Department of Biotechnology

FY: 2023-24

Annual Progress Report supported under Star College Scheme

San. No. BT/HRD/11/019/2020

1. **Name of the College** : DAV College Bathinda, Punjab

2. **Name of Coordinator, designation,** : Dr. Kulwinder Singh Mann, Assistant Professor,
   Address, Phone nos. : Department of Physics,
   DAV College, Bathinda-151001, +91-9417325696

3. **Assessment duration**: 01/04/2023 to 31/03/2024, Duration in years: 1.00

4. **Details of Departments Supported**

Sl No	Name of Department	Courses (B.Sc./M.Sc./PG Diploma, certificate etc.) offered	Regular Faculty members	
			Total	
			With Ph.D.	Without Ph.D.
1.	Chemistry	B.Sc. (Medical) B.Sc. (Non-Medical) M.Sc.-Chemistry	Total=05	
			03 Dr. Parveen Bala Dr. Paramjeet Kaur Dr. Neha Jindal	02 Ms. Meetu S. Wadhwa Mr. Aman Malhotra
2.	Physics	B.Sc. (Non-Medical) B.Sc. (Non-Medical with Computer)	Total=04	
			03 Dr. Gurpreet Singh Dr. Kulwinder Singh Mann Dr. Vikas Duggal	01 Ms. Harpreet Kaur Brar

5. **Number & Date of Advisory committee meeting** : 1st on 11/11/2020
   2nd on 25/05/2022
   3rd on 04/03/2024

6. **Qualitative improvements due to DBT support. Please highlight 5 salient points (within 500 words).**

The five salient qualitative improvements can be described by the acronym SMART.

S: Strengthened infrastructure of laboratories by procuring multiple copies of equipment.

M: Motivated students to pursue their career in sciences by interactions with resource persons.

A: Augmented interdisciplinary activities to cross-fertilize the research aptitude of students.

R: Repaired and upgraded the existing lab equipment.

T: Training provided to UG science students and lab. staff.

The detailed description of the above points is as follows:

I. Strengthened infrastructure:

Following the acquisition of multiple instances of equipment for the laboratories of the Physics and Chemistry departments, the enhanced equipment-to-student ratio significantly contributed to the provision of superior practical training compared to previous conditions. The introduction of new practical exercises and demonstrations served to enhance the quality of the extant teaching-learning paradigm.

II. Training provided to students:

ARDUINO Board and Tinkercad

Oscilloscopes: CRO and DSO
TRACKER Software
Computerized cutting and moulding of Aluminum Sheet
Importance of earth wire in electrical fitting
Honey Bee Keeping
Registration to Inflibnet to access the e-content

III. Interdisciplinary Activities:

- Executed minor projects undertaken by student groups of three or fewer, under the supervision of a designated faculty member, with the aim of cultivating their research acumen.
- Facilitated excursions to Transformer making industry (PP-Industry, Bti.), Idea-Lab (BCL and AICTE), BARC funded labs of the Physics department at MRS Punjab Technical University, Bathinda, Marhar Electrical Industries (Dhuri, Sangrur), Bee-Keeping Farm (Tungwali, Bti.), and Puspa Gujral Science City (Jalandhar), enhancing students' understanding of practical scientific applications.
- Coordinated interdepartmental initiatives across all science disciplines, such as: the Science Festival, Night Sky Watch, and Environmental Rangoli Utsav, aimed at fostering students' interest in science. This event attracted participants from neighboring schools, starting from the ninth grade onwards.
- Orchestrated interdisciplinary endeavors involving all science departments, such as the National Science Day celebrations themed *'Integrated Approach in Science & Technology for Sustainable Future*', which offered students opportunities to engage in various competitions including quizzes, slide show presentations, and poster exhibitions.
- Organized two National Conferences focusing on "*Recent Advances in Science & Technology for Sustainable Development*", and "*Emerging Trends in Science and Technology for Sustainable Development*" designed to equip undergraduate science students with skills in presenting research outcomes through poster presentations. Additionally, this conference facilitated interactions between students and distinguished resource persons and research scholars.

IV. Introduction of new Experiments:

The extended experiments along with Demonstrations have been introduced and performed by students of BSc using the following new equipment procured.

V. Interlinkage with the neighboring institutes:

We have organized district-level training for school teachers (Physics Lecturers) on innovative way of demonstrating laws of physics. We also developed networking with Maharaja Ranjit Singh Punjab Technical University, Bathinda by signing a MoU for organizing various activities (seminars/ conference/ webinars/training/ workshops) this scheme. These activities helped us to achieve the objectives of the scheme.

7. Any Novel aspect introduced or planning to introduce during the Scheme duration.

- For achieving the scheme's objective of doing Science Activities with Fun and Enjoyment (SAFE). The innovation hub of Physics Department provides a platform to demonstrate various laws of physical sciences.
- UG Students completed some projects in groups (max. four) of students under supervision and guidance of supervisor.

- Improved Equipment to Students helped to improve quality of on training for students.
- To provide the information about DBT Star College scheme and its progress DBT-TAB has been created on our college website.

8. Lessons learnt / difficulties faced/suggestions if any, in implementation of the programme and utilization of DBT grant. (Max 3 points within 300 words).

There should be some benefit in the API-Score to the teachers involved in this activity.

9. Key performance indicators:

S. No	Indicator	FY:2023-24 *(Previous year's Progress Reports Link is Provided at the Bottom of this table.)*	Remarks
1	No. of Students admitted	**Total: 123** **M=55** **F=68** SC ST OBC G SC ST OBC G 09 0 12 34 14 01 19 34 M F T B.Sc.I : 27 37 64 B.Sc.II : 10 21 31 B.Sc.III : 18 10 28	
2	No. of students passing out (%) Students Admitted/passing out (pass %)	Result Awaited	
3	Drop-out rate	0.01	
4	No. of students opting for MSc	Result Awaited	
5	Average marks	Result Awaited	
6	No. of hands-on experiments being conducted	Physics: 54 (Practical) +12 (New Practical) + 10 (Demonstrations) + 04 (Projects), Chemistry: 29 (Practical) +14 (New Practical) + 11 (Projects) *(Above mentioned Practical are as mentioned in the syllabus of Punjabi University Patiala, while the Demonstrations and Projects are new experiments)*	(Annexure#I)
7	No. of new experiments introduced	Physics Deptt.:12+10 =22 Chem. Deptt.: 14+11= 25 — Total= 47	
8	Publications (Scopus indexed) /patents, if any.	Physics Deptt: Research Articles: 02 Chemistry Deptt: 03 Reports: 07 — Total= 05 + 07 = 12	(Annexure#II)
9	Training received by faculty and Conferences attended	Physics Deptt.: 05 Chemistry Deptt.: 14 — Total= 19	(Annexure#III)
10	Exhibitions /seminars/training courses conducted/ visits	Physics Deptt.=07 Chemistry Deptt.: =5 — Total= 12	(Annexure#IV)
11	Books/journals subscribed from grants	Physics Deptt.: = 03 Chemistry Deptt.: = 01 — Total Journals = 04	(Annexure#V)
12	Outreach activities (Popular lectures)	Physics Deptt.:= 02 Chemistry Deptt.:=04 — Total= 06	(Annexure#VI)
13	Colleges mentored to apply for DBT Star College grants	NIL	N.A.
14	Invited lectures	Physics Deptt.:= 01 Chemistry Deptt.:=02 Interdepartmental = 01 — Total= 04	(Annexure#VII)
*	Media Coverage	Activities performed under DBT Star College Scheme	Annexure#VII

Link for previous years (FY:2020-21, 2021-22 and 2022-23) Progress Reports:

10. Self-evaluation

Department	*Objective (as stated in the proposal)	% achieved	Reasons for underachievement / If achieved, state in quantitative metrics Marks attained
Physics	To increase capabilities of core instrumentation resources by procuring new equipment and upgrading of existing facilities.	75%	1.5
	To strengthen the academic infrastructure for achieving excellence in teaching and practical training.		1.5
	To provide better library facilities for students and teachers.		1.5
	To assigned projects, practical, paper presentations in groups for students		1.5
	To promote networking and strengthen by inviting neighboring school Physics teachers.		1.5
Chemistry	To enhance the quality of the learning and teaching process and stimulate original thinking through 'hands on' exposure to experimental work and participation in summer school	75%	1.0
	To increase capabilities of core instrumentation resources by procuring new equipment and upgrading the existing facilities.		2.0
	To provide better library facilities for students and faculty		1.5
	To conduct specialized training programmes for the faculty to improve optimizing their technical capabilities.		2.0
	To provide access and exposure for the students to national research laboratories and industries		1.0

* For quantitative analysis you may fix five objectives (max) each having 2 marks and accordingly can calculate the matrix.

Course Coordinator
(With Seal)
Dr Kulwinder Singh Mann
Coordinator, DBT Star College Scheme
D.A.V College, Bathinda-151001

Head of the Institution
(With Seal)
Principal
D.A.V. College, Bathinda

Proofs of point 6-14 of the Annual Progress Report

The QR-code of soft copies of all the supporting documents and proofs is as follows:

QR-Code for Proofs

In accordance with the condition on the number of pages, the hyperlinked Annexure have been provided.

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D.A.V. College, Bathinda

ANNEXURE –I

NO. OF HANDS-ON EXPERIMENTS BEING CONDUCTED
AND
NEW EXPERIMENTS INTRODUCTED IN THE FY: 2023-24

Sr. No	PHYSICS: Experiments (54)	Class / Sem.
1	Analysis of experimental data by: i) Fitting of given data to a straight line. ii) Calculation of probable error.	B.Sc. I /Sem. I
2	To establish relationship between torque and angular acceleration using fly wheel and hence to find inertia of flywheel.	
3	To determine the Young's Modulus by bending of beam.	
4	To study one-dimensional collision using two hanging spheres of different materials.	
5	Determination of Poisson's ratio for rubber.	
6	Study the dependence of moment of inertia on distribution of mass (by noting time periods of oscillations) using objects of various geometrical shapes but of same mass	
7	To set up CRO for Sine and Square wave and to find their frequency and amplitude	
8	Study the dependence of solenoid field on number of turns and current.	
9	To study the magnetic field produced by a current carrying solenoid using a search coil and to find the value of permeability of air.	
10	To study the efficiency of an electric kettle/heater element with varying input voltages	
11	To study the working of energy meter.	
12	To study the variation of time period with distance between centre of suspension and centre of gravity for a bar pendulum and to determine i) Radius of gyration of bar pendulum about an axis through its Centre of Gravity and perpendicular to its length. ii) Value of Centre of Gravity, g.	B.Sc. I/Sem. II
13	Determination of g by Kater's pendulum.	
14	Determination of modulus of rigidity of material of a wire using Maxwell's needle.	
15	To determine the frequency of AC mains using a sonometer and an electro magnet	
16	Determination of unknown capacitance by flashing and quenching of neon lamp.	
17	Study the phase relationships between voltage and current using impedance triangle	
18	To study the resonance in series and parallel LCR cicuits for different resistances and calculate Q-value.	
19	Verify laws of electromagnetic induction.	
20	To study the induced EMF as function of velocity.	
21	Probability distribution using colored dice coins.	B.Sc. II/Sem. III
22	To determine the refractive index of liquid using spectrometer	
23	To determine the Cauchy’s constants	
24	To study the refractive index of doubly refracting prism	
25	Study the photoelectric effect and determine the value of Planck’s constant	
26	To determine the angle of wedge using interference method	
27	Thermal conduction in poor conductor (variation with geometry) by Lee’s method	B.Sc. II/Sem. IV
28	Thermo e.m.f. calibration comparison	
29	Study of rotation of plane of polarization with a polarimeter	
30	Set up Newton’s rings to determine wave length of sodium light	
31	To determine the wave length and dispersive power using plane diffraction grating (Use Hg source)	
32	To determine the resolving power of a grating	
33	To measure an inaccessible height using sextant	
34	To determine the ionization potential of mercury	
35	Study of variation of light intensity using photovoltaic cell/inverse square law.	
36	Measurement of reverse saturation current in p-n junction diode at various temperatures and to find the approximate value of energy gap.	B.Sc. III/Sem. V
37	To draw forward and reverse bias characteristics of a p-n junction diode and draw a load line.	
38	Study of a diode as clipping element.	
39	To show the variation of resistance of a thermistor with temperature	

40	To measure the efficiency and ripple factors for a) Half-wave (b) full wave and (C) bridge rectifier circuits.	
41	To study the reduction in the ripple in the rectified output with RC. LC and π - filters.	
42	To draw the characteristics of a Zener diode	
43	To study the stabilization of output voltage of a power supply with Zener diode.	
44	To Plot common Emitter Characteristics of a transistor (pnp or npn)	
45	To study the response of RC circuit to various input voltage (square, sine and triangular	
46	To draw output and mutual Characteristics of an FET and determine its parameters	
47	To trace the B-H curves for different materials using CRO and find the magnetic parameters from these.	B.Sc. III/Sem. VI
48	Study of a diode as clamping element	
49	To Plot common base Characteristics and determine h-parameters of a given transistor	
50	To study the characteristics of a thermistor and find its parameters.	
51	To study the gain of an amplifier at different frequencies and to find band width and gain bandwidth product.	
52	To draw the plateau of a GM counter and find its operating voltage	
53	To study the statistical fluctuations of G.M. Counter to find its standard deviation.	
54	To study the absorption of beta particles in aluminum using GM counter and determine the absorption coefficient of beta particles from it.	

PHYSICS: New Experiments Conducted (12)		
1.	To determine the value of air capacitance by de-Sauty method and to find the permittivity of air and also to determine the dielectric constant of medium.	B.Sc. I/Sem. I
2.	Measurement for logarithmic decrement, co-efficient of damping, relaxation time and quality factor of a damped simple pendulum.	B.Sc. I/Sem. II
3.	To determine the low resistance using Carey Foster Bridge.	
4.	To determine the given inductance by Anderson's bridge.	
5.	To determine the wave length of a given light using bi-prism	B.Sc. II/Sem. III
6.	To determine the resolving power of a telescope	
7.	To determine the principal points of a lens system	
8.	Total radiation law, temperature dependence of radiation	B.Sc. II/Sem. IV
9.	To determine the divergence and wavelength of a given laser source	
10.	Study of rotation of plane of polarization with a polarimeter.	
11.	To determine the divergence and wave length of a given laser source.	
12.	To measure the magnetic susceptibility of FeCl2 solution by Quincke's method	B.Sc. III/Sem. VI

PHYSICS: DEMONSTRATION (10)		
Name of Demonstration Performed	**Class**	**Name of Students**
1. Conservation of Angular Momentum	B.Sc III	Sarthak, Ramendra, Jasleen,
2. Plasma State	B.Sc III	Tanisha, Arshdeep Singh,
3. Tesla Coil	B.Sc II	Jasleen kaur

4. Faraday Electromagnetic Shielding	B.Sc III	Garima, Nikita, Arshdeep
5. Working Principle of Generator	B.Sc II	Amandeep Kaur, Sandeep kumar
6. Automatic Energy Saver	B.Sc II	Sarita, Muskan
7. Total Internal Reflection	B.Sc II	Sahil, Muskan
8. Racing Track	B.Sc III	Nikita
9. Digital Microscope	B.Sc III	Anjali Kumari, Maha Singh
10. Detection of Blood Pressure	B.Sc III	Navnish Kaur, Nishtha

PHYSICS PROJECTS: (05)			
Sr. No	**Project Title**	**Class/Name of students**	**Supervisor**
1	Assessment of fluoride exposure and associated health risks from different sources of drinking water to various age groups in Bathinda city, Punjab, India *(Research paper published in ELSEVIER Journal 'Physics and Chemistry of the Earth').*	**B.Sc. II:** Tanisha, Ramandeep Kaur, Jashandeep Kaur, Garima	Dr. Vikas Duggal
2	Capacitance measurements by digital oscilloscope: An extension of the conventional method practiced in UG physics laboratories. *(Research Article Published in Bulletin of IAPT a monthly journal of Education in Physics & Related Areas).*	**B.Sc. III:** Garima, Sarthak Bansal	Dr. K.S. Mann
3	Mini Amplifier circuit using LM386 for phones	**B.Sc.III:** Arshdeep, Rahutash Bansal, Dheeraj Thakur,	Dr. Gurpreet Singh, Technical Support by: Mr. Sukhwinder Singh
4	Luggage security system	**B.Sc.II:** Vanita, Amandeep Kaur, Sarita Oli, Akanksha Kumari,	Ms. Harpreet Kaur Brar Technical Support by: Mr. Sukhwinder Singh

CHEMISTRY: Experiments (29)	
1. Semi-micro analysis: Cation analysis, separation and identification of ion, anion analysis (2 cation and 2 anion with no interference)	B.Sc. I / Sem. I
1. Determination of melting points **2.** Determination of boiling points **3.** Concept of crystallization from water and ethanol **4.** To determine the specific reaction rate of the hydrolysis of methyl acetate/ethylacetate catalyzed by hydrogen ions at room temperature **5.** To study the effect of acid strength on the hydrolysis of an ester **6.** To determine the viscosity and surface tension of ethanol and glycerin solution in water **7.** Molecular weight determined by Rast method	B.Sc. I / Sem. II
Volumetric Analysis **8.** Acid- Base a) Determination of acetic acid in commercial vinegar using NaOH, Alkalinity of water sample. (b) Determination of alkaline content of antacid. **9.** Permagnatometry Estimation of calcium content in chalk as calcium oxalate by permanganometry **10.** Complexometry : Estimation of hardness of water by EDTA. **11.** Dichrometry : Estimation of ferrous and ferric by dichromate method. **12.** Iodometry: Estimation of copper using sodium thiosulphate. **13.** Thin Layer Chromatography **14.** Determination of R_f values of different components.	B.Sc. II /Sem. III
Qualitative Analysis **15.** Detection of elements (N, S and halogens) and functional groups in simple organic compounds. **16.** To determine the solubility of benzoic acid at different temperatures and to determine ⊗H of the dissolution process. **17.** To determine the enthalpy of neutralisation of a weak acid/weak base versus strong base/strong acid and determine the enthalpy of ionisation of the weak acid/weak base. **18.** To determine the enthalpy of solution of solid calcium chloride.	B.Sc.II / Sem. IV
19. Preparation of sodium trioxalatoferrate(III), Na_3 $[Fe(C_2O_4)_3]$ and determination of its composition by permagnometry. **20.** Preparation of Ni-DMG complex, $[Ni(DMG)_2]^{2+}$ **21.** Preparation of copper tetra-ammine complex. $[Cu(NH_3)_4]S0_4$. **22.** Preparation of cis-and trans-bis(oxalato)diaquachromate(III) ion. **23.** Synthesis of Organic Compunds a. Iodoform from ethanol and acetone b. Aromatic electrophlic substitution • m-dinitrobenzene • p-nitroacetanilide c. Bromination • p-bromoacetanilide • 2,4,6tribromophenol d. Diazotization/Coupling Preparation of methyl orange e. Oxidation Preparation of benzoic acid from toluene f. Reduction Preparation of aniline from nitrobenzene Preparation of m-nitroaniline from m-dinitrobenzene	B.Sc. III / Sem. V

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24. Column Chromatography • Separation of fluorescein and methylene blue. • Separation of leaf pigments from spinach leaves. **25.** Stereochemical Study of Organic Compounds via Model Rand S configuration of optical isomers. E, Z configuration of geometrical isomers. Conformational analysis of cyclohexanes and substituted cyclohexanes. **26.** Conductometry • To determine the strength of the given acid conductometrically using standard alkali solution. • To determine the solubility and solubility product of a given sparingly soluble electrolyte conductometrically. • To study the saponification of ethyl acetate conductometrically. • To determine the ionisation constant of a weak acid conductometrically. **27.** pH metry To determine the strength of the given acid solution pH- metrically by using standard alkali solution. **28.** Refractometry: To determine the molar refraction of methanol, ethanol and propanol. **29.** Distribution Law : To study the distribution of iodine between water and $CC1_4$. To study the distribution of benzoic acid between benzene and water.	B.Sc. III / Sem. VI
CHEMISTRY: New Experiments Conducted (15)	
1. Preparation of different concentration of solutions of acid and bases and note down their pH 2. Separation of inorganic cationic mixture using chromatography.	B.Sc. I / Sem. I
3. To separate a mixture of ethanol and water 4. Estimation of nitrogen using Kjeldah's Apparatus 5. Compare the rates of diffusion of solid on placing undisturbed solid crystal and effect of temperature.	B.Sc. I / Sem. II
6. To study of metal ion complexes of EDTA colorimetrically. 7. Colorimetric study of various beverages	B.Sc. II /Sem. III
8. Characteristics tests of carbohydrates, fats and protein in pure samples and their detection in given food stuff. 9. Potentiometric titrations of oxalic acid with base	B.Sc.II / Sem. IV
10. Evaluate the physical parameters- pH, Conductance, TDS, DO, turbidity,of contaminated water 11. To find the strength of mixture of acids conductometrically 12. To determine of the amount of Phosphate in a Detergent.	B.Sc. III / Sem. V
13. Separation of Cu,Cr,Pb, ions using Column chromatography 14. Synthesis of hexanone from hexanol using sonicator 15. IR Studies of Clasein Schmidt reaction using acetone and benzaldehyde	B.Sc. III / Sem. VI

CHEMISTRY: DEMONSTRATION (11)

S.No.	Students	Experiment performed	Class
1.	Nishtha, Tarun, Ansh	Imitating Red Blood of Movies	B.Sc. I
2.	Amaan, Harkomal, Muskan	Indicators, Colours and pH	
3.	Aman, Sarita	Golden Rain	
4.	Pushpinder, Jaspreet	Lava Lamp	

5.	Simran, Jasleen, Harpreet Kaur	Iodine Clock	
6.	Garima, Sarthak Bansal, Tanisha	Elephant toothpaste	B.Sc.II
7.	Simon, Mahan Singh, Manpreet	To find the density of different liquids	
8.	Garima, Sarthak Bansal, Tanisha	Preparing Polymer Ball	
9.	Akki, Harpreet, Jashan	Displacement Reaction	B.Sc.III
10.	Aahana, Mantaj, Sachit,	Vanishing Styrofoam glasses	
11.	Livanshi, Navneet	Preparing Rayon Fibre	

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ANNEXURE #II

LIST & PROOFS OF PUBLICATIONS DURING FY: 2023-24

RESEARCH ARTICLES			
#	**Title**	**Journal**	**DOI No. (Hyperlinked)**
Dr. Kulwinder Singh Mann			
1.	Capacitance measurements by digital oscilloscope (DSO): an extension of the conventional method practiced in UG PHYSICS LABORATORIES.	*Bulletin of the IAPT a Monthly* Journal of Education in Physics & Related Areas 15 (11), **pp. 360-364.** (IAPT Publication) (ISSN: 22778950)	
Dr. Vikas Duggal			
2.	Assessment of fluoride exposure and associated health risks from different sources of drinking water to various age groups in Bathinda City, Punjab, India.	Physics and Chemistry of The Earth (Elsevier) (Impact Factor: 3.7), Volume 132, December 2023, 103472. (Elsevier Publications).	Link
Dr. Paramjeet Kaur			
3.	Carbonaceous TiO2-Nanocomposites for Treatment of Dye-Laden Wastewater in Textile Industries In book: Nanomaterials in Manufacturing Processes, DOI: 10.1201/9781003154884-7 June 2022	Nanomaterials in Manufacturing Processes, DOI: 10.1201/9781003154884-7 June 2022	
Dr. Neha Jindal			
4.	Advancements in Photocatalytic Applications of Metal Ferrites for Water Pollution Remediation: A Focus on Biosynthesis and Innovations 2023,	https://doi.org/10.1007/s42250-023-00738-9	
5.	Nanotechnology-assisted treatment of pharmaceuticals contaminated water 2023, VOL. 14, NO. 1, 2260919	https://doi.org/10.1080/21655979.2023.2260919	
ACTIVITY REPORTS (Published in Journal with ISSN)			
6.	Mann, K. S., (January, 2024). ROBOTICS DEMONSTRATIONS,	*Bulletin of the IAPT a Monthly* Journal of Education in Physics & Related Areas 16 (1), **pp. 19-20 (2024)** (IAPT Publication) (ISSN: 22778950)	
7.	Mann, K. S., (December, 2023). WORKSHOP ON ARDUINO AND ITS APPLICATIONS IN PHYSICS EXPERIMENTS,	*Bulletin of the IAPT a Monthly* Journal of Education in Physics & Related Areas 15 (12), pp. 406-407 (2023) (IAPT Publication) (ISSN: 22778950)	

8.	Mann, K. S., (December, 2023). Demonstrations of Various Physics Principles	*Bulletin of the IAPT a Monthly* Journal of Education in Physics & Related Areas 15 (12), pp. 402 (2023), (IAPT Publication) (ISSN: 22778950)	
9.	Mann, K. S., (October, 2023). Report: DBT sponsored Competition on Experiments & Demonstrations in Sciences	*Bulletin of the IAPT a Monthly* Journal of Education in Physics & Related Areas 15 (10), pp. 334 (2023) (IAPT Publication) (ISSN: 22778950)	
10.	Mann, K. S., (July, 2023). Report: DBT sponsored Competition on Physics Experiments and Demonstrations,	*Bulletin of the IAPT a Monthly* Journal of Education in Physics & Related Areas 15 (07), pp. 223 (2023), (IAPT Publication	
11.	Mann, K. S., (May, 2023). Report: Two Days Workshop On "Python"	*Bulletin of the IAPT a Monthly* Journal of Education in Physics & Related Areas 15 (05), pp. 155-156 (2023), (IAPT Publication	
12.	Mann, K. S., (April. 2023). Report: DBT sponsored Celebration of National Science Day,	*Bulletin of the IAPT a Monthly* Journal of Education in Physics & Related Areas 15 (04), pp. 126 (2023), (IAPT Publication	

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ANNEXURE#III

LIST OF TRAINING COURSES/WORKSHOPS/CONFERENCES ATTENDED BY THE FACULTY DURING FY: 2023-24

2023-2024			
PHYSICS DEPARTMENT			
#	**Title**	**Date**	**Proofs (Hyperlinked)**
Dr. Gurpreet Singh			
1.	Attended the DBT Coordinators Meet under DBT Star College Scheme held at Coimbatore (TN)	7-9, Feb., 2024	
Dr. Kulwinder Singh Mann			
2.	Certificate of Energy Literacy by Energy Swaraj Foundation	10-09-2023	Link
3.	Attended the DBT Coordinators Meet under DBT Star College Scheme held at Coimbatore (TN)	7-9, Feb., 2024	
4.	Presented Two Posters at DBT Sponsored National Conference on Emerging Trends in Science and Technology for Sustainable Development	02-03-2024	
Ms. Harpreet Kaur			
5.	Presented Paper at International Conference on Fourth Heavy Flavor Meet 2024 at IIT Goa	02-04, Nov. 2023	Link
CHEMISTRY DEPARTMENT			
Meetu S. Wadhwa			
1.	Presented Paper at International Conference on Designing a Sustainable Future: Advances and Opportunities in Green Chemistry at University of Ladakh	3-5 July, 2023	Link
2.	Presented Paper at International conference on Futuristic Material for Sustainable Development at Chandigarh University	9-10 January, 2024	Link

3.	Presented Paper at National Conference on Chemistry for Sustainable Future at Punjabi University, Patiala	6-7, March, 2024	Link
Aman Malhotra			
4.	Attended the DBT Coordinators Meet under DBT Star College Scheme held at Coimbatore (TN)	7-9, Feb., 2024	
5.	Presented Paper at International conference on Futuristic Material for Sustainable Development at Chandigarh University	9-10 January, 2024	Link
6.	Presented Paper at National Conference on Chemistry for Sustainable Future at Punjabi University, Patiala	6-7, March, 2024	Link
Dr. Parveen Bala			
7.	Presented Paper at International conference on Futuristic Material for Sustainable Development at Chandigarh University	9-10 January, 2024	Link
8.	Presented Paper at National Conference on Chemistry for Sustainable Future at Punjabi University, Patiala	6-7, March, 2024	Link
Dr. Paramjeet Kaur			
9.	Presented Paper at International Conference on Designing a Sustainable Future: Advances and Opportunities in Green Chemistry at University of Ladakh	3-5 July, 2023	Link
10.	Presented Paper at International conference on Futuristic Material for Sustainable Development at Chandigarh University	9-10 January, 2024	Link

11.	Presented Paper at National Conference on Chemistry for Sustainable Future at Punjabi University, Patiala	6-7, March, 2024	Link
Dr. Neha Jindal			
12.	Presented Paper at International Conference on Designing a Sustainable Future: Advances and Opportunities in Green Chemistry at University of Ladakh	3-5 July, 2023	Link
13.	Presented Paper at International conference on Futuristic Material for Sustainable Development at Chandigarh University	9-10 January, 2024	Link
14.	Presented Paper at National Conference on Chemistry for Sustainable Future at Punjabi University, Patiala	6-7, March, 2024	Link

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D.A.V. College, Bathinda

ANNEXURE# IV

EXHIBITIONS /SEMINARS/TRAINING COURSES CONDUCTED/ VISITS DURING FY: 2023-24

DEPARTMENT OF PHYSICS

#	Title/Links	Dates	Resource Persons	Number of Beneficiaries
Trainings and Workshops				
1.	Experiments with Arduino & Its applications	26-10-23	Dr. H.K. Sahijwani (Principal, Retd.)	32
2.	Online Training Workshop on "SEELab3"	05-03-24	Dr. Jatin (PDF in electronics, University of Calicut, Kerela)	20
Exhibitions				
3.	Experiments and Demonstrations in Physics	18/04/2023	Dr Gurpreet Singh Dr K. S. Mann	47
4.	Competition on Experiments & Demonstrations in sciences	16-09-23	Dr Amarsantosh Singh	112 Link
5.	Mutual Induction Program	18-04-2023	Dr Gurpreet Singh Dr K. S. Mann Dr Vikas Duggal	Link
VISITS				
6.	Industrial Visit: Transformer making industry at PP Industry, Industrial Area, Bathinda	29-02-24	Dr Gurpreet Singh Dr K. S. Mann	19 LINK
7.	Educational Visit to Research Labs of the Physics Department MRSPTU, Bathinda	29-02-24	Dr Gurpreet Singh Dr K. S. Mann	20 LINK
DEPARTMENT OF CHEMISTRY				
8.	Visit to Regional Research Station of PAU, Bathinda	28-02-24	Dr K. S. Sekhon	35

				LINK
INTERDEPARTMENTAL SEMINARS Organized by the Department of Chemistry				
9.	TOPIC: 20th Century Scientists from Punjab	04-10-2023	Prof. A. K. Grover Former VC, PU, Chandigarh	165
10.	TOPIC: Environmental Crisis or Climate Change	05-10-2023	Prof. Ravinder K. Khaiwal, PGI Chandigarh	100
11.	TOPIC: Antarctica and Himalayan Geology	06-10-2023	Dr. Jitendra Patnaik, CUP, Bathinda	80
12.	TOPIC: Soil Analysis Laboratory at Regional Research Station, Bathinda	28-02- 2024	Dr. B. K. Yadav Soil Scientist PAU Regional Station	35

Dr. Kulwinder Singh Mann
Coordinator, DBT Star College Scheme
D.A.V College, Bathinda-151001

Principal
D.A.V. College, Bathinda

ANNEXURE# V

JOURNALS SUBSCRIBED IN FY: 2023-24

JOURNALS SUBSCRIBED		
S.No.	**Name of the Journal**	**Frequency per month**
PHYSICS DEPARTMENT		
1	Resonance: Journal of Science Education	1
2	Down to Earth (Fortnightly on politics of Development)	2
3	Current Science	1
CHEMISTRY DEPARTMENT		
4	Journal of Punjab Academy of Sciences (Lifetime subscription)	1

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ANNEXURE#VI

OUTREACH INTERDISCIPLINARY ACTIVITIES DURING FY: 2023-24

S. NO.	NAME OF ACTIVITY	DATE	STUDENTS/ TEACHERS	NUMBER OF BENEFICIARIES
CHEMISTRY DEPARTMENT				
1.	Chemexordia- Quiz, Caption Contest	08/09/2023	College Students	100
2.	Soil Laboratory, Regional Research Station, PAU, Bathinda	28/02/2024	Under Graduate Students	50
3.	National Conference ETSTSD-2024	02/03/2024	Colleges Students and Faculty	300
4.	Chemexordia- Quiz, Caption Contest	08/09/2023	College Students	100
PHYSICS DEPARTMENT				
5.	The exhibitions of Science demonstrations at Innovation Hub during the Festival of Science	04-10-2023 to 06-04-2023	Dr Gurpreet Singh Dr K. S. Mann	450 LINK
6.	Visit to Idea Thinking Labs of MRSPTU, Bathinda	29-02-24	Er Gurpreet Singh of IDEA Thinking Lab, MRSPTU, Bathinda	18 LINK

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Annexure#VII

INVITED LECTURES DURING FY: 2023-24

2023-24				
S. No	**TOPIC**	**RESOURCE PERSON**	**Date**	**Beneficiaries / Proof**
PHYSICS DEPARTMENT				
1.	Standardization In The Process For Measurement Of Radon And Thoron And Their Progenies In The Environment Using Ssntd	Prof. Rohit Mehra Department of Physics, NIT, Jalandar	March 2, 2024	200
CHEMISTRY DEPARTMENT				
2.	Ecofriendly Biomaterials and their Applications in Different Fields	Prof. Dr. Balbir Singh Kainth Depatment of Chemistry NIT, Jalandar	March 2, 2024	210
3.	Organic Photochemistry: A Glimpse Of The Synthetic Applications	Prof. Mohamad Yusuf Department of Chemistry Punjabi University, Patiala	March 2, 2024	210
INTERDEPARTMENTAL				
4.	Mushrooms – The Functional Foods	Dr. Avneet Pal Singh Department of Botany Punjabi University, Patiala	March 2, 2024	

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[Annexure#VIII]

ACITIVITY REPORTS PUBLISHED IN NATIONAL JOURNAL WITH ISSN 2277-8950 DURING FY: 2023-24

Bulletin of IAPT @40
₹ 25/-
ISSN 2277-8950
THE INDIAN ASSOCIATION OF PHYSICS TEACHERS
A MONTHLY JOURNAL OF EDUCATION IN PHYSICS & RELATED AREAS
VOLUME 16 NUMBER 1 JANUARY 2024

REPORT (RC-02)

ROBOTICS DEMONSTRATIONS

Topic: Arduino for Robotics

Organized by: Department of Physics,DAV College Bathinda.

Schedule: 05, October2023 **Venue:**Innovation-Hub and Car-Parking Area

Sponsored by: IAPT-RC02 and DBT-Star College Scheme-BT/HRD/11/019/2020

Activity In-charge: Dr Gurpreet Singh (HoD)

Participants: 48UG- Science students

Coordinator: Dr. KulwinderSingh Mann, Coordinator DBT-SCS.

The workshop titled "Demonstrations: Arduino for Robotics" was conducted on October 5, 2023, at DAV College Bathinda. The event was organized by Mr. Satvik, Shaksham, and Ayaan, final year B.Tech-ECE students from Punjab Engineering College, Chandigarh. It aimed to provide hands-on training to 34 B.Sc. students on various aspects of Arduino, electronics components, and related topics.

Topics covered:

Arduino Programming:Participants were introduced to Arduino, an open-source electronics platform, and given practical insights into programming it for robotics applications.

Diode Circuits:Understanding the fundamentals of diode circuits and their applications in electronic systems.Soldering Techniques:Comprehensive training on soldering techniques, emphasizing the proper use of soldering irons, soldering materials, and safety measures.Electronics Components and Their Handling:Identification and hands-on experience with various electronics components, including resistors, capacitors, LEDs, potentiometers, and more.

PCB (Printed Circuit Board):Insight into the design and fabrication of PCBs, a crucial element in electronic systems.

Butter Board:Practical knowledge about butter boards and their role in prototyping electronic circuits.Hands-on Activities:Engaging practical sessions where participants worked on assembling circuits, soldering components, and programming Arduino boards.Capacitors, LEDs, Resistances, Potentiometers, etc.:

In-depth discussions and demonstrations on the practical applications of these components in electronic systems and robotics.This workshop not only equipped the participants with theoretical knowledge but also provided them with valuable hands-on experience. The initiative aimed to foster interest and competence in the field of robotics and electronics among the students, preparing them for future endeavours in these domains. The event was made possible through the support of DBT-Star College Scheme and IAPT (RC02), showcasing the collaborative effort to promote education and practical skills development in the field of science and technology.

KS Mann

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A MONTHLY JOURNAL OF EDUCATION IN PHYSICS & RELATED AREAS
VOLUME 15 NUMBER 12 DECEMBER 2023

REPORT (RC-02)

WORKSHOP ON ARDUINO AND ITS APPLICATIONS IN PHYSICS EXPERIMENTS

Activity: Training Workshop

Resource Person: Dr. Hari KrishanSahjawani (Retd. Principal)

Schedule: 26th October2023

Venue: Innovation-Hub

Sponsored: DBT-Star College Scheme and IAPT-RC02

Activity In charges: Dr Gurpreet Singh

Beneficiaries: UG-Science students: **33**(Offline) + **79** (Online)

The Workshop on ARDUINO and Its Applications in Physics Experiments was held at the Innovation-Hub of DAV College Bathinda. It was sponsored by the DBT-Star College Scheme and IAPT-RC-02. Dr. Hari KrishanSahjawani, a renowned figure in the field, served as the resource person for the workshop. The event aimed to introduce students to the practical applications of ARDUINO in various physics experiments. A total of 112 students participated, with 33 attending in-person and 79 joining online.

Objectives:

The primary objectives of the workshop were:

To familiarize students with ARDUINO and its potential applications in experimental physics.

To provide hands-on experience in designing and conducting physics experiments using ARDUINO.

To encourage innovative thinking and problem-solving skills among the participants.

Workshop Highlights:

Inaugural Session (9:00 AM - 09:30 AM):

The event commenced with a warm welcome and introduction by Dr. Gurpreet Singh, the Activity Incharge. He emphasized the significance of incorporating modern technology, such as ARDUINO, in experimental physics.

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VOLUME 15 NUMBER 12 DECEMBER 2023

REPORT (RC-02)

DEMONSTRATIONS OF VARIOUS PHYSICS PRINCIPLES

Activity: School students visit to the Innovation-Hub of DAV College, Bathinda.

Organizing Department: Physics Department of DAV College Bathinda

Schedule: 04-06, October2023

Sponsored: DBT-Star College Scheme and IAPT-RC02

Activity In charges: Dr. Kulwinder Singh Mann and Dr Gurpreet Singh

Beneficiary: 450students from various schools

The three-day Science Utsav held at DAV College Bathinda drew students from diverse institutions. The event showcased an array of engaging exhibitions including "Circus of Science," "JasWin on Wheels," working model displays, sky observation sessions, captivating stage shows, and the much-visited Innovation-Hub. The festival's grandeur was elevated with impressive displays from the Army and Air Force.

Innovation-Hub Visit: During their visit to the Innovation-Hub, students delved into the underlying Physics principles behind each demonstration, facilitated by BSc final year students(Fig.1).On the other hand, Dr Jaswinder Singh performed stage-show of many interesting physics demonstrations in a magical way (Fig.2). The demonstrations garnered notable interest not only from the students but also from school teachers and other visitors. The collective feedback indicated a strong endorsement for this hands-on approach to learning.

Competition Results: The results of the various competitions organized during the science festival are as follows:

Quiz Competition (School Level):

First Prize: Govt. Nahiwal School, Second Prize: Govt. Girls Sen. Sec. School, Mall Road, Bathinda, Third Prize: Silver Oaks School, Bathinda.

Quiz Competition (College Level):

First Prize: CUP, Bathinda, Second Prize: Govt. Rajindra College,

Working Model Competition:

Appreciation Awarded to the following schools: School of Eminence Kot Shamer,

GSSS Jhumba, Khalsa Senior Secondary School (Boys) Talwandi Sabo, St. Joseph Convent School Bathinda, GHS Tarkhanwala, RB DAV Senior Secondary School Bathinda, GSSS Bhucho Mandi, GSSS Mehma Sarja

Poster Presentation Competition:

First Prize: Little Flower Public Senior Secondary School, Second and Third Prizes: St. Joseph Punjabi-Medium Convent School.

Fig. 1: Physics Demonstrations Explained by BSc-Final Year Students

Figure 2: Stage Show of Physics Demonstrations by Dr. Jaswinder Singh (President of RC02)

K S Mann
Co-ordinator, DBT-SCS

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THE INDIAN ASSOCIATION OF PHYSICS TEACHERS
A MONTHLY JOURNAL OF EDUCATION IN PHYSICS & RELATED AREAS

VOLUME 15 NUMBER 10 OCTOBER 2023

REPORT(RC-02)

Competition on Experiments & Demonstrations in Sciences

Organizing Departments: Physics, Botany and Zoology
Schedule: 16. 09. 2023 at 10:00 am
Venue: Innovation-Hub, Departments of Physics, DAV College Bathinda
Sponsored: DBT-SCS and IAPT (RC-02)
Activity Incharge: Dr Gurpreet Singh (Associate Professor in Physics & HoD)
Beneficiaries: 62 Students of BSc (Medical and Non-Medical)
Program Coordinator: Dr. Kulwinder Singh Mann

Departments of Physics, Botany, and Zoology, ignited the flames of scientific curiosity through an enthralling competition on Experiments & Demonstrations in Sciences. This event, held under the auspices of the DBT Star College Scheme, unfolded on the 16th of September, 2023, commencing at 10:00 AM, at the state-of-the-art Innovation-Hub.

Dr. Gurpreet Singh, the HOD Physics spearheading the activity, welcomed a vibrant cohort of 62 budding scholars pursuing BSc across Medical and Non-Medical disciplines. The competition served as an induction program for the fresh faces of BSc, seamlessly blending theory with hands-on practice.

The event witnessed participants from BSc-II and IIIrd Years expertly crafting insightful presentations using PPTs, enlightening the newcomers with a vivid array of demonstrations, each anchored in fundamental scientific principles. Dr. Amar Santosh, the Head of Zoology Department, delivered a captivating exposition on the workings of the Digital Microscope.

Dr. Kulwinder Singh Mann deftly guided the proceedings, overseeing a diverse array of demonstrations encompassing topics as diverse as Conservation of Angular Momentum, Equilibrium, Plasma, Tesla Coil, Black Hole, Faraday Electromagnetic Shielding, Racing Track, Working Principle of Generator, Automatic Energy Saver, Total Internal Reflection Vortex Formation, Digital Microscope, and Detection of Blood Pressure.

During the tea break, students engaged in a fruitful exchange with Dr. Vikas Duggal regarding his recent research, conducted in tandem with BSc scholars under the DBT-Star College Scheme. Dr. Mann, the DBT Course Coordinator, illuminated the scheme's overarching objectives.

Principal Dr. Rajeev Kumar Sharma extended his congratulations to the departments for orchestrating this enlightening interdepartmental activity. He also unveiled plans for an upcoming mega science fair scheduled for the first week of October, 2023.

Panel of judges, Dr. Mann and Dr. Amar Santosh, meticulously assessed the teams, weighing their grasp of the demonstration's underlying concepts and the level of participant involvement. In recognition of their efforts, certificates and accolades were conferred upon the victors.

Team No. 2 (Sarthik, Ramendra, Jasleen, Muskan) secured the coveted First Prize, with Team No. 8 (Aanjali Kumari, Maha Singh) clinching Second Prize, and Team No. 1 (Garima, Nikita, Sarita) securing the Third Prize. Teams No. 3 and 4 (Tanisha, Arshdeep Singh, Amandeep Kaur, Navnish Kaur, Nishtha) were lauded with Consolation Prizes.

Dr. Mann extended a vote of thanks, applauding the students for their indomitable spirit and unwavering dedication to the spirit of scientific inquiry.

K.S.Mann

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VOLUME 15 NUMBER 07 JULY 2023

REPORT RC-02

Physics Experiments and Demonstrations

Topic: Competition for UG Students on Physics Experiments & Demonstrations

Schedule: 10:00 AM onwards on 18/04/2023

Sponsored: DBT Star College Scheme and IAPT (RC-02)

Participants: B.Sc. students (Non-Medical streams)

Beneficiaries: Students of UG classes

Program Coordinator: Dr. Kulwinder Singh Mann

Email: ksmann6268@gmail.com, **Mobile: 08837510727**

The Department of Physics at DAV College Bathinda, under the DBT Star College Scheme, hosted a competition aimed at emphasizing the significance of practical applications in Physics. The competition was dedicated to centenary celebrations of Prof. Babulal Saraf and it was open to undergraduate students, who presented a total of 11 projects related to various Physics concepts. These included practical demonstrations on topics such as temperature sensing, automatic energy conservation, electric generator functionality, Lorentz pendulum, wavelength measurement of light using He-Ne laser, motion on racing tracks, vortex formation, Polaroid principles, and Faraday's laws using electromagnet. The live demonstrations and hands-on experiments proved to be quite popular, attracting a large number of students and faculty members from different departments. The projects showcased the importance of technology in daily life, and their relatability was appreciated by everyone. The students were guided by Dr. Gurpreet Singh, Head of Department of Physics, Dr. Kulwinder Singh Mann, Coordinator of DBT Star College Scheme, and other faculty members including Prof. Harpreet Kaur Brar and Dr. Vikas Duggal. The best projects were selected for awards, and the winners included Sarita and Akanksha of B.Sc. I, Sarthak and Sahil of B.Sc. II, and Harpreet Kaur and Akki Kaur of B.Sc. III. Dr. Rajeev Kr. Sharma, the college principal, congratulated the Department of Physics on the success of the event and emphasized the importance of learning Physics through practical applications. He stated that theoretical concepts are best understood when demonstrated practically, and it is the College's goal to promote a scientific temperament among students. Dr. Sharma also praised the winning project on "Solar Power driven portable mobile charger," as it highlights the need for using renewable energy resources.

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VOLUME 15 NUMBER 05 MAY 2023

Two Days Workshop On "Python"

Activity: Two Days Workshop
Topic: Python: Computer Language
Resource Persons: Dr. Anil K Verma (Professor-CSED, TIET) and Mr. Sanjeev Rao (Assistant Professor-CSED, TIET)
Schedule: March 17 & 18, 2023
Venue: Library Reading Hall and Computer Lab No. 1 of DAV College Bathinda
Sponsored by: Punjab State Council for Science & Technology, Chandigarh, DBT-SCS and (RC-02)
Activity Incharge: Dr Vandana Jindal
Beneficiaries: 120 participants of BCA, PGDCA, B.Sc., B.A. and B.Com attended the workshop.
Activity Report Author: Dr. KulwinderSingh Mann

The Department of Computer Science, DAV College Bathinda organized two days workshop on "Python" on March 17 & 18, 2023. The resource persons on the occasion were Dr. Anil K Verma (Professor-CSED, TIET) and Mr. Sanjeev Rao (Assistant Professor-CSED, TIET). The guests were welcomed by the Principal Dr. Rajeev Kumar Sharma, Head, Department of Computer Science Dr. Vandana Jindal and the faculty members of the Department of Computer Science. Dr. Anil K Verma explained about the advanced features of Python, like, functions, inheritance, function overloading, operator overloading and many others. Mr. Sanjeev Rao related the real life applications of Python language and gave practical demonstrations. He also answered queries of the participants patiently.

The students expressed immense satisfaction at attending the workshop. They stated that the workshop was very informative. It is very useful in today's times, when everything is technology driven. Principal Dr. Rajeev Kumar Sharma at the valedictory session thanked the resource persons for sparing time off their busy schedule and helping students explore various applications of Python, their practical application in various spheres, be it in academics, designing or their profession. He exhorted the students to make the best use of such workshops and enhance their knowledge and skills. He also appreciated the HOD, the faculty members and the technical staff members of the Department of Computer Science. Certificates were distributed to the participants at the valedictory session. More than 120 participants of varied disciplines like BCA, PGDCA, B.SC, B.A. with Computer Science and B.Com attended the workshop. Dr. Vandana Jindal thanked the participants for enthusiastic participation and overwhelming response. The stage was conducted by Prof. Ramil Gupta and the vote of thanks was delivered by Prof. Anuja Puri.

K.S. Mann

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THE INDIAN ASSOCIATION OF PHYSICS TEACHERS

A MONTHLY JOURNAL OF EDUCATION IN PHYSICS & RELATED AREAS

VOLUME 15 NUMBER 04 APRIL 2023

Report (RC-02)

Celebration of National Science Day

Activity: Inter College competition of Slide Show and Poster presentations.
Topic: "Global Science for Global Wellbeing".
Resource Persons: Dr. Shaweta Sharma (IFSC, Panjab University, Chandigarh)
Schedule: 04.03.2023 at 09:00AM onwards
Beneficiaries: 100students
Venue: Multipurpose Hall and Library Reading Hall of DAV College Bathinda
Sponsored: Punjab State Council for Science & Technology, Chandigarh, DBT-SCS and (RC-02)
Activity Incharge: Dr Ranjeet Singh Mann

Program Coordinator: Dr. Kulwinder Singh Mann

National Science Day was celebrated at DAV College, Bathinda, under the aegis of DBT Star College Scheme on March 4, 2023 which was financially supported by Punjab State Council for Science & Technology, Chandigarh. The Chief Guest and the Resource Person on the occasion was Dr. Shaweta Sharma (IFSC, Panjab University, Chandigarh). Faculty members of all the science departments were present during the event. The programme commenced with an introductory note by Dr. Gurpreet Singh, talking about the importance of National Science Day, commemorating the discovery of Raman Effect by nobel laureate, physicist Sir C.V. Raman in 1928.

Dr. Shaweta Sharma in her lecture emphasized upon how Forensic Sciences plays a vital role in criminal cases and provides an unbiased scientific opinion on the evidence collected.

The theme for the Slide Show was "*Scientific Discoveries that Change Human Life*". The slide shows by the students amazed the audience and acquainted them with the spellbinding discoveries which have revolutionized the lives of citizens around the world. The first prize in this category was bagged by Anjali and Manpreet (B.Sc. II Medical) DAV College Bathinda, second by Livanshi (B.Sc. III M) DAV College Bathinda, third position went to Rahul (University College Guddha) and the consolation prize was won by Akanksha (B.Sc. I Non-Medical) DAV College Bathinda. The posters were judged by Prof. Aman Malhotra, Dr. Kriti Gupta and Dr. Vikas Duggal.

The theme for pre-prepared poster presentation was "*Global Science for Global Wellbeing*". The posters depicted many solutions while addressing the present day global challenges. The first position was won by Sachit Aggarwal (B.Sc. III) DAV College Bathinda, second by

Mehakpreet Kaur (B.Sc. II) DAV College Bathinda; Anmolpreetkaur (University College Guddha), third position went to Priti Yadav (M.Sc. I Chem) DAV College Bathinda and the consolation prize was given to Gurinderjeet & Rajni, University College Guddha& Mahan Singla (B.SC. II) DAV College Bathinda. The judges for the poster presentation were Dr. Paramjeet Kaur and Dr. Amar Santosh Singh.

Principal Dr. Rajeev Kumar Sharma thanked Dr. Shaweta Sharma for gracing the occasion with her presence. He stated that the college believes in building the capacities of the spirit of inquiry and creativity. This occasion of celebrating the National Science Day is therefore an attempt at igniting the young minds with the passion to discover and develop scientific temperament and mentoring them through innovative experimental techniques. He further stated that Science is a way of life and to let peace prevail and the development of the nation, science embedded with creativity should be made an integral part of our daily lives. He expressed immense happiness at witnessing the enthusiastic participation of the students. The stage was conducted by Dr. Neha Jindal, Dr. Ranjeet Singh Mann and Prof. Ramil. The Vote of thanks was extended by Prof. Meetu S. Wadhwa.

K S Mann

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VOLUME 15 NUMBER 02 FEBRUARY 2023

REPORT (RC-02)

Celebrating the World Science Day

Topic: Demonstrating various physics principles in playful way

Resource Persons: Dr K S Mann and Dr Gurpreet Singh, Dept. of Physics, DAV College, Bathinda

Date and time: 11am on 11/11/2022 **Venue:** Innovation-Hub, DAV College Bathinda

Sponsored by: DBT Star College Scheme and IAPT (RC-02)

Participating Departments: Physics, Chemistry, Zoology, Botany& Mathematics

Beneficiaries: 48 Students & 16 Teachersof neighbouring schools

Under the banner of an outreach activity of DBT-Star Scheme on the eve of the World Science Day, about 26 physics concepts were demonstrated to students and teachers of neighboring schools. The students of 9^{th} to 12^{th}classes enjoyed this activity. The teachers took keen interest in the activity. Four distinguished science-mentors namely Mr. Jatin Sethi, Mr. Jagdeep Singh, Mr. Sarabjeet Singh and Mr. Manish Gupta from Goniana, Talwandi Sabo, Bhagta and Sangat Blocks, respectively participated in the event.The event organized with an aim to inculcate students interest in science practicals and to motivate them for pursuing higher studies in life-sciences. The event concluded with a feedback session and by proving a link to the YouTube channel (bit.ly/Ch_I) dedicated to provide quality Physics Education.

K S Mann

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VOLUME 15 NUMBER 02 FEBRUARY 2023

REPORT (RC-02)

Webinar-Cum-Training

Topic: MS-Excel for Practical-based Simulations

Resource Persons: Dr. Vijay Bhat, Associate Professor, Institute of advanced computing, SAGE University, Indore, Madhya Pradesh.

Date and Time: 30/11/2022, at 11am **Venue:** Computer Lab-II, DAV College Bathinda

Sponsored by: DBT Star College Schemeand IAPT (RC-02)

Activity Incharge: Dr Kulwinder Singh Mann (Assistant Professor in Physics)

Participating Departments: Physics, Chemistry, Computer Science& Mathematics

Beneficiaries: 64 Students & 12 Teachers

Under the banner of practical training activity of DBT-Star Scheme, a webinar-cum-workshop was organised by the department of physics, DAV College Bathinda. The webinar aimed to elucidate the use of Microsoft Excel in creating simulations for various experiments in physics. Simulations provide an alternate way of performing lab experiments when physical equipment is unavailable or difficult to set. Sometimes, it provides better observations than physical experiments, as there is greater liberty in deciding the variables of a particular experiment. This may not be the case in actual experiments due to mechanical constraints. It helped the teachers to learn this technique to illustrate various concepts in physics. Students also found the content of the lecture very informative. Active participation was seen in the interactive session by students and faculty members. The webinar was attended by around 60 students of various educational institutions. Principal (Dr.) Rajeev K. Sharma welcomed the guest and stated the importance of MS Excel for science students in various measurements and data analysis. Prof (Dr) P. K. Ahluwalia, president of IAPT was present during the webinar. He congratulated the resource person and physics department for organizing this activity. Dr. Kulwinder Singh Mann, Co-ordinator DBT STAR College Scheme, inaugurated the programme while Dr. Gurpreet Singh, HoD, introduced Dr Vijay.Technical support was provided by Dr. Vikas Duggal. Ms. Harpreet Kaur Brar thanked the resource person and participants for very informative and interactive session.

K S Mann

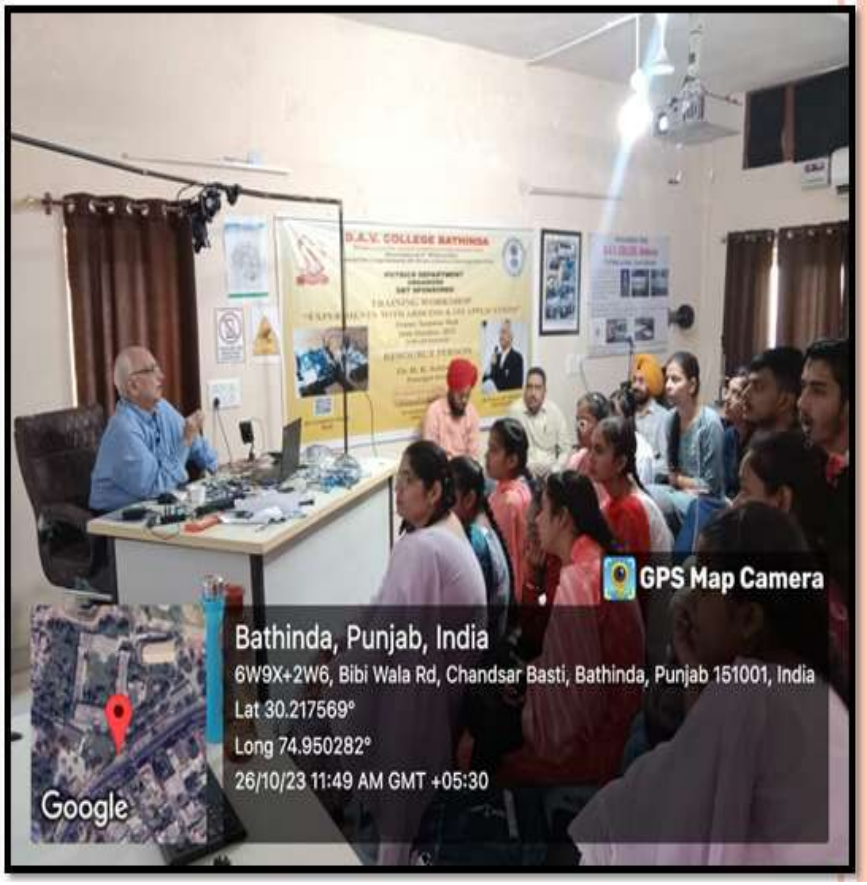
Dr. Kulwinder Singh Mann
Coordinator, DBT Star College Scheme
D.A.V College, Bathinda-151001

Principal
D.A.V. College, Bathinda

Pictures of Selected Activities Performed un DBT-SCS during 2023-24

TRAINING PROGRAMME

Title of Event: Training Workshop on "Experiments with Arduino & its Applications
Date: 26/10/2023
Beneficiaries: 32
Resource Person: Dr. H.K. Sahijwani (Principal Retd.)



OUTREACH ACTIVITY

Activity: School's students visit in the Innovation-Hub of DAV College Bathinda during "Festival of Science"

Topic: Demonstrations of various Physics principles

Organizing Departments: Faculty of Sciences

Schedule: 04-06, October2023

Venue: Innovation-Hub

Activity In charges: Dr. Kulwinder Singh Mann and Dr Gurpreet Singh

Beneficiaries: 450students from various

Innovation Hub: Physics demonstrations for School students

Mutual Induction Program of Physics demonstrations by BSc Final Year Students to their Junior students

Mutual Induction Program of Physics demonstrations


Mutual-Induction Program of BSc
Students using Experiments &
Demonstrations in Sciences.
Sponsored by DBT-SCS

Industrial Visit: Transformer making industry at PP Industry, Industrial Area, Bathinda

Industrial Visit: Transformer making industry at PP Industry, Industrial Area, Bathinda

Visit: Research Labs of Physics Department of MRS Punjab Technical University, Bathinda

Visit: IDEA Thinking Labs of MRS Punjab Technical University, Bathinda
Arranged by Physics Department

Visit to Regional Research Station of PAU, Bathinda
Arranged by Chemistry Department

DAV College Bathinda

2d ·

DAV College Bathinda organises Educational Visit to PAU Regional Research Stat... See more

Visit to Regional Research Station of PAU, Bathinda
Arranged by Chemistry Department

VISITS to SOIL TESTING LAB of Regional Research Station of PAU, Bathinda

Arranged by Chemistry Department

VISITS to SOIL TESTING LAB of Regional Research Station of PAU, Bathinda

Arranged by Chemistry Department

VISITS to Fields of the Regional Research Station of PAU, Bathinda

Arranged by Chemistry Department

VISITS to Fields of the Regional Research Station of PAU, Bathinda

Arranged by Chemistry Department

Chemexordia- Quiz, Caption Contest

QUIZ
(Interdepartmental)

National Conference
(Interdepartmental)

First Page of the PUBLICATION related to the project work performed under DBT-SCS by Dr K. S. Mann and UG Students (B.Sc. Classes)

Bulletin of

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ARTICLE

CAPACITANCE MEASUREMENT BY DIGITAL OSCILLOSCOPE: AN EXTENSION OF THE CONVENTIONAL METHOD PRACTICED IN UG PHYSICS LABORATORIES

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Abstract

This work presents an extended indirect method to estimate the capacitance of an arbitrary capacitor by recording its charging and discharging time with the help of a neon-lamp (NL) and digital storage oscilloscope (DSO). The conventional Flashing-Quenching of NL experiment was used to train undergraduate (UG) physics students to estimate the capacitance of an unknown capacitor by measuring time durations for a fixed number of light flashes produced by the NL due to charging and discharging of the capacitor network. These flashes are counted manually, and if the capacitance of the unknown capacitor lies in the micro-farad (μF or MFD) range, then only it can be estimated. Suppose that the capacitance of the unknown capacitor is below the MFD; then, it cannot be assessed because of the persistence of the vision of the human eye. In this case, it was impossible to count the light pulses manually. Thus, the capacitance measurement range of MFD is limited. Replacement of the human eye with a digital storage oscilloscope (DSO) in a conventional experimental setup extends the capacitance measurement range from MFD to PFD. This minor modification increases the accuracy of the capacitance measurement range from MFD to the PFD. The higher persistence of the DSO compared to the human eye appears to be the reason for the improvement in the capacitance measurement.

1. Introduction

The cathode ray oscilloscope (CRO) is a crucial tool used in physics laboratories of undergraduate (UG) students. It facilitates in the display of varying electrical impulses (voltage and current) and the measurement of their amplitude, frequency, etc. A modified version of the CRO is available as Digital-Storage Oscilloscope (DSO). The DSO has some additional features than CRO, such as Auto controls, data recording, colorful signal visualization and its measurement, portable, and compact. This work is an attempt to make a little more interactive the conventional experiment used for the hands-on-training purpose to the UG science students. The DSO helps in visualizing the process of charging and discharging of capacitors through the Neon-Lamp (NL) with time. DSO's ability for data acquisition is very useful, it saves much time of students that would be wasted while taking the manual observations. The practical method for determining the capacitance of an unknown capacitor in a physics laboratory is usually demonstrated using a conventional experimental kit that consists of sets of capacitors that are connected in parallel with a NL. The method involves manually counting the number of NL flashes in the allotted time to determine the unknown value of the capacity [1, 2].

2. Material and Methodology

The conventional method is simple but fails to visualize the concept of charging-discharging of a capacitor. Attaching the DSO with resistance-capacitor (RC) combination, improved the conventional experiment of capacitance measurement using flashing-quenching of NL [3]. The significance of this setup is that it reduces the observation time and improves the range of capacitance measurement. The experimental kit with 3 capacitors viz. C1, C2, C3 and C4 of capacitance 1, 2 and 3 μF (MFD), respectively are connected in parallel with a capacitor with an unknown capacitance (Figure 1).

This set of capacitors is being charged by a dc-voltage

First Page of the PUBLICATION related to the project work performed under DBT-SCS by Dr Vikas Duggal and Students of B.Sc. Classes

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Assessment of fluoride exposure and associated health risks from different sources of drinking water to various age groups in Bathinda City, Punjab, India

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ABSTRACT

The presence of elevated fluoride levels in Bathinda City, Punjab, India, has been a major health concern for residents. Previous studies have primarily focused on groundwater but have neglected other drinking water sources. The primary aims of this investigation are to analyze fluoride levels in various drinking water sources in Bathinda City, establish their relationship with physicochemical parameters, and appraise the non-carcinogenic health hazards associated with fluoride exposure for various age categories. A total of 296 water samples were collected, including groundwater (GW), surface water (SW), public water supply (PWS), bottled water (BW), private reverse osmosis water (PROW), municipal reverse osmosis water (MROW) (pre-and post-monsoon), and rainwater (RW). Fluoride levels were determined using a photometer (model: HI97739; make: Hanna Instruments) employing the SPADNS colorimetric procedure. The mean fluoride levels in different water sources were as follows: GW (3.77 mg L^{-1}), SW (0.76 mg L^{-1}), PWS (1 mg L^{-1}), BW (1.4 mg L^{-1}), PROW (0.94 mg L^{-1}), MROW (pre-monsoon) (1.62 mg L^{-1}), MROW (post-monsoon) (1.29 mg L^{-1}), and RW (0.63 mg L^{-1}). A significant proportion of GW (78.4%), PWS (14.3%), BW (37.5%), PROW (25%), and MROW (72.1% in pre-monsoon and 27.9% in post-monsoon) samples surpassed the World Health Organization guideline value. The study findings highlight the high fluoride levels in GW, BW, PROW, and MROW, making them hazardous for consumption. Hazard quotient analysis suggests that children face the highest risk of non-carcinogenic health effects from fluoride exposure, followed by teenagers, adults, senior citizens, and infants.

1. Introduction

Fluoride (F^-) is present in various natural environments such as soil, rocks, and water. The presence of F^- in water can arise from both human-induced and natural sources. Natural sources of F^- in water result from the dissolution of F^- containing minerals like apatite, micas, and fluorite present in rocks and soils (WHO, 2017). The solubility of these minerals is affected by various factors like pH, temperature, ionic strength, and other dissolved ions (Adriano, 1986). The amount of F^- in groundwater can also be impacted by the type and amount of minerals present in the aquifer, as well as the water residence period in the aquifer. In addition to natural sources, there are also anthropogenic sources, including the discharge of industrial effluents and the use of F^- containing fertilizers. These human activities raise the level of F^- in water, leading to potential health risks for humans and animals that consume it (USEPA, 2011; Yadav et al., 2019).

F^- is required for healthy bones and teeth. However, elevated consumption of F^- can cause skeletal and dental fluorosis, a disorder marked by the abnormal accumulation of F^- in bones and teeth, which can result in severe dental and skeletal deformities. F^- is also known to affect the thyroid gland, brain, kidneys, and other organs. Studies have also suggested that excessive intake of F^- can raise the risk of certain types of cancer, including osteosarcoma (Zhao et al., 1996; Rocha-Amador et al., 2007; Xiang et al., 2003; Seraj et al., 2012; Thippeswamy et al., 2021a, 2021b; Mukherjee et al., 2019; Das and Mondal, 2016).

Several countries around the world, particularly in Asia and Africa, face the problem of elevated F^- levels in drinking water. India, China, and Africa are the most affected regions due to their geology, which contains high levels of F^-. Around 62 million people in India face the risk of consuming water that surpasses the permissible limit of F^- levels (Zhang et al., 2020; Yuan et al., 2020; Adimalla and Qian, 2020).

Environmental and health regulatory bodies in different countries set

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REVIEW

Advancements in Photocatalytic Applications of Metal Ferrites for Water Pollution Remediation: A Focus on Biosynthesis and Innovations

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Received: 22 April 2023 / Accepted: 19 July 2023

Abstract
In recent years nanobiotechnology has emerged as a first phase modern science and the noble era excluded from the fields of material science and gaining international attention due to its adequate use. This review sheds light on the latest developments in the photocatalytic application of metal ferrites nanoparticles and their nanocomposites derived from the green synthetic route in relation to the destructive potential of pollutants in polluted water, with particular emphasis on their innovations. Wastewater treatment is one of major concerns in recent years and advanced oxidation process is one the most successful methodology for the treatment of water. Although enough literature is present on advanced oxidation processes with the aid of nanoparticles but still the are several challenges that needs to be addressed such as utilization of solar energy, low cost for synthesis, toxicity of chemicals used for synthesis along with the nanoparticles and most importantly the recovery as well as reusability of the catalyst. Metal ferrites are the one of the most suitable candidates that overcome all these issues. In addition, the implementation of the green chemistry for the synthesis adds on its value as an important class for the photocatalytic application. Therefore, the present review article summarized recent advancement in metal ferrites and their composites as well as doped nanostructures as photocatalyst for the degradation of organic contaminations. Finally, the challenges, gaps and needs of future research to improve the photocatalytic use of nanoparticles and their nanocomposites are addressed.

Keywords Green synthesis · Metal ferrites · Photodegradation · Waste water treatment · Water pollution

1 Introduction

In recent years, environmental pollution has become one of the major challenges to the research community, particularly water pollution needs more attention [1]. Water pollution is chiefly arising due to various anthropogenic causes [2–4]. Industrialization and globalization are the other essential factors that enhance the water pollution up to a certain level [5–8]. Though the quality of living has exceptionally improved, at the same time it leads to emergence of other new issues that uniformly impact human health along with the environment. Pollution is generally the introduction of substances or energy causing inimical changes in the environment and living entities. There are several human as well as industrial activities that cause water pollution like chemical waste arising from use of pesticides, insecticides, fertilizers, various household wastes like drain cleaners, floor cleaners, etc. [9–12]. These contaminants are mostly introduced by human activities like improper sewage treatment, oil spills, eutrophication, dumping solid wastes in water bodies, disposing untreated industrial sewage into water bodies, human and animal wastes, agricultural runoff containing pesticides and fertilizers [13, 14]. In addition to these industrial wastes is the major contributor towards wastewater discharge such as paper industry, leather industry clothes industry, pharmaceutical industry [15–17]. Every year around four hundred tons of waste is being discharged by the industries in the form of chemicals, solvents, and metal

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First Page of the PUBLICATION by Dr Neha Jindal

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Nanotechnology-assisted treatment of pharmaceuticals contaminated water

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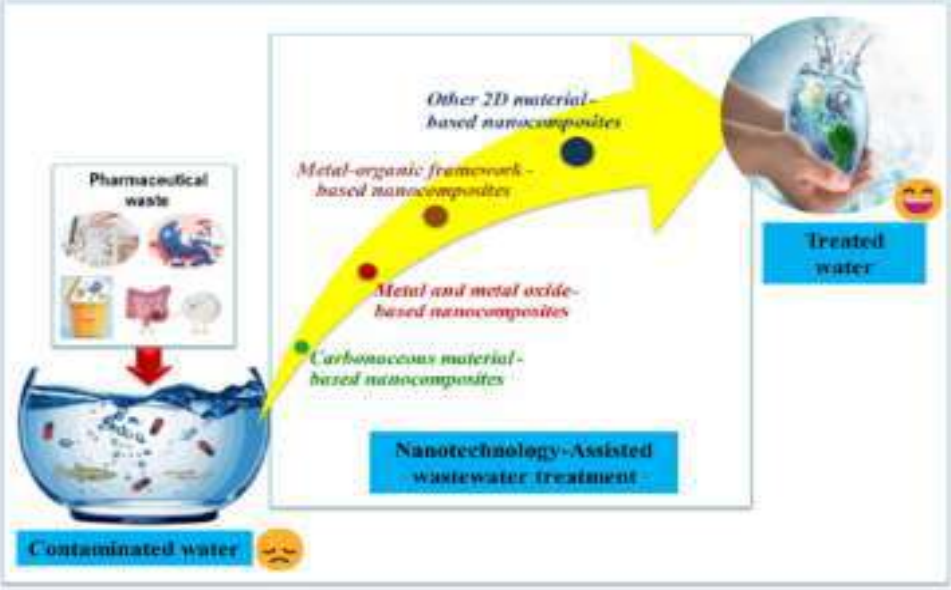
ABSTRACT

The presence of pharmaceutical compounds in wastewater due to an increase in industrialization and urbanization is a serious health concern. The demand for diverse types of pharmaceutical compounds is expected to grow as there is continuous improvement in the global human health standards. Discharge of domestic pharmaceutical personal care products and hospital waste has aggravated the burden on wastewater management. Further, the pharmaceutical water is toxic not only to the aquatic organism but also to terrestrial animals coming in contact directly or indirectly. The pharmaceutical wastes can be removed by adsorption and/or degradation approach. Nanoparticles (NPs), such as 2D layers materials, metal-organic frameworks (MOFs), and carbonaceous nanomaterials are proven to be more efficient for adsorption and/or degradation of pharmaceutical waste. In addition, inclusion of NPs to form various composites leads to improvement in the waste treatment efficacy to a greater extent. Overall, carbonaceous nanocomposites have advantage in the form of being produced from renewable resources and the nanocomposite material is biodegradable either completely or to a great extent. A comprehensive literature survey on the recent advancement of pharmaceutical wastewater is the focus of the present article.



Graphical representation showing water contamination and its treatment by nanotechnology assisted approach to obtain treated water.

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Face book Coverage of Activities Performed under DBT SCS during 2023-24

S. No.	Activity	QR Link
1	Alarming Levels of Fluoride in Bathinda's Drinking Water: A Wake-up Call for Public Health	
2	DAV College Bathinda Organized Workshop on "Experiments with Arduino & it's applications"	
3	DAV College Bathinda Organized Mutual-Induction Program of B.Sc. Students through Experiments and Demonstrations in Sciences	
4	DAV College Bathinda organizes "Sci-Fiesta-2022"	
5	National Science Day Celebrated at DAV College Bathinda	
6	DAV College Bathinda Holds Competition in "Experiments & Demonstrations in Physics"	
7	Post Graduate Department of Chemistry, DAV College Bathinda Organized "Chem Exordia"	
8.	DAV College Bathinda got Grade A in the poster presentation of the DBT Star College Scheme's Annual Progress Reports in the All India Coordinators Meet at RVS College, Coimbatore (TN) held from February 7th to 9th , 2024,	

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