Minutes of the Board of Studies Meeting of the Department of Physics and Materials Science held on 05th of October 2018 in JUIT Board room.

The following members were present.

Members from the Department

Prof. P.B. Barman	HOD	Chairman
Prof. Sunil K. Khah		
Dr. Vineet Sharma		
Dr. Pankaj Sharma		
Dr. Dheeraj Sharma		
Dr. Rajesh Kumar		
Dr. Surajit Kumar Hazra		
Dr. Ragini R. Singh		

Members from other Departments of JUIT

Prof. Sudhir Syal,	HOD, BI & BT
Prof. M.J. Nigam	HOD, ECE (Represented by Dr. Rajiv Kumar, Dept. of ECE, JUIT)

The following members were given leave of absentia as they could not attend the meeting.

Prof. D.K. Rai	HOD, Physics & Materials Science, JIIT, Sec.62, Noida (Member from Sister Institutes)
Prof. Anil Vohra	Professor, Dept. of Electronic Science, Kurukshetra University, Kurukshetra, Haryana (Member from Other Institutes)
Prof. Karanjeet Singh	HOD, Mathematics, (Member from other Departments of JUIT)
Prof. Ashok K.Gupta	HOD, Civil (Member from other Departments of JUIT)
Prof. S.P. Ghrera	HOD, CSE & IT (Member from other Departments of JUIT)
Dr. Sanjiv Kumar Tiwari	(Member from the Department)

The following agendas were discussed and deliberated upon. The agenda wise details are given.

<u>**Agenda I & II**</u>**:** To change the structure of **Engineering Physics-II** (**18B11PH211**) from **(3-1-0) to (3-0-0) (Annexure-I) &** introduce experimental lab course Engineering Physics Lab-II (**18B17PH271) (0-0-2) (Annexure-II)** of 01 credit in second semester for B.Tech. CSE, ECE, IT and CE.

The change of the structure and introduction of lab was approved.

Agenda III: To introduce the course Engineering Physics-II (**18B11PH211**) **(3-0-0) (Annexure-I)** in second semester for B.Tech. CE.

The department of Civil Engineering have dropped the proposed tailor made structure of Engineering Physics-II. The Civil Engineering students will study the same course which is offered to CSE, ECE, IT in second semester **(18B11PH211).**

Agenda IV: To propose modification in the course contents of Biophysical Techniques (**18B11PH212**) for second semester BT/BI students in the light of 160 credits for B.Tech.

The modifications were discussed with the Dept. of BI & BT and were approved. The modified syllabus is attached in the **Annexure-III**.

Agenda V: To ratify the course contents of Materials Science (**18B11PH611)** for Science Elective (Fifth semester) students in the light of 160 credits for B.Tech. CSE, ECE and IT.

It was discussed that revised Materials Science course will be taught in fifth semester for CSE, ECE, IT students as part of Compulsory Science Elective. As it will be a common course, so it is submitted that this course cannot be taught with open electives and department electives in seventh semester (as suggested by CSE, IT department). The revised course is attached (**Annexure-IV**)

Agenda VI: To revert back to Engineering Physics-I **(18B11PH111)** and Engineering Physics Lab-I course (**18B17PH171)** in place of existing Basic Engineering Physics-I (**18B11PH112)** and Basic Engineering Physics Lab-I course**(18B17PH172)** for 1st semester BI/BT students.

During discussion with HOD, BI & BT and from the inputs of stake holders, it was decided to continue with the Basic Engineering Physics-I (**18B11PH112)** and Basic Engineering Physics Lab-I course **(18B17PH172)** with minor revisions as suggested by stake holders. The revised syllabi was discussed and is attached.(**(Annexure-V & VI)**

All the decisions taken will be submitted to Academic council for approval.

The meeting ended with a vote of thanks.

Board of Studies meeting (Physics and Materials Science) – 05-10-2018

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Prof. Sunil K. Khah		
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Prof. S.P. Ghrera	HOD, CSE & IT (Member from other Departments of JUIT)
Dr. Sanjiv Kumar Tiwari	(Member from the Department)

Annexure-I

18B11PH211 Engineering Physics-II

Course Goal

At the end of the course, the students will have sufficient scientific understanding of different phenomena associated with electrodynamics, statistical physics, solid state physics and optical fibre Communication.

Course Objectives

1. To offer a broad aspect of those areas of Physics which are specifically required as an essential background to engineering students for their studies in higher semesters.
2. To enable the students to get better understanding about solid state physics and its applications in engineering.
3. To familiarize students about electromagnetism and its applications in engineering.
4. To enable the students to get better understanding about statistical physics and its applications in engineering.
5. To familiarize students with optical fibers communication.
6. At the conclusion of the course, the ability of students should have enhanced to think logically about the problems of science and technology and obtain their solutions.

Course Outcomes:

After studying this course the students would gain enough knowledge to understand/ solve basic electrodynamics, statistical physics and solid state physics problems which is not possible by classical understanding.

Course Evaluation:

Test - I	15
Test - II	25
Test - III	35
Teacher Assessment	25
Total Marks	**100**

Detailed Syllabi

Lecture-wise Breakup

Subject Code	18B11PH211	**Semester**	1
Subject Name	**18B11PH211 Engineering Physics-II**		
Credits	3	**Contact Hours**	3

Module No.	**Subtitle of the Module**	**Topics**	**No. of Lectures**
1.	Electromagnetism	Basic knowledge of fields, gradient, divergence and curl, Coulomb's law and related numerical, electric flux, Gauss's law for the charge inside and outside the Gaussian surface, applications of Gauss law: spherical and cylindrical symmetries, electric field due to charged conductor, force per unit area on the surface of the charged conductor, treatment of electrostatic problems by solution of Laplace and Poisson's equations. Biot Savart law, Ampere's law, Maxwell's equations in	**12**

		free space and dielectric media, energy in electromagnetic waves (Poynting vector and Poynting theorem), plane electromagnetic waves in free space, transverse nature, wave impedance and energy flow, energy density and energy flux (Poynting vector) in an electromagnetic field, radiation pressure.	
2.	Statistical Physics & Applications	Introduction, macrostates, microstates, thermodynamic probability, distribution of n-particles in k-cells, phase space, minimum volume, classical and quantum statistics: common approach to three statistics, Maxwell-Boltzmann (ideal gas), Bose-Einstein (photon gas), Fermi-Dirac distributions (electron gas), Compton effect.	**10**
3.	Optical Fibers Communication	Light propagation in fibers, Step index and Graded Index fibers, Numerical Aperture and Attenuation, Single and Multimode fibers and their propagation characteristics, Fiber losses and optical fiber applications.	**4**
4.	Solid State Physics	Basic ideas of bonding, ionic bonding, covalent bonding (hybridization), metallic bonding, dispersion bonds, dipole bonds, hydrogen bonds, Lattice points and space lattice, basis and crystal structure, unit cell and primitive cell, seven crystal systems and fourteen Bravais space lattice, coordination number, nearest neighbour distance, atomic radius, atomic packing factor in crystal structure, calculation of lattice constant, lattice planes and Miller indices, separation between lattice planes. X-ray diffraction, Bragg's law of X-ray diffraction, Bragg's x-ray spectrometer, powder crystal method, rotating crystal method. Electronic conduction in metals, classical free electron theory, quantum theory of free electrons, band theory of solids, distinction between metals, semiconductors and insulators, intrinsic and extrinsic semiconductors, carrier concentration in thermal equilibrium in intrinsic semiconductor, Fermi level and energy band diagram in intrinsic semiconductor, energy band diagram and Fermi level in extrinsic semiconductors, effect of temperature on extrinsic semiconductor, electrical conductivity of intrinsic semiconductor and extrinsic semiconductor, Hall effect, allied parameters and its applications.	**16**
			42

Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)

1.	Charles Kittel, Introduction to Solid State Physics. John Wiley & Sons, 8th edition 2005.
2.	S. O. Pillai, Solid State Physics, New age international publishers, 7th edition (2016).

3.	David J Griffiths, Introduction to Electrodynamics, Eastern Economy Editions, PHI, 4th edition (2012).
4.	Brij Lal, N Subrahmanyam and P.S. Hemne, Heat Thermodynamics and Statistical Physics, S. Chand, 3rd edition (2012).
5.	Gerd Keiser, Optical Fiber Communication, Tata McGraw-Hill Education Pvt. Ltd., 5th edition (2013).

Annexure-II

18B17PH271 Engineering Physics Lab-II

Course Goal

At the end of the lab course, the students will have the test of all knowledge through experiments. Students will gain sufficient scientific understanding of different phenomena associated with the respective theory paper Physics-II.

Course Objectives

1. The Art of Experimentation: The introductory laboratory engages each student in significant experiences with experimental processes, including some experience in investigation.
2. Experimental and Analytical Skills: The laboratory help the student develop a broad array of basic skills and tools of experimental physics and data analysis.
3. Conceptual Learning: The laboratory helps student's to understand basic physics concepts.
4. Understanding the Basis of Knowledge in Physics: The laboratory help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
5. Developing Collaborative Learning Skills: The laboratory helps students to develop collaborative learning skills that are vital to success in many lifelong endeavors.

Course Outcomes:

The student after doing this laboratory course will have

- insight of core Physics-II theory course
- ability to correlate their theoretical knowledge with experiment directly.
- working knowledge and principle of various instruments
- the aptitude to design new experiment.

Course Evaluation:

Day to day work 60%: Break-up of Day to day work will be as follows: (i) Attendance 15% (ii) Quantity & Quality of Experiments including Performed, Learning laboratory Skills and handling Laboratory Equipment, Instruments, Gadgets, Components, Materials and Software etc. 30% (iii)Laboratory record 15%.	60
Mid Term Test 20% (Viva + performance)	20
End Term Test 20% (Viva + Performance)	20
Total marks	100

List of Experiments

Lab-wise Breakup

Subject Code	18B17PH271	Semester	2
Subject Name	Engineering Physics Lab - II		
Credits	1	Contact Hours	2
Module No.	Subtitle of the Module	Topics	No. of lab Hours
1.	Optical Fiber	To determine the numerical aperture, of an optical fiber using LED as a light source.	2

2.	Optical Fiber	To determine the attenuation coefficient, losses of an optical fiber.	2
3.	Solid state Physics	To measure resistivity of semiconductor using four probe methods.	2
4.	Solid state Physics	To measure energy band gap of the Ge crystal using four probe methods and compare with optical band gap.	2
5.	Solid state Physics	To study Hall effect in semiconductor and determination of its allied parameters.	2
6.	Solid state Physics	To determine the carrier concentration and type of doping using hall coefficient.	2
7.	Electromagnetism	To calculate the e/m ratio for an electron using Thomson method/Bar magnet method	4
8.	Solid state Physics	To study magnetostriction in magnetic materials using He-Ne laser.	4
9.	Solid state Physics	To study the coercivity, saturation magnetization, retentivity of given materials.	4
10.	Solid state Physics	Experimental Determination of Planck's constant using Light Emitting Diodes (LEDs) and Photoelectric Effect.	4
Total number of Lab hours			28

Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)	
1.	S. P. Singh, Advanced Practical Physics,Pragati Prakashan, Vol. 1 (2013).
2.	C. L. Arora, Practical Physics, S. Chand Company Limited, 20th edition (2004).
3.	Charles Kittel, Introduction to Solid State Physics. John Wiley & Sons, 8th edition 2005.
4.	S. O. Pillai, Solid State Physics, New age international publishers, 7th edition (2016).
5.	Gerd Keiser, Optical Fiber Communication, Tata McGraw-Hill, 5th edition (2013).

Annexure-III
18B11PH212 Bio-Physical Techniques

Course Goal:
The study of techniques of structural determination is the most essential part of the biotechnology. Spectroscopic techniques are used for molecular study of biomolecules like Proteins, Nucleic acids and most importantly the DNA. The objective of this course is to familiarize the student with the basic principles and application of the most commonly used spectroscopic techniques such electron microscopy, electronic spectroscopy, Infrared, Raman, Mass, NMR and microwave spectroscopy.

Course Objectives:
1. To learn concepts for strong foundation of biophysical methods and their application in the field of biotechnology
2. Exposure to various instruments used in Biophysics.
3. To be able to use important biophysical methods to decipher problems relevant to biology.
4. Understanding of the underlying theory of these methods and their practical applications in the laboratories.
5. Better understanding of the structure-function activity of biomolecules.

Course Outcomes:
Students after going through this course will have
- Knowledge about different degrees of freedom of biological molecules with varying energy of the electromagnetic spectrum.
- Basic underlying techniques of the analytical instruments, their principle and working.
- Information about different spectroscopic Techniques (microwave, Raman, FTIR, Electronic, ESR, NMR etc).

Course Evaluation:

Test - I	15
Test - II	25
Test - III	35
Teacher Assessment	25
Total Marks	**100**

Detailed Syllabi

Lecture-wise Breakup

Subject Code	**18B11PH212**	**Semester**	2
Subject Name	**Bio-Physical Techniques**		
Credits	4	**Contact Hours**	4
Module No.	**Subtitle of the Module**	**Topics**	**No. of Lectures**
1.	Basic concepts	Quantization of energy, Regions of the electromagnetic spectrum, Representation of spectra, Basic elements of practical spectroscopy, The width and intensity of spectral lines. Crystal structure.	**3**

2.	Electron Microscopy	Transmission electron microscope. Scanning electron Microscope, Tunneling Electron microscope and Atomic Force microscope.	**5**
3.	Electronic Spectroscopy	Electronic Spectra of Diatomic molecules, Frank-Condon Principle, Dissociation energy, shape of molecular orbitals, Classification of states of diatomic molecules, Electronic spectra of polyatomic molecules. Analysis by Electronic spectroscopy, Fluorescence Spectroscopy	**8**
4.	Infrared Spectroscopy	Vibration of diatomic molecules, Simple Harmonic Oscillator, Anharmonic oscillator, Vibration rotation spectra of diatomic molecules, Vibration of polyatomic molecules, Fourier Transform Infrared Spectroscopy, Analysis of Infrared techniques.	**6**
5.	Raman Spectroscopy	Raman effect, Molecular polarisability, Rotational and vibrational Raman Spectra, Structure determination from Raman and Infrared spectroscopy.	**4**
6.	Mass Spectroscopy	Basics of the technique, Producing the ion, Detection of ions and Identifying of compounds.Analysis and application.	**3**
7.	Spin Resonance Spectroscopy	Interaction between spin and magnetic field, Nuclear Magnetic Resonance, Chemical Shift, Analysis by NMR Technique, NMR Applications in Biochemistry, Biophysics and Medicines. Electron Spin Resonance Spectroscopy and applications.	**5**
8.	Microwave spectroscopy	Rotation of molecules, Rotational spectra of rigid diatomic molecule, Rigid and Non rigid, Polyatomic –Molecules, Analysis by microwave spectroscopy Technique.	**4**
9.	Chromatograp hy	Principles of chromatography- ion exchange, gel filtration, hydrophobic interaction, affinity, GC, HPLC, FPLC; Electro-chromatography	**4**
Total number of Lectures			**42**

Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)	
1.	C. N. Banwell, Fundamentals of Molecular Spectroscopy. McGraw-Hill, (1194)
2.	Sune Svanberg, Atomic and Molecular Spectroscopy: Basic Aspects and Practical pplications, Springer Science & Business Media (2012).
3.	G. Aruldhas, Molecular structure and spectroscopy, PHI Learning Pvt. Ltd. (2007)
4.	Charles H. Townes, A. L. Schawlow, Microwave Spectroscopy, Dover Publications Inc.(1975)
5.	Walter Gordy, Microwave Spectroscopy, Springer Berlin Heidelberg (1957)
6.	Barbara H. Stuart , Infrared Spectroscopy: Fundamentals and Applications, Wiley (2004)
7.	Brian C. Smith, Fundamentals of Fourier Transform Infrared Spectroscopy, Second Edition, CRC Press (2011)
8.	S. O. Pillai, Solid State Physics, New age international publishers, 7th edition (2016).
9.	Joseph R.**Lakowicz**, Principles of Fluorescence Spectroscopy, Springer US, 3rd Edition (2006).

Annexure-IV

18B11PH611 Materials Science

Course Goal

At the completion of this course, the student should have the basic understanding of different materials and their properties. Students would be able to properly select suitable material for different engineering application and thus design better products.

Course Objectives

1. To enable the students to get better understanding about materials, properties and their applications in engineering.
2. To familiarize students for making proper selection of materials for different applications.
3. To enable the students to use the knowledge about materials for their projects and ultimately apply the materials knowledge in their respective professional career.
4. At the conclusion of the course, the student should have a far greater capacity to read and understand technical articles such as those seen in the IEEE Transactions on Electron Devices, IEEE Transactions on Nanotechnology, Computer-aided design, Computational Materials Science *etc*.

Course Outcomes:

At the end of this course students will be able to understand the microscopic and macroscopic behavior of various materials. Students will be able to select material as per specific application in engineering field.

Course Evaluation:

Test - I	15
Test - II	25
Test - III	35
Teacher Assessment	25
Total Marks	**100**

<u>Detailed Syllabi</u>

Lecture-wise Breakup

Subject Code	18B11PH611	**Semester**	6
Subject Name	Materials Science		
Credits	4	**Contact Hours**	4

Module No.	**Subtitle of the Module**	**Topics**	**No. of Lectures**
1.	***Dielectrics***	Introduction to Dielectric materials, Capacitance, Polarization, Types of Polarization, Polarization mechanism & Dielectric Constant, Frequency Dependence of the Dielectric Constant, Ferroelectricity, Piezoelectricity Applications of Dielectric Materials	**10**
2.	***Optoelectronics***	Introduction to Optoelectronic materials, Applications of Optical Phenomena Luminescence, Materials of Importance—Light-Emitting Diode Materials, photoconductivity, Lasers, Optical Fibers in Communications	**6**
3.	***Thermoelectrics***	Introduction to Thermoelectric materials, Figure of	**6**

		merit, Heat Capacity, Conductivity (electronic and thermal), Applications in sensors, energy harvesting etc.	
4.	***Magnetism***	Introduction to Magnetic materials, Concept of magnetism, Classification, dia-, para-, ferro-, antiferro- and ferri-magnetic materials, Influence of Temperature on Magnetic Behavior; Domains and Hysteresis; Magnetic Anisotropy Applications in storage devices	**8**
5.	***Superconductivity***	Introduction to Superconducting materials, Superconductivity Meissner effect, Critical field, type-I and type-II superconductors; Field penetration and London equation; High temperature Superconductors and their Applications.	**4**
6.	***Composites***	Introduction to Composite materials-Polymers & Ceramics, Various types of Polymers and their applications, Structure, Types, Properties and Applications of Ceramics, Electrical Conduction in Ceramics and Polymers. Applications.	**8**
		Total number of Lectures	**42**

Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)	
1.	Charles Kittel, Introduction to Solid State Physics. John Wiley & Sons, 8th edition 2005.
2.	S. O. Pillai, Solid State Physics, New age international publishers, 7th edition (2016).
3.	William D. Callister and David G. Rethwisch, Materials science and engineering: an introduction, John Wiley & Sons, 8th edition (2010).
4.	S.Sharma and J. Sharma, Engineering Physics, Pearson India (2018).
5.	M.A. Wahab, Solid State Physics:Structure and Properties of Materials, Narosa, 3rd edition, (2015).
6.	http://www.advancedsciencenews.com/best-of-advanced-optical-materials/

Annexure-V

18B11PH112 Basic Engineering Physics - I

Course Goal

The purpose of this course is to develop scientific temper and analytical capability through learning physical concepts and their applications in engineering and technology. Comprehension of some basic physical concepts will enable the students to logically solve problems. To give students a basic exposure to Physics that will better prepare them for more rigorous courses that will be taken later on.

Course Objectives

1. To understand the general scientific concepts required for technology.
2. To apply the concepts in solving BT/BI engineering problems.
3. To explain scientifically the new developments in engineering and technology
4. To get familiarized with the concepts, theories, and models behind many technological applications.

Course Outcomes:

Students will have the knowledge of the basic concepts of optics, viscosity and nanomaterials which is required for BT/BI.

Course Evaluation:

Test - I	15
Test - II	25
Test - III	35
Teacher Assessment	25
Total Marks	**100**

Detailed Syllabi

Lecture-wise Breakup

Subject Code	18B11PH112	**Semester**	1
Subject Name	**Basic Engineering Physics**		
Credits	4	**Contact Hours**	4

Module No.	**Subtitle of the Module**	**Topics**	**No. of Lectures**
1.	Nature of light and matter	The electromagnetic spectrum, Particle nature of radiation- The Photoelectric effect, Compton Effect. X-rays (continuous and characteristic), X-ray diffraction-Bragg's law. The origin of quantum theory- Planck's hypothesis, the wave nature of matter- wave-particle duality, matter waves (de Broglie hypothesis). Wave function - its physical interpretation, Schrodinger equation (only) and its significance.	**10**
2.	Interference	Coherence and coherent sources, Interference by division of wavefront (Young's double slit experiment, Fresnels' biprism), Interference by division of amplitude (Thin	**6**

		film, Newton's rings, Michelson's Interferrometer).	
3.	Diffraction	Fresnel and Fraunhoffer types of diffraction, Fraunhofer diffraction: Single slit, circular aperture, double slit. Diffraction grating - wavelength determination, resolving power and dispersive power.	**6**
4.	Polarization	Types of polarization, Brewster's law, Malu's law, e-ray and O-ray, Nicol prism, quarter-wave and half-wave plates, elliptically and circularly polarized light, optical activity, specific rotation.	**4**
5.	Lasers	Principle and working of laser, Different types of lasers (Three level and four level lasers). Applications in bio-medical.	**3**
6.	Viscosity and Surface tension	Viscosity, Coefficient of viscosity, Poiseulle's equation, Surface tension, Angle of contact, Methods for measuring surface tension, Interfacial surface tension.	**3**
7.	Nuclear Physics	Basics concepts: Nuclear radius, Binding energy, Radioactive decay. Significance of nuclear physics for biology, Applications of nuclear physics in medicine and agriculture.	**6**
8	Introduction to Nanotechnology	Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Fabrication: Bottom-up and Top-down, Characterization, Nanobiotechnology.	**4**
Total number of Lectures			**42**

Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)	
1.	Neeraj Mehta, Applied Physics for Engineers, PHI India Limited (2011).
2.	Brij Lal and Subramanyam, Optics, S. Chand & Company (2012).
3.	R S Burden, Surface Tension and the Spreading of Liquids, Cambridge University Press (2014).
4.	Ajoy Ghatak, Optics, Tata McGraw Hill (2005).
5.	**David Griffiths, Introduction to Quantum Mechanics, Prentice Hall (2004).**
6.	K. K. Chattopadhyay, Introduction to Nanoscience and Nanotechnology, Prentice Hall India Learning Private Limited (2009).
7.	D. S. Viswanath, T. Ghosh, Dasika H.L. Prasad, Nidamarty V.K. Dutt, Kalipatnapu Y. Rani , Viscosity of Liquids: Theory, Estimation, Experiment, and Data , Springer (2007).
8.	NUCLEAR PHYSICS, D.C. Tayal, Himalaya Publishing House.

Annexure-VI

18B17PH172 Basic Engineering Physics Lab

Course Goal:

At the end of the lab course, the students will have the test of all knowledge through experiments. Students will gain sufficient scientific understanding of different phenomena associated with the respective theory paper Basic Engineering Physics.

Course Objectives:

1. **The Art of Experimentation:** The introductory laboratory engages each student in significant experiences with experimental processes, including some experience in investigation.
2. **Experimental and Analytical Skills:** The laboratory help the student develop a broad array of basic skills and tools of experimental physics and data analysis.
3. **Conceptual Learning:** The laboratory help student's to understand basic physics concepts.
4. **Understanding the Basis of Knowledge in Physics:** The laboratory help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
5. **Developing Collaborative Learning Skills:** The laboratory helps students to develop collaborative learning skills that are vital to success in many lifelong endeavors.

Course Outcomes:

The student after doing this laboratory course will have

- Insight of core Basic Engineering Physics theory course
- Ability to correlate their theoretical knowledge with experiment directly.
- Working knowledge and principle of various instruments
- The aptitude to design new experiment.

Course Evaluation:

Day to day work 60%: Break-up of Day to day work will be as follows: Attendance 15% Quantity & Quality of Experiments including Performed, Learning laboratory Skills and handling Laboratory Equipment, Instruments, Gadgets, Components, Materials and Software etc. 30% Laboratory record 15%.	60
Mid Term Test (Viva + performance)	20
End Term Test (Viva + Performance)	20
Total marks	**100**

List of Experiments

Lab-wise Breakup

Subject Code	18B17PH172	**Semester**	1
Subject Name	Basic Engineering Physics Lab		
Credits	1	**Contact Hours**	2

Module No.	**Subtitle of the Module**	**Topics**	**No. of Labs Hours**

1.	Interference	To find the fringe width in interference pattern for sodium light using Fresnel's biprism.	**2**
2.	Interference	To find the wavelength of sodium light using Fresnel's biprism	**2**
3.	Interference	To determine the wavelength of sodium light by measuring the diameters of Newton's rings.	**4**
4.	Diffraction	To measure the wavelengths of certain lines in the spectrum of the mercury lamp using plane transmission grating.	**2**
5.	Polarization	To find the specific rotation of sugar solution by using a polarimeter.	**4**
6.	Dispersion	To calculate the angle of prism and dispersive power of the materials of the prism with the help of spectrometer.	**4**
7.	Absorbance spectroscopy	Studies for absorbance, and excitation processes in liquids in support of Jablonski diagram.	**2**
8.	Fluorescence spectroscopy	Studies of emission in liquids in support of Jablonski diagram.	**2**
9..	Viscosity	To determine coefficient of viscosity of water by Poiseuille's Method.	**2**
10.	Surface tension	To measure the surface tension of a liquid and/or the interfacial tension between two liquids using tensiometer.	**2**
11.	Surface tension	To measure the surface tension between two surfaces using theta tensiometer.	**2**
Total number of Lectures			**28**

Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)	
1.	S. P. Singh, Advanced Practical Physics,Pragati Prakashan, Vol. 1 (2013).
2.	C. L. Arora, Practical Physics, S. Chand Company Limited, 20th edition (2004).
3.	N. Subrahmanayam, Brij Lal and M.N. Avadhanulu, A Text Book of Optics, S. Chand (2012)
4.	Ajoy Ghatak, Optics, Tata McGraw Hill, 5th addition, (2012)
5.	F.A. Jenkins and H.E. White, Fundamentals of Optics, McGraw-Hill (1981).
6.	Dabir S. Viswanath, Tushar Ghosh, Dasika H.L. Prasad, Nidamarty V.K. Dutt, Kalipatnapu Y. Rani , Viscosity of Liquids: Theory, Estimation, Experiment, and Data , Springer (2007).

Board of Studies meeting (Physics and Materials Science) – 05-10-2018

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