Jankidevi Bajaj College of Science, Wardha (Autonomous)

Syllabus for B.Sc. II (Sem III) w.e.f. 2019-20

Physics III (BCSPHYT203)

Unit I: Waves in media and Applied Acoustics [10h]

Speed of transverse wave on a string, Standing waves, Harmonics, Quality of sound, Intensity and loudness, bel and decibel, musical scales(Diatonic and tempered). Applied acoustic: Transducers and their characteristics (Crystal microphone, Moving coil loud speaker), Recording and reproduction of sound (Magnetic tape, Cine film, Compact disc), Acoustics of building, Reverberation and reverberation period, Sabine's formula, Factors affecting the acoustics of building, Requirements for good acoustics.

Unit II: Ultrasonics and Power Supply [10h]

Ultrasonics: Introduction, Properties and production of ultrasonic waves, piezoelectric effect, piezoelectric generator, Magnetostriction effect and oscillators, Frequency of ultrasonic waves, Application of ultrasonic waves (measurement of depth of sea, SONAR system and Medical science).

Power supply**:** Introduction, rectification using half wave and full wave rectifiers (Find Id.c., Vd.c., Ir.m.s., η and ripple factor), Working of Full wave bridge rectifier, Filters, Difference between regulated and unregulated power supply, line and load regulation, voltage stabilization, Zener diode as voltage regulator, IC voltage regulation.

Unit III: Interference of light [10h]

Thick lens, thin lens and lens combinations. Interference in equal thickness thin film, Phase change on reflection, refraction and transmitted system. Newton's ring and its application to determine the wavelength and refractive index, Michelson Interferometer and its application to wavelength determination and wavelength difference, Fabry- Perrot Interferometer and its application.

Unit IV: Diffraction of light [10h]

Introduction, Fresnel's diffraction- Half period zones, Zone plates, Diffraction due to straight edge and due to narrow slit. Fraunhoffer diffraction- Fraunhoffer diffraction at a single slit, at circular aperture, Plane diffraction grating and its application, Resolving power of grating, Rayleigh's criterion for resolution.

Unit V: Polarization [10 h]

Introduction, Brewster's law, Polarization by scattering (concept only), Blue color of the sky(only idea), Uniaxial and biaxial crystal , positive and negative crystal, ordinary and extraordinary rays, Nicol prism, its application as an analyzer and polarizer, Double refraction in uniaxial crystal, phase retardation plate (Half and Quarter wave), Double image prism, polarimeter.

Unit VI: Electrodynamics [10 h]

Electromagnetic spectrum, Electromagnetic waves and their characteristics, Equation of continuity, Displacement current, Maxwell's equations and its significance, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves and applications of electromagnetic waves.

Laboratory-3

(BCSPHY P203)

List of Experiments: (Any 10) [40h]

1. To study the speed of waves on stretched string.
2. To determine unknown frequency and to verify the law of inverse variation of frequency and volume of air by Helmholtz resonator.
3. To determine the velocity of sound wave in air (gas) with Kundt's tube.
4. To study the characteristics of microphone.
5. To study the current regulation and ripple factor of half wave / full wave rectifier using semiconductor diodes with L and Π type filter.
6. To study the characteristics of Zener diode.
7. To study the Zener diode voltage regulating characteristics.
8. To determine the focal length of long focus convex lens using short focus convex lens.
9. To study the different lenses and eyepieces.
10. To determine the wavelength of monochromatic light using Newton's ring.
11. To determine the refractive index of material of double image prism.
12. To study of polarization of light by reflection (Brewster's law).
13. To determine the resolving power of a grating.
14. To determine the wavelength of prominent lines of mercury by plane transmission grating.
15. To determine the concentration of sugar solution by half shade polarimeter.

Reference Books for theory:

1. A Text Book of sound, by- Khanna, Bedi.
2. A Text Book of sound, by- L. P. Sharma, Saxena (S. Chand)
3. Properties of Matter and Acoustics, by- R. Murugeshan, Kiruthign Sivaprakash.
4. Fundamental of Acoustics 4th Edition, by- Kinsler , John Wiley and Sons.
5. A Text Book of Oscillations, Waves and Acoustics, by- Dr. M. Ghosh, Dr. D. Bhattacharya (S. Chand)
6. Oscillation, Waves and Sound, by- Sharma and Saxena.

7. Science and Technology of Ultrasonics, by- Baldevraj, Narosa publication .
8. Elements of Electronics, by- M. K. Bagde, S. P. Singh, K Singh S- Chand.
9. Solid State Physics and Electronics, by- R. K. Puri, and V. K. Babbar.
10. Solid State Electronic Devices II Edition, by- B. G. Streetman
11. Physics for Degree students for B. Sc. Second year, by- C. L. Arora, Dr. P. S. Hemne.
12. Optics and Spectroscopy, by- R. Murugeshan , Kiruthign Sivaprakash.
13. Optics, by- Brijlal and Subramayam.
14. Optics, by- Ajoy Ghatak.
15. A text book of Optics, by- Dr. Subrahmanyam, Brijlal and M. N. Avadhanulu.
16. Optics, by- J. K. Sharma, K. K. Sarkar.
17. Fundamentals of optics, by-Jenkins and White.
18. Optics, by- D. P. Khandelwal.
19. Foundation of Electromagnetic theory, by- John R. Retitz, Fredrick, J. Milford.
20. Electromagnetics, by- B. B. Laud.

Reference Books for Practicals:

1. Advanced Practical Physics for students, B.L. Flint & H.T. Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.
4. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
5. Physics through experiments, B Saraf et. al.,Vikas Publications 1987.
6. Advanced practical physics, Chauhan & Singh, Pragathi Publications.
7. Practical Physics, D Chattopadhyaya et al, Central Publications.
8. An Advanced Course in Practical Physics , D Chattopadhyay, PC Rakshit, B Saha, New Central Book Agency (P) Limited, Kolkata, Sixth Revised Edition, 2002.
9. Practical Physics, D. C. Tayal 2002.