# BVRIT HYDERABAD College of Engineering for Women

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(NAAC Accredited – A Grade | NBA Accredited B.Tech. (EEE, ECE, CSE and IT)) Bachupally, Hyderabad -500 090

**Department of Computer Science and Engineering**
**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: II- I**

**Course Name: Digital Electronics**
**Course Code: IT301PC**

| CO No. | Course Outcomes |
|---|---|
| **C211-Digital Electronics IT301PC** | |
| C211.1 | Apply the concepts of number systems, and codes in digital system design |
| C211.2 | Minimize Boolean expression using various techniques |
| C211.3 | Design combinational logic circuits for given specifications |
| C211.4 | Design Shift Registers and Counters using flip-flops |
| C211.5 | Implement logic functions using PLDs and Illustrate the functionality of various memories |
| C211.6 | Design and optimize asynchronous sequential circuits |

**Course Name: Data Structures**
**Course Code:CS302PC**

| CO No. | Course Outcomes |
|---|---|
| **Data Structures- CS302PC** | |
| C302.1 | Implement various operations on linear data structures to solve real world problems. |
| C302.2 | Design solutions using Dictionaries, Hash Tables and time complexity. |
| C302.3 | Implement various kinds of trees and its operations. |
| C302.4 | Describe graph representations and implement traversals. |
| C302.5 | Implement various sorting algorithms. |
| C302.6 | Demonstrate the Pattern matching algorithms and Tries. |

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**Department of Computer Science and Engineering**
**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: II - I**

**Course Name: Discrete Mathematics**
**Course Code: CS303PC**

| CO No. | Course Outcomes |
|---|---|
| **Discrete Mathematics – CS303PC** | |
| C304.1 | Read, comprehend, and construct mathematical arguments for proofs. |
| C304.2 | Model real-world problems using graphs and trees. |
| C304.3 | Work and Apply Discrete Structures. |
| C304.4 | Apply combinations and permutations to various problems. |
| C304.5 | Solve problems using Binomial and Multinomial Theorems. |
| C304.6 | Ability to analyze and solve counting problems on finite and discrete structures |

**Course Name: Database Management Systems**
**Course Code: CS304PC**

| CO No. | Course Outcomes |
|---|---|
| **Database Management Systems - CS304PC** | |
| C304.1 | Understand the basic concepts of DBMS |
| C304.2 | Design conceptual models using ER Diagram and normalize the model |
| C304.3 | Impose constraints on relations |
| C304.4 | Implement the procedural and non-procedural languages on database |
| C304.5 | Understand the recovery and concurrency control techniques |
| C304.6 | Describe file organization techniques and tree-based indexing structures. |

**Course Name: Object Oriented Programming through Java**

**Course Code: CS305PC**

| CO No. | Course Outcomes |
|---|---|
| **Object Oriented Programming through Java – CS305PC** | |
| C215.1 | Illustrate Object Oriented concepts and basics of java programming |
| C215.2 | Make use of the concepts of Inheritance, packages and Interfaces |
| C215.3 | Implement the concepts of multithreading and /or handle run time errors |
| C215.4 | Design real time applications using event handling concepts. |
| C215.5 | Develop real time GUI applications using applet, AWT and swings |
| C215.6 | Utilize collection framework to implement various data structures |

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**Department of Computer Science and Engineering**
**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: II- I**

**Course Name: Data Structures Lab**

**Course Code:CS306PC**

| CO No. | Course Outcomes |
|---|---|
| **Data Structures- CS306PC** | |
| C306.1 | Implement with various kinds of linked list and their operations |
| C306.2 | Design programs to implement stack and queue ADT |
| C306.3 | Implement programs for sorting algorithms |
| C306.4 | Implement trees and graph traversal and pattern matching algorithms |

**Course Name: Object Oriented Programming through Java Lab**

**Course Code: CS307PC**

| CO No. | Course Outcomes |
|---|---|
| **Object Oriented Programming through Java Lab - CS307PC** | |
| C217.1 | Make use of JDK, Eclipse platform for developing java programs. |
| C217.2 | Build programs using abstract classes and multithreading concepts. |
| C217.3 | Develop programs using GUI components. |
| C217.4 | Develop Programs using Collection Framework |

**Course Name: Database Management Systems Lab**

**Course Code: CS308PC**

| CO No. | Course Outcomes |
|---|---|
| **Database Management Systems Lab - CS308PC** | |
| C308.1 | Create conceptual design for the real world problems using ER Diagrams. |
| C308.2 | Convert the conceptual model into relational and normalize. |
| C308.3 | Apply DDL and DML commands on given database |
| C308.4 | Implement Triggers, Procedures and Cursors. |

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**Department of Computer Science and Engineering**
**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: II - I**

**Course Name: DATA VISUALIZATION – R PROGRAMMING / POWER BI**

**Course Code: CS309PC**

| CO No. | Course Outcomes |
|---|---|
| **DATA VISUALIZATION – R PROGRAMMING / POWER BI – CS309PC** | |
| C309.1 | Understand how to import data into Tableau. |
| C309.2 | Understand Tableau concepts of Dimensions and Measures. |
| C309.3 | Develop Programs and understand how to map Visual Layouts and Graphical Properties |
| C309.4 | Create Dashboard, custom charts, and, publish to tableau online for any realtime dataset |

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**Department of Computer Science and Engineering**
**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: II-II**

**Course Name: Operating Systems**

**Course Code: CS403PC**

| CO No. | Course Outcomes |
|---|---|
| **Operating Systems – CS403PC** | |
| C403.1 | Analyze the functionalities and structure of a generic Operating System. |
| C403.2 | Evaluate various CPU scheduling algorithms. |
| C403.3 | Analyze process synchronization and IPC mechanisms. |
| C403.4 | Assess the techniques of deadlock avoidance and prevention. |
| C403.5 | Examine different Memory management techniques. |
| C403.6 | Explore file system interface and its operations. |

**Course Name:Computer Organization and Architecture**

**Course Code: CS405PC**

| CO No. | Course Outcomes |
|---|---|
| Data Structures – CS302PC | |
| C**405**.1 | Implement Micro operations in Design, Organization and Architecture of a basic computer. |
| C405.2 | Design a suitable Control unit for a decided set of Instructions. |
| C405.3 | Design Hardware and Algorithms for manipulation of data, represented in different formats. |
| C405.4 | Implement data transfer with appropriate IO Interface and Interrupt mechanism. |
| C405.5 | Choose suitable type of Memory for given purpose |
| C405.6 | Perform Parallel Processing using suitable mechanism |

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**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: II-II**

**Course Name: Operating Systems Lab**

**Course Code: CS406PC**

| CO No. | Course Outcomes |
|---|---|
| **Operating Systems Lab – CS406PC** | |
| C406.1 | Evaluate CPU Scheduling Algorithms and Memory management techniques. |
| C406.2 | Construct deadlock detection and avoidance algorithms. |
| C406.3 | Solve classical problems of synchronization using semaphores. |
| C406.4 | Evaluate inter process communication mechanisms using system calls and pipes. |

**Course Name:** Node JS/React JS/DJango

**Course Code:** CS407PC

| CO No. | Course Outcomes |
|---|---|
| **Node JS/React JS/DJango – CS407PC** | |
| C407.1 | Build a custom website with HTML, CSS, and Bootstrap and little JavaScript. |
| C407.2 | Demonstrate Advanced features of JavaScript and learn about JDBC. |
| C407.3 | Develop Server – side implementation using Java technologies |
| C407.4 | Develop the server – side implementation using Node JS and Single Page Application using React. |

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**Department of Computer Science and Engineering**
**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: III - I**

**Course Name: Design and Analysis of Algorithms**

**Course Code: CS501PC**

| CO No. | Course Outcomes |
|---|---|
| **Design and Analysis of Algorithms – CS501PC** | |
| C501.1 | Analyze the performance of the algorithms and represent using relevant notations. |
| C501.2 | Apply the concepts of disjoint sets and priority queues to solve real world problems. |
| C501.3 | Choose appropriate algorithmic design paradigms to solve various real world problems. |
| C501.4 | Identify the issues in graph connectivity and resolve them. |
| C501.5 | Reduce the search space of a problem using bounding functions. |
| C501.6 | Categorize problems into NP hard & NP Complete. |

**Course Name: Computer Networks**

**Course Code: CS502PC**

| CO No. | Course Outcomes |
|---|---|
| **Computer Networks – CS502PC** | |
| CS502.1 | Analyze pros and cons of the components, reference models and various transmission media. |
| CS502.2 | Analyze various link control and access control mechanisms available in the data link layer. |
| CS502.3 | Grasp the foundational principles, challenges, and mechanisms of the network layer in computer networks. |
| CS502.4 | Choose the appropriate routing algorithm suitable for the given network topology |
| CS502.5 | Manage the networks to ensure efficient, reliable, and high-quality communication. |
| CS502.6 | Assess the Transport layer protocols and the features of Application layer. |

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**Department of Computer Science and Engineering**
**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: III - I**

**Course Name: DevOps**

**Course Code: CS503PC**

| CO No. | Course Outcomes |
|---|---|
| **Programming for Problem Solving – CS103ES** | |
| CS503.1 | Explore the various components of the DevOps environment. |
| CS503.2 | Identify Software development models and architectures of DevOps. |
| CS503.3 | Work with Source code management. |
| CS503.4 | Choose a project management tool. |
| CS503.5 | Use the Jenkins integration tool to build the application. |
| CS503.6 | Choose appropriate testing tools deployment model for the project. |

**Course Name:** DevOps Lab

**Course Code:** CS504PC

| CO No. | Course Outcomes |
|---|---|
| **DevOps – CS504PC** | |
| C504.1 | Practice Source code management using GIT |
| C504.2 | Build the environment for software application development using Jenkins. |
| C504.3 | Apply different project management, integration and development tools |
| C504.4 | Use different tools for automated testing of application |

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**Department of Computer Science and Engineering**
**Course Outcomes and CO-PO Mapping (BH23 Regulations)**
**Year and Sem: III - I**

**Course Name:** UI design-Flutter Lab

**Course Code:** CS506PC

| CO No. | Course Outcomes |
|---|---|
| **UI design-Flutter Lab – CS506PC** | |
| C506.1 | Apply the basics of the Dart programming language, Flutter Widgets. |
| C506.2 | Create responsive UI Widgets using navigator in Flutter Applications. |
| C506.3 | Implement a form with various input fields and animations, along with validation and error handling. |
| C506.4 | Demonstrate Flutter Application using REST API and Flutter debugging tools. |

**Course Name: Computer Networks Laboratory**

**Course Code: CS507PC**

| CO No. | Course Outcomes |
|---|---|
| **Computer Networks Laboratory – CS507PC** | |
| C507.1 | Implement various Framing methods, Error Control methods and Sliding window protocols. |
| C507.2 | Analyze various protocols, operating system detection using appropriate monitoring tools. |
| C507.3 | Evaluate various routing protocols and congestion control mechanisms. |
| C507.4 | Evaluate the performance of routing protocols and IEEE 802.x standards using NS2 simulator. |

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**Department of Computer Science and Engineering**

**Course Outcomes and CO-PO Mapping (BH23 Regulations)**

**Year and Sem: III - II**

**Course Name: Machine Learning**

**Course Code: CS601PC**

| CO No. | Course Outcomes |
|---|---|
| **Machine Learning – CS601PC** | |
| C601.1 | Understand the basic concepts of Machine Learning Techniques. |
| C601.2 | Apply the neural network concepts with Perceptron and Back Propagation |
| C601.3 | Evaluate various supervised, unsupervised learning algorithms with ensemble techniques. |
| C601.4 | Make use of Dimensionality Reduction concepts for model building. |
| C601.5 | Apply evolutionary computing algorithms approach for search and optimization. |
| C601.6 | Analyze the concepts of Reinforcement Learning for building autonomous Systems**.** |

**Course Name:** Formal Languages and Automata Theory

**Course Code:** CS602PC

| CO No. | Course Outcomes |
|---|---|
| **Formal Languages and Automata Theory – CS602PC** | |
| C602.1 | Design Finite Automata (FA) machines, minimization, achieve conversions among them. |
| C602.2 | Construct Regular expressions and Test for regular languages |
| C602.3 | Analyze Left Most Derivation (LMD), Right Most Derivation (RMD) and normal forms for context free grammars. |
| C602.4 | Design Pushdown Automata for Languages, grammars and conversions. |
| C602.5 | Design appropriate Turing Machine for a given problem. |
| C602.6 | Distinguish between decidability and undecidability. |

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**Course Outcomes and CO-PO Mapping (BH23 Regulations)**

**Year and Sem: III - II**

**Course Name: Artificial Intelligence**

**Course Code: CS603PC**

| CO No. | Course Outcomes |
|---|---|
| **Artificial Intelligence– CS603PC** | |
| C603.1 | Identify suitable search agents for problem solving. |
| C603.2 | Apply adversarial search techniques on various problem domains. |
| C603.3 | Make use of mathematical logic for knowledge representation and inference mechanisms. |
| C603.4 | Construct real knowledge bases in various domains. |
| C603.5 | Define the problem of planning in deterministic, fully observable and static environments. |
| C603.6 | Apply Probabilistic Reasoning under uncertainty. |

**Course Name: Machine Learning Lab**

**Course Code: CS604PC**

| CO No. | Course Outcomes |
|---|---|
| **Machine Learning – CS604PC** | |
| C604.1 | Implement statistical concepts required for data analysis. |
| C604.2 | Analyze data, model, and model complexity and predict the trends. |
| C604.3 | Correlate various machine learning algorithms along with their strengths and weaknesses. |
| C604.4 | Build predictive models from data and analyze the model performance. |

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**Course Outcomes and CO-PO Mapping (BH23 Regulations)**

**Year and Sem: III - II**

**Course Name: Artificial Intelligence Laboratory**

**Course Code: CS605PC**

| CO No. | Course Outcomes |
|---|---|
| **Artificial Intelligence Laboratory– CS605PC** | |
| C605.1 | Demonstrate a deep understanding of fundamental search algorithms. |
| C605.2 | Apply algorithmic techniques to implement games. |
| C605.3 | Exhibit proficiency in solving complex problems through heuristic search algorithms |
| C605.4 | Apply evaluation skills, to assess and select appropriate optimization techniques. |