Managerial Economics

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Lecture - 24

Consumer Behavior - II

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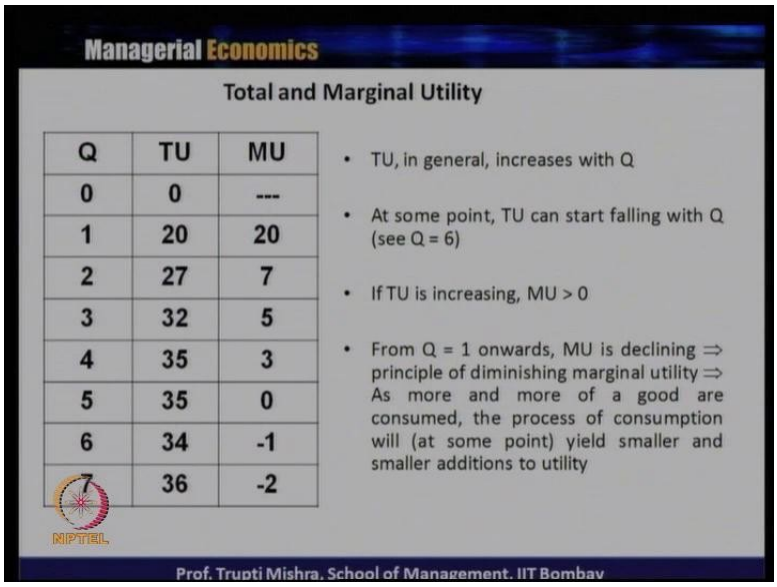

Then we will take a numerical example that how this total utility, marginal utility, they are related. So, in the first column we have Q, in the second column we have total utility. Q is the total product that is getting consumed. Second column this is total utility. Third column, we have the marginal utility. Total utility in general, increases with Q. So if you look at, from unit 1 to unit 4, the total utility is increasing. At some point, total utility can start falling with the Q. So if you look Q from 6, total utility is decreasing. But in forth unit and fifth unit, total utility is constant. Marginal utility is, if you look at it, it goes on decreasing from the beginning. If total utility is increasing, marginal utility is always greater than zero. That is evident in the fifth unit because total utility is increasing and marginal utility is greater than zero.

When total utility is maximum, beyond this the marginal utility is 0 and then negative. So from Q is equal to 1 onwards, marginal utility is declining, which follows the principle of diminishing marginal utility. As more and more of a good are consumed, the processes of consumption will at least at the same point yield the smaller and smaller addition to utility. So, if you look at between after consuming the first unit and the second unit, the additional utility is just 7 units; that is marginal utility. When it comes to third unit, again the marginal utility is 5. When it comes to fourth unit, marginal utility is When it comes to fifth unit, marginal utility has become 0. And in case of sixth and seventh units, there is negative marginal utility.

It means when you are consuming more and more, you are getting a negative utility, which leads to negative marginal utility, and this is the evidence of law of diminishing marginal utility. Initially when total utility increases, marginal utility decreases. When total utility is maximum, marginal utility is zero and when total utility is decreasing, marginal utility goes to the negative segment and the consumer get a negative marginal utility from it.

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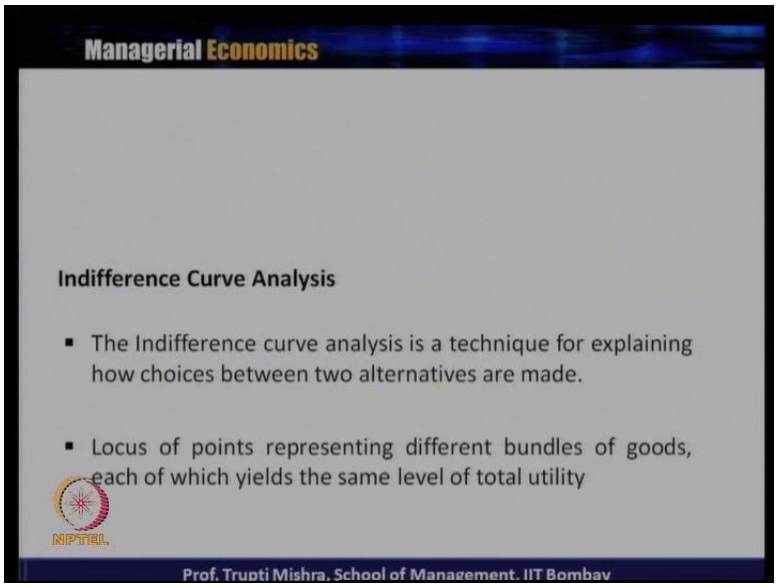

Then, we will come to the ordinal utility analysis; and this ordinal utility analysis is through the indifference curve and the basis of ordinal utility analysis is that, the consumer is not assigning any utils, rather they are ranking on the basis of their preferences.

So, indifference curve analysis is part of the ordinal utility analysis and what is indifference curve analysis? Indifference curve is one; it is a locus of points of different combination of goods which keeps the equal level of satisfaction to the consumer. So whatever the combination between two goods, it gives the equal level of satisfaction to the consumer. So, it is a technique how choices between two alternatives are made, because it gives an exposure to the different combination what the consumer can consume. So, it is a locus of points representing different bundle of goods, each of which yield the same level of the total utility.

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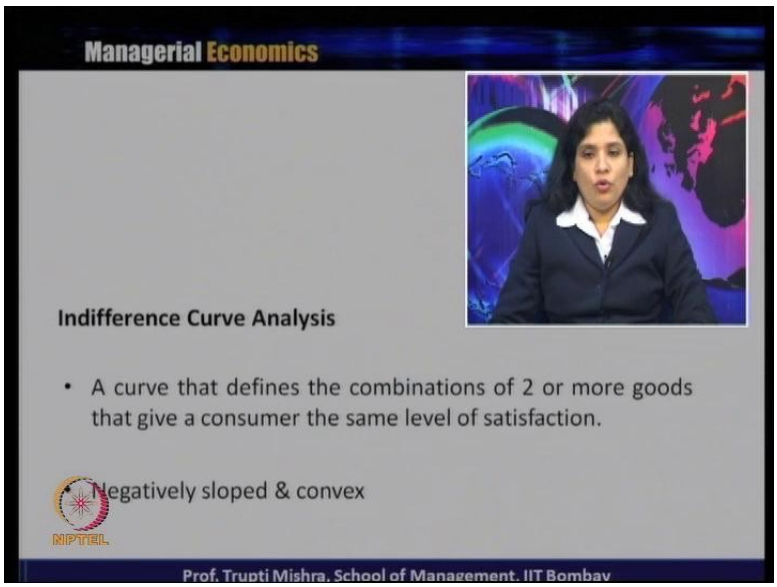

It defines the combination between two or more goods that gives the consumer the same level of satisfaction, and it is negatively sloped and convex.

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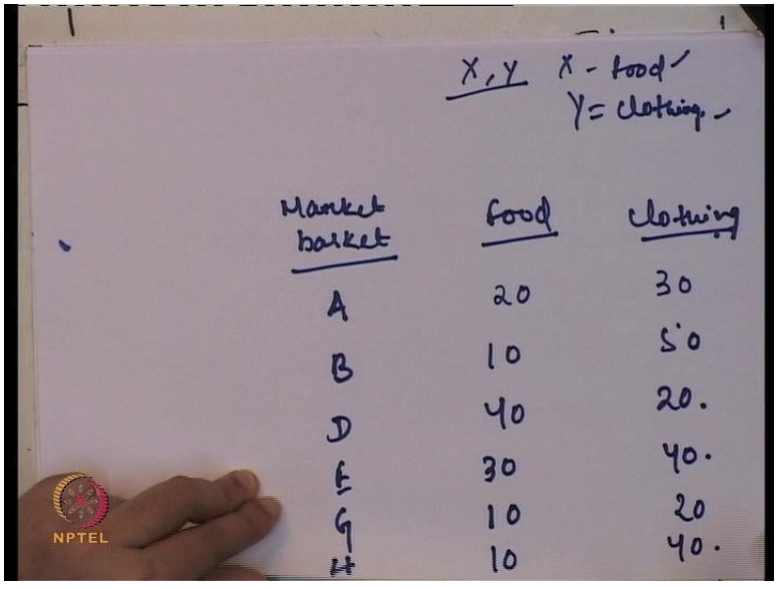

Let us take an example of indifference curve or how we can draw the indifference curve. So we are saying these are two goods. Suppose consider X and Y. X is food and Y is clothing. So there are different consumption baskets, which give different combinations of food and the clothing. So, suppose we consider this as the market basket or consumption basket. We take the good one is food, second one is clothing, then A, B, D, E, G and H; what are these A, B, D, E, G and H? These are the different consumption baskets which consist of different combinations of food and clothing.

So, A has 20 units of food and 30 units of clothing. B has 10 units of food and 50 units of clothing. D is 40 units of food and 20 units of clothing, and E is 30 units of food and 40 units of clothing. G is 10 units of food and 20 units of clothing, and H is 10 units of food and 40 unit of clothing. Now lets us see how, when we put it in a graph, how it looks like or how we can draw an indifference curve. So basically, this is a market basket which consists of both the goods and what are the two goods here; food and clothing. So if you are picking up A, it gives one combination of food and clothing. If you are picking up B, it gives another combination of food and clothing. If it is E or G, it gives again another combination of food or clothing.

The consumer can take a decision whether they have to consume the basket A, whether they have to consume the basket B or whether they have to consume the basket H; it depends on their preference that how much quantity of food they require and how much quantity of clothing they require. And it is always different for the different consumptions, different consumers, because their consumption needs are different. So, let us graphically see how these, how we can plot this indifference curve with the help of different combination of two goods and with the help of different consumption baskets.

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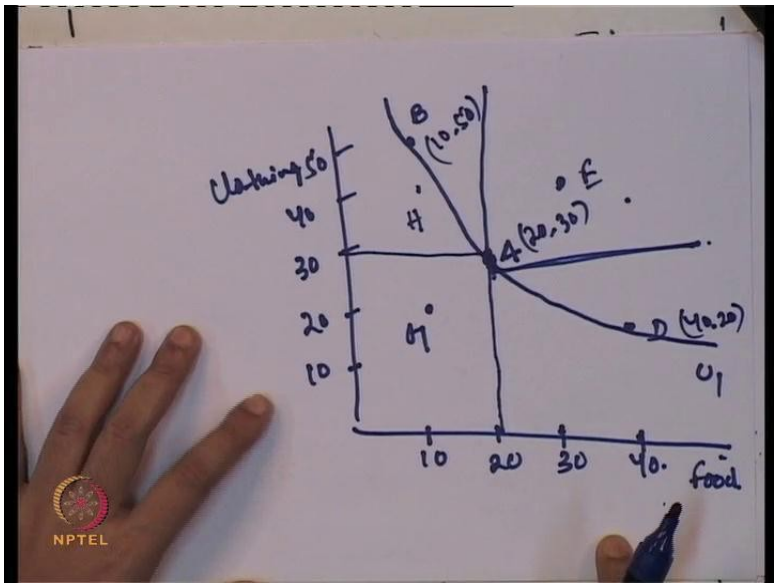

So, suppose we can take food here in x-axis, clothing here in the y-axis. We will take 10 20, 30, and 40; here also we can take 10, 20, 30, 40 and 50. So, combination say A is 20 units of food and 30 units of clothing, combination B is say 10 units of food and 50 units of clothing, combination D say 40 units of food and 20 units of clothing, combination E say 30 unit of food and 40 unit of clothing, combination G say 10 units of food and 20 units of clothing, and combination H says 10 units of food and 40 units of clothing.

So, if you look at them, here we have five different combinations A to H. So if you consider this as the two kind of box; in this segment, A will be more preferred if someone is at the point of G, because A gives us more of both the goods and more of food and clothing. But if someone in the segment E, they will always prefer E rather than A, because E gives us a better quantity of both the goods and services. So, if you join now point B point A and point D, this is one indifference curve.

Now what is the basis of this indifference curve? Any combination G and H, they will prefer G and H, then A; any consumer if they are between G and H. Any combination between E and above your any other combinations, they will prefer not A, rather than the other combination because that gives more quantity of both the goods. So, between these three

points now B and A and D, the consumer will remain indifferent. Because even if at this point B, the consumer is consuming more of cloth and less of food.

In case of D, the consumer is consuming more of food and less of clothing, and this combination A, the consumer is consuming moderate amount of both food and clothing. So, this is 20, 30; this is 10, 50; and this is 40 and 20. So between these three combinations, the consumer will remain indifferent whether it is point B, point A and point D; whatever be the combination between food and clothing whether it is 10, 50; 20, 30; or 40, 20, the consumer gets the same level of satisfaction. So, U 1 is known as the indifference curve, which gives the same level of satisfaction, irrespective of whatever be the quantity of food and the clothing.

So, that goes with our basic philosophy of the indifference curve. The locus of different points which gives the equal level of satisfaction, and what are the locus of different points, and what are the different points imply? The different points imply different combinations of goods and services. So in this case, there are two goods; food and clothing, and if you look at in the indifference curve, we got three points which gives three different quantity, combinations of food and clothing. But it is at the end, it gives the same level of satisfaction to the consumer.

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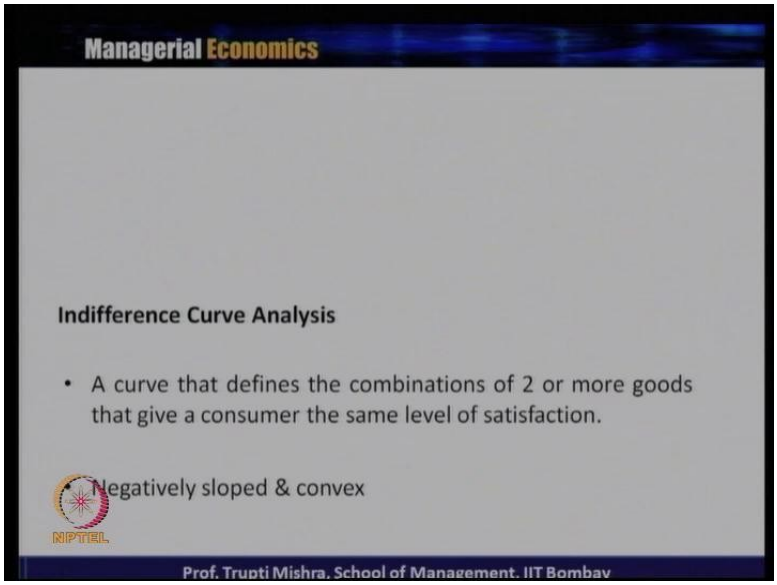

The consumer can remain indifferent between point B, point A and point D, and that is the reason it is known as the indifference curve. Because indifference curve generally, the consumer remains indifferent between all these points in the indifference curve, because irrespective of the combination chosen, they are getting the same level of satisfaction.

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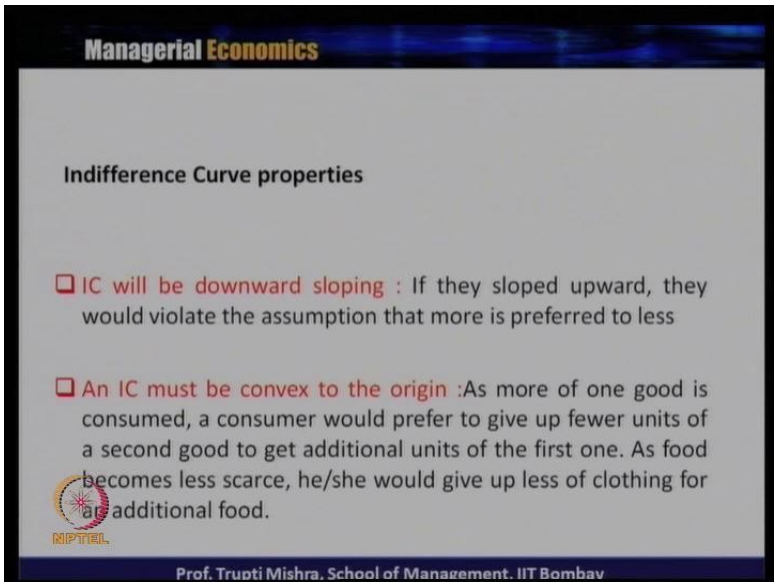

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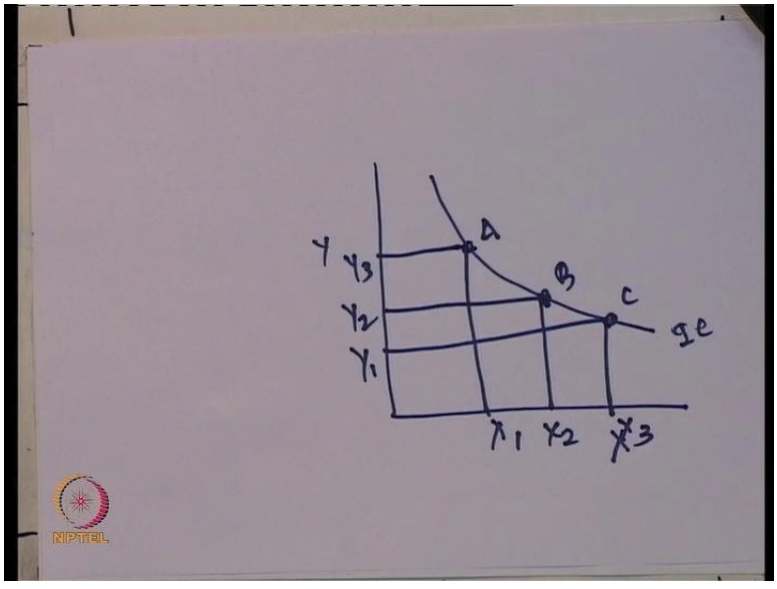

Now we will see what are the different properties of the indifference curve? The first property of the indifference curve is that it will be downward sloping. Now why it should be

downward sloping? If they sloped upward, they would violate the assumption that more is preferred to less.

Now if you are saying that this is the indifference curve. Suppose here it is X, here it Y. Each point of the indifference curve gives a different combination of two goods. Suppose this is Y1, this is Y2, this is Y3. So this is point A, this is point B, this is point C. Why the indifference curve does negatively slope? The slope has to be negative because at any point of time, if the consumer is moving from point A to point B, he is consuming more of X and less of Y. So, this more of X is by sacrificing some amount of Y here. Similarly if the consumer is moving from point B to C, he is consuming more of X, and this more of X by sacrificing some amount of Y.

If the consumer has to be at the same indifference curve, when they are consuming more of one commodity they have to reduce the consumption of the other commodity; then only there can be indifference between combinations. And that is the reason, when they are consuming more they have to sacrifice some unit from the other goods. The indifference curve is negative sloped and that is first property of the indifference curve; that indifference curve is downward sloping. And if they are sloping upward, if is a positive slope, then from one point to another point it is two different quantities, and it gives the higher level of satisfaction and the consumer has not indifferent between all these combinations.

Now, the second property is that indifference curve must be convex to the origin. As more of one good is consumed, the consumer would prefer to give a fewer unit of the second good to get additional unit of the first one. As food become less scarce, he or she would give up less clothing for the additional food.

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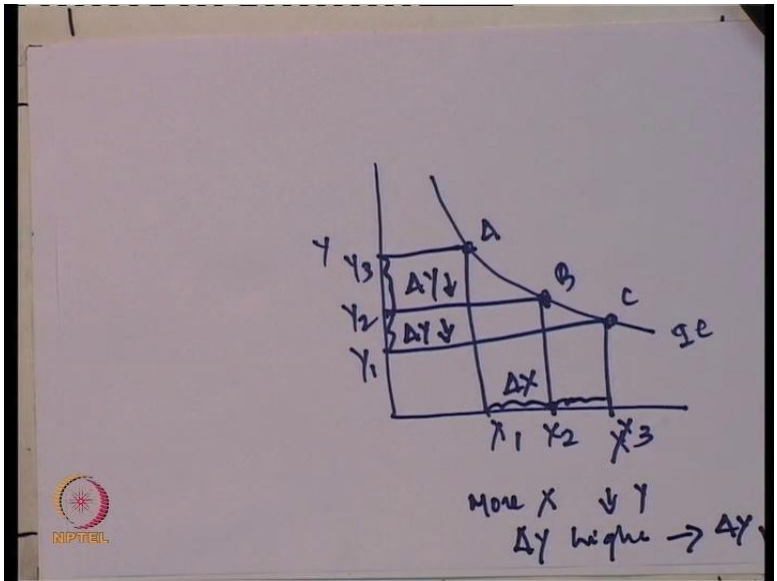

So if you are taking again, take the example of the same graph. Initially in order to get this much amount of X, the consumer was ready to sacrifice this much unit of Y. Then to get more unit of X, the consumer is sacrificing some unit of Y, which is again less than the first one. It means when you are consuming more and more of X in exchange of Y, initially this del Y is on a higher side. But when you are going on consuming the same unit by sacrificing the other one, then it slowly slowly this del Y decreases and that is the reason the slope decreases.

And if you are taking the typical example of food and clothing again; when the consumer has enough of food and still if he is getting more food in exchange of clothing, the trader between the clothing and food and whatever the amount of clothing he is going to sacrifice, that will become less and less when he is going to consume more and more of the food. So initially, the consumer is ready to sacrifice more amounts of the other good in order to get one additional unit of one of the good. But slowly slowly when he is going on consuming more of one good that takes less amount of sacrifice, less amounts from the other goods. That is the reason the slope goes on. The rate of change in the slope is decreasing and indifference curve is convex to origin.

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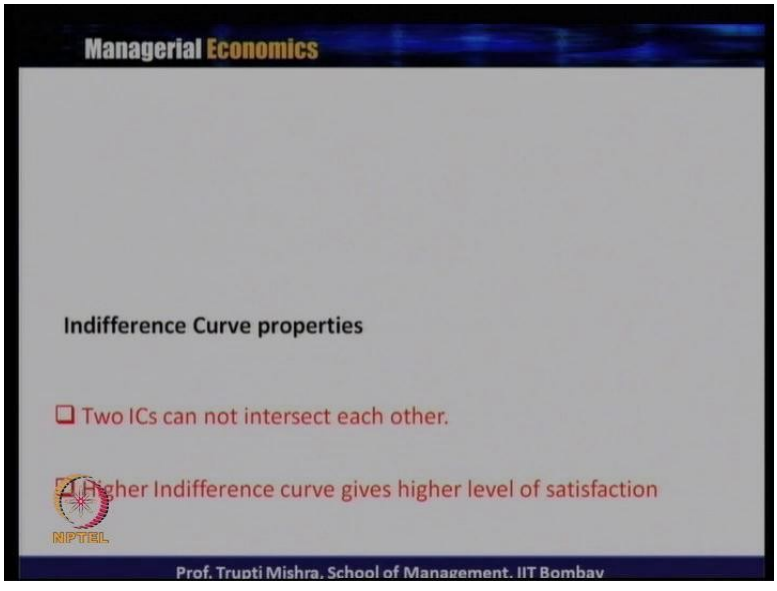

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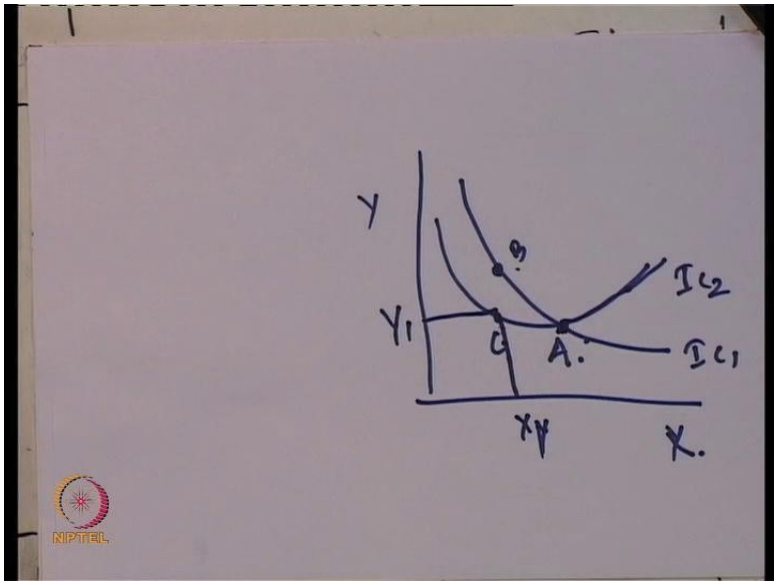

There are two different, two other properties of indifference curve. The first one is two indifference curve cannot intersect each other. Now if you take the example of two indifference curve why they cannot intersect each other ; suppose this is Y, this is X, this is our indifference curve one, that is IC 1 and this is our indifference curve two IC 2, now why they cannot intersect each other. Point A is corresponding to also IC 1 and corresponding to IC 2. So, suppose if you are taking a different point. Suppose B and C this is not following or the basic transitivity assumption, that if any time of any point of time if A is preferred B and A is preferred to C, B also preferred to C.

That is not going to happen, because if A and B if you are considering under one indifference curve, may be A is preferred B. But in case, similarly if A and C in the second indifference

curve IC 2 to A is preferred to C, but B cannot be preferred to C because C is lying on a lower indifference curve which gives less unit of combination of goods and services.

That is the reason two indifference curve cannot intersect each other because the level of satisfaction between two points are different, even if they are lying on the same indifference curve. So, that takes our third property of indifference curve that two indifference curves cannot intersect each other, because it is highlight the basic assumption of the consumer theory. Then the fourth assumption is higher indifference curve gives higher level of satisfaction.

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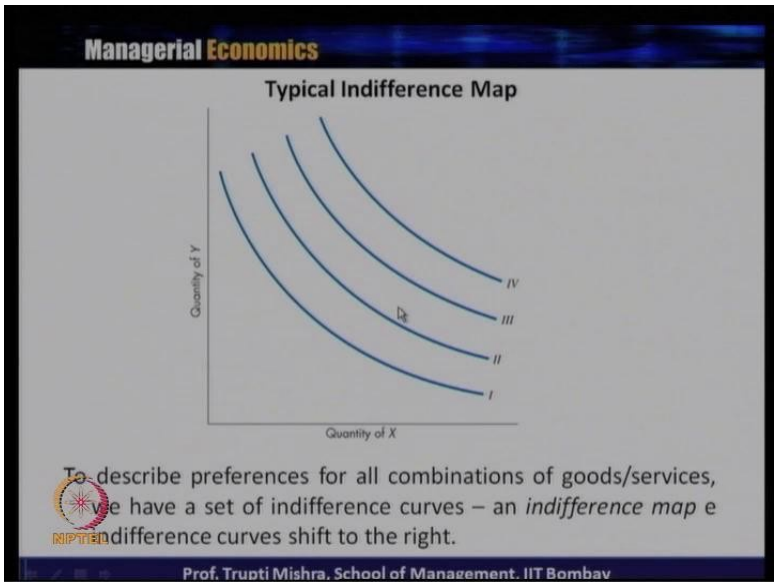

So this we can explain through an indifference map, which generally consist of different indifference curve of different quantity of goods x and y. So, to describe the preference of all combination of goods and services, we have set of indifference curve, an indifference map. When there is an increase in the quantity of goods and both the goods, quantity X and Y the indifference curve shift to the right.

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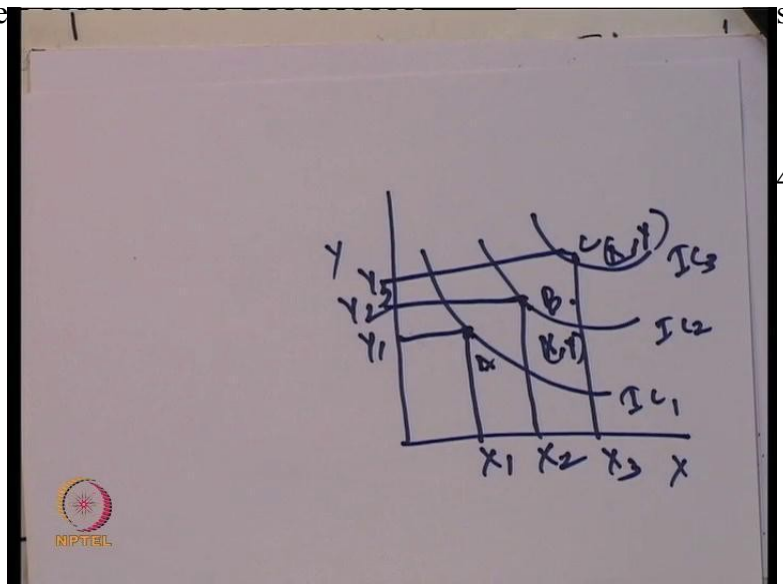

Let us us see how through this indifference map, we can prove our fourth property of indifference curve; that is higher indifference curve gives a higher level of satisfaction. So, suppose let us find out first the indifference map. We have IC 1, we have IC 2, and we have IC 3. Now suppose we take a point here, point here, and point here; this gives us one combination, this gives us the second combination, and this gives us the third combination. So if you look at, when you are moving from one indifference curve to another indifference curve it gives. So suppose from point A to point B, point B consist of more of both X and Y; again between point B to C, again it consists of more of X and more of Y.

So, if the consumer is taking a point in C; taking the point C. Since it consumes more of both of X and Y it always gives us a high level of satisfaction as compared to point B and point A. Because when the consumer moves to higher indifference curve, it helps them to consume more of both of the goods and services and that is the reason they are moving from when they are moving from one difference curve to another indifference curve, they are getting a higher level of satisfaction and that goes with our fourth property of indifference curve; that higher indifference curve gives a higher level of satisfaction and lower indifference curve gives a lower level of satisfaction. Higher indifference curve consist of more of both the goods and lower indifference curve consist of less of both the goods.

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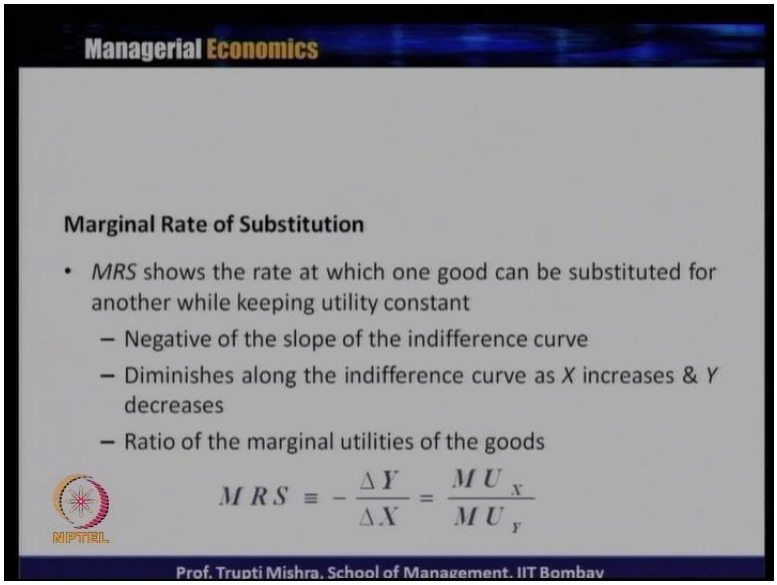

Then we will see what is the rate of at which both the goods gets substituted for one another. If you look at in the typical indifference curve we have said that, when they are consuming more of one good they have to sacrifice some amount of the other good. How this is possible or what is the rate at which the marginal rate of substitution at which the both goods gets substituted to each other. And the rate at which one good can be substituted for another is the marginal rate of substitution and here the precondition is that we have to keep the utility level constant.

So the combination gets changed, but they have to in the same indifference curve because we have to keep the utility remain constant. Now what is marginal rate of substitution? This is the rate at which one good gets substituted for another good. While keeping the utility level remains constant, it is the negative of the slope of the indifference curve. It diminishes along the indifference curve as X increases and Y decreases and this is the ratio of marginal utility of goods and services. So, marginal rate of substitution is the change in the Y with respect to change in the X and this can be also considered as the marginal utility of X and Y.

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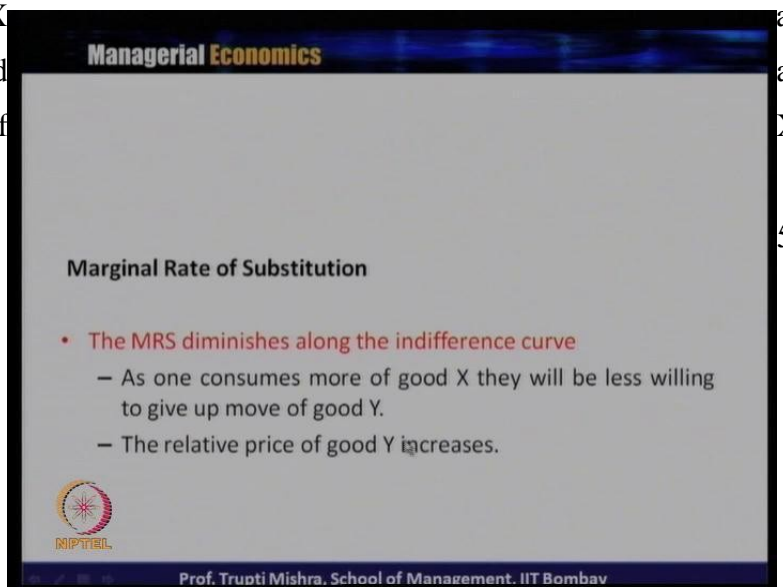

The marginal rate of substitution diminishes along the indifference curve, as one consumes more of good X they will be less willing to give up move of good Y and the relative price of good Y increases. And that is the reason the indifference curve is generally convex to origin, because the marginal rate of substitution of generally the slope that diminishes along the indifference curve.

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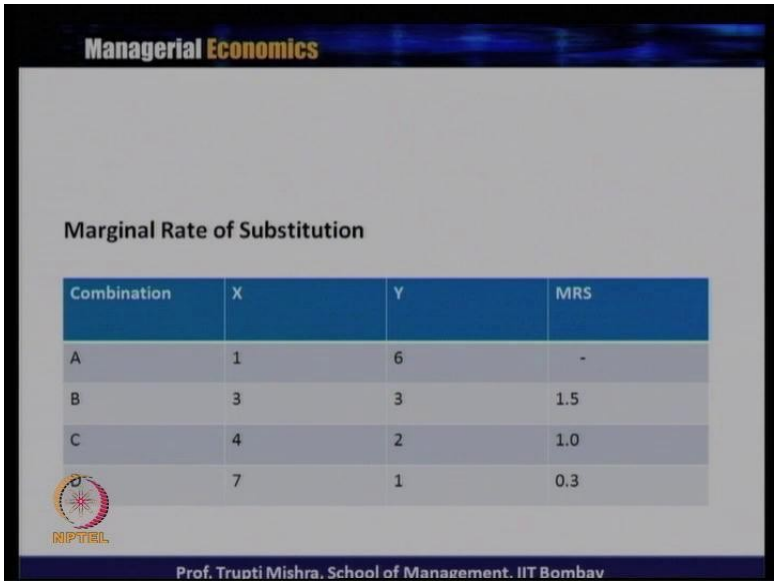

So, this is the numerical example that how the marginal revenue generally decreases when you are moving from one to another. So the combination A gives us 1 unit of X and 6 unit of

Y. When the move from combination A to combination B, combination X is combination B consist of 3 unit of X and 3 unit of Y. So for additional 2 unit of X, the consumer is sacrificing 3 unit of Y. When they are moving from point B to point C, for additional 1 unit of X, the consumer is sacrificing 1 unit of Y and for moving from combination C to combination D, for additional 3 unit of X the consumer is sacrificing 1 unit of Y. So, if you look at what is the rate of substitution? The rate of substitution is change in the Y with respect to change in the X. So in the first case, this is 1.5. In the second case, this is 1 and the third case, this is 0.3; so the marginal rate of substitution decreases, when the same good gets substituted for another good for typical time period.

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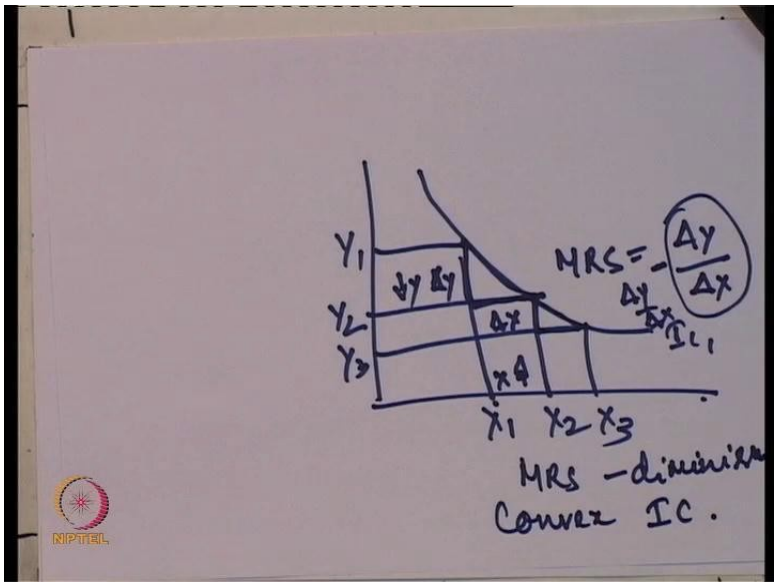

So graphically, this marginal rate of substitution is if this is the indifference curve, graphically this is nothing but the slope of the indifference curve. So, moving from point this to point this, this is the slope. So, this is del Y, this is del X. So, marginal rate of

substitution is the rate at which one could get the substituted between another. So, there is an increase in the x due to decrease in the Y. We have to decrease in the y and that is the reason the marginal rate of substitution is the del Y by del X and this is nothing but the slope of the indifference curve. And when we move further, you look at the slope the change in the Y, and A is again smaller than the initial change in Y and X and that is the reason the marginal rate of substitution goes on diminishing, and we get a convex indifference curve because of this.

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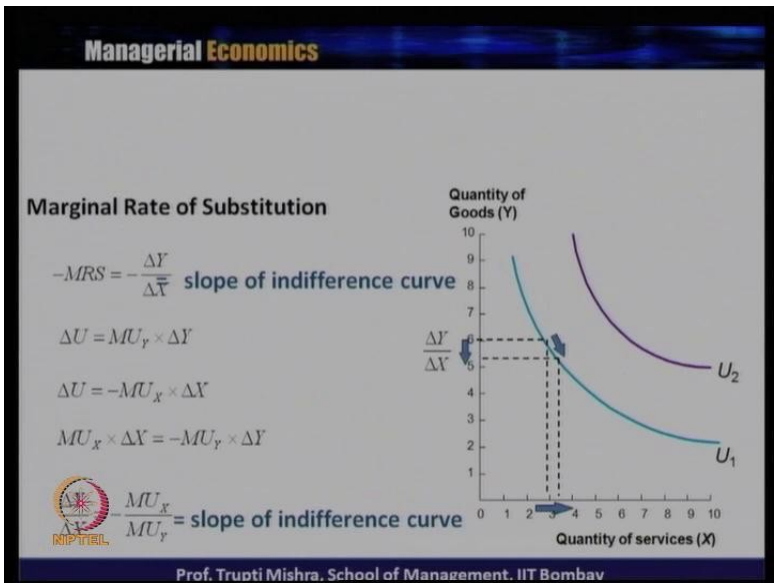

So next, we will see how this marginal rate of substitution is also equal to the ratio of marginal utility of X and Y. So, marginal rate of substitution is the change in the Y with respect to change in the x and this is also the slope of the indifference curve, and when there is an increase in the X that leads to decrease in Y. Now what is the change in the utility when there is a decrease in the Y? That is marginal utility of Y multiplied by change in the Y and what is the change in the utility when there is an increase in the X? That is marginal utility of X multiplied by the change in the X. So, marginal utility of X multiplied by del X, marginal utility of Y multiply by del Y and if you simplify this we get del Y by del X is equal to MU x by MU y which is the slope of the indifference curve and this is again also the marginal rate of substitution.

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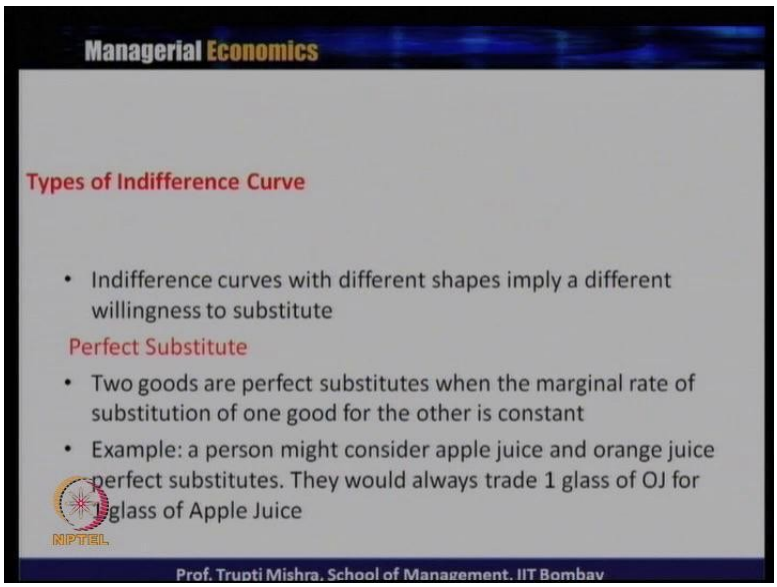

Then we will see what are the different types of indifference curve. In the first case, if you remember there are two types of good; one is the substitute goods and other is the complimentary goods. So, indifference curve with a different shape imply a different willingness to substitute for both the goods. So, perfect substitute is one when the marginal rate of substitution of one good for the other is constant. Because they are perfect substitute to each other, it is like tea and coffee. So, one is cup of tea is just equal to one cup of coffee. If someone is having one cup of tea, he has to reduce the consumption of the one cup of coffee. Like a person might consider the apple juice and orange juice is perfectly substitute. They would always trade one glass of orange juice for one glass of apple juice.

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In case of complimentary goods when the indifference curves for the goods are shaped as the right angle. So, like if you 1 left shoe and 1 right shoe, you are indifferent between having more left shoe than having more right shoe. Must have one right for one left and that is why we always get a pair of shoes, not one by one.

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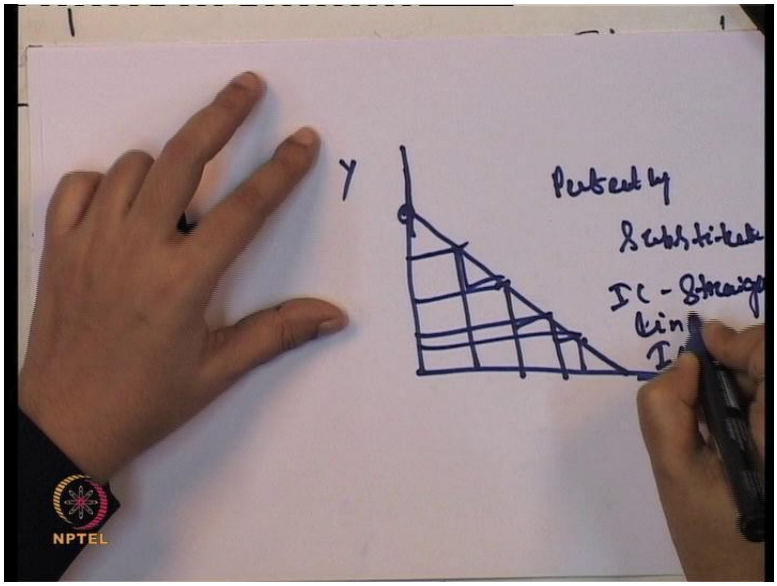

Now, we will see what shape it takes when it comes to the perfectly complimentary and perfectly substitute. So in case of perfectly substitute goods, we get the indifference curve which is straight line and both of them they are perfectly substitute to each other.

So, one unit is the slope has to be constant. So this is the slope, this is the slope and so on this is the slope. So in case of perfectly substitute, the indifference curve is straight line and in case of complimentary, the indifference curve is right angle.

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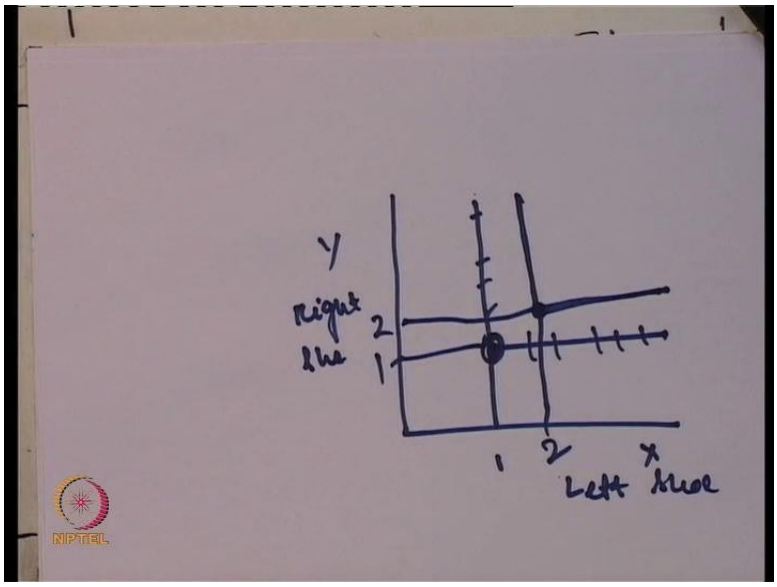

Because if you are considering X as the left shoe, and Y as the right shoe. If you have only one of left shoe irrespective of how many right shoes you have, there is only one pair valid. Similarly if you are having only one pair of right shoe irrespective of whatever the pair of the left shoe, still it is only one point is valid. Similarly, if you are getting another indifference curve, when you have two unit both the left shoe and the right shoe; in this case, again you get an indifference curve which is at a higher level, higher satisfaction, but it still gives the only one valid point where there is a matching between two products. Because it will not have any effect even if you have ten left running shoe and if you have only one right shoe, and you have ten right running shoe and you have only one left running shoe.

So we will continue our discussion for the budgets line, how the consumer reaches the consumer equilibrium, then the income substitution effect and finally the consumer surplus, which comes under the theory of consumer behavior in the next class.

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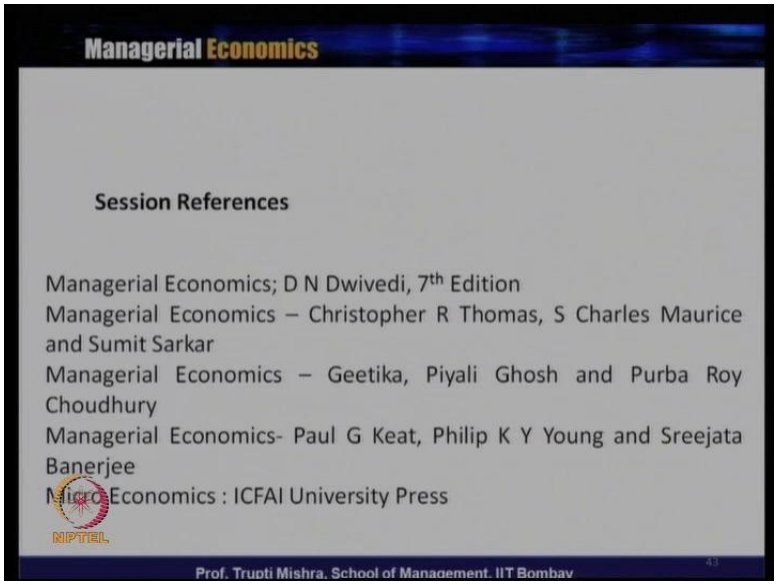

These are the session references for this specific session where we discussed about the utility analysis, and indifference curve analysis.