Organized

ONLINE REFRESHER COURSE IN PHYSICAL SCIENCE

DECEMBER – 12 TO 26, 2022

REPORT

Theme of Course/Program:	**Online Refresher Course in Physical Science**
Name of Course Coordinator:	**Prof. Nameeta Brahme,** **Professor, S.o.S. in Physics & Astrophysics,** **Pt. Ravishankar Shukla University, Raipur**
Name of Course Coordinator from HRDC:	**Dr. Brijendra Pandey** **Assistant Professor** **Human Resource Development Centre** **Pt. Ravishankar Shukla University, Raipur**
Date of Course/Program:	**12.12.2022 to 26.12.2022**
Number of Participants:	**23**
State wise number of participants:	**State(08)- Chhattisgarh-15, Madhya Pradesh-02, Maharashtra-01, Uttarakhand-01, Tamil Nadu-01 West Bengal-03**
Gender wise number of participants:	**Male – 20, Female – 03**
Number of Resource Persons	**32**
Name and Signature of Course Coordinator	
Online Platform	
Google Meet	Meet.google.com/udo-qjfo-ofw

Organizing Team

Prof. K. L. Verma
Vice Chancellor Pt. RSU, Raipur (C.G.)

Prof. Shailendra Saraf
Director
HRDC, Pt. RSU, Raipur (C.G.)

Prof. Nameeta Brahme
S.o.S. in Physics & Astrophysics,
Pt. RSU, Raipur (C.G.)

Dr. Brijendra Pandey
Assistant Professor HRDC, Pt. RSU,
Raipur, (C.G.)

Refresher Course in Physical Science
(12.12.2022 - 26.12.2022)

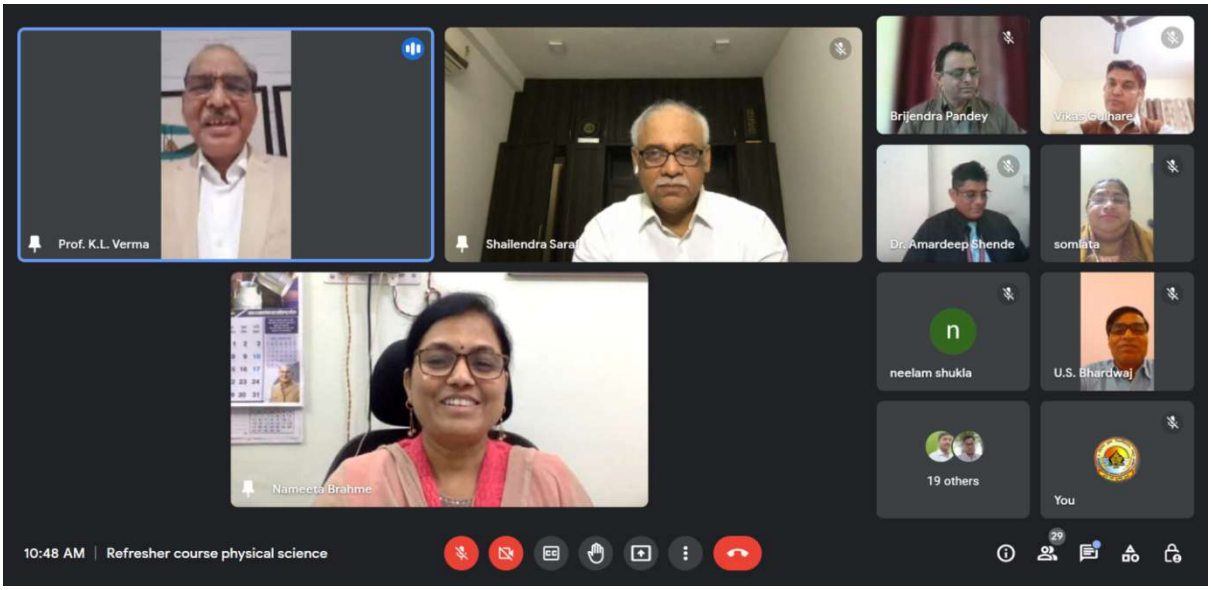
Detail of date wise organized program

Refresher course in Physical Science was scheduled from 12th to 20th December 2022 on Online mode. The theme of the refresher course was Physical Science. In all there were 48 sessions including inaugural and valedictory functions, 6 Sessions were scheduled for micro teaching, project evaluation and seminars, 2 sessions for each respective activity from participants in all 40 lectures were organized on three broad themes of Physical Science they were Understanding Physical Science at Individual and organizational level.

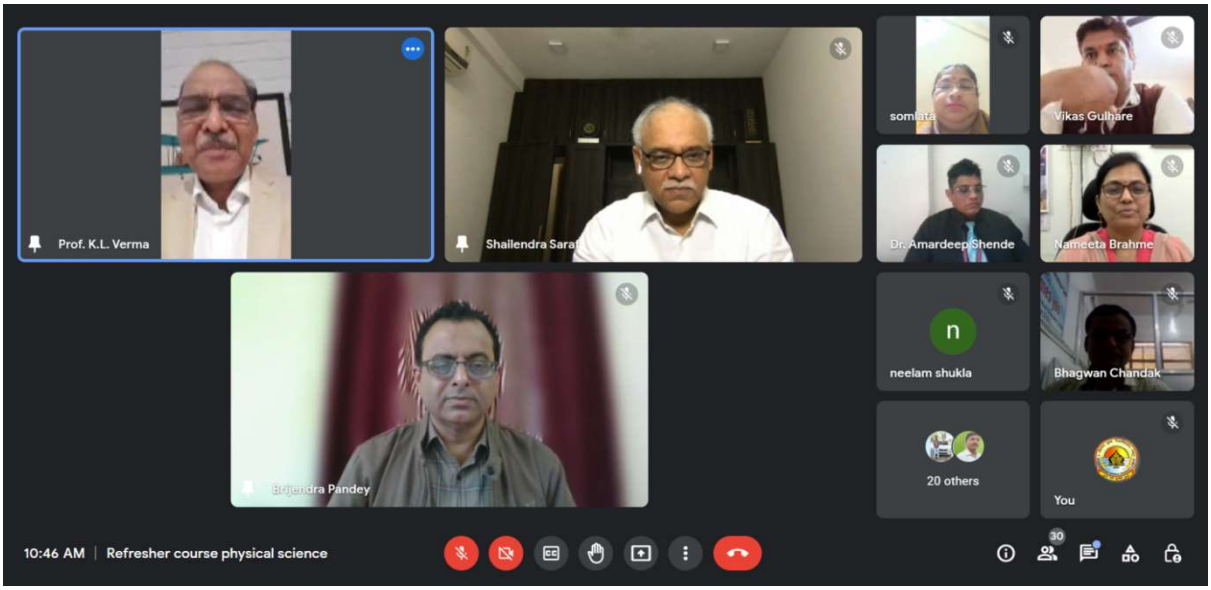
Day 1
12.12.2022

Session I (10.30-12.00) Inaugural Function

The refresher course was inaugurated by Chief Guest, Prof. Keshari Lal Verma, Hon'ble Vice-Chancellor, Pt. Ravishankar Shukla University, Raipur. Prof. Shailendra Saraf, Director UGC- HRDC, Pt. R.S.U., Raipur in his brief motivating address, urged the participants to get maximum benefit from the course by



actively participating in all the sessions. Course coordinator Prof. Nameeta Brahme welcomed all the participants and told about the available research facilities of School of Studies in Physics and Astrophysics and highlighted some of the important achievements of the department. Dr. Brijendra Pandey, Coordinator from the HRDC briefed all the participants about the general information and guidelines regarding the refresher course. The session ended with the self-introduction of the participants.

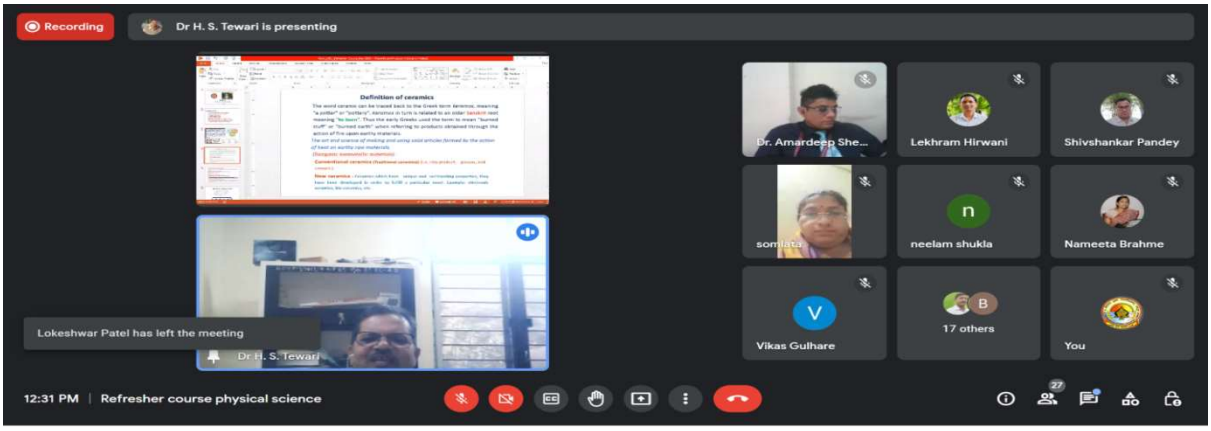


Session II (12:15 to 13:45)

Lecture- 1: Dr. H. S. Tiwari, Professor, Department of Physics, Guru Ghasidas Central University, Bilaspur,

Title: "Introduction to Oxide based advance Ceramics: Properties, Synthesis and Applications".

He described piezoelectric effect, types of piezoelectric materials, ferroelectric materials and the processing of ceramics.



Session III (14:15 to 15:45)

Lecture -2: Dr. Manoranjan Kar, Associate Professor, IIT, Patna

Title: "Magnetocaloric effect in wide temperature range for technological applications".

He outlined the problem of conventional refrigeration technology by sharing the facts that at present 15% of power consumption is due to use of Air Conditioners, and the use of compressors and heat pumps contributes to the 80% of the Global Warming. As a solution to above problem, he introduced the idea of Magnetic Refrigeration, a cooling technology based on Magneto Caloric Effect (MCE). He shared his findings of three rare-earth free magnetic materials, as an alternative of Gadolinium.

Session IV (16:00 to 17:30)

Lecture-3: Dr. D. Haranath, Professor, NIT Warangal, Telangana,

Title:"IPR (Intellectual Property Rights) for Science faculties".

He explained with clarity "what is IPR?" and described in detail kinds of IPR viz. Patent, Trade Mark, Design, Copyright, GI and Plants invented by formers. He outlined prerequisites for patentable inventions and gave examples of non-patentable inventions. He ended his lecture by telling success stories and case studies related to IPR.

Day 2
13.12.2022

Session I (10.30-12.00)

Lecture -4: Prof. Kamlesh Kumar Srivas, SoS in Chemistry, Pt. Ravishankar Shukla University Raipur.

Title of Lecture- "Surface Characterization of Chemical and Biological Materials.

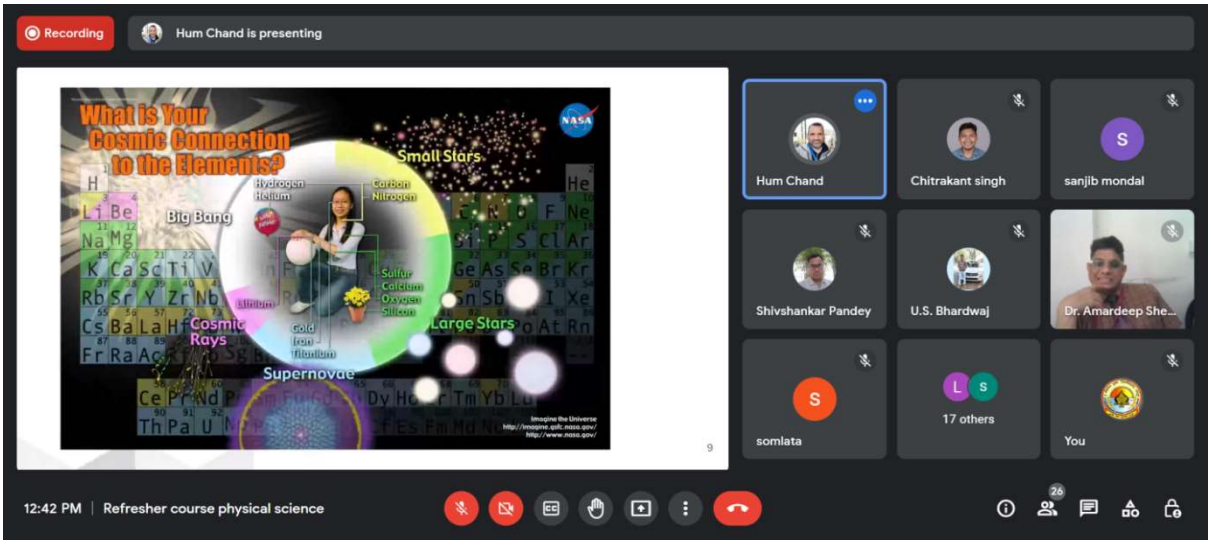
He discussed about different types of characterization techniques which is used for finding the shape, size, and properties of particles and matter. He defined spectroscopy and explained their types like XPS, AES, XRF, Electron Microscopy (SEM and TEM) and NMR etc.

Session II (12:15 to 13:45)

Lecture -5: Prof. Humcahnd, Department of Physics and Astronomical Sciences, Central University of Himachal Pradesh.

Title of Lecture- "Our Cosmos: Active Galactic Nuclei tool to probing Universe history".

He discussed about life cycle of stars, supernova explosion and elemental composition of various astronomical objects. He explained about spectrum of sun and how energy is generated inside the sun. He explained the various techniques for measuring the distance of planet and stars. He said that majority of galaxies are moving away from us and each other.



Session III (14:15 to 15:45)

Lecture -6:Dr. Tanmay Badapanda, Associate Professor, Dept. of Physics CV Raman Global University, Bhubaneswar

Title of Lecture- "Fundamentals of optical properties of materials".

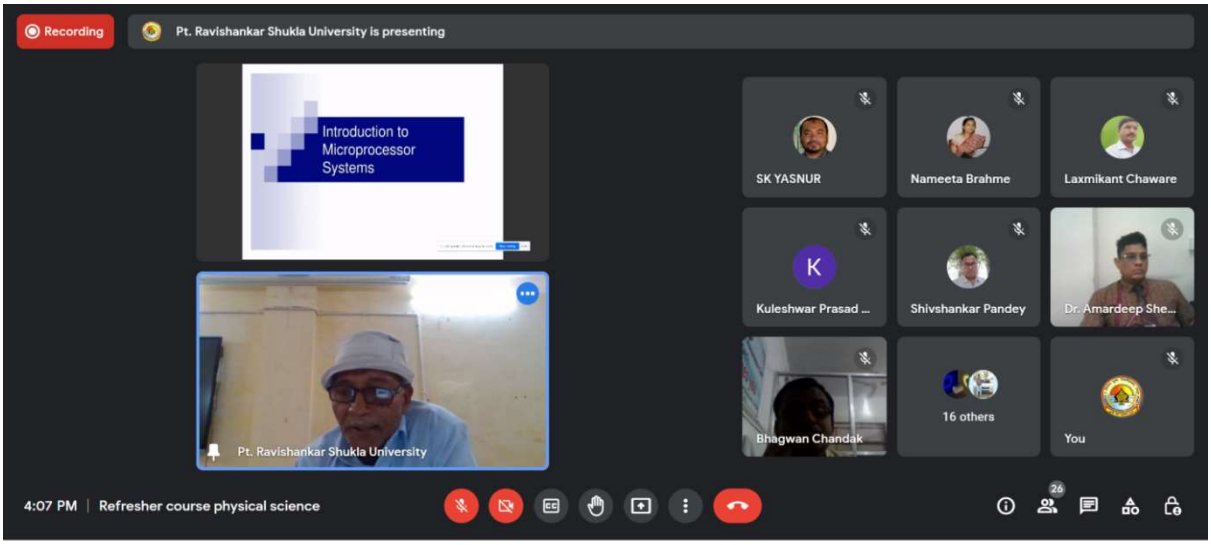
He started his lecture with explanation of absorption, reflection and transmission phenomena of material and described light and materials intrinsic properties. He said that absorption is occurs during the propagation if the frequency of the light is resonant with the transition frequency of the atoms in the medium and also explained that the transmission is related to the absorption, because only unabsorbed light will be transmitted. He explained about reflection and transmission.

Session IV (16:00 to 17:30)

Lecture -7: Prof. R. N. Baghel, Former Professor SoS in Physics and Astrophysics Pt. Ravishankar Shukla University Raipur.

Title of Lecture- "Introduction to microprocessor system".

He started his lecture on overview of 8085 microprocessor and talked about Architecture, I/O Ports, Memory organisation, and addressing modes of microprocessor. He explained the characteristics of microprocessors like-instruction set, Bandwidth, capability and clock speed.



Day 3
14.12.2022

Session I (10.30-12.00)

Lecture 8: Prof. Dilip Kumar Choudhary, Department of Physics, D.B. Science College, Gondia, M.H.,

Title: "Electromagnetic pollution".

He spoke about a new kind of pollution which is a severe issue nowadays. Radiation sources around our local vicinity and their impact on humans are explained elegantly. His lecture was interactive and informative.

Session II (12:15 to 13:45) & Session III (14:15 to 15:45)

Micro-teaching: Number of participants: 23

Subject Expert: Prof. Anjali Oudhia, , Govt. Nagarjuna PG College of Science, Raipur.

S.No	Name	Topic
1	Dr Vikas Gulhare	Transistor and its application.
2	Dr Neelam Shukla	Superconductors
3	Mr KamleshKumar Nigam	General properties of matter
4	Mr Amit KumarTamrakar	Surface Photometry of Galaxies
5	Mrs Somlata	Diode Laser
6	Mr Shivshankar Prasad Pandey	Transport of energy: thermal conductivity in gases.
7	Dr Laxmi Kant	Why do we think there is Dark Matter & Dark Energy ?
8	Mr Sanjib Mondal	Optoelectronic Devices
9	Dr Ugendra Kumar Kurrey	Thermo-Luminescence Properties of rare Earth doped ZrO_2 Phosphors
10	Mr Lekhram Hirwani	Boltzmann's Entropy Relation
11	Mr Chitrkant Belodhiya	Superconductivity
12	Mr Ashok Kumar Jyoti	Photoelectric Effect
13	Mr Kuleshwar Prasad	Newton's Law
14	Mr Bhagwan Das Chandak	Semiconductors
15	Mr Sohan Kumar Jha	Black hole, Event Horizon, Kerr Solution
16	Dr Amardeep Tulshiram Shende	Matter Wave
17	Dr Netram Kaurav	X -RAY Diffraction
18	Mr Lokeshwar Patel	Logic Gates
19	Mr Umashankar Bhardwaj	N & P Type Semiconductors

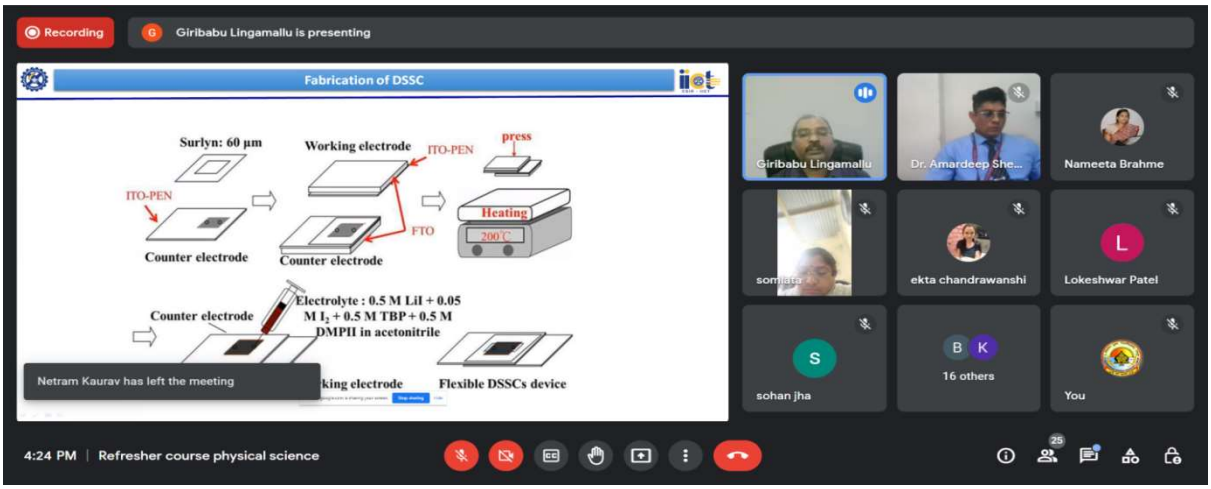
20	S K Yasnur	Electrochemical properties of group VIII based transition metal oxide
21	Dr Yogesh Prasad	Cosmology
22	Dr M. Ragamathunnisa	Nanotechnology
23	Dr Ekta Chandrawanshi	X-Ray Diffraction

Session IV (16:00 to 17:30)

Lecture-9: Dr. Giri Babu, Principal Scientist, IICT, Hyderabad,

Title: Chlorophyll Derivatives for Energy Harvesting.

He discussed natural photosynthesis, energy; electron transfer phenomena and described photovoltaic characteristics. He also provided important information about the Porphyrins as sensitizers, photo physics and materials application for Harvesting and solar cell.



Day 4
15.12.2022

Session I (10.30-12.00)

Lecture – 10: Dr. Chittaranjan Sinha, Professor & Former Head of Department of Chemistry, Jadavpur University, Kolkata.

Title of the Lecture: "Energy Harvesting Materials: Structure & Supramolecular interactions"

He started lecture with the structures of the materials, Superconductor and define supramolecular. He explained that the organic-inorganic composites are sources of new alternate materials. They exhibit novel, astonishing features and their properties can be tailored to suit a particular application. Organic unit acts as bridging agent and inorganic part are united to compose or form macroscale to nanoscale materials of versatile applications.

Session II (12:15 to 13:45)

Lecture – 11: Prof. P.K. Bhatnagar, Retired Professor, Department of Electronic Science, Delhi University, New Delhi.

Title of the Lecture: "Conducting Polymers and some of their Applications in Electronics and Medical Diagnostics"

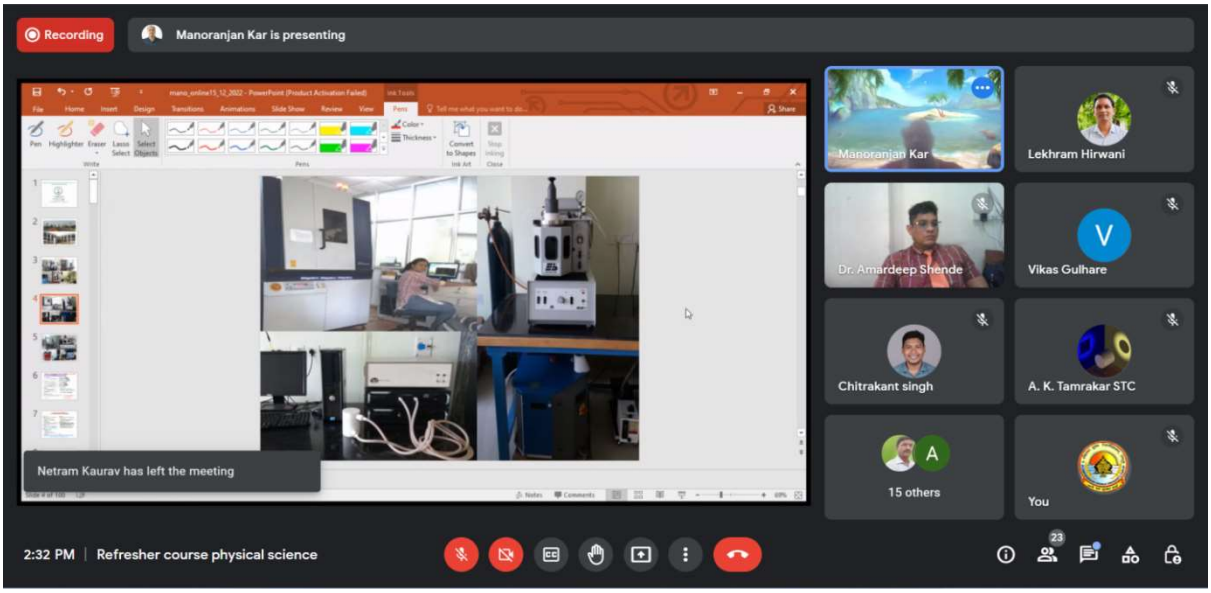
He explained that how some advanced materials for electronics and physics, such as, conducting polymers – Fullerenes, Carbon nanotubes and ZnO Nanorods, Quantum Dots, Salmon DNA, Graphene, Silicine and Germanene – Phosphorene. are using in life medicine, defence, engineering, cosmetic, agriculture, entertainment, new scientific devise and techniques. He also showed video clips for the applications of CP – OLED TV, OLED Screen mobiles.

Session III (14:15 to 15:45)

Lecture – 12: Dr. Manoranjan Kar, Associate Professor, Department of Physics, IIT Patna, Bihar.

Title of the Lecture: "Optimization of Physical Properties in Nano-composite for Technological Applications"

He Started lecture with composite and Nano-composite are different from each other. Then he explained how the properties of a material can be tuned for application by making composite or nano-composite and how the filler size in polymer nano-composite should be



Session IV (16:00 to 17:30)

Seminar session

Subject Expert- Dr. R.N. Baghel, Former Professor, SoS in Physics and Astrophysics,

Pt. Ravishankar Shukla University, Raipur (C.G.)

Total Number of Participants given presentation: 07

S.No	Name of the Participant	Topic of the Seminar
1	Dr. Vikas Gulhare	Mechano and Thermoluminescence Characterization of Luminescent Materials
2	Kamlesh Kumar Nigam	Growth of CuAlSe2 Thin Films by Pulse deposition Technique
3	Amit Kumar Tamrakar	Isophotal shape analysis of an early-type galaxy: NGC 2911
4	Mrs. Somlata	Scanning Electron Microscope (SEM)
5	Shivshankar Prasad Pandey	Effects of Electromagnetic Radiation on DNA
6	Dr. Laxmi Kant	Exploring the Faint Outer region of Early-Type Galaxies
7	Sanjib Mondal	Studies on Ag nanoparticles patterned Erbium doped TiO2 thin film for Photodetector application

Day 5
16.12.2022

Session I (10.30-12.00)

Lecture -13: Prof. S.K. Pandey, SoS in Physics and Astrophysics Pt. Ravishankar Shukla University Raipur.

Title of Lecture- "A Physicist view of the Universe".

He explained the objectivity of study of universe using the Kepler's planetary law. He discussed how the stars born and life cycle of stars with white dwarfs using Chandrasekhar Limit. He described how the origin of chemical elements, life in the universe comes out. Then he discussed the conditioned for creation of Black hole. Later he explained the Dark matter, and explained how the universe expanding. He explained how Big bang Theory helps to understand the universe. Then he explained the composition of Universe, detector used to detect Gravitational waves and gave some interesting facts related with universe.

Session II (12:15 to 13:45)

Lecture -14: Dr. Y.M. Gupta, Principal, Rungta College of Engineering

Title of Lecture- "Basics of Statistical Mechanics"

Gupta Sir wonderfully describes importance of basics of Statistical Mechanics. He described with example for understanding "Why statistics?" Later he gave the significance of Plank's constant. He gave the information about the significant people involved in development of various mechanics like Classical, Statistical and quantum Mechanics. Then he gave the Significance of statistics to understand microscopic properties of matter. Then he briefly explained the string theory and its need. He conclude his talk by describing the accessible and inaccessible microstate.

Session III (14:15 to 15:45)

Lecture -15: Dr. R.K. Pandey Vice Chancellor, Amity University, Raipur (C.G.)

Title of Lecture- "Fascinating Materials".

Pandey Sir started his lecture how materials are so fascinating in terms of bonds, bands, structure, composites and lattice design. Then he explained design of novel material using artificial intelligence. He gave example of carbon bonds in diamond and graphite He explained how Nano scale size affects resistivity which changes the properties at nano metre range. He described the importance of

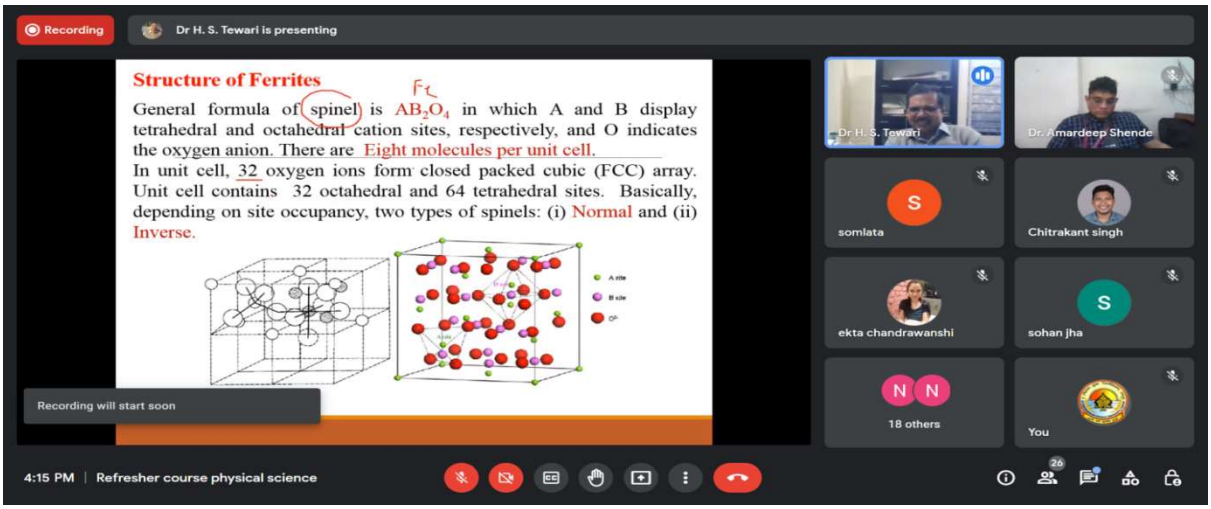
Semiconductor and described the process of band gap engineering: Core shell design and polymer quantum dot hybrid LED. Multi-material 3D printing and meta material.

Session IV (16:00 to 17:30)

Lecture -16: Dr. H.S. Tiwari Professor Department of Physics, Guru Ghasidas Central University, Bilaspur (C.G.)

Title of Lecture- "Oxide based Magnetic Materials:Ferrites, Structure and Properties and X-ray Diffraction Technique".

Prof. Tiwari Sir started his lecture by explaining Origin of Magnetism, magnetic ceramic, ferrimagnetisms and ferrites, type of ferrites materials, properties of ferrites and its applications. He also explained types of spinals that are normal spinal and inverse spinal in detailed. He described the XRD analysis and Raman analysis. In second part he explained characterization techniques mainly XRD in detail. Different diffraction methods like Laue, Rotating Crystal and Powder. Scattering by a crystal in 3 Levels: i)electron, ii) atom, iii) unit cell in detail. Significance of peaks in XRD and Williamson- Hall plots.



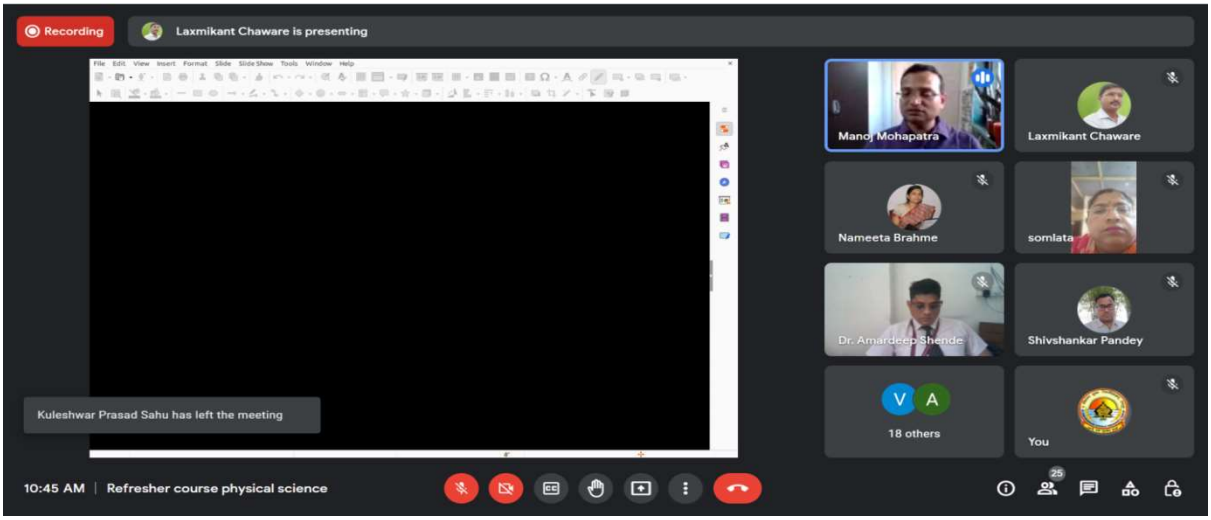
Day 6
17.12.2022

Session I (10.30-12.00)

Lecture -17: Dr. Manoj Mohapatra, BARC's Radiochemistry Division in Trombay, Mumbai,

Title of Lecture- "Defect Engineering in Multifunctional Materials".

According to the speaker, the field of multifunctional materials is in its infancy. The participants were astonished to learn about the latest advancements in the physics and chemistry of these materials and their interesting and interchanging features. It was rather intriguing to compile the many characteristics of these materials, which have wide-ranging applications for devices.



Session II (12:15 to 13:45)

Lecture -18: Dr. Rajendra Singh Thakur, CSIR CSMCRI, Bhavnagar, Gujarat,

Title of Lecture- "NMR Spectroscopy: Spin Manipulations Enabling Methodology Development."

Dr. Thakur explained the features of NMR very well and also explained the definition, principle, construction, and working of NMR spectroscopy by giving various examples. In the end, he also satisfied the participants by answering their questions. Thus, the second session was full of spectroscopic knowledge, which was well assimilated by the participants.

Session III (14:15 to 15:45)

Lecture -19: Dr. Pawan Kumar, Professor, Department of Physics and Astronomy, NIT, Rourkela

Title of Lecture- "Higher Dimensional Science,"

Dr. Kumar illustrated the history of science, particularly physics, and how we arrived at the current Morden science scenario. It was fascinating to see how science has advanced to the point where there is no longer only one face to believe in. It has several adverse impacts on human beings and Mother Nature. Prof. Kumar later clearly established a link between various faiths, beliefs, and ancient or indigenous literatures. He has come to the conclusion that Indian values and scripts are far superior to dealing with the inherent utility of Morden Science.

Session IV (16:00 to 17:30)

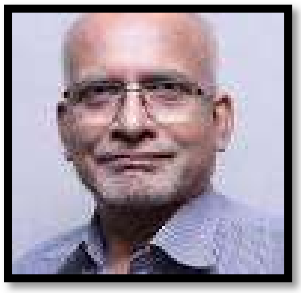
Lecture -20: Dr. Shimachala Panigrahi, Professor, Department of Physics, NIT Raurkela

Title of Lecture- 'Quantum paradox to quantum reality".

Prof. Panigrahi very nicely distinguished the two major branches of physics, classical mechanics and quantum mechanics, and also explained how we can understand quantum mechanics using our classical mechanical brain. Prof. Panigrahi also used the table to explain the difference between the two branches in a very interesting way. In this brief session, Prof. Panigrahi further explained the definition of quantum mechanics in relation to a quantum mechanical device, a quantum wire, a quantum dot, a quantum computer, and so on.

Day 7
19.12.2022

Session I (10.30-12.00)



Lecture- 21: Dr. B. N. Jagtap, Professor, IIT Mumbai

Title: "Controlling Atoms and Molecules by Photons and vice versa".

He started his lecture by basic information of atomic and molecular hypothesis. The controlling system of energy in atoms and molecules by lasers are also discussed

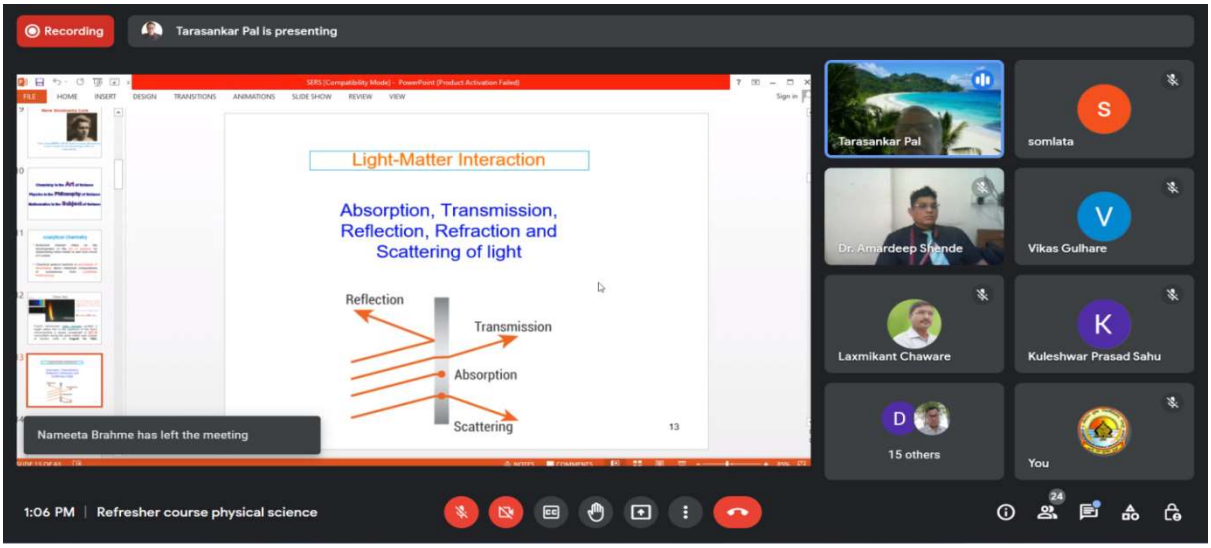
molecular in his talk. The new material can be developed by using modern quantum techniques. The effect of radiation is responsible to change its transition and also explained the weak and strong effect of magnetic field. He told the detailed investigation about optical interference. Finally he concluded the talk with basic atomic cooling technique and to develop quantum computer.

Session II (12:15 to 13:45)

Lecture 22: Professor Tarashankar Pal, Department of chemistry, University of Johannsberg, South Africa

Title: "Surface Enhanced Raman Scattering".

He started the lecture from the basic theory of chemistry and details the cause of spectrum. He broadly explained to interaction of light with matter. To explain the importance of the RAMAN spectroscope he also describes the scattering phenomena and observed the detection of single molecule. In his lecture he describes the principal of Raman spectroscopy and raman signal enhancement by vibrational signal. In the end of the talk he suggested the change in the bond length is observed due to Raman shift.



Session III (14:15 to 15:45)

Lecture- 23: Professor Anshuman Dalvi, BITS Pilani, Rajasthan

Title: "High Energy Batteries and Super capacitors for Energy Storage".

He initiated his talk from need of the high power devices in society and also gives the information of historical development of the electronic devices. He explained the concept of the super capacitors and concludes their talk with the prominent application of lithium batteries.

Session IV (16:00 to 17:30)

Lecture 24: Dr. Y. M. Gupta Principal, Rungta College of Engineering

Title: "Basics of Quantum Mechanics". He initiated his lecture by the basic concept of classical and quantum mechanics. He also discussed the presentation of a fine molecule and gaseous molecule considered as a single point. He described the Gibbs canonical ensemble and shows its relation with dynamical and statistical system.

Day 8
20.12.2022

Session I (10.30-12.00)

Lecture 25: Dr. B.S. Panigrahi, Senior Scientist, IGCAR, Kalpakkam, delivered a lecture entitled

Title: "Basics and Methodology of Luminescence for beginners-I".

He highlighted the application of phosphor luminescence materials in different areas like water purifier, LED, Bio field etc. He gave a basic information of absorption and fluorescence spectroscopy that is very helpful for detecting the luminescence materials. Different type of luminescence processes are elaborately discussed. Finally he concluded the talk with Jablonski Energy Diagram which give an insight about general idea of luminescence.

Session II (12:15 to 13:45)

Lecture-26: Prof. M. K. Deb, SoS in Chemistry, Pt. R. S. University, Raipur:

Title: "Modern Techniques for Atmospheric Analysis".

He highlighted the present scenario about air quality index (AQI) in different state in our country. He also demonstrated how the air quality is affected due to emission of number of pollutant gases like CO2, NOx, CO etc form our daily used vehicles and industry. The working mechanism of different type of measurement techniques like Chroatogram, Atomic Absorbtion Spectroscopy (AAS), Gas Chroatography (GC) and Thermal Desorption (TD) are broadly clarified with example.

Session III (14:15 to 15:45)

Seminar Session

Subject Expert : Dr. Tanmaya Badapanda, Associate Professor, Department of Physics, C. V. Raman College of Engineering, Bhubaneswar.

S. No	Name of the Participant	Topic of the Seminar
1	Dr. Ugendra Kumar Kurrey	Synthesis and Characterization of ZrO3 Phosphor
2	Lekhram Hirwani	Growth and Characterization of (Cd-Zn) Thin Film prepared by Chemical Bath Deposition
3	Chitrakant Belodhiya	Nano-Lithography
4	Ashok Kumar Jyoti	LDR/Photoresistor Study of cosmic ray modulation with coronal index during SC 20 to 22
5	Kuleswar Prasad	Rectifiers Crystal Structure
6	Bhagwan Das Chandak	X-ray and X-ray Diffraction

Session IV (16:00 to 17:30)

Lecture 27: Dr. D. Haranath, Professor, NIT Warangal, Telangana,

Title: "Step by step process for filing IPR".

He explained how to draft claims with a simple example like invention for a cup. He outlined prerequisites for patentable inventions and gave examples of non-patentable inventions. He also gave examples about different kind of trade mark, importance of trademarks and a detail conception of copyright and design of IPR.

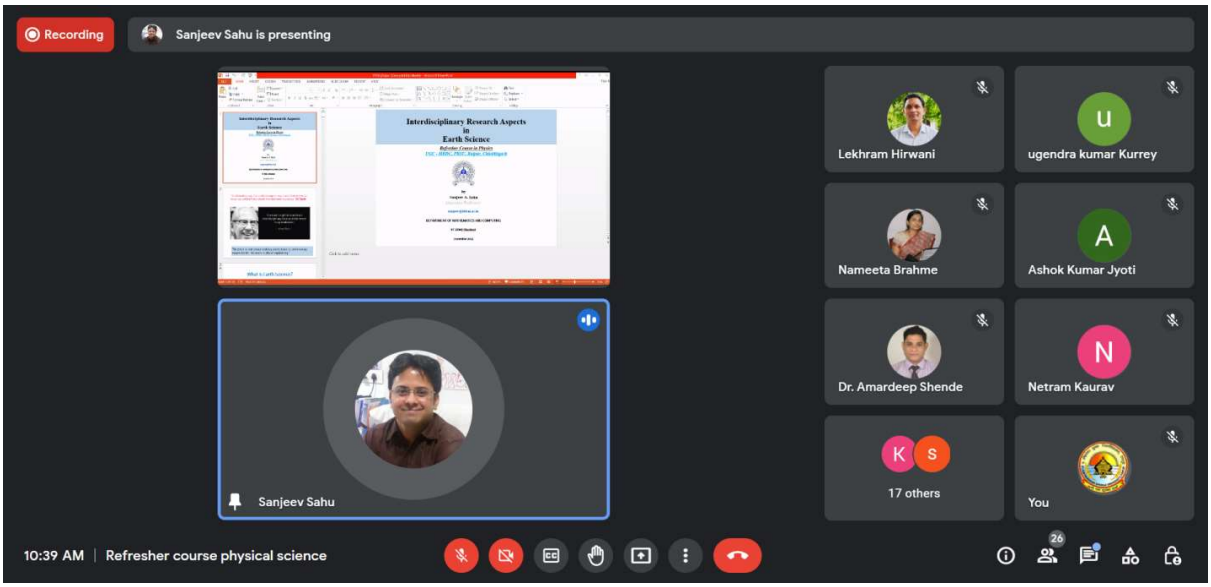
Day 9
22.12.2022

Session I (10.30-12.00)

Lecture 28: Dr. Sanjeev Anand Sahu, Associate Professor, Department of Mathematics & Computing IIT (ISM) Dhanbad

Title: Interdisciplinary Research Aspects in earth science.

He started the lecture with a main objective of research, how to search research area and interdisciplinary research. He gave the basic Knowledge about seismic waves seismology lithosphere prime factor for earthquake how much energy released in earthquake. He discussed main geophysical exploration method and explained Device Application such Ultrasonic Transducer, saw device geophone hydrophone low wave sensor used to detect the earthquake the algorithm predicts earthquake in advance.

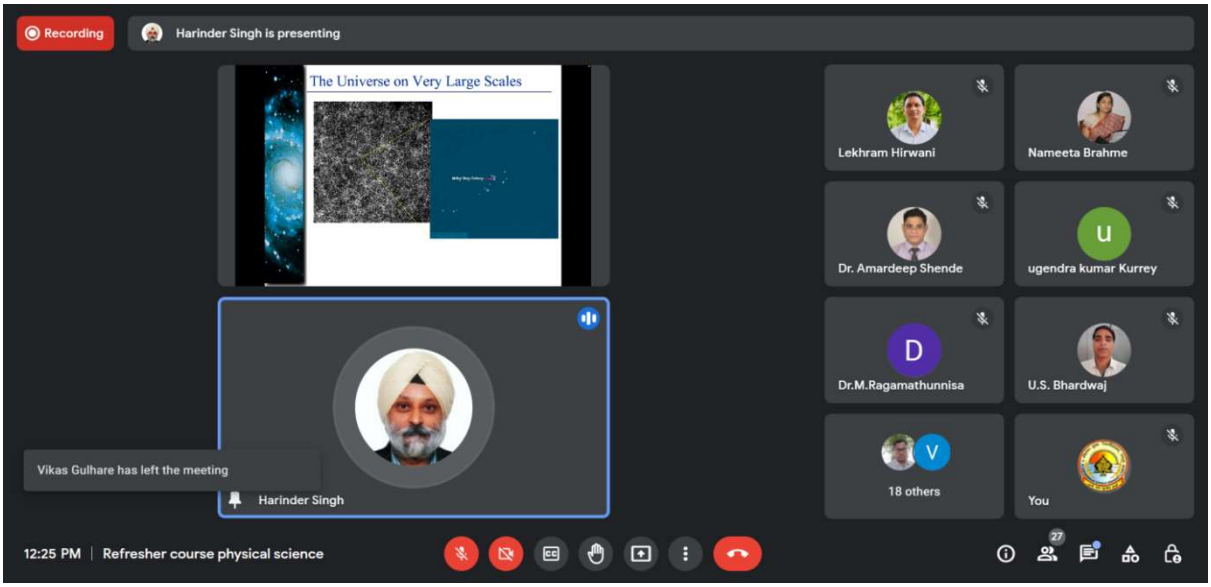


Session II (12:15 to 13:45)

Lecture 29: Prof. Harinder P. Singh, Department of Physics & Astrophysics, University of Delhi

Title: "Modern Astronomy- The Era of Big Data".

He started his Lecture with a scale of cosmos, scales of size and time.He pointed out challenges in Astronomy telescope and then detector, the Parameters of Ideal detector are very useful to know about the Accuracy of detector, Various Instrument like Photometer, Spectrograph and Polarimeter are also discussed. He discussed Telescope Facilities in India also.



Session III (14:15 to 15:45)

Lecture 30: Dr. K.V.R. Murthy, Professor, Applied Physics Department, M.S. University of Baroda

Title: "LED Applications"

The lecture was started with the brief introduction of Display devices and the generation of light sources. He explained the blue light emitting LED's which emits in 420 – 470 nm wavelength of light. Solid state lighting sources and quantum dots were also explained. He also explained why SKY is BLUE, and applications of electrons in tube light, LED lamp, X-rays, all semiconductor devices etc.

Session IV (16:00 to 17:30)

Seminar Session:

Observer (Subject Expert)- Dr. R.N. Baghel, Former Professor, SoS in Physics and Astrophysics Pt. Ravishankar Shukla University, Raipur (C.G.)

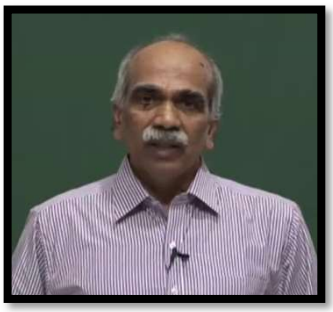
Total Number of Participants given presentation: 08

S. No	Name of the Participant	Topic of the Seminar
1	Dr. Ekta Chandrawanshi	Eu^{3+} doped $Bi_4Si_3O_{12}$ phosphor for plant grow LED's applications
2	Dr. Amardeep Tulshiram shende	Stimulation to revert the zwitterions to normal form of L-Alanine from Gibb's free energy: DFT and ultrasonic studies
3	Dr. Netram kaurav	Synthesis, Characterization and Physical Properties of Nanoparticles

4	Prof. Lokeshwar Patel	LDR/Photoresistor
5	Umashankar Bharadwaj	Rectifiers
6	S. K. Yasnur	A study on Fe_2O_3 as a supercapacitor electrode material
7	Dr. M. Ragamathunnisa	A Behavioural Study of Sulphur Compound In Low and High Concentration Using Ultrasonic and Spectroscopic Techniques
8	Dr. Neelam Shukla	Synthesis and Characterization of compound Semiconductor Nanowires

Day 10
23.12.2022

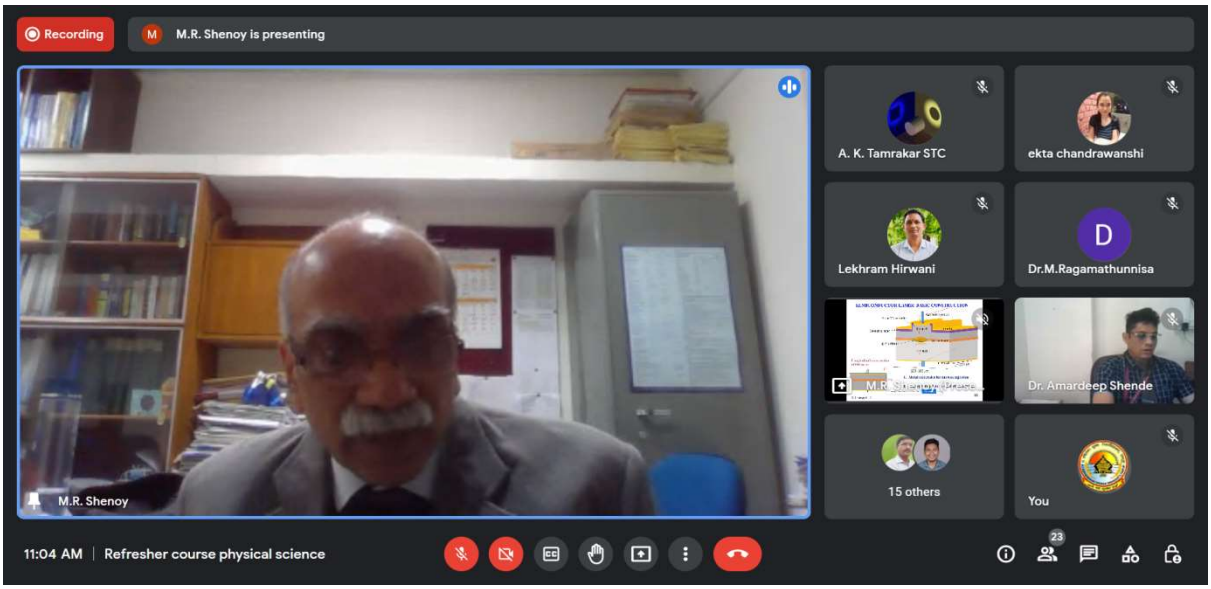
Session I (10.30-12.00)



Lecture – 31: Dr. M.R. Shenoy, Professor of Physics from IIT Delhi.

Title of the Lecture: "Quantum wells in semiconductor optoelectronics: An Introduction"

In first part, he started lecture with the Semiconductor optoelectronics and its applications. He explained the reaction and energy band between semiconductor optoelectronic materials with the help of periodic table. Also explained the variation of direct and indirect band gaps of the ternary compound AlxGa1-xAs for 0≤x≤1. In second part, he explained the semiconductor quantum wells, quantum well lasers, Quantum Cascade Lasers (QCL), superlattice-1 & 2, effect of electric field on the energy band & on a quantum well, quantum well infrared photo detectors and detection mechanism of QWIP.



Session II (12:15 to 13:45)

Lecture – 32: Prof. P.K. Bhatnagar, Former Professor, Department of Electronic Science, Delhi University, New Delhi.

Title of the Lecture: "Quantum dots and their fabrication in borosilicate glasses"

He started lecture with applications of quantum dots in various fields and then explained what are quantum dots, methods of preparation, growth process of quantum dots and various analysis techniques to studies its properties. He explained constraints of miniaturization, quantum confinement regimes, Bohr exaction radius for various semiconductors, quantum dots in borosilicate glasses, photo darkening and its effect, rules for the glass transition, nucleation and difference between QLED & Quantum Dots. He explained why QDs in glass matrix, why group II-VI semiconductor CdS, CdSe and CdTe for QDs, why semiconductor-doped glass (SDG) matrix and which is better for eyes OLED or QLED?

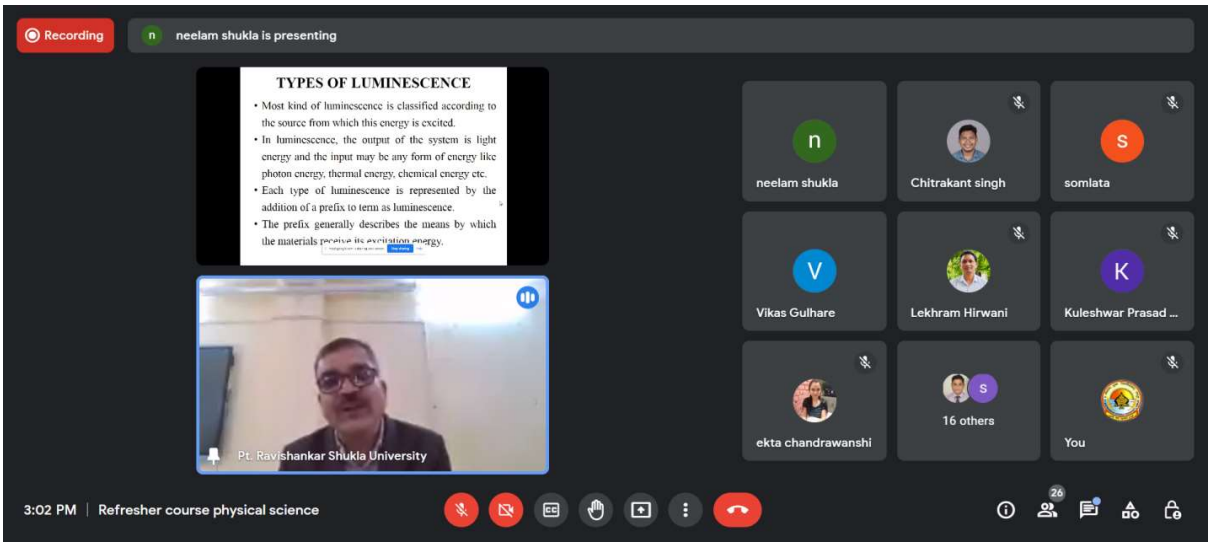
Session III (14:15 to 15:45) & Session IV (16:00 to 17:30)

Project Presentation Session & Ending Test

Observer (Subject Expert)- Dr. D.P. Bisen, Professor, SoS in Physics and Astrophysics, Pt. Ravishankar Shukla University, Raipur (C.G.)

Total Project Presented: 03 Total Number of Participants given presentation: 12

S.No	Project Group	Name of the Participant	Project Topic
1	P-1	1. Dr. Vikas Gulhare 2. Neelam Shukla 3. Kamlesh Kumar Nigam 4. Amit Kumar Tamrakar	Luminescence Characterization Rare Earth Doped Borate Based Phosphors
2	P-2	1. Dr. Laxmi Kant 2. Mrs. Somlata 3. Shivshankar Prasad Pandey 4. Sanjib Mondal	Measuring Circumference of the Earth
3	P-3	1. Dr. Ugendra Kumar Kurrey 2. Dr. Ekta Chandrawanshi 3. Chitrakant Belodhiya 4. Lekhram Hirwani	Synthesis, Characterization and Luminescence Studies of Rare Earth Doped Bismuth Silicate Phosphors



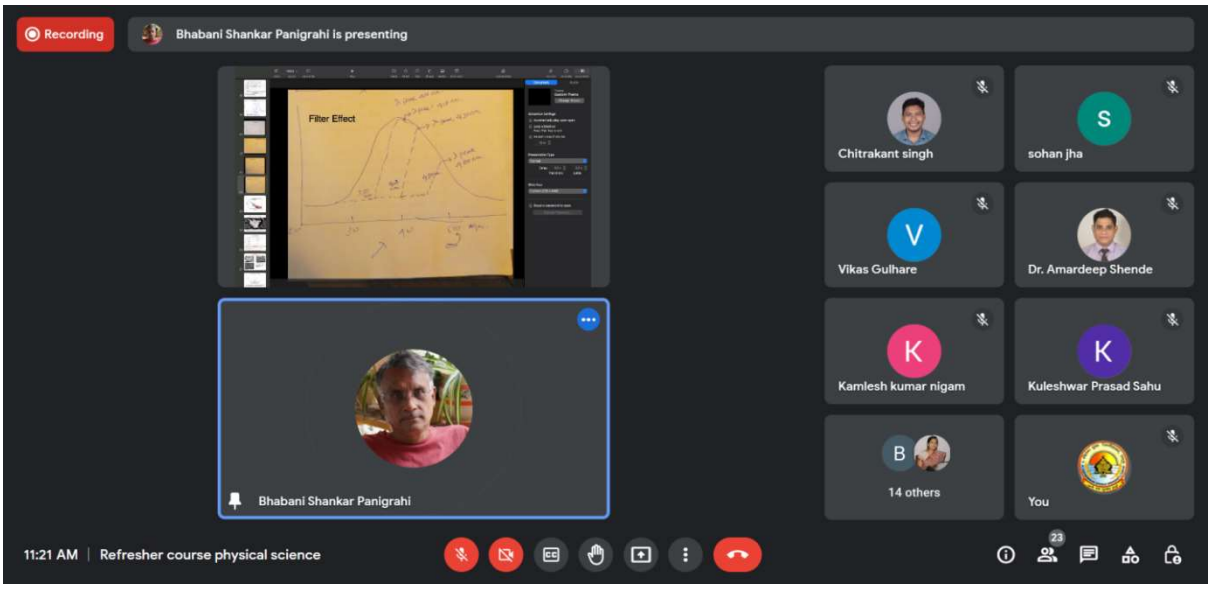
Day 11
24.12.2022

Session I (10.30-12.00)

Lecture- 33: Dr. B.S. Panigrahi, Senior Scientist IGCAR, Kalpakkam.

Title of the lecture: "Study of Uranyl and Europium Luminescence in SBP host"

The beginning of this lecture was started with a Jablonski Energy Diagram.The importance of various synthesis techniques such as Combustion, Coprecipitation, Hydrothermal, and Solid state synthesis for the preparation of $SrAl_2O_4$, $SrAl_2O_7$ and the annealing effect on the grain sizes of the prepared particles was also explained through XRD plot.



Session II (12:15 to 13:45)

Lecture- 34: Speaker Name- Prof. S.A. Hashmi, Dept. of Physics and Astrophysics, University of Delhi (North Campus), New Delhi.

Title of the lecture: "Modification of Electrolytes for super capacitors to improve Energy density: Emphasis to redox-active Electrolyte"

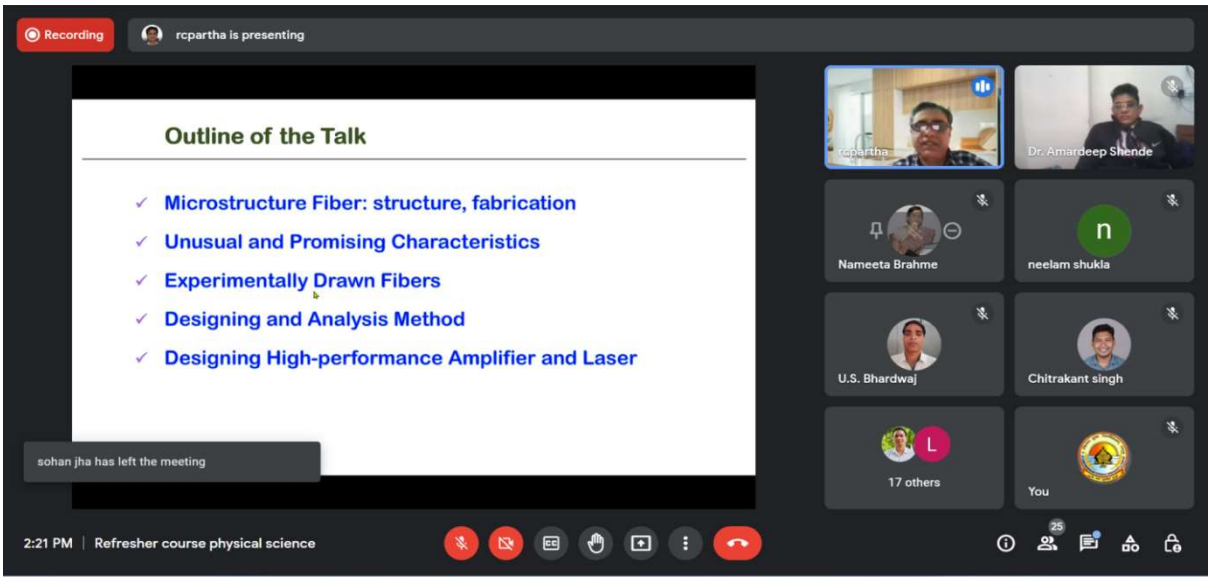
The lecture was started with the basic part of capacitor and then development of capacitor to super capacitor. The classification of super capacitor along with present materials that has been applied as an electrode material was also discussed by the speakers. The importance of electrolytes in a super capacitor and their perfect utilization for the formation of a super capacitor explained.

Session III (14:15 to 15:45)

Lecture- 35: Prof. Partha Roy Chowdhuri, Professor, Physics department, IIT Kharagpur, W.B.

Title of the lecture: "Microstructured Optical Fiber: Structures, Properties and Designing High Performance Fiber Amplifier and Fiber Laser".

This lecture was started with the basic concept of Photonics and specially fiber optics. Here, the effects of natural periodic structure on the characteristics and their interaction with EM waves were explained by the speakers. The name of the structure depending on the use of domain such as FSS, EBG, PBG etc. were discussed beautifully. Photonic crystal along with their different dimension, Photonic Crystal Fiber (PCF) and its basic structure were also explained. PCF fiber based amplifier and their importance was discussed briefly.



Session IV (16:00 to 17:30)

Project Presentation Session

Observer (Subject Expert) - Dr. D. P. Bisen, SoS in Physics and Astrophysics, Pt. Ravishankar Shukla University, Raipur, C.G, India.

Total Project Presented: 03 Total Number of Participants given Presentation:11

S.No	Project Group	Name of the Participant	Project Topic
1	P-4	1 Amardeep Tulshiram Shende 2. Kuleshwar Prasad 3. Ashok Kumar Jyoti 4. Dr.Yogesh Prasad	Photo acoustic study of L-Alanine
2	P-5	1.Dr. Netram Kaurav 2. Lokeshwar Patel 3. Umashankar Bhardwaj 4. Bhagwan Das Chandak	Role of Cappants on the physical properties of Some metal nanoparticles"
3	P-6	1.Dr. M.Ragamathunnisa 2. Sohan Kumar Jha 3. Sk Yasnur	A study on the Super capacitive performance of oxide based materials with composition with Others as an electrode material along with the variation of the morphology on different substrate"

Day 11
24.12.2022

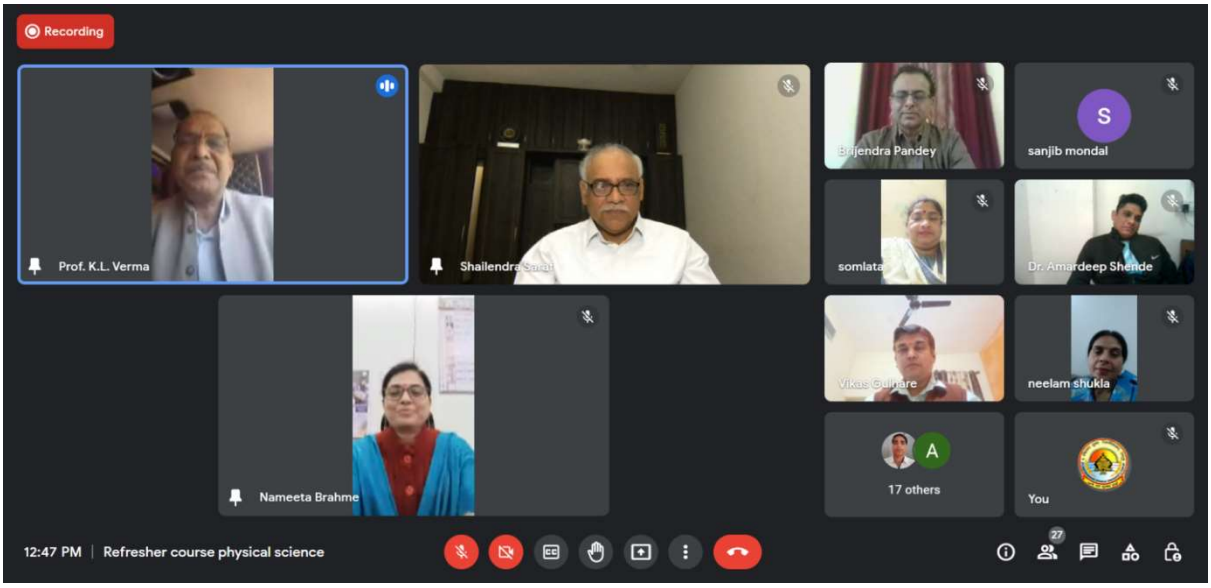
Session I (10.30-12.00)

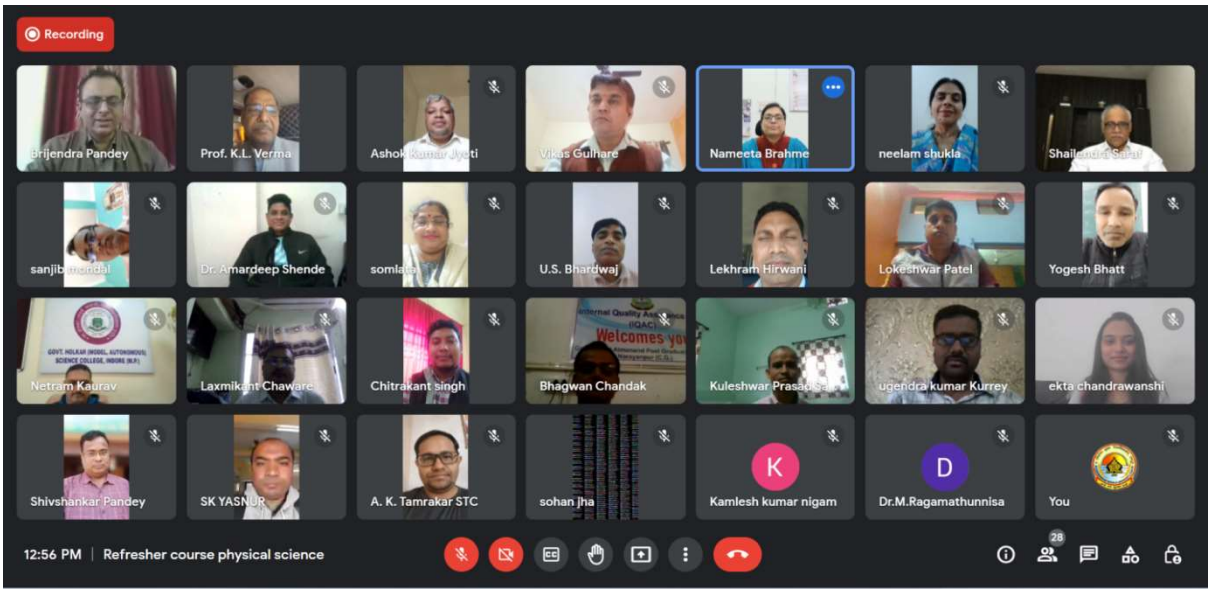
Interaction session by course coordinator: In this session all the participants interact with coordinator and shared their experience and thanked all the Coordinators for successfully conducting every session programme. Participants spoke about the usefulness of the course content and relevance of the lectures. They also extended their appreciation for the support they received from each resource person and other fellow participants.

Session II (12:15 to 13:45)

VALEDICTORY CEREMONY

The valedictory function of two week Online Refresher Course started by Dr. Brijendra Pandey Coordinator from the HRDC by welcoming all .He congratulated everyone for successful completion of the course. Prof Nameeta Brahme in her address thanked and congratulated all the participants for successful completion of the course. She also thanked all the speakers for their valuable time and efforts. Feedback about each resource person as well as about the whole course was obtained from all the participants which revealed that the participants were fully satisfied with the design, organization, conduct and content of the course. Prof Keshari Lal Verma, Hon'ble Vice-Chancellor thanked all the Course Coordinator and Director, HRDC for their efforts in making this programme a success in his valedictory address. He wished all the participants best of luck in all their future endeavours. The session ended by vote of thanks by Dr. Brijendra Pandey.





UGC-Human Resource Development Centre
Pt. Ravishankar Shukla University, Raipur, (CG)
Refresher Course- Physical Science
(12.12.2022 to 26.12.2022)
List of Participants

Sr. No.	Name of Participants	Email	Mobile No.	Designation	Subject	College	University	Photo
01.	Dr. Vikas Gulhare	vikasgulhare123@gmail.com	9827883758	Assistant Professor	Physics	Govt. G.N.A. P.G. College, Bhatapara, C.G.	Pt. Ravishankar Shukla University, Raipur, C.G.	
02.	Neelam Shukla	neelamshukla2212@gmail.com	9424129615	HOD, Dept of Physics	Physics and Electronics	Kalyan P.G. College, Bhilai, C.G.	Hemchand Yadav University, Durg, C.G.	
03.	Kamlesh kumar nigam	kkumarnnigam133@gmail.com	8109832528	Assistant professor	Physics	Govt. P.G. College, Sheopur, M.P.	Jiwaji University, Gwalior, M.P.	
04.	Amit Kumar Tamrakar	stcphy.amit@gmail.com	9755971173	Assistant Professor	Physics	St. Thomas College, Bhilai, C.G.	Hemchand Yadav University, Durg, C.G.	
05.	Mrs. Somlata	som.lata10@gmail.com	9827924032	Asst. Professor	physics	Mohan Lal Jain (Mohan Bhaiya) Govt. College, Khursipar, Durg, C.G.	Hemchand Yadav University, Durg, C.G.	
06.	Shivshankar Prasad Pandey	shivpandeybsp@gmail.com	9340206990	Assistant Professor	Physics	Govt. Mahamaya College, Ratanpur, Bilaspur, C.G.	Atal Bihari Vajpayee Vishwavidyalaya Bilaspur, C.G.	
07.	Dr. Laxmi Kant	chaware.laxmikant@gmail.com	9926555788	Assistant professor	Physics	Center for Basic Sciences	Pt. Ravishankar Shukla University, Raipur, C.G.	
08.	Sanjib Mondal	sanjibmondal220@gmail.com	9733886778	Assistant Professor	Physics	Suri Vidyasagar College, Birbhum, W.B.	The University of Burdwan, Bardhaman, W.B.	
09.	Dr. Ugendra Kumar Kurrey	kurrey7947@gmail.com	9827402714	Assistant Professor	Physics	Govt. C.L.C. Arts And Science College, Patan, C.G.	Hemchand Yadav University, Durg, C.G.	
10.	Lekhram Hirwani	lekhramhirwani@gmail.com	9907433013	Assistant Professor	Physics	Govt. College, Gurur, Dist-Balod, C.G.	Hemchand Yadav Vishwavidyalaya Durg, C.G.	
11.	Chitrkant Belodhiya	ckbelodhiya@gmail.com	7587253783	Assistant Professor	Physics	S.o.S. In Physics And Astrophysics, Pt. Ravishankar Shukla University, Raipur, C.G.	Pt. Ravishankar Shukla University, Raipur, C.G.	
12.	Ashok Kumar Jyoti	ashokkumarjyoti2014@gmail.com	8223914514	Asstt. Professor	Physics	Bhanupratapdeo Govt. P.G. Collage, Kanker, C.G.	Shaheed Mahendra Karma University, Bastar, Jagdalpur, C.G.	

13.	Kuleshwar Prasad	virgin.kuleshh1@gmail.com	9425257931	Assistant Professor (Physics)	Physics	Govt. Shaheed Gendsingh College, Charama, Dist-Uttar Bastar, Kanker, C.G.	Shaheed Mahendra Karma University, Bastar, Jagdalpur, C.G.	
14.	Bhagwan Das Chandak	chandakbhagwan1@gmail.com	9893634512	Assistant Professor	Physics	Govt. Swami Atmanand P.G. College, Narayanpur, C.G.	Shaheed Mahendra Karma University, Bastar, Jagdalpur, C.G.	
15.	Sohan Kumar Jha	sohan00slg@gmail.com	9474092867	Assistant professor	Physics	Chandernagore College, Chandannagar, W.B.	The University of Burdwan, Bardhaman, W.B.	
16.	Dr. Amardeep Tulshiram Shende	amardeepshende@gmail.com	8007300887	Assistant Professor	Physics	Shikshak Sachalit Shikshan Sansthan's Dr. Shantilal Dhanji Devsey Arts College and Commerce and Science College, Wada, Dist-Palghar, M.H.	University of Mumbai, Mumbai, M.H.	
17.	Dr. Netram Kaurav	netramkaurav@collegeholkar.org	9425957755	Assistant Professor	Physics	Govt. Holkar (Model Autonomous) Science College, Indore, M.P.	Devi Ahilya University, Indore, M.P.	
18.	Lokeshwar Patel	lokeshwarp0@gmail.com	09907939990	Assistent Professor	Physics	Govt. Lochan Prasad Pandey College, Sarangarh, C.G.	Saheed Nandkumar Patel University, Raigarh, C.G.	
19.	Umashankar Bhardwaj	usbhardwaj908@gmail.com	9893485456	Asst. Professor	Physics	Govt. Shahid Veer Narayan Singh College, Bilaigarh, C.G.	Pt. Ravishankar Shukla University, Raipur, C.G.	
20.	SK Yasnur	skyasnur@gmail.com	9883965246	Assistant Professor	Physics	Tarakeswar Degree College, Tarakeswar, W.B.	The University of Burdwan, Bardhaman, W.B.	
21.	Dr.Yogesh Prasad	bhattyp05@gmail.com	9410576851	Assistant Professor	Physics	Govt. P.G. College Dakpathar Vikasnagar, Dehradun, U.K.	Sridev Suman Uttarakhand University, Badshahithaul, Dist-Tehri Garhwal, U.K.	
22.	Dr. M.Ragamathunnisa	mars.phy@gmail.com	9944394993	Assistant Professor	Physics	Kalaignar Karunanidhi Govt. Arts College for women (Autonomous), Pudukkottai, Tamil Nadu	Bharathidasan University, Tiruchirappalli, Tamil Nadu	
23.	Ekta Chandrawanshi	16shru@gmail.com	7974209864	Assistant professor	Physics	Kalinga University, Raipur, C.G.	Kalinga University, Raipur, C.G.	

Refresher Course – Physical Science
(12.12.2022 to 26.12.2022)
Participants List
Course Coordinator – Prof. Nameeta Brahme

Chairperson and Reporter List

Date	Chairperson	Reporter
12.12.2022	Dr. Laxmi Kant	Kuleshwar Prasad
13.12.2022	Chitrkant Belodhiya	Bhagwan Das Chandak
14.12.2022	Amit Kumar Tamrakar	Kamlesh kumar nigam
15.12.2022	Lekhram Hirwani	Sohan Kumar Jha
16.12.2022	Mrs. Somlata	Dr. Amardeep Tulshiram Shende
17.12.2022	Shivshankar Prasad Pandey	Dr. Netram Kaurav
19.12.2022	Dr. Vikas Gulhare	Lokeshwar Patel
20.12.2022	Sanjib Mondal	Umashankar Bhardwaj
22.12.2022	Dr. Ugendra Kumar Kurrey	SK Yasnur
23.12.2022	Lekhram Hirwani	Dr. Yogesh Prasad
24.12.2022	Neelam Shukla	Dr. M. Ragamathunnisa
26.12.2022	Ashok Kumar Jyoti	Ekta Chandrawanshi

UGC - HRDC, PRSU, Raipur, Chhattisgarh

Tentative Time Table: Refresher Course (Physical Science)

Course Coordinator: Prof. Nameeta Brahme

(12.12.2022 to 26.12.2022)

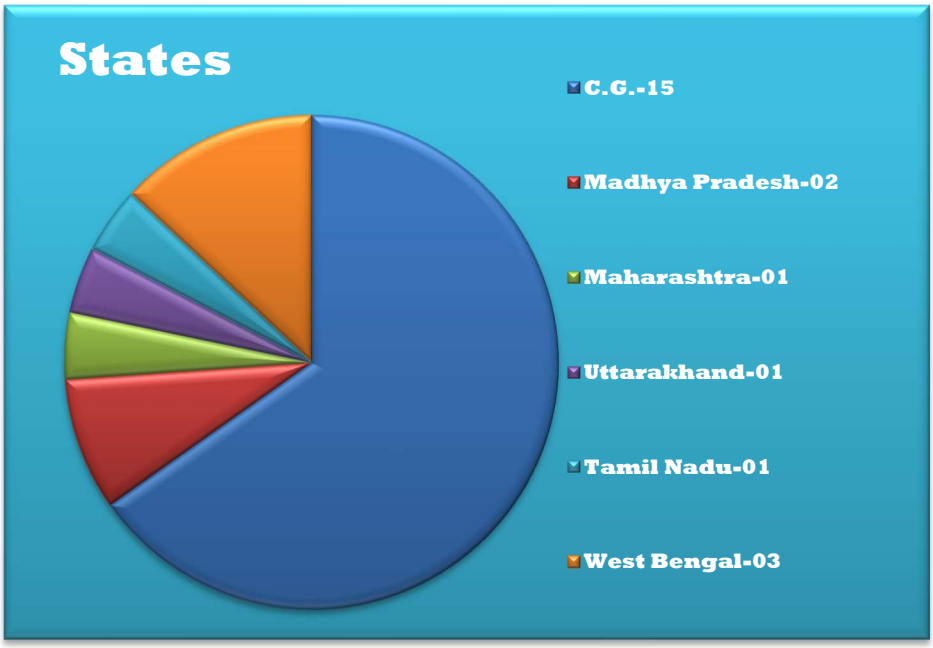
	Session - I (10:30 to 12:00)		Session - II (12:15 to 13:45)		Session - III (14:15 to 15:45)		Session - IV (16:00 to 17:30)
			First Week				
Day 01 12.12.2022	**Registration, Inauguration & Induction**	TEA BREAK	**Lecture 1** **Dr. M. Kar** Associate Professor, IIT, Patna mano@iitp.ac.in manoiitg@gmail.com **Title: Magnetocaloric effect in wide temperature range for technological application**	LUNCH BREAK	**Lecture 2** **Prof. Kamlesh Shrivas** SoS in Chemistry Pt. R. S. University, Raipur kshrivas@gmail.com **Title: Surface characterization of Chemical and Biological Materials**	TEA BREAK	**Lecture 3** **Dr. R. Haranath** Associate Professor Physics NIT Warangal, Telangana haranathnitw@gmail.com **Title: IPR for Science faculties**
Day 02 13.12.2022	**Lecture 4** **Prof. Tarachand Pal** Department of Chemistry, University of Johannesburg, South Africa tarashankar.pal@gmail.com **sds**		**Lecture 5** **Dr Humchand** Professor & Head Department of Physics and Astronomocal Sciences, Central University of Himachal Pradesh, Himachal Pradesh humchand@gmail.com **Title: Overview of observational Astronomy/cosmology**		**Lecture 6** **Dr. Tanmay Badapanda** Associate Professor Dept. of Physics CV Raman College of Engineering, Bhubaneswar badapanda.tanmaya@gmail.com **Title: Ferroelectricity and piezoelectricity in solids**		**Lecture 7** **Dr. Laksman Pandey** Dept. of Physics and Electronics, R.D.V.V Jabalpur, (M. P.) pandey@hotmail.com **Title: Basics of Impedance Spectroscopy**
Day 03 14.12.2022	**Lecture 8** **Prof. Dilip Kumar Chowdhary** Department of Physics, D.B. Science college, Gondia, M.H. dschoudhary@dbscience.org Title: Electromagnetic pollution		**Lecture 9** **Dr. Giri Babu** Principal Scientist IICT, Hyderabad giribabu@iict.res.in **Title: Chlorophyll Derivatives for Energy Harvesting**		**Micro-teaching**		**Micro- teaching**

Day 04 15.12.2022	**Lecture 10** **Prof. Chitranjan Sinha** Department of Chemistry Jadhavpur University, Kolkata crsjuchem@gmail.com **Title: Energy Harvesting Materials: Structure and supramolecular interactions**	TEA BREAK	**Lecture 11** **Prof. P. K. Bhatnagar** Dept. of Electronic Science University of Delhi South Campus, New Delhi promod48@rediffmail.com Title: Organic electronics and its applications	LUNCH BREAK	**Micro-teaching**		**Micro- teaching**
Day 05 16.12.2022	**Lecture 12** **Prof. S. K. Pandey** SoS in Physics and Astrophysics Pt. R. S. University, Raipur proskp@gmail.com Title: A physicist view of the Universe		**Lecture 13** **Dr. Y. M. Gupta** Principal Rungta college of Engineering ymg@rungta.ac.in Title: Basics of Quantum Mechanics		**Lecture 14** **Dr. R.C. Agarwal** Former Professor SoS in Physics and Astrophysics rakesh_c_agrawal@yahoo.co.in **Title: Solid state Ionics conductor's exotic energy materials synthesis and material characterization studies**		**Lecture 15** **Prof. R. N. Baghel.** Former Professor SoS in Physics and Astrophysics Pt. R. S. University, Raipur rnbaghel20@gmail.com Title: Microprocesser
Day 06 17.12.2022	**Lecture 16** **Dr. Manoj Mohpatra** Radiochemistry Division BARC, Trombay, Mumbai manojm@barc.gov.in **Title: Defect Engineering in Multi-functional Materials'**		**Lecture 17** Dr. Rajendra Singh Thakur CSIR CSMCRI, Bhavnagar, Gujrat rthakur@csmcri.res.in		**Lecture 18** **Prof. Pawan Kumar,** **Professor, Department of Physics** **NIT, Rourkela** pawankumar@nitrkl.ac.in **Title: Higher Dimensional Science**		**Lecture 19** **Prof. Manas kanti Deb** SoS in Chemistry Pt. R. S. University, Raipur debmanas@yahoo.com

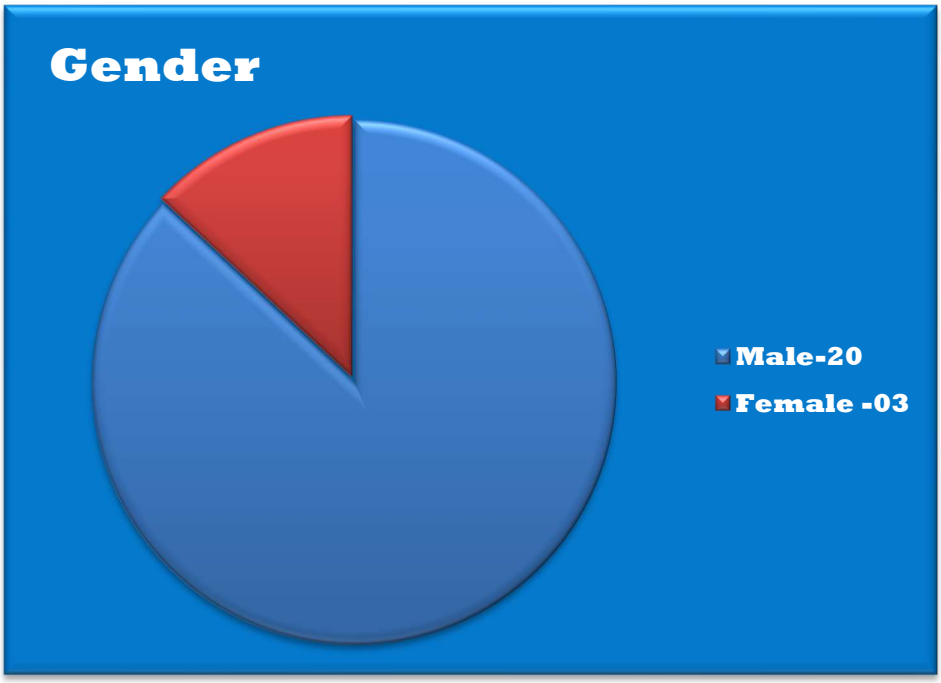
	Session - I (10:30 to 12:00)		Session - II (12:15 to 13:45)		Session - III (14:15 to 15:45)		Session - IV (16:00 to 17:30)
			Second Week				
Day 07 19.12.2022	**Lecture 20** **Prof. B. N. Jagtap** Professor IIT Mumbai bnjagatap@gmail.com **Title: Controlling atoms and molecules by photons and vice versa**	TEA BREAK	**Lecture 21** **Dr. K. V. R. Murthy** Professor Faculty of Technology, M.S. University, Vadodara drmurthykvr@yahoo.com	LUNCH BREAK	**Lecture 22** **Dr. Ravi Sharma** Asst. Prof. Dept. of Physics Devendra Nagar College Raipur rvsharma65@gmail.com	TEA BREAK	**Seminar**
Day 08 20.12.2022	**Lecture 23** **Prof. Anshuman Dalvi** BITS Pilani, Rajasthan anshumandalvi@gmail.com Title: High energy batteries and supercapacitors: recent trends in future		**Lecture 24** **Prof. Sanjeev Sahu** **Dept. of Mathematics** **Dhanbad**		**Seminar**		**Seminar**
Day 09 22.12.2022	**Lecture 25** **Dr. Shimachala Panigrahi** Professor Dept. of **Physics** NIT Raurkela spanigrahi@nitrkl.ac.in **Title: Quantum paradox to quantum reality-I**		**Lecture 26** **Prof. Harindra P. Singh** **Department of Physics and Astrophysics** **University of Delhi,** **Delhi-110007** hpsingh.du@gmail.com Title: "Modern astronomy - the era of big data"		**Lecture 27** **Prof. D. P. Bisen** Professor SoS in Physics and Astrophysics Pt. R. S. University, Raipur		**Lecture 28** **Prof. K.K Ghosh** Professor and Head SoS in Chemistry Pt. R. S. University, Raipur

			Second Week				
Day 10 23.12.2022	**Lecture 29** **Dr. M. R. Shenoy** Professor, Physics department, IIT Delhi mrshenoy@physics.iitd.ac.in Title: Semiconductor Quantum well devices in photonics	TEA BREAK	**Lecture 30** **Prof. Partha Roy Chowdhuri** Professor, Physics department, IIT Kharagpur, W.B.	LUNCH BREAK	**Project Presentation**	TEA BREAK	**Project Presentation**
Day 11 24.12.2022	**Lecture 31** **Dr. Omprakash Thakur** Scientist F Physics Lab, DRDO Timarpur, Delhi omprakasht@hotmail.com **Title: Silicon carbide single crystal as wideband gap semiconductors: Structure, Growth, properties and applications**		**Lecture 32** **Prof. S. A Hashmi** Dept. of Physics and Astrophysics, University of Delhi (North Campus) New Delhi sahashmi@physics.du.ac.in Title: Carbon Supercapacitors as Power Sources: Fundamentals and Recent Advances		**Project Presentation**		**Project Presentation**
Day 12 26.12.2022	**Lecture 33** **Dr. S.K. Omanwar** Former Professor (HAG) & UGC-BSR Faculty Fellow Department of Physics Sant Gadge Baba Amravati University,Amravati omanwar@rediffmail.com **Title: role of research in physics**		**Lecture 34** **Dr. Shimachala Panigrahi** Professor Dept. of **Physics** NIT Raurkela spanigrahi@nitrkl.ac.in **Title: Quantum paradox to quantum reality-II**		**Ending Test**		**Valedictory**

State Wise Participants



Gender Wise Participants



Some Glimpses of the Refresher Course – Physical Science