



Aldel Education Trust's
St. John College of Humanities and Sciences

(A Christian Religious Minority Institution)

Affiliated to University of Mumbai

St. John Technical Campus, Vevoor, Manor Road, Palghar (East), District - Palghar, Maharashtra - 401404.

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BACHELOR OF SCIENCE- COMPUTER SCIENCE

PROGRAMME OUTCOME:

PO1:	Knowledge and Communication: To develop problem solving abilities using a computer and prepare necessary knowledge base for research and development in Computer Science.
PO2:	Problem analysis and development of solutions: To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
PO3:	Ethically and Socially Responsible: To familiarize with the modern-day trends in industry and research based settings and thereby innovate novel solutions to existing problems.
PO4:	Life Long Learner and Researcher: Enhance the scientific temper among the students so that to develop a research culture.
PO5:	Teamwork/ Collaborators: To use current techniques, skills, and tools necessary for computing practice.
PO6:	Sensitive to Environment: Implementation of the scientific policies to tackle the burning issues at global and local level.
PO7:	Competencies for employment: To pursue higher studies of specialization and to take up technical employment.

PROGRAMME SPECIFIC OUTCOME:

PSO1:	Form strong foundations of Computer Science.
PSO2:	Nurture programming, analytical & design skills for the real world problems.
PSO3:	Introduce emerging trends to the students in a gradual way.
PSO4:	Groom the students for the challenges of ICT industry.



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Bachelor of Science- Computer Science

Semester	Subject		Course Outcome
FYBSc-CS SEM-I	Digital Systems and Architecture	CO1	Understand the concept of Digital systems and operation of a digital computer.
		CO2	Learn different architectures & organisations of memory systems, processor organisation and control unit.
		CO3	Understand the working principles of multiprocessor and parallel organisation's as advanced computer architectures.
		CO4	Learn about how computer systems work and underlying principles.
	Digital Systems and Architecture Practical	CO1	Understand the basics of digital electronics needed for computers
		CO2	Understand the basics of instruction set architecture for reduced and complex instruction sets
		CO3	Understand the basics of processor structure and operation
		CO4	Understand how data is transferred between the processor and I/O devices
	Introduction to Programming with Python	CO1	Learn how to design and program Python applications.
		CO2	Explore the innards of Python Programming and understand components of Python Program.
		CO3	Define the structure and components of a Python program.
		CO4	Learn how to write loops and decision statements in Python.
	Introduction to Python Programming Practical	CO1	Ability to store, manipulate and access data in Python
		CO2	Ability to implement basic Input / Output operations in Python
		CO3	Ability to define the structure and components of a Python program.
		CO4	Ability to learn how to write loops and decision statements in Python.
	LINUX Operating System	CO1	Learn basic concepts of Linux in terms of operating system security implementation
		CO2	Learn use of various shell commands with regular expressions
		CO3	Set Linux Environment variables and learn setting file permissions to maintain Linux
		CO4	Learn various editors available in Linux OS
LINUX Operating System Practical	CO1	Work with Linux file system structure, Linux Environment	
	CO2	Handle shell commands for scripting, with features of regular expressions, redirections	
	CO3	Implement file security permissions	



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		CO4	Work with vi, sed and awk editors for shell scripting using various control structures
Open Source Technologies		CO1	Understand the difference between open-source software and commercial software.
		CO2	Understand the policies, licensing procedures and ethics of FOSS.
		CO3	Understand open-source philosophy, methodology and ecosystem.
		CO4	Awareness with Open-Source Technologies.
Open Source Technologies Practical		CO1	Differentiate between Open Source and Proprietary software and Licensing.
		CO2	Recognize the applications, benefits and features of Open-Source Technologies.
		CO3	Gain knowledge to start, manage open-source projects.
		CO4	Acquire knowledge on Open Source virtualization technologies.
Discrete Mathematics		CO1	Familiarise the prospective learners with mathematical structures that are fundamentally discrete.
		CO2	Enhance prospective learners' reason and ability to articulate mathematical problems.
		CO3	Understand functions, forming and solving recurrence relations and different counting principles.
		CO4	Describe objects or problems in computer algorithms and programming languages and these concepts can be used effectively in other courses.
Discrete Mathematics Practical		CO1	Define mathematical structures (relations, functions, graphs) and use them to model real life situations.
		CO2	Understand, construct and solve simple mathematical problems.
		CO3	Solve puzzles based on counting principles.
		CO4	Develop an attitude to solve problems based on graphs and trees, which are widely used in software.
Descriptive Statistics		CO1	Develop the learners ability to deal with different types of data.
		CO2	Enable the use of different measures of central tendency and dispersion wherever relevant.
		CO3	Understand the techniques to check the Skewness and Kurtosis of data.
		CO4	Learners find the correlation between different variables and further apply the regression analysis to find the exact relation between them.
Descriptive Statistics Practical		CO1	Organize, manage and present data.
		CO2	Analyze Statistical data using measures of central tendency and dispersion.
		CO3	Analyse Statistical data using basic techniques of R.
		CO4	Study the relationship between variables using techniques of correlation and regression.
Soft Skills		CO1	Learners understand the importance and types soft skills
		CO2	Learners develop skills for Academic and Professional Presentations.
		CO3	Learners understand Leadership Qualities and Ethics.
		CO4	Understand the importance of stress management in their



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			academic & professional life.
FYBSc-CS SEM-II	Design & Analysis of Algorithms	CO1	Students understand the basic principles of algorithm design
		CO2	Students understand the theoretical background of the basic data structures
		CO3	Familiarise the students with fundamental problem-solving strategies like searching, sorting, selection, recursion and help them to evaluate efficiencies of various algorithms.
		CO4	Students understand the important algorithm design paradigms and how they can be used to solve various real world problems.
	Design & Analysis of Algorithms – Practical	CO1	Students understand and evaluate efficiency of the programs that they write based on performance of the algorithms used.
		CO2	Students appreciate the use of various data structures as per need.
		CO3	Decide and apply appropriate design principle by understanding the requirements of any real life problems
		CO4	Implement different algorithms for the same problem and compare their efficiency.
	Advanced Python Programming	CO1	Learn how to design object-oriented programs with Python classes.
		CO2	Learn about reading, writing and implementing other operation on files in Python.
		CO3	Implement threading concept and multithreading in Python.
		CO4	Design GUI Programs and implement database interaction using Python.
	Advanced Python Programming Practical	CO1	Ability to implement OOP concepts in Python including Inheritance and Polymorphism.
		CO2	Ability to work with files and perform operations on it using Python.
		CO3	Ability to implement regular expression and concept of threads for developing efficient program.
		CO4	Ability to implement exception handling in Python applications for error handling.
	Introduction to OOPs using C++	CO1	Work with numeric, character and textual data and arrays.
		CO2	Understand the importance of OOP approach over procedural language.
		CO3	Understand how to model classes and relationships using UML.
		CO4	Apply the concepts of OOPS like encapsulation, inheritance and polymorphism.
	Introduction to OOPs using C++ – Practical	CO1	Handle basic file operations.
		CO2	Ability to implement inheritance and derived class constructors in C++.
		CO3	Ability to implement single and multilevel inheritance in C++.
		CO4	Ability to implement pointers in C++.
	Database Systems	CO1	Students understand the fundamentals of database systems.
		CO2	Understand the ERD components which are helpful in database design and implementation.
		CO3	Experience the students working with databases using MySQL.
		CO4	Familiarise the student with normalization, database



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			protection and different DCL Statements.
	Database Systems – Practical	CO1	Appreciate the importance of database design.
		CO2	Analyze database requirements and determine the entities involved in the system and their relationship to one another.
		CO3	Write simple queries to MySQL related to String, Maths and Date Functions.
		CO4	Create tables and insert/update/delete data, and query data in a relational DBMS using MySQL commands.
	Calculus	CO1	Understand the basic tools of Calculus which are helpful in understanding their applications to the real world problems.
		CO2	Designed to have a grasp of important concepts of Calculus in a scientific way.
		CO3	It covers topics from as basic as definition of functions to partial derivatives of functions in a gradual and logical way.
		CO4	Learners are expected to solve as many examples as possible to get complete clarity and understanding of the topics covered.
	Calculus – Practical	CO1	Develop mathematical skills and enhance the thinking power of learners.
		CO2	Understand mathematical concepts like limit, continuity, derivative, integration of functions, partial derivatives.
		CO3	Appreciate real world applications which use the learned concepts.
		CO4	Skill to formulate a problem through Mathematical modelling and simulation.
	Statistical Methods	CO1	Learner aware about basic probability axioms and rules and its application.
		CO2	Understand the concept of conditional probability and Independence of events.
		CO3	Learner familiar with discrete and continuous random variables as well as standard discrete and continuous distributions.
		CO4	Learn computational skills to implement various statistical inferential approaches.
	Statistical Methods – Practical	CO1	Calculate probability, conditional probability and independence.
		CO2	Apply the given discrete and continuous distributions whenever necessary.
		CO3	Define null hypothesis, alternative hypothesis, level of significance, test statistic and p value.
		CO4	Perform Test of Hypothesis as well as calculate confidence interval for a population parameter for single sample and two sample cases.
	E-Commerce & Digital Marketing	CO1	Understand the core concepts of E-Commerce.
		CO2	Understand the various online payment techniques.
		CO3	Apply digital marketing strategies to increase sales and growth of business.
		CO4	Apply digital marketing through different channels and platforms.
SYBSc-CS SEM-III	Principles of Operating	CO1	Learn basic concepts and structure of operating systems
		CO2	Learn about process and synchronisation in operating system level




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	Systems	CO3	Learn CPU scheduling algorithms
		CO4	Learn Memory and File system management
	Principles of Operating Systems – Practical	CO1	Work with any type of operating system
		CO2	Handle threads, processes, process synchronisation
		CO3	Implement CPU scheduling algorithms
		CO4	Understand the background role of memory management
	Linear Algebra	CO1	Learn the relevant Linear Algebra concepts through Computer Science applications.
		CO2	Interpret existence and analyse the solution set of a system of linear equations.
		CO3	Formulate, solve, apply, and interpret properties of linear systems.
		CO4	Learn about the concept of linear independence of vectors over a field, and the dimension of a vector space.
	Linear Algebra - Practical	CO1	Interpret basic concepts of linear transformations, dimension, matrix representation of a linear transformation, and the change of coordinate matrix.
		CO2	Understand the concepts through program implementation.
		CO3	Install computational thinking while learning linear algebra.
		CO4	Express clear understanding of the concept of a solution to a system of equations.
	Data Structures	CO1	Introduce data abstraction and data representation in memory.
		CO2	Describe, design and use of elementary data structures such as stack, queue, and linked list.
		CO3	Understand different data structures used for different types of problems.
		CO4	Describe, design and use elementary data structures such as trees and graphs.
	Data Structures – Practical	CO1	Create different types of data structures.
		CO2	Understand which data structure to be used based on the type of the problem.
CO3		Apply combined knowledge of algorithms and data structures to write highly effective programs in various domains.	
CO4		Understand different Hashing techniques and its application.	
Advanced Database Concepts	CO1	Develop understanding of concepts and techniques for data management and learn about widely used systems for implementation and usage.	
	CO2	Develop understanding of Transaction management and crash recovery.	
	CO3	Develop concepts of programming concepts of database.	
	CO4	Understand security, recovery, and transaction aspects of database.	
			Master concepts of stored procedure, functions,



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	Advanced Database Concepts – Practical	CO1	cursors and triggers and its use.
		CO2	Learn about using PL/SQL for data management.
		CO3	Use Collections and records efficiently.
		CO4	Understand concepts and implementations of transaction management and crash recovery.
	Java based Application Development	CO1	Understand insight into java based applications using OOP concepts.
		CO2	Understand developing GUI based desktop applications in java.
		CO3	Understand the web based applications through servlet and jsp.
		CO4	Understand the implementation of basic JSON
	Java based Application Development – Practical	CO1	Design basic application in java using Graphical User Interface.
		CO2	Learner develops applications using swings.
		CO3	Learner develops web based applications using servlet and jsp.
		CO4	Learner understands to connect databases with java through.
	Web Technologies	CO1	Understand the concepts of Hyper Text Markup Language and Cascading Style Sheets.
		CO2	Learn JavaScript for creating dynamic websites.
		CO3	Learn various operations performed on data among web applications using XML
		CO4	Learn Server-Side Programming using PHP
	Web Technologies – Practical	CO1	Design valid, well-formed, scalable, and meaningful pages using emerging technologies.
		CO2	Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites
		CO3	Develop and implement client-side and server-side scripting language programs.
		CO4	Develop and implement Database Driven Websites.
Green Technologies	CO1	Explain drivers and dimensions of change for Green Technology.	
	CO2	Appreciate Virtualization; smart meters and optimization in achieving green IT.	
	CO3	Gain knowledge about green assets, green processes, and green enterprise architecture.	
	CO4	ISO 14001 and related standards for Audit for Green Compliance.	
SYBSc-CS SEM-IV	Theory of Computation	CO1	Overview of the theoretical foundations of computer science from the perspective of formal languages.
		CO2	Illustrate finite state machines to solve problems in computing
		CO3	Explain the hierarchy of problems arising in the computer sciences.
		CO4	Familiarise Regular grammars, context free grammar.



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Theory of Computation – Practical	CO1	Understand Grammar and Languages
	CO2	Learn about Automata theory and its application in Language Design
	CO3	Learn about Turing Machines and Pushdown Automata
	CO4	Understand Linear Bounded Automata and its applications
Computer Networks	CO1	Understand Basic Concepts of Networking.
	CO2	Understand Working of Network Layer Architecture.
	CO3	Understand addressing, naming, forwarding, routing, Algorithms.
	CO4	Learn communication reliability, the client-server model, web, email and other application layer protocols.
Computer Networks – Practical	CO1	Learn basic networking concepts and layered architecture.
	CO2	Understand the concepts of networking, which are important for them to be known as 'networking professionals'.
	CO3	Learn Practical Implementation of Basic Routing Algorithms.
	CO4	Learn Different Networking Protocols.
Software Engineering	CO1	Learn and understand the Concepts of Software Engineering
	CO2	Learn and understand Software Development Life Cycle
	CO3	Apply the project management and analysis principles to software project development.
	CO4	Apply the design & testing principles to software project development.
Software Engineering – Practical	CO1	Plan a software engineering process life cycle, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements.
	CO2	Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.
	CO3	Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice.
	CO4	Able to use modern engineering tools necessary for software project management, time management and software reuse.
IoT Technologies	CO1	Introduce concepts of SoC and IoT
	CO2	Introduce various types of IoT platforms
	CO3	Interfacing various types of devices using different protocols with IoT
	CO4	Understand Edge Computing
		Understand SoC and IoT



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	IoT Technologies – Practical	CO1	
		CO2	Use different types of IoT Platforms and interfaces
		CO3	Understand and implement an idea of various types of applications built using IoT
		CO4	Understand practical applications of IoT in real life world
	Android Application Development	CO1	Kotlin Programming Language for application development
		CO2	Creating robust mobile applications on simulators and physical devices
		CO3	Creating intuitive, reliable mobile apps using the android services and components
		CO4	Handling data local and remote data storage
	Android Application Development – Practical	CO1	Build useful mobile applications using Kotlin language on Android
		CO2	Install and configure Android Studio for application development
		CO3	Master basic to intermediate concepts of Kotlin required for mobile application development
		CO4	Use built-in widgets and components, work with the database to store data
	Advanced Application Development	CO1	Understand all the necessary and important technologies such as MongoDB, Express.js, AngularJS, and Node.js.
		CO2	Developing scalable, robust, and maintainable web applications using MEAN stack
		CO3	Understand modern app development using Flutter
		CO4	Learn to Use Node.js and Express Framework for building fast, scalable network applications
	Advanced Application Development – Practical	CO1	Store the data in No SQL, a document-oriented Mongo DB database that brings performance and scalability.
		CO2	Integrate the front-end and back-end components of the MEAN stack.
		CO3	Use Angular JS framework that offers declarative, two-way data binding for web applications.
		CO4	Develop robust mobile applications using Flutter.
Research Methodology	CO1	Define research, formulate problems and describe the research process and research methods.	
	CO2	Exposed to the principles, procedures and techniques of implementing research projects.	
	CO3	Understand and apply basic research methods including research design, data analysis and interpretation.	
	CO4	Understand ethical issues in research, write research reports, research papers and publish papers.	




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