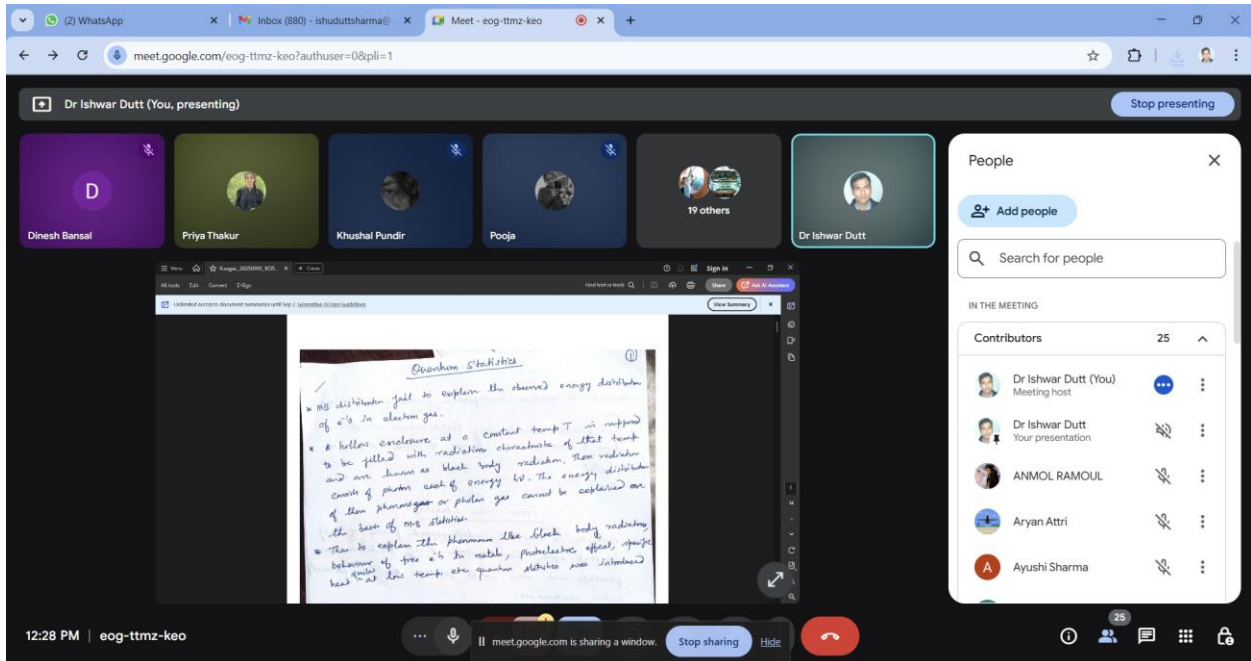
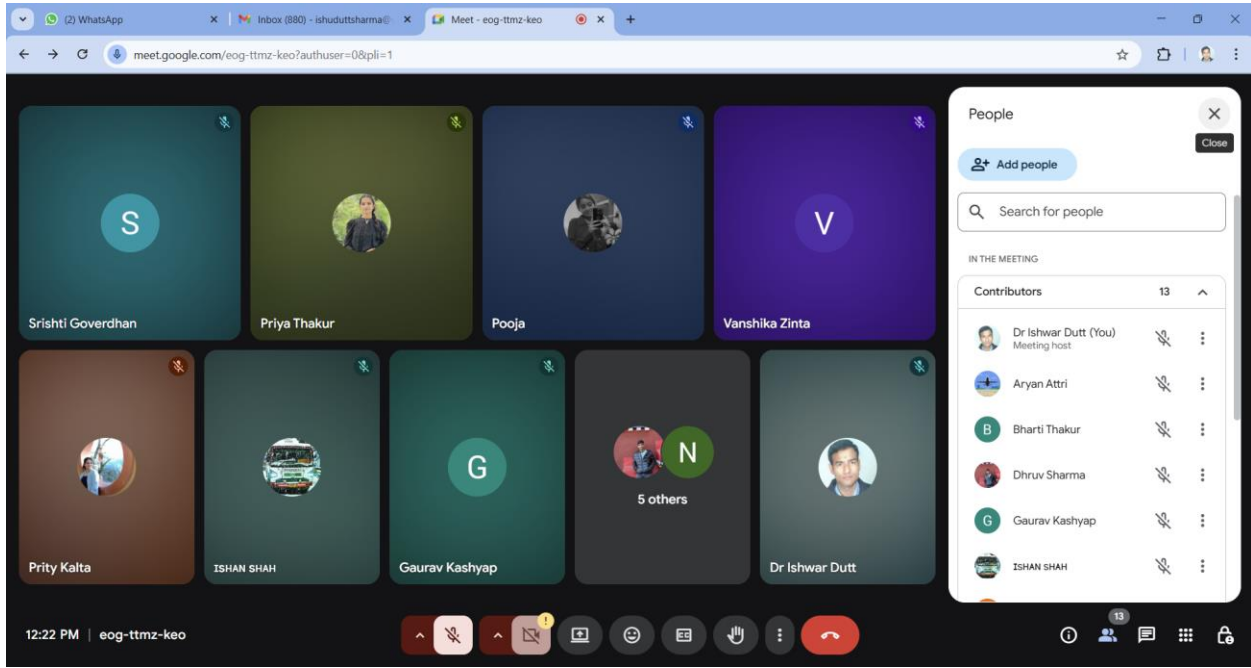
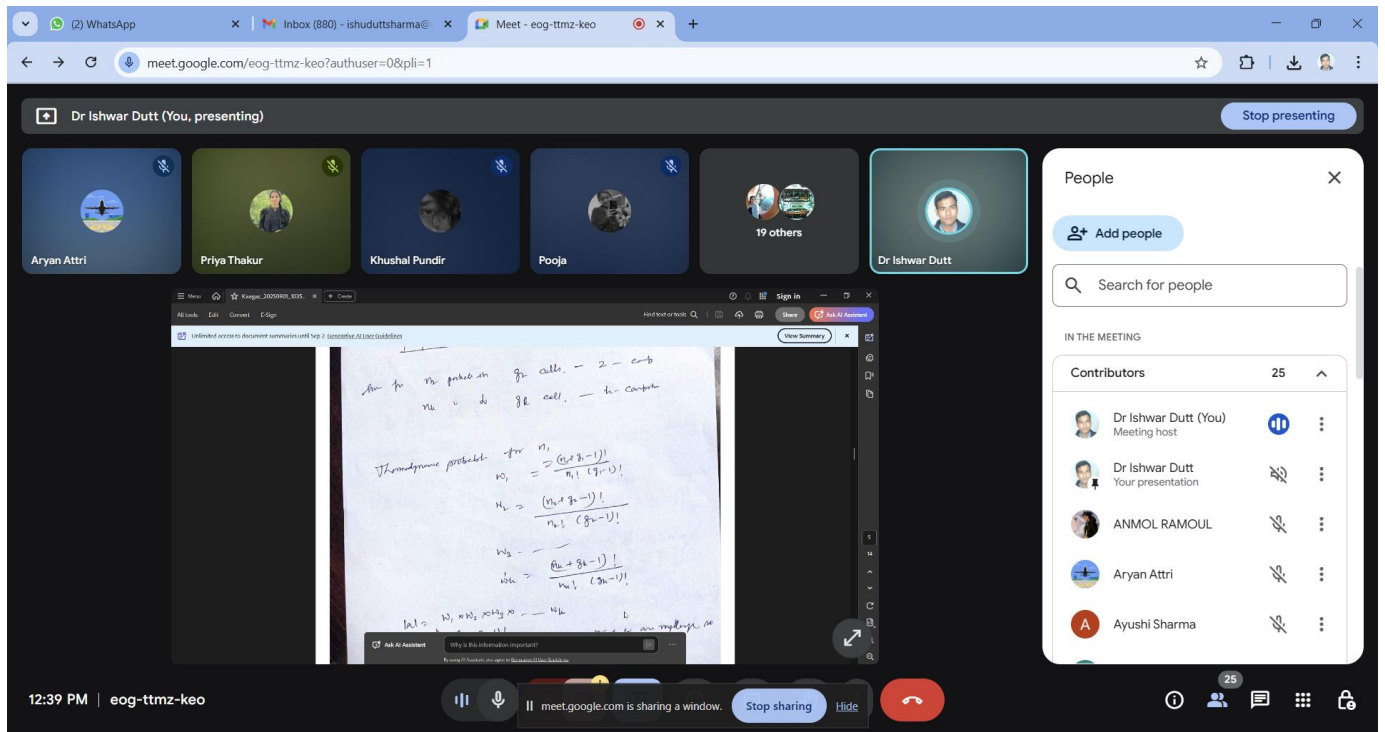


Online class on 1.9.2025

Statistical and Thermal Physics





Online class on 1.9.2025

Present =24

03.09.2025

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Participants: Aryan Atri, Amandeep, Prity Kalta, Pooja, 17 others, Dr Ishwar Dutt

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- Aarushi
- Amandeep
- Aryan Atri

12:59 PM | cqj-wbkc-svq

Handwritten notes on a document:

$$E(\nu)d\nu = \frac{4\pi\nu^2 d\nu}{c^3} \times \frac{1}{e^{\frac{h\nu}{kT}} - 1} \cdot \frac{h\nu}{4}$$
$$E(\nu)d\nu = \frac{8\pi h^3 \nu^3}{c^3} \frac{d\nu}{e^{\frac{h\nu}{kT}} - 1}$$
$$E(\nu)d\nu = \frac{8\pi h^3 \nu^3}{c^3} \frac{d\nu}{e^{\frac{h\nu}{kT}} - 1} \quad \text{--- (5)}$$

This is known as Planck's law for black body radiation. This gives the energy density of radiation having frequency ν and $d\nu$.

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Aryan Attri, Amandeep, ISHAN SHAH, Prity Kalta, 18 others, Dr Ishwar Dutt

Handwritten notes on a document:

$$W(n, n_1, n_2, \dots, n_k) = \sum_{i=1}^k w_i(n, n_1, n_2, \dots, n_k) - n!w_k$$

$$= \sum_{i=1}^k \frac{n!}{i!} \frac{(n-i)!}{(n_1-i)! \dots (n_k-i)!} - n!w_k$$

Taking natural log on both sides, we get

$$\ln W = \sum_{i=1}^k \left[\ln(n-i)! - \ln n_1! - \dots - \ln(n_k-i)! \right]$$

Since n and g are large numbers \therefore applying Stirling formula $\ln n! = n \ln n - n$

$$\ln W = \sum_{i=1}^k \left[(n-i) \ln(n-i) - (n-i) - (n_1-i) \ln(n_1-i) - (n_1-i) - \dots - (n_k-i) \ln(n_k-i) - (n_k-i) \right]$$

12:41 PM | cqj-wbkc-svq

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Nitika Thakur, Prikshit Kashyap, Aryan Attri, Prity Kalta, Pooja, Kanak Sharma, Geetanjali Sharrot, 11 others, Dr Ishwar Dutt

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- Ayushi Sharma
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Equations shown in the presentation:

$$E(\nu)d\nu = \frac{4\pi\nu^2 d\nu}{c^3} \times \frac{1}{e^{\frac{h\nu}{kT}} - 1} \cdot \frac{h\nu}{e^{\frac{h\nu}{kT}} - 1}$$

$$E(\nu)d\nu = \frac{8\pi h^3 \nu^3}{c^3} \frac{d\nu}{e^{\frac{h\nu}{kT}} - 1}$$

$$E(\nu)d\nu = \frac{8\pi h^3 \nu^3}{c^3} \frac{d\nu}{e^{\frac{h\nu}{kT}} - 1} \quad \text{---(1)}$$

This is known as Planck's law for black body radiation. This gives the energy density of radiation having frequency ν and $d\nu$.

12:59 PM | cqj-wbkc-svq

SEC Class

03.09.2025

Participants: Vanshika Zinta, Nitika Thakur, Dhruv Sharma, Gaurav Kashyap, Pooja, Dr Ishwar Dutt

Contributors (6): Dr Ishwar Dutt (Meeting host), Dhruv Sharma, Gaurav Kashyap, Nitika Thakur, Pooja, Vanshika Zinta

1:40 PM | gjc-vnfb-dav

04.09.2025 (EC&NS)

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Stop presenting

Pooja, Gaurav Kashyap, Vanshika Zinta, Nitika Thakur, 2 others, Dr Ishwar Dutt

Cont..

- **Symbol of Double Pole Single Throw or DPST Switch**: is used to simultaneously control two separate circuits with a single action, such as turning two 240-volt circuits on or off at the same time. They are common in 240-volt appliances, industrial machinery, and applications where complete isolation of both live and neutral wires is required for safety.
- **Double Pole Double Through or DPDT Switch Symbol**: simultaneously opens or closes two independent circuits. It is commonly used for controlling both the live and neutral lines of an appliance, ensuring complete isolation from the power source for safety, such as in water heaters and industrial machinery. This is different from a Double Pole Double Throw (DPDT) switch, which can switch two separate circuits between two different paths or connections, not just an ON/OFF state.

3:03 PM | quo-mijh-jcb

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Electrical Power Distribution in House:

ROOM 1, ROOM 2, ROOM 3

Energy Meter, Three Phase Meter, High pole MCB (Double Distribution Box), Three Phase Distribution Box, Earthing

3:16 PM | quo-mijh-jcb

05.09.2025 (EC&NS)

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Procedure followed

Making blueprint of electrical diagrams is easy with the proper templates and symbols, following procedure should be adopted for making blueprint of a electrical diagram:

- **Start with a collection of electrical symbols appropriate for your diagram:** Before making blueprint of an electrical circuit, one should be fully aware with the different symbols used in drawing. Number of electrical and electronic symbols has been already explained.
- **Draw circuit represented by lines:** Imagine or think about different requirements in different part of the building or industry. Now using the verbal symbol try to place the names at appropriate place and connect them with the help of connecting lines and required Switching System.
- **Drag and drop symbols to the circuits and connect them:** Now place appropriate symbols at required position and connect them with connecting lines starting from main electrical distribution meter to the end point.
- **Use Line hops if any line need to cross.**
- **Add layers to show complexity.**

3:42 PM | igk-xtog-fic

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Garima has left the meeting

Understand ground : Ground is represented by either a triangle pointing down or a set of parallel lines that become shorter as they appear below each other, in effect representing the inner area of the triangle pointing down. Ground is a common reference point that schematics use to show the overall unity of the various functions of the circuit. It does not refer to the actual ground of the earth.

Earth Ground Chassis

Fig. 3.4 Symbols of earthing and grounding a circuit.

EC&NS - PowerPoint

3:52 PM | igk-xtog-fic

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Bharti Thakur

Dhruv Sharma

Garima

4:04 PM | igk-xtog-fic

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• **Integrated Circuits** : An integrated circuit is represented by a rectangle, with pins extending out of the sides. Each pin should be labeled with both a number, and a function. Because ICs have such a generic circuit symbol, the names, values and labels become very important. Each IC should have a value precisely identifying the name of the chip.

Fig. 3.12 Schematic symbols of IC and OP amplifiers.

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- Pooja

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Integrated Circuits : An integrated circuit is represented by a rectangle, with pins extending out of the sides. Each pin should be labeled with both a number, and a function. Because ICs have such a generic circuit symbol, the names, values and labels become very important. Each IC should have a value precisely identifying the name of the chip.

VCC (P8V(MC08)) 8
 PB1 (MISO) 7
 PB2 (SCK(ADC1)) 6
 PB3 (ADC3) 5
 PB4 (ADC2) 4
 GND (P8V(MISO)) 3
 Tiny45-20-SMT IC

OP-Amplifier

Fig. 3.12 Schematic symbols of IC and OP amplifiers.

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- Vanshika Zinta

3:25 PM | iea-eufh-yyp

Turn on microphone (ctrl + d)

Reference Component Datasheets : If there's something on a schematic that just doesn't make sense, try finding a datasheet for the most important component. Usually the component doing the most work on a circuit is an integrated circuit, like a microcontroller or sensor. These are usually the largest component, off-located at the center of the schematic.

Find the correlation to all real parts. Refer to the bill of materials for the circuit to find the values of capacitors and resistors, and the manufacturers and manufacturer's part numbers of the active devices.

Determine the circuit tasks performed by the active devices. To determine the circuit tasks, acquire and read the manufacturer's data sheet for each individual device.

Evaluate what the circuit does. Based on the schematic, decide what parts of the circuit are performing what functions. This will help you determine the performance function of the entire circuit.

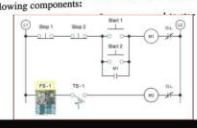
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3.5 CONTROL CIRCUITS

The use of electricity was started in 19th century. It is very use full source of energy and used almost in every sphere of life. Proper protection or safety measures should be taken otherwise it is very dangerous and may lead to death. Control circuits deals with the protection of electrical power systems from faults through the isolation of faulted parts from the rest of the electrical network. The objective of a protection scheme is to keep the power system stable by isolating only the components that are under fault, whilst leaving as much of the network as possible still in operation. Thus, protection schemes must apply a very pragmatic and pessimistic approach to clearing system faults. Protection systems usually comprise of following components:



3:30 PM | iea-eufh-yyp

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- Neetika Sandhu
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