CHAPTER -1

INTRODUCTION
Chapter-1 is introductory which gives the basic idea of scheduling and development of production scheduling problems with various performance measure and terminologies. In this chapter we have described various techniques used to solve different types of production scheduling problems such as Branch and Bound technique, Heuristic approach, Meta heuristic approach etc. Brief surveys of scheduling problems given by various researchers have also been given.
CHAPTER-2

SPECIALLY STRUCTURED FLOW SHOP SCHEDULING MODEL TO MINIMIZE THE RENTAL COST
Chapter- 2 is explored to deal with multi objective in scheduling under specified rental policy as it is imperative for manufacturing company to meet the challenges of globalization. The advent of the new technologies a continuous improvement in product quality and changing customer requirements have all lead to production with multiobjective which demand effective methodologies for their execution on the shop floor- the ones that minimize the processing time of jobs, utilization time of machines and their rental cost while meeting customer demand. Chapter 2 is divided into four sections. Section 2.1 deals with the biobjective in n jobs, 2 machines specially structured flow shop in which processing time of jobs are associated with respective probabilities to obtain the minimum possible rental cost while minimizing the utilization time of machines and minimizing make span. Section 2.2 describes heuristic approach in specially structured flow shop scheduling with n jobs 3 machines in which processing time of jobs are associated with respective probabilities and follow some restrictive rental policy. Objective of present section is to find out an algorithm through heuristic approach which gives minimum possible rental cost, while minimizing total elapsed time. Section 2.3 deals to meet the bi objective in n jobs 2 machine specially structured flow shop scheduling with separated set up time. In fact section 2.3 is further an extension of the work of section 2.1 in the sense that here we have separated the set up time from the processing time and probabilities have been associated. Section2.4 is an extension work of section 2.2 as it deals with a heuristic approach for n×3 flow shop specially structured flow shop production scheduling in which processing time, set up time associated with their respective probabilities The technique is illustrated by a numerical example.
CHAPTER 3

SPECIALLY STRUCTURED FLOW SHOP SCHEDULING MODEL TO MINIMIZE THE RENTAL COST WITH JOB BLOCK CRITERIA
This chapter describes heuristic approach in solving specially structured flow shop scheduling with the objective function to find the optimal schedule of all the jobs minimizing the rental cost of the machines under specified rental policy in which processing times are associated with probabilities including the concept of job block criteria. First it deals with $n$ jobs $2$ machines with objective to obtain the optimal schedule in which some particular jobs are processed as a group job. Secondly it deals with a heuristic approach for $n \times 3$ specially structured flow shop scheduling in which processing times are associated with probabilities and an equivalent job for a job block are involved. A new heuristic algorithm alternative to Johnson’s rule is obtained to minimize the rental cost of machines while minimizing the total utilization time under the policy that first machine will be taken on rent in the starting of processing the jobs, second machine will be taken on rent at time when 1st job is completed on first machine. The technique is illustrated by numerical examples.
CHAPTER-4

SPECIALLY STRUCTURED FLOW SHOP

SCHEDULING MODEL TO

MINIMIZE THE RENTAL COST, INCLUDING

WEIGHTAGE OF JOBS
In this chapter efforts are made to search out an algorithm which gives minimum possible rental cost under a specified rental policy, while minimizing total elapsed time and utilization time of machines for specially structured flow shop scheduling including weightage of jobs, in which the processing times of jobs are not completely random, but bears a well defined relationship to one another. First, it deals with n jobs 2 machines and n jobs 3 machines with the objective to obtain an optimal schedule in which weights are given to the jobs according to their relative importance. Secondly, it deals with a heuristic approach for n×2 specially structured flow shop production scheduling in which processing times are associated with their respective probabilities and an equivalent job for a job block are involved along with weightage of job. Further the study is extended to find out an optimal schedule to minimize the rental cost in which set up times are separated from their processing times with restrictive rental policy.
CHAPTER-5

SPECIALLY STRUCTURED FLOW SHOP
SCHEDULING MODEL WITH TRANSPORTATION
TIME TO MINIMIZE
THE RENTAL COST OF MACHINES
This chapter is explored to deal with the bi objective in n jobs two machines and n jobs three machines in which processing times of jobs are associated with their respective probabilities and bear a well defined relationship to one another including transportation time to obtain the minimum possible rental cost while minimizing the utilization time of machines. Further, the study is extended to find out a bi objective in n jobs 3 machines specially structured flow shop with transportation time, in which setup times are separated from processing times. Subsequently, the work is extended to minimize the utilization time of machines and hence their rental cost under a specified rental policy by involving the concept of job block criteria. In the last part of this chapter one more parameter i.e. weightage of jobs has been taken up along with job block criteria, transportation time and setup times separated from processing times.
CHAPTER-6

SPECIALLY STRUCTURED OPEN SHOP SCHEDULING

MODEL TO

MINIMIZE THE RENTAL COST
Chapter 6 explains specially structured open shop scheduling in which the processing times of the jobs are not completely random, but bear a well defined relationship to one another to minimize the utilization time of machines and hence their rental cost under a specified rental policy. Chapter 6 is divided into three sections. Section 6.1 is an attempt to obtain an optimal solution to minimize the utilization time of machines and hence their rental cost, in n-jobs, 2-machine specially structured open shop scheduling under specified rental policy in which processing times are associated with probabilities. Section 6.2 is an extension work of Section 6.1 as it deals with Specially Structured Two Stage Open Shop Scheduling Model to Minimize the Rental Cost, including transportation time. Section 6.3 deals to find out multi objective in n jobs 2 machines for Specially Structured Open Shop Scheduling, including Job block criteria. Objective of present section is to find out an algorithm through heuristic approach which gives minimum possible rental cost while minimizing utilization time of machines and minimization of makespan including job block criteria i.e.in which some particular jobs are processed as a group job.