**Lecture Schedule**

**Department of Computer Science Engineering & Information Technology**

# Branch & Section : III B.Tech - II Sem – IT Regulation :/R13

**Subject : Design and Analysis of Algorithms Academic Year : 2017 -2018**

**Name of the Faculty : K.Purushotam Naidu**

**Course Objectives**

At the end of the course, the students will be able to:

1. Analyze the asymptotic performance of algorithms.

2. Write rigorous correctness proofs for algorithms.

3. Demonstrate a familiarity with major algorithms and data structures.

4. Apply important algorithmic design paradigms and methods of analysis.

5. Synthesize efficient algorithms in common engineering design situations.

**Course Outcomes:**

After completing this course the student must demonstrate the knowledge and ability to:

1.Analyze worst-case running times of algorithms using asymptotic analysis.

2.Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for

it.

3. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls

for it.

4. Describe the greedy paradigm and explain when an algorithmic design situation calls for it.

5. Explain the major graph algorithms and their analyses. Employ graphs to model engineering

problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph

computations as key components, and analyze them.

6. Explain the different ways to analyze randomized algorithms (expected running time, probability of

error). Recite algorithms that employ randomization. Explain the difference between a randomized

algorithm and an algorithm with probabilistic inputs.

7. Analyze randomized algorithms. Employ indicator random variables and linearity of expectation to perform the analyses. Recite analyses of algorithms that employ this method of analysis.

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| Unit No | Topic No | Name of the Concept | No. of Classes Required |
| Unit – 1 : Introduction: |
| Unit - 1 | 1 | Algorithm, Psuedo code for expressing algorithms | 1 |
| 2 | performance Analysis-Space complexity | 2 |
| 3 | Time complexity | 2 |
| 4 | Asymptotic Notation- Big oh notation, Omega notation | 2 |
| 5 | Theta notation and Little oh notation | 1 |
| 6 | probabilistic analysis | 1 |
| 7 | Amortized analysis | 1 |
| Total number of hours  | 10 |
| Unit – 2 : Divide and conquer |
| Unit – 2 | 1 | General method | 1 |
| 2 | applications-Binary search | 1 |
| 3 | Quick sort | 2 |
| 4 | Merge sort | 2 |
| Total number of hours | 6 |
| Unit – 3 : Greedy method |
| Unit – 3 | 1 | General method | 1 |
| 2 | applications-Job sequencing with deadlines | 2 |
| 3 | knapsack problem | 2 |
| 4 | spanning trees,Minimum cost spanning trees, | 2 |
| 5 | Single source shortest path problem | 2 |
| Total number of hours | 9 |

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| Unit – 4 : Dynamic Programming |
| Unit – 4 | 1 | General method | 1 |
| 2 | applications-Matrix chain multiplication | 2 |
| 3 | Optimal binary search trees | 2 |
| 4 | 0/1 knapsack problem | 2 |
| 5 | All pairs shortest path problem, | 2 |
| 6 | Travelling sales person problem | 2 |
| 7 | Reliability design | 1 |
| Total number of hours | 12 |

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| Unit – 5: Backtracking |
| Unit – 5 | 1 | General method | 1 |
| 2 | applications-n-queen problem | 2 |
| 3 | sum of subsets problem | 2 |
| 4 | graph coloring | 2 |
| 5 | Hamiltonian cycles | 1 |
| Total number of hours | 8 |

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| Unit – 6 : Branch and Bound: |
| Unit – 6 | 1 | General method | 1 |
| 2 | applications - Travelling sales person problem | 2 |
| 3 | 0/1 knapsack problem | 2 |
| 4 | LC Branch and Bound solution | 2 |
| 5 | FIFO Branch and Bound solution | 2 |
| Total number of hours | 9 |

**Overall Number of classes required: 54**

**Text Books:**

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and

Rajasekharam, Universities Press.

2. Design and Analysis of Algorithms , S Sridhar, Oxford

3. Design and Analysis of Algorithms, Parag Himanshu Dave, Himansu

BAlachandra Dave, 2ed,Pearson Education.

**References:**

**1.** Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.

2. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA

3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein,PHI Pvt.

Ltd.

4. Algorithm Design, Foundation, Analysis and internet Examples, Michel T Goodrich, Roberto Tamassia,Wiley

Signature of Faculty