B.O.S: 2019

Subject: Minutes of BOS

Meeting of members of **BOS-Department of Physics** was held on 19.04.2019 to finalize a common course of Physics (BSPH-401, LTPC/3104) for all branches of UG students. The minutes of meeting and common course of Physics designed for all branches of UG are attached.

Submitted please.

19/4

(Dr. M.M.Sinha)
Prof. & HOD (Physics)

Dean (Acad.)

24/04/2019
BSC - 401 - M

Minutes of Meeting

Meeting of members of **BOS-Department of Physics** was held on 19.04.2019 to finalize a common course of Physics (BSPH-401, LTPC/3104) for all branches of UG students. The following members were present:

1. Dr Ashavani Kumar, Prof., External Member (Subject expert)
2. Dr M M Sinha, Prof., Chairman & HOD
3. Dr A S Dhaliwal, Prof., Member
4. Dr K S Mann, Prof., Member
5. Dr K S Kahlon, Prof., Member
6. Dr S S Verma, Prof., Member
7. Mr. Jagwinder Singh, AP, External Member (Alumni)

Following members could not attend the meeting:

1. Dr S S Ghumman, Assoc. Prof., Member
2. Dr. Prabhdeep Kaur, AP, Member
3. Ms Kanika Aggarwal, AP, Member
4. Mr. Amarjeet Singh, BESTO Ambala Cantt. (From Industry)
5. Mr. Vijay Kumar, External Member (Parents)

Recommendations of Board of Studies (BOS) Meeting are as under;

1. Physics courses for different stream of engineering were designed as per the requirement of AICTE guidelines and the decision of 21th Senate meeting held on 27.06.2018 for designing the curriculum for B.E. courses.
2. Later, vide letter No. Dean (A)/2019/2352 dated 25.01.2019, it was directed that only Common Physics course meant for all disciplines of Engineering be designed for the first year of B.E. students.
3. BOS meeting held on 19.04.2019 discussed the matter in relation to the Physics courses offered/designed for other similar institution/organization based upon the AICTE guidelines 2018. The BOS has gone through the syllabi of NITs, PTU and other technical institutions of AICTE, New Delhi. The BOS has shown its concern regarding the common Physics courses to be taught at B.E. level for all disciplines.
4. The experts and the other BOS members is of the opinion that while designing such courses the guidelines issued by the Apex bodies, like AICTE, UGC, NITs etc. may be followed. The institute may also check the course design of other similar institute/organizations in the country.
5. BOS also discussed the structure of B.Tech./B.E. course provided by AICTE, New Delhi. It is noted that in some of the Engineering disciplines, two courses of Physics are required for fulfilling the B.E. degree equivalence at national level.
6. Further, Open electives, such as, Laser and its Applications, Semiconductor Physics, Basics of Materials science, Radiation Biophysics, Analytical Mechanics, Plasma physics are required to be considered to be offered to the students of degree courses. The department has already made an extensive exercise in this regard, based upon the capabilities of the department and the infrastructure created in the department over the years. Particularly, the department has already established a Material's science lab for B.E. courses and was in a process for the last 25 years.

19/04/19

Jagwinder Singh
19/04/19

19/4/19

19/04/19

19/04/19

(K.S. Mann) 19.4.19

Contd. P/2

However, as per the directions from Dean (Academics), the common Physics course for all B.E. disciplines is designed and is enclosed. Further, it is emphasized that the modalities may be worked out for offering the Physics courses as per AICTE guidelines and other similar institutions in the country to facilitate the students for getting the equivalence at national and International levels.

Meeting ended with vote of thanks.

Submitted please.

19/04/19
(Dr. A S Dhaliwal)
Professor(Physics)

(Dr. S S Verma)
Professor(Physics)

19.4.19
(K.S. Mann)
(Dr. K S Mann)
Professor(Physics)

Jagtainder Singh 19/04/19
(Mr. Jagwinder Singh)
AP(Phy)-external member

(Dr. K S Kahlon)
Prof. (Physics)

19/4/19
(Dr. M M Sinha)
Prof. & HOD (Physics)

19/4/19
(Dr. Ashavani Kumar)
Prof.(Phys)- NITK & External expert

Prescribed for: Common for all branches of UG

BSPH-401T **PHYSICS** **LTPC/3104**

Course Outcomes:

After successful completion of the course, the students should be able to

CO1: Understand the basic knowledge about waves and oscillations, Quantum mechanics, Laser and fibre optics, Electronic, Dielectric, magnetic and superconducting properties of materials and their applications.

CO2: Know the conceptual physics and its use in solving the physical problems.

CO3: Apply the principles/laws of physics for various engineering applications.

CO4: Describe the acquired knowledge of physics in his /her words.

CO5: Identify the reasons for physical happenings.

CO/PO Mapping S-strong, M-medium and W-weak indicate the strength of correlation												
COs	Programme outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	W	W	W		W			S		W	S
CO2	S	S	S	M	S		M	W		W		M
CO3	S	W	M	W	W	S	S	S	S	M	S	S
CO4	S	S	W		W	M			M	S	W	W
CO5	M	W	S	W			S	M			M	

Jagwinder Singh

19.4.19 (K.S. Rawat)

19/4/19 (Ashavani Kumar)

BSPH-401 **PHYSICS** **LTPC/3104**

UNIT-I

Waves & Oscillations: Simple harmonic motion, damped and forced simple harmonic oscillator, Mechanical and electrical simple harmonic oscillators, damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators, electrical and mechanical impedance. 8L

Quantum Mechanics: Need of quantum mechanics, de-Broglie hypothesis, wave packet; particle, group and phase velocities and their relationships, properties of wave function, Schrödinger's time independent and time dependent wave equations, energy and momentum operators, Eigen values and Eigen functions, expectation values of physical quantities (position, momentum and energy), application of time independent wave equation for a particle in a box (one dimension). 8L

Lasers & Fibre Optics: Absorption of radiation, spontaneous and stimulated emission of radiation, Einstein's coefficients, basic requirements of laser system - population inversion, optical pumping, Helium-Neon and Ruby lasers, Applications of laser, basic theory and physical structure of optical fiber, acceptance angle and numerical aperture, fiber materials, types of fibers, losses in optical fibers and basic ideas about optical sensors. 8L

UNIT-II

Electronic Materials: Free electron theory of metals, Bloch's theorem for particles in a periodic potential, Energy band diagrams, Kronig-penny model (to introduce origin of band gap), Energy bands in solids, E - k diagram, Brillouin zone and effective mass, direct and indirect band gaps, Distinction between metals, semiconductors and insulators. 8L

Dielectric properties of materials: Introduction of dielectric materials, polar and non-polar dielectric, basic concept of polarization, Different types of polarization, polarizability, temperature and frequency dependence of polarizability, Clausius-Mossotti relation, dielectric breakdown, dielectric loss, ferroelectric and piezoelectric materials and their applications. 6L

Magnetic materials and Superconductivity: Origin of magnetism, basic idea of diamagnetic, paramagnetic, ferromagnetic and ferrite materials, Soft and hard magnetic materials, magnetostriction, magnetic anisotropy and applications of magnetic materials. Superconductivity, Introduction, type I and type II superconductors, Meissner's effect, isotope effect, effects of magnetic field, London's equations, penetration depth, specific heat, BCS theory (qualitative idea), high temperature superconductors, applications of superconductivity. 10L

TOTAL: 48L

Recommended Books:

1. The physics of vibrations and waves, H. J. Pain, Wiley, 2006
2. Engineering Physics, H K Malik and AK Singh, Tata McGraw Hill
3. Concepts of Modern Physics, A. Beiser, Tata McGraw Hill
4. Introduction to Solids, L V Azaroff, Tata McGraw Hill
5. Introduction to Solid State Physics, Charles Kittel, Wiley India Pvt. Ltd.
6. Laser theory & Applications, K Thygrajan, A K Ghatak, Mc Millan India Ltd.
7. Materials Science, M S Vijaya, G Rangarajan, Tata McGraw Hill
8. Quantum Mechanics, D. J. Griffiths, Pearson Education

19/04/19

Jagwinder Singh
19/04/19

19.4.19 (K.S. Mann)

BSPH-401P **Physics Lab** **LTPC/0021**

Course Outcomes:

After successful completion of the applied physics laboratory course, students should be able to:

CO1: verify the theoretical formulations/ concepts of physics.

CO2: know the art of recording the observations of an experiment scientifically.

CO3: learn by doing.

CO4: handle and operate the various elements/parts of an experiment.

CO5: understand the importance of an experiment in engineering & technology.

CO/PO Mapping S-strong, M-medium and W-weak indicate the strength of correlation												
COs	Programme outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S			M	M							
CO2	S	S		S	S			S		S		
CO3	M	M		S	W							S
CO4	S		W	W	M			M	S		S	
CO5	W			M		S	S				M	S

List of Experiments

1. To determine the frequency of a tuning fork using sonometer.
2. To determine the frequency of an electrically maintained tuning fork by Melde's experiment.
3. To investigate resonance in forced oscillations and to find the spring constant.
4. To verify the inverse square law of radiation using Photoelectric effect.
5. To determine the value of Planck's constant and photoelectric work function of the material of the cathode using photoelectric cell.
6. To determine the frequency of an unknown signal by drawing the Lissajous patterns for various frequency ratios and evaluative the phase difference between two sinusoidal signals applied to X and Y inputs of cathode ray oscilloscope.
7. Determination of the value of e/m of an electron by helical method/Thomson method
8. To determine the numerical aperture (NA) of a given multimode optical fibre by using laser beam.
9. To study the V-I characteristics of semiconductor diode.
10. To find the band gap of the semiconductor material using diode in reverse bias.
11. To determine the wavelength of He-Ne laser by diffraction method.
12. Use of Michelson-Morley interferometer for determining the wavelength of He-Ne laser.
13. To find the Curie temperature of the given ferrite material.
14. To calculate the dielectric constant of the given dielectric material.
15. To determine the specific rotation of sugar solution using Laurent's half-shade polarimeter.