Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

FACULTY OF LIFE SCIENCES

B. Sc. Microbiology, Biochemistry, Genetics

Programme Educational Objectives

PEO1: To acquire theoretical and practical knowledge in Microbiology, Biochemistry and Genetics.

PEO2: To instill scientific temperament to contribute to human development.

PEO3: To empower the students with employability skills and professional ethics.

Programme Outcomes

After the successful completion of the 3 year B.Sc. MBG Programme, the graduate will be able to:

PO1: Apply professional and social skills to cater to the needs of the industry, society and global scientific community.

Programme Specific Outcomes

After the successful completion of the 3 year B.Sc. MBG Programme, the graduate will be able to:

PSO1: Appraise national and global issues in Biological Sciences.

PSO2: Perform effectively with professional ethics in the domains of Microbiology, Biochemistry and Genetics.

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

I Semester

Course Type	Course Code	Course Title	Course Outcomes
MIL [Any ONE to be Opted]			
AECC	**AEN103A11**	**Additional English I**	1. Describe and differentiate between genres of poetry like ballads and sonnets. 2. Analyze critically the writing style of prose writers. 3. Develop interest to appreciate one act plays. 4. Apply the rules of punctuation to write concisely. 5. Demonstrate proficiency in creating leaflets and brochures.
AECC	**KAN103A11**	**Kannada I**	1. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ವಿವಿಧ ಪ್ರಕಾರಗಳನ್ನು ತಿಳಿಯುವರು. 2. ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ಸಾಮಾಜಿಕ ಮೌಲ್ಯಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳುವರು. 3. ಭಾಷಾ ಕೌಶಲ್ಯಗಳನ್ನು ಮೆರುಗುಗೊಳಿಸಿಕೊಳ್ಳುವರು
AECC	**HIN103A11**	**Hindi I**	1. हिंदी साहित्य के गद्य़ विधाओं को विश्लेषण करने की क्षमता का विकास 2. विद्यार्थयों में सामाजिक यथार्थ का मूल्यांकन करने का ज्ञान 3. सृजनात्मक कौशल्य में परिपूर्णता 4. गद्य विधाओं का अध्ययन करने के बाद सामाजिक मूल्यों का ज्ञान प्राप्त 5. अनुवाद कला और भाषा में परिशुद्धता
Compulsory Courses			
AECC	**ENG103A11**	**English I**	1. Demonstrate ability to identify nuances of prose and poetry 2. Develop the skill to appreciate prose and poetry 3. State the basic concepts of grammar and its usage 4. Develop communicative skills and become competent users of English in real life situations
DSCC	**UMB203A11**	**Microbiology I [Basic Microbiology and Microbiological Techniques]**	1. Appraise the contributions of microbiologists during the19th century. 2. Differentiate microorganisms based on morphology and characters. 3. Describe the working principle and applications of dark field, phase contrast, fluorescence, stereomicroscope and electron microscopes. 4. Apply the principle and procedure of staining to observe fungi and bacteria. 5. Illustrate the physical and chemical methods of sterilization adopted in microbiology laboratory.
DSCC	**UMB2L1A11**	**Microbiology Practical I**	1. Follow safety measures and aseptic techniques in the Microbiology laboratory. 2. Formulate a culture media for a given organism. 3. Perform Simple, Gram's, Endospore and capsule staining to observe bacteria.
DSCC	**BCH203A11**	**Biochemistry I[Biophysical Chemistry]**	1. Describe the fundamentals of atomic structure and properties of elements based on periodic table. 2. Explain the properties of chemical bonds and hybridization pattern. 3. Apply the concept of acids and bases in determining the ph and list the applications of electrochemical series. 4. Summarize the principles and applications of adsorption, surface tension and viscosity. 5. Illustrate the detection and measurement of radioactivity and its applications..

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

DSCL	**BCH2L1A11**	**Biochemistry Practical I**	1. Perform titrimetric estimations using standard solutions. 2. Demonstrate experiment to determine the hardness of water. Execute gravimetric estimations of sulphate and magnesium.
DSCC	**GEN203A11**	**Genetics I [Principles of Genetics]**	1. Explain the progression from Classical to Modern Genetics 2. Sketch Mendel's experimental design and familiarize with classical genetic terminologies 3. Interpret Mendel's principles of segregation, independent assortment and genetic outcomes utilizing branch diagrams and Punnett squares 4. Differentiate gene interactions 5. Appraise the chromosomal, hormonal and environmental modes of sex determination
DSCL	**GEN2L1A11**	**Genetics Practical I**	1. Perform dissection to display floral parts of *Pongamia* and *Zea mays* 2. Execute temporary slide preparation and identification of stages in Mitosis using onion root tips 3. Demonstrate the method of media preparation for *Drosophila* culture and blood grouping using human blood sample

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

II Semester

Course Type	Course Code	Course Title	Course Outcomes
MIL [Any ONE to be Opted]			
AECC	**AEN103A21**	**Additional English II**	1. Explain the meaning of select poetry, prose, and drama of writers from India, England, Chile, France, Nigeria and Canada by placing the texts in the cultural context. 2. Analyze the issues of race, problems faced by fisher community and women, futility of war, societal fabrications, Nazism, religion, spirituality, partition, and the political tensions in professional field relate and frame opinions on racial issues, war, struggles of women and the marginalized community. 3. Interpret film text 'Life is beautiful' and learn the historical background of the reign of Hitler and the injustices in concentration camps. Solve questions on idioms, super ordinates, and hyponyms.
AECC	**HIN103B21**	**Hindi II**	1. काव्य अध्ययन में संगीतात्मक शौली को समझ लेता है 2. काव्य को विश्लेषण करने की क्षमता 3. काव्य में निहित विचारों का मूल्यांकन 4. काव्य सृजन करने का कौशल्य 5. व्याकरणिक भाषा का ज्ञान एवं स्पष्टता
AECC	**KAN103B21**	**Kannada II**	1. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ವಿವಿಧ ಪ್ರಕಾರಗಳನ್ನು ತಿಳಿಯುವರು. 2. ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ಸಾಮಾಜಿಕ ಮೌಲ್ಯಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳುವರು. 3. ಭಾಷಾ ಕೌಶಲ್ಯಗಳನ್ನು ಮೆರುಗುಗೊಳಿಸಿಕೊಳ್ಳುವರು.
Compulsory Courses			
AECC	**ENG103A21**	**English II**	1. Discuss the use of animal imagery and hypersensitive characters in the twentieth century writings 2. Describe poetic style and its devices in the English verses of the Victorian Age 3. Analyze poems and sonnets regarding existentialist and metaphysical themes 4. Discover and implement new strategies of grammar in speaking English language 5. Integrate the prominence of media and the elements of advertising by creating media awareness
AECC	**NES102A01**	**Environmental Science**	1. Discuss the overexploitation of natural resources. 2. Appraise the components of ecosystem. 3. Assess the conservation of biodiversity. 4. Criticize the mitigation process of natural disasters. 5. Survey the effects of pollution in the environment. 6. Recommend the various policies for the betterment of environment.

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

DSCC	**UMB203A21**	**Microbiology II [Microbial Taxonomy and Culture Techniques]**	1. Classify Bacteria according to Bergey's manual, Fungi according to Alexopolus and Algae according to Fritsch. 2. Explain the characteristics, classification, purification assay of viruses and life cycle of bacteriophages. 3. Recall the characters and significance of actinomycetes, mycoplasma, rickettsiae and chlamydiae. 4. Explain cultivation of bacteria using pure culture techniques and anaerobiosis. 5. Familiarize concepts on microbial growth and measurement.
DSCL	**UMB2L1A21**	**Microbiology Practical II**	1. Formulate culture media and perform pure culture methods for the cultivation of bacteria and fungi. 2. Demonstrate the staining and identification of fungi by lacto phenol cotton blue. 3. Execute measurement of cell size by micrometry and enumeration of cells by haemocytometry.
DSCC	**BCH203A21**	**BiochemistryII [Biomolecules]**	1. Infer the spatial configuration and structural forms of biomolecules. 2. Classify carbohydrates, amino acids, lipids, nucleic acids, vitamins and minerals. 3. Assess physical and chemical properties of carbohydrates, amino acids and lipids. 4. Illustrate the biological importance of biomolecules. 5. Explain denaturation, renaturation and packing properties of DNA.
DSCL	**BCH2L1A21**	**Biochemistry Practical II**	1. Perform qualitative analysis of sugars. 2. Execute qualitative analysis of amino acids.
DSCC	**GEN203A21**	**Genetics II [Cell Structure and Dynamics]**	1. Appraise properties of cells and principles of microscopy 2. Summarize the ultrastructure of prokaryotic cell and cell motility 3. Illustrate the ultrastructure of eukaryotic cell, structure and function of organelles 4. Appraise the mechanism of biogenesis of mitochondria, chloroplast, endoplasmic reticulum and golgi complex 5. Describe the stages in cell cycle, cell division and mechanism of programmed cell death.
DSCL	**GEN2L1A21**	**Genetics Practical II**	1. Execute differential staining of Paramoecium and Yeast. 2. Execute temporary slide preparation and identification of stages of Mitosis and Meiosis using Fenugreek and Rhoeo discolour. 3. Demonstrate the experiment to isolate chloroplast.

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

III Semester

Course Type	Course Code	Course Title	Course Outcomes
MIL [Any ONE to be Opted]			
AECC	**AEN103A31**	**Additional English III**	1. Appreciate the beauty of gothic romantic theme in Alfred Noyes's "The Highway man". 2. Focus on the moral idea in the poem "Inchcape Rock" by Robert Southey. 3. Compare and contrast the passionate love and cruelty of fate in "A Sunny Morning". Outline the difference between essay writings and precis writing. 4. Discover the sufferings of a single parent in Rabindranath Tagore "The Editor".
AECC	**HIN103B31**	**Hindi III**	1. हिंदी कविता और खंडकाव्य के भेद को समझलेता है 2. पौराणिक कथा का विश्लेषण करता है 3. पौराणिक काव्य में आदर्श विचारों का अनुकरण करता है 4. आधुनिक और पौराणिक विचारो का मूल्यांकन काव्य सृजन शौली का विकास
AECC	**KAN103B31**	**Kannada III**	1. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ವಿವಿಧ ಪ್ರಕಾರಗಳನ್ನು ತಿಳಿಯುವರು. 2. ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ಸಾಮಾಜಿಕ ಮೌಲ್ಯಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳುವರು. 3. ಭಾಷಾ ಕೌಶಲ್ಯಗಳನ್ನು
Compulsory Courses			
AECC	**ENG103A31**	**English III**	1. Appreciate the beauty of gothic romantic theme in Alfred Noyes's "The Highway man". 2. Focus on the moral idea in the poem "Inchcape Rock" by Robert Southey. 3. Compare and contrast the passionate love and cruelty of fate in "A Sunny Morning". Outline the difference between essay writings and precis writing. 4. Discover the sufferings of a single parent in Rabindranath Tagore "The Editor".
DSCC	**UMB203A31**	**Microbiology III [Microbial Physiology and Microbial Genetics]**	1. Infer the morphological and metabolic adaptations of the bacterial cell. 2. Illustrate cell membrane function and transport mechanisms. 3. Explain the characteristics and process of photosynthesis in bacteria. 4. Discuss the genome organization and genetic recombination in bacteria. 5. Appraise the molecular mechanisms of mutation, DNA damage and repair.
DSCL	**UMB2L1A31**	**Microbiology Practical III**	1. Infer the morphological and metabolic adaptations of the bacterial cell. 2. Illustrate cell membrane function and transport mechanisms. 3. Explain the characteristics and process of photosynthesis in bacteria. 4. Discuss the genome organization and genetic recombination in bacteria. 5. Appraise the molecular mechanisms of mutation, DNA damage and repair.
DSCC	**BCH203A31**	**Biochemistry III[Bio analytical Techniques]**	1. Summarize the principle and applications of centrifugation, chromatography, and electrophoresis. 2. Describe the instrumentation and applications of spectroscopy. 3. Illustrate the usage of different types of biosensor
DSCL	**BCH2L1A31**	**Biochemistry Practical III**	1. Formulate citrate and phosphate buffers. 2. Demonstrate the separation of amino acids using paper and thin layer chromatography. 3. Execute gel electrophoresis for the separation of nucleic acids and proteins.

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

DSCC	**GEN203A31**	**Genetics III [Cyto genetics]**	1. Explain the organization of eukaryotic chromosome, chromosome ultrastructure and giant chromosomes 2. Appraise the concept of linkage and chromosomal non-disjunction 3. Interpret the mechanism of crossing over and its significance 4. Examine structural and numerical chromosomal aberrations and the consequences 5. Compare the extra chromosomal inheritance patterns in mitochondria, chloroplast, paramoecium, drosophila and plants
DSCL	**GEN2L1A31**	**Genetics Practical III**	1. Demonstrate media preparation, culture and maintenance, identification of mutants and mounting of sex comb in Drosophila 2. Perform the dissection of salivary gland and preparation of polytene chromosome 3. Execute temporary slide preparation to identify chromosomal translocation in Rhoeo discolor

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

IV Semester

Course Type	Course Code	Course Title	Course Outcomes
MIL [Any ONE to be Opted]			
AECC	**AEN103A41**	**Additional English IV**	1. Interpret select poems of Robert Frost, Sarojini Naidu and William Blake. 2. Explain the style and significant features of prose writings of R. K Narayan, Willa Cather, Doris Lessing, O. Henry, and Booker. T. Washington. 3. Compare the ethical and cultural differences in Wole Soyinka's play 'The Lion and the Jewel' and learn the unique native culture of Nigeria. 4. Assess the issues related to marriage, education, moral code of conduct, the concept of sublime, modernity, tradition, and the mindsets of human beings in life. 5. Appraise the literary devices and techniques used in poetry and prose. Formulate grammatically correct sentences using proper punctuations. Create citations of books, articles and journals using MLA format 8th edition.
AECC	**HIN103B41**	**Hindi IV**	1. हिंदी व्यंग्य अध्ययन करने की शौली को समझलेता है 2. व्यंग्य में निहित विचारों का विश्लेषण 3. व्यंग्य कथाओं में अभिव्यक्त विचारों का मूल्यांकन 4. निबंधों में निहित आदर्श विचारों का अनुकरण 5. व्यंग्य सृजन कौशल्य का विकास
AECC	**KAN103B41**	**Kannada IV**	1. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ವಿವಿಧ ಪ್ರಕಾರಗಳನ್ನು ತಿಳಿಯುವರು. 2. ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ಸಾಮಾಜಿಕ ಮೌಲ್ಯಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳುವರು. 3. ಭಾಷಾ ಕೌಶಲ್ಯಗಳನ್ನು ಮೆರುಗುಗೊಳ್ಳಿಸಿಕೊಳ್ಳುವರು
Compulsory Courses			
AECC	**ENG103A41**	**English IV**	1. Recognize, define, and identify poetic terms and genres. 2. Examine novels analytically and interpretively, to identify literary elements like plot, character, setting, tone, point of view, theme, style, symbol, metaphor, and image. 3. Analyze the characters and themes of one act plays. 4. Acquire vital employability skills and employment opportunities with in-depth knowledge of CV, cover letter, report writing and paragraph writing.
DSCC	**UMB203A41**	**Microbiology IV [Molecular Biology and Genetic Engineering]**	1. Summarize the structure forms and replication of DNA. 2. Illustrate the types of RNA and the process of transcription and translation. 3. Compare the mechanisms of gene regulation in prokaryotes and eukaryotes. 4. Interpret the types and functions of Restriction enzymes, organization of cloning vectors. 5. Assess the methods and applications of electrophoresis and blotting techniques.
DSCL	**UMB2L1A41**	**Microbiology Practical IV**	1. Trace the concentration of DNA and RNA by colorimetry. 2. Demonstrate genomic and plasmid DNA isolation from bacteria. 3. Execute gel electrophoresis for the separation and analysis of DNA.

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

DSCC	**BCH203A41**	**Biochemistry IV [Human Physiology]**	1. Explain the structure, defect and mechanistic interplay of photo pigments of eye. 2. Describe the components of blood and mechanism of respiration. 3. Infer the process of human digestion and excretion illustrate the mechanism of muscle contraction and neurotransmission. 4. Relate anatomy and endocrinology of reproductive system.
DSCL	**BCH2L1A41**	**Biochemistry Practical IV**	1. Adopt methods to estimate nucleic acids, proteins and glucose. 2. Demonstrate prothrombin time and erythrocyte sedimentation rate to analyze blood clot formation.
DSCC	**GEN203A41**	**Genetics IV [Molecular Genetics]**	1. Describe the structure and function of DNA and RNA, types of DNA and replication 2. Sketch the organization of the genome in virus, prokaryotes and eukaryotes 3. Illustrate the process of genetic recombination in Prokaryotes, Drosophila and Maize. 4. Explain the molecular basis of mutation and DNA repair mechanisms 5. Appraise the applications of molecular genetics in disease diagnosis, gene therapy and transgenic technology
DSCL	**GEN2L1A41**	**Genetics Practical IV**	1. Demonstrate genomic DNA extraction from bacteria, coconut endosperm and liver tissue 2. Perform paper chromatography to separate eye pigments from Drosophila
NCCC	**LSE5A2A41**	**Life Skills Education**	1. Analyze the emotional competence at work place. 2. Design the empathy map for the people.

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

V Semester

Course Type	Course Code	Course Title	Course Outcomes
DSCC	**UMB203A51**	**Microbiology V [Agricultural and Environmental Microbiology]**	1. Interpret the role of microorganisms in soil fertility, microbial interactions and importance of biogeochemical cycles. 2. Explain the concepts of nitrogen fixation, biofertilizer and biopesticide. 3. Assess the role of bacteria, fungi and viruses in plant pathology. 4. Convince the role of microorganisms present in air. 5. Relate to waste water treatment, concept of bio-remediation and analysis of water quality.
DSCL	**UMB2L2A51**	**Microbiology Practical V**	1. Execute isolation of symbiotic, non-symbiotic nitrogen fixing bacteria. 2. Demonstrate staining and identification of plant pathogens. 3. Perform biological oxygen demand, chemical oxygen demand and most probable number to check water quality.
DSCC	**UMB203A52**	**Microbiology VI [Immunology and Medical Microbiology]**	1. Explain the humoral and cell mediated immune response, cells and organs of the immune system. 2. Illustrate the types and properties of antigens, structure and classes of immunoglobulins and mechanisms of antigen and antibody interactions. 3. Appraise the concepts of immunization and hypersensitivity. 4. Summarize the etiology, symptoms diagnosis and treatment cholera, typhoid, tuberculosis, bacillary dysentery, tetanus, pox, hepatitis b, amebiasis, malaria and candidiasis. 5. Assess the classification and mode of action of antibiotics.
DSCL	**UMB2L2A52**	**Microbiology Practical VI**	1. Perform blood grouping, differential count of WBC, WIDAL and VDRL tests. 2. Demonstrate agglutination and precipitation reactions. 3. Trace the amount of albumin, reducing sugar and cholesterol in urine sample. 4. Execute the bacterial sensitivity to antibiotic by disc diffusion method.
DSCC	**BCH203A51**	**Biochemistry V [Advanced Bimolecular Chemistry]**	1. Assess the functions of biomolecules in cell organelles. 2. Classify carbohydrates, amino acids, lipids and its structural configuration 3. Illustrate properties and biological importance of biomolecules 4. Composition, functions and structure of membrane models. 5. Analyze the concept of bioenergetics in spontaneous biochemical reactions.
DSCL	**BCH2L2A51**	**Biochemistry Practical V**	1. Trace the concentration of blood glucose, amino acids, calcium and ascorbic acid in biological samples. 2. Adopt method to prepare casein and starch. 3. Demonstrate experiment to check the quality of lipid.
DSCC	**BCH203A52**	**Biochemistry VI [Enzymes and Enzyme Technology]**	1. Explain classification, properties, characterization and mechanism of enzymes. 2. Illustrate the kinetics involved in inhibition and regulation of enzymes. 3. Appraise the role of coenzymes, cofactors in the action of enzymes. 4. Assess the industrial production of enzymes from biological sources and enzyme immobilization. 5. Illustrate the applications of enzymes in clinical diagnosis.
DSCL	**BCH2L2A52**	**Biochemistry practical VI**	1. Demonstrate the preparation of crude enzymes. 2. Execute enzyme assay of amylase and acid phosphatase. 3. Perform optimization of factors affecting enzyme activity.
DSCC	**GEN203A51**	**Genetics V [Developmental Biology and Genetics]**	1. Illustrate the fundamental process of early development in animals and plants 2. Interpret the differential gene expression during early development 3. Describe the processes in human embryogenesis

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

			4. Associate human developmental abnormalities with teratogens
DSCL	**GEN2L2A51**	**Genetics Practical V**	1. Perform the mounting and shell-less culture of chick embryo and identify the developmental stages 2. Demonstrate the dissection and mounting of imaginal discs of drosophila 3. Demonstrate the sectioning of animal and plant tissues using microtomy
DSCC	**GEN203A52**	**Genetics VI [Basic Human Genetics]**	1. Outline the nomenclature of human chromosomes and the role of flow karyotyping and Fluorescence Activated Cell Sorting (FACS) in chromosome analysis. 2. Relate inheritance patterns to human genetic disorders
DSCL	**GEN2L2A52**	**Genetics Practical VI**	1. Trace the relationship of Mendelian traits in a population 2. Create a karyogram and distinguish normal and abnormal human karyotypes 3. Demonstrate preparation of blood smear to observe sex chromatin body in Neutrophils and blood cell counting using Haemocytometer 4. Construct pedigree chart and interpret inheritance pattern 5. Adopt rolling finger method to record and quantify finger print patterns.
NCCC	**EEC5A2A51**	**Extra-Curricular and Extension Activities as per Annexure II**	1. Adopt self-awareness, empathy, creative thinking, critical thinking, coping with emotions and stress for intra-personal effectiveness 2. Develop communication skills, inter-personal skills, problem solving and decision making skills for inter-personal effectiveness

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

VI Semester

Course Type	Course Code	Course Title	Course Outcomes
DSCC	**UMB203A61**	**Microbiology VII [Food and Dairy Microbiology]**	1. Evaluate the causative organism of spoilage of food samples and food contamination. 2. Summarize the principles and methods of food preservation. 3. Interpret the food intoxication by bacteria and fungi. 4. Judge the contamination, preservation of milk and evaluate the quality of milk sample. 5. Illustrate the process of fermented milk products
DSCL	**UMB2L2A61**	**Microbiology Practical VII**	1. Demonstrate the adulteration in milk sample by starch and formaldehyde tests. 2. Perform isolation of microorganisms from fermented foods by Standard Plate Count (SPC). 3. Estimate the amount of lactose and fat content in milk. 4. Trace the quality of milk by Methylene blue reduction test (MBRT).
DSCC	**UMB203A62**	**Microbiology VIII [Industrial Microbiology and Microbial Technology]**	1. Appraise the process of screening and selection of industrially important microorganisms. 2. Illustrate the process of fermentation. Compare the design and functioning of fermenters. 3. Integrate the techniques of downstream processing for the separation and purification of products. 4. Sketch the production of alcoholic beverage, organic acid, antibiotic, amino acid, vitamin, enzyme, fermented foods and single cell protein.
DSCL	**UMB2L2A62**	**Microbiology Practical VIII**	1. Perform culture of Spirulina, Aspergillus and Yeast. 2. Execute citric acid, lactic acid, lactose and alcohol estimation. 3. Demonstrate immobilization of yeast cells using gel entrapment. 4. Customize the method of wine preparation
DSCC	**BCH203A61**	**Biochemistry VII [Intermediary Metabolism]**	1. Relate the process of anabolism, catabolism with metabolic pathways in cells and energy conservation. 2. Describe the pathways involved in synthesis of biomolecules. 3. Summarize the metabolic pathway and energetics involved in carbohydrates, proteins, lipids and nucleic acids. 4. Explain the role of electron transport chain in cellular respiration.
DSCL	**BCH2L2A61**	**Biochemistry Practical VII**	1. Demonstrate the concentration of glycogen from liver. 2. Perform experiment to estimate glucose, ketoses, nucleic acid from biological samples. 3. Adopt a method to estimate chlorophyll from green leaves
DSCC	**BCH203A62**	**Biochemistry VIII [Clinical Biochemistry]**	1. Describe the biochemical basis of disorders due to errors in carbohydrate, lipid, amino acid & nucleic acid metabolism. 2. Illustrate the clinical manifestations of metabolic disorders. 3. Interpret the gastric, pancreatic and intestinal function test. 4. Analyze the types of liver and kidney function test for diagnosis.
DSCL	**BCH2L2A62**	**Biochemistry Practical VIII**	1. Perform the biochemical tests to determine the level of urea and uric acid from clinical sample. 2. Trace the levels of liver function enzymes. 3. Adopt a method to estimate the level of blood glucose and cholesterol.

Programme Matrix: Bachelor of Science - Microbiology, Biochemistry and Genetics [2019 Batch]

DSCC	**GEN203A61**	**Genetics VII [Population and Biometric Genetics]**	1. Trace the phylogenetic relationship and evolution of Homo sapiens 2. Describe the theories of biological evolution and mechanisms of speciation.. 3. Relate the effect of evolutionary agents on Hardy-Weinberg equilibrium. 4. Illustrate the principle and mechanism of quantitative inheritance. 5. Appraise the effect of polygenes on the phenotype.
DSCL	**GEN2L2A61**	**Genetics Practical VII**	1. Perform the estimation of allele and genotype frequencies of MN Blood type, effect of selection and genetic drift in a population. 2. Adopt rolling finger method to record and quantify finger print pattern of Downs and Klinefelters syndrome. 3. Construct pedigree chart and interpret inheritance pattern in genetic disorders 4. Solve the problems on quantitative inheritance and heritability.
DSCC	**GEN203A62**	**Genetics VIII [Applied Genetics]**	1. Explain the Germplasm activities and importance of Biodiversity conservation 2. Describe the methods and applications of breeding in animals, concept of Heterosis and hybrid vigour in plants 3. Summarize the methods of plant tissue and animal cell culture 4. Appraise the application of genetics in production of biopharmaceuticals, diagnostic kits, molecular markers and forensic science 5. Describe the fundamentals of bioinformatics and biological databases.
DSCL	**GEN2L2A62**	**Genetics Practical VIII**	1. Demonstrate pollen fertility in Catharanthusroseus and Hibiscus rosa-sinensis. 2. Perform WIDAL and VDRL tests using diagnostic kits. 3. Adopt BLAST and FASTA tools to interpret the homology of DNA and protein sequence. 4. Execute the protocol and isolate protoplast.
DSEP	**LSC2P2A61**	**Project**	1. Demonstrate sound knowledge and skills on the research topic 2. Design and conduct experiments individually 3. Interpret the results of research 4. Report research findings orally and in manuscripts