

KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL
Re-Accredited by NAAC with Grade "A"

B.Sc. PHYSICS SYLLABUS UNDER CBCS

I Year: I Semester (For Mathematics Combinations)

[w.e.f. 2021-22]

Course I: MECHANICS, WAVES AND OSCILLATIONS

Work load: 60 hrs per semester

4 hrs/week

UNIT-I:

1. Mechanics of Particles (5 hrs)

Review of Newton's Laws of Motion, Motion of variable mass system, Motion of a rocket, Multistage rocket, *Two dimensional collision*, Concept of impact parameter, scattering cross-section, Rutherford scattering-Derivation.

2. Mechanics of Rigid bodies (7 hrs)

Rigid body, rotational kinematic relations, Equation of motion for a rotating body, Angular momentum and Moment of inertia tensor, *Properties of moment of inertia tensor*, Euler equations, Precession of a spinning top, Gyroscope, Precession of the equinoxes

Unit-II:

3. Motion in a Central Force Field (12hrs)

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, Equation of motion under a central force, Kepler's laws of planetary motion- Proofs, Basic idea of Global Positioning System (GPS), *Geo tagging longitude & latitude of a place*

UNIT-III:

4. Relativistic Mechanics (12hrs)

Introduction to relativity, Frames of reference, Galilean transformations, absolute frames, Michelson-Morley experiment, negative result, Postulates of Special theory of relativity, Lorentz transformation, time dilation, length contraction, variation of mass with velocity, Einstein's mass-energy relation

Unit-IV:

5. Undamped, Damped and Forced oscillations: (07 hrs)

6. Simple harmonic oscillator and solution of the differential equation, Damped harmonic oscillator, Forced harmonic oscillator – Their differential equations and solutions, Resonance, Logarithmic decrement, Relaxation time and Quality factor.

7. Coupled oscillations: (05 hrs)

Coupled oscillators-Introduction, Two coupled oscillators, Normal coordinates and Normal modes

Unit-V:

8. Vibrating Strings: (07 hrs)

Transverse wave propagation along a stretched string, General solution of wave equation and its significance, Modes of vibration of stretched string clamped at ends, Overtones and Harmonics, Melde's strings.

9. Ultrasonics:**(05 hrs)**

Ultrasonics, General Properties of ultrasonic waves, Production of ultrasonics by piezoelectric and magnetostriction methods, Detection of ultrasonics, Applications of ultrasonic waves

REFERENCE BOOKS:

- ❖ B. Sc. Physics, Vol.1, Telugu Academy, Hyderabad
- ❖ Fundamentals of Physics Vol. I - Resnick, Halliday, Krane ,Wiley India 2007
- ❖ College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
- ❖ University Physics-FW Sears, MW Zemansky& HD Young,Narosa Publications, Delhi
- ❖ Mechanics, S.G.Venkatachalapathy, Margham Publication, 2003.
- ❖ Waves and Oscillations. N. Subramanyam and Brijlal, VikasPulications.
- ❖ Unified Physics - Waves and Oscillations, Jai PrakashNath&Co.Ltd.
- ❖ Waves & Oscillations. S.Badami, V. Balasubramanian and K.R. Reddy, Orient Longman.
- ❖ The Physics of Waves and Oscillations, N.K.Bajaj, Tata McGraw Hill
- ❖ Science and Technology of Ultrasonics- Baldevraj, Narosa, New Delhi,2004

ANNEXURE – I(a)
KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL
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I Year :I Semester (For Mathematics Combinations)

[w.e.f. 2021-22]

Practical Course 1

Work load: 30 hrs per semester

2 hrs/week

Minimum of 6 experiments to be done and recorded:

1. Young's modulus of the material of a bar (scale) by uniform bending
2. Young's modulus of the material a bar (scale) by non- uniform bending
3. Surface tension of a liquid by capillary rise method
4. Viscosity of liquid by the flow method (Poiseuille's method)
5. Bifilar suspension –Moment of inertia of a regular rectangular body.
6. Fly-wheel -Determination of moment of inertia
7. Rigidity modulus of material of a wire-Dynamic method (Torsional pendulum)
8. Volume resonator experiment
9. Determination of 'g' by compound/bar pendulum
10. Simple pendulum- normal distribution of errors-estimation of time period and the error of the mean by statistical analysis
11. Determination of the force constant of a spring by static and dynamic method.
12. Coupled oscillators
13. Verification of laws of vibrations of stretched string –Sonometer
14. Determination of frequency of a bar –Melde's experiment.
15. Study of a damped oscillation using the torsional pendulum immersed in liquid-decay constant and damping correction of the amplitude.

ANNEXURE – III
KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL
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I Year : I Semester(Mathematics combinaion)
CBCS: Syllabus –As per APSCHE w.e.f 2021-22
SKILL DEVELOPMENT COURSE
Physical Science Stream
ELECTRICAL APPLIANCES

Total 30 hrs (02h/wk),

Max Mark :50

UNIT-I

(6 hrs)

Voltage, Current, Resistance, Capacitance, Inductance, Electrical conductors and Insulators, Ohm's law, Series and parallel combinations of resistors, Galvanometer, Ammeter, Voltmeter, Multimeter, Transformers, Energy & Power, consumption of electrical power, Kilowatt hour (kWh)

UNIT-II

(10 hrs)

Direct current and alternating current, RMS and peak values, Power factor, Single phase and three phase connections , Basics of House wiring , Star and delta connection , Electric shock, First aid for electric shock, Overloading , Earthing and its necessity, Short circuiting , Fuses , MCB , ELCB, Insulation, ***Basics of Inverter and UPS***

UNIT-III

(10 hrs)

Principles of working, parts and servicing of Electric fan, Electric Iron box, Water heater; Induction heater, Microwave oven; Concept of illumination, Electric bulbs, CFL, LED lights, Energy efficiency in electrical appliances, IS codes & IE codes.

Reference Books:

1. A Text book on Electrical Technology, B.L.Theraja, S.Chand& Co.,
2. A Text book on Electrical Technology, A.K.Theraja.
3. Performance and design of AC machines, M.G.Say, ELBSEdn.,
4. Handbook of Repair & Maintenance of domestic electronics appliances; BPB Publications
5. Consumer Electronics, S.P.Bali, Pearson
6. Domestic Appliances Servicing, K.P.Anwer, Scholar Institute Publications

ANNEXURE - II
KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL
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B.Sc. PHYSICS SYLLABUS UNDER CBCS

I Year :II Semester (For Mathematics Combinations)

[w.e.f. 2021-22]

Course II: WAVE OPTICS

UNIT-I Interference of light:

(12hrs)

Introduction, Conditions for interference of light, Interference of light by division of wave front and amplitude, Phase change on reflection- Stokes' treatment, Lloyd's single mirror, Interference in thin films: *Normal & Oblique incidence (Cosine light law in reflected light)*, Plane parallel and wedge- shaped films, colours in thin films. Newton's rings in reflected light-Theory and experiment, Determination of wavelength of monochromatic light, Michelson interferometer and determination wavelength

UNIT-II Diffraction of light:

(12hrs)

Introduction, Types of diffraction: Fresnel and Fraunhofer diffractions, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, Plane diffraction grating, Determination of wavelength of light using diffraction grating, Resolving power of grating, Fresnel's half period zones, Explanation of rectilinear propagation of light, Zone plate, comparison of zone plate with convex lens.

UNIT-III Polarization of light:

(12hrs)

Polarized light: Methods of production of plane polarized light, Brewster's law- Double refraction, Malus law, Nicol prism, Nicol prism as polarizer and analyzer, Quarter wave plate, Half wave plate, Plane, Circularly and Elliptically polarized light- Production and detection, Optical activity, Laurent's half shade polarimeter: determination of specific rotation, Basic principle of LCDs

UNIT-IV Aberrations and Fibre Optics:

2hrs) Monochromatic aberrations, Spherical aberration, Methods of minimizing spherical aberration, Coma, Astigmatism and Curvature of field, Distortion; Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by a distance.

Fibre optics: Introduction to Fibers, different types of fibers, rays and modes in an optical fiber, *Fibre materials*, Principles of fiber communication (qualitative treatment only), *Applications of fiber optic communication*.

UNIT-V Lasers and Holography:

(12hrs)

Lasers: Introduction, Spontaneous emission, stimulated emission, Population Inversion, Laser principle, Properties of Laser, Einstein coefficients, Types of lasers- He-Ne laser, Ruby laser, Applications of lasers;

Holography: *Gabor Hologram*, Basic principle of holography, *Recording of a hologram and R.econstruction of image from hologram*, Applications of holography

REFERENCE BOOKS:

- BSc Physics, Vol.2, Telugu Akademy, Hyderabad
- A Text Book of Optics-N Subramanyam, L Brijlal, S.Chand& Co.
- Optics-Murugesan, S.Chand& Co. Unified Physics Vol.IIOptics, Jai PrakashNath&Co.Ltd., Meerut
- Optics,F.A. Jenkins and H.G.White, McGraw-Hill
- Optics, AjoyGhatak, TataMcGraw-Hill.
- Introduction of Lasers – Avadhanulu, S.Chand& Co.
- Principles of Optics- BK Mathur, Gopala Printing Press, 1995

ANNEXURE – II(a)
KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL
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B.Sc. PHYSICS SYLLABUS UNDER CBCS

I Year : II Semester (For Mathematics Combinations)

[w.e.f 2021-22]

Practical Course II

Work load:30 hrs per semester

2 hrs/week

Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton's rings.
2. Resolving power of grating.
3. Study of optical rotation –polarimeter.
4. Dispersive power of a prism.
5. Determination of wavelength of light using diffraction grating-minimum deviation method.
6. Determination of wavelength of light using diffraction grating-normal incidence method.
7. Resolving power of a telescope.
8. Refractive index of a liquid-hallow prism
9. Determination of thickness of a thin wire by wedge method
10. Determination of refractive index of liquid-Boy's method.

ANNEXURE – IV
KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL
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I Year : I Semester(Mathematics combinaion)
CBCS: Syllabus –As per APSCHE w.e.f 2021-22
SKILL DEVELOPMENT COURSE
Physical Science Stream
SOLAR ENERGY

*Total 30 hrs (02h/wk),
:50*

Max Marks

UNIT-I – Solar Radiation: (6 hrs)

Sun as a source of energy, Solar radiation, Solar radiation at the Earth's surface, Measurement of Solar radiation- Pyranometer, Sunshine recorder, Prediction of available solar radiation, Solar energy-Importance, Storage of solar energy, Solar pond

UNIT-II – Solar Thermal Systems: (10 hrs)

Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion: Flat plate collectors and Concentrating collectors, Solar Thermal Power Plant, Solar cookers, Solar hot water systems, Solar dryers, Solar greenhouses.

UNIT-III – Solar Photovoltaic Systems: (10 hrs)

Conversion of Solar energy into Electricity - Photovoltaic Effect, Solar photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: domestic lighting, street lighting and water pumping

Reference Books:

1. Solar Energy Utilization, G. D. Rai, Khanna Publishers
1. Solar Energy- Fundamentals, design, modeling & applications, G.N. Tiwari, Narosa Pub., 2005.
2. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata Mc-Graw Hill Publishers, 1999.
3. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
4. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.