VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Department of Computer Science

Post Graduate M.Sc. -I Computer Science Program 2022-23

Program Outcomes (POs) for M.Sc.

PO 1: **Disciplinary Knowledge:** Demonstrate comprehensive knowledge of the concerned discipline and execute theoretical and practical understanding

PO 2: **Research-related skills and Scientific temper:** Infer scientific literature and formulate hypothesis for research problems; plan and write a research paper/project while emphasizing on academics and research ethics, scientific conduct and creating awareness about intellectual property rights and issues of plagiarism.

PO 3: **Entrepreneurship Development:** Apply acquired knowledge to build entrepreneurship

PO 4: **Environment and Sustainability:** Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

PO 5: **Self-directed and Life-long learning:** Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.

Program Specific Outcomes (PSOs) for M.Sc. Computer Science:

PSO 1: Ability to design, analyze and implement efficient algorithms to solve complex computational problems.

PSO 2: Proficiency in using programming languages such as Python, Java, and PHP for software development to design and develop software solutions adhering to industry standards and best practices.

PSO 3: Competence in designing and managing relational databases and Proficient in utilizing database management systems to handle data efficiently and securely.

PSO 4: Understanding and implementation of cybersecurity measures to safeguard computer systems and networks and Capability to analyze and mitigate security threats, ensuring the integrity and confidentiality of information.

PSO 5: Proficient in web technologies and frameworks for developing modern and interactive web applications to design and develop mobile applications using platforms like Android with Kotlin.

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Course Outcomes (COs) for M.Sc. Computer Science:

M.Sc. I (SEM-I)		
1.	**CC-2500**	**Design and Analysis of Algorithms**
	CO 1: Understand and apply various algorithmic design paradigms, including divide and conquer, dynamic programming, and greedy algorithms. **CO 2:** Analyze the time and space complexity of algorithms, providing a foundation for efficient problem-solving. **CO 3:** Design and implement algorithms for common computational problems, demonstrating proficiency in algorithmic thinking. **CO 4:** Apply graph algorithms, sorting algorithms, and searching algorithms to solve practical problems. **CO 5:** Evaluate the trade-offs between different algorithms and choose the most appropriate solution based on problem requirements.	
2.	**CC-2501**	**Python Programming**
	CO 1: Develop Python programs for solving diverse computational problems, demonstrating proficiency in the language's syntax and features. **CO 2:** Utilize Python libraries and frameworks for efficient software development, including NumPy, pandas, and Django. **CO 3:** Apply object-oriented programming principles in Python, creating modular and maintainable code. **CO 4:** Implement file handling, exception handling, and other advanced features of Python for robust application development. **CO 5:** Design and develop Python applications that interact with external APIs and web services.	
3.	**CC-2502**	**Database Management System**
	CO 1: Design normalized relational database schemas, considering data integrity, consistency, and efficiency. **CO 2:** Use SQL queries to perform data manipulation, retrieval, and management in a database system. **CO 3:** Implement database security measures, including access controls and encryption, to protect against unauthorized access. **CO 4:** Develop stored procedures, triggers, and views to enhance the functionality and performance of a database. **CO 5:** Evaluate and implement database optimization techniques, such as indexing and query optimization, for efficient data handling.	

4.	CC-2503	Cyber Security
	CO 1: Understand the fundamentals of cybersecurity, including threats, vulnerabilities, and risk management. **CO 2:** Implement security measures, including encryption, firewalls, and intrusion detection systems, to protect against cyber threats. **CO 3:** Conduct vulnerability assessments and penetration testing to identify and mitigate security weaknesses. **CO 4:** Develop and implement security policies and procedures to ensure the confidentiality, integrity, and availability of information. **CO 5:** Stay abreast of emerging threats and technologies in cybersecurity and apply best practices for continuous improvement.	
	M.Sc. I (SEM-II)	
5.	CC-2506	Web Technology
	CO 1: Develop interactive and responsive web pages using HTML, CSS, and JavaScript. **CO 2:** Utilize web development frameworks and libraries for efficient and scalable web application development. **CO 3:** Implement server-side scripting for dynamic web content using technologies such as PHP, Node.js, or Flask. **CO 4:** Design and optimize databases for web applications, considering factors such as normalization, indexing, and query optimization. **CO 5:** Apply security measures for web applications, including authentication, authorization, and protection against common vulnerabilities.	
6.	CC-2507	Advanced Java
	CO 1: Design and implement advanced Java applications using features such as multithreading, generics, and collections. **CO 2:** Develop Java applications that incorporate design patterns for scalable and maintainable code. **CO 3:** Utilize Java Enterprise Edition (EE) technologies for building robust and scalable server-side applications. **CO 4:** Implement network programming in Java, including socket programming and remote method invocation (RMI). **CO 5:** Integrate Java applications with databases using JDBC, ensuring efficient data retrieval and manipulation.	

7.	CC-2508	Android Development with Kotlin
	CO 1: Develop Android applications using the Kotlin programming language and leverage its features for concise and expressive code. **CO 2:** Design and implement user interfaces for Android applications, considering responsiveness and material design principles. **CO 3:** Utilize Android development tools and frameworks to create feature-rich and interactive mobile applications. **CO 4:** Implement data storage and retrieval mechanisms on Android using SQLite databases and other persistent storage options. **CO 5:** Integrate mobile applications with web services and APIs, enabling seamless data exchange between Android devices and servers.	
8.	**CC-2509**	**Software Project Management**
	CO 1: Understand and apply project management principles and methodologies for software development projects. **CO 2:** Develop project plans, including scope, schedule, resource allocation, and risk management, using project management tools. **CO 3:** Apply agile and iterative development methodologies, such as Scrum, in software project management. **CO 4:** Demonstrate effective communication and collaboration skills for managing project teams and stakeholders. **CO 5:** Evaluate and implement quality assurance measures, including testing and validation, in the software development lifecycle.	

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