



# S.D. College Barnala

## Annual Progress Report of DBT Star College Scheme: 2022-23

Sanction No: HRD-11011/29/2021-HRD-DBT  
Date of Advisory committee meeting: 25<sup>th</sup> April, 2023



### FACULTY DETAILS

S.No	Name of Department	Courses	Regular Faculty
1.	Botany	B.Sc. Medical	Total=02 With Ph.D.: 02 Dr. Manish Kumar Dr. Amardeep Kaur Without Ph.D.: Nil
2.	Zoology	B.Sc. Medical	Total=02 With Ph.D.: 02 Dr. Renu Singla Dr. Kamalpreet Kaur Without Ph.D.: Nil
3.	Chemistry	B.Sc. Medical & Non-Medical	Total=06 With Ph.D.: 01 Dr. Kulbhushan Rana Without Ph.D.: 05 Mrs. Savita Sood Mrs. Rajni Gupta Mrs. Navneet Kaur Mrs. Mitika Mrs. Malika
4.	Mathematics	B.Sc./B.A.	Total=05 With Ph.D.: 01 Dr. Dimple Rani Without Ph.D.: 04 Sh. Ashwani Kumar Mrs. Upasana Rani Mr. Gurkeert Singh Mr. Manish Kumar Garg
5.	Physics	B.Sc. Non-Medical	Total=05 With Ph.D.: 03 Dr. Baltej Singh Dr. Manoj Kumar Gupta Dr. Sanjay Kumar Singh Without Ph.D.: 02 Mrs. Achhra Garg Mrs. Shalu Rani

Student Strength: 294

### Dissertation/Projects

#### Botany

- Evaluation of phytotoxic and antioxidant activities of *Cannabis sativa* and *Parthenium hysterophorus*
- Determination of stomatal index of plants growing in the campus of S.D. College, Barnala, Punjab, India.
- Study of the Dissolved Oxygen Content and Salinity of different water samples collected from nearby villages in Barnala.
- Evaluation of antihelminthic activity of *Melia azadirach* and *Callistemon lanceolatus*
- Pollen viability studies of medicinal plants growing in the campus of S.D. College, Barnala and surroundings.
- Study the effect of chemical Fertilizer, vermicompost and compost on the growth of *Brassica juncea* Seedlings .
- Survey on trees growing in the campus of S.D. College, Barnala, Punjab, India
- Ethnobotanical survey on plants of Dhanoula region of District Barnala.

#### Zoology

- Avian diversity in rural landscape of district Barnala (Punjab).
- Effectiveness of household agents as larvicide on first instar larva of *Aedes aegypti* .
- To study different larval stages of *Aedes aegypti* and *Culex sp*
- Estimation of haemoglobin by different methods.
- Estimation of calcium content and thickness in eggshells of birds commonly found in agricultural fields of district Barnala, Punjab (India).
- Study of development of an insect.

#### Chemistry

- Synthesis of some Biginelli compounds via conventional heating method and their characterization through PMR, Mass & IR spectroscopy
- Green Synthesis of some Biginelli compounds using Microwave and their characterization through PMR, Mass & IR spectroscopy.
- To prepare mosquito repellent from citrus peels extract.
- Synthesis of biodiesel using trans- esterification method.
- Separation & estimation of casein protein content in different milk samples.
- To compare hardness of water samples taken from different resources.
- Study of different coordination compounds formed during salt analysis and to detect the presence of cationic and anionic species in them.
- Analysis of different chemical dyes on fabric.
- Anti-Covid Drug: 2-Deoxy-D-Glucose & its mechanism of action.
- Isolation & Extraction of caffeine in Tea leaves samples of different brands & comparison of caffeine content & water-soluble Polyphenol in the samples.
- Study of different biological activities related with Dihydropyrimidines.
- Gambia & Uzbekistan Children tragedies: Cough Syrup contaminated with DEG & EG

### Interdepartmental/interdisciplinary Dissertations/ Projects

#### Botany & Chemistry

- Study of biochemical parameters of plant samples under heavy metal stress
- Assessment of hydrogen and electron donating activities of synthetic compounds.
- Extraction of colored dyes from plants such as *Hibiscus rosa-sinensis*, *Acacia catechu* etc. using various solvent extraction procedures

#### Chemistry & Physics

- Determination of adulteration in milk samples by attenuation using nuclear technique and organic analysis.
- To study the structural Properties of CeMg & YbMg by Using X crystal density & DFT

#### Physics & Botany

- To study the absorption coefficient of protein rich pulses and leaf of edible vegetables

#### Mathematics & Chemistry

- Balancing a chemical equations using Algebraic approach

### New/extended Practicals

#### Botany

- To study couch smut disease in *Cynodon dactylon* caused by *Ustilago cyanodontis*.
- To study the effect of different light radiations on the growth of *Rhizopus* species.
- To study various types of chloroplasts in green algae
- To study the technique of emasculation in plant breeding experiments.
- To study the effect of heavy metals on chromosomes employing *Allium cepa* root chromosomal assay
- To study the technique of DNA electrophoresis
- To study the anatomy of gymnosperms using microtome
- To study the abnormal secondary growth in *Dracaena*, *Acyranthes* & *Amaranthus*.
- To determine stomatal index of various plants.
- To study phenomenon of plant morphogenesis in *Vigna radiata* seedlings.
- To study the effect of GA<sub>3</sub> plant hormone on the growth of plant seedlings.
- To separate secondary metabolites present in the bark and leaf extracts of medicinal plants using Thin Layer Chromatography (TLC).
- To identify the presence of *Argemone mexicana* seeds as adulterant in mustard seeds by morphological and anatomical studies.

#### Chemistry

- To analyse the commercial sample of Potash Alum (Fitkari) for cations & Anions
- To prepare the crystals of FeSO<sub>4</sub> 7H<sub>2</sub>O from Kipps Apparatus waste
- To determine the contents of cold drinks
- To determine the mixed melting point of given substance
- Synthesis of Dihydropyrimidine via conventional method and characterisation
- Microwave assisted green method for the Synthesis of Dihydropyrimidine & characterization.
- Estimation of Oxalate ions in tomatoes and potatoes volumetrically
- To calculate the acid value of a given sample of refined oil.
- Green method to analyse the organic compound for detection and confirmation of its elements
- Determination of composition of a mixture of two acids conductometrically
- Separation of Casein Protein in given milk sample
- To determine enthalpy of solution of BaCl<sub>2</sub>.2H<sub>2</sub>O & KNO<sub>3</sub> in water at room temperature
- To verify Beer-Lambert law spectrophotometrically
- To prepare p-Nitroacetanilide from Acetanilide & detection of its functional group

### VISITS TO RESEARCH INSTITUTES/INDUSTRIES

- Educational visit to **IISER Mohali (21/02/23)**
- Educational visit to **Thapar Institute of Engineering & Technology (25/03/23)**
- Educational visit to **Central University, Bathinda (29/04/2022)**
- Industrial visit to **Verka Milk Plant, Sangrur (06/08/2022)**
- Educational tour to **Pushpa Gujral Science City, Kapurthala (16/2/2023)**
- Visit to **Panjab University Chandigarh (27/03/2023)**
- Educational visit to **Pushpa Gujral Science City, Kapurthala & Kanjli Wetland (16/02/2023)**
- Educational visit to **Zoological Park, Chhatbir (10/03/2023)**
- Field visit local to **Shaheed Bhagat Singh Park (29/09/2022)**.
- Educational visit to **SS Bir Botanical Garden, Punjabi University, Patiala**

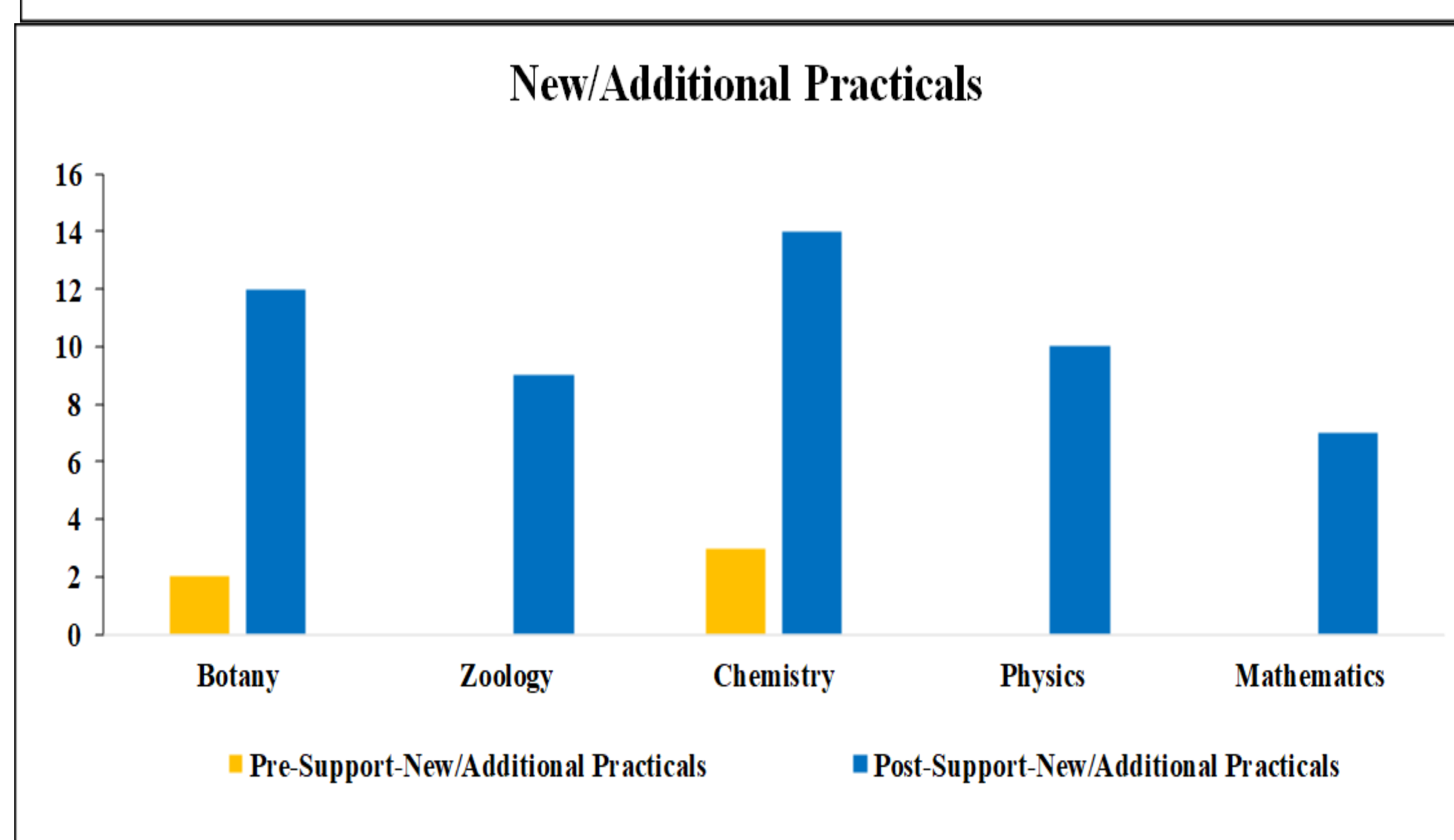
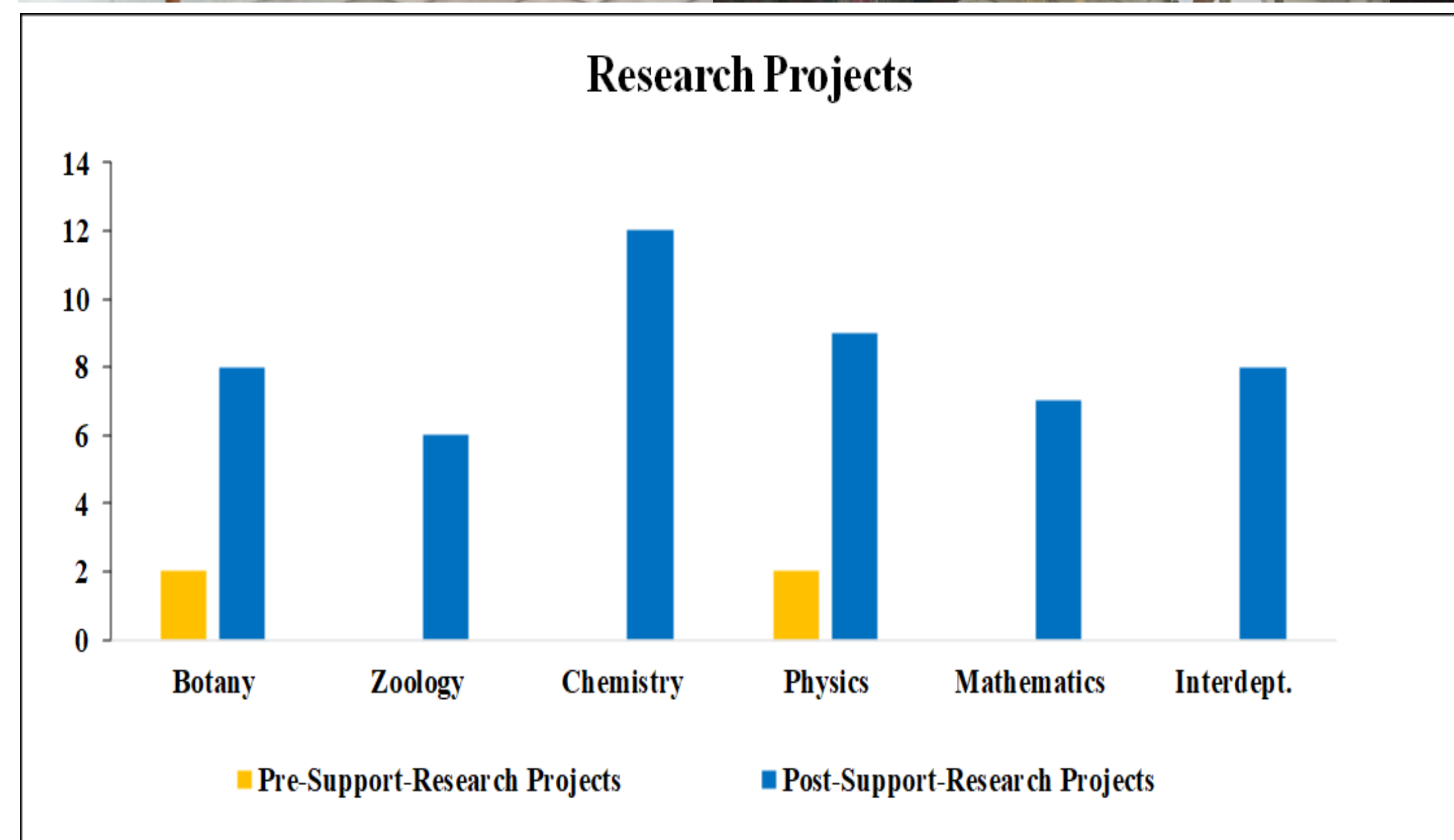


#### Mathematics

- Solution of algebraic and transcendental equation using Software MATLAB.
- Practical problem's solution of Linear Programming using MS EXCEL'S SOLVER.
- Temperature forecasting using interpolation.
- Applications of cyclic group.
- Modeling with differential equations.

#### Physics

- To study the variation in intensity of light using different light sources .
- To find the of density of different types of materials of irregular shape using Archimedes principle
- To design a working model for study the behavior and variation of temperature wrt displacement in different conducting materials.
- To study the amount of pollutant ions in the Air /soil surrounding different zones of the City Barnala .
- To design Kundt's Tube to observer Nodes & Antinodes in closed glass tube.
- To design Kundt's tube by PVC pipe to study constructive and destructive interference.
- To design Simple /Series pendulum and coupled oscillator to study transfer of energy.
- To design Magnetic Oscillator with low cost Magnet and to study magnetic oscillation.
- To design Single/double slit and study diffraction of light.



#### Zoology

- To study dissolved oxygen, total alkalinity & free CO<sub>2</sub> of water sample
- To study different types of nests.
- To study development of insect.
- To study larvae of mosquitoes from water samples.
- To study different types of zoogeographical regions.
- To study RBC count using Neubaur Chamber.
- To estimate haemoglobin by colorimetry.
- To detect chloride ions in urine/water samples.
- To study bar body in buccal mucosal cells.
- Pedigree analysis
- Survey of fauna in college campus.

#### Physics

- To measure the magnetic susceptibility of FeCl<sub>2</sub> solution using Quinck's method.
- To measure voltage and unknown frequency using CRO.
- To draw voltage current characteristics of silicon controlled rectifier (SCR).
- To study diffraction of light by using He-Ne LASER and Diffraction Grating.
- To measure the refractive index of given liquids for a given wavelength of light (5893Å) using spectrometer.
- To find the height of S.D. College, R.P.S.D. School and B. Pharmacy Barnala buildings using sextant.
- To study the variation of magnetic field on axis of circular current carrying coil using Gee & Stewart apparatus.
- To study the Faraday laws of electromagnetic induction using a strong magnet, coil and a galvanometer.

#### Mathematics

- Creating a matrix and different operations on matrices.
- Matrix manipulations.
- Creating different functions.
- Solving basic algebraic equations
- Solving system of equations.
- Creating simple plots.
- Creating symbolic variables and manipulating expression using symbolic math functions.

SD College Barnala acknowledges financial support under Star College Scheme by Department of Biotechnology, GOI



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### Workshops/Trainings/Outreach Activities

#### Workshops/Trainings

- Botany:**
- One Week Hands on Training on Basic Techniques in Botany (Herbarium Preparation and Plant Tissue Sectioning) (13 -20 December, 2022)
  - One day training on the techniques and various methods of vegetative propagation at Durga Nursery, Barnala (24<sup>th</sup> November, 2022)

- Zoology:**
- One Day Workshop on 'Insect taxonomy: collection, preservation and identification. (26 Nov. 2022)
  - One Day Workshop on DNA Isolation, Electrophoresis and Immunological Techniques. (06 Feb. 2023)
  - One week Training at Poultry Farm (15.6. 22 to 21.6. 22).
  - One Week Hands on Training on Basic Techniques in Blood analysis and Animal taxonomy (13 -20 December, 2022).

- Chemistry**
- Workshop on Chemistry Software (Chem Sketch) (2<sup>nd</sup> June, 2022)
  - Workshop on Lab Safety Measures on 13<sup>th</sup> Feb.2023
  - Training for Laboratory Staff on 17<sup>th</sup> Feb.2023.
  - Training Program for students of Sarvhitkari Senior Secondary School, Barnala from 26th Nov. to 05th Dec. 2022.
  - Hands on Training Program: Hydro – Distillation and Spectroscopic Techniques (21-22March 2023)

- Mathematics**
- One week workshop on MATLAB (05-02-2022 to 12-02-2022)
  - 3-days workshop on MATLAB (2-02-2023 to 04-02-2023)

- Physics**
- Two days hands on Training Programme on "Repair and Maintenance of Electrical Instruments" (15/02/2023 to 16/02/2023).
  - Three days workshop on "Projects making based on Electronics and Electrical Circuits" from 23-2-2023 to 25-2-2023.
  - One week Hands-on Training Programme for 12<sup>th</sup> standard students of Sarvhitkari Vidyamandir Sen. Sec. School Barnala from 5 December 2022 to 12 December 2022.



### Awareness programs/Exhibitions

- Awareness drive against stubble burning in the nearby village Pharwahi for farmers (19th Oct, 2022)
- Department of Physics, S. D. College, Barnala organized **Science Cartoon Poster Presentation Competition** on 13/03/2023 for BSc students.
- Department of Physics and Department of Mathematics in collaboration with all science departments jointly organized '**Science Fair**' on 25<sup>th</sup> and 26<sup>th</sup> April, 2022
- National Science Day** was celebrated on 27<sup>th</sup> and 28<sup>th</sup> February, 2023 by Department of Mathematics along with all the science Departments under DBT Start College Scheme.
- Department of Botany organized "**Plantation Drive**" in the college campus on 5<sup>th</sup> December 2022. Around 200 different ornamental plants such as *Marigold*, *Petunia*, *Dimorpha*, *Salvia*, *Kale* etc. along with few medicinal plant such as lemon grass, Betel etc were planted in the campus.
- Department of Botany introduced **Colour coded dustbins of blue and green color for segregation of biodegradable and non-biodegradable wastes** in the college campus on 7<sup>th</sup> March, 2023.



### Summer Training Programme

#### A Multidisciplinary Two-Week Summer Training Programme (28th July to 10th Aug, 2022)

- Practical exposure on laser diffraction, refraction, reflection, polarization etc.
- Chromatographic techniques
- Cytological & Enzymatic studies
- Haematological studies
- Matlab and its applications

### Guest/Invited Lectures

S.No.	Topic of Invited Lecture	Resource Person	Date
1.	Biodiversity and Environment	Dr. Ashita Sharma, Associate Professor, Chandigarh University, Gharuan, Mohali	17 <sup>th</sup> Feb., 2023
2.	Covid19: its impact on Environment and Health	Dr. Ashita Sharma, Associate Professor, Chandigarh University, Gharuan, Mohali	17 <sup>th</sup> Feb., 2023
3.	Plant Tissue Culture: Basic & Recent Advancements	Dr. Tarunpreet Singh Thind, Assistant Professor, Govt. College for Girls, Ludhiana	11 <sup>th</sup> March, 2023
4.	Vermicomposting & Organic Farming	Dr. Tarunpreet Singh Thind, Assistant Professor, Govt. College for Girls, Ludhiana	11 <sup>th</sup> March, 2023
5.	Intellectual Property Rights-A tool for Protection of Innovations	Dr. Balwinder Singh Sooch, Head Dept of Biotechnology, Depty coordinator, IPR and Technology transfer cell, Punjabi University Patiala, Punjab	26 <sup>th</sup> May 2022
6.	Genetically Modified Foods	Prof. R.S. Singh, Associate Dean Research, Chandigarh University, Gharuan, India. Former Dean, Faculty of Life Sciences. Punjabi University, Patiala.	26 <sup>th</sup> May 2022
7.	Scope of taxonomy and importance of insects	Dr. Abhinav Saxena, Assistant Professor, Akal University, Talwandi Sabo, Bathinda, Punjab	26 <sup>th</sup> Nov.2022
8.	Spotlight on Immunology: Theory and Experimentation	Dr. Ritu Pawan Head, Department of Biotechnology and Medical Sciences, Baba Farid College, BFGI, Bathinda, Punjab	6 <sup>th</sup> Feb, 2023
9.	Identification of Chemical Hazards and Risks	Dr. Kuldeep Kaur, Assistant Professor, Dept. of Chemistry, Mata Gujri College, Fatehgarh Sahib, Punjab	13 <sup>th</sup> Feb, 2023
10.	Lab Safety Practices	Dr. Kuldeep Kaur, Assistant Professor, Dept. of Chemistry, Mata Gujri College, Fatehgarh Sahib, Punjab	13 <sup>th</sup> Feb, 2023
11.	Chemistry Software (Chem Sketch)	Dr. Bhupinder Kaur, Assistant Professor, Akal Degree College, Mastuana	2 <sup>nd</sup> June 2022
12.	Mobile Phone Radiations and its Impacts on human body	Dr. Tajinder Singh, Associate Professor and Head, PG Physics Department, Mata Gujri College, Fatehgarh Sahib, Punjab	30 <sup>th</sup> November 2022
13.	Applications of Nanotechnology	Dr. Karamjit Singh, Assistant Professor, Punjabi University Patiala.	30 <sup>th</sup> November 2022
14.	Nuclear Radiation: Awareness & Applications	Dr. Tejbir Singh, Dean faculty of Basic and Applied Sciences, Professor & Head, Dept. of Physics, SGGSW University, Fatehgarh Sahib, Punjab	13 <sup>th</sup> March, 2023.
15.	Career Opportunities in Physics in India	Dr. Tejbir Singh, Dean faculty of Basic and Applied Sciences, Professor & Head, Dept. of Physics, SGGSW University, Fatehgarh Sahib, Punjab	13 <sup>th</sup> March, 2023.
16.	'Golden ratio' and 'Fermat's Last Theorem	Dr. Gurmeet Singh, Vice Principal and Head of Department of Mathematics at G.S.S.D.G.S Khalsa College, Patiala	18 <sup>th</sup> Nov. 2022
17.	Everything Around you in Mathematics'	Prof. Parveen Lata, Head, Department of Mathematics, Punjabi University, Patiala.	28 <sup>th</sup> Feb., 2023



### Salient Achievements

- Purchase of new equipments, MATLAB Software, consumable items enhancing the infrastructure with a variety of tools that boosted student's confidence.
- Enabled the students to do additional practicals, minor projects as well as participation in conferences/seminars, workshops leading to inculcation scientific temperament
- Field trips and industrial/institutional visits gave the students ample opportunity of exposure in experiential learning.
- Faculty participation in conferences/ seminars/FDP's/Workshops/online courses
- Creation of departmental libraries

### Faculty trained for skill improvement

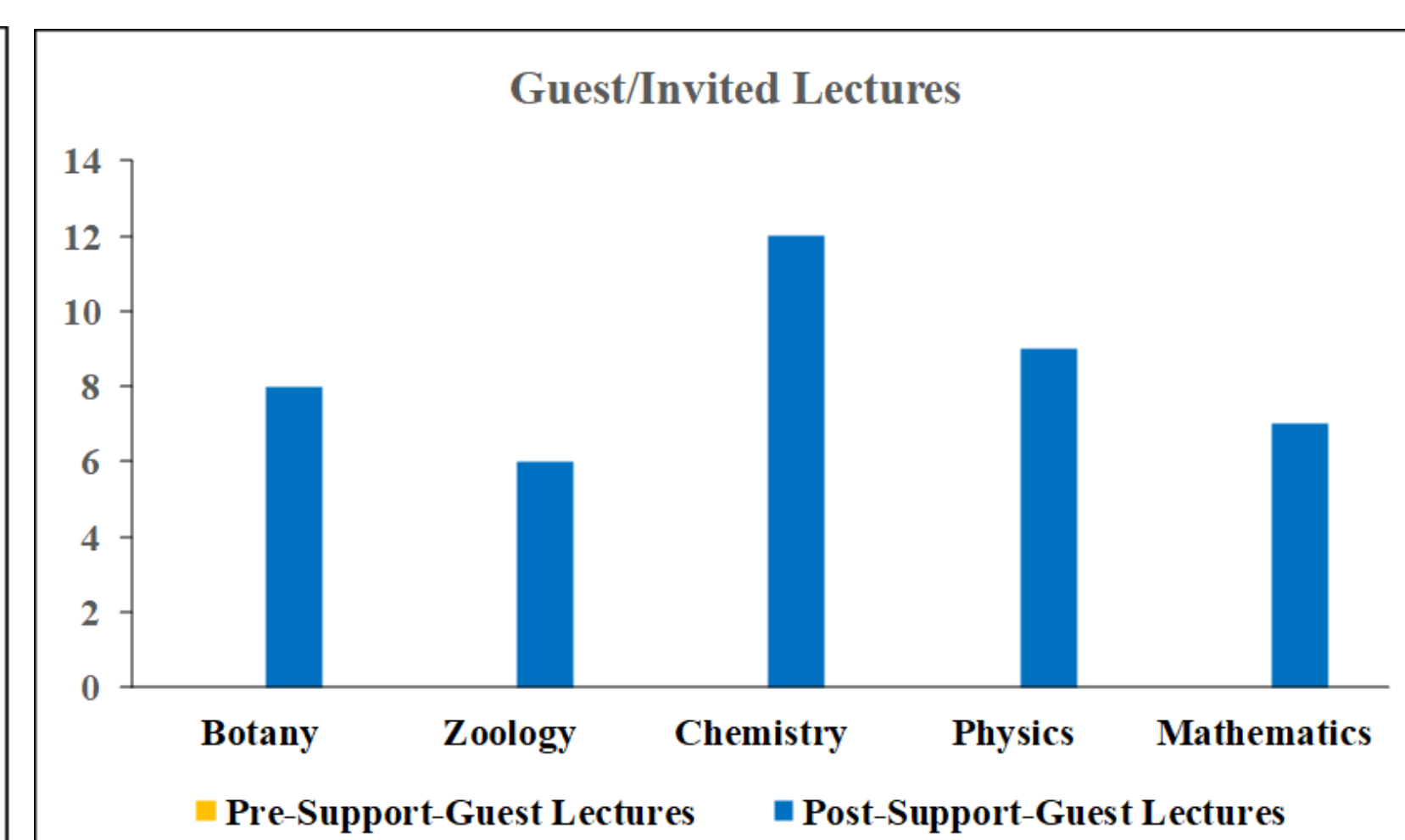
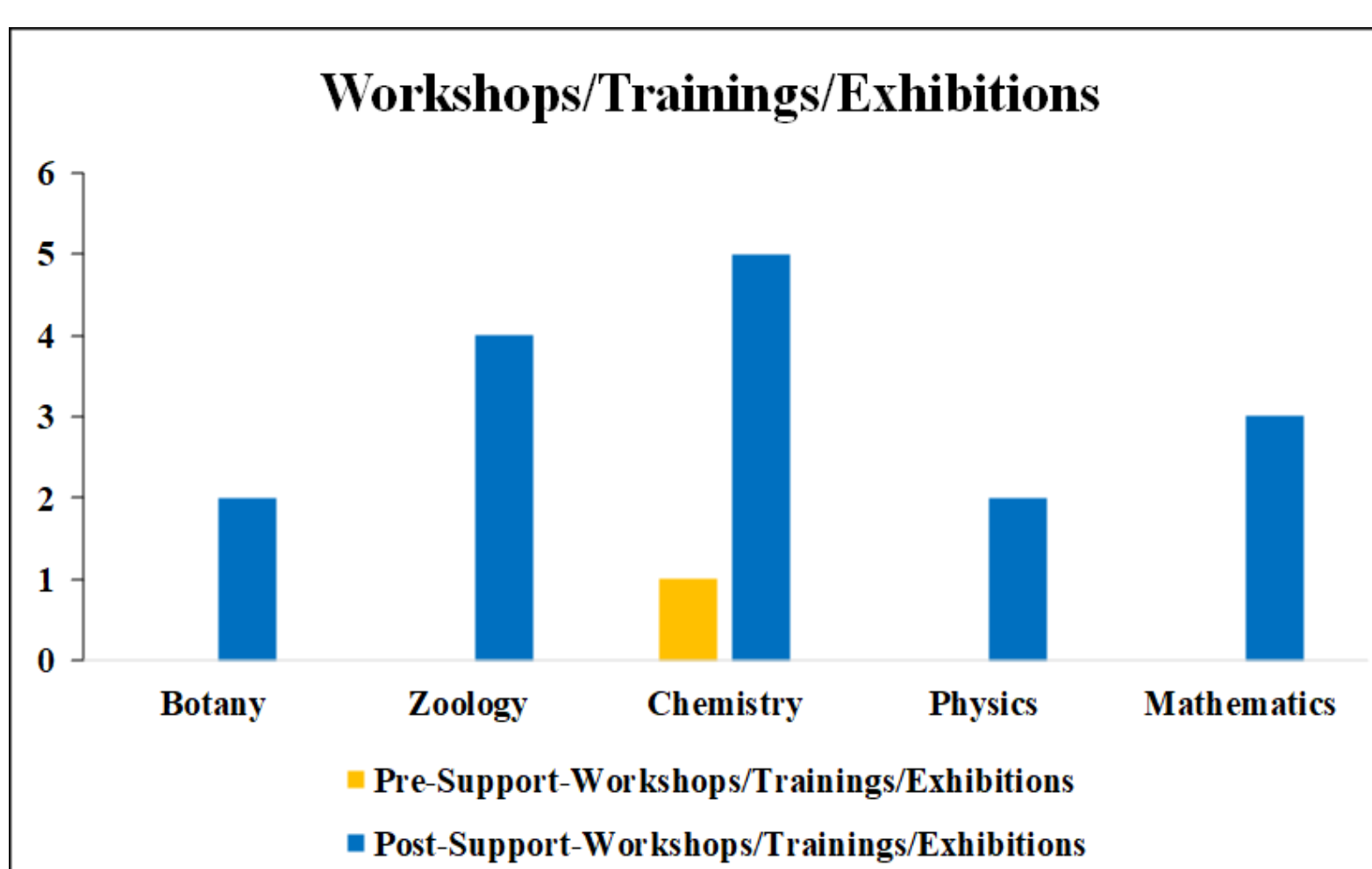
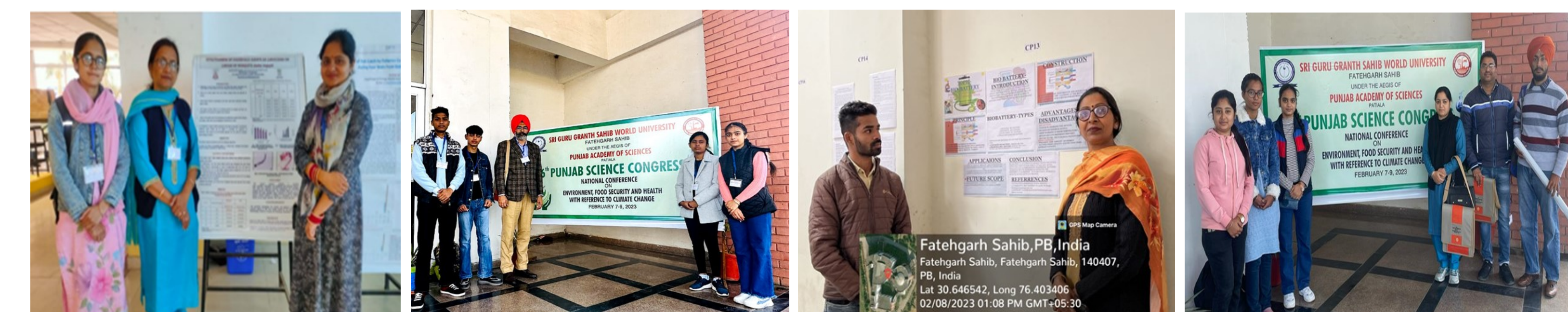
- Botany:**
- Dr. Manish Kumar has completed 3- days training program on "**Plant extraction, Phytochemistry & Anthelmintic activity**" organized jointly by Ambika Prasad Research Foundation, Odisha & Institute of Biological Sciences, Odisha from 28<sup>th</sup> to 30<sup>th</sup> July, 2022.
  - Dr. Manish Kumar & Dr. Amardeep Kaur has completed Seven days training program on "**MEDICINAL PLANTS**" from 15th May 2022 organized by Ambika Prasad Research Foundation, Odisha, India.
  - Dr. Manish Kumar & Dr. Amardeep Kaur participated in **26<sup>th</sup> Punjab Science Congress; National Conference on "Environment, Food Security and Health with Reference to Climate Change"** held at Sri Guru Granth Sahib World University, Fatehgarh Sahib on 7-9 Feb., 2023.
  - Dr. Manish Kumar participated in the National Conference on "**Recent Advances in Science and Technology for Sustainable Development**" organized by DAV College, Bathinda, March 05, 2022.

- Zoology**
- Dr. Renu Bala has completed Seven-Days Faculty Development College, Bathinda, March Program on "**Understanding Biodiversity & Geoheritage**" from 22-2-2023 to 28-2-2023 conducted by Human Resource Development Centre, Panjab University, Chandigarh.
  - Dr. Renu Bala & Dr. Kamalpreet Kaur participated in **26<sup>th</sup> Punjab Science Congress; National Conference on "Environment, Food Security and Health with Reference to Climate Change"** held at Sri Guru Granth Sahib World University, Fatehgarh Sahib on 7-9 Feb., 2023.
  - Dr. Renu Bala participated in the National Conference on "**Recent Advances in Science and Technology for Sustainable Development** organized by DAV College, Bathinda, March 05, 2022.

- Chemistry**
- Dr. Kulbhushan Rana participated in FDP "**Miniaturised Total Analysis System**" from 10-01-2023 to 20-01-2023.
  - Mrs. Rajni Gupta & Dr. Kulbhushan Rana participated in **26<sup>th</sup> Punjab Science Congress; National Conference on "Environment, Food Security and Health with Reference to Climate Change"** held at Sri Guru Granth Sahib World University, Fatehgarh Sahib on 7-9 Feb., 2023.

- Physics**
- Dr. Baltej Singh participated in **26<sup>th</sup> Punjab Science Congress; National Conference on "Environment, Food Security and Health with Reference to Climate Change"** held at Sri Guru Granth Sahib World University, Fatehgarh Sahib on 7-9 Feb., 2023.
  - Dr. Baltej Singh participated in FDP on "**Principles of Radiation detection and measurement and experimental technique**" from 3-4-2023 to 9-4-2023
  - Dr. Manoj Kumar Gupta participated in **2<sup>nd</sup> National Conference on Radiaton Physics** from 15-12-2022 to 16-12-2022
  - Dr. Manoj Kumar Gupta participated in FDP on "**Principles of Radiation detection and measurement and experimental technique**" from 3-4-2023 to 9-4-2023
  - Dr. Sanjay Kumar Singh participated in 7 days Training and Workshop on Advances in Characterization of Material from 12-9-2022 to 12-9-2022
  - Dr. Sanjay Kumar Singh participated in Short Term Course on **OPTICS (Diffraction and Interference of Light)** from 25-2-2022 to 2-3-2022.
  - Dr. Sanjay Kumar Singh participated in **PTTP training programe** at International Center for Theoretical Science (ICTS) from 09-01-2023 to 13-01-2023

- Mathematics**
- Dr. Dimple Rani participated in 5-day workshop on "**Statistical Analysis using Python**" held at VNRVJIT, Hyderabad, Telangana, India during 6-11 March, 2023.
  - Dr. Dimple Rani, presented paper on topic "**Operational Matrix of Bernoulli Polynomials for computing Numerical inverse Laplace Transform**" in the International Conference on "Analysis and Its Applications" ICAA-23 held during February 27-28, 2023.
  - Mrs Upansana Rani participated in **26<sup>th</sup> Punjab Science Congress; National Conference on "Environment, Food Security and Health with Reference to Climate Change"** held at Sri Guru Granth Sahib World University, Fatehgarh Sahib on 7-9 Feb., 2023.



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