



## FACULTY OF SCIENCES

### Programme Matrix: Bachelor of Science – Microbiology, Genetics [2023 Batch]

#### Programme Outcomes

After successful completion of B.Sc. Honours in Microbiology / Genetics, a student will be able to:

PO1: integrate scientific temper and spirit of enquiry

PO2: apply scientific knowledge and skills ethically for societal development and entrepreneurship

PO3: apply microbiological concepts to address the needs of the society

PO4: evaluate the biological diversity of microbes and their impact on health, agriculture and environment

PO5: articulate genetic and biomolecular processes of inheritance, development, mutation, genetic change, plant and animal physiological processes, and epigenetics

PO6: apply genetic concepts in identifying issues related to health and disease, food and environmental sustainability.

PO7: design and execute ethical research in biological sciences

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KRISTU JAYANTI COLLEGE AUTONOMOUS  
K. Narayanapura, Kothanur PO  
Bengaluru - 560077



**Programme Matrix: Bachelor of Science – Microbiology, Genetics [2023 Batch]**

<b>I Semester</b>			
<b>Course Type</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Outcomes</b>
DSC	21UMG2T411	General Microbiology	<ol style="list-style-type: none"> <li>1. Appraise the contributions of Microbiologists during the 19th century</li> <li>2. Differentiate microorganisms based on morphology and characters</li> <li>3. Describe the working principle and applications of compound and electron microscope</li> <li>4. Apply the principle and procedure of staining to observe fungi and bacteria</li> <li>5. Illustrate the methods of sterilization and preservation adopted in microbiology laboratory.</li> </ol>
DSC	21UMG2L211	General Microbiology Practical	<ol style="list-style-type: none"> <li>1. Follow safety measures and aseptic techniques in the Microbiology laboratory</li> <li>2. Formulate a culture media for a given organism</li> <li>3. Perform Simple, Gram's, Endospore and Capsule staining to observe bacteria.</li> </ol>
DSC	21GEN2T411	Principles of Genetics	<ol style="list-style-type: none"> <li>1. Outline Mendel's experimental design and familiarize with classical genetic terminologies</li> <li>2. Describe Mendel's principles of segregation, independent assortment and genetic outcomes utilizing branch diagrams and Punnett squares</li> <li>3. Interpret various types of gene interactions</li> <li>4. Comprehend the significance of multiple factor inheritance</li> <li>5. Summarize chromosomal, hormonal and environmental modes of sex determination.</li> </ol>
DSC	21GEN2L211	Principles of Genetics Practical	<ol style="list-style-type: none"> <li>1. Understand the handling of microscopes and lifecycles of model organisms</li> <li>2. Demonstrate the method of Drosophila culture and human blood grouping</li> <li>3. Identify and correlate the presence of Barr body and drumsticks in females</li> <li>4. Perform genetic crosses and solve problems on multiple alleles, gene interaction and polygenes.</li> </ol>
AECC	22ENG1T312	Musings in English Literature	<ol style="list-style-type: none"> <li>4. Articulate the relevant issues of society through the imbibed knowledge of prose</li> <li>5. Identify and appreciate nuances of poetry</li> <li>6. Implement the basic concepts of grammar and its usage.</li> </ol>
AECC	21KANIT312	Saahithya Sangama I	<ul style="list-style-type: none"> <li>• ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ವಿವಿಧ ಸಾಮಾಜಿಕ ಮೌಲ್ಯ ಮತ್ತು ಜವಾಬ್ದಾರಿಗಳನ್ನು ಅರಿಯುವರು.</li> <li>• ಭಾಷಾ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು.</li> <li>• ವಿದ್ಯಾರ್ಥಿಗಳು ತಮ್ಮ ಜೀವನದ ಸೃಜನಶೀಲತೆಯ ಮಹತ್ವವನ್ನು ಚರ್ಚಿಸುವರು.</li> <li>• ಹದಿಹರೆಯ ವಯಸ್ಸಿನ ಸಮಸ್ಯೆಗಳು ಹಾಗೂ ಪರಿಹಾರಗಳನ್ನು ವಿಶ್ಲೇಷಿಸುವರು.</li> <li>• ಜೀವನದಲ್ಲಿ ಮಾನವ ಪಡೆಯಬೇಕಾದ ಯಶಸ್ಸಿನ ಹಾದಿಯನ್ನು ವಿವರಿಸುವರು.</li> </ul>

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AECC	21HIN1T312	Hindi Kahani aur Prayajanmulak Hindi	1: हिन्दी कहानी विधा का ज्ञान ग्रहण करने की क्षमता का विकास। 2: विद्यार्थियों में सामाजिक यथार्थ और मुल्यांकन करने का विकास। 3: विद्यार्थियों में कहानी विधा का वर्णन करने की क्षमता का विकास। 4: विद्यार्थियों में कहानी का विश्लेषण और भाषा कौशल में प्रवीणता।
AECC	22AEN1T311	Listening and Comprehension in English	1. Identify the barriers to listening and describe the key components that contribute to effective listening 2. Use their grammatical knowledge to refine their speech and writing 3. Analyse complex human situations and challenges that emerge from the prescribed texts

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II Semester			
Course Type	Course Code	Course Title	Course Outcomes
DSC	21UMG2T421	Microbial Physiology and Biochemistry	<ol style="list-style-type: none"> <li>1. Explain the properties of chemical bonds and hybridization pattern</li> <li>2. Apply the concept of acids and bases in determining the pH</li> <li>3. Series classify and assess physical and chemical properties of biomolecules</li> <li>4. Illustrate cell membrane function and transport mechanisms and familiarize concepts on microbial growth and measurement</li> <li>5. Explain the characteristics and process of photosynthesis in bacteria and cultivation of bacteria using pure culture techniques and anaerobiosis.</li> </ol>
DSC	21UMG2L221	Microbial Physiology and Biochemistry Practical	<ol style="list-style-type: none"> <li>1. Prepare standard solutions</li> <li>2. Adopt methods to estimate biomolecules</li> <li>3. Perform the biochemical tests for the identification of bacteria</li> <li>4. Trace the effect of pH and temperature on growth of bacteria.</li> </ol>
DSC	21GEN2T421	Cell Structure and Dynamics	<ol style="list-style-type: none"> <li>1. Appraise properties of cells and principles of microscopy</li> <li>2. Summarize the ultrastructure of prokaryotic cell and cell motility</li> <li>3. Illustrate the ultrastructure of eukaryotic cell, structure and function of organelles</li> <li>4. Appraise the mechanism of biogenesis of Mitochondria, Chloroplast, Endoplasmic Reticulum and Golgi Complex</li> <li>5. Describe the stages in cell cycle, cell division and mechanism of programmed cell death</li> </ol>
DSC	21GEN2L221	Cell Structure and Dynamics Practical	<ol style="list-style-type: none"> <li>1. Execute differential staining of Paramecium and Yeast</li> <li>2. Perform temporary slide preparation and identification of stages of mitosis and meiosis using onion flower buds</li> <li>3. Understand the calculation of numerical aperture</li> <li>4. Demonstrate the experiment to isolate chloroplast.</li> </ol>
AECC	22ENG1T322	Glimpses: Readings from English Literature	<ol style="list-style-type: none"> <li>1. Identify the themes and relevant issues through the study of prose and poetry</li> <li>2. Develop the skill to identify the pertinent themes and characters in the novel</li> <li>3. Implement new approaches in speaking and writing skills.</li> </ol>
AECC	21KAN1T322	Saahithya Sangama II	<ol style="list-style-type: none"> <li>1: ಸಾಹಿತ್ಯದಲ್ಲಿ ವ್ಯಕ್ತವಾಗಿರುವ ಮಾನವೀಯ ಮೌಲ್ಯಗಳನ್ನು ಅರಿಯುವರು</li> <li>2: ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ಸಾಮಾಜಿಕ ಮೌಲ್ಯಗಳನ್ನು ಅರಿಯುವರು.</li> <li>3: ಯುದ್ಧದಿಂದಾಗುವ ಅನಾಹುತಗಳನ್ನು ಅರಿಯುವರು.</li> <li>4: ಮಾನ್ಯವಿಲ್ಲದ ಜಾತಿ ಬೇಧಭಾವಗಳ ಬಗ್ಗೆ ಅರಿಯುವರು.</li> <li>5: ಜೀವನ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು.</li> </ol>

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AECC	21HIN1T322	Hindi Kavitha aur Anuvaad Koushal	1: हिन्दी कविता का विश्लेषण एवं समझने की योग्यता का विकास। 2: विद्यार्थियों में सामाजिक यथार्थ और मूल्यांकन करने का विकास। 3: कविता में वर्णित कथा का वर्णन एवं काव्य सृजन करने का विकास। 4: अनुवाद एवं भाषा कौशल में प्राविण्यता।
AECC	22AEN1T321	Conversation Practice in English	1. Acquaint students with listening skills and grammar. 2. Enable students to analyse the prescribed texts based on relevant themes. 3. Introduce students to varied genres of writing in English.
AECC	21EVS1T321	Environmental Studies	1. Understand the concept of Environment and ecosystems 2. Gain knowledge on various components controlling the stability of ecosystem 3. Understand the Policies and laws pertaining to the welfare of life forms.

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III Semester			
Course Type	Course Code	Course Title	Course Outcomes
DSC	21UMG2T431	Bacteriology and Virology	<ol style="list-style-type: none"> <li>1. Relate the systems of classification of bacteria</li> <li>2. Assess the characteristics and significance of typical and a typical prokaryotes</li> <li>3. Illustrate structure, classification and properties of viruse</li> <li>4. Explain in vivo and in vitro cultivation of viruses.</li> </ol>
DSC	21UMG2L231	Bacteriology and Virology Practical	<ol style="list-style-type: none"> <li>1. Isolate bacteria and study the cultural characteristics of bacteria on respective media</li> <li>2. Isolate the bacterial and plant viruses form the respective hosts</li> <li>3. Identify the cytopathic effects caused by various viruses.</li> </ol>
DSC	21GEN2T431	Cytogenetics	<ol style="list-style-type: none"> <li>5. Outline the organization of eukaryotic chromosome, chromosome ultrastructure and giant chromosomes</li> <li>6. Describe the concept of linkage and chromosomal non-disjunction</li> <li>7. Comprehend the mechanism of crossing over and its significance</li> <li>8. Interpret structural chromosomal aberrations and the consequences</li> <li>9. Summarize numerical chromosomal aberrations and the consequences.</li> </ol>
DSC	21GEN2L231	Cytogenetics Practical	<ol style="list-style-type: none"> <li>1. Perform mitosis and determine the mitotic index</li> <li>2. Demonstrate the identification of mutants of Drosophila and C. elegans</li> <li>3. Perform the dissection of salivary gland and prepare polytene chromosome</li> <li>4. Execute temporary slide preparation to identify chromosomal translocation in Rhoeco discolor.</li> </ol>
AECC	21ENG1T332	Symphony of English Literature	<ol style="list-style-type: none"> <li>1. Identify the themes and relevant issues through the study of prose and poetry</li> <li>2. Develop the skill to identify the pertinent themes and characters in the novel</li> <li>3. Implement new approaches in speaking and writing skills.</li> </ol>
AECC	21KAN1T332	Saahithya Sangama III	<ol style="list-style-type: none"> <li>1: ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ವಿವಿಧ ಸಾಮಾಜಿಕ ಮೌಲ್ಯ ಮತ್ತು ಜವಾಬ್ದಾರಿಗಳನ್ನು ಅರಿಯುವರು.</li> <li>2: ಭಾಷಾ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು.</li> <li>3: ವಿದ್ಯಾರ್ಥಿಗಳು ತಮ್ಮ ಜೀವನದ ವರ್ತಮಾನದ ಘಟನೆಗಳ ಕುರಿತು ಚರ್ಚಿಸುವರು.</li> <li>4: ಹದಿಹರೆಯ ವಯಸ್ಸಿನಲ್ಲಿ ಅರಿಯಬೇಕಾಗಿರುವ ಶಾಂತಿ-ಸೌಹಾರ್ದತೆಯ ಕುರಿತು ವಿಶ್ಲೇಷಿಸುವರು.</li> <li>5: ಜೀವನದಲ್ಲಿ ಮಾನವನು ಬೆಳೆಸಿಕೊಳ್ಳಬೇಕಾದ ಬಹುಮುಖ್ಯ ಅದರ್ಶ, ತತ್ವಗಳ ಕುರಿತು ಚರ್ಚಿಸುವರು.</li> </ol>

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AECC	21HIN1T332	Hindi Natak Sahitya aur Sanchar Maadhyam evam Hindi	1:हिन्दी नाटक विधा को समझना और अभिनय करने की योग्यता का विकास। 2:विद्यार्थियों में सामाजिक यथार्थ और मुल्यांकन करने का विकास। 3: नाटक लेखन और पठन में रुचि एवं सृजनात्मक कौशल्य का विकास। 4: संचार माध्यम कला में प्राविण्यता।
AECC	21AEN1T331	Essential English Reading	1. Recognize the techniques of effective reading and demonstrate their competence in comprehension. 2. Articulate their thoughts and structure written compositions as needed in official contexts 3. Formulate their responses to contemporary challenges that emerge from the prescribed texts.

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IV Semester			
Course Type	Course Code	Course Title	Course Outcomes
DSC	21UMG2T441	Eukaryotic Microbiology	<ol style="list-style-type: none"> <li>1. Point out the distribution, morphology and life cycle of major classes of algae, fungi and protozoa</li> <li>2. Analyze the structure and reproduction of algae, fungi and protozoa</li> <li>3. Evaluate the biological and economic importance of algae and fungi.</li> </ol>
DSC	21UMG2L241	Eukaryotic Microbiology Practical	<ol style="list-style-type: none"> <li>1. Perform the isolation and cultivation of protozoa, fungi and algae</li> <li>2. Demonstrate growth assessments of fungi</li> <li>3. Isolate epiphytic and endophytic fungi from leaves</li> <li>4. Formulate algal culture media for establishment of algae in large scale.</li> </ol>
DSC	21GEN2T441	Molecular Genetics	<ol style="list-style-type: none"> <li>1. Appreciate and illustrate the chemical composition of the genetic material and its multiplication</li> <li>2. Describe the organization of viral, prokaryotic and eukaryotic genomes</li> <li>3. Explain the process of gene expression in prokaryotes and eukaryotes</li> <li>4. Explain the concept of transposition, mutation and DNA repair mechanism</li> <li>5. Appraise the molecular techniques and its applications in diagnostic and research.</li> </ol>
DSC	21GEN2L241	Molecular Genetics Practical	<ol style="list-style-type: none"> <li>1. Understand the working principle and handling of instruments</li> <li>2. Perform the isolation of DNA from various sources</li> <li>3. Characterize the eye pigments in Drosophila using paper chromatography</li> <li>4. Demonstrate the effects of mutation and appraise the applications of molecular markers.</li> </ol>
AECC	21ENG1T342	Ruminations of English Literature	<ol style="list-style-type: none"> <li>1. Articulate the relevant social issues and thematic representation in prose and poetry</li> <li>2. Analyse the characters, plot, setting and themes of novel</li> <li>3. Acquire vital employability skills and employment opportunities with in-depth knowledge of writing skills.</li> </ol>
AECC	21KAN1T342	Saahithya Sangama IV	<ol style="list-style-type: none"> <li>1: ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ವಿವಿಧ ಸಾಮಾಜಿಕ ಮೌಲ್ಯ ಮತ್ತು ಜವಾಬ್ದಾರಿಗಳನ್ನು ಅರಿಯುವರು.</li> <li>2: ಭಾಷಾ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು.</li> <li>3: ವಿದ್ಯಾರ್ಥಿಗಳು ತಮ್ಮ ಜೀವನದಲ್ಲಿ ಧಾರ್ಮಿಕ ಸಹಿಷ್ಣುತೆಯ ಮಹತ್ವವನ್ನು ಚರ್ಚಿಸುವರು.</li> <li>4: ಶ್ರೀಸಾಮಾನ್ಯನ ಬದುಕಿನ ಸಮಸ್ಯೆಗಳು, ಬವಣೆಗಳು ಹಾಗೂ ಪರಿಹಾರಗಳನ್ನು ವಿಶ್ಲೇಷಿಸುವರು.</li> <li>5: ದಮನಿತ ಲೋಕದ ಶೋಷಣೆಯ ಭಿನ್ನ ರೂಪಗಳ ಕುರಿತು ಚರ್ಚಿಸುವರು.</li> </ol>
AECC	21HIN1T342	Hindi Laghu Upanyas aur Bhasha Ke Vividh Roop	<ol style="list-style-type: none"> <li>1: हिंदी उपन्यासों का ज्ञान ग्रहण और समझने की योग्यता का विकास।</li> <li>2: विद्यार्थियों में सामाजिक यथार्थ और मुल्यांकन करने का विकास।</li> <li>3: लघु उपन्यास की कथा का वर्णन और विश्लेषण करने की क्षमता का विकास।</li> <li>4: भाषा के विविध रूपों एवं भाषा कौशल में प्राविण्यता।</li> </ol>

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AECC	21AENIT341	Fundamentals of English Written Communication	1. Examine the features of effective writing and demonstrate their skills in complex, non-formulaic writing 2. Identify and fix common stylistic errors in written English 3. Analyze the representation of cross-cutting issues in literary works.
AECC	21INCIT341	India and Indian Constitution	4. Evaluate the philosophy of the Constitution and its structure 5. Appraise the powers and functions of various offices under the Constitution 6. Analyze the Indian values, Ideals and the role of Constitution in a Democracy.

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