Programme Matrix: Bachelor of Science- Physics, Mathematics, Computer Science [2019 Batch]

Kristu Jayanti College
AUTONOMOUS Bengaluru
Reaccredited 'A' Grade by NAAC | Affiliated to Bengaluru North University

FACULTY OF SCIENCE

B.Sc. Physics, Mathematics, Computer Science

Programme Educational Objectives

PEO1: To provide knowledge on the fundamentals and latest developments in physics.

PEO2: To familiarize the students with mathematical concepts and tools.

PEO3: To empower the students with current trends in computational sciences.

PEO4: To nurture the students with employability skills and professional ethics.

Programme Outcome

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

PSO1: Analyze the concepts and theories of physics.

PSO2: Appraise mathematical concepts and reasoning.

PSO3: Apply logical reasoning and algorithmic solutions to national and global computational problems.

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I Semester

Course Type	Course Code	Course Title	Course Outcome
AECC	**AEN103A11**	**Additional English I**	1. Describe and differentiate between 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	**HIN103B11**	**Hindi I**	• हिन्दी साहित्य के गद्य विधाओं का विश्लेषण करने की क्षमता का विकास • विद्यार्थियों में सामाजिक यथार्थ का मूल्यांकन करने का ज्ञान • सृजनात्मक कौशल्य में परिपूर्णता • गद्य विधाओं के अध्ययन करने के बाद सामाजिक मूल्यों का ज्ञान प्राप्त • अनुवाद कला और भाषा में परिशुद्धता
AECC	**KAN103B11**	**Kannada I**	• ಜಾನಪದ& ಶಿಷ್ಟ ಸಾಹಿತ್ಯದ ವ್ಯತ್ಯಾಸಚರ್ಚೆ ಮಾಡುವರು • ಸಾಮಾಜಿಕ ಸಮಾನತೆ ಮತ್ತು ಜೀವನಮೌಲ್ಯಗಳ ಪುನರಾವಲೋಕನ ಮಾಡುವರು • ಗ್ರಾಮೀಣ ಸಂಸ್ಕೃತಿಯನ್ನು ವಿವರಿಸುವರು • ಕನ್ನಡ ಭಾಷಾಪ್ರೇಮವನ್ನುಇತರೆ ಭಾಷೆಗಳೊಂದಿಗೆ ಹೋಲಿಕೆ ಮಾಡುವರು
AECC	**ENG103A11**	**English I**	1. To attune young minds to concerns and issues which have a broad and wide scope of use and application to life. 2. To cut across the history of creative expression in focusing primarily on the core values that governs human lives.
DSCC	**PHY203B11**	**Physics I [Mechanics, Thermodynamics and Kinetic Theory of Gases]**	1. Explain the concept of mechanics, thermodynamics and kinetic theory of gases 2. Evaluate the escape velocity and orbital velocity of the planets. 3. Derive and demonstrate the first law of thermodynamics. 4. Classify thermodynamic processes which are happening in our life cycle.
DSCL	**PHY2L1A11**	**Physics Practical I**	1. Design experiments and acquire data in order to explore physical principles of motions, effectively communicate results, and critically evaluate related scientific studies. 2. Adopt an understanding of thermodynamics principles effectively. 3. Solve mechanical problems in day to day life.
DSCC	**UMT204B11**	**Mathematics I [Calculus and Analytical Geometry]**	1. Construct nth derivative of f(z)=uv using Leibnitz's Theorem. 2. Evaluate partial derivatives of algebraic and transcendental functions. 3. Evaluate integral using a reduction formula. 4. Use the equations of line, plane, sphere, cone and cylinder.
DSCC	**CSC203A11**	**Computer Science I [Programming in C]**	1. Design flowchart and algorithms for C program. 2. Construct sequential, iterative problems and input/output operations on text files. 3. Differentiate between decision control structures and loop control structures. 4. Distinguish between data representation through arrays, functions, function using pointers, structures and unions.
DSCL	**CSC2L1A11**	**Computer Science Practical I**	1. Trace sequential, decision making and iterative C programs. 2. Design user defined data types and functions in C language.

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II Semester

Course Type	Course Code	Course Title	Course Outcome
MIL [Any ONE to be Opted]			
AECC	**AEN103A21**	**Additional English II**	1. To provide the young learners an introduction to new ideas and issues that bear relevance to our life today. 2. To give the students an opportunity to develop values that will help them adapt to the changing world.
AECC	**HIN103B21**	**Hindi II**	• काव्य अध्ययन मे संगीतात्मक शैली को समझ लेता है • काव्य विशलेषण करने की क्षमता • काव्य में निहित विचारों का मूल्यांकन • काव्य सृजन करने का कौशल्य • व्याकरणिक भाषा का ज्ञान एवं स्पष्टता
AECC	**KAN103B21**	**Kannada II**	• ಕನ್ನಡ ಸಾಹಿತ್ಯದಲ್ಲಿನ ಭಾಷಾ ಮಡಿವಂತಿಕೆಯ ವಿವರಣೆ ತಿಳಿಯುವರು • ಪುರಾಣ ಕಾವ್ಯಗಳಲ್ಲಿನ ಸಾಂಸ್ಕೃತಿಕ ಮುಖಾಮುಖಿಯ ವಿಶ್ಲೇಷಣೆ ಮಾಡುವರು • ನಾಟಕಗಳಲ್ಲಿನ ಪರಿಸರ ವರ್ಣನೆಯ ಪುನರಾವಲೋಕನ ಕೈಗೊಳ್ಳುವರು • ವೃತ್ತಿಆಧಾರಿತ ವ್ಯವಸ್ಥೆ ಬಗ್ಗೆ ಚರ್ಚಿಸುವರು
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 the ecosystem.
DSCC	**PHY203B21**	**Physics II [Properties of Matter, Relativity and Thermodynamics]**	1. Distinguish SHM and motion of particles. 2. Infer the concept of relativity and calculate the speed of the light. 3. Calculate mass - energy equivalence of a system of particles.
DSCL	**PHY2L1A21**	**Physics Practical II**	1. Prepare set-ups to perform experiments related to thermal conductivity and rigidity modulus. 2. Construct the applications of simple harmonic motion.
DSCC	**UMT204B21**	**Mathematics II [Algebra and Differential Calculus]**	1. Identify algebraic structures as groups. Construct pedal equation, radius of curvature and evolute. 2. Explain singular point, asymptote and envelope. 3. Solve first order linear and homogeneous differential equations.

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DSCC	**CSC203A21**	**Computer Science II [Data Structures]**	1. Explain data structures, dynamic memory management and usage of pointer variables. 2. Differentiate operations associated with arrays, linked lists, stacks, queues and trees. 3. Design recursive procedures, sorting and searching algorithms for data structure applications.
DSCL	**CSC2L1A21**	**Computer Science Practical II**	1. Write programs explaining the data structures operations. 2. Develop programs for searching and sorting techniques. 3. Execute recursive functions for tower of Hanoi and binomial coefficient.

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III Semester

Course Type	Course Code	Course Title	Course Outcome
MIL [Any ONE to be Opted]			
AECC	**AEN103A31**	**Additional English III**	1. Appreciate the theme of love and suspense in the works of Alfred Noyes, Robert Southey, Sir Arthur Conan Doyle and Shakespeare 2. Discover the sufferings of human being in the works of Tagore, Mary Fisher, Charley Chaplin, John Stainbeck and Philip Larkin 3. Analyses the dramatic techniques in the prescribed one act play 4. Outline the difference between essay writings and precis writing 5. Develop the interest on poem and prose
AECC	**HIN103B31**	**Hindi III**	• हिन्दी कविता और खण्डकाव्य के भेद को समझलेता है • पौराणिक कथा का विश्लेषण • पौराणिक आदर्श विचारों का अनुकरण करता है • आधुनिक और पौराणिक विचारों का मुल्यांकन • काव्य सृजन शैली का विकास
AECC	**KAN103B31**	**Kannada III**	• ಕನ್ನಡ ಸಾಹಿತ್ಯದ ವಿವಿಧ ಪ್ರಕಾರಗಳನ್ನು ಪರಿಚಯಿಸುತ್ತದೆ • ಮಧ್ಯಕಾಲೀನಯುಗದ ಭಕ್ತಿ ಪರಂಪರೆಯೊಂದಿಗೆ ಬದುಕಿನ ವಾಸ್ತವತೆಯನ್ನು ಹೋಲಿಸಿ ಚರ್ಚಿಸುವರು • ಭಾಷೆಯ ಕೌಶಲ್ಯಗಳೊಂದಿಗೆ ವಿಜ್ಞಾನ ಹಾಗೂ ತಾಂತ್ರಿಕ ಚಿಂತನೆಗಳನ್ನು ಗ್ರಹಿಸಲು ಅಗತ್ಯ ಕ್ರಮಗಳನ್ನು ಅರಿಯುವರು • ಯುವಜನಾಂಗವುಅಭಿವೃದ್ಧಿಯಜಗತ್ತಿನಲ್ಲಿ ಹೊಂದಾಣಿಕೆಯಾಗಲು ಸಂವಹನ ಕೌಶಲ್ಯಗಳ ಅಗತ್ಯತೆಯನ್ನುಚರ್ಚಿಸುವರು • ಧರ್ಮ ಮತ್ತು ಪರಂಪರೆಗಳ ಕುರಿತು ಪುನರಾವಲೋಕನ ಮಾಡುವರು
Compulsory Courses			
AECC	**ENG103A31**	**English III**	1. State the problems of a man and the significance of parental affection in real life 2. Review the historical background of true events in roman history 3. Extrapolate the reflections on the lives of writers in literary genres 4. Interpret the significance of English literature in the forms of movies and serials in media 5. Formulate the structure of oral and written presentations and develop speaking skills
DSCC	**PHY203B31**	**Physics III [Electricity and Magnetism]**	1. Distinguish between DC and transient currents. 2. Discuss the concept of magnetic field, forces and electromagnetic waves. 3. Demonstrate the concepts of thermoelectricity and thermoelectric series.
DSCL	**PHY2L1A31**	**Physics Practical III**	1. Design current and voltage theorem circuits. 2. Develop working electronic models based on thermoelectric series experiments.
DSCC	**UMT204B31**	**Mathematics III [Algebra, Differential Calculus, Improper**	1. Explain cyclic group and Lagrange's theorem.

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		Integrals and Linear Programming]	2. Evaluate limit of algebraic and transcendental function using L' Hospital's Rule. 3. Evaluate integral using beta and gamma functions. 4. Formulate a given simplified definition as a linear programming problem and solve using graphical or simplex methods.
DSCC	**CSC203A31**	**Computer Science III [Java Programming]**	1. Compare Procedural and Object-oriented Programming Paradigms. 2. Construct windows and frame based GUI applications using control fundamentals. 3. Construct windows and AWT based applications using control fundamentals.
DSCL	**CSC2L1A31**	**Computer Science Practical III**	1. Build sequential, decision making and iterative Java programs. 2. Design GUI based applications using applets and frames.
SEC	**SSP4L2A01**	**Soft Skills Practices**	1. Build verbal/oral communication, leadership and listening skills. 2. Perform group discussion, presentations and personal interview.

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IV Semester

Course Type	Course Code	Course Title	Course Outcome
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 6. Formulate grammatically correct sentences using proper punctuations 7. Create citations of books, articles and journals using MLA format 8th edition
AECC	**HIN103B41**	**Hindi IV**	• हिन्दी व्यंग्य अध्ययन करने की शैली को समझालेता है • व्यंग्य में निहित विचारों का विश्लेषण • व्यंग्य कथाओं में अभिव्यक्त विचारों का मूल्यांकन • निबंधों में निहित आदर्श विचारों का अनुकरण करता है • व्यंग्य सृजन कौशल्य का विकास
AECC	**KAN103B41**	**Kannada IV**	• ನಮ್ಮ ನಾಡು–ಸಮಾಜ–ಕುಟುಂಬ ಪರಂಪರೆಯಕುರಿತುಅರಿವು ಹಾಗೂ ಕಾಳಜಿಯನ್ನು ಅಧ್ಯಯನಮಾಡುವರು • ಮಹಿಳಾ ಹಕ್ಕುಗಳು ಹಾಗೂ ರಕ್ಷಣೆಯಜವಾಬ್ದಾರಿಯನ್ನು ಸ್ಪಷ್ಟವಾಗಿ ತಿಳಿಯುವರು • ಅರಣ್ಯ ಹಾಗೂ ನೈಸರ್ಗಿಕ ಸಂಪನ್ಮೂಲಗಳನ್ನು ವಿವಿಧ ವಿಷಯಗಳ ಅಧ್ಯಯನದೊಂದಿಗೆಚರ್ಚಿಸುವರು • ಭಕ್ತಿಯಅರ್ಥ, ಗ್ರಹಿಕೆಗಳು, ವಿವಿಧ ನೆಲೆಗಳು ಕುರಿತುಕಾಲಘಟ್ಟದ ಹಿನ್ನಲೆಯಲ್ಲಿ ಹೋಲಿಸುವರು • ಆದರ್ಶಗಳು, ಸಮಾಜಿಕ ಸೇವೆ ಈ ಕುರಿತು ಮೌಲ್ಯಾಧಾರಿತ ಬದುಕನ್ನುಕುರಿತು ಪುನರಾವಲೋಕನ ಮಾಡುವರು
Compulsory Courses			
AEEC	**ENG103A41**	**English IV**	1. Recognize, define, and identify poetic terms and genres 2. Examine novels analytically and interpretively, to identify literary elements of 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	**PHY203A41**	**Physics IV [Optics , Laser and Fourier Series]**	1. Define refractive index of materials.

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			2. Discuss the concepts of optical instruments and properties of lasers. 3. Illustrate the importance and applications of Fourier series in optical phenomena.
DSCL	**PHY2L1A41**	**Physics Practical IV**	1. Perform experiments to calculate refractive index of glass and liquid. 2. Design optical experiments using spectrometers and lasers.
DSCC	**UMT204B41**	**Mathematics IV [Algebra, Differential Equations, Laplace Transforms and Fourier Series]**	1. Analyze homomorphism and isomorphism of a group. 2. Solve second and higher order differential equations. 3. Evaluate Laplace transforms and inverse Laplace transforms. 4. Estimate Fourier series for even and odd functions.
DSCC	**CSC203A41**	**Computer Science IV [Internet Technology]**	1. Explain TCP/IP, HTTP protocols and directory services rendered by the internet. 2. Analyze the elements and attributes in HTML tags. 3. Develop webpages using HTML, JavaScript, XML and CSS.
DSCL	**CSC2L1A41**	**Computer Science Practical IV**	1. Design webpages using HTML, JavaScript and CSS. 2. Manage web pages using XML tags.
NCCC	**LSE5A2A41**	**Life Skills Education**	1. Develop self-competency and confidence in their day to day life 2. Evaluate the problems and find the sustainable solutions in their daily life 3. Enhance interpersonal relationship effectively in the community 4. Develop coping mechanisms to manage their stress effectively in their environment

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V Semester

Course Type	Course Code	Course Title	Course Outcome
DSCC	**PHY203A51**	**Physics V [Statistical Physics and Quantum Mechanics]**	1. Illustrate the normalization for the Boltzmann factor. 2. Classify Fermi-Dirac and Bose-Einstein statistics according to the spin of the particles. 3. Solve the harmonic oscillator Schrodinger equation and its applications. 4. Evaluate the energy Eigen levels and evolution of a particle in a box.
DSCL	**PHY2L2A51**	**Physics Practical V**	1. Design set-ups to execute experiments related to statistical and quantum physics. 2. Construct experimental set-ups for the applications of harmonic oscillator and plank's constant.
DSCC	**PHY203A52**	**Physics VI [Solid State Physics and Magnetic Materials]**	1. Discuss the concept of solid state physics and magnetic materials. 2. Distinguish between crystalline and amorphous solids. 3. Demonstrate the concepts of x-ray diffraction and magnetism.
DSCL	**PHY2L2A52**	**Physics Practical VI**	1. Design experiments related to resistivity and magnetic properties of materials. 2. Perform experiments to study electric and magnetic properties of materials. 3. Execute solar cell experiment.
DSCC	**UMT204A51**	**Mathematics V [Real and Complex Analysis]**	1. Categorize sequences and series to convergent, divergent or oscillatory. 2. Construct analytic functions from complex functions. 3. Evaluate integrals using Cauchy's integral theorem and formula. 4. Compare circles and lines in z-plane and w-plane.
DSCC	**UMT204A52**	**Mathematics VI [Total and Partial Differential Equations, Algebra and Numerical Analysis]**	1. Solve the partial differential equation of first order using Char pit's method and second order using complementary function and particular integral. 2. Identify rings, integral domain and field. 3. Apply numerical methods to perform interpolation and integration. 4. Solve algebraic and transcendental equations using bisection method, newton's method and secant method.
DSCL	**UMT2L2B51**	**Mathematics Practical I**	1. Create programs for sequences and series using the Maxima tool. 2. Develop solutions for algebraic, transcendental and partial differential equations using the Maxima tool.
DSCC	**CSC204A51**	**Computer Science V [DBMS and Visual Programming]**	1. Explain the concepts of relational data model, Normalization, database design, relational algebra and transaction processing. 2. Construct ER model for data tables and formulate SQL queries on data. 3. Design graphical user interface using arrays, functions and VB.Net controls. 4. Integrate connectivity between user interface and the database.

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DSCL	**CSC2L2A51**	**Computer Science Practical V**	1. Design primary key, foreign key constraints and joins in the database. 2. Manage connectivity between user interface and the database.
DSCC	**CSC204A52**	**Computer Science VI [Operating System Concepts and UNIX /LINUX]**	1. Compare batch, time sharing, and real time and distributed operating systems. 2. Explain system calls and operating system services. 3. Demonstrate CPU scheduling, disk scheduling, page replacement algorithms and process synchronization. 4. Analyze the critical section problems, deadlocks and storage management. 5. Design shell scripts using UNIX tools and utility commands.

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Course Type	Course Code	Course Title	Course Outcome
Compulsory Courses			
DSCC	**PHY203A61**	**Physics VII [Electronics, Semiconductor and Dielectrics]**	1. Explain fundamental concepts and techniques of digital electronics. 2. Design semiconductor models with respect to carrier densities and carrier transport. 3. Analyze the working of semiconductor p-n diodes and transistors.
DSCL	**PHY2L2A61**	**Physics Practical VII**	1. Design circuits to execute inverting and non-inverting performance of Op-amp. 2. Perform experiments to study the applications of transistors.
DSCC	**PHY203A62**	**Physics VIII [Atomic, Molecular and Nuclear Physics]**	1. Describe the changes in behavior of atoms with externally applied electric and magnetic fields. 2. Explain rotational, vibrational, electronic and Raman spectra of molecules. 3. Distinguish fission and fusion processes used in nuclear reactors. 4. Discuss ionizing radiation interaction with matter and the functionality of detectors for radioactivity.
DSCL	**PHY2L2A62**	**Physics Practical VIII**	1. Manage experimental set-ups to study atomic and molecular spectra. 2. Design experiments to test the relation between photoelectric current and intensity of light.
DSCC	**UMT204A61**	**Mathematics VII[Vector Calculus and Integral Calculus]**	1. Use curl, divergence and gradient. Solve problems on line and multiple integrals. 2. Evaluate length, area and volume of curves using multiple integrals.
DSCC	**UMT204A62**	**Mathematics VIII [Matrices, Linear Algebra and Calculus of Variations]**	1. Evaluate rank, inverse, eigen values and eigen vectors of a matrix and solve a system of linear equations. 2. Explain vector space, subspace, linear span, basis and dimension. 3. Interpret linear transformation and fundamental concepts of rank nullity theorem. 4. Evaluate the extreme value of a functional.
DSCL	**UMT2L2B61**	**Mathematics Practical II**	1. Create programs for matrices and linear transformations using the Maxima tool. 2. Design Maxima programs to evaluate line and multiple integral.
DSCC	**CSC204A61**	**Computer Science VII [Software Engineering]**	1. Analyze software components and process models in software development life cycle. 2. Prepare the plan, design, schedule and assess the risks in project management. Categorize software metrics, testing and maintenance of a project.

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DSCL	**CSC2L2A61**	**Computer Science Practical VII**	1. Design project development phases using waterfall, prototyping, spiral and agile model. 2. Manage the workflow of the project using Gantt chart.
DSCP	**CSC2P4A61**	**Enterprise Computing Project**	1. Design a web-based application using .NET platform. 2. Create data flow and entity relationship diagrams. 3. Connect client applications with database servers.