KLEF

(Deemed to be University estd. U/S 3 of the UGC Act, 1956)

DEPARTMENT OF PHYSICS

2nd Board of Studies (BOS) Meeting

20th June 2019

Venue: Physics Lab, Room: F201

Time: 3:00 – 5:00 PM

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Koneru Lakshmaiah Education Foundation
(Deemed to be University)
Green Fields, Vaddeswaram-522 302,
Guntur Dist., A.P., India.

XXVII Academic Council - Annexure 3.5

Department of Physics

Minutes of 2nd Board of Studies Meeting

The Department of Physics held the 2nd BOS meeting on **20th June, 2019**, from 3:00 PM to 5:00 PM in Room No.F201

The following members were present:

1. Dr. G. Sunita Sundari, Head of the Dept. and Associate Professor, BOS-Chairperson
2. Dr.M.Venkateswartlu, Asst. Professor
3. Prof. J. Suryanarayana Murty, Professor, Dept. of Physics, IIT Hyderabad
4. Prof. K. S. Ramesh, Professor, Dept. of ECE, KLEF
5. Dr. G. China Satyanarayana, Assoc. Professor, Dept. of ECE, KLEF
6. Dr.N.S.M.P. Latha Devi, Associate Professor
7. Dr. K.Swapna, Associate Professor
8. Dr.Sk. Mahamuda, Associate Professor
9. Dr. M V V K Srinivas Prasad, Asst. Professor
10. Dr. A.Venkateswara Rao, Asst. Professor
11. Sk.Babu, Asst. Professor
12. Dr. S. Shanmugan, Asst. Professor
13. Mr M Gnana Kiran, Asst. Professor
14. Prof. B.V. Appa rao, Professor, HOD, Dept. of Mathematics
15. Prof. J.V. Shanmukha Kumar, Professor, HOD, Dept. of Chemistry

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Contents

Item No.	Item Description
1	Follow-up actions on the Minutes of the previous meetings of the Board of Studies of the Department of Physics, KLEF
2	Propose to revise course structure and syllabus for M.Sc. as per resolution passed in Department Academic Committee meeting for the academic year 2019-20 admitted batch. Propose to revise course structure and syllabus for M.Sc. as per resolution passed in Department Academic Committee meeting for the academic year 2019-20 admitted batch.
3	Proposed to introduce the new courses and elective courses for A.Y: 2019-20 M.Sc Students.

Welcoming the New Members

(Dr. G. Sunita Sundari will brief the meeting)

1. Prof. J. Suryanarayana, Asso. Professor, Dept. of Physics, IIT-Hyderabad.
2. Dr. K. S. Ramesh, Professor, Dept. of ECE, KLEF
3. Dr. G. China Satyanarayana, Asso. Professor, Dept. of ECE
4. Dr. J.V. Shamnmukh Kumar, Chemistry-HOD.
5. Dr. B.V. Apparao, Maths-HOD.
6. Dr S. Shanmugham, Assistant Professor

AGENDA ITEMS

Agenda Item 1
To consider and approve the previous BoS meeting minutes held on 19th March 2018.

Agenda Item 2

BOS Chairman presented the detailed M.Sc Physics curriculum for the 2019 admitted batch to the all members. Upon due deliberations, the external members suggested the following modifications / revisions in the curriculum.

Propose to revise the syllabus modification for the following subjects. The courses entitled Solid state Physics-2 (18PH5305) (a part of syllabus lattice thermal vibrations syllabus removed from SSP-2 and added in Solid state Physics -1(19PH5204) and SSP-2 as 19PH5305	Forwarded for the Academic council approval

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Based on the Dean of Academics suggestions few more lab experiments are added in Analog Electronics Lab (19PH5106), Solid State Physics-1 Lab (19PH5206), Digital Electronics Lab (19PH5207), and Solid State Physics-2 lab (19PH5308).	
Based on the suggestions of BOS external members Nuclear and Particle physics into two separate courses (Nuclear Physics(19PH5303) and Particle Physics(19PH5304))	

Discussion:

As per the suggestion of external BoS Member Prof. J. Suryanarayana garu, Particle and and Nuclear physics course is spilitted into two courses such as Nuclear physics and particle Physics.

As per the suggestion of external Dean. Academics Satavat sir we have added a few lab experiments to Analog Electronics Lab (19PH5106), Solid State Physics-1 Lab (19PH5206), Digital Electronics Lab (19PH5207), and Solid State Physics-2 lab (19PH5308).

Resolution:

It is resolved to approve the splitted into Nuclear Physics and Particle Physics and adding of few experiments to Analog Electronics Lab (19PH5106), Solid State Physics-1 Lab (19PH5206), Digital Electronics Lab (19PH5207), and Solid State Physics-2 lab (19PH5308) lab courses offered in the academic year 2019-20 as given in Annexure-1.

Agenda Item-3

To consider and approve the new courses proposed by external BOS members for the courses offered in the academic year 2019-21. • Electrodynamics _19PH5103 • Fiber Optics and Non-linear optics -19PH5203 • Laser and Photonics-19PH5306 • Experimental Techniques-19PH54E1 • Basic Communication Theory -19PH54E2 • Physics of Nano Materials-19PH54E3	Forwarded for the Academic council approval

Discussion:

- As per the suggestion of external BoS Member Prof. J. Suryanarayana garu, Electromagnetic theory -18PH5103 was replaced with the Electrodynamics _19PH5103.

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- Two more core courses suggested by Prof. J. Suryanarayana garu, which are Fiber Optics and Non-linear optics -19PH5203 and Laser and Photonics-19PH5306 and total credits increased from 89 to 96.
- Three elective courses were added for the A.Y:2019-20 batch students to enhance the research skills and enrich the advanced functional materials such as Experimental Techniques-19PH54E1, Basic Communication Theory -19PH54E2 and Physics of Nano Materials-19PH54E3

Resolution:

It is resolved to approve the new course suggested by external BOS members and remove the Electromagnetic theory (18PH5103) to be offered in the academic year 2019-20 as listed above and the proposed new courses syllabus is shown in Annexure-2.

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MEMBERS ATTENDED THE BOARD OF STUDIES MEETING, DEPARTMENT OF PHYSICS

S. No.	Name	Designation	Position	Signature
1	Dr. Pranvir S Satvat	Professor	BOS Patron	ABSENT
2	Dr. G. Sunita Sundari	Associate Professor	BOS-Chairperson	20/6/2019
3	Dr. M. Venkateswarlu	Asst. Professor	BOS-Secretary	
4	Prof. J. Suryanarayana Murty	Assoc. Professor, Dept. of Physics, IIT Hyderabad, Telangana. Mobile No. 9676212499 Office: 040-23017085 E –mail: surya@iith.ac.in	External Member& Expert	
5	Dr. V.N. Mani	Scientist-E, C-MET, Telangana, Mobile No. 07382489862 E-mail: vnmanicrystal1272001@gmail.com	External Member & Expert	ABSENT
6	Dr. K. S. Ramesh	Professor, Dept. of ECE, KLEF	Internal Member	
7	Dr. G. China Satyanarayana	Asso. Professor, Dept. of ECE	Internal Member	
8	Dr. N. S. M. P. Latha Devi	Associate Professor, Dept. of Physics	Internal Member	
9	Dr.K.Swapna	Associate Professor	Internal Member	20/6/2019
10	Dr. Sk. Mahamuda	Associate Professor	Internal Member	
11	Dr. M V V K Srinivas Prasad	Assistant Professor	Internal Member	
12	Dr. N. Krishna Jyothi	Assistant Professor	Internal Member	
13	Dr A Venkateswara Rao	Assistant Professor	Internal Member	
14	Dr Sk Babu	Assistant Professor	Internal Member	
15	Dr S. Shanmugham	Assistant Professor	Internal Member	
16	Dr. A. Sendil Kumar	Assistant Professor	Internal Member	ABSENT
17	Mr M Gnana Kiran	Assistant Professor	Internal Member	
18	Dr. B. V. Appa Rao	Professor, HOD, Dept. of Mathematics	Internal Member	
19	Dr. J.V. Shanmukh Kumar	Professor, HOD, Dept. of Chemistry	Internal Member	ABSENT

20/6/2019

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Annexure I:

Course Code	Course Name	Course Category	Existing Syllabus	New syllabus	Topics Added/ Removed/ Replaced	Change in Outcome	Justification for the Modification	Overall Revision Percentage
19PH5204	Solid State Physics -1	Professional core	**CRYSTAL STRUCTURE:** Periodic array of atoms—Lattice translation vectors and lattices, symmetry operations, The Basis and the Crystal Structure, Primitive Lattice cell, Fundamental types of lattices—Two-Dimensional lattice types, three-Dimensional lattice types, Index system for crystal planes, simple crystal structures-- sodium chloride, cesium chloride and diamond structures. **CRYSTAL DIFFRACTION AND RECIPROCAL LATTICE:** Bragg's law, Experimental diffraction methods-- Laue method and powder method, Derivation of scattered wave	**Crystal structure:** Periodic array of atoms—Lattice translation vectors and lattices, symmetry operations, The Basis and the Crystal Structure, Primitive Lattice cell, Fundamental types of lattices—Two Dimensional lattice types, three Dimensional lattice types, Index system for crystal planes, simple crystal structures-- sodium chloride, cesium chloride and diamond structures. **Crystal diffraction and reciprocal lattice:** Bragg's law, Experimental diffraction methods- Laue method and powder method,	**Topics added** Lattice Energies and Lattice Vibrations: Origin of chemical binding in ionic and van der Waals crystals – Elastic properties – Stress and strain – Elastic moduli - Lattice energy calculations for ionic and van der Waals crystals – Lattice vibrations: Mono and diatomic one dimensional infinitely long lattices.	Yes	Proposed by External BOS member	

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			amplitude, indexing pattern of cubic crystals and non-cubic crystals (analytical methods). Geometrical Structure Factor, Determination of number of atoms in a cell and position of atoms. Reciprocal lattice, Brillouin Zone, Reciprocal lattice to bcc and fcc Lattices. **FREE ELECTRON FERMI GAS:** Energy levels and density of orbitals in one dimension, Free electron gas in 3 dimensions, Heat capacity of the electron gas, Experimental heat capacity of metals, Motion in Magnetic Fields- Hall effect, Ratio of thermal to electrical conductivity. **FERMI SURFACES OF METALS:** Reduced zone scheme, Periodic Zone schemes, Construction of Fermi surfaces, Electron orbits, hole orbits and open orbits,	Derivation of scattered wave amplitude, indexing pattern of cubic crystals (analytical methods). Geometrical Structure Factor, Determination of number of atoms in a cell and position of atoms. Reciprocal lattice, Brillouin Zone, Reciprocal lattice to bcc and fcc Lattices. **Lattice Energies and Lattice Vibrations:** Origin of chemical binding in ionic and van der Waals crystals – Elastic properties – Stress and strain – Elastic moduli - Lattice energy calculations for ionic and van der Waals crystals – Lattice vibrations: Mono and diatomic one dimensional infinitely long lattices. **Free electron fermi gas:** Energy levels and density of orbitals in one				

			Experimental methods in Fermi surface studies-- Quantization of orbits in a magnetic field, De-Hass-van Alphen Effect, extremal orbits, Fermi surface of Copper. **THE BAND THEORY OF SOLIDS:** Nearly free electron model, Origin of the energy gap, The Block Theorem, Kronig-Penny Model, wave equation of electron in a periodic potential, Crystal momentum of an electron-Approximate solution near a zone boundary, Number of orbitals in a band--metals and isolators. The distinction between metals, insulators and semiconductors. **TEXT BOOKS**: 1. Introdcution to Solid State Physics, C.Kittel, 5th edition, 2. Solid State Physics, A.J.DEKKER.	dimension, Free electron gas in 3 dimensions, Heat capacity of the electron gas, Experimental heat capacity of metals, Motion in Magnetic Fields- Hall effect, Ratio of thermal to electrical conductivity., Fermi surfaces of metals: Reduced zone scheme, Periodic Zone schemes, Construction of Fermi surfaces, Electron orbits, hole orbits and open orbits. **The band theory of solids:** Nearly free electron model, Origin of the energy gap, The Block Theorem, Kronig-Penny Model, wave equation of electron in a periodic potential. The distinction between metals,insulators and semiconductors. **TEXT BOOKS**:				

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				1. Introduction to Solid State Physics, C.Kittel, 5th edition, 2. Solid State Physics, A.J.DEKKER.				
19PH5305	**Solid State Physics -2**	**Professional core**	**Lattice Energies and Lattice Vibrations** Origin of chemical binding in ionic and van der Waals crystals – Elastic properties – Stress and strain – Elastic moduli - Lattice energy calculations for ionic and van der Waals crystals – Lattice vibrations: Mono and diatomic one dimensional infinitely long lattices – Vibrational spectra – Infrared absorption in ionic crystals – Vibrational spectra of finite lattice – Quantization of lattice vibrations – Phonons – Properties – Experimental measurement of dispersion relation. **Magnetic Materials**	**Semiconductor Physics:** Intrinsic and extrinsic semiconductors – Expression for position of Fermi levels and carrier concentrations – Variation of Fermi level with temperature – np product – Carrier mobility, conductivity and their variation with temperature – Direct and indirect band gap semiconductors – Differences and examples – Hall effect - Continuity equation – Drift and Diffusion – Einstein relation – Generation, Recombination and life time of non-equilibrium carriers – Heyness-Schockley	**Dielectrics:** Dielectric constant, types of polarization, local field, Classius-Mossiti equation, frequency dependence of p0larizatioons, piezo and ferro-electric materials and their applications.	**Yes**	**Proposed by External BOS member**	

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			Types- Dia, para, ferro, anti-ferro & Ferri magnetic materials- Hysteresis curve- susceptibility measurement: Guoy balance, Quincke's Method- Quantum theories of para and ferro magnetism – Curie point and exchange integral – Curie temperature and Neel Temperature (Definitions) - Magnons – Domain Theory - Applications of Magnetic materials. **Semiconductor Physics** Intrinsic and extrinsic semiconductors – Expression for position of Fermi levels and carrier concentrations – Variation of Fermi level with temperature – np product – Carrier mobility, conductivity and their variation with temperature – Direct and indirect band gap semiconductors – Differences and examples – Hall effect - Continuity equation – Drift and Diffusion – Einstein relation – Generation,	experiment – Determination of life time, diffusion length of minority charge carriers. **Superconductivity:** Concept of zero resistance – Magnetic behavior – Distinction between a perfect conductor and superconductor – Meissner effect – Isotope effect – Type-I,Vortex state of a Type II superconductors, difference between normal and superconducting states – London's equations – Penetration depth – BCS theory –Josephson junctions – SQUIDS and its applications - Applications of superconductors – High TC superconductors – Preparation – Properties. **Magnetic Materials:**Types- Dia, para, ferro, anti-ferro &Ferri magnetic materials- Hysteresis curve- susceptibility measurement:				

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			Recombination and life time of non-equilibrium carriers – Heyness-Schockley experiment – Determination of life time, diffusion length of minority charge carriers. **Superconductivity** Concept of zero resistance – Magnetic behavior – Distinction between a perfect conductor and superconductor – Meissner effect – Isotope effect – Specific heat behavior – Two-fluid model – Expression for entropy difference between normal and superconducting states – London's equations – Penetration depth – BCS theory –Josephson junctions – SQUIDS and its applications - Applications of superconductors – High TC superconductors – Preparation – Properties. **Prescribed Text Books** 1. Solid State Physics, C.	Guoy balance, Quincke's Method- Quantum theories of para and ferro magnetism – Curie point and exchange integral – Curie temperature and Neel Temperature (Definitions) - Magnons – Domain Theory - Applications of Magnetic materials. **Dielectrics:** Dielectric constant, types of polarization, local field, Classius-Mossiti equation, frequency dependence of p0larizatioons, piezo and ferro-elctric materials and their applications. **Prescribed Text Books** 1. Solid State Physics, C. Kittel, John Wiley & Sons. 2. Solid State Physics, A.J. Dekkar, Macmillan India Ltd. 3. Elementary Solid State				

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			Kittel, John Wiley & Sons. 2. Solid State Physics, A.J. Dekkar, Macmillan India Ltd. 3. Elementary Solid State Physics, M. Ali Omar, Addison-Wesley. 4. Solid State Physics, M.A. Wahab, Narosa Publishing House. 5. Solid State Electronic Devices, B.G. Streetman. 6. High TC Superconductivity, C.N.R. Rao and S.V. Subramanyam. 7. Solid State Physics, S.O. Pillai. 8. Solid State Physics, S.L.Kakani and C. Hemarajan. 9. Electrons in Solids, Richard H. Bube.	Physics, M. Ali Omar, Addison-Wesley. 4. Solid State Physics, M.A. Wahab, Narosa Publishing House. 5. Solid State Electronic Devices, B.G.Streetman. 6.HighTC Superconductivity, C.N.R. Rao and S.V. Subramanyam. 7. Solid State Physics, S.O. Pillai. 8. Solid State Physics, S.L. Kakani and C. Hemarajan. 9. Electrons in Solids, Richard H. Bube.				
19PH5106	Analog	**Professio**	1. Transistor Characteristics	1. Diode Characteristics.	1. Study of LED	Yes	Propos	

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	Electronics Lab	nal core	2. UJT Characteristics 3. FET Characteristics 4. Rectifiers 5. Active low pass, high pass and band pass filter 6. RC Phase Shift Oscillator 7. Wein Bridge Oscillator 8. Colpitt's Oscillator 9. Astable Multivibrator 10. Op-amp Characteristics	2. Zener diode as voltage regulator. 3. Study of LED Characteristics. 4. Transistor Characteristics. 5. UJT Characteristics. 6. FET Characteristics. 7. Rectifiers by diodes and transistors 8. Active low pass, high pass and band pass filter using transistor 9. RC Phase Shift Oscillator using transistor. 10. Wein Bridge Oscillator. 11. Colpitt's Oscillator. 12. Astable Multivibrator using transistor. 13. Op-amp Characteristics. 14. Op-Amp as Summing amplifier, scaling and averaging amplifiers, integrator and differentiator, instrumentation amplifier 15. Astable Multivibrator using Op-	Characteristics. 2. Rectifiers by diodes and transistors 3. Op-Amp as Summing amplifier, scaling and averaging amplifiers, integrator and differentiator,. instrumentation amplifier 4. Astable Multivibrator using Op-Amp. 5. Low pass and High pass filers using Op-Amps. 6. Square wave and triangular wave generators. 7. Regulated power supply using IC723 8. Op-Amp as full wave rectifier. **9.** Series and parallel resonant circuits.		ed by External BOS Member	30

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				Amp. 16. Low pass and High pass filers using Op-Amps. 17. Square wave and triangular wave generators. 18. Regulated power supply using IC723 19. Op-Amp as full wave rectifier. **20.** Series and parallel resonant circuits.					
19PH5206	SSP-1 LAB	Professional core	*1.* Planck's constant *2.* Hall magnetic fields *3.* Internal series resistance of a solar cell *4.* Determination of Hall coefficient *5.* e/m Thomson method *6.* Characteristics of a Solar cell *7.* Forbidden energy band gap *8.* Thickness of wire using Wedge method	1. Lattice Constant measurement using X-ray diffracted film strip 2. Wavelength of LASER using diffraction grating 3. Hall magnetic fields 4. Internal resistance of a solar cell 5. Determination of Hall coefficient 6. e/m Thomson method 7. Characteristics of a Solar cell 8. Forbidden energy band gap 9. Thickness of wire using Wedge method 10. Series and parallel combination of solar cell	1. Lattice Constant measurement using X-ray diffracted film strip 2. Wavelength of LASER using diffraction grating 3. Planck's constant 4. Refractive index of various liquids using hallow prism 5. Refractive index of various liquids by forming Newton's rings 6. Diffraction grating for sodium doublet 7. Radius of curvature of lens by Newton's rings 8. Preparation of glass material using melt			Proposed by External BOS Member	30

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			9. Series and parallel combination of solar cell 10. Resolving power of a prism	11. Resolving power of a prism 12. Planck's constant 13. Refractive index of various liquids using hallow prism 14. Refractive index of various liquids by forming Newton's rings 15. Diffraction grating for sodium doublet 16. Radius of curvature of lens by Newton's rings 17. Preparation of glass material using melt quenching method. 18. Determination of refractive index and energy band gap of glass material 19. Analysis of absorption spectra of amorphous materials (UV-vis-NIR) 20. Analysis of photoluminescence spectra of amorphous materials.	quenching method. 9. Determination of refractive index and energy band gap of glass material 10. Analysis of absorption spectra of amorphous materials (UV-vis-NIR) Analysis of photoluminescence spectra of amorphous materials.			
19PH5207	Digital Electronics Lab	**Professional core**	1. Verification of Logic Gates and Universal Logic Gates 2. Logic Gates using Universal Gate (NAND)	1. Verification of Logic Gates and Universal Logic Gates 2. Construction of Logic	1. Construction of Logic gates by Universal Logic gates 2. De-Morgan's			

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			3. Combinational Circuits (half adder, full adder, half subtractor) 4. A/D and D/A conversion 5. Encoder – Decoder 6. Multiplexer and Demultiplexer 7. Verification of Flip-Flops 8. Counters 9. Registers 10. Microprocessor 8085 programs	gates by Universal Logic gates 3. De-Morgan's Theorem 4. Construction of Logic gate circuit by Boolean Problem 5. Construction of the Combinational Circuits (Half adder and Full adder) 6. Construction and verification of the A/D and D/A conversion circuits 7. Construction and verification of the Encoder and Decoder Circuits with truth table 8. Construction and verification of the Multiplexer and De multiplexer Circuits 9. Verification of Flip-Flops (Latch, SR flip-flop, D flip-flop, T flip-flop) 10. Verification of Flip-Flops (JK flip-flop, Master slave JK flip-flop) 11. Registers: Serial in serial Out and Serial in Parallel Out	Theorem 3. Construction of Logic gate circuit by Boolean Problem 4. Construction of the Combinational Circuits (Half adder and Full adder) 5. Verification of Flip-Flops (JK flip-flop, Master slave JK flip-flop) 6. Design of Automobile garage control system using counters 7. Construction of Combinational Circuit Based Car Security System 8. Design of Traffic signals by using Counters	**Yes**	Proposed by External BOS Member	30

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				12. Registers: Parallel in serial Out and Parallel in parallel Out 13. Counters: Synchronous Counters/ Asynchronous Counters 14. Design of Automobile garage control system using counters 15. Construction of Combinational Circuit Based Car Security System Design of Traffic signals by using Counters				
19PH5308	Solid State Physics Lab-II	**Professional core**	1. B-H Curve 2. Dielectric constant of a solid 3. Specific heat of a solid (Graphite) 4. Specific heat of a metal (Brass) using Lee's Method 5. Synthesis of nano particles 6. Photoluminescence properties of Materials 7. Refractive index by Abbe refractometer 8. Resistivity measurement	1. Youngs modulus by uniform bending method 2. Creep behavior of a metal wire 3. Lattice Dynamics 4. Energy loss of magnetic materials by tracing B-H curve 5. Curie temperature of a Ferroelectric material 6. Dielectric constant of a solid 7. Specific heat of a solid (Graphite)	1. Youngs modulus by uniform bending method 2. Creep behavior of a metal wire 3. Curie temperature of a Ferroelectric material 4. Velocity of Ultrasonic waves in a given liquid 5. Measurement of numerical aperture of optical fiber	**Yes**	Proposed by External BOS Member	30

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			of any composite material 9. Density,Viscosity, Surface tension measurement by using Ultrasonic interferometer 10. Lattice dynamics	8. Specific heat of a metal (Brass) using Lee's Method 9. Velocity of Ultrasonic waves in a given liquid 10. Density and Viscosity measurement of liquids 11. Measurement of numerical aperture of optical fiber 12. Optical fiber loss 13. Susceptibility measurement using Quincke's method 14. Circular coil – Stewart Gee Galvonometer 15. Determination of electrical conductivity using two probe method 16. Preparation of polymer electrolyte using solution casting technique 17. Analysis of XRD spectra of polymer electrolytes 18. Preparation of cathode materials using	6. Optical fiber loss 7. Susceptibility measurement using Quincke's method 8. Circular coil – Stewart Gee Galvonometer 9. Determination of electrical conductivity using two probe method 10. Preparation of polymer electrolyte using solution casting technique 11. Analysis of XRD spectra of polymer electrolytes 12. Preparation of cathode materials using hydro thermal method 13. Analysis of FT-IR spectra of polymer electrolytes 14. Preparation of cathode materials using solid state reaction method 15. Analysis of the cathode materials			

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				hydro thermal method 19. Analysis of FT-IR spectra of polymer electrolytes 20. Preparation of cathode materials using solid state reaction method 21. Analysis of the cathode materials using XRD and SEM **22.** Preparation of materials using spin coating method	using XRD and SEM 16. Preparation of materials using spin coating method			
19PH5303	Nuclear Physics	**Professional core**	**General Properties of nuclei:** Size of the nuclei, nuclear binding energy, nuclear angular momentum, parity and statistics, nuclear magnetic dipole moments and its experimental measurement, Schmidt limits, nuclear quadrupole moment. **Beta Decay:** Energy release in beta decay, Fermi theory of beta decay, shape of the beta spectra, angular momentum and parity selection rules, comparative half-lives, non-conservation of parity, beta	Nuclear Forces: The Deuteron – Ground state of deuteron – Magnetic dipole moment of deuteron – Properties of nuclear forces – Scattering cross section – High energy nucleon-nucleon scattering – Spindependence – Charge symmetry –	Nuclear Forces: The Deuteron – Ground state of deuteron – Magnetic dipole moment of deuteron – Properties of nuclear forces – Scattering cross section – High energy nucleon-nucleon scattering – Spindependence – Charge symmetry – Charge independence – Repulsion at short	Yes	Based on the external BOS member suggesion	20

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			spectroscopy. **Gamma Decay:** Energetics of gamma decay, angular momentum and parity selection rules, internal conversion, lifetimes for gamma emission, gamma ray spectroscopy. **Radiation Detection:** Introduction: Principle of detection of photons, charged particles and neutrons. Gas counters: Ionization chambers, Proportional counters, Neutron detectors and G.M. counters. Scintillation detectors: Organic and inorganic Scintillators – theory, characteristics and detection efficiency. BGO detectors – advantages of BGO over Scintillation detectors. Solid State Detectors: Silicon Surface Barrier detectors, E - E detection for charged particles, Si (Li) detectors for X-rays and electrons, HP Ge detectors for photon detection. Energy resolution, efficiency and timing considerations. **Prescribed Text Books:**	Charge independence – Repulsion at short distances – Meson theory of nuclear forces – Exchange forces. ***Nuclear Models*** The degenerate gas model – Liquid drop model –Binding energy of nucleus – semi empiricalmass formula (Bethe-Weizsacker formula) – Stability of nuclei against beta decay – Massparabola – Fermi gas model – Alpha particle model – Shell model – Collective model – Opticalmodel. **Radioactive Decays** (Alpha, Beta, Gamma radiations):	distances – Meson theory of nuclear forces – Exchange forces. The degenerate gas model – Liquid drop model –Binding energy of nucleus – semi empirical mass formula (Bethe- Weizsacker formula) – Stability of nuclei against beta decay – Massparabola – Fermi gas model – Alpha particle model – Shell model – Collective model – Opticalmodel.			

			1. Introductory Nuclear Physics - Kenneth S Krane. 2. Nuclear Radiation Detectors - S.S. Kapoor & V.S. Ramamurthy 3. Radiation Detection and Measurement - G.F. Knoll **Reference Books:** 1. The Atomic Nucleus - R.D. Evans. 2. Nuclear and Particle Physics - E.B.Paul. 3. Techniques for Nuclear and Particle Physics experiments - William. R. Leo	Law of radioactive decay– Half life, mean life and successive radioactive transformation – Alpha decay and barrier penetration – Gamow's theory of alpha decay – Pauli's hypothesis and Fermitheory of beta decay – selection rules – Electron captures – Absorption of Gamma rays bymatter – Interaction of Gamma ray with matter – Internal conversion. Nuclear Reaction, Fission and Fusion-1: Types of reaction and conservation laws – Energetic of nuclear reactions – Isospin – Reaction				

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				cross section – Compound nucleus reactions - Breit - Wigner one level formula.**II:** Characteristics of fissions – Energy in fission – Fission reactors – Basic fusion processes – Characteristics of fusion – Solar fusion – Controlled fusion reactors ***Prescribed Text Books:*** 1. Introductory Nuclear Physics - Kenneth S Krane. 2. Nuclear Radiation Detectors - S.S. Kapoor & V.S. Ramamurthy 3. Radiation Detection and Measurement - G.F. Knoll				

				Reference Books: 1. The Atomic Nucleus - R.D. Evans. 2. Nuclear and Particle Physics - E.B.Paul. 3. Techniques for Nuclear and Particle Physics experiments - William. R. Leo				
19PH5304	Particle Physics	**Professional core**	**Particle Physics:** Particle interactions and families, symmetries and conservation laws--- energy and momentum, angular momentum, parity, Baryon number, lepton number, isospin, strangeness and quarks and gluons, Grand unified theories (preliminaries only) charm, the quark model, colored 1. Nuclear and Particle	**Syllabus:** **Particle Physics:** Broad classification of elementary particles and particle interactions in nature, Properties of the Elementary Particles , Properties of the Fundamental Interactions conservation laws, symmetry	**Particle Physics:** Broad classification of elementary particles and particle interactions in nature, Properties of the Elementary Particles , Properties of the Fundamental Interactions conservation laws, Weak and Stronginteractions – Standard model, Particle accelerators and detectors: linear accelerators, cyclotron, synchrotron, colliding	yes	Based on the external BOS member suggestion	20

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			Physics - E.B.Paul. 2. Techniques for Nuclear and Particle Physics experiments - William. R. Leo	classifications of elementary particles- Gell-Mann-Nishijima scheme, CPT conservation, Quark hypothesis & Quantum chromodynamics, Quark modeland quark composition of mesons and baryons – Color and Flavor – Weak and Stronginteractions – Standard model, Particle accelerators and detectors: linear accelerators, cyclotron, synchrotron, colliding beam accelerators (LHC), gas-filled counters, scintillation detectors, semiconductor detectors. ***Text Books:***	beam accelerators (LHC), gas-filled counters, scintillation detectors, semiconductor detectors			

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				1. The Atomic Nucleus - R.D. Evans. 2. Nuclear and Particle Physics - E.B.Paul. 3. Techniques for Nuclear and Particle Physics experiments - William. R. Leo				

Anexure 2:

19PH5103 – ELECTRODYNAMICS

L-T-P-S: 4-0-0-0 Credits: 4 Prerequisite: Nil

Course Outcomes (COs) – Program Outcomes (POs) – Blooms Taxonomy Levels (BTL) Mapping Table:

CO#	Course Outcome	PO	BTL
CO1	Explain about Laplace and Poisson's equations, Static fields in material media, Polarization vector, macroscopic equations, classification of dielectric media, Molecular polarizability and electrical susceptibility, Clausius-Mossetti relation, Models of Molecular polarizability, energy of charges in dielectric media	1, 2	3
CO2	Discuss about The differential equations of magneto statics, vector potential, magnetic fields of a localized current distribution, Singularity in dipole field, Fermi-contact term, Force and torque on a localized current distribution.	1, 2	3
CO3	Explain about Formal solution of electrostatic boundary value problem with Green function, Method of images with examples, Magneto static boundary value problems. Wave guide and its types, Introduction of TE, TM modes and their boundary values	1, 2	3
CO4	Discuss about Faraday's law of induction, displacement current, Maxwell equations, scalar and vector potential, Gauge transformation, Lorentz and Coulomb gauges, conservation of energy, Poynting Theorem, Conservation of momentum.	1, 2	3

Syllabus:

Electrostatics:

Laplace and Poisson's equations, Electrostatic potential and energy density of the electromagnetic field, Multipole expansion of the scalar potential of a charge distribution, dipole moment, quadrupole moment, Multipole expansion of the energy of a charge distribution in an external field, Static fields in material media, Polarization vector, macroscopic equations, classification of dielectric media, Molecular polarizability and electrical susceptibility, Clausius-Mossetti relation, Models of Molecular polarizability, energy of charges in dielectric media (Maxwell stress tensor).

Magnetostatics:

The differential equations of magnetostatics, vector potential, magnetic fields of a localized current distribution, Singularity in dipole field, Fermi-contact term, Force and torque on a localized current distribution. (Magnetic stress tensor)

Boundary value problems:

Uniqueness theorem, Dirichlet and Neumann Boundary conditions, Earnshaw theorem, Green's (reciprocity) theorem, Formal solution of electrostatic boundary value problem with Green function, Method of images with examples, Magnetostatic boundary value problems. Wave guide and its types, Introduction of TE, TM modes and their boundary values

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Time varying fields and Maxwell equations:

Faraday's law of induction, displacement current, Maxwell equations, scalar and vector potential, Gauge transformation, Lorentz and Coulomb gauges, Hertz potential, General expression for the electromagnetic fields energy, conservation of energy, Poynting Theorem, Conservation of momentum.

Text Books:

1. Classical Electrodynamics: S.P. Puri (Narosa Publishing House) 2011.

2. Classical Electrodynamics: J.D. Jackson, (New Age, New Delhi) 2009.

3. Introduction to Electrodynamics: D.J. Griffiths (Prentice Hall India, New Delhi) 4th ed., 2011.

Reference Books:

1. Classical Electromagnetic Radiation: J.B. Marion and M.A. Heald(Saunders College Publishing House) 2nd edition, 1995.

2. Electromagnetic Fields, Ronald K. Wangsness (John Wiley and Sons) 1nd edition,1986.

3. Electromagnetic Field Theory Fundamentals: Bhag Singh Guru and H.R. Hiziroglu

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19PH5203-FIBER OPTICS AND NON-LINEAR OPTICS

L-T-P-S : 4-0-0-0 Credits : 4 Pre-requisite: NIL

Course Outcomes (COs) – Program Outcomes (POs) – Blooms Taxonomy Levels (BTL) Mapping Table:

CO#	Course Outcome	PO	BTL
CO1	Explains the light properties like total internal reflection and interference	1, 2	3
CO2	Fundamental properties of optical fibers, types of optical fibers and their related information	2	3
CO3	Different concepts of light and information related to interferometers and sensors	2	3
CO4	Explains the fiber optics in modulation sensors and different effects of light	2	3

Syllabus:

Introduction: Plane polarized wave – propagation of a light through a quarter wave plate – reflections at a plane interface – Brewster angle – total internal reflection – interference – refraction – concept of coherence – diffraction of Gaussian beam.

Fundamentals of Fiber Optics: Numerical aperture – attenuation in optical fibers – pulsed dispersion in step index optical fiber – loss mechanisms – absorptive loss – radiative loss – principle of optical waveguides – characteristics of fibers – pulsed dispersion in planar optical waveguide – modes in planar waveguides – TE, TM modes – propagation characteristics of step index and graded index optical fibers.

Intensity modulated Sensors: Transmission concept – reflective concept – microbending concept – intrinsic concepts – transmission and reflection with other optical effects - source of error and compensation schemes – phase modulation mechanisms in optical fibers – optical fiber interferometers – optical fiber phase sensors for mechanical variables – the optical fiber sagnac interferometer – optical fiber interferometric sensors.

Frequency modulation in Optical fiber sensors: Introduction – optical fiber Doppler system – development of the basic concepts. Polarization modulation in fiber sensors – introduction – optical activity – Faraday rotation – electro-gyration – electro –optic effect – kerr effect – photoelastic effect – polarization modulation sensors.

Text Boks:

1. D.A. Krohn, Fiber Optic Sensors: Fundamentals and Applications, 2nd edition, Instrument Society of America (1992).
2. B. Culshaw, Optical Fiber Sensing and Signal Processing, Peter Peregrinus Ltd. (1984).
3. Djafar K. Mynbaev and Lowell L. Scheiner, Fiber Optic Communications Technology, Pearson Education Asia (2001).

19PH5306-LASERS AND PHOTONICS

L-T-P-S : 4-0-0-0 Credits : 4 pre-requisite: NIL

Course Outcomes (COs) – Program Outcomes (POs) – Blooms Taxonomy Levels (BTL) Mapping Table:

CO#	Course Outcome	PO	BTL
CO1	Illustrating energy mechanism, distribution and design of various laser system	PO1, PO2	3
CO2	Understanding and explaining the various lasers systems and their applications	PO1, PO5	3
CO3	Illustrating the various mechanism in non linear optics	PO1, PO5	3
CO4	Understanding and interpreting the different properties of light like scattering and their applications the need of ceramics, and coatings	PO1, PO6	3

Syllabus:

Energy distributions and laser design:

Boltzmann distribution, Population inversion, Rate equations, Stability conditions, Three level and four level lasers; Issues in designing a laser; Pumping mechanisms; Stable and unstable resonators, Laser Cavity, Longitudinal and Transverse Modes, Mode Selection, Gain in a Regenerative Laser Cavity; Q-switching, Mode locking, Laser amplification, Frequency conversion, Pulse expansion, Pulse shortening – Pico-second and Femtosecond operatlons, Spectral narrowing and Stabilization.

Laser systems:

Basics of tunable, ultrafast and power lasers; Gas lasers: He-Ne, He-Cd, Ar, Kr ion, CO2, Excimer lasers; Solid state lasers: Diode pumped solid state lasers, Lamp pumping and thermal issues; Ruby, Nd-YAG, Fibre lasers; Semiconductor lasers: Laser materials, Laser structure, Frequency control of laser output, Modern diode laser, Quantum cascade lasers, p-Ge lasers, Vertical-cavity surface-emitting laser.

Applications of laser:

Laser cooling; Laser barcode scanner, Laser trimming, Cutting, Welding, Drilling and Tracking, Pattern formation by laser etching; LIDAR; Laser-tissue interaction, Laser surgery; Holography, Interferometry, Microscopy.

Nonlinear optics & Linear optics:

Homogeneous isotropic media, wave propagation in linear isotropic media, anisotropic materials, tensor nature of anisotropy, harmonic oscillator: optical response, nonlinear optical susceptibility: susceptibility tensor, wave propagation in nonlinear media, second harmonic generation.

Light scattering

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Extinction, scattering, and absorption cross sections, optical theorem, light scattering from small objects, Mie theory, Mie scattering, Rayleigh scattering, importance of scattering and extinction in optical experiments.

Optical properties of materials: Complex dielectric function and refractive index, optical properties of metals, permittivity of metals, damping constant, optical properties of semiconductors, optical properties of semiconductor nanocrystals: quantum dots, excitons, optical properties of novel materials like graphene and topological insulators.

TEXT BOOKS

1. Jasprit Singh, Optoelectronics: An introduction to Materials and Devices, McGrawHill Inc, 1996.
2. O. Svelto, *Principles of Laser,* Plenum (1998).
3. Robert W. Boyd, *Nonlinear Optics,* Academic Press, New York, 1992.

REFERENCE BOOKS

1. S.O.Kasap, Optoelectronics and photonics: principles and practices, Prentice Hall 2001.
2. W. T. Silfvast, *Laser and Fundamentals,* Cambridge (1996).
3. A. K. Ghatak & K. Thyagarajan, *Optical Electronics*, Cambridge University Press,(1991).

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19PH54E1-EXPERIMENTAL PHYSICS

L-T-P-S : 3-0-0-0 Credits : 3 Pre-requisite: NIL

Course Outcomes (COs) – Program Outcomes (POs) – Blooms Taxonomy Levels (BTL) Mapping Table:

CO#	Course Outcome	PO	BTL
CO1	Ability to understand basic properties of materials and applying the techniques to calculate required values	PO2	4
CO2	Analyze the results obtained from different characterization techniques	PO3, PSO2	4
CO3	Ability to analyze the results to obtain better output	PO3, PSO2	4
CO4	Ability to analyze the results obtained from different characterization techniques to achieve quality material for better out put	PO3, PSO2	4

Syllabus:

Unit-1: Properties of Electromagnetic radiation, interaction of EM radiation with matter, absorption, scattering, diffraction, polarization, excitation and de-excitation. Experimental techniques and analysis of materials through X- ray scattering techniques: powder method, Laue method, crystal structure determination. Phase diagram determination of X-ray diffraction. Atomic scattering and Geometrical structure factors. Factors influencing the intensities of diffracted beams. Powder X-ray diffractometer. Applications of XRD in materials.

Unit-2: Study of the morphology, aggregation, size and microstructure of ceramic materials using Optical microscope, quantitative phase analysis. Principle of electron microscopy. Construction and operation of Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM), Atomic force microscopy (AFM). Electron diffraction by crystalline solids; selected area diffraction. Atomic Force Microscope. Mechanism of image formation in SEM and its processing. Electron microprobe analysis (EDAX and WDS). Preparation of samples for electron microscopic studies. ESCA and PES.

Unit-3: Spectroscopic analysis of materials: Basic laws of spectroscopy and its application in micro analysis, Spectroscopic characterization techniques: Rutherford backscattering0
method, X-ray photoelectron Spectroscopy. Electrical Characterizations: Dielectric measurements, polarization-electric field measurements. Magnetic Characterization: M-H.

Unit-4: Nanoscale lithography techniques and technology, major methods of nanoscale lithography. Moore's Law. Lithography techniques (Photolithography, Electron-beam lithography,X-Ray Lithography. DTA, TGA and DSC with suitable examples of glass and ceramic materials. Vacuum Techniques: Physical vapor deposition, Chemical vapor deposition and Molecular beam Epitaxy method.

Text Books:

1. H.H. Willard, L.L. Merritt, J.A. Dean and F.A. Settle, Instrumental Methods of Analysis, 6th Ed., C.B.S. Publishers, New Delhi, 1991.
2. Metals Handbook Vol. 9, Characterization of Materials, 10th Ed., American Soc. of Metals, Metals Park, Ohio, 1986.
3. G.A. Higgerson, Experiments in Materials Technology, Affiliated East-West Press, 1973.
4. L.C. Azzarof, Elements of X-ray Crystallography, McGraw-Hill, New York, 1968.
5. M.V. Heimendahl, Electron Microscopy of Materials-An Introduction, Academic Press, 1980.

19PH54E2-BASIC COMMUNICATION THEORY

L-T-P-S : 3-0-0-0 Credits : 3 Pre-requisite: NIL

Course Outcomes (COs) – Program Outcomes (POs) – Blooms Taxonomy Levels (BTL) Mapping Table:

CO#	Course Outcome	PO	BTL
CO1	To understand production and detection of amplitude modulation.	PO1, PO2	2
CO2	To understand production and detection of angle or frequency modulation.	PO1, PO2	2
CO3	To understand noise, its characterization and its effects on FM system	PO1, PO2	2
CO4	To understand Shannon law, Source coding theorem, Huffman & Shannon Fano codes.	PO1, PO2	2

Syllabus:

Amplitude Modulation

Generation and detection of AM wave-spectra-DSBSC, Hilbert Transform, Pre-envelope & complex envelope – SSB and VSB –comparison -Superheterodyne Receiver.

Angle Modulation

Phase and frequency modulation-Narrow Band and Wind band FM – Spectrum – FM modulation and demodulation – FM Discriminator- PLL as FM Demodulator – Transmission bandwidth.

Random Process

Random variables, Central limit Theorem, Random Process, Stationary Processes, Mean, Correlation & Covariance functions, Power Spectral Density, Ergodic Processes, Gaussian Process, Transmission of a Random Process Through a LTI filter.

Noise Characterization

Noise sources and types – Noise figure and noise temperature – Noise in cascaded systems. Narrow band noise – PSD of in-phase and quadrature noise –Noise performance in AM systems – Noise performance in FM systems – Pre-emphasis and de-emphasis – Capture effect, threshold effect.

Information Theory

Entropy – Discrete Memoryless channels – Channel Capacity -Hartley – Shannon law – Source coding theorem – Huffman & Shannon – Fano codes.

TEXT BOOKS:

1. J.G.Proakis, M.Salehi, "Fundamentals of Communication Systems", Pearson Education 2006.
2. S. Haykin, "Digital Communications", John Wiley, 2005.

REFERENCES:

1. B.P.Lathi, "Modern Digital and Analog Communication Systems", 3rd Edition, Oxford University Press, 2007.
2. B.Sklar, "Digital Communications Fundamentals and Applications", 2nd Edition Pearson Education 2007
3. H P Hsu, Schaum Outline Series – "Analog and Digital Communications" TMH 2006
4. Couch.L., "Modern Communication Systems", Pearson, 2001.

19PH54E3-PHYSICS OF NANOMATERIALS

L-T-P-S : 3-0-0-0 Credits : 3 Pre-requisite: NIL

Course Outcomes (COs) – Program Outcomes (POs) – Blooms Taxonomy Levels (BTL) Mapping Table:

CO#	Course Outcome	PO	BTL
CO1	Understand the importance quantum mechanics, energy bands and electronic statistics	PO1,PO7	2
CO2	Understand heterostructures, quantum wells, dots, wires.	PO1,PO7	2
CO3	Understand the coupling between quantum wells, dots and wires and transmissions.	PO1,PO7	2
CO4	Understand the CNT and bulk nanostructured materials	PO1,PO7	2

Syllabus:

Overview of quantum mechanics, concepts related to low-dimensional systems, wave-particle duality, Heisenberg principle, Schrödinger wave equation, Fermi-Dirac and Bose-Einstein distributions. Concepts related to electronic structure: direct lattice, reciprocal lattice, energy bands, direct and indirect band gap semiconductors, variation of energy bands with alloy composition, lattice mismatching, effective-mass, electron statistics

Heterojunctions, Type I and Type II heterostructures, classification of quantum confined systems, electrons and holes in quantum wells, surface to volume ratio in quantum confined systems, spherical cluster approximation, exterior and interior surface area. Electron states in heterostructures: electronic wave functions, energy subbands and density of electronic states in quantum wells, quantum wires, quantum dots, effective-mass mismatch in heterostructures

Coupling between quantum wells, super lattices, wave functions and density of states for super lattices, unit cell for quantum well, for quantum wire and for quantum dots, 2DEG. Transmission in nanostructures: tunneling in planar barrier, Resonant Tunnel diodes. Excitons: in bulk, in quantum structures and in heterostructures

Metal nanoclusters, magic numbers, geometric structures, electronic structure, bulk to nanotransition, magnetic clusters, semiconducting nanoparticles, rare-gas and molecular clusters. Carbon nanoparticles: CNTs, chiral vector, chiral angle, unit cell for CNTs. Bulk nanostructured materials: Solid disordered crystals, colloidal Photonic crystals

Text Books:

1. Nanotechnology-Molecularly Designed Materials: *G.M. Chow & K.E. Gonsalves (American Chemical Society), 1996.*
2. Nanotechnology Molecular Speculations on Global Abundance: *B.C. Crandall (MIT Press), 1996.*

Reference Books:

1. Quantum Dot Heterostructures: D. Bimerg, M. Grundmann and N.N. Ledentsov (Wiley),1998.
2. Nanoparticles and Nanostructured Films–Preparation, Characterization and Application: J.H.Fendler (Wiley), 1998.
3. Nanofabrication and Bio-system: H.C. Hoch, H.G. Craighead and L. Jelinski (Cambridge Univ. Press), 1996.
4. Physics of Semiconductor Nanostructures: K.P. Jain (Narosa), 1997.
5. Physics of Low-Dimension Semiconductors: J.H. Davies (Cambridge Univ. Press) 1998.
6. Advances in Solid State Physics (Vo.41): *B. Kramer (Ed.) (Springer), 2001.*

PROPOSED AND REVISED M. SC (PHYSICS) COURSE STRUCTURE FOR Y19 (2019-20) (CHOICE BASED CREDIT SYSTEM (CBCS))

Sl No	Course Code	Course Title	Type	L	T	P	S	Cr	CH	Pre-Requisite	New Course/Revised Course/ Retained Course	Focused on
1	19PH5101	Mathematical Physics	PC/M	4	0	0	0	4	4	NIL	Retained	Employability
2	19PH5102	Classical Mechanics	PC/M	4	0	0	0	4	4	NIL	Retained	Employability
3	19PH5103	Electrodynamics	PC/M	4	0	0	0	4	4	NIL	New course	Employability
4	19PH5104	Analog Electronics	PC/M	4	0	0	0	4	4	NIL	Retained	Employability
5	19PH5105	Computational Physics	PC/M	4	0	0	0	4	4	NIL	Retained	Employability/Skilling
6	19PH5106	Analog Electronics Lab	PC/M	0	0	6	0	3	6	NIL	Revised	Employability
7	19PH5107	Computational Physics Lab	PC/M	0	0	4	0	2	4	NIL	Retained	Employability
8	198PH5108	Seminar-1	PC/M	0	0	2	0	1	2	NIL	Retained	Skilling
9	19PH5201	Statistical Mechanics	PC/M	4	0	0	0	4	4	NIL	Retained	Employability
10	19PH5202	Quantum Mechanics-1	PC/M	4	0	0	0	4	4	NIL	Retained	Employability
11	19PH5203	Fiber Optics and Non-linear optics	PC/M	4	0	0	0	4	4	NIL	New course	Employability
12	19PH5204	Solid State Physics-1	PC/M	4	0	0	0	4	4	NIL	Revised	Employability
13	19PH5205	Digital Electronics	PC/M	4	0	0	0	4	4	NIL	Retained	Employability
14	19PH5206	Solid State Physics-1 Lab	PC/M	0	0	6	0	3	6	NIL	Revised	Skilling
15	19PH5207	Digital Electronics Lab	PC/M	0	0	4	0	2	4	NIL	Revised	Skilling

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16	19PH5208	Seminar-2	PC/M	0	0	2	0	1	2	NIL	Retained	Skilling
17	19PH5301	Quantum Mechanics-2	PC/M	4	0	0	0	4	4	Q M-1	Retained	Employability
18	19PH5302	Atomic and Molecular Spectroscopy	PC/M	4	0	0	0	4	4	NIL	Retained	Employability
19	19PH5303	Nuclear Physics	PC/M	2	0	0	0	2	2	NIL	Revised	Employability
20	19PH5304	Particle Physics	PC/M	2	0	0	0	2	2	NIL	Revised	Employability
21	19PH5305	Solid State Physics-2	PC/M	4	0	0	0	4	4	NIL	Revised	Employability
22	19PH5306	Lasers and Photonics	PC/M	4	0	0	0	4	4	NIL	New course	Employability
23	19PH5307	Term Paper	PC/M	0	0	4	0	2	4	NIL	Retained	Skilling
24	19PH5308	Solid State Physics-2 Lab	PC/M	0	0	6	0	3	6	NIL	Revised	Skilling
25	19PH5401	Dissertation with Published Paper	PC/M	0	0	16	0	8	16	NIL	Retained	Skilling
		Electives										
		Elective-1										
26	19PH54E1	Experimental Techniques	PE	3	0	0	0	3	3	NIL	New course	Employability
27	19PH54E2	Basic Communication Theory	PE	3	0	0	0	3	3	NIL	New course	Employability
		Elective-2										
28	19PH54E3	Physics of Nanomaterials	PE	3	0	0	0	3	3	NIL	New Course	Employability
29	19PH54E4	Radar Systems and Satellite Communication	PE	3	0	0	0	3	3	NIL	Retained	Employability
		Elective-3										
30	19PH54E5	Thin film Technology	PE	3	0	0	0	3	3	NIL	Retained	Employability

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31	19PH54E6	Antenna Theory and Radiowave Propagation	PE	3	0	0	0	3	3	NIL	Retained	Employability
				69	**02**	**50**		**96**	**121**			

*PC/M – Professional Core/Mandatory; PE – Professional Elective; PW/M – Project Work/Mandatory.

Percentage of syllabus revision=26.4
Percentage of Courses focusing on Employability= No. of courses focusing on Employability/ Total number of courses=21/28=75
Percentage of Courses focusing on Entrepreneurship= No. of courses focusing on Entrepreneurship / Total number of courses=0
Percentage of Courses focusing on Skill Development = No. of courses focusing on Skill Development /Total number of courses=3/28=28.57

Reference for Program Structures and Syllabus Revision

S.No	Course Code	Course Name	Course Category	Existing Syllabus	New Syllabus	Topics Added/Removed/ Replaced	Change in outcome	Justification for modification	Revision Percentage
1	19PH5101	Mathematical Physics	PC/M	-	-	-	-	-	-
2	19PH5102	Classical Mechanics	PC/M	-	-	-	-	-	-
3	19PH5103	Electrodynamics	PC/M	**Annexure-2**	New Syllabus	- **Annexure-2**	-	-	100
4	19PH5104	Analog Electronics	PC/M	-	-	-	-	-	30
5	19PH5105	Computational Physics	PC/M	-	-	-	-	-	-
6	19PH5106	Analog Electronics Lab	PC/M	-	-	-	-	-	30

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7	19PH5107	Computational Physics Lab	PC/M	-	-	-	-	-	-
8	198PH5108	Seminar-1	PC/M	-	-	-	-	-	-
9	19PH5201	Statistical Mechanics	PC/M	-	-	-	-	-	-
10	19PH5202	Quantum Mechanics-1	PC/M	-	-	-	-	-	-
11	19PH5203	Fiber Optics and Non-linear optics	PC/M	**- Annexure-2**	**New syllabus**	**-Annexure-2**	-	-	**100**
12	19PH5204	Solid State Physics-1	PC/M	-	-	-	-	-	-
13	19PH5205	Digital Electronics	PC/M	-	-	-	-	-	-
14	19PH5206	Solid State Physics-1 Lab	PC/M	-	-	-	-	-	**30**
15	19PH5207	Digital Electronics Lab	PC/M	-	-	-	-	-	**30**
16	19PH5208	Seminar-2	PC/M	-	-	-	-	-	-
17	19PH5301	Quantum Mechanics-2	PC/M	-	-	-	-		-
18	19PH5302	Atomic and Molecular Spectroscopy	PC/M	-	-	-	-	-	-
19	19PH5303	Nuclear Physics	PC/M	-	-	-	-	-	**20**
20	19PH5304	Particle Physics	PC/M	-	-	-	-	-	**20**
21	19PH5305	Solid State Physics-2	PC/M	-	-	-	-	-	-
22	19PH5306	Lasers and	PC/M	**- Annexure-2**	**New**	**- Annexure-2**	-	-	**100**

		Photonics			syllabus				
23	19PH5307	Term Paper	PC/M						
24	19PH5308	Solid State Physics-2 Lab	PC/M						
25	19PH5401	Dissertation with Published Paper	PC/M	-	-	-	-	-	-
26	219PH54E1	Experimental Techniques	**PE**	**Annexure-2**	**New Course**	**Annexure-2**	-	-	**100**
	19PH54E2	Basic Communication Theory	**PE**	-	-	-	-	-	-
27	22PH54E3	Physics of Nanomaterials	**PE**	**Annexure-2**	**New Course**	**Annexure-2**			**100**
	22PH54E4	Radar Systems and Satellite Communication	**PE**	-	-	-	-	-	-
28	22PH54E5	Thin film Technology	**PE**	**Annexure-2**	**New Course**	**- Annexure-2**	-	-	**100**
	22PH54E6	Antenna Theory and Radiowave Propagation	**PE**		--				
	Average percentage of revision= (sum of revision in all courses/ Total no. of courses)								**26.4**

Suni 20/6/2019

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Meeting Minutes of DAC-1 held on 26-03-2019

The Head of Department of Physics conducted the DAC-1 meeting on 26-03-2019 from 2 pm to 3:30 pm in Physics Lab (F201).

The following Committee members were concerned and discussed the following:

Members Present:

1. Dr. G. Sunita Sundari	Assoc. Professor & Head of the Department
2. Dr. N.S.M.P. Latha Devi	Assoc. Professor
3. Dr. K. Swapna	Assoc. Professor & RPAC Chairman
4. Dr. Shaik Mahamuda	Assoc. Professor
5. Dr. K. Raghavendra Kumar	Assoc. Professor & PG Coordinator
6. Dr. M.V.V.K. Srinivas Prasad	Asst. Professor& Assoc. Dean (Academics)
7. Dr. M. Venkateswarlu	Asst. Professor & Professor In-charge
8. Dr. A. Venkateswara Rao	Asst. Professor
9. Dr. Sk. Babu	Asst. Professor & Research Group Head
10. Dr. A. Sendil Kumar	Asst. Professor
11. Dr. S. Shanmugan	Asst. Professor
12. Mr. M. Gnana Kiran	Asst. Professor & Assoc Dean (P & D)

- Dr. G. Sunita Sundari, Assoc. Prof. & Head, Department of Physics welcomed all committee members to the DAC meeting.
- Agenda Items

Agenda – 1

Proposed to include Computational Fluid Mechanics as an elective for the AY 2017-18	**Approved the same in DAC and recommended to BOS for the approval**

As per the feedback received from one of the stakeholder, Mr John De Nibigerau, MSc Physics student (172220001), the department resolved to introduce the computation fluid mechanics course as an elective after being approved in the DAC meeting. The same has been resolved and approved in the BOS also.

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Agenda – 2

Proposed to have major revision in the existing syllabus of MSc Physics program with the addition of several new courses and deletion of topics in few course and revision of curriculum for the Y19 admitted students.	**Approved the same in DAC and recommended to BOS for the approval**

- Considering the feedback received from different stakeholders such as student, faculty, academic peers and others, the department decided to have an extensive revision of curriculum and the same has to be introduced for the Y19 batch students.

20/6/2019

Dr. G. Sunita Sundari

HOD-Physics

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