KLEF

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

DEPARTMENT OF PHYSICS

5th Board of Studies (BOS) Meeting

15th March 2022

Koneru Lakshmaiah Education Foundation
(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)
Accredited by NAAC as 'A++' ❖Approved by AICTE ❖ ISO 9001-2015 Certified
Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA
Phone No. 08645 - 350200; www.klef.ac.in; www.klef.edu.in; www.kluniversity.in
Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002. Ph: +91 - 866 - 3500122, 2576129

XXXV Academic Council - Annexure 2.10

Department of Physics

Minutes of 5th Board of Studies Meeting

The Department of Physics held its 5th BOS meeting on **15th March 2022**, from 2:00 PM to 3:30 PM in Room No. F201 with be
Cisco WebEx virtual meeting (External BOS member will join online)
https://kluniversity.webex.com/kluniversity/j.php?MTID=mb53b054ae359597fd2fe5b33fbd91b97

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 & Dept Prof In charge (Academics)
3. Dr. Balakrishna Ramalingam, Project Engineer, Singapore University of Technology & Design (SUTD), Singapore
4. Dr.N.S.M.P. Latha Devi, Associate Professor
5. Dr. K.Swapna, Associate Professor
6. Dr.Sk. Mahamuda, Associate Professor
7. Dr. K Raghavendra Kumar, Assoc Professor
8. Dr. M V V K Srinivas Prasad, Asst. Professor
9. Dr. A.Venkateswara Rao, Asst. Professor
10. Dr. Sk.Babu, Asst. Professor
11. Dr. S. Shanmugan, Asst. Professor
12. Dr A Sendil Kumar, Asst Professor
13. Mr M Gnana Kiran, Asst. Professor
14. Prof. B.V. Appa rao, Professor, HOD, Dept. of Mathematics

15/3/2022
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.

MEMBERS ATTENDED THE BOARD OF STUDIES MEETING, DEPARTMENT OF PHYSICS

S. No.	Name	Designation	Position	Signature
1	Dr. V. R. Raghuveer	Professor & Dean-Academics	BOS Patron	ABSENT
2	Dr. G. Sunita Sundari	Associate Professor & HOD	BOS-Chairperson	15/3/2024
3	Dr. M. Venkateswarlu	Asst. Professor & Prof. In-Charge	BOS-Secretary	
4	Prof. J. Suryanarayana	Assoc. Professor, Dept. of Physics, IIT Hyderabad, Telangana. Mobile No. 9676212499 Office: 040-23017085 E –mail: surya@iith.ac.in	External Member & Expert	ABSENT
5	Prof. D. Haranath	Associate Professor Department of Physics National Institute of Technology Warangal (NITW), Warangal - 506004, Telangana. Email: haranath@nitw.ac.in Mobile: 9958101115, 7678248149	External Member & Expert	ABSENT
6	Prof. Balakrishnan Ramalingam	Researcher, Project Engineer Singapore University of Technology & Design (SUTD) 8 Somapah Road, SINGAPORE 487372 Mobile: +6583804054 Email: balakrishnan.sjc@gmail.com	External Member & Industrial Expert	
7	Dr. P. Vidya Sagar	Professor & Assoc Dean (Acad)	BOS member from Academics office	ABSENT
8	Dr. V.N. Sailaja	Professor & Assoc Dean (Acad)	BOS member from Academics office	ABSENT
9	Dr. N. S. M. P. Latha Devi	Associate Professor	Internal Member	
10	Dr. K. Swapna	Associate Professor & APEX Member	Internal Member	
11	Dr. Mahamuda Shaik	Associate Professor	Internal Member	
12	Dr. K. Raghavendra Kumar	Associate Professor & PG Coordinator	Internal Member	
13	Dr. M V V K Srinivas Prasad	Assistant Professor & Assoc. Dean (Academics)	Internal Member	
14	Dr. A Venkateswara Rao	Assistant Professor & RPAC Chair	Internal Member	
15	Dr. Shaik Babu	Assistant Professor & Dy. HOD	Internal Member	
16	Dr. S. Shanmugan	Assistant Professor	Internal Member	
17	Mr. M. Gnana Kiran	Assistant Professor & Assoc. Dean (P&D)	Internal Member	
18	Dr.A.Sendhil Kumar	Assistant Professor	Internal Member	
19	Dr. D. Haritha	Professor, HOD, Dept of BES-1	Internal Member	ABSENT
20	Dr. B. V. Appa Rao	Professor, HOD, Dept. of Mathematics	Internal Member	
21	Dr. J.V. Shanmukh Kumar	Professor, HOD, Dept. of Chemistry	Internal Member	ABSENT

15/3/2024

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

Contents

Item No.	Item Description
1	Follow-up actions on the Minutes of the previous meetings of the Board of Studies of Department of Physics, KLEF, Vaddeswaram campus.
2	Proposed to revise the existing syllabus of Nuclear Physics (21PH5303; 2-0-0-0; Cr: 2) in MSc Physics program
3	Proposed to revise the existing syllabus with the deletion of few advanced topics related to research in the course "Physics of Nanomaterials" (21PH54E3; 3-0-0-0; Cr: 3).
4	Proposed to include three elective courses under each professional elective category (Nano Photonics-22PH54E3; Nanoelectronics-22PH54E6). Nanotechnology for Renewable Energy Materials- 22PH54E9 and English course in MSc Physics program for the AY 2022-23 admitted batch students.
5	Proposed to merge Design Thinking and Innovation (DTI) - 1 and 2 courses as a single course Design Thinking and Innovation (DTI) implemented from Y21 batch onwards.
6	Propose to include Five new courses with their Pre-PhD curriculum related to specific research areas.

The Head, Department of Physics formally welcomed all the members to the meeting of Board of Studies and thereafter the agenda items are discussed and resolved as follows:

AGENDA ITEMS

Agenda Item-1

To consider and approved the previous BoS meeting minutes held on 19th May 2021.

BOS Chairman presented a detailed M.Sc Physics curriculum for the A.Y. 2022-23 admitted batch students to the all members. Upon due deliberations, the external members suggested the following modifications/revisions in the curriculum.

Agenda Point – 2

Proposed to revise the existing syllabus of Nuclear Physics (21PH5303; 2-0-0-0; Cr: 2) in MSc Physics program.	Recommended and sent for the approval of Academic council

Discussion:

As per the suggestion of external BoS Members Prof. J. Suryanarayana garu and Prof D Haranath garu as well as feedback from the course coordinator, we have modified the existing syllabus of Nuclear Physics course (21PH5303) and added topics covering national competitive exams such as CSIR/GATE and others.

Resolution:

It is resolved to approve the modifications suggested by the external BOS members and course coordinator/feedback received from the students to add few topics to meet the requirements of CSIR/GATE syllabus in the existing curriculum and updated curriculum is shown in Annexure-I.

15/3/2022

Dr. G. SUNITA DEVI
Head of the Department
Department of Physics
Koneru Lakshmaiah Education Foundation
(Deemed to be University)
Green Fields, Vaddeswaram-522 502.
Guntur Dist., A.P., India.

Agenda Point – 3

Proposed to revise the existing syllabus with the deletion of few advanced topics related to research in the course "Physics of Nanomaterials" (21PH54E3; 3-0-0-0; Cr: 3).	Approved and recommend to the Academic Council for approval

Discussion:

As per the suggestion of external BoS Members Prof. J. Suryanarayana garu as well as feedback from the course coordinator (Dr S Shanmugan) and alumni (Mr Rajesh Kumar (194220001) and Ms Ch Pravallika (194220002)), we modified the existing syllabus of Physics of Nanomaterials (21PH54E4) by deleting topics which are in advanced level of learning and research-oriented ones.

Resolution: It is resolved to approve the modifications suggested by the external BOS members and course coordinator/feedback received from the alumni students to revise/delete the advanced topics related to research from the existing curriculum and updated curriculum is shown in Annexure – II.

Agenda Point – 4

Proposed to include three elective courses under each professional elective category (Nano Photonics-22PH54E3; Nanoelectronics-22PH54E6). Nanotechnology for Renewable Energy Materials- 22PH54E9 and English course in MSc Physics program for the AY 2022-23 admitted batch students.	Approved and recommend to the Academic Council for approval

Discussion:

As per the suggestion of Externall BoS member Prof. Balakrishnan Ramalingam and Dean-Placements Prof NBV Prasad garu, we have introduced the three elective courses under each professional elective category (Nano Photonics-22PH54E3; Nanoelectronics-22PH54E6). Nanotechnology for Renewable Energy Materials- 22PH54E9 under the contemporary requirements and English Proficiency course in the program to enhance the students' carrier and communication and soft skills which are very much useful to undergo rigorous training and employment through campus placements.

Resolution:

It is resolved and approved in the BOS meeting to implement the three professional elective courses and Integrated Proficiency in English course in MSc Physics program for the students admitted in the AY 2022-23. The motivation and implementation of this value-added course is it will enhance and improve the soft and communication skills of students. The proposed syllabus for the course is shown in Annexure – III.

15/3/2022

Dr. G. S[illegible]
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.

Agenda Point – 5

Proposed to merge Design Thinking and Innovation (DTI) - 1 and 2 courses as a single course Design Thinking and Innovation (DTI) implemented from Y21 batch onwards.	Approved and recommend to the Academic Council for approval

Discussion:

As per the suggestion of Dean-Academics Prof V Raghuveer garu, we have included and merged two DTI (DTI-1 & DTI-2) courses in to a single DTI course for the AY 2021-22 batch students. The course is aimed to motivate students for the initiation of Startups and towards development of leadership qualities in the students.

Resolution:

It is resolved and approved in the BOS meeting that both earlier scheduled DTI-1 and DTI-2 are merged as a single course as DTI (with course details as 21UC1203, 0-0-4-0; Cr: 2). The merged course is implemented for the students in the university and it will be conducted in Hybrid mode (offline/online) classes with initiation from Y21 batch admitted students itself. The same is permitted by the external, internal, and other stakeholders of BOS for its inclusion as a single merged course that add students to think innovatively and enhance the employability and entrepreneur skills. The proposed syllabus for the course is shown in Annexure – IV.

Agenda Point – 6

Propose to include Five new courses with their Pre-PhD curriculum related to specific research areas.	Approved and recommend to the Academic Council for approval

Discussion:

As per the suggestion of BoS chair based on faculty research specialization, we have introduced the five Pre-Ph.D elective courses which are more useful for better analysis of the research data.

Resolution: It is resolved and approved in the BOS meeting to include five more new courses in Pre-PhD program of Physics to the existing courses related to specific areas of research. The proposed syllabus for the courses is shown in Annexure – V.

Agenda Point – 7

Propose to include the PDD for the Y22 batch students for the approval in BOS.	Approved and recommend to the Academic Council for approval

Resolution: It is resolved and approved in the BOS meeting the inclusion of PDD file prepared for the Y22 batch students. The same has been recommended to the Academic council for the necessary approval.

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.

Annexure I:

Course Code	Course Name	Course Category	Existing Syllabus	New Syllabus for approval	Topics Added/Removed/ Replaced	% Change of syllabus	Change in outcome	Justification for the modification
21PH5303	Nuclear Physics	Professional Core/Mandatory	**Two body problem and 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 – Spin dependence – Charge symmetry – Charge independence S-wave effective range theory– 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 empirical mass formula (Bethe-	**CO I: Two body problem and 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 – Spin dependence – Charge symmetry – Charge independence – Repulsion at short distances –**Nucleon-nucleon interaction –** – Exchange forces **and tensor force** - Meson theory of nuclear forces. **CO II: Nuclear Models** The degenerate gas model – Liquid drop model –Binding energy of nucleus – semi empirical mass formula	Nucleon-nucleon interaction — Exchange forces and tensor force - Meson theory of nuclear forces. Magnetic moments Collective model of Bohr and Motteision - Nuclear vibration – Optical model - Nuclear rotation – Nelson model Resonance scattering – Absorption cross section at high energy Prescribed Text Books: 1. K. Krane, " Introductory Nuclear Physics", Wiley, New York, 1987. 2. V. Devanathan, "Nuclear Physics" Narosa Publishing house	**25%**	YES	As proposed by the BOS external members, course coordinator, and feedback received from all stakeholders.

Sunita 12/3/2022

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Dhanalakshmi Education Foundation
(Deemed to be University)
Velappanchavadi, Chennai-600 073, India.

			Weizsacker formula) – Stability of nuclei against beta decay – Mass parabola – Fermi gas model – Alpha particle model – Shell model – Collective model – Optical model. **Radioactive Decays** (Alpha, Beta, Gamma radiations): 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 Fermi theory of beta decay – selection rules – Electron captures – Absorption of Gamma rays by matter – Interaction of Gamma ray with matter – Internal conversion Radiation Utilizing Technology. **Nuclear Reaction, Fission and Fusion**	(Bethe- Weizsacker formula) – Stability of nuclei against beta decay –Mass parabola – Fermi gas model – Alpha particle model – Shell model – **Magnetic moments Collective model of Bohr and Motteision - Nuclear vibration** – Optical model - **Nuclear rotation – Nelson model** **CO III: Radioactive Decays** (Alpha, Beta, Gamma radiations): 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 Fermi theory of beta decay – selection rules – Electron captures – Absorption of Gamma rays by matter – Interaction of Gamma ray with matter – Internal conversion- Radiation Utilizing Technology	D. Griffiths, "Introduction to Elementary Particles", 2nd Ed., Wily-Vch, 2008			

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Lakshmaiah Education Foundation
(Deemed to be University)
Vaddeswaram-522 302.
Guntur Dt. India.

			I: Introduction: - Types of reaction and conservation laws– Energetic of nuclear reactions, Isospin – Reaction cross section – Compound nucleus reactions - Breit - Wigner one level formula. Neutron Classification and Neutron Sources, Interactions of Neutrons with Matter. Definition of Neutron Flux and Fluence, Neutron Cross Section, Reactor Flux Spectrum - **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	**CO IV: Nuclear Reaction, Fission and Fusion** **I:** Types of reaction and conservation laws – Energetic of nuclear reactions – Isospin – Reaction cross section – Compound nucleus reactions - Breit - Wigner one level formula - **Resonance scattering – Absorption cross section at high energy** - Neutron Classification and Neutron Sources, Interactions of Neutrons with Matter. Definition of Neutron Flux and Fluence, Neutron Cross Section, Reactor Flux Spectrum **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				

Dr. G. [illegible] SUBBAIAH
Head of the Department
Department of Physics
Acharya Nagarjuna University
Nagarjuna Nagar-522 510.
Andhra Pradesh, India.

			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.	Nuclear Physics - Kenneth S Krane. 2. Nuclear Radiation Detectors - S.S. Kapoor & V.S. Ramamurthy 3. Radiation Detection and Measurement - G.F. Knoll 4. B. B. Cohen, "Concepts of Nuclear Physics", TMGH, Bombay, 1971. 5. K. Krane, " Introductory Nuclear Physics", Wiley, New York, 1987. 6. V. Devanathan, "Nuclear Physics" Narosa Publishing house 7. D. Griffiths, "Introduction to Elementary Particles", 2nd Ed., Wily-Vch, 2008 **Reference Books:** 1. Nuclear and Particle Physics - E.B.Paul. 2. Techniques for Nuclear and Particle Physics experiments -				

DR. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Lakshmaiah Education Foundation
(Deemed to be University)
Vaddeswaram-522 302
Andhra Pradesh, India.

				William. R. Leo 3. R. D. Evans, "Atomic. Nucleus", Mcgraw-Hill NY.1955. 4. J. M. Blatt and V. F. Weisskopf, "Theoretical Nuclear Physics". Berlin 1979. 5. H. Enge, "Introduction to Nuclear Physics Addision-Wesley". Reading MA. 1975 6. D.C. Tayal „ Nuclear Physics".				

Dr. C. SURYANARAYANA
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.

Annexure – II

Course Code	Course Name	Course Category	Existing Syllabus	New Syllabus for approval	Topics Added/Removed/Replaced	% Change of syllabus	Change in outcome	Justification for the modification
21PH54E3	Physics of Nanomaterials	Professional Elective -2	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	CO1: 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. CO2: 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, 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.	Non-linear effects, Interband and Intraband absorption in Semiconductor Nanostructures, Charging effects. Catalysis by Gold Nanoparticles, Carbon Nanotube Emitters, Photoelectrochemical cells, Photonic crystals and plasmon waveguides, Single	25%	YES	As proposed by the BOS external members, course coordinator, and feedback received from all stakeholders.

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

			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 nano transition, 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:**	CO3: Physical Properties of Nanomaterials Melting Points and Lattice constants, Mechanical Properties, Optical Properties, Surface Plasmon Resonance, Quantum Size Effects, Electrical Conductivity, Ferroelectrics and Dielectrics, Superparamagnetism, Modulation doping, Quantum Hall Effect, Resonant Tunnelling, Non-linear effects, Interband and Intraband absorption in Semiconductor Nanostructures, Charging effects. CO4: Special Nanomaterials and Applications of Nanomaterials Carbon Fullerenes and Nanotubes, Micro and Mesoporous Materials, Core-Shell Structures. Molecular Electronics, Nanoelectronics, Nanobots, Biological applications of nanoparticles, Catalysis by Gold Nanoparticles, Carbon Nanotube Emitters, Photoelectrochemical cells, Photonic crystals and plasmon waveguides, Single Photon sources, optical memories, Coulomb blockade devices. **Text Books:** 1. Nanotechnology-Molecularly Designed Materials: G.M. Chow & K.E. Gonsalves (ACS), 1996.	Photon sources, optical memories, Coulomb blockade devices.			

15/3/2022
Dr. G. SUNITA SARGAR
Head of the Department
Department of Physics
Education Foundation
University)

			1. Nanotechnology-Molecularly Designed Materials: G.M. Chow & K.E. Gonsalves (ACS), 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	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.				

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.

Annexure – III

To propose to include three more elective courses under each professional elective (Nano Photonics) based on the course feedback received from the academic peers.

22PH54E3 – NANO PHOTONICS

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite: Nil**

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

CO#	Course Outcome	PO	BTL
CO1	Understand the concepts of Nano photonics to acquire the optical Sensors - Mathematical Methods in Nano photonics	PO3	3
CO2	Apply the fundamental concepts of physics which is necessary for Plasmonic biosensors - nanofabrication.	PO1	3
CO3	Understand the basic principles of Nano lasers Sensors and Nano photonics and its importance	PO1	2
CO4	Apply of Nuclear Reaction, Fission and Fusion behaviourr of Energetic of nuclear reactions and Characteristics of fissions and fusion reactors.	PO7	3

Syllabus:

CO-1: **Mathematical Methods in Nano photonics:**

Algebraic techniques - solid-state quantum mechanics - linear algebra and eigen systems, group theory, Bloch's theorem and conservation laws, optical phenomena to nonlinear filters. Waveguides; Photonic crystals fibres and filter

CO-2: **Nano-Plasmonic biosensors,** Basics of Plasmonics, Metallic nanoparticles, nanorods and nano shells, local field enhancement. Collective modes in nanoparticle arrays, particle chains and arrays. suface plasmons and waveguides. Applications of Metallic Nanostructures - Fabrication Adiabatic nanofabrication – Regulating the size and position of nanoparticles using size dependent resonance.

CO-3: **Nano photonics devices:**

Basis of Nanophotonics - Optical near fields and effective - interactions as a base for nanophononics – Principles of operations of nanophotonic devices - using optical near fields – Principles of nanofabrication using optical near fields - Spontaneous emission control, Application of microcavities

CO-4: **Medical Sensors:**

15/3/2022
Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Lakshmaiah Education Foundation
Deemed to be University)
Vaddeswaram-522
Dist., A.P., India

Classical contrast mechanisms: bright field, dark field – Fluorescence contrast mechanism – Nonlinear microscopy based on second harmonic generation - coherent anti-Stokes Raman scattering –Stimulated emission depletion - nanoscale electronic energy transfer. Cooperative emissions.

Text Books:

1. Motoichchi Ohtsu, Kiyoshi Kobayashi, Principles of Nano Photonics, CRC Press,Taylor & Francis Group, 2020.
2. Jean Michael; Lourtioz, Nano Photonics, Springer, 2006.
3. John D Joannoupoulos, Photonic Crystals, Princeton University Press, 2008.
4. P N Prasad, Nano Photonics, John Wiley & Sons, 2020.

13/3/2022
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.

22PH54E6 – NANO ELECTRONICS

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#	CO Outcome	PO Mapping	BTL
CO1	Understanding of the principles, limitations, and applications of nano electronics.	PO3	2
CO2	Understanding of the nano scale effects, techniques for nanoscale transistor fabrication, industrial CMOS technology, and non-classical elements of nano MOSFETs.	PO3	2
CO3	Understanding of the introduction to nanostructures, the fabrication and patterning techniques used to create nanostructures, and the characterization techniques.	PO3	2
CO4	Understanding of nano sensors, nano actuators, memory devices, photovoltaic cells, and their applications in communication, industry, commercial settings, agriculture, biomedical fields, and the Internet of Things (IoT).	PO3	2

Syllabus:

CO-1: Overview of Nano Electronics: Introduction to nano electronics, Development of Micro-Electronics, Limitation of Micro-Electronics, Micro-Electronics to Nano Electronics, Examples of Nano Devices, Application of Nano Devices in Electronics.

CO-2: Scaling Theory: Nano scale effects, Techniques for Nano Scale Transistor, Industrial CMOS Technology, Non-classical Elements of Nano MOSFET.

CO-3: Nanofabrication Techniques: Introduction to nano structures (Thin films, Nano wire, Nano rods, CNT), Fabrication/Patterning of nano structure (CVD, AFM, Lithography), Characterization techniques of nanostructures (SEM, TEM).

CO-4: Smart Nano Devices/Materials: Nano Sensors, nano actuators and bio sensor, memory devices (Fin FET), photo voltaic cell. Applications: Communication, Industry, Commercial, Agriculture and bio medical, IOT.

Text Books:

1. Y. Taur and T Ning, Fundamentals of Modern VLSI Devices, Cambridge University Press, 2009.
2. Plummer, Deal and Griffith, Silicon VLSI Technology, Pearson Education India, 2000.
3. W.R.Fahrner, Nanotechnoogy and Nanoelectronics: Materials, Devices, Measurement Techniques.

13/3/22

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Koneru Lakshmaiah Education Foundation
(Deemed to be University)
Green Fields, Vaddeswaram-522 502
Guntur Dist., A.P., India

22PH54E9 – NANOTECHNOLOGY FOR RENEWABLE ENERGY MATERIALS

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	Apply the basic concepts of energy conversion systems.	PO-1	3
CO2	Appraise the working of fuel cells current status and future trends	PO-1	3
CO3	Apply the knowledge of photovoltaic cells and energy conversion systems to improve their performance.	PO-1	3
CO4	Apply the knowledge of photovoltaic systems to understand the working of Solar cells.	PO-1	3

Syllabus:

CO-1: Fundamental Concepts in Electrochemistry Electrochemical Cell, Faraday's laws, Electrode Potentials, Thermodynamics of electrochemical cells, Polarization losses in electrochemical cells, Electrode process and kinetics, Electrical double layer, Photo-electrochemical cell, thermoelectric effect.

CO-2: Energy Conversion Systems Issues and Challenges of functional Nanostructured Materials for electrochemical Energy, Conversion Systems, Fuel Cells, Principles and nanomaterials design for; Proton exchange membrane fuel cells (PEMFC); Direct methanol fuel cells (DMFC); Solid-oxide fuel cells (SOFC), Current status and future trends

CO-3: Photovoltaic Systems Principles of photovoltaic energy conversion (PV), Types of photovoltaic Cells, Physics of photovoltaic cells, Organic photovoltaic cell cells, thin-film Dye-Sensitized Solar Cells, Quantum dot (QD) Sensitized Solar Cells (QD-SSC), Organic-Inorganic Hybrid Bulk Hetero junction (BHJ-SC) Solar cells, Current status and future trends

CO-4: Energy Storage System - Batteries Issues and Challenges of functional Nanostructured Materials for electrochemical Energy Storage Systems, Primary and Secondary Batteries (Lithium-ion Batteries), Cathode and anode materials, Nanostructured Carbon-based materials, Nano-Oxides, Novel hybrid electrode materials, Current status and future trends

Text Books:

1. Gang Zhang, Navin Manjooran, Nanofabrication and its application in Renewable Energy, Royal Society of Chemistry, 2014.
2. Flavio Leandro de Souza, Edson Roberto Leite, Nanoenergy, Nanotechnology Applied for Energy production, Springer Berlin Heidelber, 2013
3. Anatoli Korkin, Predrag S Kristic, Jack C Wells, Nantechnology for Electronics, Photonics, and Renewable Energy, Springer, New York, 2010.

Dr. G. SUNITA SUNDAR
Head of the Department
Department of Physic
Vaddeswa

22UC1101 – INTEGRATED PROFESSIONAL ENGLISH

L-T-P-S : 0-0-4-0 Credits:2 Pre-requisite : NIL

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

CO NO	Course Outcome (CO)	PO/PSO	Blooms Taxonomy Level (BTL)
CO1	Understand the concepts of grammar to improve Communication Skills	PO10	2
CO2	Demonstrate the ability in interactive skills of speaking and writing that are better suited for corporate environment.	PO10	2
CO3	Understand various strategies of reading and use them in interpreting the text	PO10	2
CO4	Apply the concepts of writing to draft corporate letters, emails and memos, reports, etc.	PO10	3

Syllabus :CO-1: Language Mechanics A) Basic Grammar - Countable and Uncountable nouns, Present simple and continuous, Past simple and continuous – classroom practice – Understand and interpret Texts and work place situations B) Structural Pattern - Present continuous for future arrangements State verbs, Regular and Irregular verbs, Voice, Modal verbs – Reporting on going tasks in the corporate world C) Descriptive and Qualitative Patterns: Adjectives and Adverbs, Time Expressions, Comparatives and Superlatives, Pronouns, Conditionals, Phrases and Clauses (Including Relative) CO-2: Interactive Listening & Speaking A) Formal contexts: Describing changes in a company - Taking orders over the phone B) Listening & Speaking: Participate in conversation with proper contextual language markers and turn taking. Classroom practice- Presenting context, reason, problem – Case analysis (short). C) Body Language: Dos and Don'ts of one-to-one interaction, Telephone interaction Video/ web conferencing. Culture specific practices. D) Work Etiquette- situation, ambiance, team skills, time

management and leadership ability. CO-3: Integrated Reading A) Understand and assimilate main ideas and specific details. (250-300 words text of moderate difficulty) B) Read for general understanding, interpreting, factual or specific information, for grammatical accuracy and information transfer. C) Understand the corporate context D) Understand office correspondence CO-4 Techniques of Business Correspondence A) Internal Correspondence, Making notes on routine matters, such as, taking/ placing orders B) Emails: Types of emails, salutations, vocabulary used in formal and informal (Including beginnings and endings) C) Writing straight-forward, routine letters of factual nature

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.

Annexure – IV

Course Code	Course Name	Course Category	Existing Syllabus	New Syllabus for approval	Topics Added/Removed/Replaced	% Change of syllabus	Change in outcome	Justification for the modification
21UC1203	Design Thinking and Innovation (DTI)	Professional Core	Design thinking an overview, Design Thinking for Contextualized Problem-Solving: Problem Selection/Definition Need for Cultural Relevance (Time, Space, and Environment). Empathy: definition, Empathic research: framing interview questions, focus groups, procedure to conduct skilled interviews, Insights from Empathetic research, Define: Developing user personas, nuggets from insights, laying customer journey maps, POV statements and POV questions to define user needs. Ideate: Techniques to generate, shortlist and evaluate Ideas: Rapid	Design thinking an overview, Design Thinking for Contextualized Problem-Solving: Problem Selection/Definition Need for Cultural Relevance (Time, Space, and Environment). Empathy: definition, Empathic research: framing interview questions, focus groups, procedure to conduct skilled interviews, Insights from Empathetic research, Define: Developing user personas, nuggets from insights, laying customer journey maps, POV statements and POV questions to define user needs. Ideate: Techniques to generate, shortlist and evaluate Ideas: Rapid Estimation form and Solution concept form. Prototyping and T	Merged two courses and in to a single course with deletion of topics	**40%**	YES	As proposed by the BOS external members, course coordinator, and feedback received from all stakeholders.

Sunita 13/3/2022
Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Vignan Education Foundation
Deemed to be University

			Estimation form and Solution concept form. Prototyping and T esting: Products vs. Services, Rough Prototypes, T esting T echniques, User Experience High-Fidelity Prototypes Entrepreneurial Innovation: Innovation Management, Business Model Basics, Financial Estimation, Pitch Decks, IPR Considerations. Textbooks: David Lee: Design Thinking in Classroom. Ulysses Press: 2018 2. The Art of Innovation Lessons in Creativity from IDEO, America's Leading Design Firm by Tom Kelley : 2001 Michael Lewrick, Patrick Link & Larry Leifer: The Design Thinking Play Book. Wiley Press: 2018	esting: Products vs. Services, Rough Prototypes, T esting T echniques, User Experience High-Fidelity Prototypes Entrepreneurial Innovation: Innovation Management, Business Model Basics, Financial Estimation, Pitch Decks, IPR Considerations. Textbooks: David Lee: Design Thinking in Classroom. Ulysses Press: 2018 2. The Art of Innovation Lessons in Creativity from IDEO, America's Leading Design Firm by Tom Kelley : 2001 Michael Lewrick, Patrick Link & Larry Leifer: The Design Thinking Play Book. Wiley Press: 2018				

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Sri Padmavati Mahila Visvavidyalayam
(Women's University)
Tirupati-517 502, A.P., India

Annexure – V:

Annexure – V: To Propose to include five new courses with their Pre-PhD curriculum related to specific research areas based on the course feedback received from the academic peers.

Code: 21PHY310

PHY-PhD-16: -EXPERIMENTAL TECHNIQUES IN SOLID STATE PHYSICS

CO 1: Methods of crystal growth Solution methods, Melt methods, Homogeneous nucleation and heterogeneous nucleation, Energy of formation of a nucleus

CO 2: Preparation of Amorphous Materials: Introduction to amorphous materials & conducting mechanism, Melt Quenching technique, Thermal Evaporation method, Ball milling, Electrodeposition, Sputtering, Glow-discharge decomposition. Shear amorphization.

CO 3: Thin film and epitaxial growth: Thermal Evaporation method, Sputtering, CVD, LPCVD, Spin Coating, Molecular beam epitaxy.

CO 4: Ceramic material preparation: Introduction to ceramic materials, properties, preparation; Recrystallization and Grain Growth, solid state sintering, sintering with reactive liquid, pressure sintering. Synthesis of Nano-Scale

ceramics powder.

CO 5: Preparation of Nanomaterials: Sol gel technique, Chemical Vapor Deposition, LPCVD, plasma arc discharge, sputtering, evaporation, Pulsed laser deposition, electrodeposition.

Unit 6. Preparation of Conducting Polymers: Conducting polymer, Properties, Conduction mechanism, Preparation; Chemical Oxidation polymerization, Plasma polymerisation.

References:

1. Essentials of Crystallography, M. A. Wahab, Narosa, New Delhi

2. Introduction to Ceramics, 2nd Ed. W. D. Kingery, H. K. Bowen and D. R. Uhlmann John Wiley & Sons,

Singapore, 1991.

3. Ceramic Processing, M. N. Rahaman, CRC Press, 2007.

4. Introduction to the Principles of Ceramic Processing, J. S. Reed 2nd Ed., John Wiley & Sons, 1995.

5. Non-Crystalline Semiconductors, Device and Mott.

6. Amorphous Semiconductors, Richard and Zallen.

7. Handbook of Conducting Polymers, T.A Skotheim and J.R. Reynolds

8. Nanomaterials: Synthesis; properties and applications, A.S. Edelstein and R.C. Commarat

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Lakshmaiah Education Foundation
to be University)
Vaddeswaram-522
Dist., A.P., India

Code: 21PHY311

PHY-PhD-17: PHASE TRANSITIONS AND CRITICAL PHENOMENA

CO1: Scaling functions and scaling relations; renormalization group; Ginzburg-Landau free-energy functional; momentum-space renormalization group; Î-expansion; real-space renormalization group.

CO2: Criteria for thermodynamic stability; first-order phase transitions; Van der Waals' theory; Gibbs phase rule.

CO3: Examples of phase transitions and phase diagrams; criticl points; second-order phase transitions; order parameter; critical exponents. Universality; Landau theory for phase transitions.

CO4: Ising model; mean-field approximation; transfer matrix method; Onsager solution of 2-dimensional Ising model; Yang-Lee theorem.

References:

D. A. Porter. and K. E. Easterling: Phase Transformations in Metal and Alloys, Van Nostrand, T&F/Crc Press, 2017

K. Jena, and M. Chaturvedi: Phase Transformations in Materials, Prentice-Hall, 1993

G. Khachaturyan: Theory of Structural Transformation in Solids, John Wiley, Dover Publications, 2008

R. E. Reed-Hill and R. Abbaschian: Physical Metallurgy Principles, P.W.S-Kent, 1992

Dr. G. SUNITA SUNDARI
Professor & 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.

Code: 21PHY312

PHY-PhD-18: MAGNETIC MATERIALS AND DEVICES

CO1: A brief review of the fundamentals of solid-state physics; Classical and quantum mechanical pictures of magnetism; spin orbit coupling, crystal field environments, diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism, dipolar and exchange interactions, magnetic domains, magnetic anisotropy, magnetostriction, superparamagnetism, biomagnetism, and spin glass

CO2: Bulk magnetic Materials: Transition and rare earth metals and alloys. Oxide based magnetic materials. Hard, soft and magnetostrictive materials, Magnetic shape memory alloys, Structure-microstructure-magnetic property correlations.

CO3: Low dimensional Magnetic systems and devices: Magnetic nanostructures, thin films, and epitaxial heterostructures; exchange bias and exchange coupling, and magneto-optical materials and devices, AMR, GMR, TMR, spin-transfer torque, spin-orbit torque and spin-Hall effect; Multiferroics, magnetoelectric and magnetoionics; nonvolatile magnetic memory, synaptic and neuromorphic computing devices.

CO4: Experimental techniques: VSM, SQUID, Mossbauer, MFM, Magneto-transport, Magnetooptical Kerr-effect, TEM for magnetic characterization, XMLD and XMCD.

References:

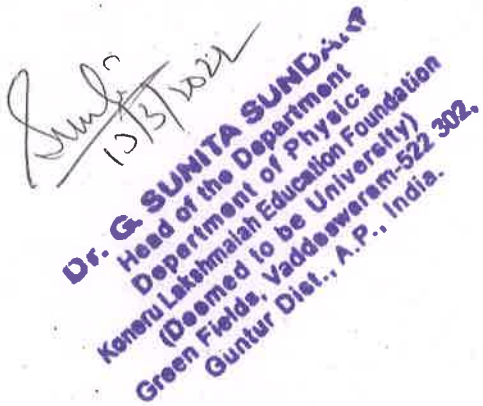
S. O. Kasap, Principles of Electronic Materials and Devices; McGraw Hill Education, 3 EDITION, 2017

Stephen Blundell, Magnetism in Condensed Matter; OUP Oxford, EDITION 1, 2001

J.M.D. Coey, Magnetism and Magnetic Materials; Cambridge University Press, 2010

B. D. Cullity and C.D. Graham, Introduction to Magnetic Materials; Wiley-IEEE Press, Edition 2, 2008

K. M. Krishnan, Fundamental and Application of Magnetic Materials, OUP Oxford, Edition 1, 2016



Code: 21PHY313

PHY-PhD-19: Phosphors for lighting applications

Fundamentals of luminescence: Absorption and emission of light, electronic states and optical transition of solid crystals, Luminescence of a localized center, Impurities and luminescence in semiconductors, Transient characteristics of luminescence, Excitation energy transfer and cooperative optical phenomena, Excitation mechanism of luminescence by cathode-ray and ionizing radiation, Inorganic electroluminescence, Lanthanide level locations and its impact on phosphor performance.

Properties of phosphors

Principal phosphor materials and their optical properties: Luminescence centers of ns^2-type ions, Luminescence centers of transition metal ions, Luminescence centers of rare-earth ions, Luminescence centers of complex ions, Ia-VIIb compounds, IIa-VIb compounds, IIb-VIb compounds, ZnSe and related luminescent materials, IIIb-Vb compounds, (Al,Ga,In)(P,As) alloys emitting visible luminescence, (Al,Ga,In)(P,As) alloys emitting infrared luminescence, GaN and related luminescence materials, Silicon carbide (SiC) as a luminescence material, Oxynitride phosphors.

Methods of phosphor synthesis and related technology: General technology of synthesis, Inorganic nanoparticles and nanostructures for phosphor applications, Preparation of phosphors by the sol–gel technology, Surface treatment, Coating methods, fluorescent lamps, Mercury lamps, Intensifying screens (Doctor Blade Method), Dispersive properties and adhesion strength.

Types of phosphor

Phosphors for lamps: Construction and energy conversion principle of various lamps, Classification of fluorescent lamps by chromaticity and color rendering properties, High-pressure mercury lamps, Characteristics required for lamp phosphors, Practical lamp phosphors, Phosphors for high-pressure mercury lamps, Phosphors for white light-emitting diodes.

Phosphors for X-ray and ionizing radiation: Phosphors for X-ray intensifying screens and X-ray fluorescent screens, Phosphors for thermoluminescent dosimetry, Scintillators, Phosphors for X-ray image intensifiers, Photostimulable phosphors for radiographic imaging.

Electroluminescence materials: Inorganic electroluminescence materials, Inorganic electroluminescence, Organic electroluminescence

Phosphors for plasma display: Plasma display panels, Discharge gases, Vacuum-ultraviolet phosphors and their characteristics, Characteristics of full-color plasma displays, Plasma displays and phosphors.

Other phosphors: Infrared up-conversion phosphors, Luminous paints, long persistent phosphors, Phosphors for marking, Stamps printed with phosphor-containing ink, Application of near-infrared phosphors for marking.

1/3/2022

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Vishnu Education Foundation
Deemed to be University)
Bhimavaram-522 30
A.P., India.

Solid-state laser materials: Introduction: Basic laser principles, Operational schemes, Materials requirements for solid-state lasers, Activator ions and centers, Host lattices, Conclusions.

Measurements of phosphor properties

Measurements of luminescence properties of phosphors: Luminescence and excitation spectra, Reflection and absorption spectra, Transient characteristics of luminescence, Luminescence efficiency, Data processing, Measurements in the vacuum-ultraviolet region.

Measurements of powder characteristics: Particle size and its measurements, Methods for measuring particle size, Measurements of packing and flow.

Textbooks

1. Phosphors Handbook, Second Edition, William M. Yen, Shigeo Shionoya, Hajime Yamamoto, CRC Press.
2. Rare Earth Activated Phosphors, Vikas Dubey, Neha Dubey, Marta Michalska Domanska, M Jayasimhadri, Sanjay J. Dhoble, Elsevier.

Reference Book

1. Phosphors Handbook: Process, Properties and Applications, Vijay B. Pawade, Ritesh L. Kohale, Sanjay J. Dhoble, Hendrik C. Swart, Woodhead Publishing Series in Electronic and Optical Materials, Elsevier.

13/3/2021

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.

Code: 21PHY314

PHY-PhD-20: ATMOSPHERIC TRACE GASES – MECHANISM AND MODELING

Chapter 1: Introduction to Remote Sensing of Atmospheric Trace Gases

Definition and significance of atmospheric trace gases, Overview of remote sensing techniques and instruments for trace gas measurements, Applications and importance of studying atmospheric trace gases, Introduction to spectroscopy and absorption principles for remote sensing.

Chapter 2: Remote Sensing Platforms and Instruments

Satellite-based remote sensing instruments for trace gas measurements, Ground-based remote sensing techniques (e.g., lidar, Fourier transform spectrometry), Airborne platforms and their role in atmospheric trace gas monitoring, Comparison of advantages and limitations of different remote sensing platforms.

Chapter 3: Spectroscopy and Absorption of Atmospheric Trace Gases

Principles of spectroscopy and molecular absorption, Interaction of electromagnetic radiation with trace gas molecules, Absorption features and spectral signatures of specific trace gases, Remote sensing bands and channels used for trace gas detection.

Chapter 4: Measurement Techniques for Specific Trace Gases

Remote sensing of greenhouse gases (e.g., CO2, CH4), Ozone remote sensing and monitoring, Monitoring of atmospheric pollutants (e.g., NO2, SO2), Techniques and instruments used for the measurement of different trace gases.

Chapter 5: Data Analysis, Retrieval Methods, and Applications

Data processing, calibration, and validation of remote sensing measurements, Retrieval algorithms for trace gas concentrations, Applications of remote sensing data in studying air quality, climate change, and ozone depletion, Future directions, challenges, and advancements in remote sensing of atmospheric trace gases.

Reference Books:

1. "Remote Sensing of the Atmosphere for Environmental Security" by Alexander A. Kokhanovsky and Gottfried Kirchengast.
2. "Remote Sensing of Atmospheric Composition: Techniques and Applications" by K. Chance and G. W. Burrows.
3. "Remote Sensing of Atmosphere and Ocean from Space: Models, Instruments, and Techniques" by Frank S. Marzano and Guido Visconti.
4. "Satellite Remote Sensing for Resources Development" by Prasad S. Thenkabail.
5. "Airborne and Satellite Remote Sensing of the Earth's Surface and Atmosphere" by Charles Elachi and Jakob J. van Zyl.

Academic Papers and Journals:

1. Bhartia, Pawan K., et al. (2020). "Measuring Ozone Profiles in the Troposphere and Stratosphere from Nadir Solar Backscatter: A Proof of Concept." Remote Sensing, 12(5), 867. https://doi.org/10.3390/rs12050867
2. Worden, H., et al. (2018). "Decadal Record of Satellite Carbon Monoxide Observations." Atmospheric Chemistry and Physics, 18(3), 1367-1385. https://doi.org/10.5194/acp-18-1367-2018
3. Joiner, J., et al. (2013). "Global Monitoring of Terrestrial Chlorophyll Fluorescence from Moderate-spectral-resolution Near-infrared Satellite Measurements: Methodology, Simulations, and Application to GOME-2." Atmospheric Measurement Techniques, 6(11), 2803-2823. https://doi.org/10.5194/amt-6-2803-2013
4. Veefkind, J. P., et al. (2016). "TROPOMI on the ESA Sentinel-5 Precursor: A GMES Mission for Global Observations of the Atmospheric Composition for Climate, Air Quality and Ozone Layer Applications." Remote Sensing of Environment, 120, 70-83. https://doi.org/10.1016/j.rse.2011.09.027

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.

PROPOSED AND REVISED M. SC (PHYSICS) COURSE STRUCTURE FOR Y22 (2022-23) (CHOICE BASED CREDIT SYSTEM (CBCS))

S. No	Course Code	Course Title	Type	L	T	P/S	Cr	CH	New Course/revised course/retained	Focused on
1	22PH5101	Mathematical Physics	PC/M	4	0	0	4	4	Retained	Employability
2	22PH5102	Classical Mechanics	PC/M	4	0	0	4	4	Retained	Employability
3	22PH5103	Electrodynamics	PC/M	4	0	0	4	4	Retained	Employability
4	22PH5104	Analog Electronics	PC/M	4	0	0	4	4	Retained	Employability
5	22PH5105	Computational Physics	PC/M	4	0	0	4	4	Retained	Employability
6	22PH5106	Analog Electronics Lab	PC/M	0	0	6	3	6	Retained	Skilling
7	22PH5107	Computational Physics Lab	PC/M	0	0	4	2	4	Retained	Skilling
8	22PH5201	Statistical Mechanics	PC/M	4	0	0	4	4	Retained	Employability
9	22PH5202	Quantum Mechanics-1	PC/M	4	0	0	4	4	Retained	Employability
10	22PH5203	Fiber Optics and Non-linear optics	PC/M	4	0	0	4	4	Retained	Employability
11	22PH5204	Solid State Physics-1	PC/M	4	0	0	4	4	Retained	Employability
12	22PH5205	Digital Electronics	PC/M	4	0	0	4	4	Retained	Employability
13	22PH5206	Solid State Physics-1 Lab	PC/M	0	0	6	3	6	Retained	Skilling
14	22PH5207	Digital Electronics Lab	PC/M	0	0	6	3	6	Retained	Employability
15	22PH5208	Seminar	Skill/M	0	0	2	1	2	Retained	Skilling
16	22PH5301	Quantum Mechanics-2	PC/M	4	0	0	4	4	Retained	Employability
17	22PH5302	Atomic and Molecular Spectroscopy	PC/M	4	0	0	4	4	Retained	Employability
18	22PH5303	Nuclear Physics	PC/M	3	0	0	3	3	New Course	Employability
19	22PH5304	Particle Physics	PC/M	2	0	0	2	2	Retained	Employability
20	22PH5305	Solid State Physics-2	PC/M	4	0	0	4	4	Retained	Employability

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Vignan Education Foundation
(Deemed to be University)
Vadlamudi, Guntur-522 302
India.

21	22PH5306	Lasers and Photonics	PC/M	4	0	0	4	4	Retained	Employability
22	22PH5307	Term Paper	PW/M	0	0	4	2	4	Retained	Skilling
23	22PH5308	Solid State Physics-2 Lab	PC/M	0	0	6	3	6	Retained	Skilling
24	22UC1203	Design Thinking and Innovation (DTI)	UC/M	0	0	4	2	4	Revised	Skilling/ Entrepreneurship
25	22UC1101	Integrated Professional English	PC/M	0	0	4	2	4	New Course	Skilling
26	22PH54E1/ 22PH54E2/22PH54E3	Elective – 1	PE	3	0	0	3	3	Retained	Employability
27	22PH54E4/ 22PH54E5/22PH54E6	Elective – 2	PE	3	0	0	3	3	Revised	Employability
28	22PH54E7/ 22PH54E8/22PH54E9	Elective – 3	PE	3	0	0	3	3	Retained	Employability
29	22PH5401	Dissertation with Published Paper	PC/M	0	0	16	8	16	Retained	Skilling
		Elective-1								
26	22PH54E1	Experimental Techniques	PE	3	0	0	3	3	Retained	Employability
	22PH54E2	Basic Communication Theory	PE	3	0	0	3	3	Retained	Employability
	22PH54E3	**Nano Photonics**	PE	3	0	0	3	3	New Course	Employability
		Elective-2								
27	22PH54E4	Physics of Nanomaterials	PE	3	0	0	3	3	Revised	Employability
	22PH54E5	Radar Systems and Satellite Communication	PE	3	0	0	3	3	Retained	Employability
	22PH54E6	**Nano Electronics**	PE	3	0	0	3	3	New Course	Employability
		Elective-3								

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Vignan's Foundation for Science, Technology & Research (Deemed to be University)
Vadlamudi, Guntur Dist., Pin-522 213.

28	22PH54E7	Thin film Technology	PE	3	0	0	3	3	Retained	Employability
	22PH54E8	Antenna Theory and Radio wave Propagation	PE	3	0	0	3	3	Retained	Employability
	22PH54E9	**Nanotechnology for Renewable Energy Materials**	PE	3	0	0	3	3	New Course	Employability
	Grand Total			**70**	**0**	**58**	**99**	**128**		

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

Percentage of syllabus revision=16.37

Percentage of Courses focusing on Employability= No. of courses focusing on Employability/ Total number of courses=20/29=68.9

Percentage of Courses focusing on Entrepreneurship= No. of courses focusing on Entrepreneurship / Total number of courses=1/29=3.44

Percentage of Courses focusing on Skill Development = No. of courses focusing on Skill Development /Total number of courses=9/29=31.03

13/3/2022

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.

Reference for Program Structures and Syllabus Revision

S.No	Course Code	Course Name	Course Category	L	T	P	S	C R	Pre-Requisite	New/Revised/Retained	Stakeholder Category	Justification for considering the feedback
1	22PH5101	Mathematical Physics	Professional core	4	0	0	4	4	-	Retained	-	-
2	22PH5102	Classical Mechanics	Professional core	4	0	0	4	4	-	Retained	-	-
3	22PH5103	Electrodynamics	Professional core	4	0	0	4	4	-	Retained	-	-
4	22PH5104	Analog Electronics	Professional core	4	0	0	4	4	-	Retained	-	
5	22PH5105	Computational Physics	Professional core	4	0	0	4	4	-	Retained	-	-
6	22PH5106	Analog Electronics Lab	Professional core	0	0	6	3	0	-	Retained	-	-
7	22PH5107	Computational Physics Lab	Professional core	0	0	4	2	0	-	Retained	-	-
8	22PH5108	Seminar-1	Skilling	0	0	4	0	2	-	---------	-	-Removed
9	22PH5201	Statistical Mechanics	Professional	4	0	0	4	4	-	Retained	-	-

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Education Foundation
University)
522

			core									
10	22PH5202	Quantum Mechanics-1	**Professional core**	4	0	0	4	4	-	**Retained**	-	-
11	22PH5203	Fiber Optics and Non-linear optics	**Professional core**	4	0	0	4	4	-	**Retained**	-	-
12	22PH5204	Solid State Physics-1	**Professional core**	4	0	0	4	4	-	**Retained**	-	-
13	22PH5205	Digital Electronics	**Professional core**	4	0	0	4	4	-	**Retained**	-	-
14	22PH5206	Solid State Physics-1 Lab	**Professional core**	0	0	6	3	0	-	**Retained**	-	-
15	21PH5207	Digital Electronics Lab	**Professional core**	0	0	6	3	0	-	**Retained**	-	
16	22PH5208	Seminar	**Professional core**	0	0	2	1	0	-	**Retained**	-	**Modified**
17	22UC1203	Design Thinking and Innavoation	**Uni Core**	4	0	0	4	4	-	**Retained**		**Removed-DTI-I**
18	22PH5301	Quantum Mechanics-2	**Professional core**	4	0	0	4	4	Quantum Mechanics-1	**Retained**	-	-

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Education Foundation

19	22PH5302	Atomic and Molecular Spectroscopy	**Professional Core**	4	0	0	0	4	-	**Retained**	-	-
20	22PH5303	Nuclear Physics	**Professional Core**	3	0	0	3	3	-	**New Course**	**-Feedback given by our faculty**	**added few topics in the course Nuclear Physics to improve the quality**
21	22PH5304	Particle Physics	**Professional Core**	2	0	0	2	2	-	**Retained**	-	
22	22PH5305	Solid State Physics-2	**Professional Core**	4	0	0	4	4	-	**Retained**	-	-
23	22PH5306	Lasers and Photonics	**Professional Core**	4	0	0	4	4	-	**Retained**	-	-
24	22PH5307	Term Paper	**Professional Core**	0	0	4	2	0	-	**Retained**	-	-
25	22PH5308	Solid State Physics-2 Lab	**Professional Core**	0	0	6	3	0	-	**Retained**	-	-
26	22UC1203	Design Thinking and Innovation	**UC**	0	0	4	2	0	-	**Retained**	-	
27	22UC2106	Communication and Logical Skills	**UC**	0	0	4	2	0	-	**New Course**	**Academic peers**	**Proposed to include English course in MSc Physics program**

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics

												for the AY 2022-23 admitted batch students to enhance the students' communication and soft skills.
28	22PH5401	Dissertation with Published Paper	**Professional core**	0	0	16	8	16	-	**Retained**	-	-
29	22PH54E1	Experimental Techniques	**Professional Elective**	3	0	0	0	3	-	**Retained**	-	-
30	22PH54E2	Basic Communication Theory	**Professional Elective**	3	0	0	0	3	-	**Retained**	-	-
31	22PH54E3	Nano Photonics	**Professional Elective**	3	0	0	0	3		**New Course**	**Academic peers**	**To enhance the knowledge in the domain of Nano photonics, which is useful in research domain.**
32	22PH54E4	Physics of Nanomaterials	**Professional Elective**	3	0	0	0	3	-	**New Course**	**Feedback given by our Faculty**	**modifications in the existing syllabus in MSc Physics program with the deletion of few advanced topics related to research in the**

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics

												course "Physics of Nanomaterials"
33	22PH54E5	Radar Systems and Satellite Communication	Professional Elective	3	0	0	0	3	-	Retained	-	-
34	22PH54E6	Nano Electronics	Professional Elective	3	0	0	0	3		New Course	Academic peers	To enhance the knowledge in the domain of Nano Electronics, which is useful in research domain.
35	22PH54E7	Thin film Technology	Professional Elective	3	0	0	0	3	-	Retained	-	-
36	22PH54E8	Antenna Theory and Radiowave Propagation	Professional Elective	3	0	0	0	3	-	Retained	-	-
37	22PH54E9	Nanotechnology for Renewable Energy Materials	Professional Elective	3	0	0	0	3	-	New Course	Academic peers	To enhance the knowledge in the domain of Nanotechnology, for renewable energy materials which is useful in research domain.
			Average percentage of revision= (sum of revision in all courses/ Total no. of courses)									16.35

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Koneru Lakshmaiah Education Foundation
Deemed to be University)
Vaddeswaram-522 502

Koneru Lakshmaiah Education Foundation
(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)
Accredited by NAAC as 'A++' ❖ Approved by AICTE ❖ ISO 9001-2015 Certified
Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA
Phone No. 08645 - 350200; www.klef.ac.in; www.klef.edu.in; www.kluniversity.in
Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002. Ph: +91 - 866 - 3500122, 2577715, 2576129.

Meeting Minutes of DAC-2 held on 15-03-2022

The Head, Department of Physics conducted the DAC-2 meeting on 15-03-2022 i.e., Tuesday at 10:00 am in the Physics Lab (Offline mode, Room No: F201).

The DAC members were concerned and discussed the following points:

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 & APEX Member
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 & RPAC Chairman
9. Dr. Sk. Babu	Asst. Professor & Dy. HOD
10. Dr. A. Sendil Kumar	Asst. Professor & APEX Member
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.

  Points discussed:

1. To revise (addition/deletion) the existing syllabus of Y21 curriculum in MSc Physics program
2. To include English course for MSc Physics program.
3. To increase course conducting hours and credits in the existing Nuclear Physics(21PH5303; 2-0-0-0; Cr: 2) to Nuclear Physics (21PH5303; 3-0-0-0; Cr: 3).
4. To merge Design Thinking and Innovation (DTI) - 1 and 2 courses as Design Thinking and Innovation (DTI) as a single course for Y21batch
5. To propose to include Minor degree certificate courses offered by MSc Physics for the A.Y. 2022-23 admitted batch students.
6. To propose to include three more elective courses under professional electives.
7. To propose to include five Pre-PhD new courses to enhance the employability and research skills.
8. Any other item with the permission of BOS chair.

Dr. G. SUNITA SUNDARI
Head of the Department
Department of Physics
Koneru Lakshmaiah Education Foun
(Deemed to be Univers
Green Fields, Vaddeswara
Guntur Dist., A.P.

AGENDA ITEM-1

To proposed to revise (addition/deletion) the existing syllabus of Y21 curriculum in MSc Physics program	**Approved in DAC and recommended the same to the BOS for approval**

AGENDA ITEM-2

To propose to include English course to improve the communication and soft skills in students for MSc Physics program	**Approved in DAC and recommended the same to the BOS for approval**

AGENDA ITEM-3

To proposed to increase course conducting hours and credits in the existing Nuclear Physics (21PH5303; 2-0-0-0; Cr: 2) to Nuclear Physics (21PH5303; 3-0-0-0; Cr: 3	**Approved in DAC and recommended the same to the BOS for approval**

AGENDA ITEM-4

To proposed to merge Design Thinking and Innovation (DTI) - 1 and 2 courses as Design Thinking and Innovation (DTI) as a single course for Y21batch	**Approved in DAC and recommended the same to the BOS for approval**

AGENDA ITEM-5

To propose to include Minor degree certificate courses offered by MSc Physics for the A.Y. 2022-23 admitted batch students	**Approved in DAC and recommended the same to the BOS for approval**

AGENDA ITEM-6

To propose to include three more electives courses to MSc Physics for the A.Y. 2022-23 admitted batch students	**Approved in DAC and recommended the same to the BOS for approval**

- Considering the suggestions and recommendations given by the internal committee members, we are going to change with the addition or deletion of topics/course from the Y21 MSc Physics curriculum for the above-mentioned courses.

Dr. G. SUNDAR
Head of the Department
Department of Physics
Deemed to be University

- The above-mentioned DAC agenda points, Y22 and Y21 curriculum, PDD, and checklist are submitted to the stakeholders and received their feedback. The feedback received from Academic peers, Faculty, Industry personnel, Students and Parents sounds good, and all are suggested and given permission for the revision of curriculum for Y22 batch.

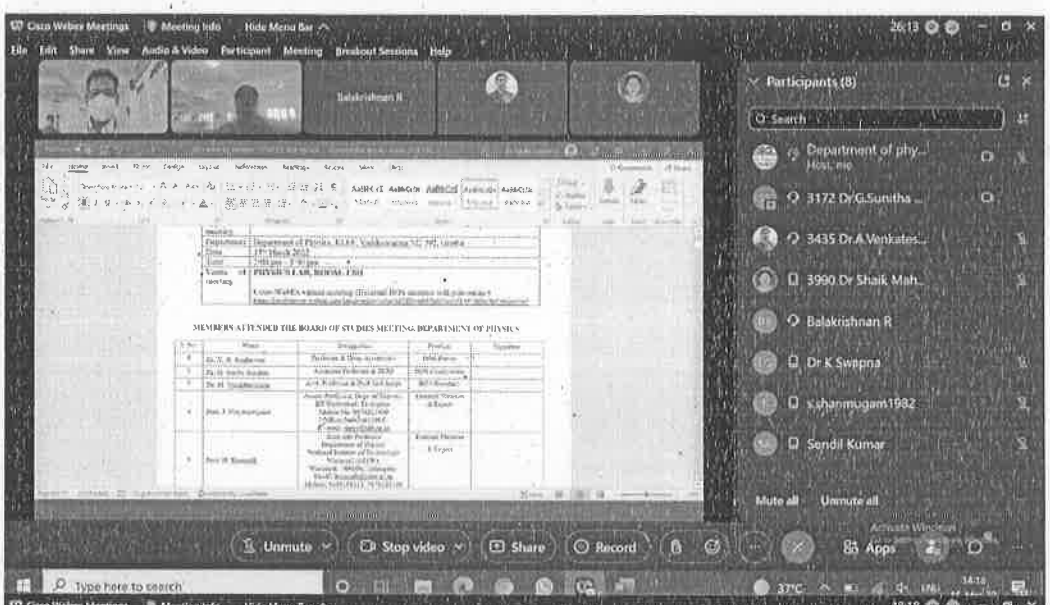
- All the members attended in the DAC-2 meeting approved the modified curriculum, and hence, the same is recommended to the BOS-Chairman for the approval.

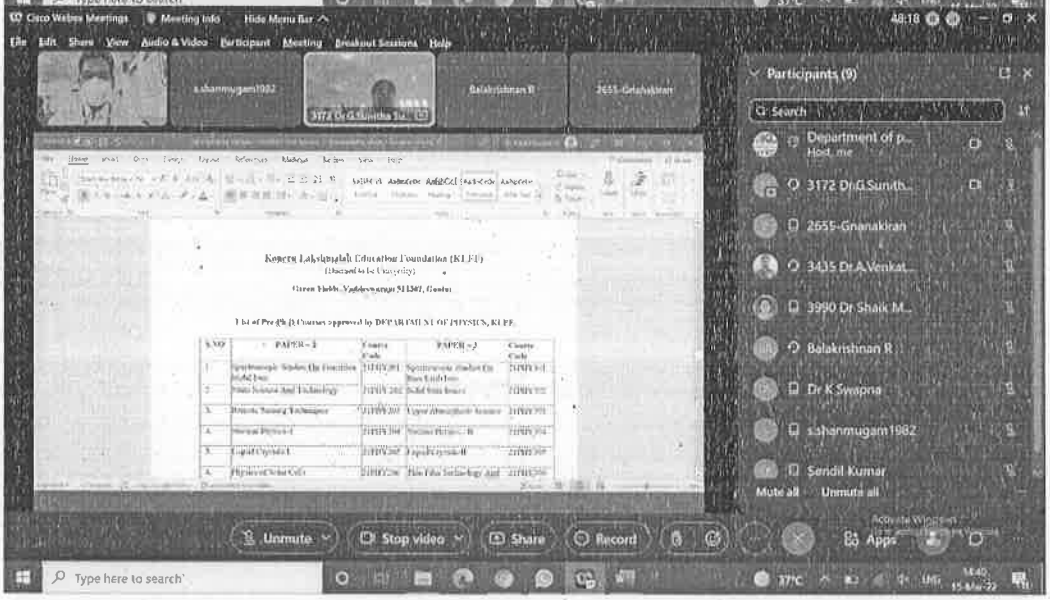
Sunita 13/3/2022

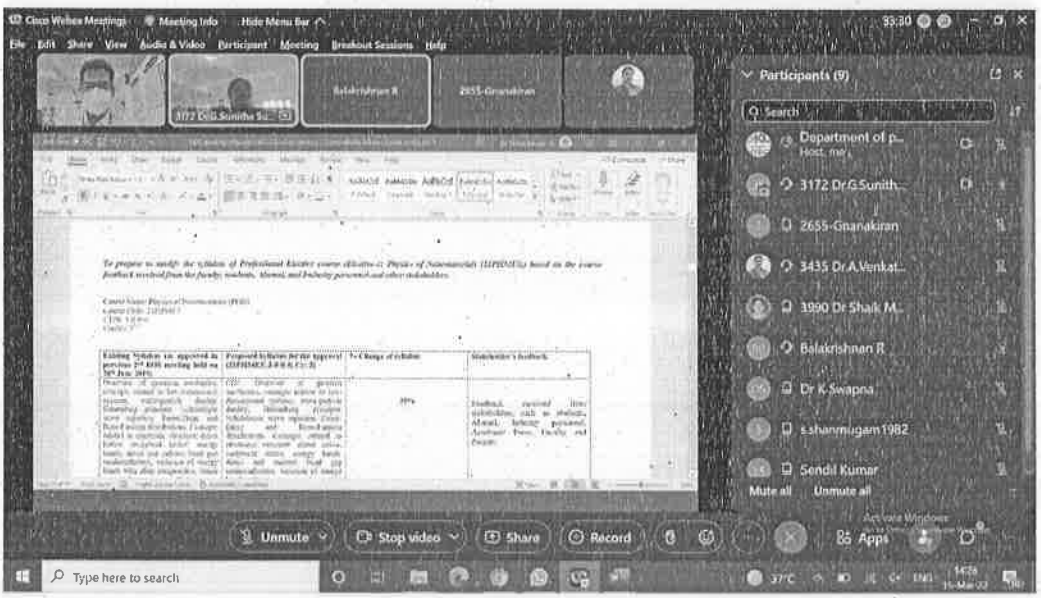
Dr. G. Sunita Sundari

HOD-Physics

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.







Dr. G. SUNITA SU
Head of the Depart
Department of Ph
Koneru Lakshmaiah Educati
Deemed to be 'U
Guntur, Andhra