Principles of Industrial Engineering
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Lecture 1
Introduction

Hello, I welcome you all in this presentation related with the subject Principles of Industrial Engineering. As we can see the title of the subject, the primarily here the industrial engineering is the main area and the various principles and the tools and techniques associated with the industrial engineering will be covered in this subject. Since here we have the two important words like Industrial means of the industries and the engineering.

So, what is the meaning and significance of this two? Industry or the industrial aspects means, an organization or an enterprise where something is produced or distributed in form of the goods or services. So, basically an industry is an organization or enterprise where things are produced or they are distributed in form of products and services.

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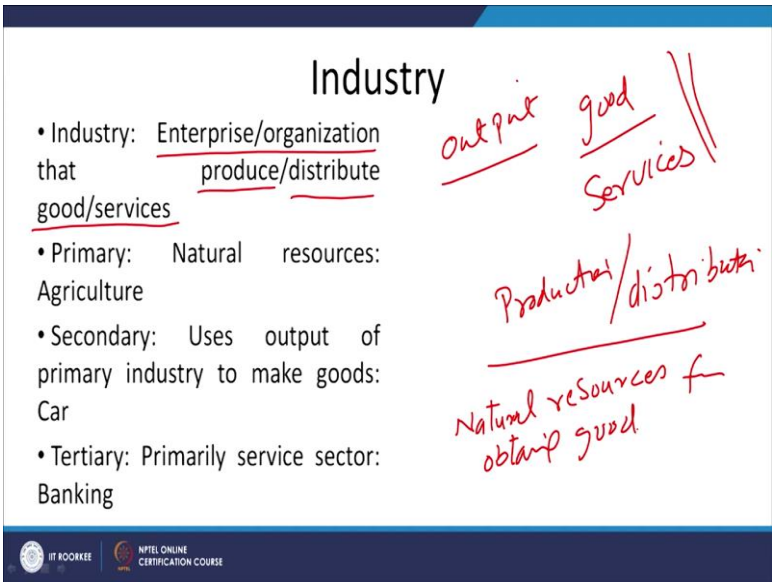

So, if we see industry as an enterprise or organisation which produces or distributes the goods and services. So means there is some output which may be in form of the goods or the services. So, these industries may be involved, industries may be involved in either production or distribution of the goods and services. Broadly, there are three types of the industries; one is the primary industry. In primary industry basically it uses the natural resources for obtaining the goods.

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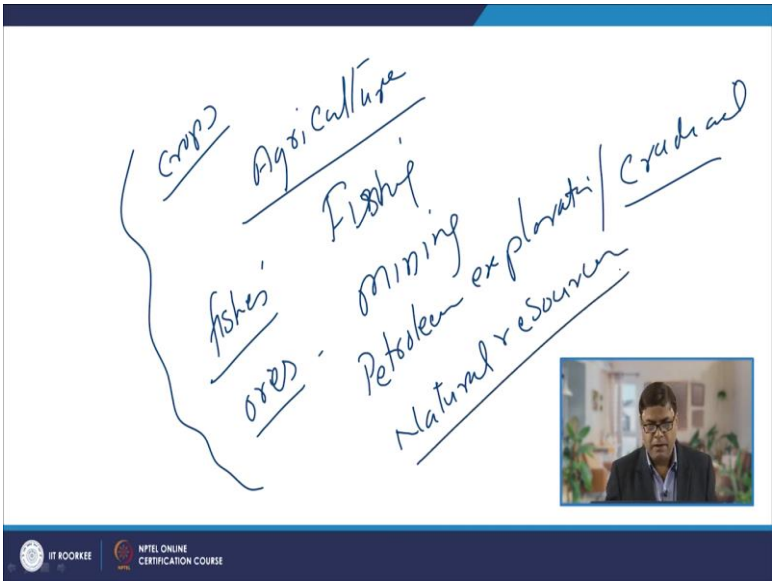

It may be in form of say producing the crops using agriculture or obtaining the fishes through fishing or obtaining the ores in mining. Likewise, here, petroleum exploration not the refining, refining is the secondary industry, petroleum exploration and the production of the crude oil; crude oil production. So, these are the industries where the output is realized through the use of the natural resource.

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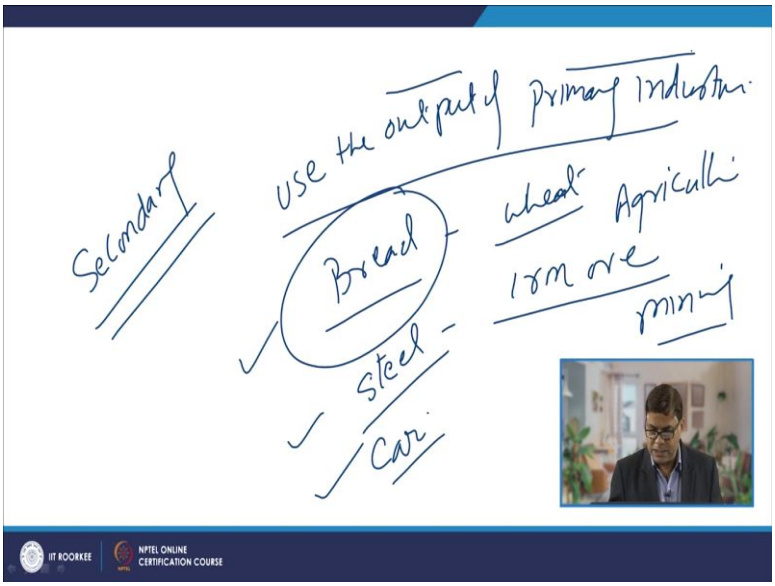

Similarly, there is a secondary a type of secondary industry, another type of industries that we have is secondary. These industries use the output of primary industries. For example, the bread prepared using the wheat which is the output of the agricultural industry. So, the production of the bread like producing the steel using iron ore obtained from the mining

industry or making the cars using variety of the raw materials produced from the primary industry produced by the primary industry. So, in the secondary industry we have the output in form of various usable goods, which are produced from the output of the primary industry.

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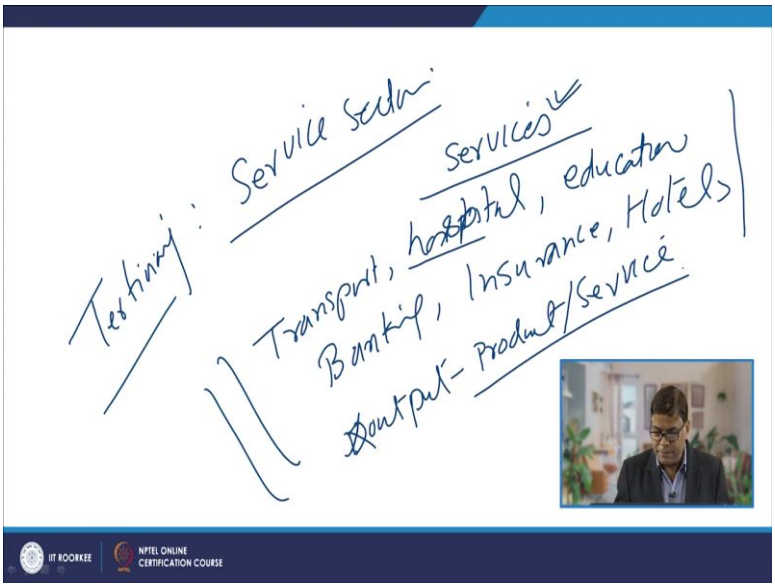

Then there is a tertiary industry. In tertiary industry is basically, primarily it comprises the service sector, all industries related with the services. So, their output is in form of the services they offer, like in it may be in form of the transport, it may be in form of the hospitals providing the medical services, maybe in form of the education, banking, insurance hospitality industries like hotels.

So, in these cases, in the tertiary industry, we have the industries which are primarily related with the providing services of the different types to the customers. So, it is not necessary that output will be there in form of the some product or the goods which will be used by the users or the customers, it may also be in form of the services. Since, in each type of the industry, in each type whether it is primary, secondary or tertiary, in each type of the industry, there is an output. Output either in form of some product or in form of service.

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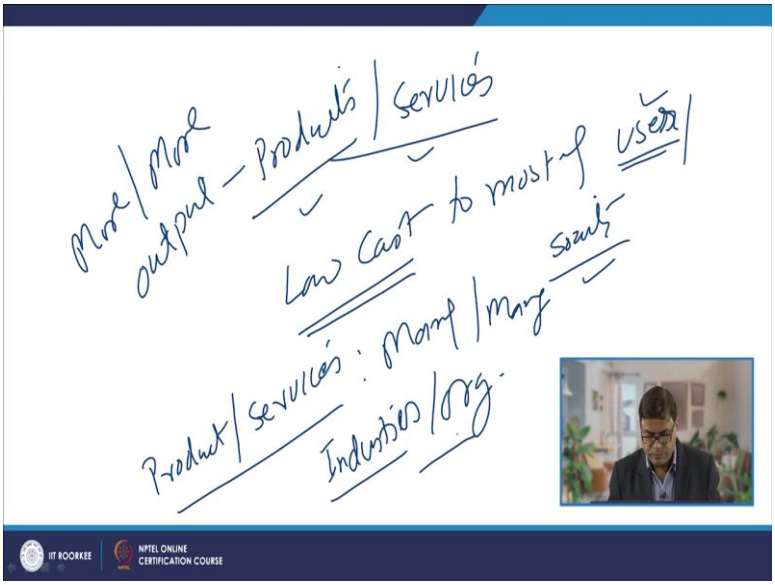

So efforts are always made in the industry to produce more and more products output in form of products and services. So that, these can be made available at low cost to most of the users or the, to the society. The purpose is that, if we have produced more and more products and services at low cost, then these can easily be availed by the users and those associated with the particular region or the country or the society. We also know that for each type of the product and the services there are many-many producers. There are many-many industries and organizations. These organizations produce the products of the similar type.

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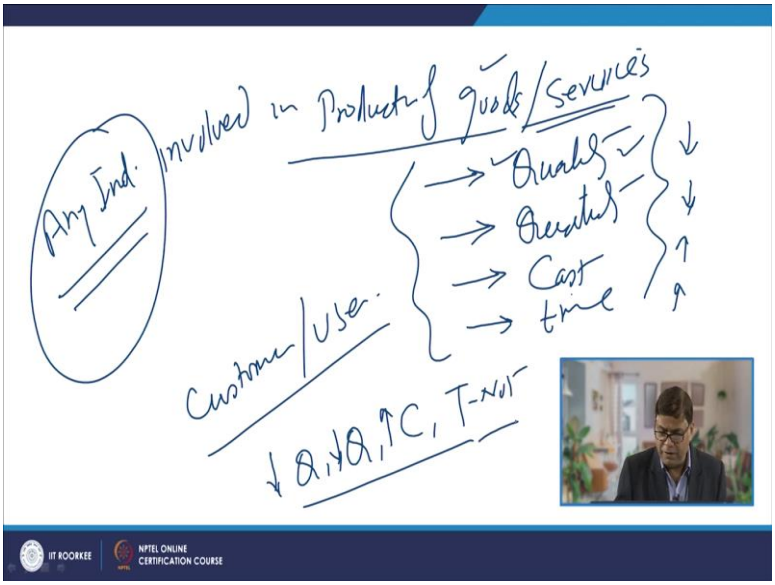

So, here it becomes important that any industry which is involved in production of goods, it must produce the goods in very good quality in the required quantity, so that it is able to

satisfy the requirement or the demand available in the market and that too at low cost. So, these are the three very important parameters, at the same time that time is also important.

So, any industry involved in production or providing the goods or the services must be in position to provide the required output in the desired quantity, desired quality at the low cost and that too on time, so that the customers or the users of the product and services can effectively avail. If the industry involved in production of goods or services is not able to deliver these things or the goods or services in the required quantity, required quality at high cost or not in time.

So, if the company or organization or industry fails in providing the goods and services in the required quantities, required quality at low cost and on time, then it will not be able to survive in the market because there may be other competitors in the market, which will be able to capture their market and so the survival of the industry, which is producing the limited quantity, poor quality at high cost, not in time, then it will not be able to survive. So, why it is important?

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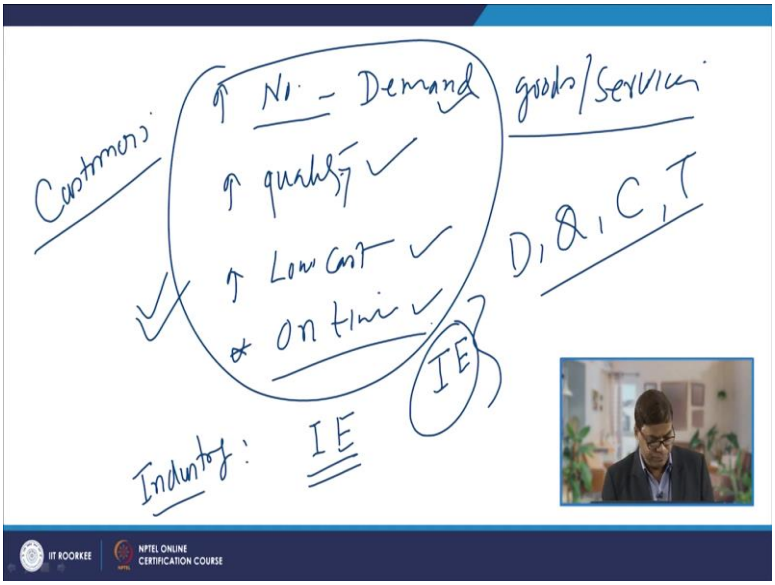

We know that the customers nowadays are increasing in numbers, this is one. So, the demand is increasing, in general the economies are improving, the purchasing capabilities of the customers is improving and therefore the demand for goods and services is also improving. So, there is increasing demand for goods and services.

At the same time, due to the increased awareness of the customers about the quality, about their rights, about the kind of options which are available in the market, they are also looking

for certain quality aspect in the goods and services which are being made available by particular industry. So, not just demand in terms of the numbers is increasing, but the requirement for the quality or the demand for quality goods and services is also increasing.

At the same time, the customers are looking for the goods and services at the low cost that is the competitive price. So, that the goods and services are made available to them at the competitive prices, the price at which the other options are available. And at the same time, these goods and services must be made available on time. So, these are the kind of the forces which are dictating the industries to come out with the goods and services of the required quality in so that they can satisfy the demand at the low cost and on-time delivery of the goods and services.

So, how this can be done effectively. To do this effectively, it is important that the industries when the competition is increasing, industries will have to come out with the goods and services, so that they can satisfy these requirements of the customers. And for that, they must be aware of, they must apply the all relevant approaches of the Industrial Engineering so that they can deal with these challenges effectively.

And here the industrial engineering plays a central role in producing the goods and services or facilitating their distribution, so that they can satisfy the demand in required numbers, the required quality, the cost and the on-time delivery related aspects. So, here industrial engineering plays a central role in this regard.

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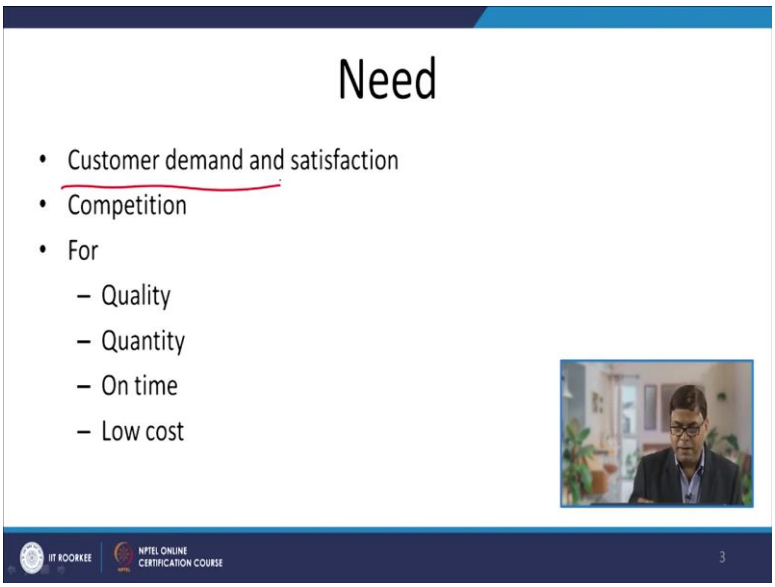

So, that is what is there in these slides is what I have said that customers in demand and customers' demand, the required quality, and desired quantity, on time delivery and low cost must be satisfied. And if it is not done, then they will we get unsatisfied and unsatisfied customers will definitely be looking for other options which are available to the customer. And these may be the products and the services or goods and services being offered by the competitors. So, to remain in the market, they must produce the goods in such a way that they are able to remain in the market, they are able to give enough competition to their competitor.

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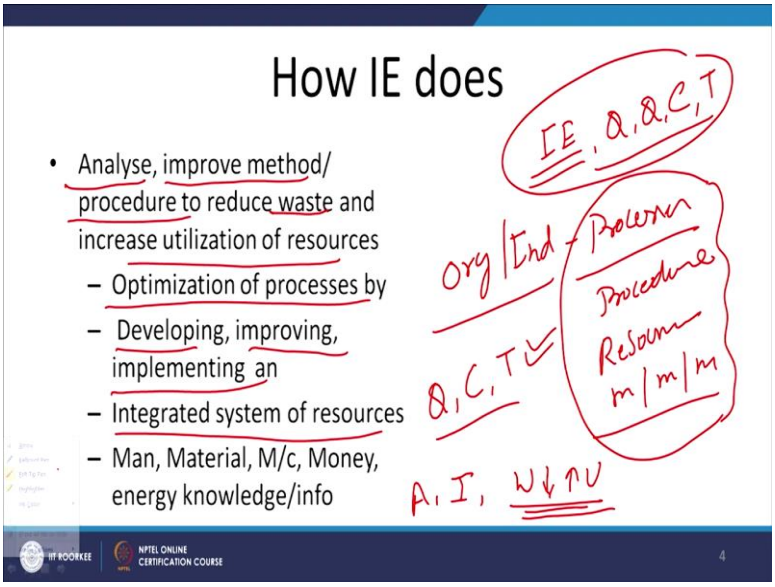

So, what industrial engineering does, because, as I have said industrial engineering plays a central role in facilitating the production of the goods and services and their distribution so that the required quantity, quality, cost and the on time delivery of the goods and services can be facilitated. So what industrial engineering does basically for any organization or industry, which are having the different processes, procedures using the different resources in form of man, material, machine?

So, whether these are being utilized in effective way or not that will dictate whether the quality is alright, cost is less, the delivery will be on-time or not. So, the different processes, procedures and the effective utilization of the resources, this has to be perfect for satisfying these requirements.

So, industrial engineering what industrial engineering does is it analyses the various aspects involved in the production of the goods and services so that it can come out with the way by which the improvements can be done, improvements of the methods and procedures, so that

if any wastage is involved that can be reduced and whatever resources are being used for producing the goods and services, their utilization can be increased it. So, the primarily the focus is on the analysis of the existing system, so that the improvements can be evolved, can be developed in order to reduce the wastage and increase the utilization.

This is in the core of the Industrial Engineering. So, what it does up, so it basically these things are realized through the optimum use of the resources, optimization of the various processes which are being used for producing goods and services, through the development, improvement and implementing an integrated system of resources, which are being used during the production.

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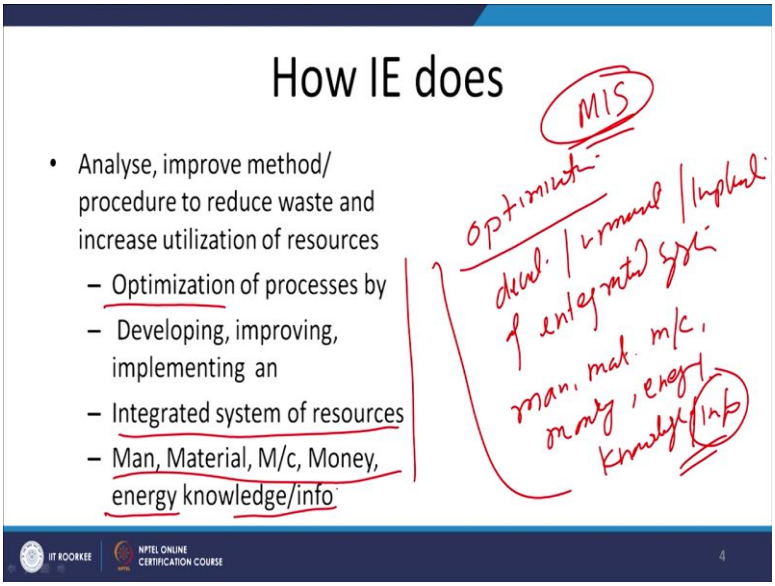

So, here if we see though, how the industrial engineering is helping to deal with the competitive market situations is this that it helps in optimization of the processes, so that under this optimization of the processes through the development, improvement and implementation of integrated system involving various resources, these are the common resources which are used, man, material, machines, money, energy, knowledge and information.

So, it also includes like information is power. So, right, the right information is available at right time then it will help in effective decision making. So, development of the management information system is one typical way where the organizations will be aware of what is the current situation with regard to the particular aspect that will help in taking the suitable decision.

So, it helps in developing an integrated systems of the resources of man, material, machine, money, energy and knowledge and information so, that whatever the resources are available, those are effectively used.

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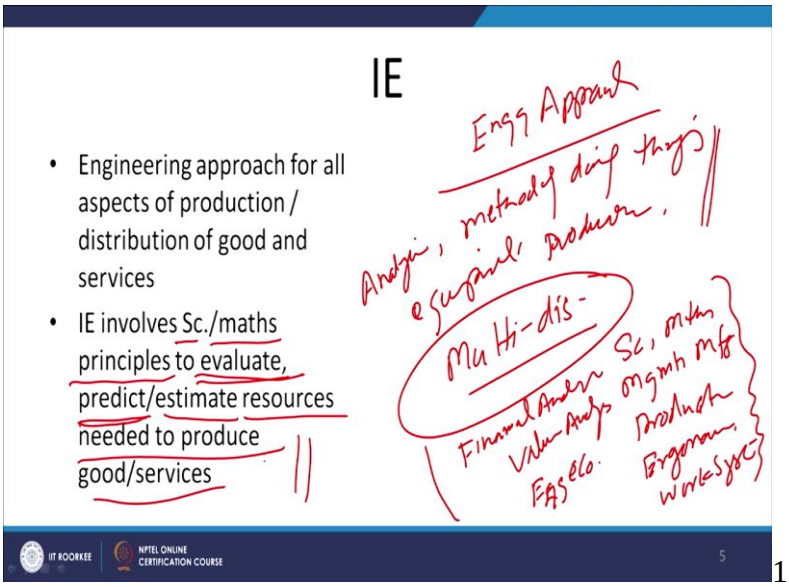

So, if we see what is an industrial engineering? It is basically an engineering approach to the various aspects of the production and distribution of the goods. So, here it may involve like analysing the different aspects involved in the production or the distribution of the goods, it may involve like the method of the doing the things or it may involve the kind of the equipment which are being used, there is a possibility that some better systems can be utilized.

The kind of the procedures being used it is possible through the analysis, using the engineering approach to find out if the procedure is perfect or if there is a need the of the improvement and that can be done in order to improve any of the steps involved in production of the goods and services.

This is basically a multi-disciplinary approach because it involves the knowledge of the science, scientific and mathematical principles to evaluate, predict or estimate the resources needed to produce the goods and services. Multi-disciplinary approach is one aspect where it uses the science, maths, management, manufacturing, production, ergonomics, work-study and value analysis, engineering economy, financial analysis.

So, very wide range of the fields, knowledge and skill related with the different fields are used in industrial engineering primarily to evaluate, predict and estimate the resources needed to produce the goods and services so that the utilization of the resources can be enhanced, the wastage of the resources can be reduced in order to improve the utilization of the resources and increase the efficiency and effectiveness of the system.

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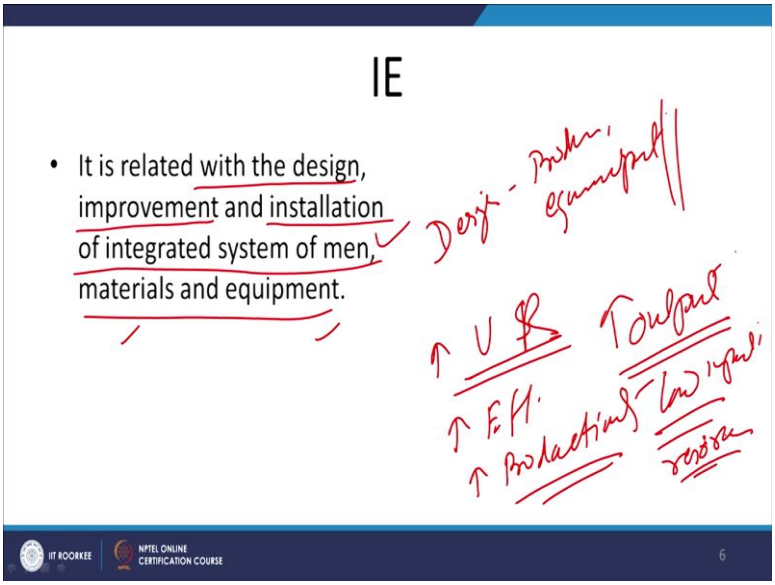

It is related with the design, improvement and installation of integrated systems of man, material and equipment. So, it also involves, like coming out with the new design of maybe procedures, equipment itself so that the worker is able to do the job with the minimum effort, minimum fatigue and installation or putting in place the Integrated Systems man, material and equipment so, that the more effective use of the resources, utilization of the resources.

Utilization of the resources is realized and the efficiency of the system is improved, it will help in improving the productivity of the system, means, we are able to produce more, give more output at the low input, increase the output at the low input or the low input of the resources because it will be able to reduce the wastage and increase the effective utilization of the resources.

Now, here I will summarize this presentation. In this presentation basically, I have tried to introduce the need of the industrial engineering and the various aspects which are covered under the industrial engineering. Thank you for your attention.