

# Department of Physics: Annual Report 2020-2021

Teacher In-charge: Dr. Rakesh Kumar Pandey

Physics Convenor, DBT Star College Scheme: Dr. Sangeeta D. Gadre

Physics Seminar Society convener: Dr. Raksha Sharma

The Department of Physics conducted the following events during the academic year 2020-21:

(1) Python workshop (eight days): Scientific and Physical computing of the experiments with Python (Under the aegis of DBT Star college Scheme) (2) Webinar: Adaptive Optics and Exoplanet Imaging to motivate students and impart knowledge to them in the field of Science and Technology (3) Online Faculty development Program: Innovation in Scientific Research Methods (Under the aegis of DBT Star college Scheme) (4) Interdisciplinary Science Workshop: Outreach Program (under the aegis of DBT Star College Scheme) (5) Individual faculty achievements like research papers, invited talks, paper presentations, FDP and Refresher courses attended etc. are listed in the report below.

The detailed report is as follows:

## Workshop: Scientific and physical computing of the experiments with python

Dates: 05-11-2020, 06-11-2020, 07-11-2020, 13-11-2020, 19-11-2020, 20-11-2020, 23-11-2020.

**Kirori Mal College**  
Department of Physics  
University of Delhi  
(under the aegis of DBT STAR College Scheme)

**WORKSHOP**  
"Scientific and Physical Computing of the experiments with Python"  
(For 7 days)  
Date: 5th November, 2020 onwards  
Time: 4-6 PM (IST)

Inaugural Lecture:  
Topic: Review of Physical and Scientific computing using Python.

Speaker: Prof. Dhananjay V. Gadre  
Netaji Subhash University of Technology (NSUT), Delhi

Instructors:  
1) Divanshu Dodeja (LAMBDAV LLP)  
2) Harsh Sharma (NSUT)

For Schedule, Visit: [shorturl.at/suvwR](http://shorturl.at/suvwR)  
Or Scan: [QR Code]

For Queries, Contact:  
Kaushke: 9818413713

Prof. Vibha Singh Chauhan, Principal  
Dr. Rakesh Kumar Pandey, Teacher-in-charge  
Dr. Sangeeta D. Gadre, DBT Physics Coordinator  
Dr. Anita K. Verma, DBT Programme Coordinator

A seven days' workshop on "Scientific and physical computing of the experiments with PYTHON" has been conducted on above dates in virtual (Online) mode at Physics Department, Kirori Mal College. The aim of the workshop was to impart basics of python programming language and its commonly used libraries like SciPy, NumPy, Pandas, etc. This workshop was initiated/organised by Dr. Sangeeta D Gadre, Associate professor in Physics Department and DBT Physics Coordinator, under the aegis of DBT star scheme of the college.

**Key Speaker:** Prof. Dhananjay V. Gadre, Netaji Subhas University of Technology (NSUT), Delhi.

**Instructors:** 1. Mr. Divanshu Dodeja (LAMBDAV LLP) 2. Mr. Harsh Sharma (NSUT)

**Participants:** A total of around 80 students from various institutions and few faculties from the college participated in the workshop.

**Online Platforms:** Google Meet, Google Classroom, Whats App

### **Description about the Programm:**

On inaugural of workshop, Dr. Anita K. Verma, Associate Professor and DBT star Programme coordinator, briefly introduced about the DBT star scheme. The session then was addressed by our Principal, Dr. V.S.Chauhan, Senior Professor Physics Department Dr. O.P. Sharma and Teacher-in-Charge of Physics Department Dr. R. K. Pandey. They emphasised the usefulness of Python programming language, their plan to introduce this language in Physics(H) course and elaborated on their association with the key speaker.

A detail introduction of main speaker of the workshop, Prof. Dhananjay V. Gadre was presented by organising member and our student Mr. Vijay and invited prof. Gadre to deliver the inaugural lecture.

Prof. Dhananjay V. Gadre, with 31 years of research and teaching experience, author of several professional articles and books, directs two open access laboratories at NSUT, namely Centre for Electronics Design and

Technology (CEDT) and Texas-Instrument Centre for Embedded Product Design (TI-CEPD). Since past several years he has been interested in microcontroller based embedded system design. His lecture was upon review of Physical and Scientific Computing using Python. He described about the physical computing devices which takes input samples and based on the program that has been written, the program processes this information and gives output. The output needs to be analysed with some other scientific method. He talks about the association of scientific computing with physical computing and their features. He emphasised on main aim of this workshop: introduction of python, its usefulness in scientific computing. He also talked about efficiency of Python in combination with its modules NumPy, SciPy, Matplotlib and Pandas.

After the inaugural lecture the technical sessions of workshop was conducted by the two instructors Mr. Harsh Sharma and Mr. Divanshu Dodeja.

Mr. Harsh talked about course objective, its prerequisite, Introduction to python language and how to install the compiler. Starting with how to install and use Jupyter notebook for python programming, the lecture covered features and very basic introduction of some python syntax, various libraries and modules. He also mentioned the areas of scientific computing where python is used. He also demonstrated that how python is more efficient than other similar programming languages like C++.

On second day Mr. Divanshu Dodeja started session with taking problems faced by participants in installation of python shell or Jupyter. Thereupon he introduced how Python variables are defined and mentioned various data types (list, tuples, Dictionaries etc.) available in the programming language. On Day 3 Mr. Dodeja described in detail about the data type “list, sets and dictionary” and their various modules and operations. He also explained how to define and use conditional statement, Looping statement, various operators and functions in Python programming. At the end of the session two assignments were posted in the Google Classroom.

On fourth day Mr. Harsh introduced the two of the most commonly used libraries in python like NumPy- Numerical python, Pandas- for python data analysis tool. At the end of the session questions and problems faced with the participants were resolved.

On fifth day Mr. Harsh continued the session with elaborate discussion of two other commonly used libraries: a) Matplotlib- plotting and visual analysis. In matplotlib various plotting functions like: stems, Curve plots, Histograms, Bar Graph, Pie-charts, Scatter plot and bubble plots were discussed. However, the library is not limited to only these modules. b) SciPy- Scientific Python, a tool with functions like- interpolation, integration, Fourier Transform, Differentiation and many more. The session ended with basic exercises based on above modules.

Day six started with taking problems from previous sessions and a brief overview of Numpy, Pandas, SciPy and matplotlib libraries. On the end of day 6 and day 7 various assignments problems like behaviour of Electric field of two charges, population dynamics problem, etc. were discussed in detail. On the end of day 7 we motivated participants to work on a project of their interest i.e., to write a program for any scientific problem which would require most of the python syntax and its modules discussed during the entire workshop. We agreed to meet one more day to take the queries and doubts from participants.

Hence the last day of the workshop was conducted on Dec 4 where the participants were given time to present their projects. So, it was mostly a discussion-cum question answer session.

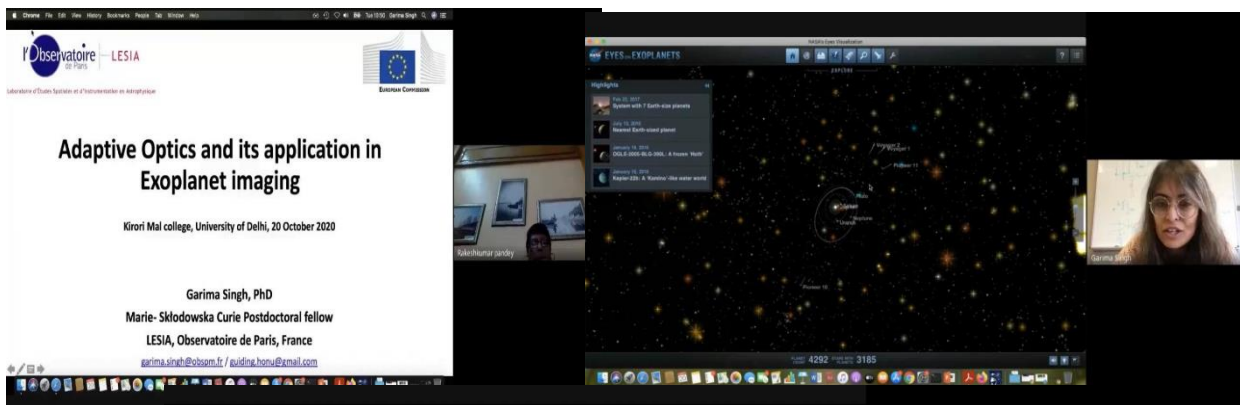
All the sessions were very interactive adopting do it yourself (DIY) approach. The duration of the sessions were between 1:30Hrs to 2:00Hrs. Participants were very enthusiastic during the entire workshop as they were kept involved through assignments plus quizzes and to work on a problem of their choice. This was initially a seven days' workshop however it went up to eight days. The whole workshop was spread over a month. The flexibility in dates were decided in order to accommodate students' regular classes and also giving them time to solve workshop assignments and work on project of their interest.

The entire programme was co-ordinated with support of the Principal, faculties and students of Physics department, Kirori Mal College, University of Delhi.

## Webinar: Adaptive Optics and Exoplanet Imaging

Physics department, Kirori Mal College and KMC Astro Club organised a webinar on Adaptive Optics and Exoplanet Imaging on 20th October 2020. Our guest was Dr. Garima Singh, who is currently a Marie Curie Postdoctoral fellow at Observatoire de Paris. She earned her PhD in 2015 at LESIA - Observatoire de Paris and has worked as a postdoctoral fellow at NASA JPL. She is currently a Marie Curie Postdoctoral fellow at Observatoire de Paris. Her expertise lies in exoplanet imaging and use of adaptive optics in coronagraphs.

The webinar started with basic introduction to Exoplanets:- what are Exoplanets, why it is important to hunt for Exoplanets? and what are some basic ways to look for them. Then Dr. Garima Singh introduced us to the world of adaptive optics. We got to know that how atmosphere forbids us to get a high resolution image and how adaptive optics can be used to reverse the effect of atmosphere. We got the idea of how an adaptive optics system looks like & how it works. After that, Dr. Garima Singh showed us some very large optical telescopes and images made by them using adaptive optics. Then, the session concluded by how we can hunt for exoplanets using the adaptive optics system and a questionnaire round. The session was really informative and students about various imagine and analysing techniques through very large telescopes.



### **Challenges with direct imaging of exoplanets continued**

Why among ~4000 exoplanets (as of 17 October 2020), only 51 have been directly imaged?

1) High contrast between star and planet. Finding planetary signatures in raw images of a star-planet system is like finding a firefly on the surface of a bright lamp.



<https://books.google.co.in/books?id=Dp7IS0cWYUC&printsec=frontcover#v=onepage&q&f=false>

## Online Faculty development Program: Innovation in Scientific Research Methods

An Online Faculty Development Program: Innovation in Scientific Research Methods was organized (Under the aegis of DBT Star college Scheme) from 14<sup>th</sup> to 18<sup>th</sup> October 2020. It was an interdisciplinary FDP in which eminent personalities from Physics, Chemistry, Botany and Zoology were invited as a speakers.

Patron	Professor Vibha S. Chauhan Principal
Program Coordinator	Dr. Anita K. Verma
Subject Coordinators	Dr. Renu Kathpalia, Botany Dr. Reena Saxena, Chemistry Dr. Sangeeta Gadre, Physics Dr. Anita K. Verma, Zoology

**About the College**  
Kirori Mal College is an institution of academic excellence, established in 1954, with a NAAC accreditation A+ grade with 3.54 CGPA, provides our students an environment rich in knowledge and supportive of their

### Interdisciplinary Science Workshop: Outreach Program

An Interdisciplinary Science Workshop was organized under the aegis of DBT Star College Scheme for Maharaja Agarsen Public School, Ashok Vihar, Delhi on 19<sup>th</sup> March 2021. Dr Sanageeta D Gadre Physics Department, Kirori Mal College delivered two lectures in the workshop regarding Error analysis and Oscillations.

**Kirori Mal College**  
University of Delhi  
NAAC accredited A+ grade with 3.54 CGPA

**“Interdisciplinary Science workshop”  
Outreach Program**  
(under the aegis of DBT Star College Scheme)

for  
Maharaja Agarsen Public School,  
Ashok Vihar, Delhi  
on  
March 19, 2021 at 12 noon to 4pm

Registration link: <https://forms.gle/1Ypi24XzwFaAogLz8>  
Join through Google meet: [meet.google.com/qio-xvqb-ced](https://meet.google.com/qio-xvqb-ced)

Renu Kathpalia  
Coordinator-Botany  
Dr. Reena Saxena  
Coordinator-Chemistry  
Dr. Sangeeta Gadre  
Coordinator-Physics

Dr. Anita K Verma  
Program Coordinator  
DBT Star College Scheme

Prof. Vibha S Chauhan  
Principal  
Kirori Mal College

### Faculty Achievements:

**Dr. Rakesh Kumar Pandey** was Teacher In-Charge Physics Department and has published the following research papers:

- (1) "Atomic structure and radiative properties of He-like Ni<sup>26+</sup> ion in dense plasma" authored by A.K. Singh, Dishu Dawra, Mayank Dimri, Alok K.S. Jha, Rakesh Kumar Pandey and Man Mohan accepted for publication in the 'Canadian Journal of Physics' (Acceptance on 14 Dec 2020)
- (2) "Entropic Analysis to Assess impact of Policies on Disorders and Conflicts within a system: Case Study of Traffic intersection as 12-Qubit Social Quantum System" authored by Rakesh Kumar Pandey and published in arxiv at <https://arxiv.org/abs/2012.15012> on December 30, 2020.

**Dr. Sangeeta D. Gadre** was member of the following committees (1) Deputy dean, Student welfare committee, Delhi University (2) Member of OneDUAepx committee (3) Member of University Covid Care Task committee, Delhi University (4) Physics convenor for DBT star Scheme (5) Course Coordinator for UGC sanctioned certificate course on embedded systems and applications (to be started in off-line mode, as soon as college reopens) (6) Member of RISHII Project: (Resources for internationalisation of higher Education Institutions in India) Aim of the project is internationalisation of curriculum (IoC)

Dr. Sangeeta D. Gadre has Co-authored the following Chapter: “Recent Advances and Role of Computational Chemistry in Drug Designing and Development on Viral Diseases”, Amit Lochab, Rakhi Thareja, Sangeeta D Gadre and Reena Saxena, *Frontiers in computational Chemistry* Vol. 5, 1-61, 2020

**Dr. Pradyumna Kumar Sethi** has published two papers and completed four FDP. The details are as follows:

(1) A Simple Model Approach to Dilepton Production Rate in Relativistic Heavy Ion Collisions, *Phys. of Part. and Nucl. Lett.*, 2021, Vol. 18, No. 2, pp. 160–165.

(2) Dilepton production rate calculation using MEQM in heavy-ion collision, *Int. J. of Mod. Phys. A*, Vol 35, No.21, 2020

(3) One week online faculty development program on Research Methodology: Tools and Techniques organized by TLC, Ramanujan college and ARSD college from June 05-11, 2020.

(4) One week online faculty development program on “ Research Methodology and Technology LED Paradigm Shift in teaching and learning” organized by Internal Quality Assurance Cell, Research and Consultancy cell, P.G.D.A.V. College (Evening) in collaboration with Buniyad Education Society, Delhi during 4-12 August, 2020

(5) One week online faculty development program on "Design thinking" organized by ATAL-FDP, AICTE and Kirori Mal college from Oct 26 - 30, 2020.

(6) One week online faculty development program on " Modeling and Simulation of Energy Systems" organized by ATAL-FDP, AICTE and IIT, Roorkee from Oct 19 - 23, 2020.

**Dr. Agam Kumar Jha** has published one paper, one student completed thesis under his guidance attended two national seminars and participated in online lecture series. The details are as follows:

(1) Quark Gluon Plasma (QGP) Evolution Under Loop Corrections" got published in *International Journal of Scientific Research in Physics and Applied Sciences*, vol. 8, issue. 6, pp 13-18, December 2020.

(2) Mr. Abdul Hamid, Ph.D. student (Dr. Agam Kumar Jha as Co-supervisor ) at Department of Physics, Jamia Millia Islamia defended his thesis successfully in April 2021.

(3) Participated in an online National Seminar on Exploring Physics with experts organised by Kalindi College, University of Delhi on 10th February 2021.

(4) participated at Three days Online National Workshop on Challenges of Teaching Physics Laboratory Courses in Online Mode organised by Kalindi College, Department of Physics and



Astrophysics and The National Academy of Sciences India (NASI), Delhi Chapter on 23-25 January 2021.

(4) participated at Three days Online National Workshop on Challenges of Teaching Physics Laboratory Courses in Online Mode organised by Kalindi College, Department of Physics and Astrophysics and The National Academy of Sciences India (NASI), Delhi Chapter on 23-25 January 2021.

(5) Participated in Online Lecture Series Organised by Indian Association of Physics Teachers and Delhi State Science Teachers' Forum during 2020.

**Dr. Bipin Singh Koranga**, has published seven papers and two books. The details are as follows:

(1)“Quantum Gravity Correction to Co-bimaximal Neutrino Mixings ” Bipin Singh Koranga, Kirori Mal college, University of Delhi, *Boson J. of Modern Physics*. Volume 7, 2020

(2)“Empirical formulation for small circular electron fields ” Bipin Singh Koranga, Kirori Mal college, University of Delhi. *Biomed. Phys. Eng. Express* 6 (2020) 065023.

(3)“Neutrino Mass Spectrum for Co-Bimaximal Mixings from Quantum Gravity ” Bipin Singh Koranga, Kirori Mal college, University of Delhi. *Int. J. Modern Theo. Physics*, 2020, 9(1): 16-23.

(4)“The CP Violating Phase in Matter for Three Generatons of Neutrinos Using the Fritzsch Parametrization” Bipin Singh Koranga, Kirori Mal college, University of Delhi. *Int.J.Theor.Phys.* 53 (2020) 2753-2759

(5) Effective Neutrino Masses from Four Flavor Neutrino Mixing Matrix Published in : *Int. J. Theor. Phys.* 60 (2021) 3, 781-792

(6) CPT Violation in Four Flavor Neutrino Framework from Planck Scale Effects, Published in: *Int.J.Theor.Phys.* 60 (2021) 3, 976-981

(7) Quantum Gravity Effects on Oscillation Par ameters in a Four Flavor Framework  
Accepted in Journal: *International Journal of Theoretical Physics*

Book Authored by Dr. Bipin Singh Koranga are:

(1) An Introduction of Tensor Analysis, Level of Publisher- International River Publisher Denmark,2020 ISBN–9788770225816

(2) Special Functions & Its Application Level of Publisher- International River Publisher Denmark,2020 ISBN–9788770226257

**Dr. Siddhartha Lahon** has published the following paper and attended one FDP course:

(1) Publication: Effects of temperature and hydrostatic pressure on the optical rectification associated with the excitonic system in a semi-parabolic quantum dot, Suman Dahiya, Siddhartha Lahon, Rinku Sharma, *Physica E*, 118, 113918, 2020

(2) FDP course: Siddhartha Lahon - Obtain A+ in FDP "Enhancing Psychological skills for teaching and Practice", 15-29 September 2020, organized by TLC Ramanujan College, DU, Delhi

**Dr. Chongtham Jiten** has completed the following Refresher course and FDP:

(1) Participated Refresher Course in “Environmental Science/Education” ( ID) organised by UGC-HRDC, Jamia Millia Islamia, New Delhi from 7th October to 21st October, 2020.

(2) Participated One Week Workshop on “Research Methodology”, organised by UGC-HRDC, Jamia Millia Islamia, New Delhi from 17th December to 23rd December, 2020.

(3) Participated One Week Faculty Development Programme on “Academic Writing”, organised by Teaching Learning Centre, Ramanujan College, University of Delhi from 18th February to 24th February, 2021.

**Dr. Raksha Sharma** has one published one paper, one international conference presentation (best presentation award), completed five Faculty development program and two Refresher courses. The details are as follows:

(1) Publication: “Recent advances in carbon based nanomaterials as electrochemical sensor for toxic metal ions in environmental applications” Amit Loachab, Raksha Sharma, Siddharth kumar and Reena Saxena Materials today Proceedings Volume 45, Part 3, 2021, Pages 3741-3753 <https://doi.org/10.1016/j.matpr.2021.01.271>

(2) Best Oral presentation award and additional Poster prize (GBP 100) in 2<sup>nd</sup> International Symposium (via virtual Platform):Functional Nanomaterials for Industrial applications, Academy-Industry-Clinicians Meet from 14<sup>th</sup> to 16<sup>th</sup> July 2020, title of Presentation “Antibacterial properties of highly magnetic monodispersed FeCo Nanoparticles, Moditma, Priyanka Singh, Raksha Sharma, A. K. Verma and S. Annapoorni

(3) Faculty Development Program on ICT: “Instructional Design Development and Learning analytics” organized by IQAC and UGC-PARAMARSH Kirorimal College, Delhi University from 24<sup>th</sup> July 2020 to 30<sup>th</sup> July 2020.

(4) One Week Faculty Development Program: “E-Content Development and Learning Management System” (with A+ Grading) organized by Guru Angad Dev Teaching Learning Center GAD-TLC, SGTB Khalsa College, Delhi University under PMMMNMTT of MHRD from 22<sup>nd</sup> August to 28<sup>th</sup> August 2020

(5) Faculty Development Program “Innovation in scientific Research method” (Online), organized by DBT kirori Mal College from 14 October to 18<sup>th</sup> October 2020

(6) Faculty Development Program “Design Thinking organized by ATAL- AICTE and Kirori Mal College from 26<sup>th</sup> October to 30<sup>th</sup> October 2020

(7) Faculty Development Program: Digital Tools for 21<sup>st</sup> Century: Word Processing & Spreadsheets, organized by Guru Angad Dev Teaching Learning Center: S.G.T.B Khalse College, University of Delhi, under under PMMMNMTT from 27<sup>th</sup> January to 2<sup>nd</sup> February 2021

(8) Refresher Course: “Advanced Research Methodology tools and techniques”, organized by Teaching Learning centre, Ramanujan College, University of Delhi under the aegis of Ministry of

Education, Pandit Madan Mohan Malaviya National Mission on Teachers and teaching from 30<sup>th</sup> January 2021 to 14<sup>th</sup> February 2021

(9) Refresher Course on blended learning: Alternative dimensions organized by Teaching Learning centre, Ramanujan College, University of Delhi under the aegis of Ministry of Education, Pandit Madan Mohan Malaviya National Mission on Teachers and teaching (PMMMNMST) from 12<sup>th</sup> January 2021 to 29<sup>th</sup> January 2021

**Dr. Pranav Kumar** has completed the following Orientation and Refresher Courses:

(1) Completed four week Induction/Orientation Program (with A+ grading) organized by Teaching Learning Centre, Ramanujan College, University of Delhi, under the aegis of Ministry of education, PMMMNMST, from 11<sup>th</sup> February to 13<sup>th</sup> March 2021

(2) Completed two weeks Faculty Development Program (with A+ grading), “Enhancing Psychological Skills for Teaching and Practice” organized by Teaching Learning Centre, Ramanujan College, University of Delhi, under the aegis of Ministry of education, PMMMNMST, from 15<sup>th</sup> September-29<sup>th</sup> September 2020.

**Dr. Kajal Jindal** has published five papers, two international conference presentations, awarded best presentation award in national conference and attended one orientation course, three FDP and one Refresher course as follows:

(1) “Enhanced low temperature thermoelectric properties by nano-inclusion of 2D MoS<sub>2</sub> with Fe:ZnO thin films”, Aakash Gupta, Sujit Kumar, Kajal Jindal, Anjali Sharma and Monika Tomar, Journal of Electronic Materials (2021) <https://doi.org/10.1007/s11664-021-08979-5>.

(2) “Role of charge states and dopant site in governing electronic properties of Cr doped BiFeO<sub>3</sub>”, Tahir Ahmad, Kajal Jindal, Monika Tomar, Pradip K. Jha, Vinay Gupta, Materials Chemistry and Physics 263 (2021) 124438.

(3) “Thiol-functionalized Multiwall Carbon Nanotubes for Electrochemical Sensing of Thallium”, Amit Lochab, Megha Saxena, Kajal Jindal, Monika Tomar, Vinay Gupta, Reena Saxena, Materials Chemistry and Physics 259 (2021) 124068.

(4) “Tunable electronic and magnetic properties of 3d transition metal doped Bi<sub>2</sub>Fe<sub>4</sub>O<sub>9</sub>”, Shaan Ameer, Kajal Jindal, Monika Tomar, Pradip K. Jha, Vinay Gupta, Journal of Magnetism and Magnetic Materials, 509 (2020) 166893.

(5) “Role of unintentional carbon dopant in resolving the controversial conductivity aspects in BiFeO<sub>3</sub>”, Shaan Ameer, Kajal Jindal, Monika Tomar, Pradip K. Jha, Vinay Gupta, Physical Chemistry Chemical Physics 22 (2020) 10010-10026.

(6) “Role of underlying substrate in the development of ZnO thin film based SAW UV photodetector”, Kajal Jindal, Monika Tomar, Vinay Gupta, presented at “World Nano Congress on Advanced Science and Technology (WNCST-2021) organized by Centre for Nanotechnology research (CNR) at Vellore Institute of Technology, Vellore from 8<sup>th</sup> -13<sup>th</sup> March 2021.

(7) “Electrocatalytic properties of ZnO thin film based biosensor for detection of uric acid”, Kajal Jindal, Monika Tomar, Vinay Gupta, presented at International Conference on “Advanced Functional



Materials and Devices” (AFMD-2021) organized by Atma Ram Sanatan Dharma College, University of Delhi, India from 3<sup>rd</sup> – 5<sup>th</sup> March 2021.

(8) “Influence of magnetic ordering on the electronic, optical and magnetic properties of Bi<sub>2</sub>Fe<sub>4</sub>O<sub>9</sub>”, Kajal Jindal, Shaan Ameer, Monika Tomar, Pradip K. Jha, Vinay Gupta, presented at Recent Advances in Functional Materials (RAFM-2020) held at Atma Ram Sanatan Dharma College, University of Delhi, India from 5<sup>th</sup> – 6<sup>th</sup> November 2020 and has been awarded the “*Best Presentation award*”.

(9) Completed four weeks Induction/Orientation Program (with A+ grading) organized by Teaching Learning Centre, Ramanujan College, University of Delhi, under the aegis of Ministry of education, PMMMNMTT, from 11<sup>th</sup> February to 13<sup>th</sup> March 2021.

(10) One Week FDP on “Digital Tools for 21st Century: Word Processing & Spreadsheets” organized by Guru Angad Dev Teaching Learning Centre, S.G.T.B. Khalsa College, University of Delhi under PMMMNMTT scheme from 27<sup>th</sup> January 2021 to 02<sup>nd</sup> February 2021.

(11) One week FDP on “Innovation in Scientific Research Method” organized by Kirori Mal college, University of Delhi under DBT star college scheme from 14<sup>th</sup> October 2020 to 18<sup>th</sup> October 2020.

(12) One week FDP on “Pedagogical Training for effective online Teaching & Learning” organized by Deen Dyal Upadhyaya college, University of Delhi in collaboration with K.T.H.M. College, Nashik from 03<sup>rd</sup> August 2020 to 10<sup>th</sup> August 2020.

(13) Two Weeks refresher Course on “Managing Online Classes and Co-Creating MOOCs 3.0” organized by Teaching Learning Centre, Ramanujan College, University of Delhi from 25<sup>th</sup> July 2020 to 10<sup>th</sup> August 2020.

**Dr. Ishpal Rawal** has published 8 papers and completed five FDP/short term courses. The details are as follows:

(1) Rishi Pal, Sneha Lata Goyal, Ishpal Rawal, Anil Kumar Gupta, Ruchi , Efficient energy storage performance of electrochemical supercapacitors based on polyaniline/graphene nanocomposite electrodes, Journal of Physics and Chemistry of Solids 154 (2021) 110057

(2) Rishi Pal, Sneha Lata Goyal, Ishpal Rawal, Asha, Lightweight graphene encapsulated with polyaniline for excellent electromagnetic shielding performance in X-band (8.2–12.4 GHz), Materials Science and Engineering B 270 (2021) 115227

(3) Ishpal Rawal, Parveen K. Goyal, Effect of Ammonia Based Deprotonation on the Variable Range Hopping Conduction in Polypyrrole Nanotubes, Solid State Sciences, 99 (2020) 105984.

(4) Rishi Pal, Sneha Lata Goyal, and Ishpal Rawal, Transition of charge transport phenomena from 3D to 1D hopping at low temperatures in polyaniline/graphene composites, J. Appl. Phys. 128 (2020) 175108 (1-10),

(5) Ravi Kant Tripathi, O. S. Panwar, Ishpal Rawal, C. K. Dixit, A. K. Srivastava and B. C. Yadav, Study of Variable Range Hopping Conduction Mechanism in Nanocrystalline carbon thin Films deposited by modified anodic jet carbon arc technique: Application to light-dependent resistors, Journal of Materials Science: Materials Electronics 32 (2021) 2535-2542

(6) Rishi Pal, Sneha Lata Goyal, Ishpal Rawal, High-performance solid state supercapacitors based on intrinsically conducting polyaniline/MWCNTs composite electrodes, *Journal of Polymer Research* 27 (2020) 179 (1-13)

(7) Rishi Pal, Sneha Lata Goyal, Ishpal Rawal, Smriti Sharma, Efficient room temperature methanol sensors based on polyaniline/graphene micro/nanocomposites, *Iranian Polymer Journal*, 29, (2020) 591–603

(8) V Kumar, Ishpal Rawal, V Kumar, Easy Synthesis of Nanostructures of ZnO and ZnS for Efficient UV Photodetectors, *Micro-Electronics and Telecommunication Engineering*, 106 (2020) 713  
Online Short Term Course: Synthesis and Characterization of Nanomaterials (SCNM-2020) organized by Department of Physics, J.C. Bose University of Science and Technology, YMCA, Faridabad from November 02-07, 2020.

(9) Faculty Development Program: on “Moving Towards New Normal Through Effective Online Teaching”, organized by Kalindi College, University of Delhi, Delhi in the collaboration of Mahatma Hansraj, Faculty Development Centre, Hansraj College, University of Delhi, under the Ministry of Education, Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) from December 01-07, 2020.

(10) Online Faculty Induction-Orientation Program: organized by Teaching Learning Centre (TLC), Ramanujan College, under the Ministry of Education, Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) from February 11 2021 to March 13, 2021 →

(11) Faculty Development Program/one week workshop: on “Academic Writing” organized by Teaching Learning Centre (TLC), Ramanujan College, under the Ministry of Education (erstwhile, Ministry of Human Resource Development), Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) from March 12-18, 2021

(12) Online Refresher Course/Faculty Development Program: on “Managing Online Classes and CoCreating Moocs 4.0” organized by the Teaching Learning Centre, Ramanujan College, University of Delhi under the Ministry of Education (erstwhile, Ministry of Human Resource Development), Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) from March 11-26, 2021

#### **Dr. Nandkishore has completed the following Faculty Development Program**

(1) One Week Faculty Development Program on ACADEMIC WRITING organized by Ramanujan College, University of Delhi, Delhi-110007 under aegis of Ministry of Education during 18 February, 2021- 24 February, 2021

(2) One Week Faculty Development Program on ACADEMIC WRITING organized by Ramanujan College, University of Delhi, Delhi-110007 under aegis of Ministry of Education during 21 March 2021- 18 March, 2021

**Ms. Arti Chauhan** has published one paper and attended two Faculty Development Programs as follows:

(1) Improvement in Photovoltaic response of bismuth ferrite by tuning its ferroelectric and band-gap properties, Arti, Reema Gupta, Renuka Bokolia and Vivek Verma, *Journal of Material Science: Mater Electron* (Springer), <http://doi.org/10.1007/s10854-020-04925-z>.

(1) One week Faculty Development Programme on "Open Source Tools for Research" from June 08 - June 14, 2020 conducted by Ramnujan college university of delhi, sponserd by MHRD Pandit Madan Mohan Malviya National Mission on Teachers and Teaching.

(2) Two Weeks Faculty Development Programme on "ADVANCED CONCEPTS FOR DEVELOPING MOOCS" from July 02 - July 17, 2020 conducted by Ramanujan college university of Delhi, sponsored by MHRD Pandit Madan Mohan Malviya National Mission on Teachers and Teaching

**Mr. Mayank Dhimri** has published the following papers:

(1) **M. Dimri**, D. Dawra, A. K. Singh, A. K. Jha, R. K. Pandey, R. Sharma, M. Mohan. Electron impact excitation of Na-like Cu XIX using the Breit–Pauli R-matrix method, The European Physical Journal D 75, 1-7 (2021)

(2) **M. Dimri**, D. Dawra, A. K. Singh, A. K. Jha, R. K. Pandey, R. Sharma, M. Mohan. Atomic structure and radiative properties of He-like Ni 26+ ion in dense plasma. Canadian Journal of Physics. (Accepted Manuscript). doi: <https://doi.org/10.1139/cjp-2020-0036>