

# Group of Institutions

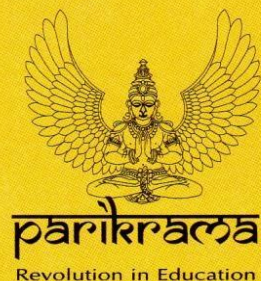
Kashti, Tal - Shrigonda, Dist-Ahmednagar, Maharashtra - 414 701

## Faculty of Engineering

Approved by AICTE, MS (New-Int)-Engg./2009/09, Dt. 15/06/09, Affiliated to Savitribai Phule Pune University

Savitribai Phule Pune University		
<u>Fourth Year of Computer Engineering (2019 Course)</u>		
<b>410241: Design and Analysis of Algorithms</b>		
<b>Teaching Scheme:</b> TH: 03 Hours/Week	<b>Credit</b> 03	<b>Examination Scheme:</b> In-Sem (Paper): 30 Marks End-Sem (Paper): 70 Marks
<b>Prerequisites Courses:</b> Discrete Mathematics (210241), Fundamentals of DataStructures(210242), Data Structures and Algorithms(210252), Theory of Computation ( 310242)		
<b>Companion Course:</b> Laboratory Practice III (410246)		
<b>Course Outcomes:</b> On completion of the course, student will be able to– <b>CO1: Formulate</b> the problem <b>CO2: Analyze</b> the asymptotic performance of algorithms <b>CO3:</b> Decide and <b>apply</b> algorithmic strategies to solve given problem <b>CO4: Find</b> optimal solution by applying various methods <b>CO5: Analyze</b> and <b>Apply</b> Scheduling and Sorting Algorithms. <b>CO6: Solve</b> problems for multi-core or distributed or concurrent environments		

Savitribai Phule Pune University		
<u>Fourth Year of Computer Engineering (2019 Course)</u>		
<b>410242: Machine Learning</b>		
<b>Teaching Scheme:</b> TH: 03 Hours/Week	<b>Credit</b> 03	<b>Examination Scheme:</b> In-Sem (Paper): 30 Marks End-Sem (Paper): 70 Marks
<b>Prerequisite Courses:</b> Data Science and Big Data Analytics(310251)		
<b>Companion Course:</b> Laboratory Practice III(410246)		
<b>Course Outcomes:</b> On completion of the course, student will be able to– <b>CO1:</b> Identify the needs and challenges of machine learning for real time applications. <b>CO2:</b> Apply various data pre-processing techniques to simplify and speed up machine learning algorithms. <b>CO3:</b> Select and apply appropriately supervised machine learning algorithms forreal time applications. <b>CO4:</b> Implement variants of multi-class classifier and measure its performance. <b>CO5:</b> Compare and contrast different clustering algorithms. <b>CO6:</b> Design a neural network for solving engineering problems.		



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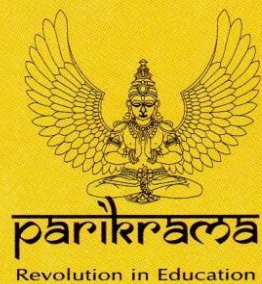
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<b>Savitribai Phule Pune University</b> <b>Fourth Year of Computer Engineering (2019 Course)</b> <b>410243: Blockchain Technology</b>		
<b>Teaching Scheme:</b> TH: 03 Hours/Week	<b>Credit</b> 03	<b>Examination Scheme:</b> In-Sem (Paper): 30 Marks End-Sem (Paper): 70 Marks
<b>Prerequisite Courses:</b> Computer Networks and Security(310244)		
<b>Companion Course:</b> Laboratory Practice III(410246)		
<b>Course Outcomes:</b> On completion of the course, student will be able to–		
<ul style="list-style-type: none"> <li><b>CO1:</b> Interpret the fundamentals and basic concepts in Blockchain</li> <li><b>CO2:</b> Compare the working of different blockchain platforms.</li> <li><b>CO3:</b> Use Crypto wallet for cryptocurrency based transactions.</li> <li><b>CO4:</b> Analyze the importance of blockchain in finding the solution to the real-world problems.</li> <li><b>CO5:</b> Illustrate the Ethereum public block chain platform</li> <li><b>CO6:</b> Identify relative application where block chain technology can be effectively used and implemented.</li> </ul>		

<b>Savitribai Phule Pune University</b> <b>Fourth Year of Computer Engineering (2019 Course)</b> <b>Elective III</b> <b>410244(C): Cyber Security and Digital Forensics</b>		
<b>Teaching Scheme:</b> TH: 03 Hours/Week	<b>Credit</b> 03	<b>Examination Scheme:</b> In-Sem (Paper): 30 Marks End-Sem (Paper): 70 Marks
<b>Prerequisite Courses:</b> Computer Networks and Security(310244), Information Security(310254(A))		
<b>Companion Course:</b> 410246: Laboratory Practice IV		
<b>Course Outcomes:</b> At the end of the course, the student should be able to:		
<ul style="list-style-type: none"> <li><b>CO1:</b> Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.</li> <li><b>CO2:</b> Build appropriate security solutions against cyber-attacks.</li> <li><b>CO3:</b> Underline the need of digital forensic and role of digital evidences.</li> <li><b>CO4:</b> Explain rules and types of evidence collection</li> <li><b>CO5:</b> Analyze, validate and process crime scenes</li> <li><b>CO6:</b> Identify the methods to generate legal evidence and supporting investigation reports.</li> </ul>		



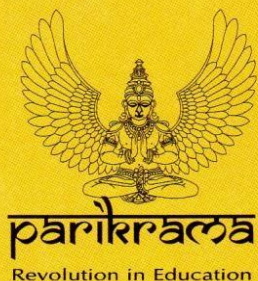
# ग्रुप ऑफ़ इंस्टिट्यूट्स

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<b>Savitribai Phule Pune University</b> <b>Fourth Year of Computer Engineering (2019 Course)</b> <b>Elective IV</b> <b>410245 (D): Software Testing and Quality Assurance</b>		
<b>Teaching Scheme:</b> <b>TH: 03 Hours/Week</b>	<b>Credit</b> <b>03</b>	<b>Examination Scheme:</b> <b>In-Sem (Paper): 30 Marks</b> <b>End-Sem (Paper): 70 Marks</b>
<b>Prerequisite Courses:</b> Software Engineering (210253), Software Project Management(310245(D))		
<b>Companion Course:</b> Lab Practice IV		
<b>Course Outcomes:</b> On completion of the course, student will be able to– <b>CO1: Describe</b> fundamental concepts in software testing such as manual testing, automation testing and software quality assurance. <b>CO2: Design and Develop</b> project test plan, design test cases, test data, and conduct test operations. <b>CO3: Apply</b> recent automation tool for various software testing for testing software. <b>CO4: Apply</b> different approaches of quality management, assurance, and quality standard to software system. <b>CO5: Apply</b> and analyze effectiveness Software Quality Tools. <b>CO6: Apply</b> tools necessary for efficient testing framework.		



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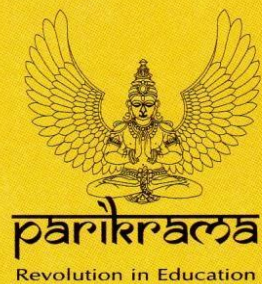
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### SEMESTER VIII

Savitribai Phule Pune University Fourth Year of Computer Engineering (2019 Course) 410250: High Performance Computing		
<b>Teaching Scheme:</b> TH: 3 Hours/Week	<b>Credit</b> 3	<b>Examination Scheme:</b> In-Sem (Paper): 30 Marks End-Sem (Paper): 70 Marks
<b>Prerequisites Courses:</b> -Microprocessor (210254), Principles of Programming Languages(210255), Computer Networks and Security(310244)		
<b>Companion Course:</b> Laboratory Practice V(410254)		
<b>Course Outcomes:</b> CO1: <b>Understand</b> various Parallel Paradigm CO2: <b>Design and Develop</b> an efficient parallel algorithm to solve given problem CO3: <b>Illustrate</b> data communication operations on various parallel architecture CO4: <b>Analyze</b> and measure performance of modern parallel computing systems CO5: <b>Apply</b> CUDA architecture for parallel programming CO6: <b>Analyze</b> the performance of HPC applications		

Savitribai Phule Pune University Fourth Year of Computer Engineering (2019 Course) 410251: Deep Learning		
<b>Teaching Scheme:</b> TH: 03 Hours/Week	<b>Credit</b> 03	<b>Examination Scheme:</b> In-Sem (Paper): 30 Marks End-Sem (Paper): 70 Marks
<b>Prerequisite Courses:</b> Machine Learning (410242)		
<b>Companion Course:</b> Laboratory Practice V(410254)		
<b>Course Outcomes:</b> On completion of the course, student will be able to– CO1: Understand the basics of Deep Learning and apply the tools to implement deep learning applications CO2: Evaluate the performance of deep learning models (e.g., with respect to the bias-variance trade-off, overfitting and underfitting, estimation of test error). CO3: To apply the technique of Convolution (CNN) and Recurrent Neural Network (RNN) for implementing Deep Learning models CO4: To implement and apply deep generative models. CO5: Construct and apply on-policy reinforcement learning algorithms CO6: To Understand Reinforcement Learning Process		



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### Savitribai Phule Pune University

#### Fourth Year of Computer Engineering (2019 Course)

#### Elective V 410252(A): Natural Language Processing

<b>Teaching Scheme:</b>	<b>Credit</b>	<b>Examination Scheme:</b>
<b>TH: 03 Hours/Week</b>	<b>03</b>	<b>In-Sem (Paper): 30 Marks</b> <b>End-Sem (Paper): 70 Marks</b>

**Prerequisite Courses:** Discrete Mathematics (210241), Theory of Computation (310242), Data Science and Big Data Analytics (310251)

**Companion Course:** Laboratory Practice VI(410255)

#### Course Outcomes:

On completion of the course, student will be able to–

- CO1:** Describe the fundamental concepts of NLP, challenges and issues in NLP
- CO2:** Analyze Natural languages morphologically, syntactical and semantically OR Describe the concepts of morphology, syntax, semantics of natural language
- CO3:** Illustrate various language modelling techniques
- CO4:** Integrate the NLP techniques for the information retrieval task
- CO5:** Demonstrate the use of NLP tools and techniques for text-based processing of natural languages
- CO6:** Develop real world NLP applications

### Savitribai Phule Pune University

#### Fourth Year of Computer Engineering (2019 Course)

#### Elective VI

#### 410253(C): Business Intelligence

<b>TeachingScheme:</b>	<b>Credit</b>	<b>Examination Scheme:</b>
<b>TH: 03 Hours/Week</b>	<b>03</b>	<b>In-Sem (Paper) : 30 Marks</b> <b>End-Sem (Paper): 70 Marks</b>

**Prerequisites Courses:** Database Management System(310241), Data Science & Big data Analytics(310251), Machine Learning (410242)

**Companion Course:** Laboratory Practice VI(410256)

**Course Outcomes:** On completion of this course, the students will be able to

- CO1:** Differentiate the concepts of Decision Support System & Business Intelligence
- CO2:** Use Data Warehouse & Business Architecture to design a BI system.
- CO3:** Build graphical reports
- CO4:** Apply different data preprocessing techniques on dataset
- CO5:** Implement machine learning algorithms as per business needs
- CO6:** Identify role of BI in marketing, logistics, and finance and telecommunication sector