ANNEXURE - I
KVR Govt. College for Women(A), Kurnool
Re-Accredited with Grade 'B++' by NAAC
II Year B.Sc Physics- III Semester
Revised Syllabus under CBCS,2020-21
Course – III: HEAT AND THERMODYNAMICS

[w.e.f. 2022-23]

Work load: 60 hrs per semester 4 hrs/week

UNIT-I: Kinetic Theory of gases: (12 hrs)

Kinetic Theory of gases-Introduction, Maxwell's law of distribution of molecular velocities(qualitative treatment only) and its experimental verification, Mean free path, Transport phenomenon in ideal gases: viscosity, Thermal conductivity and diffusion of gases.

UNIT-II: Thermodynamics: (12hrs)

Introduction-Isothermal and Adiabatic processes, Reversible and irreversible processes, Carnot's engine and its efficiency, Carnot's theorem, Second law of thermodynamics: Kelvin's and Clausius statements, Principle of refrigeration, Entropy, Physical significance, Change in entropy in reversible and irreversible processes; Entropy and disorder-Entropy of Universe; Temperature-Entropy (T-S) diagram and its uses; change of entropy when ice changes into steam.

UNIT-III: Thermodynamic Potentials and Maxwell's equations: (12hrs)

Thermodynamic Potentials Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy and their significance, Derivation of Maxwell's thermodynamic relations from thermodynamic potentials, Applications to (i) Clausius-Clapeyron'sequation (ii) Value of C_P-C_V(iii)Value of C_P/C_V

UNIT-IV: Low temperature Physics: (12hrs)

Methods for producing Low temperature and its measurement -Joule Kelvin effect-Joule-Kelvin coefficient for ideal gas and Vander Waals' gases, porous plug experiment, Joule expansion, Distinction between adiabatic and Joule Thomson expansion, Expression for Joule Thomson cooling, Liquefaction of air by Linde's method, Production of low temperatures by adiabatic demagnetization (qualitative), Practical applications of substances at low temperatures.

UNIT-V: Quantum theory of radiation: (12hrs)

Blackbody and its spectral energy distribution of black body radiation, Kirchoff's law, Wein's displacementlaw,Stefan-Boltzmann's law and Rayleigh-Jean'slaw (No derivations) -Planck's law of black body radiation-Derivation, Deduction of Wein's law and Rayleigh -Jean's law from Planck'slaw, Solar constant-Definition ,Estimation of surface temperature of Sun

REFERENCE BOOKS:

- BSc Physics, Vol.2, Telugu Akademy, Hyderabad.
- Thermodynamics, R.C.Srivastava, S.K.Saha& Abhay K.Jain, Eastern Economy Edition.
- Unified Physics Vol.2, Optics & Thermodynamics, Jai PrakashNath&Co.Ltd., Meerut.
- Fundamentals of Physics. Halliday/Resnick/Walker.C. Wiley India Edition 2007.
- Heat and Thermodynamics -N BrijLal, P Subrahmanyam, S.Chand& Co.,2012.
- Heat and Thermodynamics- MS Yadav, Anmol Publications Pvt. Ltd, 2000.
- University Physics, HD Young, MW Zemansky,FW Sears, Narosa Publishers, New Delhi.

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ANNEXURE – I(a)
KVR Govt. College for Women (A), Kurnool
Re-Accredited with'B++' Grade by NAAC
II Year B.Sc Physics- III Semester
Revised Syllabus under CBCS,2020-21
Practical Course III
[w.e.f. 2022-23]

Work load: 30 hrs per semester **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Specific heat of a liquid–Joule's calorimeter–Barton's radiation correction
2. Thermal conductivity of bad conductor-Lee'smethod
3. Thermal conductivity of rubber.
4. Measurement of Stefan's constant.
5. Specific heat of a liquid by applying Newton's law of cooling correction.
6. Heating efficiency of electrical kettle with varying voltages.
7. Thermo emf-thermocouple–Potentiometer.
8. Thermal behavior ofan electric bulb(filament/torch light bulb).
9. Measurement of Stefan's constant-emissive method.
10. Study of variation of resistance with temperature-Thermistor.
11. **Verification of Stefan's law**

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ANNEXURE – II
KVR Govt. College for Women (A), Kurnool
Re-Accredited with 'B++' Grade by NAAC
II Year B.Sc Physics- IV Semester
Revised Syllabus under CBCS,2020-21
Course-IV: ELECTRICITY, MAGNETISM AND ELECTRONICS
[w.e.f. 2022-23]

Work load: 60 hrs per semester **3hrs/week**

UNIT-I

1. Electrostatics: **(6hrs)**

Gauss's law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere and (ii) an infinite conducting sheet of charge, Deduction of Coulomb's law from Gauss law, Electrical potential–Equi potential surfaces, Potential due to a (i)dipole(ii) uniformly charged sphere

2.Dielectrics: **(6hrs)**

Dielectrics-Polar and Non-polar dielectrics- Effect of electric field on dielectrics, **Gauss law in dielectrics**, Dielectric strength, Capacitance of a parallel plate condenser with dielectric slab between the plates, Electric displacement D, electric polarization P, Relation between D, E and P, Dielectric constant and electric susceptibility.

UNIT-II

3.Magnetostatics: **(6hrs)**

Biot-Savart's law and its applications: i) circular loop and (ii) solenoid, Divergence and curl of magnetic field, Ampere's Circuital Law, Hall effect, determination of Hall coefficient and applications.

4.Electromagnetic Induction: **(6 hrs)**

Faraday's laws of electromagnetic induction,Lenz'slaw,Self-induction, Self-inductance of a long solenoid, Energy stored in magnetic field, Mutual inductance of two coils, Eddy currents and Electromagnetic damping

UNIT-III

5. Alternating currents: **(6 hrs)**

Alternating current -**Relation between current and voltage in pure L,R,C** -Phasor and

Vector diagrams. LCR series and parallel resonant circuit, Q –factor, Power in ac circuits, Power factor.

6.Electro magnetic waves-Maxwell's equations: (6hrs)

Idea of displacement current, Maxwell's Equations-Differential and integral forms,Maxwell's wave equation(with derivation), Transverse nature of electromagnetic waves , Poynting theorem (Statement and proof).

UNIT-IV

7. Basic Electronic devices: (12hrs)

PN junction diode, Zener diode and LED their I-V characteristics, Zener diode as a voltage regulator-CB,CE and CC Configurations of transistor, CE-Transistor-Input and output characteristics, Relation between alpha, beta and gamma; Determination of Hybrid parameters in CE- mode, Transistor as an amplifier.

UNIT-V

8. Digital Electronics: (12 hrs)

Number systems: Conversion of binary to decimal and vice versa,Binary addition &Binary subtraction (1's and 2's complement methods),**Conversion of Decimal to Hexa-Decimal and vice versa**, Laws of Boolean algebra, De-Morgan's laws-Statements and Proofs,–Basic logic gates, NAND and NOR as universal gates, Exclusive-OR gate, Half adder and Full adder circuits**.**

REFERENCEBOOKS

- BScPhysics,Vol.3, Telugu Akademy, Hyderabad.
- Electricity and Magnetism, D.N. Vasudeva. S.Chand &Co.
- Electricity and Magnetism, B.D.Duggal andC.L.Chhabra.Shobanlal&Co.
- Electricity,MagnetismwithElectronics,K.K.Tewari,R.Chand&Co.,
- Electrodynamics by Griffith
- ElectricityandMagnetism,R.Murugeshan, S.Chand&Co.
- PrinciplesofElectronics, V.K.Mehta,S.Chand&Co.,
- DigitalPrinciplesandApplications,A.P.MalvinoandD.P.Leach,McGrawHillEdition.

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ANNEXURE – IIa
KVR Govt. College for Women (A), Kurnool
Re-Accredited with 'B++' Grade by NAAC
II Year B.Sc Physics- IV Semester
Revised Syllabus under CBCS,2020-21
Practical Course IV:Electricity, Magnetism and Electronics
[w.e.f. 2022-23]

Workload: 30 hrs **3hrs/week**

Minimum of 6 experiments to be done and recorded

1. Figure of merit of a moving coil galvanometer.
2. LCR circuitseries/parallel resonance, Qfactor.
3. Determination ofac-frequency–Sonometer.
4. Verification of Kirchoff's laws and Maximum Power Transfer theorem.
5. Field along the axis of a circular coil carrying current-Stewart &Gee'sapparatus.
6. PN Junction Diode Characteristics
7. Zener Diode–V-I Characteristics
8. Zener Diode as a voltage regulator
9. Transistor CE Characteristics-Determination of hybrid parameters
10. Logic Gates-OR, AND, NOTand NAND gates.Verification of Truth Tables.
11. Verification of DeMorgan's Theorems.
12. Construction of Half adder and Full adders-Verification of truth tables

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ANNEXURE – III
KVR Govt. College for Women (A), Kurnool
Re-Accredited with 'B++' Grade by NAAC
II Year B.Sc Physics- IV Semester
Revised Syllabus under CBCS,2020-21
Course-V: MODERN PHYSICS
[w.e.f. 2022-23]

Work load: 60 hrs per semester **3 hrs/week**

UNIT-I:

1. Atomic and Molecular Physics: (12hrs)

Vector atom model and Stern-Gerlach experiment, Quantum numbers associated with it, Coupling schemes, Spectral terms and spectral notations, Selection rules, Intensity rules, Fine structure of Sodium D-lines **Fine Structure of Hydrogen lines,** Zeeman effect**, Stark effect-Definitions** ;Raman effect ,Charactersitics of Raman effect, Experimental arrangement to study Raman effect,**Classical** &Quantum theory of Raman effect, Applications of Raman effect.

UNIT-II:

2. Matter waves &Uncertainty Principle: (12 hrs)

Matter waves, de Broglie's hypothesis, Wave length of matter waves, Properties of matter waves, Davisson and Germer's experiment, Phase and group velocities, Heisenberg's uncertainty principle for position and momentum & energy and time, Illustration of uncertainty principle using diffraction of beam of electrons (Diffraction by a single slit) and photons (Gamma ray microscope), Complementary principla of Bohr.

UNIT-III:

3. Quantum(Wave)Mechanics: (12hrs)

Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations-Derivations, Physical interpretation of wave function, Eigen functions, Eigen values, Application of Schrodinger wave equation to (i) one dimensional potential box of infinite height (Infinite Potential Well) (ii)one dimensional harmonic oscillator

UNIT-IV:

4. Nuclear Physics: **(**12hrs)

NuclearStructure:GeneralPropertiesofNuclei,Massdefect,Bindingenergy, **Packing fraction;** Nuclear forces: Characteristics of nuclear forces; Nuclear Models: Liquid drop model, **Semi Empirical Mass formula,** The Shell model, Magic numbers; *Nuclear Radiation detectors*: G.M. Counter, Cloud chamber

UNIT-V:

5. Nano materials: **(7hrs)**

Nano materials –Introduction, **General properties,** Classification of nano materials– (0D, 1D, 2D); Quantum dots, Nano wires, Fullerene, CNT, Graphene(structure and properties), Distinct properties of nano materials(mechanical, optical, electrical, and magnetic properties); **Applications of Nano materials**

6. Superconductivity: **(5hrs)**

Introduction to Superconductivity- -Experimental results- **Concept of zero resistance**- critical temperature T_c, critical magnetic field, Meissner effect, Isotope effect, Type I and Type II superconductors, BCS theory(elementary ideas only), **High temperature Super conductors**, Applications of superconductors

REFERENCE BOOKS:

- BScPhysics,Vol.4, TeluguAkademy,Hyderabad.
- AtomicPhysics byJ.B. **Rajam**; S.Chand&Co.,
- ModernPhysics byR. MurugeshanandKiruthigaSivaPrasath. S. Chand& Co.
- Concepts ofModernPhysics byArthurBeiser. TataMcGraw-HillEdition.
- NuclearPhysics,D.C.Tayal,HimalayaPublishingHouse.
- S.K.Kulkarni,Nanotechnology:Principles &Practices(CapitalPubl. Co.)
- K.K.Chattopadhyay&A.N.Banerjee, Introd.to Nanoscience and Technology

(PHI VKM LearningPriv.Limited).

- Nanomaterials,AKBandopadhyay. NewAgeInternationalPvtLtd(2007)
- Textbook of Nanoscience and Nanotechnology, BS Murthy, P Shankar, Baldev JRaj,BBRath andJMurday-UniversitiesPress-IIM

ANNEXURE – III(a)
KVR Govt. College for Women (A), Kurnool
Re-Accredited with 'B++' Grade by NAAC
II Year B.Sc Physics- IV Semester
Revised Syllabus under CBCS,2020-21
Practical Course V: Modern Physics
[w.e.f. 2022-23]

Workload: 30 hrs **3 hrs/week**

Minimumof 6 experiments to be done and recorded

1. e/m of an electron byThomson method.
2. Determination of Planck's Constant(photocell).
3. Verification of inverses quare law of light using photovoltaiccell.
4. Determination of the Planck's constant using LED sof atleast 4 different colours.
5. Determinationofworkfunctionofmaterialoffilamentofdirectlyheatedvacuumdiode.
6. Studyof absorptionof α-rays.
7. Study of absorption of β-rays.
8. Determinationof Range of β-particles.
9. DeterminationofM &H.
10. Analysis ofpowderX-raydiffraction patterntodeterminepropertiesofcrystals.
11. Energy gap of a semiconductor using junction diode.
12. GM counter characteristics
13. **Bridge Rectifier- Filter circuits**
14. **LR& CR circuits**
15. **LDR Characteristics**
16. **Solar cell- Study of V-I characteristics**

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