Fundamentals of Power Electronics
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Lecture - 44
Practicals 1

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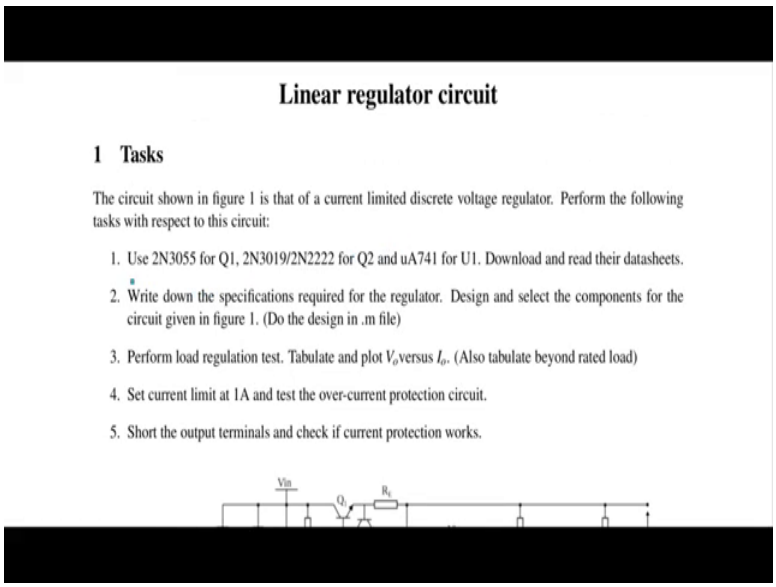

Here are some tasks that you can do for Practical work. Of course, it is not in the scope of this course, but to gain further insight into the circuit nothing like implementing it on a lab table. So, if you can take the help of your mentor and instructors in the colleges and if you can find a lab table with appropriate components, do please try to implement them by yourself so, that you get a much better understanding of the circuit. So, the linear regulator circuit we have discussed this circuit.

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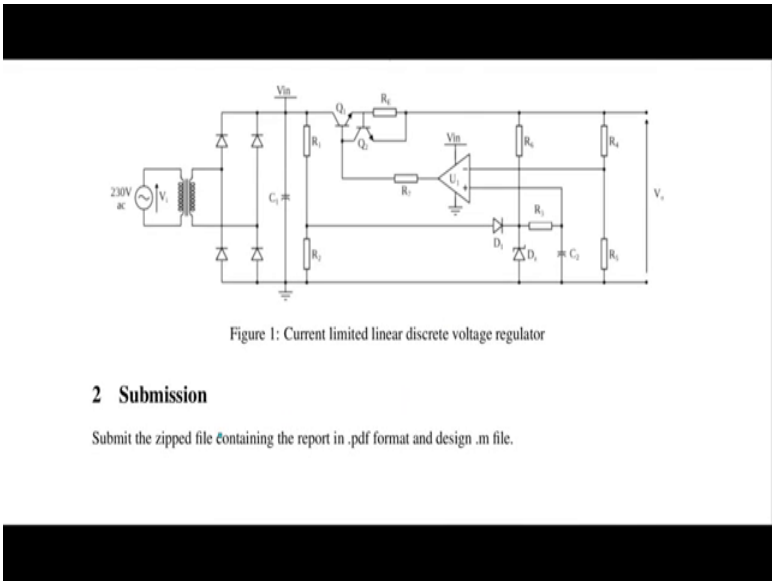

We have here the 230 volt AC and followed by a transformer; the transformer does 3 jobs here scaling the input output scaling it gives galvanic isolation and third importantly it also gives inrush current limiting. And you have a rectifier diode and this is followed by a capacitor filter, and this is the point which acts as V in for the regulator this is the unregulated DC.

And you have the series pass element here you have a constant current limiting current protection, you may modify it into fold back current limiting protection also and try it out and then this is the feedback for the output voltage brought to the minus terminal, this is the zener which is filtered output brought as reference this is the start up circuit and the output of the op amp is driving the transistor Q 1.

So, this would be the entire current limited linear discrete voltage regulator, please try to read them up you can use 2N3055 for Q 1 2N3019 or 2N2222 for Q 2 these are low power 1 amp devices this is 10 amp device uA741 you are already familiar with op amp or any other equivalent op amp. Do the design using octave or matlab m files so, that you can do iterations perform the load regulation test tabulate and plot V-naught versus I naught.

And set the current limit at 1 amp and test the over current protection by adjusting the value of R e. Short circuit the output terminal bravely and check if the current protection works. Then finally, if you it is preferable recommended I would recommend that you

document the results take the waveforms design equations put them into a word file and convert them into pdf and zip them along with the design file and keep it for records or submit it to your instructor.

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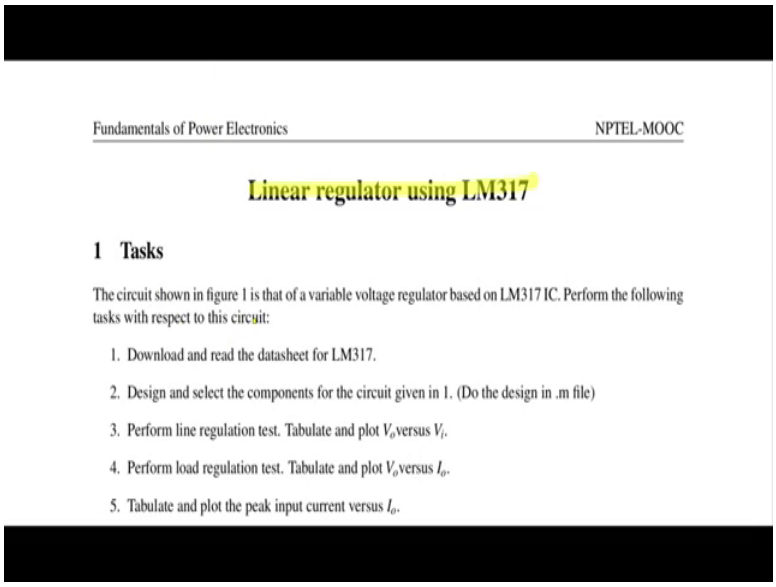

There is another exercise that you can do and that is linear regulator using LM 317.

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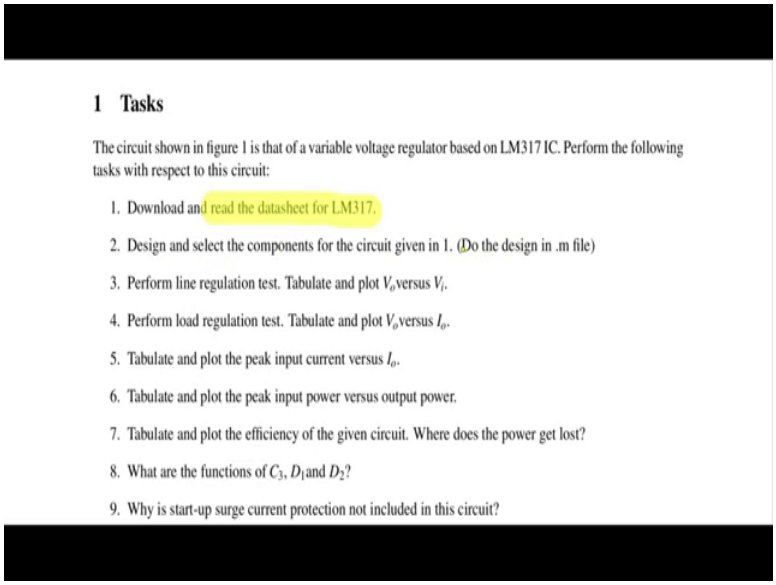

So, this is IC regulator, it is a variable output voltage regulator download and read the data sheet very important and design select the components based on the using a dot m file.

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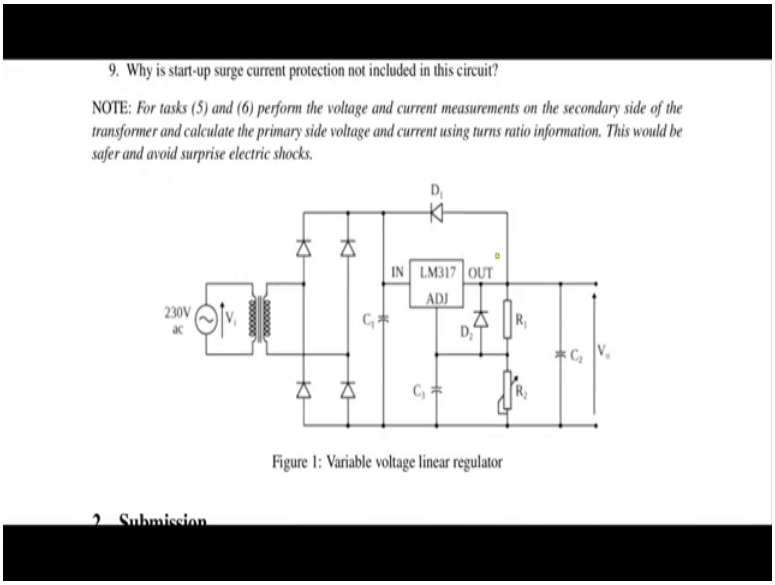

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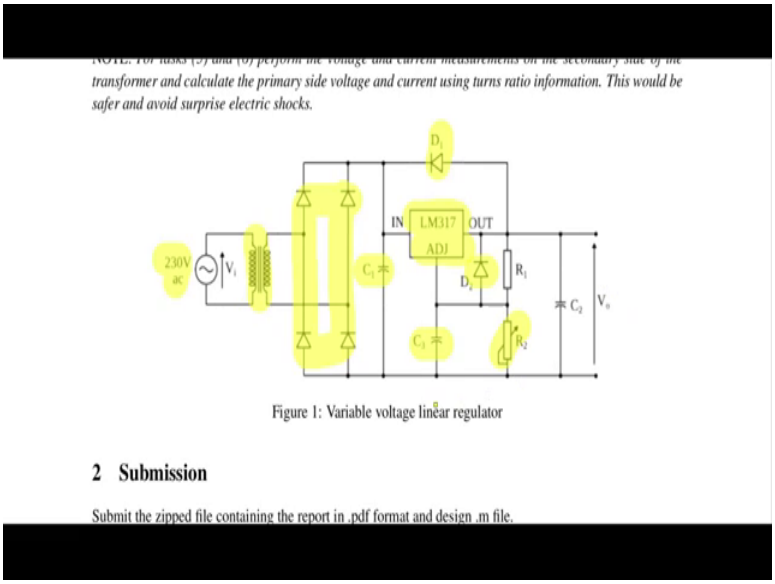

In octave or matlab this is the circuit similar circuit we have the 230 volts AC. And then you have the transformer and you have the rectifier and the C filter then after that you have the LM 317 now the in out adjust pin and you have R 2 and R 1 and I have made R 2adjustable. So, that you can adjust that and get different voltage settings.

I have explained in the class on the need to use C 3 D 2 and D 1 recall that and understand what they do and what are the functions here ok. So, do all these tasks to get better insight and then document them, tabulate the results wave shapes and then put

them in the word file zip it along with your design file, submit it to your instructor or keep it for records.