnology | 3 | 2 | 3 | 2 | 2 |
| | | Illustrate about the nanoparticle synthesis and their characterization | 3 | 2 | 2 | 2 | 2 |
| | | Apply the use of nanoparticles in detection system | 2 | 1 | 2 | 3 | 2 |
| | | Prepare the workflow for the drug delivery through nanocarriers | 3 | 2 | 3 | 3 | 1 |
| | | Sketch the use nanoparticles in quality assessment analysis | 2 | 2 | 3 | 3 | 1 |
| 20U6LMP7 | Major Practicals-VII | Describe the methodology used for DNA extraction | 3 | 2 | 3 | 2 | 2 |
| | | Prepare the competent cells and transformation of rDNA | 3 | 2 | 3 | 2 | 2 |
| | | Manipulate the DNA using enzymes | 3 | 2 | 2 | 3 | 2 |
| | | Practice various sequences analysis tools used in bioinformatics | 3 | 2 | 3 | 1 | 1 |
| | | Construct the phylogenetic tree using nucleic acid and protein sequences | 3 | 2 | 3 | 2 | 2 |
| 20U6LMP8 | Major Practicals-VIII | Estimate COD and BOD level in the given water samples | 3 | 2 | 3 | 2 | 2 |
| | | Analyse the ecological parameters for microbial contamination | 3 | 2 | 3 | 2 | 2 |
| | | Write about use of nanoparticles in diagnostic process | 3 | 2 | 2 | 3 | 2 |
| | | Use appropriate methods for the isolation of microbes from environment | 3 | 2 | 3 | 1 | 1 |
| | | Analyse the molecular diagnostic results | 3 | 2 | 3 | 2 | 2 |


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