## Prabhakar Patil Education Society's
Arts, Commerce and Science College, Veshvi- Alibag

Department of Computer Science

The college is affiliated to university of Mumbai. Thus, the college follows the syllabus and guidelines provided by university of Mumbai

Programme Outcomes

- To formulate, to model, to design solutions, procedure and to use software tools to solve real world problems.
- To design and develop computer programs/computer -based systems in the areas such as networking, web design, security, cloud computing, IoT, data science and other emerging technologies.
- To familiarize with the modern-day trends in industry and research based settings and thereby innovate novel solutions to existing problems.
- To apply concepts, principles, and theories relating to computer science to new situations.
- To use current techniques, skills, and tools necessary for computing practice
- To apply standard Software Engineering practices and strategies in real-time software project development
- To pursue higher studies of specialization and to take up technical employment.
- To work independently or collaboratively as an effective tame member on a substantial software project.
- To communicate and present their work effectively and coherently.
- To display ethical code of conduct in usage of Internet and Cyber systems.
- To engage in independent and life-long learning in the background of rapid changing IT industry
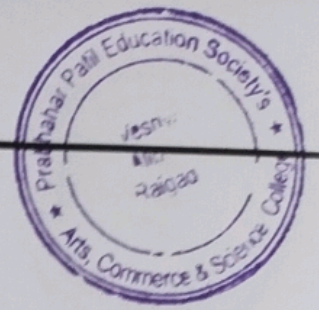
Programme Specific Outcomes

PSO 1 :- To learn and understand the basic ideas of Computer Science, including theory, systems, and practical applications, and build a strong foundation in these areas.
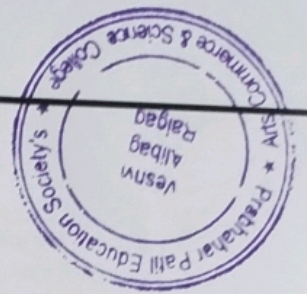
PSO 2 :- To develop the skills and analytical abilities needed to create computer-based solutions for real-life problems.

PSO 3 :- To offer training in new computer technologies that help create creative solutions for both industry and academia.

PSO 4 :- To build the study skills and knowledge needed to continue studying computer science or related subjects at a higher level after graduation.

PSO 5 :- To acquire the skills needed for a job in an information technology-focused business or industry.

PSO 6 :- To help students learn to work by themselves and with others, communicate well, and become responsible, skilled, confident, thoughtful, and creative users of computer technology.
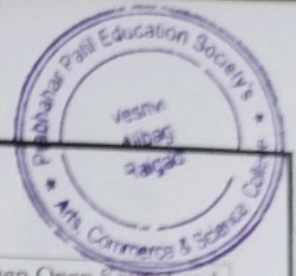
Course Outcomes

- ## Semester 1

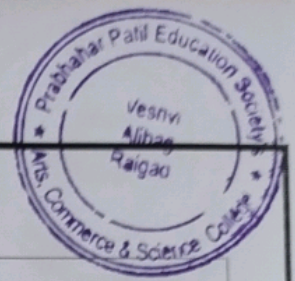| Sr. No.	Name of the Course	Outcomes
1.	Digital Systems & Architecture	- Learn how computers operate and their fundamental principles. - Grasp the basics of digital electronics used in computers. - Understand the fundamentals of instruction set architecture for simple and complex instruction sets. - Comprehend the basics of processor structure and how it functions. - Learn how data is exchanged between the processor and input/output (I/O) devices.
2.	Introduction to Programming with Python	- Know how to work with data in Python, like storing, changing, and getting data. - Be able to do simple input and output tasks in Python. - Understand how to set up the structure and parts of a Python program. - Learn how to write loops and make decisions in Python. - Learn how to create functions and use them with inputs in Python. - Be able to make and use more complex data types in Python.
3.	LINUX Operating System	- Learn about the structure of the Linux file system and how the Linux environment works. - Use shell commands for scripting, including things like regular expressions and file redirection. - Set up file security permissions to control who can access what. - Work with editors like vi, sed, and awk to write scripts using different control structures. - Install software such as compilers and write programs in C and Python on the Linux platform.

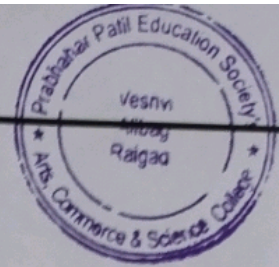|		
4.	Open Source Technologies	• Understand the difference between Open Source and Proprietary software and how their licenses work. • Identify the uses, advantages, and characteristics of Open Source Technologies. • Acquire the know-how to initiate and oversee Open Source projects.
5.	Discrete Mathematics	• Describe mathematical structures like relations, functions, and graphs and use them to represent real-life situations. • Grasp, create, and solve straightforward mathematical problems. • Solve puzzles that rely on counting principles. • Gain basic knowledge about automata theory models and the formal languages associated with them. • Develop a problem-solving mindset using graphs and trees, which are commonly used in software.
6.	Descriptive Statistics	• Arrange, handle, and show data. • Study statistical data using methods like average values and spread. • Analyze statistical data using fundamental R techniques. • Examine how variables relate to each other using correlation and regression techniques.
7.	Soft Skills	• Learn about the significance and various kinds of soft skills. • Acquire skills for giving academic and professional presentations. • Understand leadership qualities and ethical behavior. • Recognize the importance of stress management in both academic and professional life.

- **Semester 2**

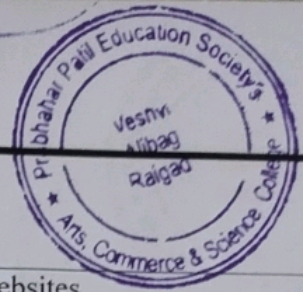| Sr. No.	Name of the Course	Outcomes
1.	Design & Analysis of Algorithms	• Students should be able to judge how well their programs work by looking at how fast the algorithms are. • Students should be able to see when to use different types of data structures. • Students should be able to choose the right design for solving real-life problems by understanding what those problems need.
2.	Advanced Python Programming	• Be able to use OOP concepts like Inheritance and Polymorphism in Python. • Work with files and do tasks with them using Python. • Implement regular expressions and use threads to make programs work better. • Handle errors by adding exception handling to Python applications. • Understand how to work with databases, create graphical user interfaces (GUI) in Python, and set up networking in Python.
3.	Introduction to OOPs using C++	• Deal with numbers, letters, and text data, including arrays. • Recognize why using an Object-Oriented Programming (OOP) approach is better than procedural languages. • Learn how to represent classes and their connections using UML (Unified Modeling Language). • Use OOP concepts like encapsulation, inheritance, and polymorphism. • Manage basic file tasks.
4.	Database Systems	• Understand why designing databases is crucial. • Figure out what information needs to go into the database and how it's all connected. • Write basic queries in MySQL for tasks like working with text, numbers, and dates. • Make tables, add or change data, and ask questions to a database using MySQL commands. • Learn about normalization and its role in creating efficient databases. • Manage who can access and modify data. • Create indexes and see how they make searches faster in a database.
5.	Calculus	• Improve students' math skills and make their

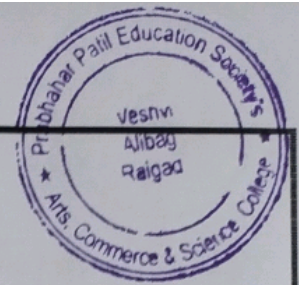|		
		thinking abilities stronger.
		• Learn math ideas such as limits, continuity, derivatives, and integrations of functions, as well as partial derivatives.
		• Recognize how these math concepts are used in real-life situations.
		• Gain the ability to turn real-world problems into mathematical models and simulate them.
6.	Statistical Methods	• Figure out probabilities, including conditional ones, and when events are independent.
		• Use specific probability distributions when needed.
		• Explain terms like null hypothesis, alternative hypothesis, significance level, test statistic, and p-value.
		• Run hypothesis tests and find confidence intervals for different situations, whether it's one sample or two samples.
		• Use non-parametric tests when they're appropriate.
		• Perform and understand one-way and two-way ANOVA (Analysis of Variance).
7.	E-Commerce & Digital Marketing	• Get a grasp of the basic ideas of E-Commerce.
		• Learn about different ways people can pay online.
		• Get the hang of digital marketing's main ideas and how it helps businesses.
		• Use digital marketing strategies to boost sales and business growth.
		• Utilize digital marketing on various online platforms.
		• See why Web Analytics and Google Analytics are important and use them to track website performance.

- **Semester 3**

Sr. No.	Name of the Course	Outcomes
1.	Principles of Operating Systems	- Be able to work with any kind of operating system. - Manage threads, processes, and make sure they work together smoothly. - Create CPU scheduling plans for efficient task handling. - Get the idea of how memory management works in the background. - Design a file system for storing and organizing data.
2.	Linear Algebra	- Recognize how Linear Algebra is important in Computer Science and how it's used. - Learn the concepts by putting them into practice through programming. - Develop a way of thinking that's good for solving problems using computers. - Explain the idea of solving a group of equations. - Determine eigenvalues and their corresponding eigenvectors for a square matrix.
3.	Data Structures	- Make various kinds of data arrangements. - Know which data arrangement to choose depending on the problem. - Use what you know about both algorithms and data structures to write really good programs for different areas.
4.	Advanced Database Concepts	- Become an expert in stored procedures, functions, cursors, and triggers and how to use them. - Get the hang of using PL/SQL to handle data. - Use collections and records effectively. - Learn about managing transactions and recovering from crashes, and how it works in practice.
5.	Java based Application Development	- Create simple programs in Java with a visual interface for users. - Learn to build applications using swings. - Develop web-based programs using servlets and JSP. - Connect databases to Java. - Work on programs that use JSON objects effectively.
6.	Web Technologies	- Create web pages that are correct, easy to use, can grow when needed, and make sense. - Know about the different devices and web browsers

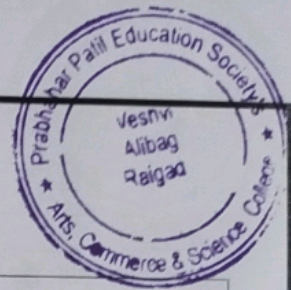|			that people use to view websites.
			• Write programs that run on the user's computer and on the web server.
			• Build websites that use a database to store and show information.
			• Use XML to create a special way of organizing data for apps that work with documents and data.
7.	Green Technologies		• Understand how Virtualization, smart meters, and optimization help in making IT more environmentally friendly.
			• Learn about green resources, green methods, and how businesses can be more eco-friendly in their structure.
			• Get familiar with ISO 14001 and similar standards used for checking if a company follows green practices.

- **Semester 4**

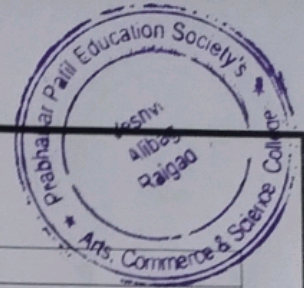| Sr. No.	Name of the Course	Outcomes
1.	Theory of Computation	• To know about grammar and languages. • To study automata theory and how it's used to create languages. • To learn about Turing Machines and Pushdown Automata, which are tools in automata theory. • To get a grasp of Linear Bound Automata and where it's used.
2.	Computer Networks	• Get the hang of fundamental networking ideas and the layered structure. • Grasp the key networking concepts that are important for becoming a networking professional.
3.	Software Engineering	• Make a plan for creating software, including figuring out what it should do, how it should look, building it, and making sure it works well and stays good over time. • Study and turn a description of what the software should do into a plan, then turn that plan into real software, using the right methods. • Write the actual code based on the plan, follow the rules, and test it to make sure it's good and high-quality. • Use modern tools to manage software projects, keep track of time, and reuse parts of software when needed.
4.	IoT Technologies	• Learn about System-on-Chip (SoC) and the Internet of Things (IoT). • Use various IoT platforms and connections. • Get the idea of how to create different kinds of applications using IoT.
5.	Android Application Development	• Create helpful mobile apps using the Kotlin language on Android. • Set up Android Studio for making apps. • Learn the important Kotlin skills for app development. • Use ready-made tools and save data in a database. • Understand important Android programming ideas and publish your app on Google Play.
6.	Advanced Application Development	• Save your data in a fast and scalable MongoDB database that's great for documents. • Build quick and scalable network apps with Node.js and Express Framework.

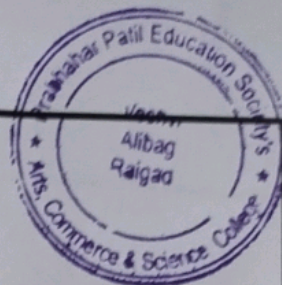|		
		• Create web apps that work well and have smart data connections using the AngularJS framework. • Make the front-end and back-end parts of the MEAN stack work together. • Build strong mobile apps with Flutter.
7.	Research Methodology	• Explain what research is, figure out a problem to solve, and talk about how research works and how you do it. • Learn and use simple research methods like how to design your study, analyze data, and understand what it means. • Know about ethical concerns in research, write reports and papers about your research, and even get them published.

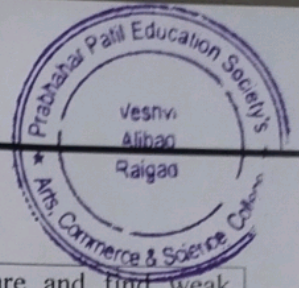| Sr. No.	Name of the Course	Outcomes
1.	Artificial Intelligence	• Show that you understand the basics and important ideas in AI (Artificial Intelligence). • Create smart computer programs that can work well in certain situations. • Use problem-solving methods and rules to find answers to different problems. • Build models that help the computer understand and use knowledge, and use methods to make new conclusions. • Make computer programs that can learn from data and see how good they are at tasks like sorting things or making predictions.
2.	Information & Network Security	• Study and understand security trends, attacks, and defenses, and come up with effective ways to protect systems using a security framework. • Use traditional encryption methods, like changing letters or shuffling them, to make messages secret and figure out how secure they are. • Set up public-key encryption, including RSA, to exchange secret keys and make sure communication is secure. • Create secure ways for confirming identities, like using secret codes and digital signatures, to make sure data is safe and no one can deny they sent it. • Choose and use different security measures, like protecting data as it travels over the internet, spotting unauthorized access, and setting up barriers like firewalls to keep networks and systems safe from attacks.
3.	Software Testing & Quality Assurance	• Talk about why testing software is important and how it affects the quality of the software. • Use the right methods to find and fix problems in the software. • Make plans for testing and then actually test the software to make sure it works correctly and performs well. • Know the rules for checking and confirming that the software is good and does what it's supposed to do. • Use tools and systems to make testing faster and

4.	Cyber Forensics	better.
		• Show that you know the basics and methods used in computer forensics.
		• Follow step-by-step processes to collect, save, and study digital proof from different places.
		• Use special tools and computer programs for good forensic analysis.
		• Become skilled at investigating problems related to networks, like gathering data while things are happening and looking into network matters.
		• Create detailed and well-written reports that explain exactly what you found during a computer forensic investigation.
5.	Project Managament	• Use project management rules, methods, and good ideas to plan, do, and control projects well.
		• Make project plans, figure out what the project should do, and make lists of all the tasks to reach the project goals.
		• Create schedules, guess how much of what you need, and watch how the project is going using the right project management tricks.
		• Make sure the project work and results are up to the standards that people want and what the industry expects.
		• Show that you can lead and work with a team, handle people who care about the project, solve problems, and make good choices when doing project management.

Sr. No.	Name of the Course	Outcomes
1.	Data Science	• Use methods to clean and change raw data, fix missing or strange values, and put different sets of data together.
		• Put machine-learning tools to work to do things like making predictions, grouping stuff, and combining lots of models to make a better one.
		• Check and compare different machine learning methods using the right tools and methods.
		• Make data visualizations that show interesting things in data in an easy-to-understand way.
		• Know the basics of handling data well, including making sure data is good, reliable, and private.
2.	Cloud Computing and Web Services	• Show that you know a lot about cloud computing, including different types of clouds and what makes them different.
		• Use web service technologies, like SOAP and REST, to build applications that can work over the internet and do multiple things at once.
		• Make, put online, and handle applications and services that are in the cloud using well-known cloud platforms like OpenStack and AWS.
		• Follow safe methods when developing and keep cloud software safe so that the data stays secret, it doesn't get messed up, and it's always available.
		• Use virtualization to make and manage virtual worlds for software to run in, and think about the good and bad sides of using virtualization.
3.	Information Retrieval	• Talk about the important parts and rules of information retrieval systems.
		• Use ways to keep and find information so you can quickly get the right documents.
		• Look at different methods for finding information and pick the best one for each search.
		• Learn how to make and test information retrieval systems in real situations.
		• Show that you understand harder parts of information retrieval, like searching on the web and using machine learning tricks.
4.	Ethical Hacking	• Use ethical hacking methods to check how

		secure computer systems are and find weak spots.
		• Do research and gather important details about the systems you're testing.
		• Discover and use weaknesses in different parts of networks and systems, using the right tools and tricks.
		• Check how safe web servers, web apps, and wireless networks are, and suggest ways to make them safer.
		• Know the rules and laws for ethical hacking, and always act professionally and fairly when doing it.
5.	Cyber Laws and IPR	• Show that you know a lot about laws related to the internet and digital technology.
		• Look at the rules and laws that control how things work online.
		• Understand important topics in cyber laws like online business, government services, and electronic records and agreements.
		• Study cybercrimes, how they are enforced, and the role of the Cyber Appellate Tribunal.
		• Think about new problems in cyber laws, such as who's responsible for what online, keeping personal information private, and deciding which laws apply.
		• Know about rights related to intellectual property and follow rules for things like copyrights, patents, and domain name disagreements.

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