Depreciation, Alternate Investment and Profitability Analysis.
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Lecture-1.
Introduction to Course.

Hello, I am Professor Bikash Mohanty department of chemical engineering IIT, Roorkee. I shall be taking this course that is depreciation, alternate investment and profitability analysis. This is my first lecture, in fact this course is built up with the help of three modules of engineering economics.

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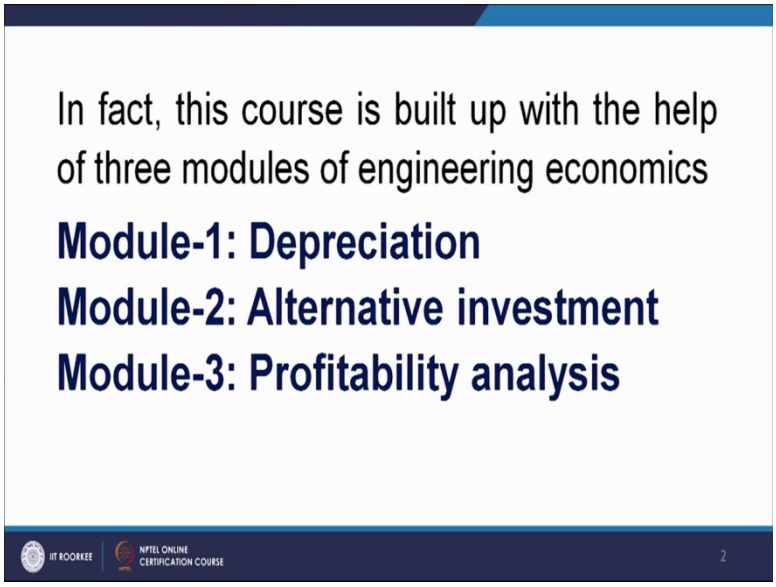

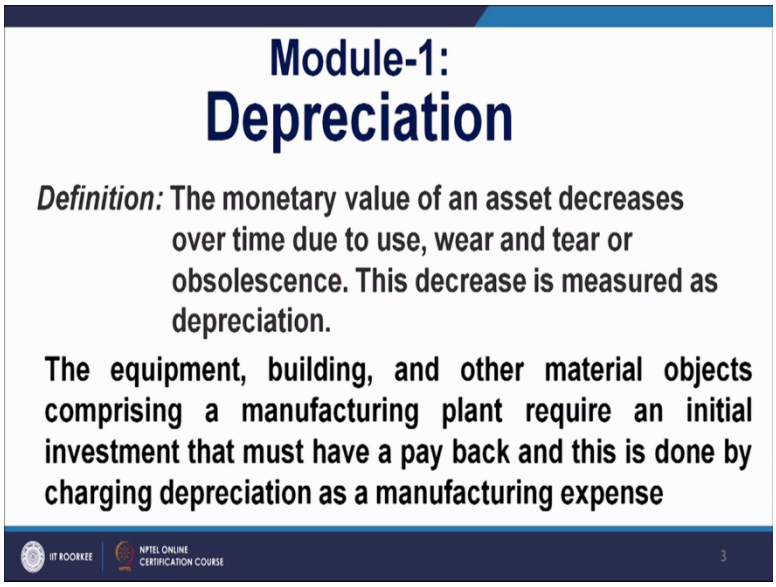

The module 1 is depreciation, module 2 is alternative investment and module 3 is profitability analysis. Let us take the module 1 and its content, the module 1 is depreciation. The definition of depreciation is the monetory value of an asset decreases over time due to use, wear and tear or obsolescence. This decrease is measured as depreciation.

The equipment, building and other material objects comprising a manufacturing plant require an initial investment that must have a payback and this is done by charging depreciation as a manufacturing expense. In the analysis of cost and profit for any business operation the fact that physical assets decrease in value with age due to physical deteriorations,technological advances, changes in economic environment or other similar factors which ultimately will cause retirement of the property is always recognized. The reduction in value of the physical assets due to any of these causes is a measure of the depreciation.

Therefore, it can be used as a means of distributing the original expense of a physical asset over the life period during which the asset is in use and can be considered from a point of view of cost.

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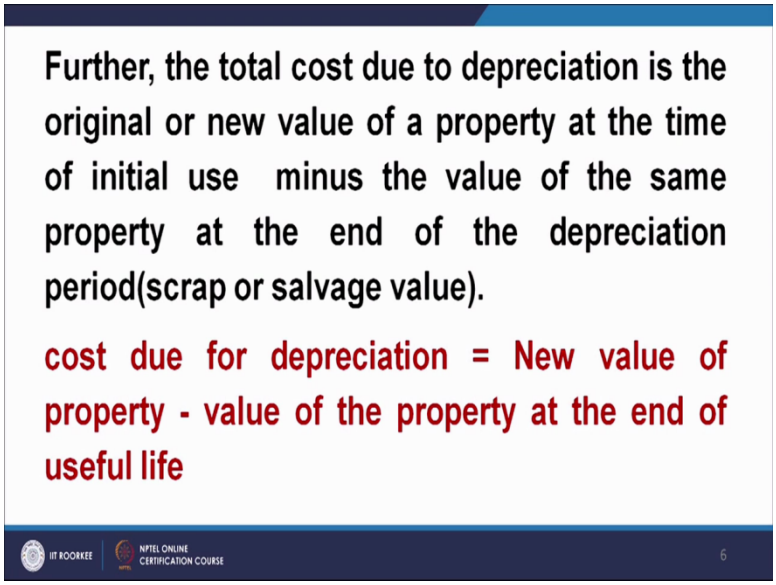

Further the total cost due to depreciation is the original or new value of the property at the time of initial use, that means when it is pressed to use - the value of the same property at the end of the depreciation period and this value is called either a scrap value or a salvage value. So we can write down that the cost due to depreciation is equal to new value of the property that is the initial cost - value of the property at the end of useful life.

The total depreciation period is ordinarily assumed to be the length of the property's useful life, that means the property when will be pressed to use it will be used for a certain duration of time before its requirement, this period is called the useful life of the property. It should be appreciated that an engineer cannot wait until the end of the depreciation period to determine the depreciation cost and thus this cost must be prorated throughout the entire life of the property and must be included as an operating cost incurred during each year.

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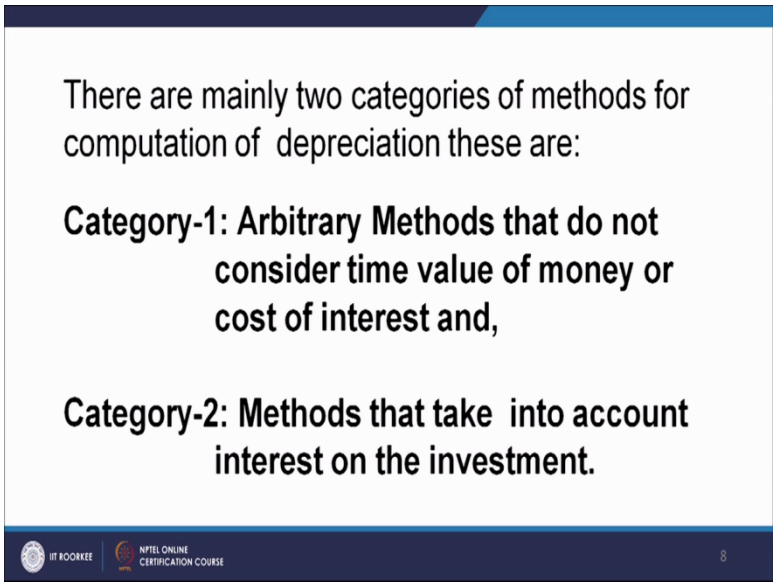

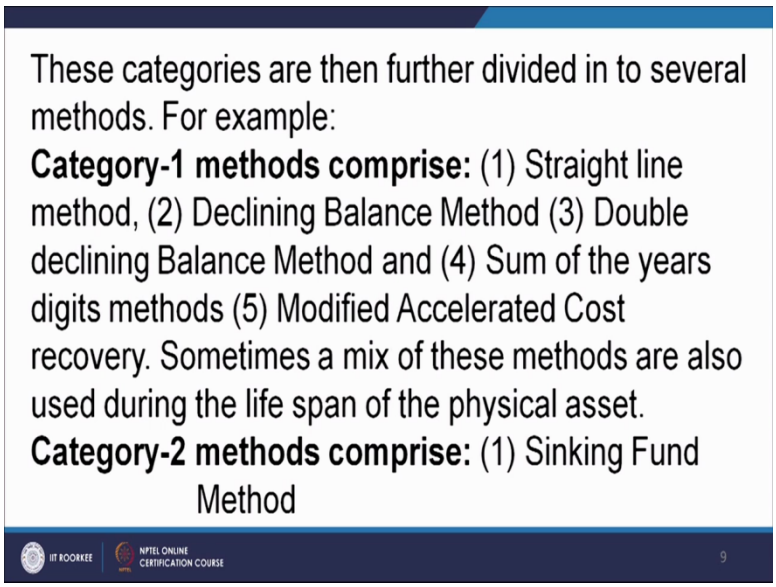

There are mainly two categories of method for computation of depreciation, these are category 1 arbitrary methods that do not consider time value of money or cost of interest and the second category methods, the methods that take into account interest on the investment. These categories can then be subdivided into several methods, for example in the category

one methods comprise straight line method, the second is declining balance method, the third is double declining balance method, the fourth sum of the years digits method and is five is modified accelerated cost recovery method. Sometimes a mix of these methods are also used during the life span of the physical asset.

In the later lectures we will find that the declining balance method is used along with straight line method or the double declining balance method is also used with straight line method to come to this salvage value that we will see later in our lectures. The category two method comprises shrinking fund method. In the present module computation of depreciation using above methods will be presented through examples. It should be noted that for tax purposes not all business assets can have depreciation claimed on them, as depreciation is used in the computation of profit and government tax calculations is based on the amount of profit, only government approved methods should be used for the computation of depreciation.

I have told you many methods for the calculation of depreciation, but only those methods can be used for the calculations of depreciation which are government approved because it reflects or this affects the income tax.

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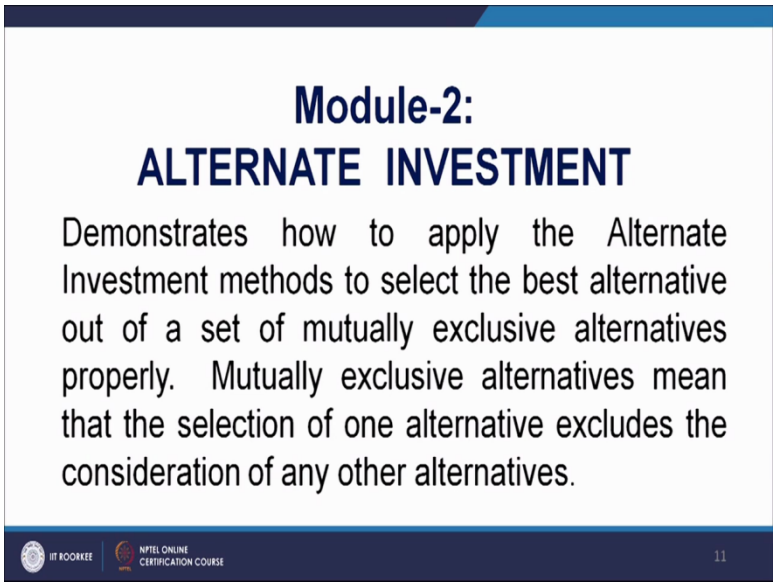

The module number 2 in this course is alternate investment. This module demonstrates how to apply the alternate investment methods to select the best alternative out of a set of mutually exclusive alternatives properly. Now what is the meaning of mutually exclusive alternatives? The mutually exclusive alternatives means that the selection of one alternative excludes the consideration of any other alternatives.

That means if you have five alternatives, then you can if you are selecting one alternative out of it, then you cannot select other four alternatives. The common problem confronted in engineering economics are those where alternative comparison between two or more mutually exclusive alternative investments compete involving different series of capital disbursements. For example if one alternative have both less capital investment as well as operating cost, there is no need of comparing it with other alternatives because here the operating cost as well as capital cost is less. So the overall cost of this equipment will be less than others.

However, the comparison becomes essential if one alternative offers higher initial capital investment, but lower annual operating cost in the successive years in comparison to the second alternative which offers less capital investment initially but subsequently higher operating cost. In such cases one has to find trade-off between the future advantages of a lower operating cost vis-a-vis the advantage of a higher initial investment, for example suppose you are purchasing a equipment for blood test, automatic equipment, if there are two alternatives, in one alternative the fixed cost is high but the operating cost is low and in the other alternative the fixed cost is low but the operating cost in terms of accessories in terms of useables are higher.

Then we have to find out a way how to select one put of these two. While different series of disbursements are compared, it is necessary to reflect the time value of money under each alternative. A variety of methods exist for selecting the superior alternative from a group of alternatives proposals, each method has its own merit and application.

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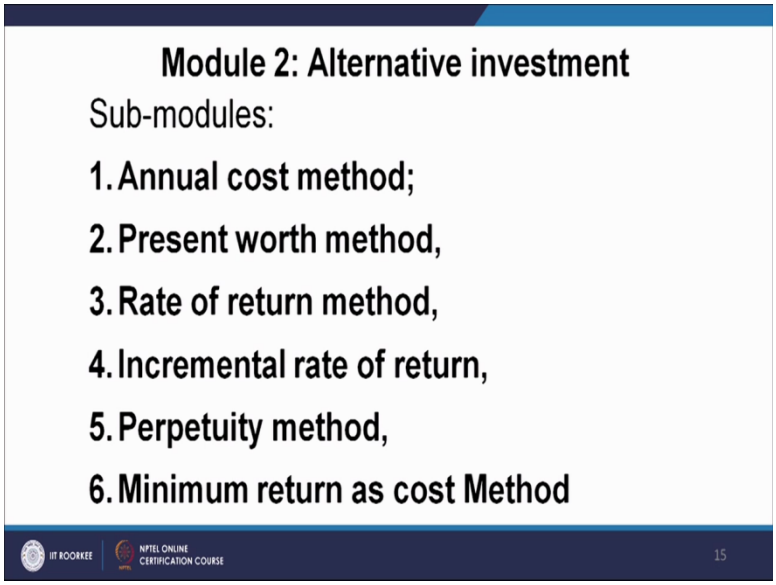

Now in the module 2 in the alternative investment the sub modules are, 1 Annual cost method, 2 Present worth method, 3 Rate of return method, 4 Incremental rate of return method, 5 Perpetuity method and the last 6 Minimum is return as cost method.

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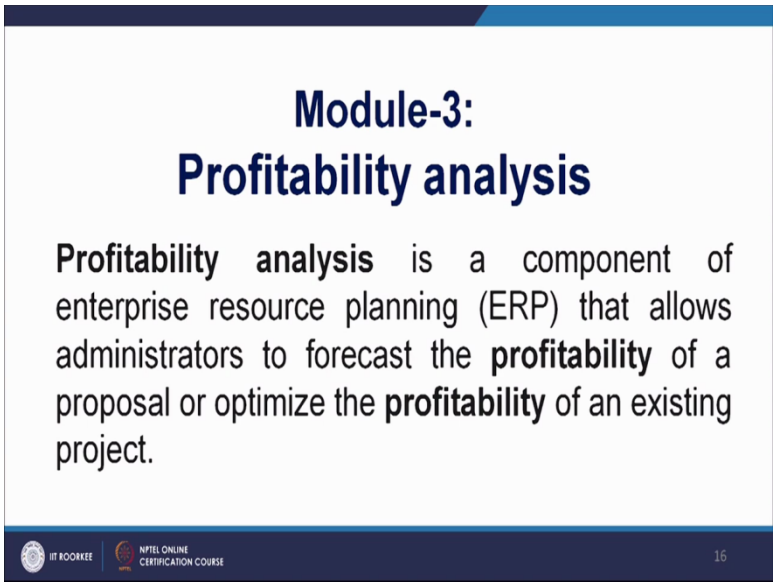

Now module 3 is profitability analysis. Now profitability analysis is defined as profitability analysis is a component of enterprise resource planning that allows administrators to forecast the profitability of a proposal or optimize the profitability of an existing project. Often resources require to carry out a project are often less than that available for it, this is a known fact. Hence, all investments must be carried out carefully and should be evaluated towards its economic feasibility based on some profitability standards.

The cost of capital which is the amount to be paid for the use of capital, such as bonds, preferred stocks, loan etc. is generally used as a basics profitability standard. The underlying, the underlining principle is that the project must earn at least that rate which is required to repay the cost of capital. A number of methods are employed for computation of profitability in the economic analysis. Primarily two types of methods are used, the category one consist methods that do not use time value of money and the category two methods comprise those which use the time value of money.

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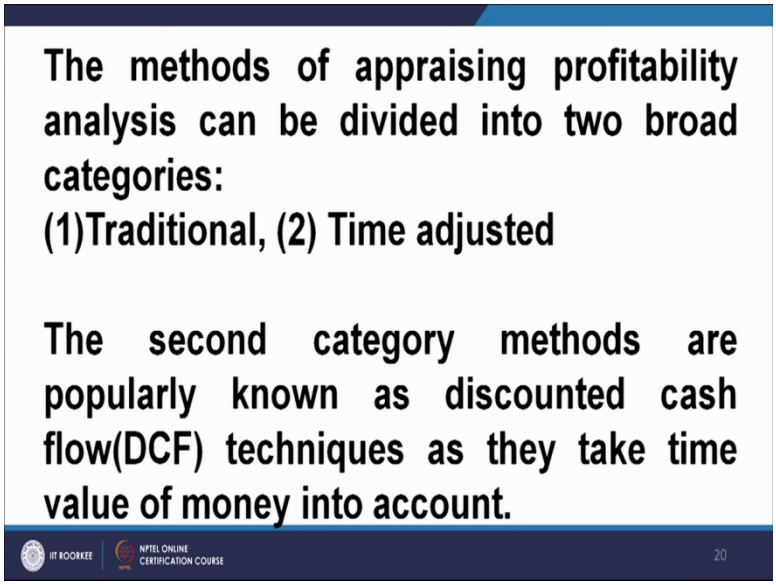

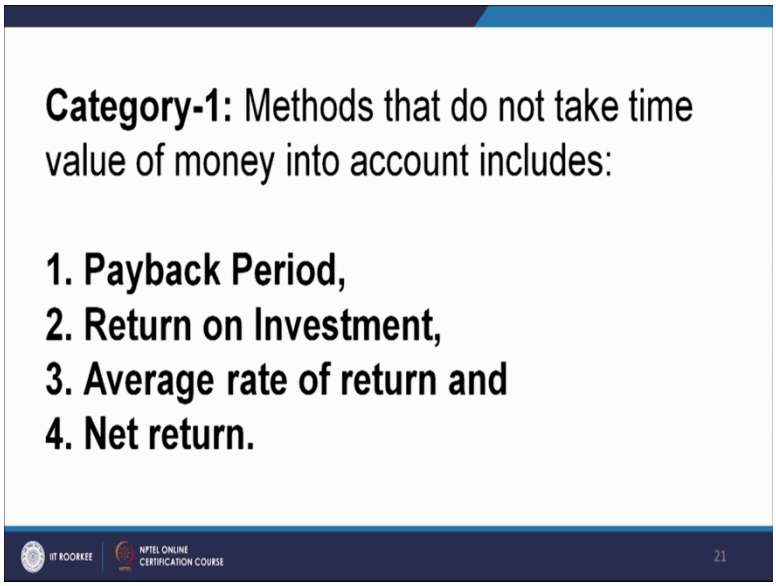

These methods of apprising profitability analysis can be divided into two broad categories, one is traditional methods. The traditional methods are those methods which do not use the time value of money and the second type of methods which are called time adjusted methods

they use the time value of money. The second category methods are popularly known as discounted cash flow techniques as they take time value of money into account. Now in the category one, there are many methods, obviously I have told you that category one methods do not take time value of money into account and these methods are, 1 Payback period, 2 Return on investment, 3 Average rate of return, and 4 is Net return.

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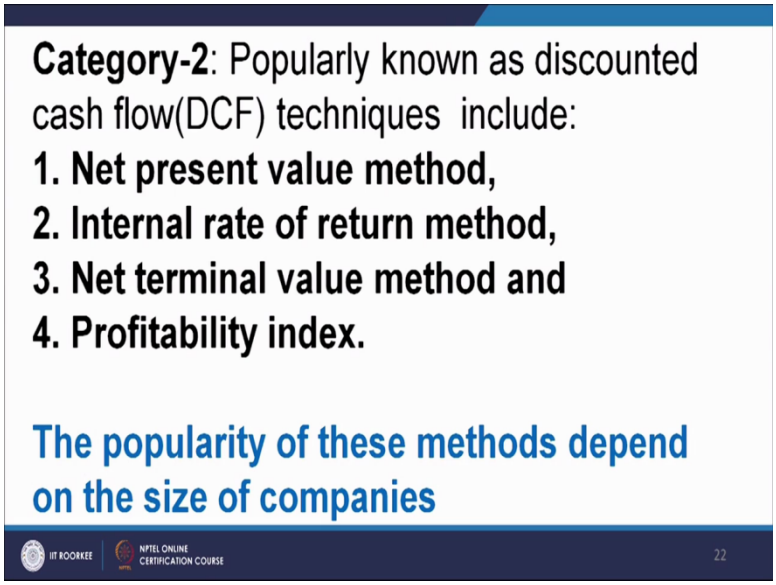

The category two methods which are popularly known as discounted cash flow methods or DCF methods. These techniques include number 1 Net present value method, number 2 internal rate of return method, number 3 Net terminal value method, and number 4 is profitability index method. The popularity of these methods depend on the size of companies. Now summary, the present lecture introduces all the three modules of this course as given below, the module 1 is depreciation, module 2 is alternative investment, module 3 is profitability analysis.

I have included in these lectures what are the different methods available for computation of depreciation and when these methods are used will be seen in the later lectures. The details of the above modules have been discussed along with their utilities, thank you.