

Programme Matrix: Bachelor of Science – Biotechnology, Botany [2023 Batch]



# Kristu Jayanti College

**AUTONOMOUS**

**Bengaluru**

Reaccredited 'A++' Grade by NAAC | Affiliated to Bengaluru North University

## FACULTY OF SCIENCES

Programme Matrix: Bachelor of Science – Biotechnology, Botany [2023 Batch]

### Programme Outcomes

After successful completion of B.Sc. Honours in Biotechnology / Botany, 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: demonstrate disciplinary and interdisciplinary knowledge and skill in biotechnology

PO4: employ biotechnological practices in addressing the current and future needs in food, health and environment

PO5: classify the major taxa and appraise processes and functions related to morphology, anatomy, embryology, physiology and biochemistry of plants

PO6: apply botanical knowledge and skills in areas of food, environmental sustainability and health

PO7: design and execute ethical research in biological sciences

Date of Approval: 10/2/2023

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K. Narayanapura, Kothanur PO  
Bengaluru - 560077



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<b>I Semester</b>			
<b>Course Type</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Outcomes</b>
DSC	21BTG2T411	Cell Biology	<ol style="list-style-type: none"> <li>1. Explain the structure of Prokaryotic and eukaryotic cells, functions of the cell and the fundamentals of microscopy</li> <li>2. Review the structural and functional organization of cell organelles</li> <li>3. Appraise the mechanisms of cell motility</li> <li>4. Relate to the mechanism of cell division and programmed cell death</li> <li>5. Appraise the mechanism of cell signaling.</li> </ol>
DSC	21BTG2L211	Cell Biology Practical	<ol style="list-style-type: none"> <li>1. Explain the structure of Prokaryotic and eukaryotic cells, functions of the cell and the fundamentals of microscopy</li> <li>2. Review the structural and functional organization of cell organelles</li> <li>3. Appraise the mechanisms of cell motility</li> <li>4. Relate to the mechanism of cell division and programmed cell death</li> <li>5. Appraise the mechanism of cell signaling.</li> </ol>
DSC	21BOT2T411	Microbial Diversity and Techniques	<ol style="list-style-type: none"> <li>1. Understand the fascinating diversity, evolution, and significance of microorganisms</li> <li>2. Comprehend the systematic position, structure, physiology and life cycle of microbes</li> <li>3. Analyse the diseases caused by various microbes in nature and their impact on human and environment</li> <li>4. Apprise the techniques involved in microscopy and microbial culture techniques</li> <li>5. Summarize the applications of microbial study in research, industry and society at large</li> </ol>
DSC	21BOT2L211	Microbial Diversity and Techniques Practical	<ol style="list-style-type: none"> <li>1. Experiment the safety measures and appliances of laboratory</li> <li>2. Identify the diverse micro flora</li> <li>3. Review the pathogenesis of microorganisms.</li> </ol>
AECC	22ENG1T312	Musings in English Literature	<ol style="list-style-type: none"> <li>1. Articulate the relevant issues of society through the imbibed knowledge of prose</li> <li>2. Identify and appreciate nuances of poetry</li> <li>3. 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	21HINIT312	Hindi Kahani aur Prayajanmulak Hindi	<ol style="list-style-type: none"><li>1: हिन्दी कहानी विधा का ज्ञान ग्रहण करने की क्षमता का विकास।</li><li>2: विद्यार्थियों में सामाजिक यथार्थ और मुल्यांकन करने का विकास।</li><li>3: विद्यार्थियों में कहानी विधा का वर्णन करने की क्षमता का विकास।</li><li>4: विद्यार्थियों में कहानी का विश्लेषण और भाषा कौशल में प्रवीणता।</li></ol>
- AECC	22AENIT311	Listening and Comprehension in English	<ol style="list-style-type: none"><li>1. Identify the barriers to listening and describe the key components that contribute to effective listening</li><li>2. Use their grammatical knowledge to refine their speech and writing</li><li>3. Analyse complex human situations and challenges that emerge from the prescribed texts</li></ol>

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<b>II Semester</b>			
<b>Course Type</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Outcomes</b>
DSC	21BTG2T421	Microbiology and Microbial Techniques	<ol style="list-style-type: none"> <li>1. Explain the fundamentals of microscopy and staining used in microbiology</li> <li>2. Appraise the essential concepts of sterilization techniques</li> <li>3. Decipher the various culture techniques</li> <li>4. Review the different antimicrobial agents.</li> </ol>
DSC	21BTG2L221	Microbiology and Microbial Techniques Practical	<ol style="list-style-type: none"> <li>1. Demonstrate safety measures, instrumentation and sterilization methods in a Microbiology laboratory</li> <li>2. Formulate media for the isolation, culture and enumeration of microorganisms</li> <li>3. Perform fundamental staining techniques and biochemical tests for the identification of bacteria and fungi.</li> </ol>
DSC	21BOT2T421	Diversity and Conservation of Non Flowering Plants	<ol style="list-style-type: none"> <li>1. Explain the diversity, significance and affinities among Algae, Bryophytes, Pteridophytes, Gymnosperms and fossil plants</li> <li>2. Understand the morphology, anatomy, reproduction and life cycle of non-flowering plants</li> <li>3. Summarize the techniques involved in the exploration and preservation of plant fossils</li> <li>4. Analyze the economical and ecological significance of non-flowering plants</li> <li>5. Apply the techniques for mass cultivation of plants for agricultural and ornamental purposes.</li> </ol>
DSC	21BOT2L221	Diversity and Conservation of Non Flowering Plants Practical	<ol style="list-style-type: none"> <li>1. Prepare temporary slides of lower plant groups</li> <li>2. Identify the diverse plant groups by morphological and anatomical observation</li> <li>3. Obtain laboratory skills for mass cultivation of plants.</li> </ol>
AECC	22ENGIT322	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	21KANIT322	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: ಮಾನವಿಲ್ಲದ ಜಾತಿ ಭೇದಭಾವಗಳ ಬಗ್ಗೆ ಅರಿಯುವರು.</li> <li>5: ಜೀವನ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು.</li> </ol>
AECC	21HINIT322	Hindi Kavitha aur Anuvaad Koushal	<ol style="list-style-type: none"> <li>1: हिन्दी कविता का विश्लेषण एवं समझने की योग्यता का विकास।</li> <li>2: विद्यार्थियों में सामाजिक यथार्थ और मूल्यांकन करने का विकास।</li> <li>3: कविता में वर्णित कथा का वर्णन एवं काव्य सृजन करने का विकास।</li> <li>4: अनुवाद एवं भाषा कौशल में प्राविण्यता।</li> </ol>

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AECC	22AENIT321	Conversation Practice in English	<ol style="list-style-type: none"><li>1. Acquaint students with listening skills and grammar.</li><li>2. Enable students to analyse the prescribed texts based on relevant themes.</li><li>3. Introduce students to varied genres of writing in English.</li></ol>
AECC	21EVSIT321	Environmental Studies	<ol style="list-style-type: none"><li>1. Understand the concept of Environment and ecosystems</li><li>2. Gain knowledge on various components controlling the stability of ecosystem</li><li>3. Understand the Policies and laws pertaining to the welfare of life forms.</li></ol>

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III Semester			
Course Type	Course Code	Course Title	Course Outcomes
DSC	21BTG2T431	Biomolecules	<ol style="list-style-type: none"> <li>Infer the spatial configuration and structural forms of biomolecules</li> <li>Classify carbohydrates, amino acids, lipids, nucleic acids, vitamins and minerals</li> <li>Assess physical and chemical properties of carbohydrates, amino acids and lipids</li> <li>Illustrate the biological importance of biomolecules</li> <li>Explain denaturation, renaturation and packing properties of DNA.</li> </ol>
DSC	21BTG2L231	Biomolecules Practical	<ol style="list-style-type: none"> <li>Perform paper; thin layer and column chromatography for separation of analytes</li> <li>Relate the application of Beer- Lamberts law to the operational principle of colorimeter</li> <li>Execute enzyme assay of amylase</li> <li>Execute the extraction, partial purification of proteins and estimate its concentration.</li> </ol>
DSC	21BOT2T431	Plant Anatomy and Developmental Biology	<ol style="list-style-type: none"> <li>Summarize the anatomical details of plant cells and tissue system</li> <li>Distinguish the properties of wood and their economic and commercial importance</li> <li>Explain the structure and development of microsporangium and megasporangium</li> <li>Illustrate the mechanism of pollination and fertilization</li> <li>Explain the reasons of polyembryony and apomixis and its applications.</li> </ol>
DSC	21BOT2L231	Plant Anatomy and Developmental Biology Practical	<ol style="list-style-type: none"> <li>Prepare temporary anatomical slides of plant materials</li> <li>Visualize and describe the floral structure</li> <li>Identify the embryological structures of plants.</li> </ol>
AECC	21ENG1T332	Symphony of English Literature	<ol style="list-style-type: none"> <li>Identify the themes and relevant issues through the study of prose and poetry</li> <li>Develop the skill to identify the pertinent themes and characters in the novel</li> <li>Implement new approaches in speaking and writing skills.</li> </ol>
AECC	21KAN1T332	Saahithya Sangama III	<ol style="list-style-type: none"> <li>ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ವಿವಿಧ ಸಾಮಾಜಿಕ ಮೌಲ್ಯ ಮತ್ತು ಬವಾಬ್ಬಾರಿಗಳನ್ನು ಅರಿಯುವರು.</li> <li>ಭಾಷಾ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು.</li> <li>ವಿದ್ಯಾರ್ಥಿಗಳು ತಮ್ಮ ಜೀವನದ ವರ್ತಮಾನದ ಘಟನೆಗಳ ಕುರಿತು ಚರ್ಚಿಸುವರು.</li> <li>ಹದಿಹರೆಯ ವಯಸ್ಸಿನಲ್ಲಿ ಅರಿಯಬೇಕಾಗಿರುವ ಶಾಂತಿ-ಸೌಹಾರ್ದತೆಯ ಕುರಿತು ವಿಶ್ಲೇಷಿಸುವರು.</li> <li>ಜೀವನದಲ್ಲಿ ಮಾನವನು ಬೆಳೆಸಿಕೊಳ್ಳಬೇಕಾದ ಬಹುಮುಖ್ಯ ಅದರ್ಶ, ತತ್ವಗಳ ಕುರಿತು ಚರ್ಚಿಸುವರು.</li> </ol>

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AECC	21HINIT332	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	21AENIT331	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	21BTG2T441	Molecular Biology	<ol style="list-style-type: none"> <li>1. Appraise the structure of DNA and concepts of DNA replication</li> <li>2. Explain the organization of genome and recombination</li> <li>3. Describe the process of DNA damage and repair mechanisms</li> <li>4. Summarize the mechanism transcription in prokaryotes and eukaryotes</li> <li>5. Appraise the mechanisms of protein synthesis and gene regulation</li> </ol>
DSC	21BTG2L241	Molecular Biology Practical	<ol style="list-style-type: none"> <li>1. Adopt a method to isolate and estimate nucleic acids</li> <li>2. Execute precipitation and estimation of proteins from plant source</li> <li>3. Detect the mutants induced by physical and chemical agents</li> <li>4. Analyze the horizontal gene transfer techniques of conjugation and transduction.</li> </ol>
DSC	21BOT2T441	Ecology and Conservation Biology	<ol style="list-style-type: none"> <li>1. Summarize the core concepts of ecology</li> <li>2. Paraphrase the impact of ecological interactions</li> <li>3. Describe biodiversity and phytogeographical regions of India</li> <li>4. Analyze the threats caused by human intervention and management strategies for conservation of natural resources</li> <li>5. Appraise the implementation of technology and involvement of global organizations in resource management.</li> </ol>
DSC	21BOT2L241	Ecology and Conservation Biology Practical	<ol style="list-style-type: none"> <li>1. Observe and identify the ecological adaptations of plants in different habitats</li> <li>2. Analyze the usage of instruments and techniques used in ecological experiments</li> <li>3. Identify the vegetation pattern in a locality.</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, ಒಪ್ಪಣೆಗಳು ಹಾಗೂ ಪರಿಹಾರಗಳನ್ನು ವಿಶ್ಲೇಷಿಸುವರು.</li> <li>5: ದಮನಿತ ಲೋಕದ ಶೋಷಣೆಯ ಭಿನ್ನ ರೂಪಗಳ ಕುರಿತು ಚರ್ಚಿಸುವರು.</li> </ol>

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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>
AECC	21AEN1T341	Fundamentals of English Written Communication	<ol style="list-style-type: none"> <li>1. Examine the features of effective writing and demonstrate their skills in complex, non-formulaic writing</li> <li>2. Identify and fix common stylistic errors in written English</li> <li>3. Analyze the representation of cross-cutting issues in literary works.</li> </ol>
AECC	21INC1T341	India and Indian Constitution	<ol style="list-style-type: none"> <li>1. Evaluate the philosophy of the Constitution and its structure</li> <li>2. Appraise the powers and functions of various offices under the Constitution</li> <li>3. Analyze the Indian values, Ideals and the role of Constitution in a Democracy.</li> </ol>

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