Digital Land Surveying and Mapping (DLS&M)
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Lecture – 39
Data Preparation and Map Making

Welcome students. Today is the planimetric class on Digital Land Surveying and Mapping. Today I am going to discuss on how to prepare the data for making the map using some particular software.

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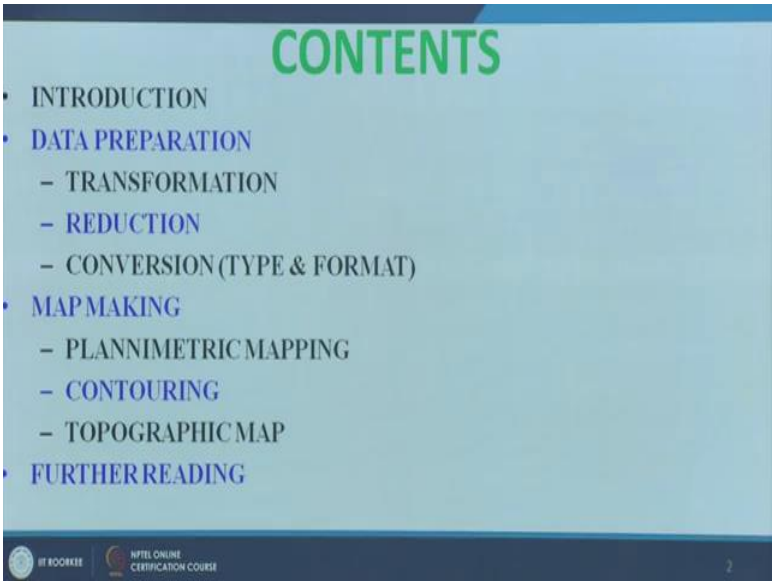

Now this class will be discussed under the following at first I will introduce then the data preparation actually data preparation will be done under three heads transformation reduction in conversion and then map making, I will show you how to make the planimetric map using a software then contouring using another software then how both these map has to be registered or to converted to topographic map followed by further discussion.

Last few classes, I have discussed about the data collection and the input of the data collection is to have the digital data. Now during data collection we have two fundamental parts; one is that GPS surveying through which we have collected the position of control points we know that the GPS provides us co-ordinates and location in WGS coordinate system and the WGS coordinate may be either in Cartesian system or a

geodetic system. Now next part what we did, we had made use of total station to collect the location of many details along with the objects name. The procedure is that where you should color the GPS based control point and that will be WGS 84 co-ordinates and this WGS 84 co-ordinates as I told you may be Cartesian or in geodetic.

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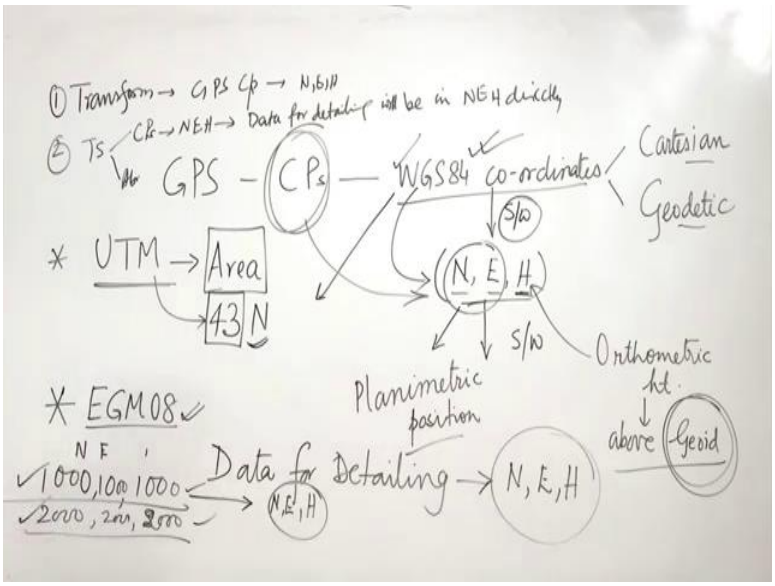

Now, this WGS 84 co-ordinates are the global co-ordinate system and the surface of the earth which is (Refer Time: 02:53), but map we will prepare is on a plane paper. So, we need to convert these all we call it transform this WGS 84 co-ordinates to north east and orthomatric height. Generally we prepare map making use of north east and orthomatric height, now the WGS 84 co-ordinates which is geodetic or Cartesian that has to be transformed to north east height and that can be done through software. So, is what our mapping software are also our GPS software who is the process the data and many other software's are there which may be used to convert the WGS 84 co-ordinate to north east and height co-ordinates.

Now, these north east and height actually this north east this is the planimetric this is planimetric position; that means, we do consider it on a plane and this height is the orthomatric height and this height is above the geoid. Now in order to convert the WGS 84 co-ordinates to north east and height, the software demands two information; one is the projection system to which we have to convert this 3D coordinate into (Refer Time:

04:59) position and in GPS WGS 84 system they make a use of UTM; Universal Transcribers Marketal projection.

So, UTM is by default because of we are taken by data from WGS 84 coordinate system and also we need to define the area for which we why like to transform the data. Now as for example, for our Roorkee (Refer Time: 05:38) have the UTM area 43 n; n for north 43 is a number. So, corresponding to each area you will have a number and most of India is in the northern hemisphere, so the process in the northern hemisphere they have to give the north. So, this is the information that the software we will like to have before converting, another information that it will have it will like to have is that which geoid you will like to have.

Now, generally from for WGS 84 coordinate system we do make use of the global earth globalizational model EGM 08. So, this is the informationing that we have to provide to the software and then software we will provide the corresponding to the WGS 84 coordinate software will provide the north eastern height locations. So, for control points this is the method how we can get the north eastern height. Now this location of the control points we make use of this location of the control points in the total station, in the last class when we are demonstrated the collection of detailing using total station that we have seen therefore, that some stations has been located whose GPS co-ordinates available and those co-ordinates are in either in WGS 84 coordinate system or any age.

So, if we make use of the any age coordinate then all further collection of data will get reduced inside the total station automatically. So, for the reduction in data will not be required, so it is advisable to make use of the local co-ordinates or north east height co-ordinates of the control points to the total station during this backside and in station location and for further detailing further collection of data, all data; all detail data, data for detailing we will have in terms of north eastern age.

Now in some cases it may be we may not be possible to provide the position of control points in terms of north eastern height because it made some software to convert from WGS 84 co-ordinates and may be during the field work you may need to carry out your total station surveying some times before control point establishments sometimes simultaneously, in those cases will not be able to provide the north east height co-ordinate of the control points.

So, in that case we have to assume some arbitrary value like 0, 0, 100 something like that for the north eastern height for the control points for different control points we may make use of different north eastern height like 1000, 2000, 3000 just to have a identification also this will provide us the identification from which control point we have done the work. Now where is the work is over coming to back to the t d office then after processing the GPS data then we can we will have this north east height corresponding to each of this control stations then we can convert all our data for detailing in terms of north eastern height. So, that reduction has to be done after the data has been collected and that is called data reduction indirectly means we have to do it in office separately rather than getting the data directly using the total station.

So, in that way first we should transform the data; transform GPS c p control point to north eastern height. Now then either in total station for control points if we provide north eastern height then we will get the data for detailing will be in north eastern height directly, otherwise we should go for arbitrary arbitrary north eastern height for the control points to start with coming back to the office we have to convert those using the control point north eastern height and then we have to reduce the data. So, this is for how our data is to be prepared before we go further for our digital map making, where is the data has been transformed and reduced then we have to identify the software in which we are going to prepare the map.

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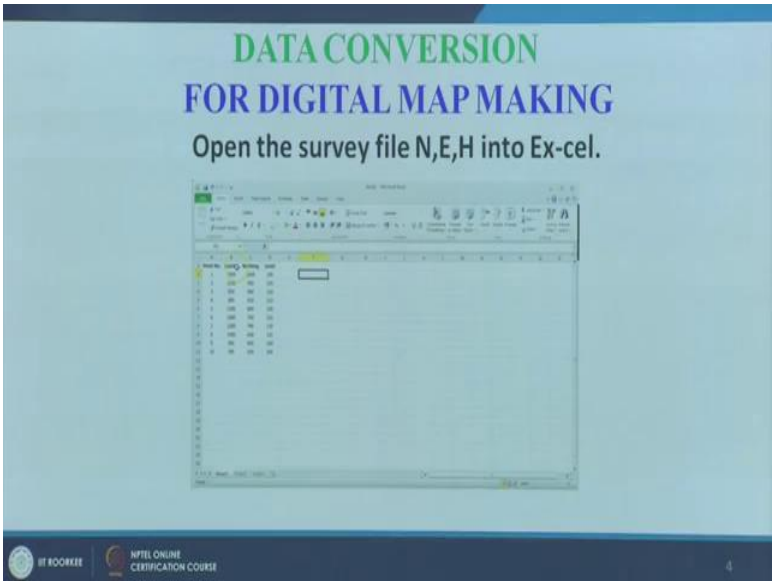

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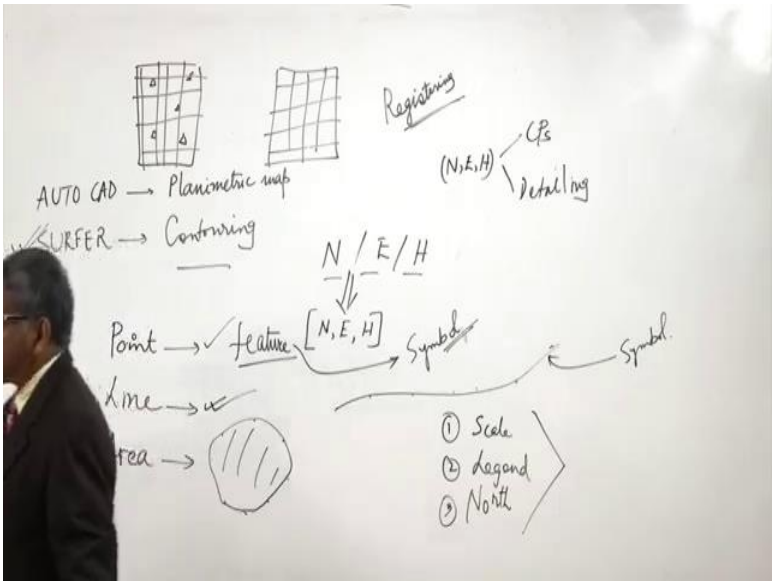

Now, in our case I will take the demonstration for our demonstration of our, for my explanation I have taken or took it as the map for our auto cad for planimetric map and surfur for contouring. So, my further discussion will be more oriented towards this software otherwise similar type of operation has to be done for other software also. So, by transforming and deduction all our data now in the format of north eastern height, we have two sets of data one for control points and other for detailing. Now first what we need to do; all this data for auto cad actually we need to have the data in the format of N, E, H but our data which we have got from our digital land surveying in the format of north east and height independently.

So, we have to put all these together as a single unit, so we have to do it by using the auto cad software first we will tells for our N, E, H of the control point and detailing in the excel sheet. So, this is the sample data you can see here easting northing and height we have taken, so we can open this file. So, they we will maintain the data in a file then that data may be open in an microsoft excel.

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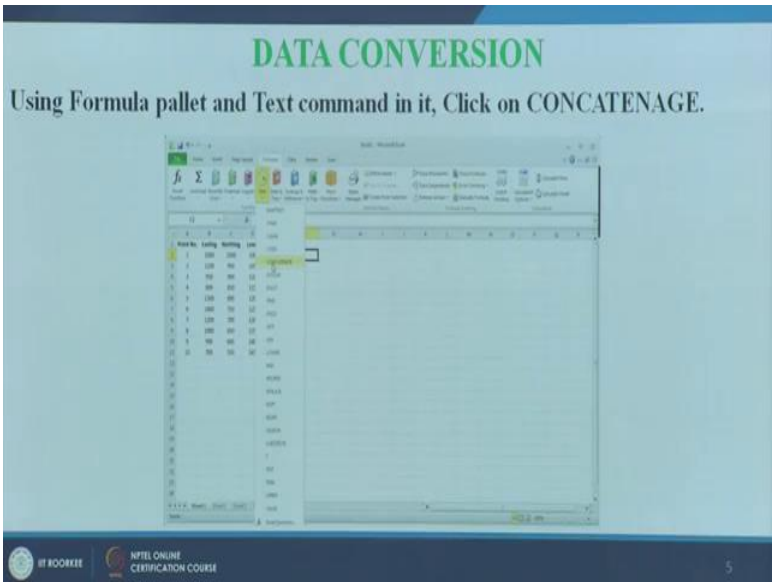

And once that data is there, so we can put it to three in three columns after that we make use of a formula called palette and from there is a test command unit in the test command there will be a option called concatenate. So, if I can concatenate these easting northing and height in another set in that way we can convert the independent north east and height these are a three columns in a excel sheet by using the concatenate command or option we can make this data in this format, so that is what we have shown here.

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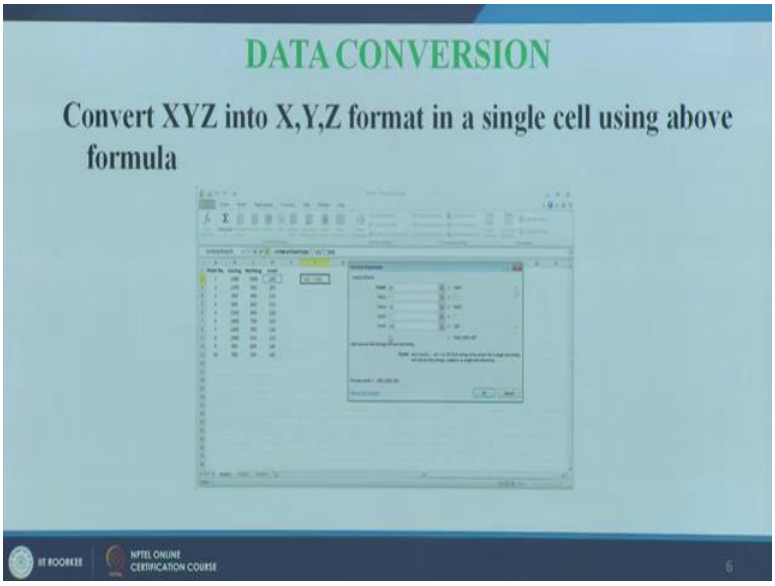

So, once the data is available, so we have got converted this X, Y, Z or north east height to our this format then these all these data may be copied as a combined cell for further use.

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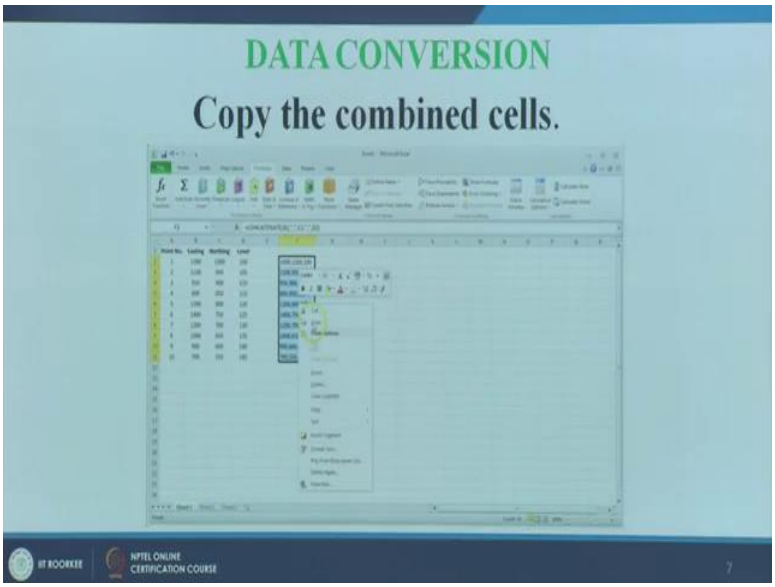

So, this is the way how we have to convert the data in the format, the way our auto cad software will consider.

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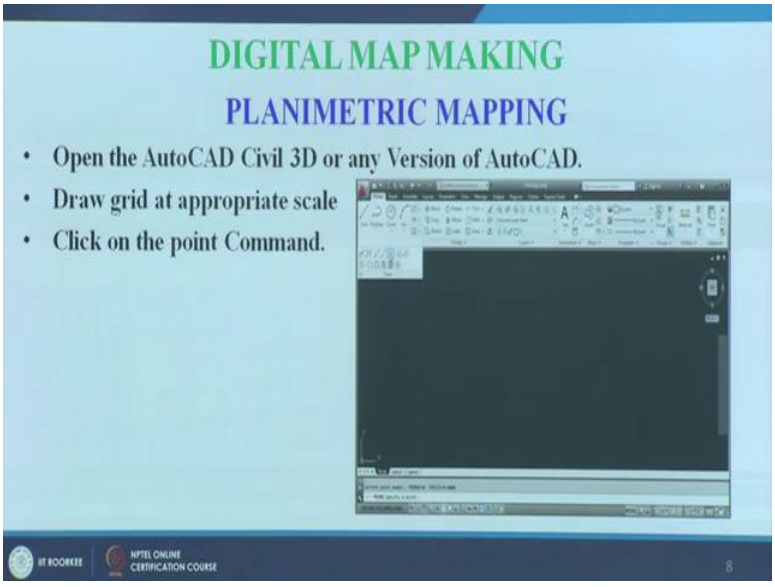

Now, where is the data is available in that format then we will like to open our auto cad software, now auto cad there are varieties of our auto cad software auto cad 3D civil is a

software which is provided to students free of cost. So, the student version may be procured by any student for this academic work and that will be given to you free of cost. So, I will suggest all of you to register for that software and get yourself a custom to working with that software and now at specifically for mapping purpose. In fact, auto cad 3D civil directly provides all the three dimensions what; that means, both planimetric work as well as mapping work can be done.

However, I will be doing here using independently auto cad for planimetric surfur for contouring. Now (Refer Time: 16:56) is that I am found that surfur provides contouring such for superior then what it provided by the auto cad 3D civil anyway. Now after opening the auto cad software first we have to make use of the good option available in the auto cad software and that we can draw the grid at some appropriate scale. So, giving and scaling has been done now then we should go for the click command there is a command available in the software which is called point.

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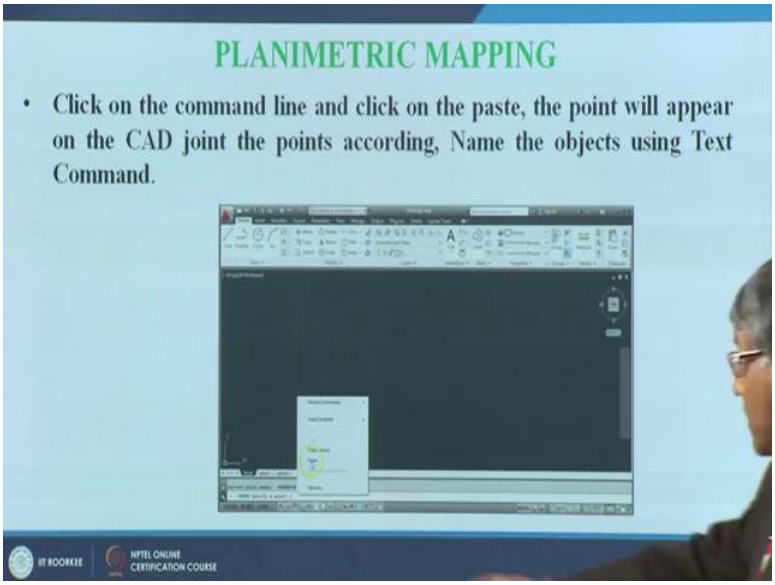

So, you click it and then we this is the; we should first select the control points from the file and then we test it is shown here in this. So, once we test it than the points will be displayed in the display place, display window. So, in that way we can get the (Refer Time: 18:19) of the control point and we may make use of very faint line to join the control points and that will provide us the network of control points because that we that we will surved as the base of our mapping. Now we should also look into (Refer Time:

18:44) our network shape is same as that available in the failed or not, if it is fine if it is not that we have to visit revisit to our whole work, so that they control points are being test as they are in the field.

So, once control points has been satisfactorily plotted (Refer Time: 19:11) network has been defined then we can go for the points of the detail detailing and we in the similar way we just select the points, we test it and then the always points will appear in the display map. Then we have to identify each and every point and we have to classify our self whether the points belong to point object or line object or area object.

So, whichever for the point object we should identify not only the location of the point also we should know what feature we should go for, what is the feature of that and corresponding symbols we should symbol, we should note down during corresponding to that point. So, in that way all the point object has to be represent by symbol then line objects. So, all the points which belong to the same line has to be joined using the line command that is available in the software and also we have to make use of the corresponding symbol to represent the object.

Finally, we should also look at the point which are belong to a particular area, so you should get all those points and also make use of symbols and also if sometimes we need to go for test, so all those test we have to do. In that way we can prepare of planimetric map and after preparing the planimetric map also we have to go for other cartographic elements like scale then our legend set then our north direction. So, that can be done only north planimetric mapping has been done or we can also do after the topographic map has been prepare. So, next thing we can do also the making use of surfur the case, so for contouring. So, when our we will go next in the we will open the surfur petals and once in the surfur (Refer Time: 22:06) again.

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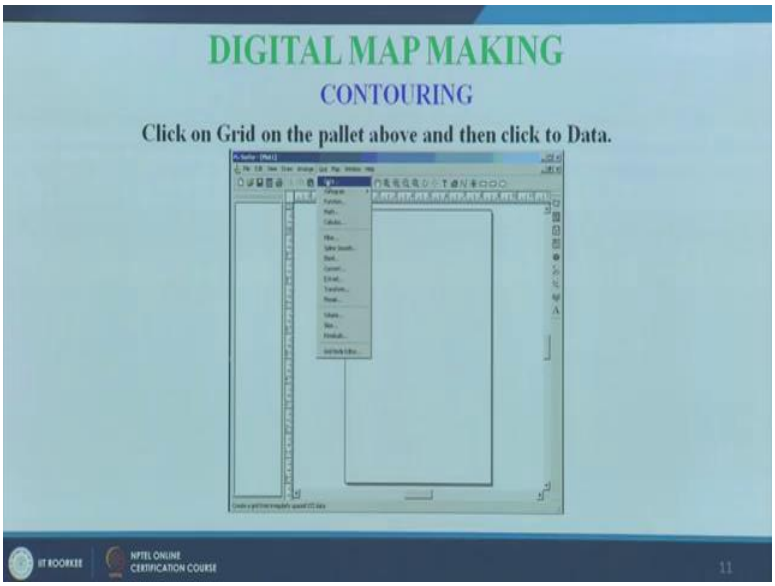

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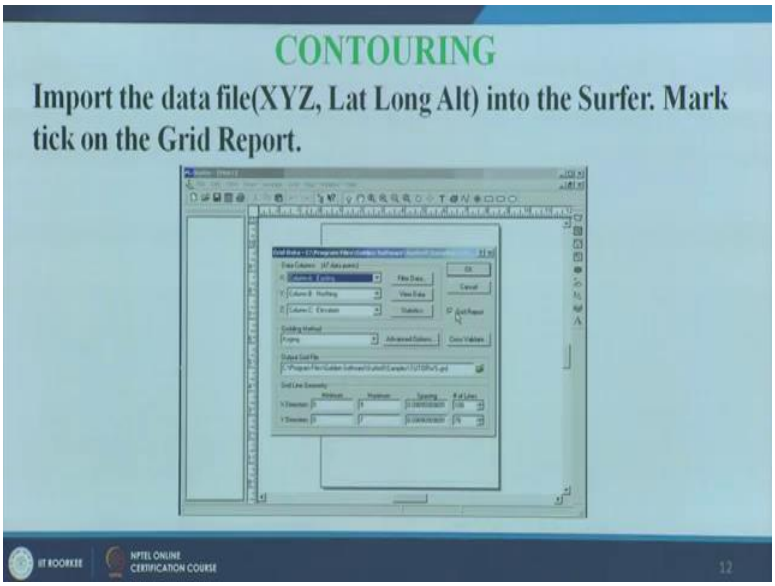

Similarly, we will go for the grid module and we will prepare the grid to the scale which we want to have and then after preparing the grid, we will click to data; data may be obtain through our file and then this we have to define in which direction we want to grid; the northing easting and height elevation of height and then after that we should therefore, griding method and then we should click the grid report.

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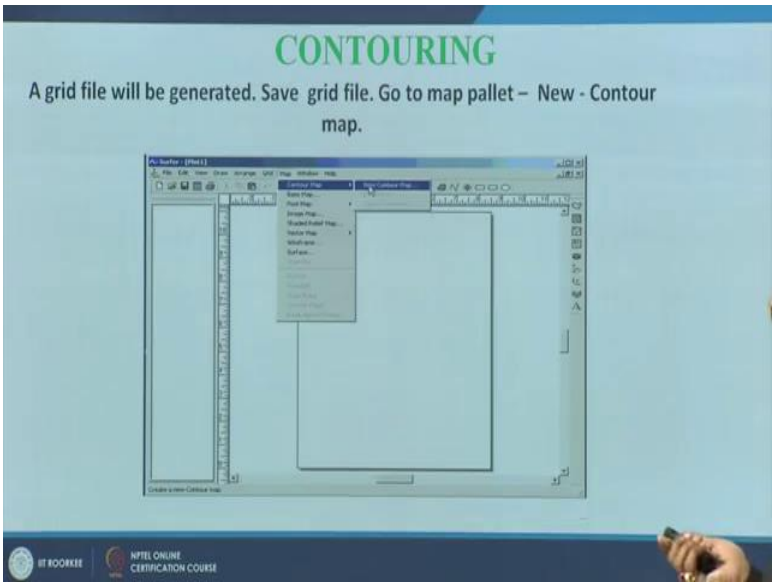

So, simply by doing that we will be able to get next point we have to go to be map and format the map we should you we will go to the contour map and we can get new contour map then we will get the contour of the area.

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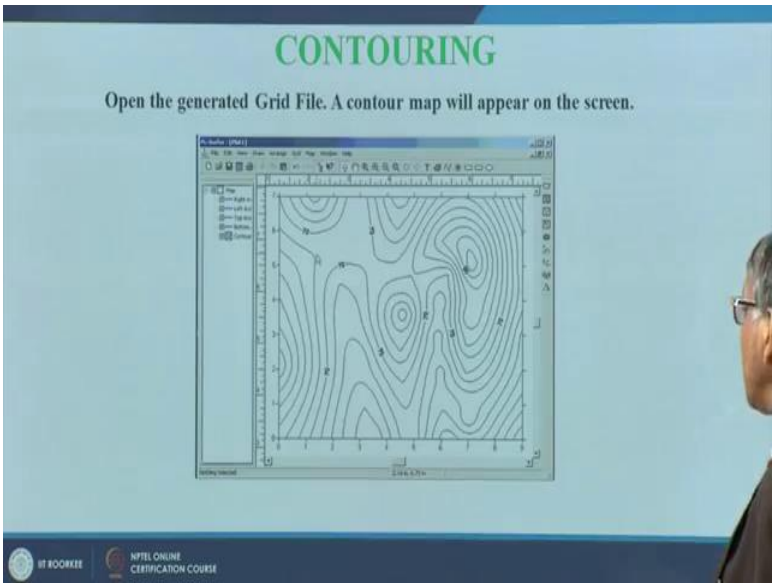

So, the work is very simple but we have to the concepts about the type of interpolation taking that the software provides us and we have to go on changing that thing too we get the contours as appropriately represents our area. So, once the contour has been prepared than an also planimetric map has been prepared, then the next work is to be done is to

super imposed these two because ultimately it is the topographic map which really we want to prepare and the topographic map contains both the planimetric positions of objects along with the symbols as well as contours with the contour value.

Now these thing we should do by making these two maps the two maps we will have the control points as I have already told I am having the groups. So, by matching the grids as well as control points we can super imposed one about the other that is the process called registering or registration. So, there are so many software also available independent software's available also this work and be done by making use of auto cad software. So, one planimetric map can be super imposed on the surfur map or surfur map may be (Refer Time: 24:52) on the planimetric map, we can make use of auto cad software, we can make use of some other software and we must be we have to ensure that they are registered properly and so to ensure that the best way is to take care of the control point overlapping as well as weights having the same scale.

In that way whenever we will get the super imposed map then we can say that our draft map or the topography has been prepared. So, then we can go for scaling as I told you in the last class, some other class that there are two types of scaling we need to have represent one is the graphical mode another is the r f mode, then we should go for the legend chart we should have the north direction, we list to have the different text has to be written. So, all those cartographic work has to be completed and each one of the symbol should be noted down having the proper color, contour should be noted with proper color and every fifth contour should be a bit more thick and contour should be identified along with the contour value.

So, in that way we can complete our work and the draft one we should compare with the actual field whether all the objects which really we want to have to be represented in the map are available or not, if not we should go on editing till we are satisfied with the elements to be represented as well as we should also know what are the way the ellipse available in the field is also should be represented in our map and whether it is represented in the map properly or not; if it is fine if it is not then we have to see what we whether there is a problem with the data or the interpolation technique with the mapping.

So, all those has issues has to be resolved before we make it as a final map. Once the map is final then we should take the map print out using automated pattern and also we

will have the map in digital format, so that is the digital map and the (Refer Time: 27:29) digital map that we can change the scale whatever where we like if the data is are sufficiently high quality then the quality of the map will be maintained and also will be able to take the print out output of the map to the size whichever we will require, so in that way our we can prepare the digital map.

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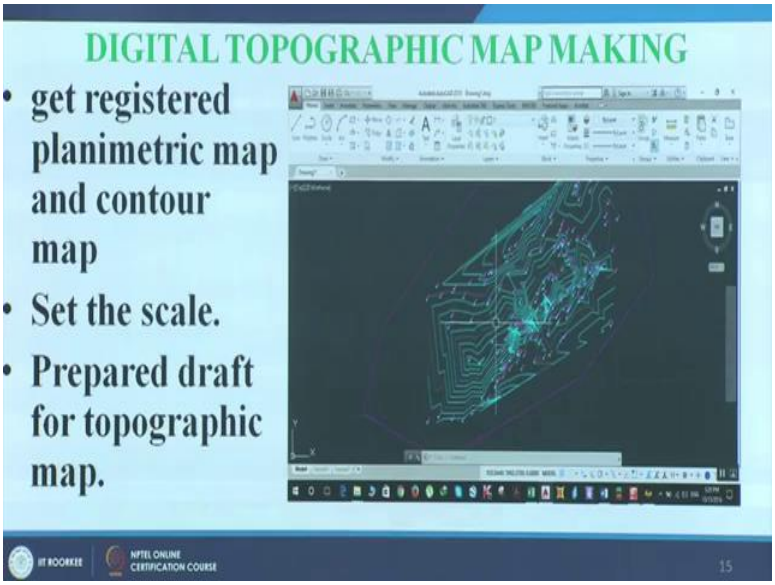

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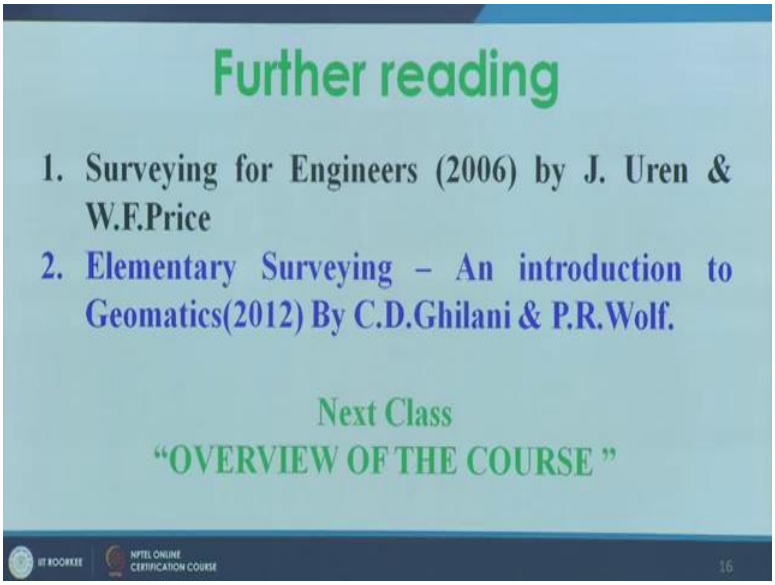

So, with this I like to conclude my classes on Digital Land Surveying and Mapping and the next class I will like to tell you about the whole of the course about the how this

course is being planned. So, that you can have a filling this how the connectivity comes and ultimately need to have the knowledge about the Digital Land Surveying and Mapping.

Thank you.