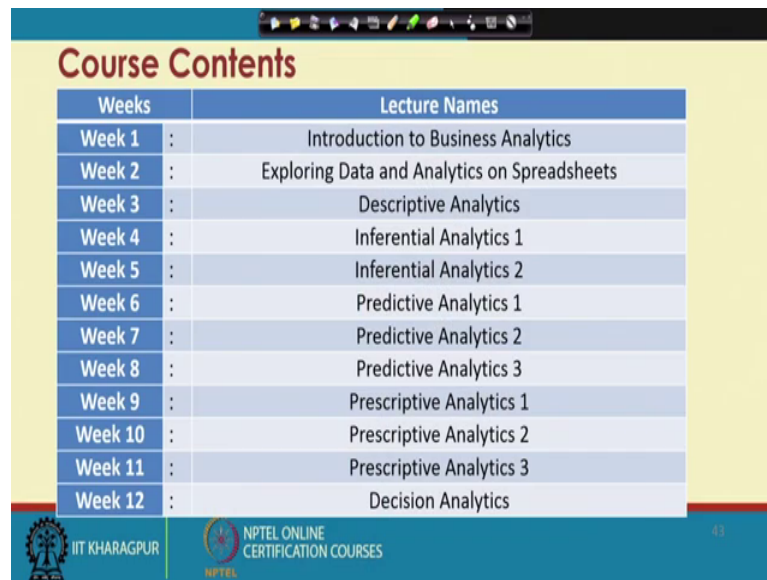**Business Analytics for Management Decision**
Prof. Rudra P Pradhan
Vinod Gupta School of Management
Indian Institute of Technology, Kharagpur

Lecture – 08
Exploring Data and Analytics on Spreadsheets (Contd.)

Hello everybody, this is Rudra Pradan here. Welcome to Business Analytics for Management Decisions and we are here in unit 2 in that two-third lecture, third lecture on exploring data and analytics on spreadsheets. In the last two lectures we have already highlighted the details about the data structure, the data view in excel sheet and then various operations related to excel functions. So, what we have already actually concluded that you know excel has a beautiful kind of a kind of softwares or you know kind of a structure through which a data can be you know a data can be investigated or it can be analyzed in a much better way.

So, what that means, technically what I can say excel itself will give you some kind of insights and that will be that will be very useful for business analytics. So, even if you without having advanced kind of, use of analytics techniques or tools still you will get some kind of insights through excel functions and that insights will help you lot to take some kind of management decision. So, here we are in the process of knowing more more about this particular you know excel functions and I will give you some of the examples where you know again excel has a kind of beauty.
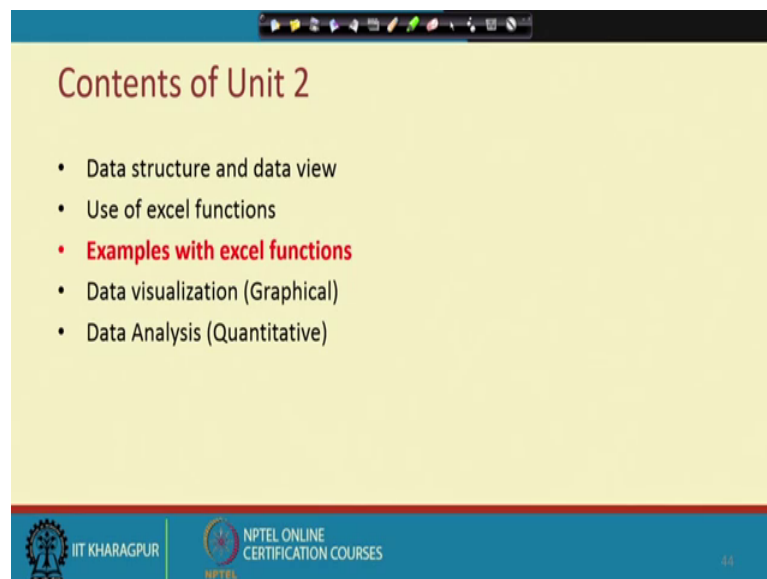
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So, let us see here and we are here in the second a component.

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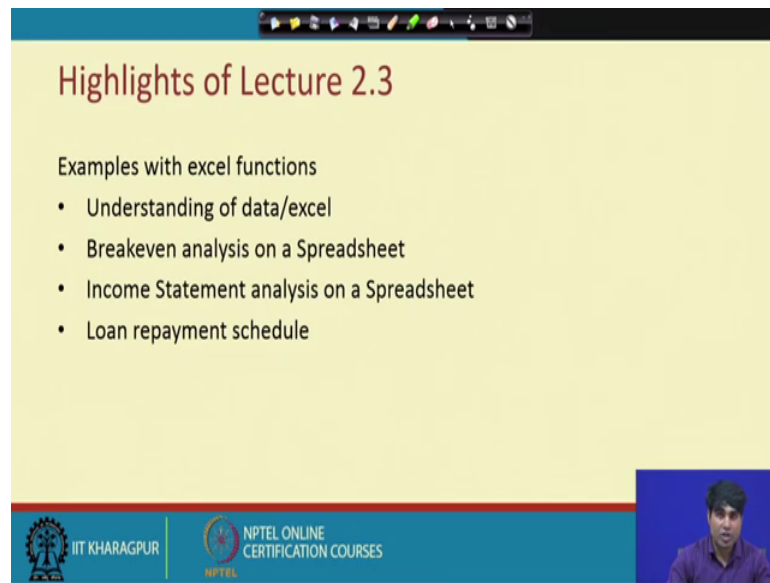
And then with the third kind of requirement examples with excel functions of course, we have discussed couple of examples already, but still you know will be just a highlight once again as per your particular requirement.
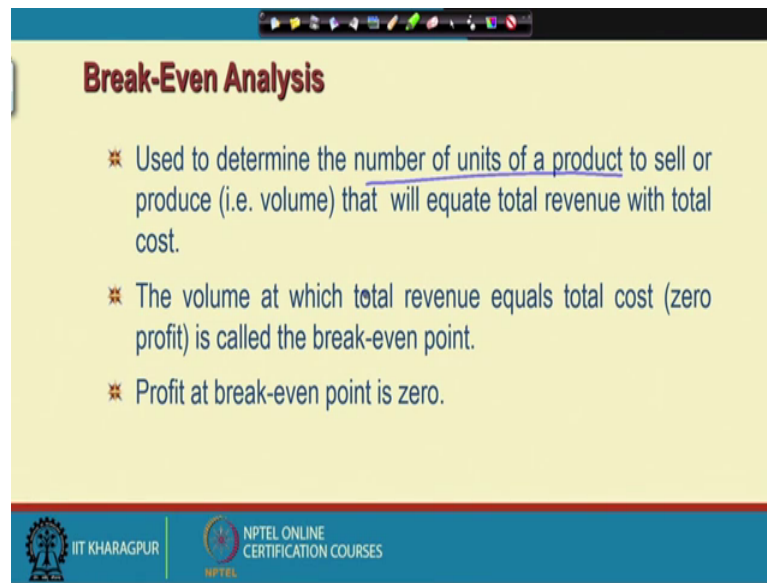
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So, in these particular lectures we are supposed to again and to know something more about the understanding of you know data and excel use. And then I will just you know connect with the some of the examples some of the financial examples like you know breakeven analysis, incomes state income statement analysis and laundry repayment kind of structures. And again excel has a beautiful kind of environment or the kind of spreadsheet where you know all these things can be very easily can be evaluated and analyzed. So, that is how it can be also you know called as one of the analytics mode or medium through which you can get some kind of insights and that insight will help you lot to take some kind of management decisions.

So, let us, let me give you some kind of exposure here.

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And the first example which I like to connect with the excel sheet is called as a break even analysis. In the break even in any kind of a business process and a profit is the kind of prime goals there is a guy who you know Peter Drucker who mentioned that you know profit is meant for three things. It is the kind of premium of cost of productions and it is the benchmark of particular organization and then it is a component through which actually a company can plan for you know or make investment strategy. So, there are you know three most important requirements through which actually a business is always evaluated and that is how profit, a profit is the key component in any kind of business and business analytics that is how you know very keen on to analyze all these things. So, that you know profit can be always you know they are in the systems.

So, we are doing all these things kind of analytics or the use of analytics for business problems and in order to have you know more profit and to make you know the business in era you know positive sides and the profit is the actually difference between the revenue and cost which we have already highlighted me you know many instances and again I will give you here more in depth kind of understanding where you can actually again use excel sheet through which through which you can take a you know management decision. For instance let us say there are three different forms and you know you have actually price and cost informations about the time and you are interested to know which form is in which shape whether it is in a profit shape or loss, loss shape you know in a kind of in a balanced positions and that too in which period and with
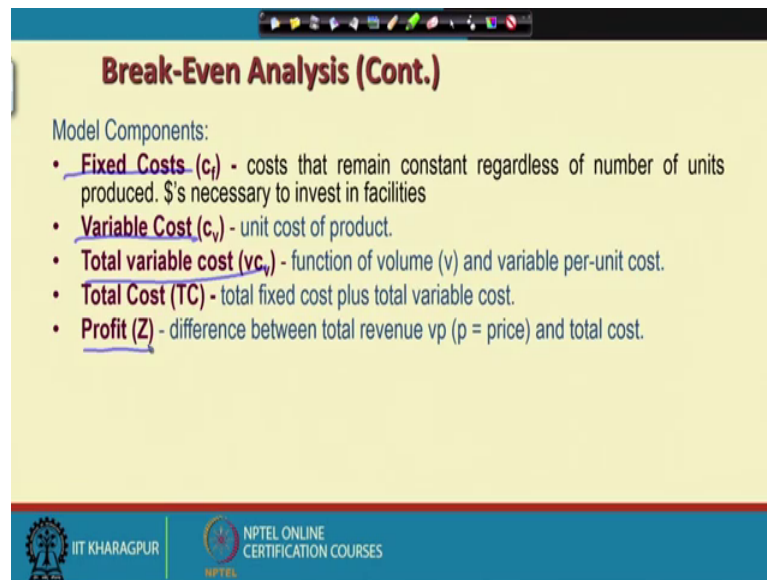
respect to you know kind of comparisons. So, as if these are the kind of environment and problems so the excel sheet can again further help you lot to solve the problems.

So, you know you just calculate for a particular company and then that can be just you know applied for other companies then automatically everything can be systematically reported. So, that is how the beauty of the excel sheet is all about. So, now, let me give you some kind of snap shot about the break even analysis. So, breakeven is kind of a situation where your revenue exactly equal to cost and if not then a revenue may be greater than to cost or revenue may be less than to cost. If revenue is greater than to cost so then business is at profit levels. So, that is called as actually supernormal profit and if not then there is a chance of you know revenue equal to cost. So, that is what we called as a normal profit. And the other name of normal profit is called as a break even analysis and then if not then revenue less than to cost that is what actually called as you know loss situations.

So, every business there you know the analysis or the requirement is just to see the kind of status of a business. So, you know that is with respect to revenue versus you know cost whether the particular firm or you know a particular business is operating in a loss shape or it is inappropriate shape or it is in a break even kind of a point. Because breakeven is a kind of private or you know key kind of a situation or you know kind of a stage where you have to take a very kind of crucial decisions and that is how we are you are very keen to know this kind of examples. And then you we like to know how excel can help you help us to solve such kind of problems and to get some kind of phenomenal decisions.

So, now, these are all here is to you know highlight and here to you know in the break even analysis we are supposed to know the kind of number of units quantity to be produced at a kind of number break even situations. Then it is the kind of a situation we are total revenue exactly equal to total cost and as a result your declaration is the profit at breakeven point is nothing, but called as you know 0; that is how it is the other name of particular situation is called as a no profit and not loss situations. So, now, I will here give you some kind of details about this break even analysis.

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So, the requirement is like this that you know your you are supposed to know cost and that cost is usually divided into two parts the fixed cost and variable cost and this is actually fixed cost and this is variable cost this sum of fixed cost and variable cost will give you the total cost.

And then you have actually profit, profit is the difference between total revenue and total cost and total revenue is nothing, but actually price a in two cells that is the quantity and then once you get the cells revenue. So, the sales revenue need to be compared with you know fixed cost and variable cost that is what is called as you know total cost. So, then we will see the kind of signal and we are actually at keen to know what is the break even quantity. So, that is very important in any kind of business process. So, we are here to know how excel can help us to decide this particular point and that can be for generalized for other company when we have a big spreadsheet kind of environment right.

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So, accordingly we can proceed. So, profit is actually total revenue minus total cost and profit is again divided into a revenue and a minus fixed cost and variable cost that is actually the difference between; that means, these two gives the kind of a composition total cost and the revenue is nothing but actually sales price and the quantity to be a contradiction to be sell to be solved and then it will give you the a component called as a sales revenue then variable cost actually is nothing, but depends upon quantity. So, that is why variable cost multiplied by quantity that is P Q and then fixed cost fixed cost actually independent of quantity. So, technically a let me give you actually structure like this. So, this is actually a let us say in the breakeven situation its total revenue exact equal to total cost.

So that means, total revenue actually this is a P into Q that is nothing, but called as total revenue and then equal to total cost that is the total fixed cost total fixed cost plus total variable cost. So, total variable cost is nothing, but actually Q into let us say V. So, I will put you know component like this Q into V total variable cost. So, then your equation will be your equation will be like this. So, let me give you a kind of a composition here.
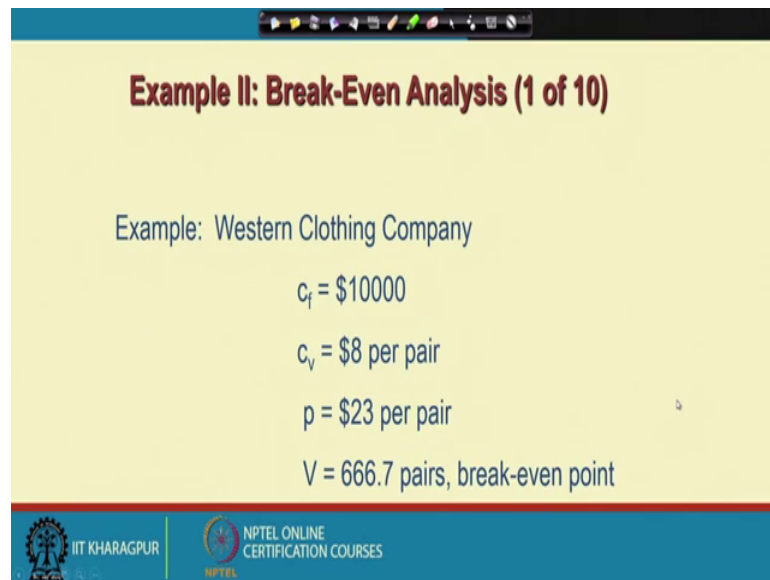
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So, now, here P into P into Q P into Q minus Q into V equal to TFC. So, this is actually if you simplify then it will give you the structure like this. So, now, this is actually TFC, this is actually TFC right, TFC. Then if you take Q commons then this is P minus V and then equal to TFC then finally, Q is nothing, but actually equal to TFC divided by P minus V. So, this is actually called as you know break even quantity this is actually called as a break even quantity and by default one of the standard actually business decision or you know business understanding is that you know P should be any contest should be greater than to V that is actually for a unit quantity particular unit quantity your price should be greater than to variable cost. So, for a particular you know unit, the price composition should be greater than to variable cost, if P greater if not P greater than two V then the mathematically this particular you know requirement is actually useless.

So that means, technically in any kind of business process the theoretical requirement is that you know quantity should be positive and price should be positive and here the signal is that you know it is mathematically also true and also it also supports the theory and the kind of business logic. So, as a result you have to be very careful how you have to deal with all these kind of situations. So, then, this is how the clear cut understanding. So, let me give you some kind of structure here again.

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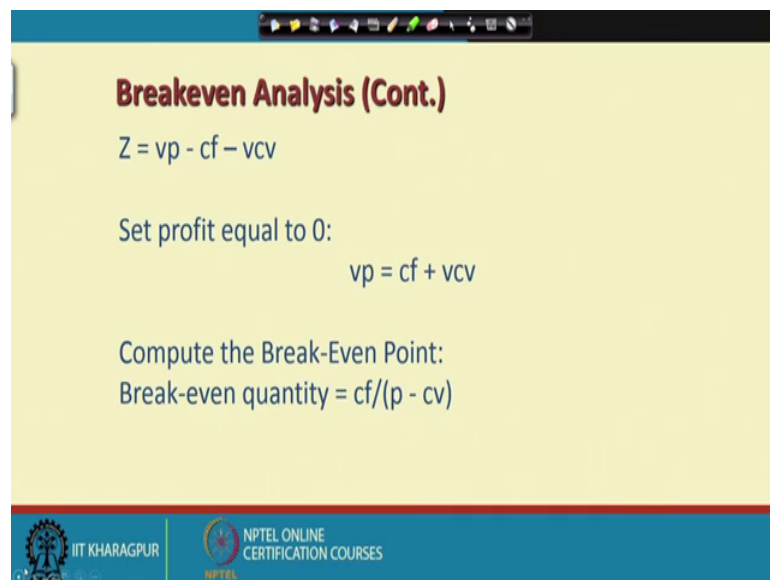
So, this is how the whole compositions what do you know. So, the break even quantity is actually fixed cost divided by price into variable cost that is the particular unit.

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So, then accordingly, we can actually analyze through actual through excel sheet and in the excel sheet you just enter this data and then by default some kind of using excel functions you are in a position to calculate the exact requirement. So, that means, actually. So, once your entry data are you know readily available then there is no need of you actually a calculate step by step just you know put a functional form then give the

kind of exactly requirement then by default excel will help you to report the particular requirement. So, then on the basis of this requirement you can take a management decision.

The way which we have already solved some of the problems in the last lecture this is also similar kind of a situation. Just you report all these thing in the excel sheet then you put equal to signs and you know exactly connect with you as per the particular you know formula, then you once you put the enters then automatically the particular you know on the value will come and that value will give you some kind of insight as per here you know a particular requirement.

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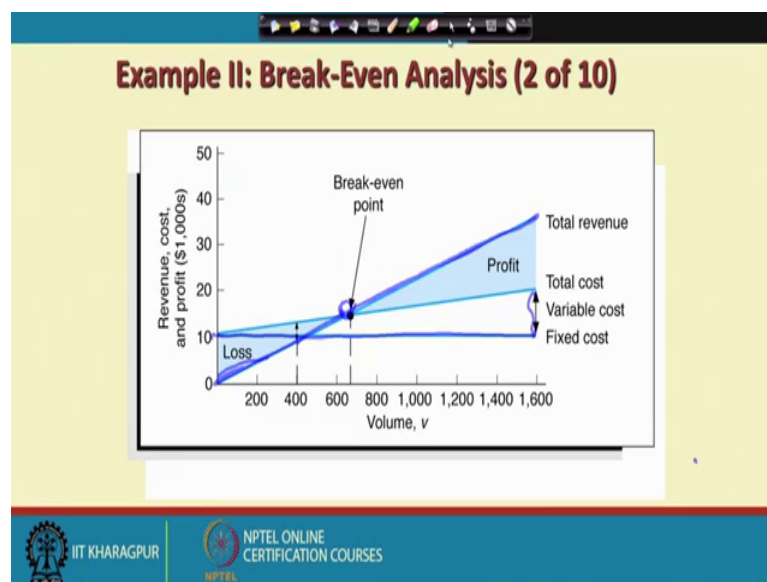
In fact, you know, this is actually graphical structure of kind of break even analysis. In fact, actually excel has a two different kind of modes in one mode you can get directly quantitative informations and the same information can be also graphically plotted and then you can get some kind of better insights or you know better clarity. So, this is one of the examples and that can be also solved through excel sheet. I will show you in the later stage, but in this in the mean times let me clarify how it is actually happening in the kind of situation see here.

So, actually total revenue is starts from here only. So, this is actually, this is what actually the requirement here. So, the 45 degree angle is nothing, but actually total revenue curve and this starts with is 0 because when actually a quantity equal to zero then you know

you know the revenue is also equal to 0. But cost cannot be actually 0 because you know there is a fixed cost component which is always above than 0 as a result. So, this is the composition of you know fixed cost and then variable cost will start from onwards and the variable cost and the fixed cost will give you the total cost picture. So, this amount is nothing, but called as a variable cost.

So, now, this is a total revenue pictures then you have a total cost pictures then the intersection point will give you the understanding about the break even situation and the break even left side will give you the structure 1 and the right side will give you the structure 2. So, this is actually profit side and this is the loss side. So, the this; that means, this is actually called as you know key stage or you know key component or pi what kind of situation through which you know the particular situation is a different game all together so that means, in one side negative and in another side kind of positive.

So, we like to know the break even requirement is just to know at what quantity levels. So, the particular business will return from loss to profit or you know profit to loss so; that means, if you are moving from right to left or left to right. So, you like to know. So, what is the point you know you know quantity through which you know business or management is changing one angle to another angle and that is how the breakeven is all about and this can be mathematically calculated and again with the help of you know excel sheet you can also solve this particular business problems right.

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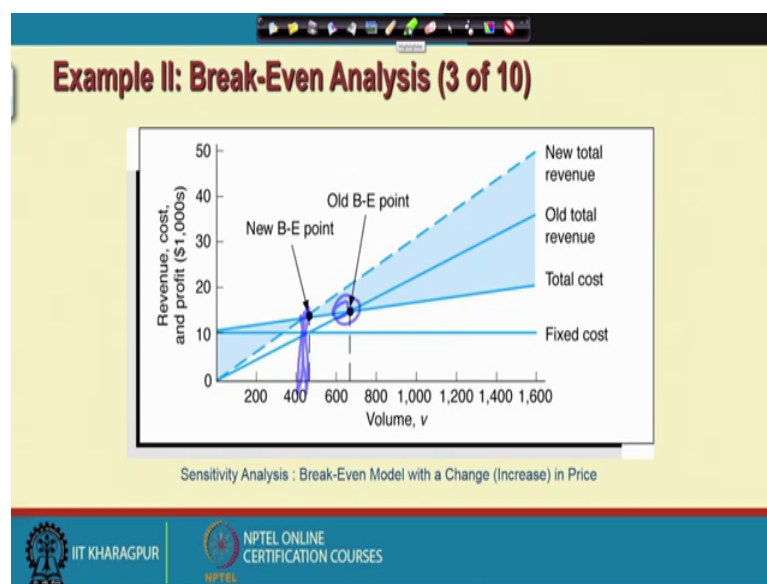
So, this is another kind of examples. In fact, I told you earlier that business is a kind of complex kind of situations and we have lots of you know dynamics and with the help of you know dynamics you can you know you can have a change kind of situation. The cited example is here. So, we have a fixed cost and total cost and this is actually initial total revenue then again same price will changed increase price or you know a decreased price your revenue curve will also change. So, now, the breakeven point will be different.

So that means, this is a typical example you know what we called actually sensitivity analysis. So, keeping other things remain constant in price will change here then the break even situation will change and here we are allowing you know increased price situation then we are you know checking what is the break even position. So, now, initially, the initial this is actually all revenue and this is what the breakeven point now with increase your price then you know your quantity structure is actually reducing. So, this is actually as per the business kind of the demand theory we have already highlighted you know if you increase the price then quantity will be little bit you not lower. So, this is what happening here. So, that need to be tested again mathematically and that too through excel function it can be also easily a in a position to help and you know solve the kind of requirement.

So, let us go to another kind of in a situation here. And this is another kind of situation another sensitive kind of a situation here keeping revenue constant if you like to reduce the cost or you know increase the cost then the break even situation will increase. So that means, actually in any kind of business process to retain profit or to decide profit or decide breakeven. So, you can apply cost strategy or you can apply actually revenue strategy. So, increasing revenue or you know re reducing cost will allow you to go to the at a profit levels.

So, that is how we are keen to know how it is happening and how excel can help you to analyze all these situation. So, means typically actually the beauty of the excel sheet know when you have a kind of sensitive kind of situation sensitive analysis; that means, when there is a change of various price then change of various cost then how it a actually a farm is behaving over the time or you know over the all the changes. So, manually it is very difficult to do all these things, but you know once you know enter the data and you know you commands to the excels and put a particular functional form or you know; that means, to indicate a particular functional form. So, automatically, excel will give you

some kind of judgment or you know insights that insight will help you to take some kind of management decisions.

So, this is another kind of situation. So, changing the kind of cost and revenue structure the situation is changing one point to another point.
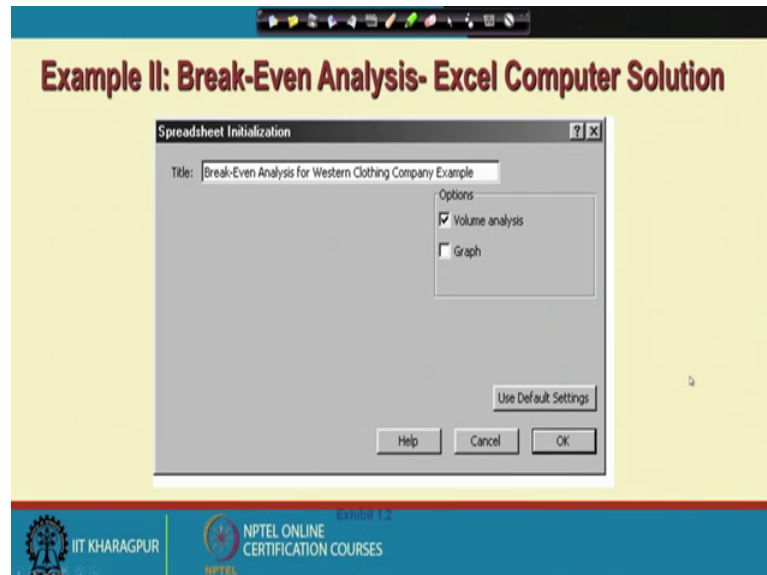
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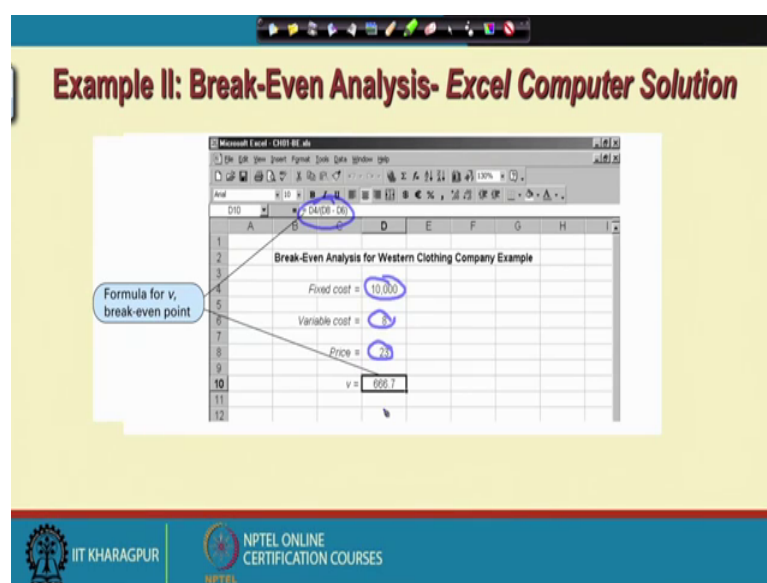
So, now, go to the excel sheet again. And this is the excel view and here the break even analysis then you know same things you know fixed cost structure is there, variable cost structure is there and prices you like this and you like to check actually whether you know what is the operation of you know variable or you know break even quantity. So, we have already calculated; however, the formula is written here actually. So, this is what actually. So, this is what actually the operation of formula and exactly that is the fixed cost divided by actually, price minus variable cost, so the price actually the price component is here and variable cost component is here and this is actually fixed cost; that means, technically. So, the operation is a deed force that is actually 10,000 and then divided by a price minus you know variable cost price is actually this is actually d eight and then minus d 6, d 6 is nothing but called as actually variable cost.

So, now the once you actually put the enter then; obviously, it will give you the signal about the break even quantity. So that means, actually, this is again beauty of the excel sheet once you have actually information then excel function will help you lot to take a decision so; that means, it will give you some kind of an insights and once you get this

insight then this will help you a lot to solve the a business problem and you can take a management decision.

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Similarly this is actually break even analysis you know in the spreadsheet.

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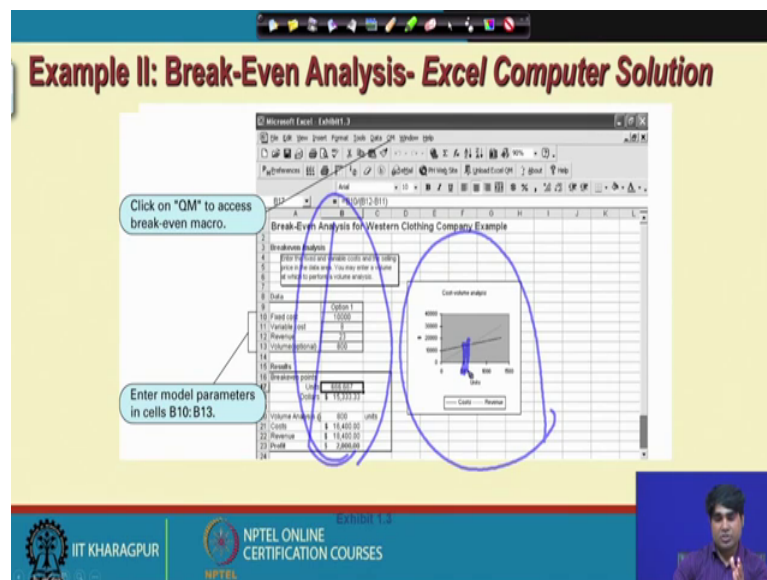
So, I am not going in details again. So, this is a little bit you know complex kind of environment which I have already highlighted that you know in the excel so you can have a quantitative information quantitative judgmentary you have a quantitative judgment here and then the same judgment you can you know graphical actually plot and

get to know what is the kind of a strategy and signal. Then with the help of you know, once you know the plotting will be different when you will change the price structure and cost structure. So, this will be a different kind of environment all together us.

That means, technically what I again hi interested to highlight that you know. So, breakeven has a means excel has a kind of beauty that you know it helps lots of you know business related problems with the operation of you know excel functions. So, similarly you know some of the other situations you can also apply excel functions and then take some kind of management decisions.

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So, this is again actually the spreadsheet and the spread sheet will give you some kind of judgment of how the break even units all together. So, this is actually details about the structure of you know total revenue and total cost and then finally, it will give you a snapshot about the kind of our requirement.

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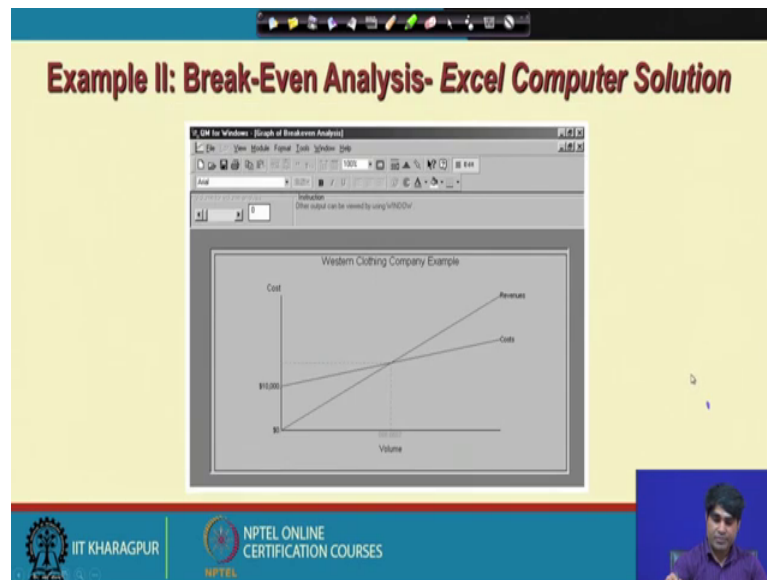
So this is again excel view of you know graphical plotting. And we have a detailed discussion on graphical plotting in the next lecture. So, in the mean times we will see what are the other scenario through which actually you know excel function can help you lot to take some kind of management decision.

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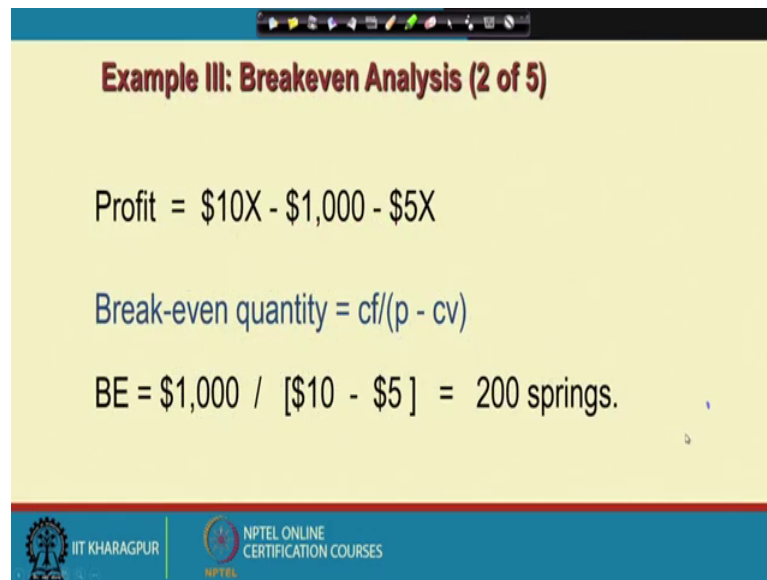
So, again the standard examples of you know break even analysis.

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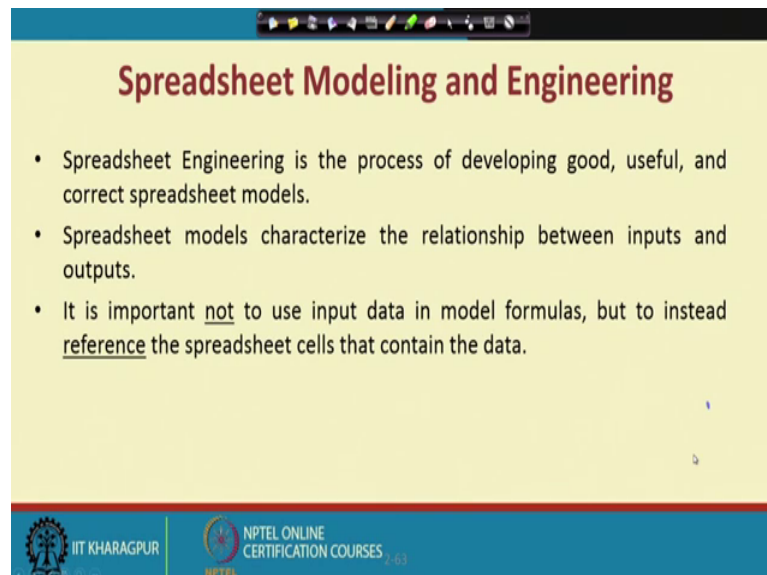
So, I am not going in details, it is just you know a similar kind of situation. A fixed cost variable cost then you know get the total cost then connect with the price and quantity get the total revenue. Then accordingly you can find out what is the quantity through which you know we can say that it is a break even kind of situation.

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And so there are many other various where the excel spreadsheet can be frequently used in spread sheet engineering is the process of developing good useful and you know correct spreadsheet models and spreadsheet models characterize the relationship between

inputs and you know outputs. And it is very important to note that you know the to use input data in the model formula, but not to instead reference this spreadsheet cells that contain the data. That means, actually means the whole idea exactly like this you know you must have actually the kind of proper informations and that should be actually in a structured format then with the help of you know excel functions you are in a position to calculate and then get some kind of insight and on the basis of these insights you can take some kind of you know a management decisions.

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Here is another kind of a situation where actually the excel sheet can help you lot to get some kind of management decisions. So, this is again actually the outsourcing kind you know decisions where actually we are interested to know what is the cost difference you know kind of cost difference in a particular industry anyway. Actually move one situation to another situation.

This is similar kind of environment and, we are interested to know how cost is effective from one situation to another situations and you know cost difference is there and you have to take a decision with you know if signals by putting actually if signals then you will find actually a management decision. So, I am not going in details it is a like you know break even analysis the similar structure can be applied here and then to analyze the particular you know situations.

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So, this is how the a pricing decision spreadsheet models then here also similar kind of situation you like with the availability of you know price and you are supposed to report you know revenue and then you are in a position to or you are in a position to find out whether you know you have to go with this particular model or you have to reject this particular model.

So, these are you know means you what I am interested to say that you know, this is actually the spread sheet has a beauty that if you have a some kind of proper inputs then you have the objective kind of a requirement. Then with the help of excel functions you are easily in a position to find out insights and get some kind of kind of results and with the basis of these insights and results you are in a position to make a judgment whether to accepter whether to reject. These are the kind of requirements which you need in and that to excel will help you a lot to solve this kind of a situation.

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So, these are all details more about to you know something like you know spreadsheet modeling and engineering. So, you know means it is a kind of huge use structure restructure through which on the actual requirement till we get means till we get you know some kind of final decision excel as a kind of beauty that you know with the help of you know sensitivity analysis and kind of various excel functions you are in a position to take some kind of decisions right.

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So, this is another kind of example financial examples. Here the idea is to declare whether you know what is the actually income of a particular company and this is income statement analysis. We have actually we are living in a corporate kind of environment and; that means, since we are discussing about you know business analytics. So, every business you know business organization has a kind of income statement kind of structures. So, we our requirement is to take a decision whether you know the particular business is in appropriate step or you know loss step and how is the net income how is the operating income like this.

So, this is a standard examples and these are the standard the requirement. Starting from the basic understanding is that you know gross profit then you know there are you know some of the other kind of profits like operating proprietary net profit etcetera etcetera.

So, the basic idea of you know financial modeling is that you know graph gross profit is the difference between you know sales revenue minus cost of goods and services. And then operating expenses will be there is like you know administrative expenses selling expenses all these things once you deduct then finally, a component will be with you that is called as you know net operating income. And that is technically called as actually you know earnings before interest and takes then there are you know tax deduction interest deductions, tax deductions then after you know deducting tax and interest then finally, there is a component called as you know net income. And this net income actually is nothing, but actually the business kind of for total profit and that is the profit which actually meant for you know shareholders kind of requirement.

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So, again actually every company big big company you know the you know the business depends upon you know share holders investment. So, that is why the net income is one of the important requirement every company or every business one you know they need to report. And that is how the status of a company you can you understand and according the software you know excels of excel, excel spreadsheet will help you lot to calculate all these details; that means, just you report all these item then finally, with the kind of excel functions or you know excel formula. So, you are in a position to report actually what is the happening of a particular company and then that can be generalized for you know if you have a series of companies and if you have a data in proper or in our structure you calculate for one company then you know just scroll it then you can in a position to come or if other companies in the several times. And that is what the beauty of you know excel spreadsheet.

This is similar kind of examples, you can go through all these details.

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This is another examples and since we have no time, that is why I am just highlighting that you know we have already discussed this kind of problems in net present criteria and this another kind of example where you know if you have actually investment then cash flows and then a what should be the present value of a you know investment.

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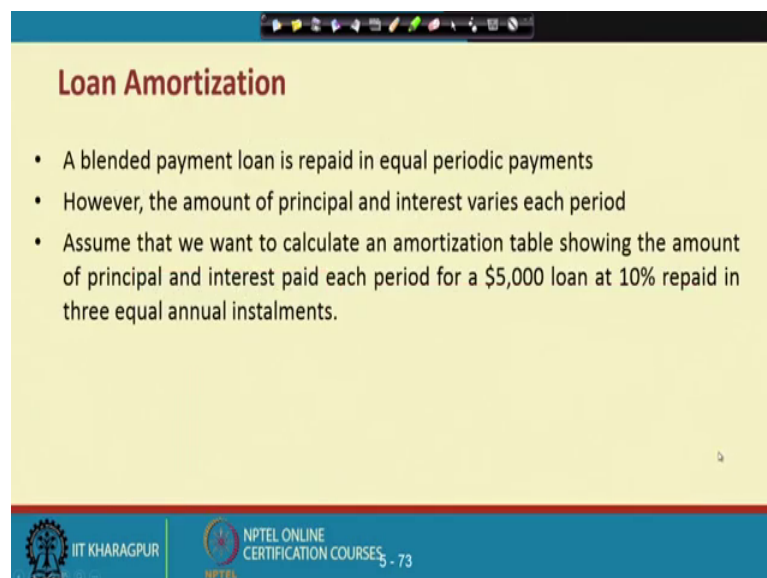
So that means, for examples we want to invest you know some amount and you like to actually know how much actually invest every month when you are in, when you need actually a big amount at a particular period of time and the present value criteria already

help you lot to get this kind of a decision. And we have excel functions and excel function really help you lot to take a decisions with a particular you know structure and you know understanding just you know report all these figures and it will give you the snapshot that what is the kind of a particular requirement you are supposed to invest. So, that you know the total amount you will reach at a particular years. So, this is how the excel spreadsheet all about.

Similarly a investment rate of return can be calculated by the self of you know excel formula.

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And the last, but not the least final example is you know, it is very useful for you know a kind of laundry payment systems, it is useful for loan repayment systems where you like to know actually what is the actually the in the minimum in this constant amount you are supposed to pay and you know if you are you know a loan amount is fixed and time period is fixed.

So, you are supposed to know, what is the minimum down payment and then what is the maximum period of constant payment towards this particular loan repayment system? So, here is you know excel will help you a lot to calculate this kind of requirement. So, this is what the mathematics is all about.

And again through the excel spreadsheet it will help you lot you know or what I can say that you know excel, for excel sheet spreadsheet will give you very quick decisions because you know it is well connected with all these you know financial functionalities. So, as a result you can take easy decisions.

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So, this is how the typical process, usually actually excel will help you to know what is the actually the a monthly installment a constant instrument you are supposed to pay within this you know loan amount and that to for a 3 years time period and that too a particular interest rate is given.

So, this is actually the beauty of this particular you know such kind of you know this is another kind of you know example. So, I am not going in details.

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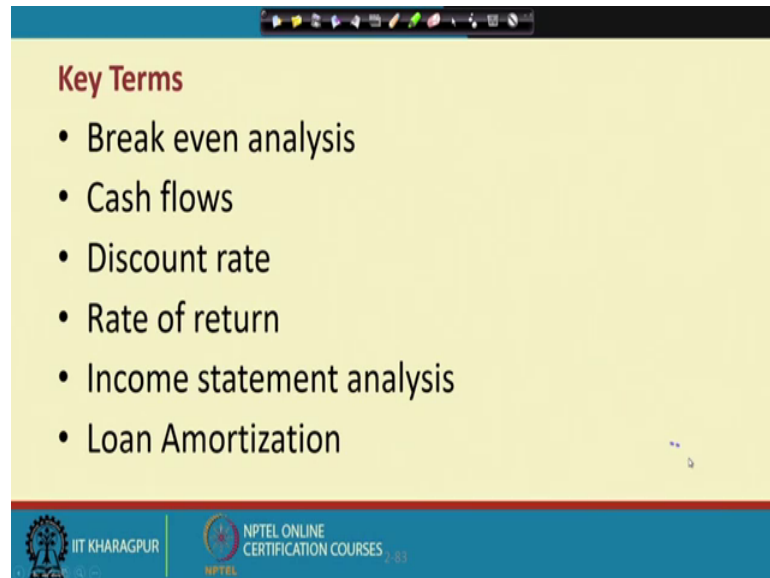So, these are the things we have supposed, we have actually discussed in this particular you know lectures.

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So, some of the classic actually management problems and that rule can be solved through excel functions. And we have discussed break even analysis cash flow analysis and then you know the kind of investment decision income statement analysis and the loan repayment system. So, these are actually typical areas where you know excel functions usually help lot to solve some of the management decisions.

So, with this we will stop here.

Thank you very much, have a nice time.