LECTURE PLAN DEPARTMENT OF PHYSICS

NAME: PROF.G.P.Gupta

DESIGNATION: ASST. PROF.

COURSE: B.Sc SEMISTER III

SESSION: 2018-2021

PAPER NAME: PHY-CC-5.T: MATHEMATICAL PHYSICS-II AND THERMAL PHYSICS

SL. No	Topic/Sub Topic	Expected No. of Lecture
01	Fourier Series: Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions. Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Complex representation of Fourier series. Fourier's Theorem, Analysis of saw tooth, triangular and square wave form. (23 Lectures)	23
02	Kinetic Theory of Gases Distribution of Velocities: Maxwell- Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy, Specific heats of mono-,dia- and tri-atomic Gases. (12 Lectures)	12
03	Molecular Collisions:Mean Free Path,Collision Probability. Clausius and Maxwell Derivations of mean free path. Transport Phenomenon in Ideal Gases: (1) Viscosity, (2) Thermal Conductivity and (3) Diffusion. Brownian Motion-Einstein's theory and experimental determination of Avogadro's number.(10 Lectures)	10
04	Real Gases: Behavior of Real Gases: Deviations from the Ideal Gas Equation. Andrew's Experiments on CO2 Gas. Critical Constants. Continuity of State. Boyle Temperature. Van der Waal's Equation of State for Real Gases using Virial theorem. Values of Critical Constants. Law of Corresponding States. Comparison with Experimental Curves. p-V Diagrams. Theory of Joule-Thomson effect, Porous Plug Experiment. J-T effect for perfect and Van der Waal gases, Temperature of Inversion & Critical temperature. Joule- Thomson Cooling, Relation between Boyle temperature. (15 Lectures)	15
	Total Lecture=	60

Reference Books:

1. Mathematical Methods for Physicists: Arfken, Weber, 2005, Harris, Elsevier.

2. Fourier Analysis by M.R. Spiegel, 2004, Tata McGraw-Hill.

3. Mathematics for Physicists, Susan M. Lea, 2004, Thomson Brooks/Cole.

4. Differential Equations, George F. Simmons, 2006, Tata McGraw-Hill.

5. Partial Differential Equations for Scientists & Engineers, S.J. Farlow, 1993, Dover Pub.

6. Mathematical methods for Scientists & Engineers, D.A. McQuarrie, 2003, Viva Books

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SESSION: 2018-2021

PAPER NAME: PHY-CC-6.T: PHYSICS OF THERMODYNAMICS

SL. No	Topic/Sub Topic	Expected No. of
		Lecture
	Zeroth and First Law of Thermodynamics: Zeroth Law of	
	Thermodynamics, First Law of	
	Thermodynamics and its differential form, Internal Energy, First Law	
01	& various processes,	12
	Applications of First Law: General Relation between CP and CV, Work	
	Done during Isothermal and	
	Adiabatic Processes, Compressibility and Expansion Co-efficient. (12	
	Lectures)	
	Second Law of Thermodynamics: Reversible and Irreversible process	
	with examples. Conversion of	
	Work into Heat and Heat into Work. Heat Engines. Carnot's Cycle,	
02	Carnot engine & efficiency.	
	Refrigerator & coefficient of performance, 2ndLaw of	
	Thermodynamics: Kelvin-Planck and Clausius	14
	Statements and their Equivalence. Carnot's Theorem. Applications of	
	Second Law of	
	Thermodynamics: Thermodynamic Scale of Temperature and its	
	Equivalence to Perfect Gas Scale. (14	
	Lectures)	
	Entropy: Concept of Entropy, Clausius Theorem. Clausius Inequality,	
	Second Law of Thermodynamics	
0.2	in terms of Entropy. Entropy of a perfect gas. Principle of Increase of	
03	Entropy.Entropy Changes in	10
	Reversible and Irreversible processes with examples. Entropy of the	12
	Universe. Temperature–Entropy	
	diagrams for Carnot's Cycle. Third Law of Thermodynamics.	
	Unattainability of Absolute Zero.(12	
	Lectures)	
	Thermodynamic Potentials: Thermodynamic Potentials: Internal	
	Energy, Enthalpy, Helmholtz Free	
0.4	Energy, Gibb's Free Energy. Their Definitions, Properties and	10
04	Applications. First and second order	12
	Page 12 of 24	
	Phase Transitions with examples, Clausius Clapeyron Equation (12	
05	Maxwell's Thermodynamic Relations: Derivations and applications of	
	$\frac{1}{2} \frac{1}{2} \frac{1}$	
	Relations:(1) Clausius Clapeyron equation, (2) Values of Cp-CV, (3)	10
	1 us Equations, (4) Joule-Keivin	10
	Change of Temperature during	
	Adiabatic Process (10 Lectures)	
	Total Lastura-	
	Total Lecture=	60

Reference Books:

1. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.

2. A Treatise on Heat, Meghnad Saha, and B.N.Srivastava, 1958, Indian Press

3. Thermal Physics, S. Garg, R. Bansal and Ghosh, 2nd Edition, 1993, Tata McGraw-Hill

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DESIGNATION: ASST. PROF.

COURSE: B.Sc SEMISTER III

SESSION: 2018-2021

PAPER NAME: PHY-CC-7.T: ANALOG SYSTEMS AND APPLICATIONS

SL. No	Topic/Sub Topic	Expected No. of
		Lecture
	Comisso dustan Diadag Derivatian of Diahandaan's formula Dand N	
	Semiconductor Diodes: Derivation of Richardson's formula, P and N	
	type semiconductors. Energy	
01	Level Diagram. Conductivity and Mobility, Concept of Drift velocity.	10
01	Static and Dynamic Resistance.	10
	Current equation Mechanism in Forward and Reverse Blased Diode.	
	Derivation for Barner Polential, Barrier Width and Current for Sten Junction (10 Lectures)	
	Two terminal Daviage and their Applications (1) Destifier Dieder Half	
	1 wo-terminal Devices and their Applications. (1) Rectifier Diode: Hall-	
02	and Bridge Full wave Destifiers, Calculation of Dipple Factor and	10
02	Protification Efficiency, C filter (2)	10
	Zener Diode and Voltage Regulation (10 Lectures)	
	Bipolar Junction transistors: n-n-n and n-n-n Transistors	
	Characteristics of CB CE and CC	
03	Configurations Current gains and and Relations between and Load	
	Line analysis of	10
	Transistors, DC Load line and O-point. Physical Mechanism of Current	
	Flow.Active, Cutoff and	
	Saturation Regions. (10 Lectures)	
04	Amplifiers: Transistor Biasing and Stabilization Circuits. Fixed Bias	
	and Voltage Divider Bias. Transistor	
	as 2-port Network. h-parameter Equivalent Circuit. Analysis of a	
	single-stage CE amplifier using	10
	Hybrid Model. Input and Output Impedance. Current, Voltage and	
	Power Gains. Classification of Class	
	A, B & C Amplifiers. (10 Lectures)	
05	Coupled Amplifier: Two stage RC-coupled amplifier and its frequency	04
0.6	response. (4 Lectures)	
06	Coupled Amplifier: Two stage RC-coupled amplifier and its frequency	
	response. (4 Lectures)	06
	Feedback in Amplifiers: Effects of Positive and Negative Feedback on	00
	Imput Impedance, Output Impedance, Gain, Stability, Distortion and Noise (6 Lastures)	
07	Sinusoidal Oscillatore: Barkhauson's Criterion for solf sustained	
07	oscillations RC Phase shift oscillator	
	determination of Frequency Hartley & Colnitts oscillators Wien Bridge	10
	Oscillator.(10 Lectures)	
	Total Lecture=	60

Reference Books:

1. Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata Mc-Graw Hill.

2. Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.

3. Solid State Electronic Devices, B.G.Streetman & S.K.Banerjee, 6th Edn., 2009, PHI Learning

SL. No	Topic/Sub Topic	Expected No. of
		Lecture
01	To determine the Coefficient of Thermal Conductivity of Cu by Searle's Apparatus.	
02	To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.	
03	To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).	
04	To study the variation of Thermo-Emf of a Thermocouple with Difference of Temperature of its Two Junctions.	
05	To study V-I characteristics of PN junction diode, and Light emitting diode.	
06	To study the V-I characteristics of a Zener diode and its use as voltage regulator.	
07	Study of V-I & power curves of solar cells, and find maximum power point & efficiency.	
08	To study the characteristics of a Bipolar Junction Transistor in CE and CB configurations .	
09	To study the frequency response of voltage gain of a RC-coupled transistor amplifier.	

Reference Books :

1. Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing

House

2. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Ed., 2011, Kitab Mahal

3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted

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