

# LESSON PLAN



MCA Third Semester



**COLLEGE OF IT AND MANAGEMENT EDUCATION**

(A Constituent College of Biju Patnaik University of Technology, Rourkela)

# MCPC2001

## Design and Analysis of Algorithm (3-0-0)

Faculty: Shesha Shankar Gnanindranath Mishra

Credit : 3

Credit Hour: 36

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### Course Objectives:

The objective of the course is to:

- Design and analysis of algorithms and find complexity on them.
- Find the complexity of different sorting algorithm.
- Understand the dynamic programming and greedy algorithms
- Analyze and implementation of Graph Algorithms
- Demonstrate NP-Completeness and Approximation Algorithms

### Course Outcomes:

Upon successful completion of this course, the student shall be able to:

- CO 1.** Identify the different design technique of algorithm.
- CO 2.** Analyze the different sorting algorithm based on time and space.
- CO 3.** Analyze the different approaches of designing algorithm like dynamic programming and greedy algorithms
- CO 4.** Discuss different graph algorithm.

## Syllabus

**Module-1 :** Introduction to design and analysis of algorithms, Growth of functions, Recurrences, Solution of recurrences by Substitution, Recursion tree and Master method, Worst case analysis of Merge sort, Quick sort and Binary search, Heap sort: Heaps, Building a heap, The Heap sort algorithm, Priority Queue, Lower bounds for sorting

**Module-II :** Dynamic Programming: Matrix-chain multiplication, Elements of dynamic programming, longest common subsequence. Greedy Algorithms: An activity-selection problem, Elements of greedy strategy, Fractional knapsack problem, Huffman codes

**Module-III :** Data structures for Disjoint Sets: Disjoint set operations, Linked-list representation of disjoint sets, Disjoint-set forests. Graph Algorithms: Elementary Graph Algorithms: Representations of graphs, Breadth-first search, Depth-first search, Minimum Spanning Trees: Kruskal and Prim's algorithms, Single-Source Shortest Paths: The Bellman-Ford and Dijkstra's algorithm, All-Pairs Shortest Paths: The Floyd-Warshall Algorithm.

**Module-IV :** Maximum Flow: Flow Networks, The Ford-Fulkerson method, Polynomials and the FFT: Representation of polynomials, The DFT and FFT, String Matching: The naïve string-matching algorithm, The Rabin-Karp algorithm. NP-Completeness: Polynomial time, Polynomial-time verification, NP-completeness and reducibility-completeness proofs, NP-completeness problems, Approximation Algorithms: The vertex-cover problem, The travelling-salesman problem, The set-covering problem, The subset-sum problem.

### Books:

1. Introduction to Algorithms: T. H. Cormen, C. E. Leiserson, R. L. Rivest (PHI), Second Edition.
2. E. Horowitz, S. Sahani, S. Rajsekharan, "Fundamentals of Computer Algorithms", Second Edition, Universities Press, 2007

### Reference Books:

1. Design and Analysis of Algorithm – M R Kabat, PHI Learning Pvt. Ltd.
2. Algorithm Design – Goodrich, Tamassia, WileyIndia.
3. Algorithms By Sanjay Dasgupta, Umesh Vazirani – McGraw-Hill Education

## LESSON PLAN

(Students are encouraged to clear previous class doubt in First 10 Mins in every class)

| SI No            | Topic                                                                              | Session | Pedagogy                                       |
|------------------|------------------------------------------------------------------------------------|---------|------------------------------------------------|
| <b>Module I</b>  |                                                                                    |         |                                                |
| 1                | Introduction to design and analysis of algorithms, Growth of functions, Complexity | 1       | Lecture and Questionnaires.                    |
| 2                | Complexity analysis of some algorithms.                                            | 1       | Lecture and demonstration                      |
| 3                | Complexity analysis of some recursive algorithms.                                  | 1       | Lecture and demonstration                      |
| 4                | Recurrences, Solution of recurrences by Substitution.                              | 1       | Lecture, Derivation                            |
| 5                | Master method.                                                                     | 1       | Lecture, Group exercise                        |
| 6                | Recursion tree.                                                                    | 1       | Derivation, Group exercise                     |
| 7                | Divide and Conquer Approach: Merge sort. Analysis of Merge sort.                   | 1       | Flip class. Question answer                    |
| 8                | Quick sort Analysis of Quick sort.                                                 | 1       | Lecture. Performance analysis                  |
| 9                | Heap sort: Heaps, Building a heap, The Heap sort algorithm.                        | 1       | Lecture, Problem solving, Performance analysis |
| 10               | Priority Queue, Lower bounds for sorting.                                          | 1       | Lecture with board work                        |
| 11               | <b>Module Review and doubt clearing session</b>                                    | 1       | Question answer, Problem solving session       |
| <b>Module II</b> |                                                                                    |         |                                                |
| 12               | Dynamic Programming: Elements of dynamic programming.                              | 1       | Lecture, Explanation by example                |
| 13               | Matrix-chain multiplication.                                                       | 1       | Board work, Tabular solution                   |
| 14               | Longest common subsequence.                                                        | 1       | Board work, Tabular solution                   |
| 15               | Greedy Algorithms: Elements of greedy strategy.                                    | 1       | Board work, Comparison study                   |
| 16               | An activity-selection problem, Fractional knapsack                                 | 1       | Problem solving session                        |
| 17               | Huffman codes.                                                                     | 1       | Diagrammatic explanation                       |
| 18               | <b>Module review and Doubt clearing session.</b>                                   | 1       | Seminar/Peer level doubt clearing              |

| Module III |                                                                                                          |    |                                                  |
|------------|----------------------------------------------------------------------------------------------------------|----|--------------------------------------------------|
| 19         | Data structures for Disjoint Sets: Disjoint set operations, Linked-list representation of disjoint sets. | 1  | PPT Presentation                                 |
| 20         | Disjoint-set forests.                                                                                    | 1  | Lecture by demonstration                         |
| 21         | Graph Algorithms: Elementary Graph Algorithms: Representations of graphs.                                | 1  | Lecture by demonstration.                        |
| 22         | Breadth-first search, Depth-first search.                                                                | 1  | Diagrammatic approach, Performance analysis      |
| 23         | Minimum Spanning Trees: Kruskal algorithm.                                                               | 1  | Diagrammatic solution. Performance analysis      |
| 24         | Minimum Spanning Trees: Prim's algorithm.                                                                | 1  | Diagrammatic solution. Performance analysis      |
| 25         | Single-Source Shortest Paths: The Bellman-Ford and Dijkstra's algorithm.                                 | 1  | Diagrammatic solution. Performance analysis      |
| 26         | All-Pairs Shortest Paths: The Floyd-Warshall Algorithm.                                                  | 1  | Diagrammatic solution. Performance analysis      |
| 27         | <b>Doubt clearing session.</b>                                                                           | 1  | Student-student session                          |
| Module IV  |                                                                                                          |    |                                                  |
| 28         | Maximum Flow: Flow Networks, The Ford-Fulkerson method.                                                  | 1  | Board work, Step wise solution                   |
| 29         | Polynomials and the FFT: Representation of polynomials.                                                  | 1  | Lecture                                          |
| 30         | The naïve string-matching algorithm.                                                                     | 1  | Lecture with demonstration. Performance analysis |
| 31         | The Rabin-Karp string-matching algorithm.                                                                | 1  | Step wise solution. Performance analysis         |
| 32         | NP-Completeness: Polynomial time, Polynomial-time verification, NP-completeness and reducibility.        | 1  | Board work, Group Discussion                     |
| 33         | NP-completeness proofs, NP-completeness problems.                                                        | 1  | Lecture                                          |
| 34         | Approximation Algorithms: The vertex-cover problem, The travelling-salesman problem.                     | 1  | Lecture, Comparison study                        |
| 35         | The set-covering problem, The subset-sum problem.                                                        | 1  | Lecture, Comparison study                        |
| 36         | <b>Revision and doubt clearing session.</b>                                                              | 1  | Model Question paper discussion                  |
|            | <b>Total</b>                                                                                             | 36 |                                                  |

# **CSPC2002**

## **OPERATING SYSTEM(3-0-0)**

**Faculty : Susanta Kumar Behera**

Credit : 3

Credit Hour: 36

### **Course Objectives**

- To understand the fundamental concepts and role of Operating System.
- To learn the Process Management and Scheduling Algorithms
- To provide a detailed discussion of the various memory management techniques
- To gain insight on I/O and File management techniques
- Understand various problems related to concurrent operations and their solutions.

### **Course Outcomes**

- CO 1.** Understand the structure and functions of Operating System and how of the working principle of various types of operating systems
- CO 2.** Ability to comprehend the techniques used to implement the process manager
- CO 3.** Compare the performance of Scheduling Algorithms and Analyze resource management techniques
- CO 4.** Ability to comprehend virtual memory abstractions in operating systems

# Syllabus

**MODULE-1: Operating Systems:** Definition, Generations of Operating systems, Types of Operating System, Functions of operating System, Abstract view of OS, System Structures, System Calls. **Processes:** Definition, Process Relationship, Process states, Process State transitions, Process Control Block, Context switching, Threads, Concept of multithreads, Benefits of threads, Types of threads.

**MODULE-2: Process Scheduling:** Definition, Scheduling objectives, Types of Schedulers. Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time, Scheduling algorithms: Preemptive and Non-preemptive, FCFS, SJF, RR, Priority Scheduling, Multiple Queue Scheduling, Multilevel Feedback Queue Scheduling. **Deadlocks:** Definition, Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

**MODULE-3: Inter-process Communication:** Race Conditions, Critical Section, Mutual Exclusion, Peterson's Solution, The Producer Consumer Problem, Semaphores, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc.

**Memory Management:** Main Memory, Swapping, Memory allocation Methods, Internal and External fragmentation and Compaction, Paging, Structure of Page Table, Segmentation, Virtual Memory: Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

**MODULE-4: Disk management:** Disk Structure, Disk Scheduling, RAID Structure. **I/O Management:** I/O devices, direct memory access. File Management: File concept, access methods, File types, File operation, Directory structure, Allocation methods (contiguous, linked, indexed). **Security & Protection:** Security Environment, Design Principles of Security, User Authentication.

## Text Book:

1. Operating System Concepts (9<sup>th</sup> Edition) by Silberschatz, Peter B. Galvin and Greg Gagne, Wiley Indian Edition.

## Reference Books:

1. Modern Operating Systems (Fourth Edition) by Andrew S Tanenbaum, Prentice Hall India.
2. William Stallings, "Operating Systems Internals and Design Principles", Pearson, 2018, 9th Edition.

# LESSON PLAN

| Sl               | Topic                                                                   | Session | Pedagogy                    |
|------------------|-------------------------------------------------------------------------|---------|-----------------------------|
| <b>Module I</b>  |                                                                         |         |                             |
| 1                | Definition, Generations of Operating systems, Types of Operating System | 1       | Lecture                     |
| 2                | Functions operating System                                              | 1       | Lecture and Demonstration   |
| 3                | OS Structure                                                            | 1       | Lecture                     |
| 4                | System Calls                                                            | 1       | Practical                   |
| 5                | Program vs Process, States of Process                                   | 1       | Lecture and Demonstration   |
| 6                | Process State Transition and Context Switch                             | 1       | Lecture and Demonstration   |
| 7                | Thread Concept and benefits of multi threaded program                   | 1       | Flip class.                 |
| 8                | Types of thread                                                         | 1       | Lecture                     |
| <b>Module II</b> |                                                                         |         |                             |
| 9                | Scheduling objective, Types of Scheduling                               | 1       | Lecture                     |
| 10               | Scheduling Criterion                                                    | 1       | Lecture                     |
| 11               | Non Pre-emptive Algorithms: FCFS,SJF, Priority based                    | 1       | Lecture and Problem solving |
| 12               | Pre-emptive Algorithms: Round Robin                                     | 1       | Problem solving             |
| 13               | SRTN algorithm,Priority based Non-preemptive algorithm                  | 1       | Problem solving             |
| 14               | Multilevel Queue Scheduling                                             | 1       | Lecture and Demonstration   |
| 15               | Multilevel Feedback Queue Scheduling                                    | 1       | Lecture and Demonstration   |
| 16               | Deadlock Characteristics                                                | 1       | Lecture                     |
| 17               | Prevention of Deadlock                                                  | 1       | Lecture, Real life example  |

|                   |                                                                                  |   |                           |
|-------------------|----------------------------------------------------------------------------------|---|---------------------------|
| 18                | Banker's Algorithm for deadlock avoidance                                        | 1 | Lecture and Demonstration |
| 19                | Deadlock detection                                                               | 1 | Lecture and Demonstration |
| 20                | Recovery from Deadlock                                                           | 1 | Lecture and Demonstration |
| <b>Module III</b> |                                                                                  |   |                           |
| 21                | Race Conditions, Critical Section Problem and its solution                       | 1 | Lecture and Demonstration |
| 22                | Peterson Solution                                                                | 1 | Lecture and Demonstration |
| 23                | Semaphore Concept and operations                                                 | 1 | Lecture and Demonstration |
| 24                | Producer Consumer problem and its solution through Semaphore                     | 1 | Lecture and Demonstration |
| 25                | Inter Process Communication                                                      | 1 | Lecture, Group Discussion |
| 26                | Reader Writer Problem                                                            | 1 | Lecture and Demonstration |
| 27                | Dining Philosopher Problem and its deadlock free solution                        | 1 | Lecture and Demonstration |
| 28                | Memory Management : Basic Hardware ,Address binding ,Linking                     | 1 | Lecture and Demonstration |
| 29                | Contiguous Memory allocation :Fixed Partitioning and variable partitioning       | 1 | Lecture and Demonstration |
| 30                | Non Contiguous Memory allocation: Paging, Segmentation, Segmentation with Paging | 3 | Lecture and Demonstration |
| 31                | Internal Fragmentation and external fragmentation, Compaction                    | 1 | Lecture and Demonstration |
| 32                | Page replacement algorithms                                                      | 2 | Lecture and Demonstration |
| 32                | Thrashing and working set model                                                  | 1 | Lecture and Demonstration |
| <b>Module IV</b>  |                                                                                  |   |                           |
| 31                | Disk Structure, Disk Scheduling (FCFS,SSTF)                                      | 1 | Lecture and Demonstration |
| 32                | SCAN,LOOK,C- SCAN ,C – LOOK algorithms                                           | 1 | Lecture and Demonstration |
| 33                | File types, operations, Directory Structure                                      | 1 | Lecture and Demonstration |
| 34                | Allocation Methods                                                               | 1 | Lecture and Demonstration |
| 35                | Security and Protection                                                          | 1 | Lecture and Demonstration |

# MCPE2004

## Internet and Web Technology(3-0-0)

Faculty : Sabita Rani Behera

Credit : 3

Credit Hour: 36

**Course Objectives:**

To learn about the concept of Internet and a Web

To learn how to design Website

To learn about client scripting and server scripting language to implement client server communication

# Syllabus

**Module-1: TCP/IP Overview: TCP/IP and Internet:** Layers of TCP/IP, Network Layer: Addressing, Sub netting, Introduction to WWW, WWW Architecture, URL, Domain Name, Overview of HTTP, Client server model , Web browser and Web servers , Generation of dynamic web pages, Features of Web 2.0 ,Web Hosting. **Web Design:** Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Web site, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation.

**Module-2: HTML:**Basics of HTML, formatting and fonts, commenting code, color , images, hyperlink, lists, tables, forms, XHTML, Meta tags, Character entities, frames and frame sets, features of HTML5. **Style sheets :** Need for CSS, introduction to CSS, basic syntax and structure, using CSS, Internal ,External and Inline style, Background images, colors and properties, Manipulating text ,Margins and Padding ,Positioning using CSS. **XML:** Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas

**Module-3: JavaScript:** Client-side scripting with JavaScript, variables, functions, conditions, loops and repetition **Advance JavaScript:** JavaScript and objects, JavaScript Built in objects, the DOM and web browser environments, Manipulation using DOM, forms and validations. **DHTML:** Combining HTML, CSS and JavaScript, Events and buttons

**Module-4: PHP:** Introduction and basic syntax of PHP, decision and looping statement, Arrays, Functions, Browser control and detection, string handling, Form processing ,Files ,PHP with Database connectivity, Cookies and Session handling in PHP

## Reference Books:

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2. Web Technologies, Black Book, dreamtech Press
3. HTML 5, Black Book, dreamtech Press
4. The Complete Reference – PHP, Steven Holzner, Tata McGraw Hill, 2008.
5. PHP & MySQL in easy Steps, Mike Mcgrath, Tata McGraw Hill, 2012.
6. Web Design, Joel Sklar, Cengage Learning
7. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson

# LESSON PLAN

| Sl. No.                                           | Topic                                                                                          | Session | Pedagogy                                                                  |
|---------------------------------------------------|------------------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------|
| <b>Module 1: TCP/IP &amp; Web Design Overview</b> |                                                                                                |         |                                                                           |
| 1                                                 | Introduction to Internet, History of Internet and OSI vs TCP/IP architecture, Layers of TCP/IP | 1       | Lecture real-world analogies, and Board explanation                       |
| 2                                                 | Network Layer Functionalities and concept of IP Addressing, Classful and Classless addressing  | 1       | Problem-solving with numerical examples, interactive discussion           |
| 3                                                 | Sub netting and CIDR notation with Real life application                                       | 1       | Problem-solving with real life numerical examples, interactive discussion |
| 4                                                 | Concept of WWW, Architecture, Web browser, Web Server, URL, Domain Name System HTTP Protocol   | 1       | Lecture with diagrams                                                     |
| 5                                                 | Dynamic Web Pages, Features of Web 1.0, Web 2.0 and Web 3.0, Web Hosting                       | 1       | Lecture with real world case studies of websites                          |
| 6                                                 | Web Design Concepts, Browser & Bandwidth Issues, Operating system and Caching issues           | 1       | Lecture with board explanation                                            |
| 7                                                 | Display Resolution, Look & Feel, Page Layout, Linking                                          | 1       | Visualizing with sample HTML/CSS                                          |
| 8                                                 | User-Centric Design, Sitemap, Website Planning and Effective Navigation & Publishing Websites  | 1       | create a sitemap for a hypothetical site                                  |
| <b>Module 2: HTML, CSS &amp; XML</b>              |                                                                                                |         |                                                                           |
| 9                                                 | Basics of HTML: Text formatting, Fonts, Colors, Lists                                          | 1       | HTML code Implementations                                                 |
| 10                                                | Images, Hyperlinks, Tables                                                                     | 1       | Hands-on lab exercises                                                    |
| 11                                                | Forms Design                                                                                   | 1       | Practical demonstration with Hands-on lab exercises                       |
| 12                                                | XHTML, Meta Tags, Character Entities, Frames                                                   | 1       | Lecture with coding practice                                              |
| 13                                                | HTML5 Features & Enhancements                                                                  | 1       | Practical demonstration of HTML5 tags                                     |
| 14                                                | CSS Introduction: Syntax, Structure, Internal, External, Inline                                | 1       | Lecture with coding examples                                              |

|                                         |                                                                 |   |                                               |
|-----------------------------------------|-----------------------------------------------------------------|---|-----------------------------------------------|
| 15                                      | CSS Properties: Backgrounds, Colors, Text, Margins, Padding     | 1 | Hands-on practice                             |
| 16                                      | CSS Positioning: Relative, Absolute, Fixed                      | 1 | Visual demonstration with coding              |
| 17                                      | XML Basics: Structure, Uses, Key Components                     | 1 | Lecture ,coding                               |
| 18                                      | DTD & XML Schema                                                | 1 | Hands-on lab exercise for validation          |
| <b>Module 3: JavaScript &amp; DHTML</b> |                                                                 |   |                                               |
| 19                                      | JavaScript Basics: Variables, Conditions, Loops                 | 1 | Lecture with coding demonstration             |
| 20                                      | Function, JavaScript Objects & Built-in Objects                 | 1 | Hands-on activity with examples               |
| 21                                      | DOM & Web Browser Environment                                   | 1 | Demonstration with coding                     |
| 22                                      | Forms & Validations using JavaScript                            | 1 | Lab-based exercise with real-time validation  |
| 23                                      | DHTML: Integrating HTML, CSS, and JavaScript                    | 1 | Project-based task                            |
| 24                                      | Events & Buttons in JavaScript                                  | 1 | Interactive coding session                    |
| <b>Module 4: PHP</b>                    |                                                                 |   |                                               |
| 25                                      | Introduction to PHP: Syntax, Variables, constants and operators | 1 | Practical installation of XAMPP server        |
| 26                                      | PHP Decision making statements and Loops,                       | 1 | Practical demonstration                       |
| 27                                      | Arrays in PHP                                                   | 1 | Lecture with coding                           |
| 28                                      | Functions handling in PHP                                       | 1 | Hands-on exercise                             |
| 29                                      | Browser Control, String Handling in PHP                         | 1 | Practical coding                              |
| 30                                      | Form Processing in PHP                                          | 1 | Practical session with real-time form design  |
| 31                                      | File Handling in PHP                                            | 1 | Practical implementation                      |
| 32                                      | PHP with Database (MySQL)                                       | 1 | Practical implementation with sample database |
| 33                                      | Cookies & Session Handling                                      | 1 | Practical implementation                      |
| 34                                      | Advance PHP concept                                             | 1 | Lecture with board explanation                |
| 35                                      | Exercise on reviewing module 2,3 and 4                          | 1 | Lab-based work                                |
| 36                                      | Mini Project Development                                        | 1 | Lab-based work                                |

# MCPE2007

## Soft Computing (3-0-0)

**Faculty: Dr. Rajalaxmi Mishra**

Credit : 3

Credit Hour: 36

### **Course Objectives:**

1. To introduce the fundamental concepts of Soft Computing Techniques.
2. To understand the feasibility of applying a soft computing methodology for a particular problem.
3. To develop and understanding of Neural Networks, Fuzzy System and Genetic Algorithm.
4. To explore advanced topics such as Hybrid systems, GA based Back propagation Networks and Fuzzy Back propagation Networks.

### **Course Outcomes: Upon successful completion of this course, students should be able to:**

- CO1:** Apply the techniques of soft computing and foster their abilities in designing and implementing soft computing-based solutions for real-world engineering problems.
- CO2:** Analyze neural networks to pattern recognition, classification and regression problems to evaluate solutions by various soft computing approaches.
- CO3:** Apply and design fuzzy logic and reasoning to handle uncertainty and solve engineering problems.
- CO4:** Examine and formulate genetic algorithm to combinatorial optimization problems

# Syllabus

**MODULE – I: Introduction:** What is Soft Computing? Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing. **Neural Networks:** What is Neural Network, Learning rules and various activation functions, Single layer Perceptrons, Back Propagation networks, Architecture of Backpropagation(BP) Networks, Backpropagation Learning, Variation of Standard Back propagation Neural Network, Introduction to Associative Memory, Adaptive Resonance theory and Self Organizing Map, Recent Applications.

**MODULE – II: Fuzzy Systems:** Fuzzy Set theory, Fuzzy versus Crisp set, Fuzzy Relation, Fuzzification, Minmax Composition, Defuzzification Method, Fuzzy Logic, Fuzzy Rule based systems, Predicate logic, Fuzzy Decision Making, Fuzzy Control Systems, Fuzzy Classification. **Genetic Algorithm:** History of Genetic Algorithms (GA), Working Principle, Various Encoding methods, Fitness function, GA Operators- Reproduction, Crossover, Mutation, Convergence of GA, Bit wise operation in GA, Multi-level Optimization.

**MODULE – III : Hybrid Systems:** Sequential Hybrid Systems, Auxiliary Hybrid Systems, Embedded Hybrid Systems, Neuro-Fuzzy Hybrid Systems, Neuro-Genetic Hybrid Systems, Fuzzy-Genetic Hybrid Systems.

**MODULE – IV: GA based Backpropagation Networks:** GA based Weight Determination, K - factor determination in Columns, **Fuzzy Backpropagation Networks:** LR type Fuzzy numbers, Fuzzy Neuron, Fuzzy BP Architecture, Learning in Fuzzy BP, Application of Fuzzy BP Networks.

## Text Book:

1. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S.Rajasekaran, G. A. Vijayalakshami, PHI.

## Reference Books:

1. Genetic Algorithms: Search and Optimization, E. Goldberg.
2. Neuro-Fuzzy Systems, Chin Teng Lin, C. S. George Lee, PHI.

# LESSON PLAN

| Sl. No.                                                    | Topic                                                    | Session | Pedagogy                                    |
|------------------------------------------------------------|----------------------------------------------------------|---------|---------------------------------------------|
| <b>Module – I</b>                                          |                                                          |         |                                             |
| 1                                                          | Introduction to Soft Computing                           | 1       | Lecture with real-life examples, Board Work |
| 2                                                          | Hard vs Soft Computing                                   | 1       | Comparative discussion, Board Work diagrams |
| 3                                                          | Requirement & Major Areas of Soft Computing              | 1       | Brainstorming session, case studies         |
| 4                                                          | Applications of Soft Computing                           | 1       | Demonstrations with examples                |
| 5                                                          | Introduction to Neural Networks                          | 1       | Lecture with biological neuron analogy      |
| 6                                                          | Learning Rules (Hebbian, Delta, Perceptron, Competitive) | 1       | Board work + solved examples                |
| 7                                                          | Activation Functions (Step, Sigmoid, Tanh, ReLU)         | 1       | Graph plotting, interactive Q&A             |
| 8                                                          | Single-layer Perceptron                                  | 1       | Hands-on problem solving                    |
| 9                                                          | Back propagation Networks – Architecture                 | 1       | Board work + diagram explanation            |
| 10                                                         | Back Propagation Learning Process                        | 1       | Step-by-step derivation, numerical example  |
| 11                                                         | Variations of BP Networks                                | 1       | Comparative discussion                      |
| 12                                                         | Associative Memory & ART                                 | 1       | Concept explanation, real-world examples    |
| 13                                                         | Self-Organizing Maps                                     | 1       | Demonstrations with Examples                |
| 14                                                         | Recent Applications of Neural Networks                   | 1       | Seminar / student presentations             |
| <b>Module – II: Fuzzy Systems &amp; Genetic Algorithms</b> |                                                          |         |                                             |
| 15                                                         | Fuzzy Set Theory & Crisp vs Fuzzy                        | 1       | Board explanation, example problems         |
| 16                                                         | Fuzzy Relations, Fuzzification                           | 1       | Diagrammatic explanation                    |
| 17                                                         | Min-Max Composition & Defuzzification                    | 1       | Step-by-step examples                       |

|                                           |                                                    |           |                                      |
|-------------------------------------------|----------------------------------------------------|-----------|--------------------------------------|
| 18                                        | Fuzzy Logic & Rule-based Systems                   | 1         | IF–THEN rule examples                |
| 19                                        | Predicate Logic & Fuzzy Decision Making            | 2         | Problem-solving session              |
| 20                                        | Fuzzy Control Systems & Classification             | 1         | Case study: washing machine, AC      |
| 21                                        | History & Principle of GA                          | 1         | Lecture + analogy with evolution     |
| 22                                        | Encoding Methods & Fitness Functions               | 1         | Demonstration with board work        |
| 23                                        | GA Operators – Selection, Crossover, Mutation      | 1         | Demonstration with Examples          |
| 24                                        | Convergence, Bitwise Ops, Multi-level Optimization | 1         | Discussion with numerical examples   |
| <b>Module – III: Hybrid Systems</b>       |                                                    |           |                                      |
| 25                                        | Sequential, Auxiliary, Embedded Hybrid Systems     | 1         |                                      |
| 26                                        | Neuro-Fuzzy Hybrid Systems                         | 1         | Board Work + examples                |
| 27                                        | Neuro-Genetic Hybrid Systems                       | 1         | Simulation example                   |
| 28                                        | Fuzzy-Genetic Hybrid Systems                       | 1         | Board Work + application discussion  |
| <b>Module – IV: Advanced Applications</b> |                                                    |           |                                      |
| 29                                        | GA-based Weight Determination in BP Networks       | 1         | Mathematical derivation, coding demo |
| 30                                        | K-factor Determination                             | 1         | Step-by-step example                 |
| 31                                        | Fuzzy Back propagation Networks – LR-type Numbers  | 1         | Diagram + explanation                |
| 32                                        | Fuzzy Neuron & Architecture                        | 1         | Board diagram + coding demo          |
| 33                                        | Learning in Fuzzy BP                               | 1         | Step-by-step explanation             |
| 34                                        | Applications of Fuzzy BP Networks                  | 1         | Case study + Q&A session             |
| 35                                        | <b>Revision &amp; Mock Test</b>                    | 1         | Quiz, past question paper discussion |
|                                           | <b>Total</b>                                       | <b>36</b> |                                      |

# **HSHS2003**

## **ENTREPRENEURSHIP DEVELOPMENT (3-0-0)**

**Faculty: DR PRAJNADIPTA DAS**

Credit : 2

Credit Hour: 24

### **Course Objectives:**

1. To develop a knowledge on basic concepts of entrepreneurship.
2. To develop a knowledge on affecting parameters of entrepreneurship and its policies.
3. To create a knowledge on preparation of entrepreneurship methodology.
4. To get a knowledge on applications of entrepreneurship.
5. To know about effective management of entrepreneurship in small scale Industries

### **Course Outcomes:**

At the end of the course the student will be able to:

**CO1:** Apply the knowledge of entrepreneurship qualities and skills to startup a business.

**CO2:** Apply the knowledge of entrepreneurship policies to startup a business.

**CO3:** Prepare a feasibility report and evaluation criteria for an entrepreneurship.

**CO4:** Analyze marketing strategies of entrepreneurship.

**CO5:** Apply preventive measures to be followed for effective management of entrepreneurship.

# Syllabus

## **Module - I:**

Entrepreneurship: Concept of Entrepreneurship and intrapreneurship, Types of Entrepreneur, Nature and Importance, Entrepreneurial Motivation and Achievement, Entrepreneurial Personality & Traits and Entrepreneurial Skills.

## **Module - II:**

Entrepreneurial Environment, Identification of Opportunities, Converting Business opportunities into reality. Start-ups and business incubation, Skill Development. Setting up a Small Enterprise. Issues relating to location, Environmental Problems and Industrial Policies and Regulations.

## **Module - III:**

Basics of Accounting, Terms: Assets, Liabilities, Equity, Revenue, Expense, Working capital, Marketing Mix and STPHRM: Concepts and Function, Labour Laws- Factories Act, Organizational support services – Central and State Government, Incentives and Subsidies.

## **Module - IV:**

Sickness of Small-Scale Industries, Causes and symptoms of sickness, cures of sickness, Role of Banks and Government in reviving sick industries.

## **Recommended Books:**

1. Entrepreneurship Development and Management, Vasant Desai, HPH
2. Entrepreneurship Management, Bholanath Dutta, Excel Books
3. Entrepreneurial Development, Sangeeta Sharma, PHI
4. Entrepreneurship, Rajeev Roy, Oxford University Press

# LESSON PLAN

## Module-I

| SL NO | TOPIC                                                               | SESSION | PEDAGOGY                                             |
|-------|---------------------------------------------------------------------|---------|------------------------------------------------------|
| 1     | Entrepreneurship: Concept of Entrepreneurship and Intrapreneurship, | 1       | Introduction                                         |
| 2     | Types of Entrepreneur, Nature and Importance                        | 1       | Lecture and discussion class                         |
| 3     | Entrepreneurial Motivation and Achievement,                         | 1       | Case-based discussion, Illustrations                 |
| 4     | Entrepreneurial Personality & Traits and                            | 1       | Lecture, discussion and Activity-1                   |
| 5     | Entrepreneurial Skills                                              | 1       | Lecture, Activity-2, Self-assessment questions, Quiz |

## Module-II

|    |                                                      |   |                                                   |
|----|------------------------------------------------------|---|---------------------------------------------------|
| 6  | Entrepreneurial Environment,                         | 1 | Lecture and discussion class                      |
| 7  | Identification of Opportunities,                     | 1 | Lecture and case-let discussion                   |
| 8  | Converting Business opportunities into reality.      | 1 | Case-based discussion, Illustrations              |
| 9  | Start-ups and business incubation, Skill Development | 1 | Lecture, discussion and Activity, Quiz            |
| 10 | Setting up a Small Enterprise.                       | 1 | Lecture and discussion class                      |
| 11 | Issues relating to location,                         | 1 | Lecture and discussion class, case-let discussion |
| 12 | Environmental Problems and                           | 1 | Lecture and case-let discussion                   |
| 13 | Industrial Policies and Regulations.                 | 1 | Lecture and discussion class                      |

## Module-III

|    |                                                                       |   |                              |
|----|-----------------------------------------------------------------------|---|------------------------------|
| 14 | Basics of Accounting,                                                 | 1 | Lecture and discussion class |
| 15 | Terms: Assets, Liabilities, Equity, Revenue, Expense, Working Capital | 1 | Lecture and discussion class |

|                  |                                                                 |           |                                                               |
|------------------|-----------------------------------------------------------------|-----------|---------------------------------------------------------------|
| 16               | Marketing Mix and                                               | 1         | Case-base discussion, Illustrations                           |
| 17               | STPHRM: Concepts and Function,                                  | 1         | Lecture, discussion and Activity, Students presentation, Quiz |
| 18               | Labour Laws- Factories Act,                                     | 1         | Lecture & discussion class                                    |
| 19               | Organizational support services – Central and State Government, | 1         | Lecture and Case-let discussion                               |
| 20               | Incentives and Subsidies.                                       | 1         | Lecture & discussion class                                    |
| <b>Module-IV</b> |                                                                 |           |                                                               |
| 21               | Sickness of Small-Scale Industries,                             | 1         | Lecture & discussion class                                    |
| 22               | Causes and symptoms of sickness,                                | 1         | Lecture and Case-let discussion                               |
| 23               | cures of sickness,                                              | 1         | Lecture and Case-let discussion                               |
| 24               | Role of Banks and Government in reviving sick industries.       | 1         | Lecture & discussion class                                    |
| <b>TOTAL</b>     |                                                                 | <b>24</b> |                                                               |