**Department of Biotechnology**

**Proforma for submission of Annual Progress Report supported under Star College Scheme**

**(Kindly font size 12pt and line spacing 1.5)**

1. **Name of the College**: Hans Raj Mahila Maha Vidyalaya, Jalandhar

2. **Name of Coordinator, designation Address, Phone nos.**

   Dr Anjana Bhatia, Dean Innovations and Research, HMV, Jalandhar

3. **Assessmentduration** 2 3 /12/2 1to3 1 /3/22 **Duration in years:** 0 years 3 months

4. **Details of Departments Supported**

**Note that the annual report from Point 6 to 10, should not be more than 5 A4 size sheets, with**

| Sl No | Name of Department | Courses (B.Sc./M.Sc./PG Diploma, certificate etc) offered | RegularFacultymembers | |
|---|---|---|---|---|
| | | | Total= 42 | |
| | | | WithPh.D. | Without Ph.D. |
| 1 | Botany | B.Sc.,M.Sc(Botany) | 4 | 2 |
| 2 | Bioinformatics and Biotechnology | B.Sc. Biotechnology | 2 | 2 |
| 3 | Zoology | B.Sc. Medical/Non-Medical with Bioinformatics | 2 | 1 |
| 4 | Physics | M.Sc. Bioinformatics | 1 + 1 | 2 |
| 5 | Mathematics | PG Diploma in Bioinformatics | 03 | 02 |
| 6 | Chemistry | B.Sc. | 3 | 1 |
| 7 | Botany | B.Sc., M.Sc. | 4 | 2 |
| 8 | Computers | B.ScNM, B.ScCSc, B.Sc Eco, BA(Maths), M.Sc (Maths) | 03 | 07 |

5. **Number & Date of Advisory committee meeting:** 20 January, 2024

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

(You may enumerate 5 minor projects where students were involved and their impact or similar activities andtheir outcome; this is for representative purpose and coordinator may include details as per his own choice;kindly refrain from providing philosophical data Avoid any introduction.All the justifications must be verycrisplike anyaspectnon-existentpre-STARScheme and you achievedafterthe grant).

- **Genomic Data Analysis for Disease Research**
  With the introduction of the STAR Scheme, the Bioinformatics department initiated a project where students were trained in genomic data analysis, focusing on plant and animal genomes linked to disease resistance. Prior to the DBT support, bioinformatics tools and training were minimal. The project allowed students to analyze large datasets, contributing to significant insights in plant and animal genetics. The outcomes included students publishing research papers and presenting their findings at national conferences, while also gaining competitive skills in the field of genomics.

- **Wildlife Conservation and Biodiversity Study**

The Zoology department, under the STAR Scheme, launched a project on wildlife conservation with a focus on local biodiversity, particularly bird and insect populations. Students conducted field surveys to document species diversity, which was not a focus prior to DBT support. They also participated in conservation awareness programs for the community. The findings led to greater community involvement in biodiversity preservation, and students developed a deeper understanding of wildlife conservation techniques, contributing to local environmental initiatives.

- **Solar Energy Projects and Sustainable Power Solutions**
  Before the STAR Scheme, research into sustainable energy solutions was limited. The Physics department initiated student-led projects on harnessing solar energy, with a focus on developing cost-effective solar panels and storage systems. These panels were installed on campus buildings. The project led to a reduction in electricity costs, a decrease in the institution's carbon footprint, and gave students practical experience in renewable energy technologies. This project served as a prototype for other departments interested in energy-efficient solutions.

- **Mathematical Modeling for Environmental Systems**
  A post-STAR Scheme project in the Mathematics department focused on developing mathematical models to predict the impact of environmental changes, such as climate change and pollution. Students created models to simulate water and air pollution scenarios in the local area, offering insights into mitigation strategies. The project, non-existent before DBT support, provided students with applied mathematical experience and contributed valuable data to environmental studies. The models were used by local authorities to plan more effective pollution control measures.

- **Green Chemistry Initiatives and Eco-Friendly Compounds**
  With DBT funding, the Chemistry department launched a project on green chemistry, aiming to develop eco-friendly and biodegradable compounds for industrial use. Students synthesized non-toxic chemicals that could replace harmful ones in various industries. The project's outcomes included creating safer chemical alternatives and reducing the environmental impact of chemical processes. Students gained practical lab experience in green chemistry techniques and contributed to ongoing environmental safety research.

- **Smart Irrigation Systems Using IoT**
  The Computer Science department developed a smart irrigation project leveraging IoT (Internet of Things) technologies. Students designed sensors and automated systems to monitor soil moisture and optimize water usage in agricultural fields. This project, made possible by DBT support, led to improved water management practices for farmers in nearby areas. Students learned to integrate software and hardware systems in real-world agricultural applications, contributing to sustainable farming solutions.

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

- **Interdisciplinary Research on Climate Change**
  The introduction of interdisciplinary research on climate change is a novel initiative that brings together students and faculty from departments like Zoology, Chemistry, Physics, Computers and Environmental Science. This research aims to model climate change scenarios, monitor biodiversity, and develop eco-friendly materials to mitigate climate impacts. The STAR Scheme has facilitated collaborative projects like Development of Aab-O-Hawa (a weather monitoring app) that tackle global challenges, positioning the institution at the forefront of climate-related research.

**Digital Repository and Virtual Learning Environment**
A significant aspect in the planning stage is the development of a Digital Repository and Virtual Learning Environment. This initiative will allow students and faculty to access and contribute to a vast digital library of research papers, project reports, and e-learning resources. By integrating this platform with online courses and virtual labs, the institution aims to make learning more accessible

and flexible, promoting self-paced learning and collaborative research. This novel aspect will further enhance the academic environment and research culture during the STAR Scheme duration.

8. Lessons learnt/ difficulties faced/ suggestions if any, in implementation of the programme and utilization of DBT grant.(Max 3 points within300 words).

- Difficulties Faced:

1. **Procurement Delays for Equipment and Infrastructure**
2. **Need for Structured Planning and Timely Execution**

One of the key lessons learned during the implementation of the DBT STAR Scheme was the importance of structured planning and timely execution. Initially, there were delays in project initiation due to inadequate planning of timelines and resource allocation. This underscored the need for a comprehensive project management strategy, ensuring that milestones and deliverables are clearly defined from the outset. Future programs would benefit from establishing a dedicated project coordinator to monitor progress and ensure efficient utilization of resources.

## 9. Key performance indicators

| S. no | Indicator | Pre-support (2018-2021) | During/After Support | Remarks |
|---|---|---|---|---|
| 1 | No.ofstudentsadmitted | Total =258 | Total =303 | |
| | | M=Nil F=258 | M=Nil F=303 | |
| | | SC 68 ST 3 OBC 40 G 147 | SC 85 ST 1 OBC 37 G 180 | |
| 2 | No. of studentspassing out (%)StudentsAdmitted/passingout (pass%) | 99% | 99.4% | |
| 3 | Drop-outrates | 1% | Less than 1% | |
| 4 | No.ofstudents optingforMSc | 87 | 115 | |
| 5 | Average marks | 76.3% | 79.5% | |
| 6 | No.ofhands-on experiments beingconducted | 459 | 516 | |
| 7 | No.ofnew experiments introduced | 3 | 35 | |
| 8 | Publications(scopus indexed)/patents,ifany. | 23 | 47 | |
| 9 | Trainingreceived by faculty | 47 | 82 | |
| 10 | Exhibitions/seminars/training coursesconducted' | 21 | 35 | |
| 11 | Books/journalssubscribedfrom grants | - | - | |
| 12 | Outreachactivities (Popularlectures) | 4 | 14 | |
| 13 | CollegesmentoredtoapplyforDBTStar Collegegrants | Nil | 3 | |
| 14 | Invitedlectures | 7 | 15 | |

- Proofs ( S.No. 6-14 not more than 5 pages, 1.5 line spacing 11 times roman font size) to be provided dulyattestedbyPrincipaland Coordinator.

## 10. Self evaluation

| Department | *Objective(asstatedinproposal) | %achieved | Reasons forunderachievement /Ifachieved, state in quantitativemetrics |
|---|---|---|---|
| Chemistry | To make chemistry department as centralized hub for analytical instruments with every instrument available to help girl students to get more expertise in doing various advanced experiments which are related with their curriculum. • With up gradation of laboratories interdisciplinary activities will be carried out which will give a better perspective and clearer understanding of different techniques to the students. • Various hand on activities proposed like workshops, training program and seminars will enrich the mind of students providing formal and informal education. • | 50% | It's the beginning of the project and work has been initiated in the direction |
| Physics | Up gradation of labs in terms of apparatus and ICT tools b) Upgrade departmental library with latest books and softwares. c) To collaborate with other department for carrying out inter disciplinary projects d) To make learning experience more innovative and research oriented | 50% | It's the beginning of the project and work has been initiated in the direction |
| Maths | Development of mathematical software skills: We propose to make department occupied with various mathematical softwares like: Matllab, Mathematica etc. which are helpful to develop the skills of programming among students as well as staff of college. | 50% | It's the beginning of the project and work has been initiated in the direction |
| Computer Science | The objective of the department is to provide an environment to the students by upgrading its infrastructure where they can learn new technologies and techniques to become proficient programmers. • To enhance the presentation skills of the students and teachers with the use of ICT enabled tools. • To provide Latest and Hi-tech Lab Equipment to achieve Higher Skills and Excellence in Teaching Methodologies. | 50% | It's the beginning of the project and work has been initiated in the direction |
| Zoology | o strengthen the academic and physical infrastructure for improving quality of teaching and learning process. ? To enhance the ability of creative thinking and innovation, cooperation, communication and presentation skills through hands-on trainings, interaction with experts in seminars and participation in summer schools | 50% | It's the beginning of the project and work has been initiated in the direction |
| Biotechnology | • To help girls students get more expertise in doing various advanced experiments which are related with their curriculum. • To help students to understand new latest techniques in various interdisciplinary subjects of science like Biochemistry, Molecular biology, Immunology, Bioinformatics etc. | 50% | It's the beginning of the project and work has been initiated in the direction |
| Botany | To provide suitable academic and physical ambience to encourage more girls to take up Science at higher level and increase the participation of girls and women in the field | 50% | It's the beginning of the project and work has been initiated in the direction |

| | | | |
|---|---|---|---|
| | of STEM nationally. • To reinforce the intellectual, academic, physical infrastructure of Science Departments of the college for accomplishing excellence in teaching-learning of Science. | | |

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

Anjana Bhola

**Course Coordinator**
**(With Seal)**

Course Coordinator
D.B.T. Star College Grant
Hans Raj Mahila Maha Vidyalaya
Jalandhar City

Principal,
Hans Raj Mahila Maha Vidyalaya,
Jalandhar City

**Head of the Institution**
**(With Seal)**

## GLIMPSES INTO PROGRESS AFTER DBT STAR SCHEME IMPLEMENTATION

# Trainings to students at Laboratories of National Repute



FOREST RESEARCH INSTITUTE, DEHRADUN


IHBT, PALAMPUR

- Panjab University, Chandigarh: Exposure to research facilities and academic projects in diverse fields.
- Forest Research Institute, Dehradun: Training in forestry research and conservation methods.
- Indian Sucrose Limited, Mukerian, Punjab: Industrial exposure to sugar production and related processes.
- Institute of Himalayan Bioresource Technology (IHBT), Palampur: Training in bioresource technology, including medicinal plants and agro-bio resources.
- SardarSwaran Singh National Institute of Bioenergy (NIBE), Kapurthala, Punjab: Insight into bioenergy and renewable energy technologies.
- Central Potato Research Institute, Shimla: Research and training in potato cultivation, disease management, and genetic studies.
- ICAR-Central Potato Research Institute, Regional Station, Jalandhar: Specialized training in potato agronomy and breeding.
- Horticulture Department, Jalandhar: Practical learning in horticulture practices, including crop production and management.

# Some Minor Research projects of students after DBT Star Scheme GRANT

- IoT-Based Smart Plants: Development of smart plant systems using IoT for real-time monitoring of plant health (e.g., soil moisture, light, temperature).

- IoT-Based Weather Monitoring System "Aab-O-Hawa": An IoT-enabled system for tracking local weather conditions such as temperature, humidity, and air quality.

- App Development for Tree Biodiversity of the College (e-TREE): Creation of an app that documents and provides data on the biodiversity of trees within the college campus.

- Digitized Database of Fauna of the College: Development of a digital repository cataloging the fauna found on the college campus, possibly integrated with the e-TREE app.

- Phylogenetic Analysis of Biofuel Crops (Botany and Bioinformatics): Research project focusing on analyzing the genetic relationships of biofuel crops to identify efficient sources.

- Phylogenetic Screening of Potential Drug Candidates for Plasmodium falciparum: Bioinformatics-driven analysis to identify promising drug candidates to combat malaria-causing parasites.

- Formulation and Preparation of Essential Oil Perfume from Medicinal Plants: Study and production of perfumes from essential oils derived from medicinal plants, focusing on extraction methods and formulation.

- Electricity Meter Reading Using IoT: Design of an IoT-based system for automated electricity meter reading, reducing the need for manual readings.

- Agriculture Monitoring System: IoT-driven system for real-time monitoring of agricultural fields, checking parameters such as soil moisture, temperature, and plant health.

## Increase in number of workshops/short term courses/trainings at the college level

**1. Software Development**

- **Objective**: Students were trained in the latest programming languages, frameworks, and software development methodologies.
- **Content**: Courses covered topics like full-stack development, mobile app development, web development, and coding in Python, Java, and C++. Students also learned agile methodologies and collaborative tools such as Git.
- **Outcome**: Participants gained skills that were highly demanded in the IT industry, allowing them to create applications, websites, and software solutions.
- **Workshops**: Real-world projects were included in workshops, enabling students to practice coding, debugging, and software design.

**2. Matlab**

- **Objective**: Students learned to use Matlab, a high-level programming language for numerical computation, visualization, and programming.
- **Content**: The courses covered matrix operations, data analysis, signal processing, and control system design, focusing on applications in engineering and science.
- **Outcome**: Participants gained the ability to implement algorithms, visualize data, and create simulations, enhancing their research and analytical capabilities.

- **Trainings**: Students received hands-on training in solving technical problems using Matlab in fields such as electronics and bioinformatics.

**3. Plant Pathology**

- **Objective**: Students were educated about plant diseases, diagnostic techniques, and management practices.
- **Content**: Topics included the identification of plant pathogens (fungi, bacteria, viruses), disease cycles, and modern plant protection methods. Organic and chemical disease management techniques were also taught.
- **Outcome**: Participants became proficient in diagnosing and managing plant diseases, gaining valuable skills for careers in agriculture, horticulture, and research.
- **Hands-on Training**: The program included field visits, lab work, and training in the use of diagnostic tools to identify plant diseases.

**4. Entrepreneurship in Herbal Products**

- **Objective**: Students were encouraged to explore business opportunities in the herbal products industry.
- **Content**: Courses covered herbal product formulation, market analysis, regulatory aspects, and business model development. Students also learned about medicinal plants, essential oils, and wellness products.
- **Outcome**: Participants acquired entrepreneurial skills and knowledge to start their own ventures in the herbal products sector.
- **Workshops**: Product formulation labs, branding exercises, and guest lectures from successful entrepreneurs were part of the workshops.

**5. Green Chemistry**

- **Objective**: Students were educated on sustainable chemical practices and the principles of green chemistry.
- **Content**: Courses included designing safer chemicals, waste reduction, renewable resources, and pollution prevention in various industries.
- **Outcome**: Participants learned to think in terms of sustainability and environmental impact, which was essential for careers in chemistry, environmental science, and manufacturing.
- **Workshops**: Hands-on sessions included the use of green solvents and eco-friendly product synthesis, focusing on reducing waste and using renewable resources.

**6. Safe Practices in Laboratory**

- **Objective**: Students were trained in safety protocols for working in scientific laboratories, with a focus on accident prevention and compliance with safety regulations.
- **Content**: Topics included chemical handling, waste disposal, fire safety, the use of personal protective equipment (PPE), and biological safety. Students were also taught first-aid and emergency response procedures.
- **Outcome**: Participants gained an understanding of risk assessment, hazard identification, and how to follow proper safety protocols in laboratory environments.
- **Trainings**: Practical workshops involved simulations of emergency situations and the safe use of lab equipment and disposal of hazardous waste.

## Increased Activities to Develop a Scientific Temperament

We significantly expanded activities aimed at fostering a scientific temperament among students, supported by funding from the Department of Biotechnology (DBT) under the **DBT STAR College Scheme**. The primary objective was to instill a spirit of inquiry, critical thinking, and innovation in students across various disciplines.

As part of this initiative, the **"Innovative Teaching Pedagogies"** program was launched, focusing on adopting new methods to engage students in science and research. Key activities under this program included:

## 1. Hands-On Experiments and Practical Sessions

- **Objective**: Encourage students to learn by doing, enhancing their understanding of scientific concepts through direct experimentation.
- **Activities**: We organized practical sessions and experiments that allowed students to work with modern scientific equipment and research tools. These sessions spanned various disciplines, including biotechnology, physics, chemistry, and environmental science.
- **Outcome**: Students gained hands-on experience, improving their problem-solving skills and ability to apply theoretical knowledge to real-world situations.

## 2. Workshops on Emerging Technologies

- **Objective**: Introduce students to cutting-edge technologies and innovations in science.
- **Workshops**: We conducted workshops on topics like artificial intelligence, bioinformatics, genetic engineering, and green chemistry. These workshops were designed to expose students to the latest scientific advancements.
- **Outcome**: Students became aware of current trends in scientific research, motivating them to pursue further studies or careers in these areas.

## 3. Interdisciplinary Projects

- **Objective**: Promote collaborative learning and cross-disciplinary research.
- **Activities**: Students participated in interdisciplinary projects where they combined knowledge from different fields, such as integrating biology with computer science or chemistry with environmental studies.
- **Outcome**: These projects fostered teamwork, creativity, and innovation, as students learned to tackle complex problems using a multifaceted approach.

## 4. Scientific Research Competitions

- **Objective**: Develop critical thinking and research skills.
- **Activities**: We organized science fairs, poster presentations, and model-making competitions, where students presented their research and innovative ideas.
- **Outcome**: These competitions encouraged independent thinking and allowed students to showcase their research, improving their communication and presentation skills.

## 5. Guest Lectures and Seminars

- **Objective**: Provide insights from experts in various scientific fields.
- **Activities**: Renowned scientists, researchers, and industry professionals were invited to deliver lectures and seminars on contemporary scientific issues and advancements.
- **Outcome**: Students had the opportunity to interact with experts, ask questions, and gain a broader perspective on scientific research and its real-world applications.

## 6. Field Visits and Industry Collaborations

- **Objective**: Offer students exposure to real-world scientific applications.
- **Activities**: Field visits to research institutes, industries, and scientific organizations were organized. These visits allowed students to observe scientific practices and innovations outside the classroom environment.
- **Outcome**: Students gained practical insights into how scientific research and innovation are applied in industries, helping them connect classroom knowledge with professional practices.

## 7. Mentorship Programs

- **Objective**: Guide students in developing research projects and scientific inquiry.
- **Activities**: Faculty members and senior researchers provided mentorship to students working on research projects, offering guidance on research methodologies, data analysis, and report writing.
- **Outcome**: Mentorship helped students refine their research skills, boosted their confidence, and encouraged them to think critically about scientific problems.

## 8. Scientific Temperament through Societal Outreach

- **Objective**: Promote the application of science for the benefit of society.
- **Activities**: Students participated in community-based projects that applied scientific solutions to real-world problems, such as water conservation, waste management, and public health awareness campaigns.
- **Outcome**: These activities not only developed scientific thinking but also instilled a sense of social responsibility in students, helping them understand the broader impact of science.

Through these activities, we aimed to create a learning environment where scientific curiosity was nurtured and students were motivated to pursue research and innovation. The support from the **DBT STAR College Scheme** played a crucial role in realizing these goals and advancing scientific education at the institution.

## SOME GLIMPSES OF ACTIVITIES DONE TO PROMOTE SCIENCE AMONG STUDENTS

- Hans Raj Mahila Maha Vidyalaya, Jalandhar inaugurated 7 day **long Vigyan Sarvatra Pujyata Festival** of Scope for all, for "**Science Communication, Popularization & Its Extension**" . College celebrated event in association with Ministry of Culture, PSA Govt. of India and Vigyan Prasar, to Mark 75th "Azadi Ka Amrit Mahotsav" . This programme is organized under State Nodal Agency of Punjab State Council for Science & Technology, Chandigarh. The main attractions of this festival are book fair, film show, lecture series by experts, innovation gallery and poster exhibition.

- R. Venkatraman Chemical Society of Chemistry Department of Hans Raj Mahila Maha Vidyalaya, Jalandhar in collaboration with Beauty and Wellness Hub, PG Department of Cosmetology, organized a **workshop on the topic "Beauty Through Lens of Chemistry"**. 80 students from Science and Cosmetology were benefitted from this workshop which was conducted under the DBT-Star College Scheme Students of Cosmetology presented homemade cleanser, toner and moisturizer.. In the workshop, **hands on training and how to check the pH of cosmetics like toner, moisturizer, shampoo, hair serum, face serum, cleanser** etc. was conducted. Students were made aware about how chemistry and beauty work together. A Poster Making Competition was also organized in which students participated with great zeal and enthusiasm. Through posters they explained about the various ingredients and chemicals present in cosmetics.

- On the occasion of Foundation Day Celebrations of HMV and to mark World Health Day, under DBT Star Scheme, Department of Zoology in collaboration with Synergy Pathology Laboratory, Jalandhar organized **one day Health Checkup Camp**.. A team of Lab. staff members from Synergy Pathology Lab., Jalandhar

performed Health Checkup including the physical examination along with Blood Group, Hb estimation, Blood Sugar and other tests. **Students of B.Sc Medical (2nd and 3rd Yr.) actively participated in organizing the event and assisted in checking of various parameters**. Students also got training on different methods of blood collection, and other hematological tests.

- Under the aegis of Punjab Government's DBT Star Scheme for Colleges,, a seven day Faculty Development Programme (FDP) on 'Guru Siddhta' was started

## Department of Biotechnology

## Proforma for submission of Annual Progress Report supported under Star College Scheme

(Kindly note that the annual report from Point 6 to 10 should not be more than 5 A4 size sheets. with font size 12ptandlinespacing1.5)

**1. Name of the College:** Hans Raj Mahila Maha Vidyalaya, Jalandhar

**2. Name of Coordinator, designation, Address, Phone nos.**

Dr Anjana Bhatia, Dean Innovations and Research, HMV, Jalandhar

**3. Assessment duration**:1-4-2022 To 31-3-2023 **Duration in years:** 11 months and 30 days.

**4. Details of Departments Supported**

| S.No | Name of Department | Courses (B.Sc./M.Sc./PG Diploma, certificate etc) offered | Regular Faculty members | |
|---|---|---|---|---|
| | | | Total=42 | |
| | | | With Ph.D. | Without Ph.D. |
| 1 | Botany | B.Sc., M.Sc (Botany) | 4 | 2 |
| 2 | Bioinformatics and Biotechnology | B.Sc. Biotechnology | 2 | 2 |
| 3 | Zoology | B.Sc. Medical/Non-Medical with Bioinformatics | 2 | 1 |
| 4 | Physics | M.Sc. Bioinformatics | 1 + 1 | 2 |
| 5 | Mathematics | PG Diploma in Bioinformatics | 03 | 02 |
| 6 | Chemistry | B.Sc. | 3 | 1 |
| 7 | Botany | B.Sc., M.Sc. | 4 | 2 |
| 8 | Computers | B.Sc NM, B.Sc CSc, B.Sc Eco, BA(Maths), M.Sc (Maths) | 03 | 07 |

**5. Number & Date of Advisory committee meeting:** 20 January, 2024

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

- **Group practical were converted into individual practical**: Since more equipments were purchased under DBT, additional practicals were incorporated in the existing syllabus. Group practicals were converted into individual practical which provide more opportunity to do the experiments individually by students rather than team. Students interest on practical , Research and doing ability has been increased.
- **Invitation to eminent academic expertise, scientists and industrialists** : Due to DBT support, all the beneficiary science departments were able to invite eminent academic expertise, scientists and industrialists across the country through organized Guest Lectures, Seminar, Workshop, Conference and Faculty Development Programmes for providing a broad academic exposure to both the students and faculty.
- **Science day celebration in an interdisciplinary manner**: It was possible to organize Science day celebration in an interdisciplinary manner in our college with the help of DBT funds which has enabled undergraduate students of our college to participate in the various events and present their research work in the form of oral and poster presentations and also provided an opportunity to expose their hidden talents.
- **Increase in interdepartmental collaborations:** Organized Inter-departmental /Inter-disciplinary/ inter institutional competitions created awareness on the celebrations of special occasion by conducting various competitions. These competitions not only sharpen the innate talents of the students but fostering innovative ideas for discoveries. The grant has enabled the departments to organize workshops in collaborative way and also provided hands on training to students.
- **Science Projects**: The projects on :
- "Study of various parameters of water
- Testing Soil Samples from botanical garden
- Testing Milk Samples
- Testing Oil Samples

These kinds of projects boost the students to identify the problems in their own area that involve them to overcome the real life situation and generate environmental awareness

and social responsibility among the students.

- **Better Infrastructure**: The increased number of instruments, apparatus and books availed through the scheme has provides an opportunity to students to carry out research individually and improve their practical skills in understanding of the experiments and also obtain a deep insight in their subject of studies through the availability of different books.
- **Industrial visit and field visits**: Industrial visit and field visits conducted under this scheme has enabled deserving students. The students obtained a unique opportunity to come across different theoretical as well as wide range of interdisciplinary hands-on training exposure. The facility of Industrial Visits could be extended to all the students with the financial aid from DBT. The number of Industrial Visits has increased. Research Centres and Industrial Trainings provided more opportunities to the students to have interaction with the Scientists and Industrialists. These visits promoted higher studies, self employment venture, in the challenging world and instilled entrepreneurial skills.

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

- ✓ UG Students completed some projects in groups (max. four) of students under supervision and guidance of supervisor
- ✓ Learning by doing Following the concept of 'Learning by doing' students got an opportunity to follow an application based approach that did supplement the classroom learning. The students did work with Natural dyes, Natural Medicinal Products, Neutraceuticals which are need of hour.
- ✓ The Department of Zoology, the collected vermicompost and it was given to Green Club of our college to make green environment. It was planned to conduct more interdepartmental and interdisciplinary projects to promote self – employment opportunities among the students.
- ✓ Introduced Short term courses in Bioinformatics, Medicinal Botany, Vedic Mathematics, and Pharmaceutical Biotechnology.
- ✓ Conducted workshops in the field of Molecular Biology, Biotechnology and Biofarming, Mushroom cultivation by inviting experts from industry to augment

internship programmes to acquire hands-on experience and training

- ✓ Students were encouraged to undertake compulsory Swayam NPTEL Courses and Course).
- ✓ Enabled student initiatives such as paper/poster presentations in conferences /Seminars .
- ✓ Conduct of Awareness and Sensitization Programs to the society in the context of health .
- ✓ Standard e-learning modules were enhance

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

Due to time constraints, overlapping of the star college activities with the academic schedule for each semester Since the academic schedule of the Guru Nanak Dev University is pre-decided, the Star College activity at time overlaps with the academic schedule. This adversely impacts the desired outcome from the given activity. To carry out maximum number of events/activities as part of the Star College Scheme, sometimes students do find it difficult to balance out such activities with academic syllabus.

**9. Key performance indicator**

| S. no | Indicator | Pre-support (2018-2022) | | | | | During/After Support | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | No. of students admitted | Total =303 | | | | | Total =402 | | | | | |
| | | M=Nil | F=303 | | | | M=Nil | F=402 | | | | - |
| | | | SC 85 | ST 1 | OBC 37 | G 180 | | SC 102 | ST 12 | OBC 52 | G 236 | |
| 2 | No. of students passing out (%)Students Admitted/ passing out (Pass %) | 99.4% | | | | | 99.6% | | | | | |
| 3 | Drop-out rates | Less than 1% | | | | | Less than 1% | | | | | |
| 4 | No .of students Opting for MSc | 115 | | | | | 132 | | | | | |
| 5 | Average marks | 79.5% | | | | | 87.5% | | | | | |

| | | | | |
|---|---|---|---|---|
| | No. of hands-on experiments being conducted | 516 | 601 | |
| | No. of new Experiments introduced | 35 | 53 | |
| | Publications(scopus Indexed)/patents, if any. | 47 | 62 | |
| | Training received by faculty | 82 | 123 | |
| 0 | Exhibitions/seminars /training courses conducted | 35 | 58 | |
| 11 | Books/journals subscribed from grants | - | - | |
| 12 | Outreach activities (Popular lectures) | 14 | 43 | |
| 13 | Colleges mentored to apply for DBT Star College grants | 3 | 3 | |
| 4 | Invited lectures | 15 | 35 | |

**10. Self Evaluation:**

| **epartment** | ***Objective(as stated in proposal)** | **% achieved** | **Reasons for underachievement/ If achieved, state in Quantitative metrics** |
|---|---|---|---|
| hemistry | • To introduce new practicals those are application oriented as well as to enhance the research ability of students.<br>• To provide practical problems in form of minor projects to undergraduate students so that they can get exposure to latest instruments at UG level.<br>• To start some interdisciplinary projects<br>• To provide students with hands on training workshops to develop their interest in the subject as well as | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |

| | | | |
|---|---|---|---|
| | research. | | |
| s | • To Provide Hands on Training to students.<br>• To strengthen the syllabus, introduction of research oriented practicals.<br>• To give exposure of latest instruments to UG Students so they can develop interest in research.<br>• To motivate students to take part in conferences, seminars, Workshops. | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| | • Exposure of UG Students to latest soft wares like MATLAB,MATHEMATICA<br>• To Enhance Mathematic Thinking Ability of Students through Various Competitions like Puzzle Solving, Working Maths Model, Celebration of Pie Day<br>• To Motivate Students to participate in Inter Departmental Events. | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| er | • To improve the ratio of number of students to available hardware, software and tools<br>• To provide workshops, Trainings on Latest Technology, Programming and usage of latest softwares.<br>• To organize events where students can show their talents of computational skills. | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| | • To organize Guest Lectures, Seminars and expose them with latest developments in science and technology.<br>• To organize field visits, Industrial Visits for better practical understanding | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |

| | | | |
|---|---|---|---|
| | • To motivate students to do minor research projects so that they can have keen interest in research<br>• To provide students hands on training so that they become aware of usage of latest instruments and develop scientific attitude among them. | | |
| Botany | • To motivate students to participate and present Posters/Papers in National and International Conferences.<br>• To improve Microscopic Skills of Students and organizing various events like slide making, Thin Section Cutting So that students can have better understanding of concept as well as better knowledge.<br>• To motivate students to attain industrial training at reputed institutions and do projects there.<br>• To motivate students to do minor research based projects.<br>• To organize field trips so that students can have better understanding of botanical sciences. | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| Biotechnology | • To organize periodic workshops and guest lecturers to have exposure with industrial experts.<br>• To promote students to do projects related with environmental issues.<br>• To enable students to visit advanced labs, industries and attend workshops to get hands-on training of the latest techniques and improve their scientific attitude.<br>• To motivate students interdisciplinary, Interdepartmental Projects to develop their research attitude, | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |

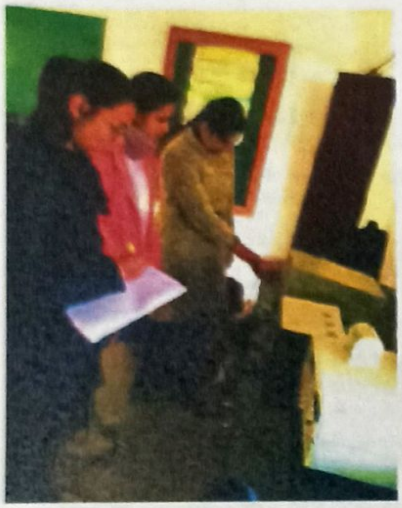
* For quantitative analysis you may fix five objective (max) each having 2 marks and accordingly can calculate the matrix.

Course Coordinator
(With Seal)

Principal,
Hans Raj Mahila Maha Vidyalaya
(Autonomous)
Jalandhar City

Course Coordinator
D.B.T. Star College Grant
Hans Raj Mahila Maha Vidyalaya
Jalandhar City

## SOME GLIMPSESOF INNOVATIVE EXPERIEMNTS DONE BY STUDENTS



To study the concept of quantization using Frank Hertz's Experiment

Experimental Demonstration of Michelson Morley Experiment

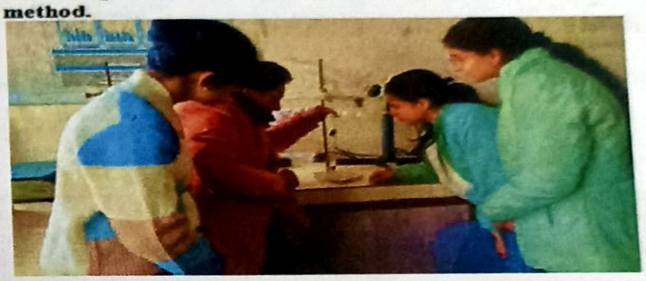
Study of Spectral Characteristics of Photovoltaic Cell

Isolation of DNA from bacteria obtained from solid waste management plant.

Isolation, staining and microscopic observation of *Lactobacillus* bacteria with methylene blue

Streaking of Pure of bacterial culture using streaking plate method.

Detailed examination of various stages of mitosis and meiosis using appropriate plants material using camera Integrated Olympus Microscope and acetocarmine



Evaluation of Waste water algae for Biofuel potential

Green Experiments: Solvent Free Chalcone Synthesis

Estimation of reducing Sugars by Fehling Solution Method

Determination of Hall Coefficient using Hall Effect Apparatus

Isolation of DNA from bacteria obtained from solid waste management plant .

# INCREASED ACTIVITIES TO DEVELOP A SCIENTIFIC TEMPERAMENT

We significantly expanded activities aimed at fostering a scientific temperament among students, supported by funding from the Department of Biotechnology (DBT) under the DBT STAR College Scheme. The primary objective was to instill a spirit of inquiry, critical thinking, and innovation in students across various disciplines.

As part of this initiative, the **"Valuing Science: Raising Awareness on Research and Technology"** program was launched, focusing on adopting new methods to engage students in science and research. Key activities under this program included:

- **Hands on Training Programmes**
- **Industrial Visits**
- **Inter –Departmental Projects**
- **Strengthening of Infrastructure**
- **Research based Workshops, Seminars**
- **Industrial Trainings**
- **Quiz, Scientific Story Writing, Poster Making, Slide making Competitions to inculcate Research aptitude among students.**
- **Allotting Minor Research Projects to students**
- **Participation and presentation in Conferences by students**

# INCREASE IN NUMBER OF WORKSHOPS/SHORT TERM COURSES/TRAININGS AT THE COLLEGE LEVEL

| **Glimpses of Activities Done With DBT STAR Support** | |
|---|---|
| R. Venkataraman Chemical Society of Chemistry Department of Hans Raj Mahila Maha Vidyalaya, Jalandhar organized DBT-STAR sponsored **Workshop on "Preparation of Standard Solutions"**. The workshop was designed to develop skills in students and all the laboratory attendants of Science Department to prepare analytical solutions independently. These skills are highly desired in Industry, Research and Academia |  |
| DD Pant Botanical Society of PG Department of Botany of Hans Raj Mahila Maha Vidyalaya celebrated **World Ozone Day** under DBT Star Scheme. The Resource Person of the day was Prof. Dr. Anish Dua, Professor at Zoology Department, GNDU, Amritsar. |  |

| | |
|---|---|
| R.Venkataraman Chemical Society of Chemistry Department of Hans Raj Mahila Maha Vidyalaya, Jalandhar organized DBT-STAR sponsored **Guest Lecture and Workshop on Green Chemistry Practices** Resource Person Dr. S.S. Chimni Professor, Chemistry Department, Guru Nanak Dev University, Amritsar and introduced the motive of the event that green chemistry is an umbrella approach to save human health and environment by designing new molecules and processes. **Dr. Swapandeep Singh Chimni delivered a lecture on "Green Chemistry Practices"**. |  |
| The PG Department of Mathematics of Hans Raj Mahila Maha Vidyalaya organized an **Inter-Class Mathematical Quiz and Power-Point Presentation competition** under DBT Star scheme. 8 teams participated in Quiz competition and 16 teams participated in Power-Point Presentation competition |  |

C.V. Raman Science Society of Hans Raj Mahila Maha Vidyalaya organized DBT Sponsored **Science Marathon 2022** More than 300 participated in events like Scientific Quotation Writing, Quiz Competition, Scientific Rangoli Making Competition, Extempore Speech Competition, Scientific Skit and Choreography. Students presented their views on various latest topics of Science like Private Sector Participation in Space Programs,Black Holes, Liquid Urea Plant in India, Clean Technologies, Challenges related to Stem Cell Technology, Genetically Modified Crops, Xenotransplant, Journey of Earth from then to now etc . Students participated with great interest and enthusiasm.

Department of Zoology under DBT Star Scheme organized **Guest Lecture on the topic 'Evolution'** in the premises of Hans Raj Mahila Maha Vidyalaya .**The Resource Person of the day was Dr. Anish Dua, Professor, GNDU Amritsar** Dr. Dua explained to the students in a very simplified way the mystery lying behind the process of evolution

| | |
|---|---|
| Zoology Department under DBT Star Scheme celebrated **'World Heart Day'** .The poster presentation and slogan writing competition was organized to bring awareness against cardiovascular diseases. Around 100 students from all streams enthusiastically participated in the event by preparing beautiful posters and creative slogans on the theme 'Use Heart for Every Heart' to highlight the goal to bring people together to fight against Heart related diseases. |  |
| Department of Zoology and Environment Club under DBT Star Scheme organized **one day seminar on Environment and Health to celebrate "World Environment Health Day"** Dr. Jagbir Singh, Department of Zoology and Environmental Sciences, Punjabi University, Patiala. |  |

## SOME OF LATEST PUBLICATIONS BY FACULTY:

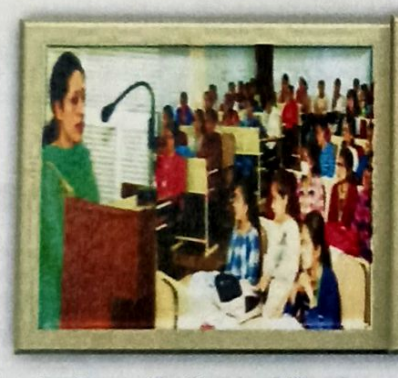
| | Title of paper | Name of the author/s | Name of journal | ISSN number |
|---|---|---|---|---|
| 1 | Characterization of structural, optical and photocatalytic properties of silver modified hematite (α-Fe2O3) nanocatalyst | Dr. Sakshi Verma | Journal of Alloys and Compounds | 1873-4669 (Online ISSN NO.) |
| 2 | Protective efficacy of naringenin against cadmium induced redox imbalance in Labeo rohita: an integrated biomarker approach | Dr. Sakshi Verma | Environmental Science and Pollution Research | 1614-7499 |
| 3 | Studying regenerative competence of *Satyrium nepalense* D.Don through leaf segments in vitro | Dr.Shaveta Chuahan | Research Journal Of Biotechnology | 0973-6263 |
| 4 | Structural, Optical and Thermal Properties of PVC/ Polyaniline Composite Thin Films | Mrs.Saloni Sharma | JOM-The Journal of Minerals, Metals & Materials Society | 1047-4838 ; https://doi.org/10.1007/s11837-021-04851-3 |
| 5 | Scanning Electron Microscopic Studies on Viscin threads of Pollinia of two Temperate Terrestrial Orchids | Dr.Shaveta Chuahan | Research Journal Of Biotechnology | 0973-6263 |
| 6 | Hsp90 and Associated Co-Chaperones of the Malaria Parasite | Dr.Harpreet Singh | Biomolecules | 2218-273X |
| 7 | Effect Of Shi Ni6+Irradiation On Pvc: Structural, Optical And Electrical Properties | Mrs.Saloni Sharma | Stochastic Modeling & Applications | 0972-3641 |

# INCREASE IN OUTREACH ACTIVITIES, FIELD VISITS WITH DBT STAR SUPPORT

STAR Science laboratories' visit by students from BUC, Batala

The tree plantation drive was carried out in collaboration with Rotract Club of Jalandhar City Youth

AIDS Awareness Campaign on World AIDS Day



Seminar on Healthcare and Cancer Awareness

Science Awareness amongst students of Rural areas

World Ozone Day Celebrated at HMV

- An increase in student participation in various events and competitions.
- There has been an enhancement of sensitization of students to socially relevant issues and **social outreach.**


**Students won Solution Competition 2021 organised by ADBU Innovation & Start up cell**

**"Swachhta Saarthi Fellowship" sanctioned by office of Principal Scientifc Advisor to the Government of India.**

**HMV became the First Model Institution of Jalandhar by fulfilling all the criteria under Swachh Bharat Mission Urban.**

6 day workshop on digital training of women constables

First Aid Training

Helping Hands to the Special Ones

जालंधर भास्कर 21-01-2022

निगम ने कॉलेज के दोनों प्रोजेक्ट का चयन कर मुख्यालय भेज दिया

स्वच्छता सर्वेक्षण-2022 : एचएमवी ने बायो प्लॉस्टिक व पेपर रिसाइकल के प्रोजेक्ट बनाए

26 जनवरी को स्वच्छता का संदेश देगा निगम




Educational Visit to National Institute of Renewable Energy, Kapurthala


Visit to Synergy Pathology Lab., Jalandhar

Field Visit to Manali and Manikaran


Visit to Foodcoast International, Jalandhar

Rock Garden and Mahendra Chowdhary Zoological Park,

Visit to Sun Pharmaceuticals, SBS Nagar

## Department of Biotechnology

**Proforma for submission of Annual Progress Report supported under Star College Scheme**

(Kindly note that the annual report from Point 6 to 10, should not be more than 5 A4 size sheets, with font size 12pt and line spacing1.5)

**1. Name of the College:** Hans Raj Mahila Maha Vidyalaya, Jalandhar

**2. Name of Coordinator, designation, Address, Phone nos.**

Dr Anjana Bhatia, Dean Innovations and Research, HMV, Jalandhar

**3. Assessment duration**: 1-4-2023 to 31-3-2024 **Duration in years:** 11 months and 30 days.

**4. Details of Departments Supported**

| S.No | NameofDepartment | Courses (B.Sc./M.Sc./PG Diploma,certificateetc) offered | RegularFacultymembers | |
|---|---|---|---|---|
| | | | Total=42 | |
| | | | WithPh.D. | Without Ph.D. |
| 1 | Botany | B.Sc.,M.Sc(Botany) | 5 | 1 |
| 2 | Bioinformatics and Biotechnology | B.Sc. Biotechnology | 2 | 2 |
| 3 | Zoology | B.Sc. Medical/Non-Medical with Bioinformatics | 2 | 1 |
| 4 | Physics | M.Sc. Bioinformatics | 1 + 1 | 2 |
| 5 | Mathematics | PG Diploma in Bioinformatics | 03 | 02 |
| 6 | Chemistry | B.Sc. | 3 | 1 |
| 7 | Botany | B.Sc., M.Sc. | 4 | 2 |
| 8 | Computers | B.Sc NM, B.Sc CSc, B.Sc Eco, BA(Maths), M.Sc (Maths) | 03 | 07 |

**5. Number & Date of Advisory committee meeting:** 20 January, 2024

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

- **Inculcate Research Aptitude among students:** The Star College Scheme has enabled the Science departments to purchase new instruments /equipments so that infrastructure of department has been improved .We have procured new equipments which enable the students to do minor research projects, so this increases their research aptitude. This also improves equipment /student ration, Students handles equipments confidentially as well as their practical skills are improved.
- **Advanced Learning Methods:** The Star College Scheme has enabled the departments to introduce new methods of teachings which make students more research oriented, improve their practical skills
- Group discussions, Debates, Quiz, role plays
- Presentations (Poster/Paper) in national and International Conferences.
- Participation in MOOC and other online courses on SWAYAM platform
- Participation in Science Day Celebrations
- Group Projects
- Inter Class, Inter Departmental Events
- **Improved teaching Learning Tools**: The departments are able to purchase latest softwares /Research Tools which help the teachers in improving the teaching methods and also enable students to do research.
- **Enhanced Experiential Learning**: The STAR College Scheme has Enhanced Experiential Learning and understanding through hands on training and facilitated exposure to latest techniques for both faculty and students. Various workshops organized like Workshop-cum-Extension Lecture on "Mathematical Computations using SCILAB and MATLAB and its Applications, which help students in dealing with problems of mathematics provide software knowledge for the same.
- **Research Centres and Industrial visit:** There is increase in Industrial Visits which provide more opportunities to the students to have interaction with the Scientists and Industrialists.

- **Increase Environmental awareness and work in area of social issues through outreach activities:** There is an Increase Environmental awareness and work in area of social issues through outreach activities with DBT STAR Scheme Support. Students participated in AIDS Awareness, Cancer Awareness Programmes in collaboration with NSS to aware the society regarding social and environmental issues.

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

- **Interdepartmental and interdisciplinary projects.** With DBT STAR Scheme support we have planned to carry out more interdepartmental and interdisciplinary projects.
  - Study of biochemical parameters of plant samples under heavy metal stress
  - Extraction of colored dyes from plants such as Hibiscus rosa-sinensis, Rose ,Petunia using soxhlet apparatus
  - To study antibacterial and antifungal properties of Tulsi and Neem using microbiological Techniques.
  - Balancing a chemical equations using Algebraic approach
  - Formulation, preparation of essential oil perfume from medicinal plants
  - Agriculture monitoring system using IoT
- **Interdepartmental Events :**There is an increase in Interdepartmental events which help faculty and students to have better experience .The Visual and Performing Arts and Sciences departments of Hans Raj Mahila Maha Vidyalaya inaugurated **a two day DBT sponsored Interdisciplinary International Workshop on Science of Sustainability "Art Eco 2024" in collaboration with Shryansy International Art and Culture**
- **Entrepreneurship Development Programmes with Environment Save theme** – Waste to wealth (handmade paper, Jute Planters jute craft, bio-gas, vermi-compost).
- **Chandrayaan Mahotsav** Celebration: To celebrate successful soft landing of Chandrayaan-3 on moon. On this occasion, Physics department organized scientist talk.. Students dressed up as Women scientists working in Chandrayaan-

3 Mission. They informed the audience about the contributions of women scientists in the successful soft landing of Chandrayaan-3.

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

**LESSONS LEARNT:**

- With DBT STAR Support, Team spirit is well developed among the students and faculty during the organization of various programmes .Students do group projects which helps them to understands the value of team /group work. It also develops better relations among departments through interdepartmental projects.
- Projects that are concerned with environment issues help students to make them aware about issues and also motivate then to solve issues.
- With latest Instruments / Softwares/ Research Tools, Research aptitude of Students has been increased. They showed increased participation in Presentation in conferences/seminars/workshops.

**DIFFICULTY FACED:**

To carry out maximum number of events/activities as part of the Star College Scheme, sometimes students do find it difficult to balance out such activities with academic syllabus due to semester system.

**SUGGESTIONS:**

If the funds are released at the beginning of the every academic year, it will be easier for the faculty members to proceed various planned activities.

**9. Key performance indicator**

| S. No | Indicator | Pre-support (2018-2023) | During/After Support | Remarks |
|---|---|---|---|---|
| | No. of students admitted | **Total =** 402 | **Total =453** | |
| | | **M=Nil** **F=402** | **M=Nil** **F=453** | - |
| | | **SC 102** **ST 12** **OBC 52** **G 236** | **SC 125** **ST 21** **OBC 54** **G 253** | |
| | No. of students passing out (%)Students Admitted/ passing out (pass%) | 99.6% | 99.8% | |
| | Drop-outrates | Less than 1% | Less than 1% | |
| | No .of students Opting for MSc | 132 | 141 | |
| | Average marks | 87.5% | 87.9% | |
| | No. of hands-on experiments being conducted | 601 | 623 | |
| | No. of new Experiments introduced | 53 | 61 | |
| | Publications(scopus Indexed)/patents ,if any. | 62 | 71 | |

| | | | | |
|---|---|---|---|---|
| 9 | Training received by faculty | 123 | 135 | |
| 10 | Exhibitions/seminars /training courses conducted | 58 | 67 | |
| 11 | Books/journals subscribed from grants | - | 21 | |
| 12 | Outreach activities (Popular lectures) | 43 | 54 | |
| 13 | Colleges mentored to apply for DBT Star College grants | 3 | 5 | |
| 14 | Invited lectures | 35 | 43 | |

## 10. Self Evaluation:

| Department | *Objective(as stated in proposal) | % achieved | Reasons for underachievement/If achieved, state in Quantitative metrics |
|---|---|---|---|
| Chemistry | To make chemistry department as centralized hub for analytical instruments with every instrument available to help girl students to get more expertise in doing various advanced experiments which are related with their curriculum. • With up gradation of laboratories interdisciplinary activities will be carried out which will give a better perspective and clearer understanding of different techniques to the students. • Various hand on activities proposed like workshops, training program and seminars will enrich the mind of students providing formal and informal education. • | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| Physics | Up gradation of labs in terms of apparatus and ICT tools b) Upgrade departmental library with latest books and softwares. c) To collaborate with other department for carrying out inter | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |

| | | | |
|---|---|---|---|
| | disciplinary projects d) To make learning experience more innovative and research oriented | | |
| laths | Development of mathematical software skills: We propose to make department occupied with various mathematical softwares like: Matllab, Mathematica etc. which are helpful to develop the skills of programming among students as well as staff of college. | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| omputer cience | The objective of the department is to provide an environment to the students by upgrading its infrastructure where they can learn new technologies and techniques to become proficient programmers. • To enhance the presentation skills of the students and teachers with the use of ICT enabled tools. • To provide Latest and Hi-tech Lab Equipment to achieve Higher Skills and Excellence in Teaching Methodologies. | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| oology | To strengthen the academic and physical infrastructure for improving quality of teaching and learning process. ? To enhance the ability of creative thinking and innovation, cooperation, communication and presentation skills through hands-on trainings, interaction with experts in seminars and participation in summer schools | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| iotechnology | • To help girls students get more expertise in doing various advanced experiments which are related with their curriculum. • To help students to understand new latest techniques in various interdisciplinary subjects of science like Biochemistry, Molecular biology, Immunology, Bioinformatics etc. | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |
| otany | To provide suitable academic and physical ambience to encourage more girls to take up Science at higher level and increase the participation of girls and women in the field of STEM nationally. • To reinforce the intellectual, academic, physical infrastructure of Science Departments of the college for accomplishing excellence in teaching-learning of Science. | 70% | • Work has been initiated in the direction.<br>• Part of the activities conducted. |

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

**Course Coordinator**

**(With Seal)**

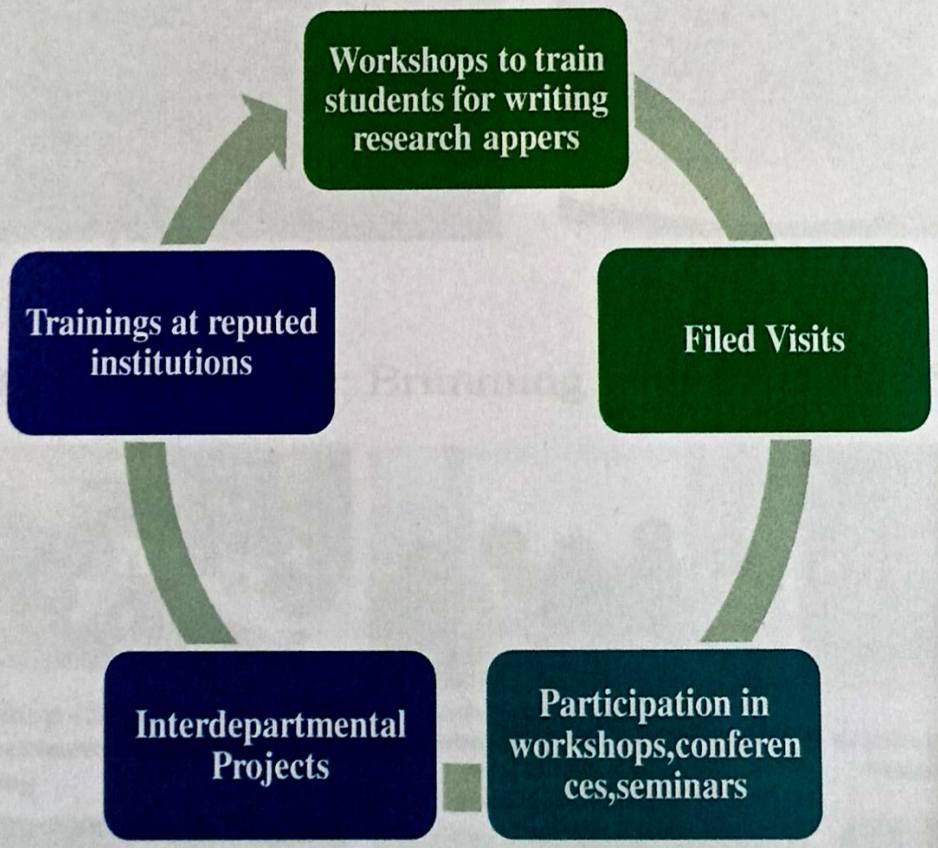
Course Coordinator
D.B.T. Star College Grant
Hans Raj Mahila Maha Vidyalaya
Jalandhar City

Principal,
Hans Raj Mahila Maha Vidyalaya
Jalandhar City
(With Seal)

# INCREASED ACTIVITIES TO DEVELOP A SCIENTIFIC TEMPERAMENT

We significantly expanded activities aimed at fostering a scientific temperament among students, supported by funding from the Department of Biotechnology (DBT) under the DBT STAR College Scheme. The primary objective was to instill a spirit of inquiry, critical thinking, and innovation in students across various disciplines.

As part of this initiative, **Vigyan Protsahan Yojana- "Inculcating scientific and research aptitude among students"** program was launched, focusing on adopting new methods to engage students in science and research. Key activities under this program included:



## SOME GLIMPSES OF ACTIVITIES PERFORMED UNDER DBT STAR

### DBT STAR Yuvaan: An Annual Event involving 700+students

### DBT STAR Events: Brimming with Scientific Spirit

**Workshop - Skill Enhancement and Trouble Shooting**

**Extension Lecture on "Unbounding the future with Nanoscience and Nanotechnology"**

**Workshop on Preparation of Standard Solutions**

**Night Sky Watch**

**Hands on Training workshop on 'MATLAB'**

**Seminar on the topic "Quantum Computing'**

# DBT STAR Events: Brimming with Scientific Spirit

**Chandrayaan Mahotsav**

**Extension Lecture on "Introduction to Data Science through Python"**

**Health Check up Camp**

**Checking of Common Food Adulterants**

**Workshop on "Beauty Through Lens of Chemistry"**

**Guest Lecture on "Cancer: A multifaceted disease with novel insights**

**Hands on Training Workshop on Parasite Isolation**

**Workshop on Multiomics Data Integration and Visualization**

**Seminar on Environment and Health**

**Seven-day Faculty Development Programme "Guru Siddhta" on the theme of 'Advances in Teaching and Learning Pedagogies'.**

National Conference organized by **Department of Mathematics**

Faculty Enrichment Programme

Training the Trainer

✓Appointed as a **topic editor** for the **journal "Frontiers in Genetics"** for the special topic **"The 22nd International Conference on Bioinformatics (InCoB 2023) Translational Bioinformatics Transforming Life".**
✓Acted as a member of the **Steering Committee** for the **International Conference on Bioinformatics 2023 (IncoB 2023)** held at the **Translational Research Institute (TRI), Brisbane, Australia** from 12-16 November 2023.

✓Awarded with GLOBAL BEST PRESENTATION AWARD on presenting paper on the topic "Spectroscopic analysis of oil extracted from *Chlorella pyrenoidosa*" in **2nd International Conference on Multidisciplinary Research and Innovation- 2023 on 1-2June 2023.**
✓Awarded with BEST PRESENTATION AWARD in oral presentation on topic "Biodiesel production from microalga *Chlorella pyrenoidosa* to use it as green fuel" in **International Conference on Environment & Life Sciences organized by International Group of Conferences 'ARAVALLI' on 16-18th December,2023.**

✓Attended Astronomy Olympiad Exposure Camp at the Homi Bhabha Centre for Science Education (TIFR), Mumbai from November 21 to 24, 2022 Eminent scientists/speakers interacted with participants on various interesting topics, giving them a flavour of Astronomy Olympiad activities.

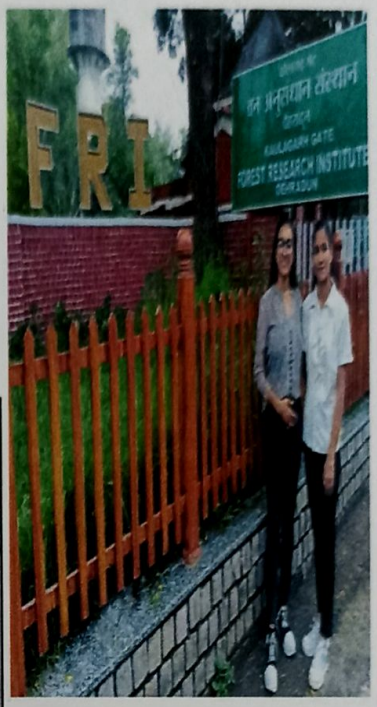
✓SERB TARE Fellowship Awardee
✓State Evaluator: Children Science Congress
✓Best Teacher Award-2023
✓Resource Person : PGScience City, Kapurthala

# Faculty achievement

# INCREASE IN NUMBER OF TRAININGS WITH DBT STAR SUPPORT

CENTRAL POTATO RESEARCH INSTITUTE, SHIMLA

PLANT TISSUE CULTURE LAB, PANJAB UNIVERSITY, CHANDIGARH




FOREST RESEARCH INSTITUTE, DEHRADUN

- J.R. Agrotech Pvt. Ltd., Gurdaspur
- FRI Deharadun
- Punjab University Chandigarh
- CPRI Shimla
- IHBT Palmpur
- Rana Sugar Ltd., Amritsar
- Nawanshahr Cooperative Sugar Mills Ltd., Nawashahr
- Kashiv Infotech
- N.F.L., Nangal
- Heerco Fruits Products (P) Ltd., Hoshiarpur
- Imperial HI-Tech Lab and Medical Hall, Mehatpur, Nakodar
- The Bhogpur Co-operative Sugar Mills Ltd. Bhogpur
- Indian Sucrose Limited, Mukerian
- ABCA Biosolution Private limited , Mohali, Punjab

- Guru Nanak Clinical Laboratory, Nadala, Kapurthala
- Microsure Clinical Laboratory , Jalandhar
- We Care Multispecialty Hospital, Sonipat Road, Rohtak
- Verka Milk Plant, Jalandhar
- Tagore Hospital and Heart Care Centre Private Limited Jalandhar, Punjab
- Capitol Hospital, Jalandhar
- Verka Milk Plant, Jalandhar
- LUXIT Laboratories, Ballabgarh, Faridabad
- Ankur Hospital, Jalandhar
- Capitol Hospital, Jalandhar
- Sacred Heart Hospital, Jalandhar
- Dr. Lal Path Lab, Kunjwani, Jammu(J&K)
- Eknoor Clinical and Pathological Lab, Jalandhar
- Shiv Shakti Clinical Laboratory, Kapurthala
- Aashirwad Hospital, Jalandhar
- IIT Delhi
- IIIM, Jammu
- IMTECH, Chandigarh
- PGI, Chandigarh
- CMC, Ludhiana
- Mohan Dai Oswal Hospital, Ludhiana
- Jaipur National University
- BISR Jaipur
- NABI Mohali

# INCREASE IN NUMBER OF GUEST LECTURES WITH DBT STAR SUPPORT

Dr. Gitanjali Yadav, Group leader, NIPGR, New Delhi and Professor (Data Sciences) IISER Bhopal

Dr. P.K. Pati, Professor, Department of Biotechnology and Dr. Sandeep Sharma, HOD Department of Computer Science, GNDU Amritsar

Dr. Neelima Jairath, Director General, Pushpa Gujral Science City, Kapurthala.

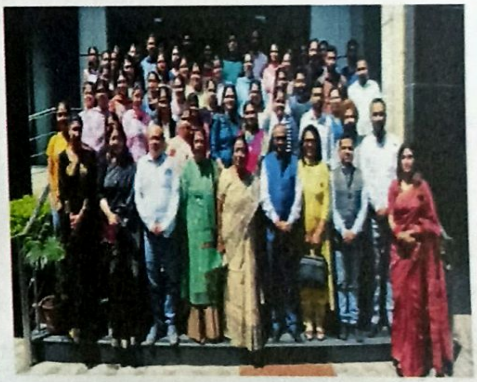
Dr. Adarsh Pal Vig, Chairman, Punjab Pollution Control Board

S Gurmeet Singh, Maths is Fun

Dr. Ravinder Singh, Senior Scientist, Indian Council of Medical Research

Dr. Sandesha Rayapa , JNU.

•Dr. Renu Bhardwaj , Research Director GNDU Amritsar
•Dr. Gagandeep, Associate Professor, GNDU, Amritsar



•Prof. S.K. Tomar, Vice Chancellor J.C. Base University of Science & Technology, YMCA, Faridabad.
•Prof. Romesh Kumar, Professor, University of Jammu.
•Dr. Jatinder Singh, Associate Prof., Guru Nanak Dev University, Amritsar,
• Retd. Prof. Sunita Gakhar, Prof. IIT, Roorkee

•Dr. K.S. Bath
•Sh. Ashish Shah and
•Dr. Mandakini

Dr. Gazal Sharma, Assistant Professor, Department of Food Science and Technology, IKG Punjab Technical University, Kapurthala


Dr. Garima Gupta, Scientist F, DBT, Govt. of India

Dr. Manpreet Kaur, Associate Professor & Head of Human Genetics Department, GNDU, Amritsar

Dr. Malkiat Singh, Deputy Director AIS centre, Guru Nanak Dev University.

S Shivdular Singh, Secretary, State Red Cross

Sh Sushil Rinku, MP in Yuvaan



- Dr. Ngueyen Bao Avoc from Research Institute of Biotechnology Environment, Vietnam
- Dr. Gurharminder Singh, Principal Scientific Advisor, Directorate of Environment and Climate Change and Punjab Biodiversity Board, Government of Punjab, India
- Sh. Rohit Mehra, IRS
- Dr. Adarsh Pal Vig, Director, HRDC, GNDU, Amritsar

Dr. Anish Dua, Professor, GNDU Amritsar

Dr. Manisha Sachar from Sachar Hospital, Jalandhar

Dr. Umesh Arya, GJU, Hisar

Dr. Monisha Sikka, Cancer Awareness

## SOME OF LATEST PUBLICATIONS BY FACULTY:

| S.NO | Title of paper | Name of the author/s | Department of the teacher | Name journal |
|---|---|---|---|---|
| 1 | Study of the local convergence of a derivative free method in Banach spaces | Dr. Gagandeep | Mathematics | The Journal Analysis, Springer |
| 2 | Improved Higher Order Compositions for Nonlinear Equations | Dr. Gagandeep | Mathematics | Foundations |
| 3 | Extended Newton-like Midpoint Method for Solving Equations in Banach Space | Dr. Gagandeep | Mathematics | Foundations |
| 4 | A Newton-like Midpoint Method for Solving Equations in Banach Space | Dr. Gagandeep | Mathematics | Foundations |
| 5 | Generalized Iterative Method of Order Four with Divided Differences | Dr. Gagandeep | Mathematics | Foundations |
| 6 | Characterization of structural, optical and photocatalytic properties of silver modified hematite (α-Fe2O3) nanocatalyst | Dr. Sakshi Verma | Zoology | Journal of Allo and Compound |
| 7 | Genome-wide characterization of FK506-binding Proteins, Parvulins and Phospho-tyrosyl Phosphatase Activators in wheat and their regulation by heat stress | Dr.Harpreet Singh | Bioinformatics | Frontiers in Pla Science |
| 8 | Hsp90 and Associated Co-Chaperones of the Malaria Parasite | Dr.Harpreet Singh | Bioinformatics | Biomolecules |
| 9 | Exported J domain proteins of the human malaria parasite | Dr.Harpreet Singh | Bioinformatics | Front. M Biosci |
| 10 | Intrinsic disordered nature and prediction of the secondary structure in wheat dehydrins | Dr.Harpreet Singh | Bioinformatics | Research Jourr of Biotechnology, |
| 11 | Post-COVID-19 Pandemic Impact Assessment of Bioinformatics and Women Bioinformaticians: A | Dr.Harpreet Singh | Bioinformatics | The Op COVID Journa |

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| | Realm of Possibilities or Gloom-Ridden. | | | |
| 12 | Methods to make Gurmukhi Handwriting Verification more authenticated and convincing to Courts | Mrs.Urvashi | Computer Science | Journal ofManagement and Technolog |
| 13 | Analysis of Existing Algorithms for verifying Gurmukhi Scripts and the Shortfall | Mrs.Urvashi | Computer Science | Springer Natu Cognitive Science a Technology |
| 14 | Characterization of structural, optical and photocatalytic properties of silver modified hematite (α-Fe2O3) nanocatalyst | Dr. Sakshi Verma | Zoology | Journal of Allo and Compound |
| 15 | Protective efficacy of naringenin against cadmium induced redox imbalance in Labeo rohita: an integrated biomarker approach | Dr. Sakshi Verma | Zoology | Environmental Science and Pollution Research |
| 16 | Studying regenerative competence of Satyrium nepalense D.Don through leaf segments in vitro | Mrs.Saloni Sharma | Physics | JOM-The Journal of Minerals, Meta & Materials Society |
| 17 | EFFECT OF SHI NI6+IRRADIATION ON PVC: STRUCTURAL, OPTICAL AND ELECTRICAL PROPERTIES | Mrs.Saloni Sharma | Physics | Stochastic Modeling & Applications |
| 18 | Studying regenerative competence of Satyrium nepalense D.Don through leaf segments in vitro | Dr.Shaveta Chuahan | Botany | Research Journ Of Biotechnology |
| 19 | FREE AND OPEN-SOURCE SOFTWARE FOR COMPUTATIONAL CHEMISTRY | Dr.Harpreet Singh | Bioinformatics | Stochastic Modeling & Applications |
| 20 | Hsp90 and Associated Co-Chaperones of the Malaria Parasite | Dr.Harpreet Singh | Bioinformatics | Biomolecules |

| Sl. No. | Name of the teacher | Title of the book/chapters published(2022-2024) | ISBN/ISSN number of the proceeding | Name of the publisher |
|---|---|---|---|---|
| 1 | Dr.Nitika Arora | Interaction Between Root Endophytes and Plants: Their Bioactive Products and Significant Functions"" In : Symbiotic Soil Microorganisms, Soil Biology, Vol. 60. (Eds: NeerajShrivastava et al.). | ISBN: 978-3-030-51915-5, ISBN (e Book): 978-3-030-51916-2 | Springer Nature Switzerland https://doi.org/10.1007/978-3-030-51916-2_3 |
| 2 | Dr.Nitika Arora | Role of Beneficial Microbes in the Molecular Phytotoxicity of Heavy Metals. In: Faisal M., Saquib Q., Alatar A.A., Al-Khedhairy A.A. (eds) Cellular and Molecular Phytotoxicity of Heavy Metals. Nanotechnology in the Life Sciences. | Print ISBN 978-3-030-45974-1Online ISBN 978-3-030-45975-8, pp. 227-262 | Springer, Cham. https://doi.org/10.1007/978-3-030-45975-8_13 |
| 3 | Dr.Nitika Arora | Role of Hydrogen sulfide and Ca signaling in abiotic stress tolerance in plants In: Hydrogen Sulfide in Plant Biology- Past and Present (1st Edition), S. Singh, V.Singh, D.Tripathi, S. Prasad and D. Chauhan (Eds) | , Paperback ISBN: 9780323858625. Chapter 16 | Academic Press, Elsevier |
| 4 | Dr.Nitika Arora | Mechanisms of Heavy metal detoxification and tolerance in higher plants. In: Agriculture and Forestry: Current trends, perspectives, issues-III, S. Rout (Ed), | , ISBN: 978-93-5437-260-5 | Immortal Publications |
| 5 | Dr.Nitika Arora | Advance in Agronomic management and cultivation Practices of Brassica juncea. In: Brasicajuncea: Production, Cultivation and Uses (Eds. D Kapoor, V. Gautam). pp. 235-262, | ISBN- 978-1-53619-241-4 | Nova publication, New York, USA. |

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| 6 | Dr.Nitika Arora | Biochar Assisted Remediation of Toxic Metals and Metalloids. In:Handbook of Assisted and Amendment-Enhanced Sustainable Remediation Technology, (1st Edition), | ISBN: 1119670381 (ISBN13: 9781119670384). Chapter 7 | M. N. V. Prasad (Ed).John Wiley & Sons Ltd. New YorkPp. 131-162 |
| 7 | Dr.Nitika Arora | Prospects of PGPR-Mediated Antioxidants and S and P Metabolism in Plants Under Drought Stress. In: Antioxidants in Plant-Microbe Interaction (1st edition), H.B. Singh, A. Vaishnav, R.Z. Sayyed (Eds.) Ch 24, | eBook ISBN 978-981-16-1350-0, Hardcover ISBN 978-981-16-1349-4 | Springer Nature Singapore Chapter DOI https://doi.org/10.1007/978-981-16-1350-0_24, |
| 8 | Dr.Nitika Arora | Nanoparticle-induced oxidative stress in plants. In: Plant responses to nanomaterials: Recent Interventions, and Physiological and Biochemical Responses (1st edition), V.Singh,S. Singh, D.K.Tripathi, S.M. Prasad and D.K,Chauhan (Eds) | ISBN: 978-3-030-36740-4. Chapter 12 | Academic Press, Springer Nature, Switzerland |
| 9 | Dr.Nitika Arora | Role of metabolites in abiotic stress tolerance in legumes. In: Abiotic stress and Legumes (1st edition), V.P. Singh,S. Singh, D.K.Tripathi, S.M. Prasad and R. Bhardwaj (Eds) | ISBN-13: 9780128153550 Chapter 11, pp. 245-276 | Academic Press, Elsevier, |
| 10 | Dr.Nitika Arora | Role of potassium in heavy metal stress. In: Role of Potassium in Abiotic Stress, Iqbal, N. and Umar, S. (Eds) | ISBN 978-981-16-4460-3 ISBN 978-981-16-4461-0 (eBook) https://doi.org/10.1007/978-981-16-4461-0_8. Chapter 8, pp. 163-182 | Academic Press, Springer Nature,Singapore |

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| 11 | Dr.Nitika Arora | Involvement of brassinosteroids in plant response to salt stress. In: Brassinosteroids in Plant Developmental biology and stress tolerance , Ahammed, G.J., Sharma, A. and Yu, J. (Eds) | ISBN: 978-0-12-813227-2 Chapter 12, pp. 237-253 | Academic Press, Elsevier |
| 12 | Dr.Nitika Arora | Microbial remediation of hexavalent chromium from the contaminated soils. In: Microbes and Microbial Biotechnology for Green Remediation, J. A. Malik (ed.). | .,eBook ISBN: 9780323904537, Paperback ISBN:9780323904520 Chapter 27, | Academic Press, Elsevier Inc |
| 13 | Dr.Sakshi | Microbial remediation of hexavalent chromium from the contaminated soils. In: Microbes and Microbial Biotechnology for Green Remediation, J. A. Malik (ed.). | .,eBook ISBN: 9780323904537, Paperback ISBN:9780323904520 Chapter 27, | Academic Press, Elsevier Inc |
| 14 | Dr.Nitika Arora | Biochar as an Emerging Amendment for Remediation of Heavy Metals-Contaminated Soil. In: Microbial and Biotechnological Interventions in Bioremediation and Phytoremediation, J. A. Malik (ed.), | ISBN: 9783031088292 Chapter 19, https://doi.org/10.1007/978-3-031-08830-8_19 | Springer Nature Switzerland, |
| 15 | Dr.Nitika Arora | Physiological mechanism associated withhyperaccumulation in plants inprotection against metal stress. In: Metals and Metalloids in soil-plant-water systems-Phytophysiology and Remediation Techniques, T. Aftab and K.R. Hakeem(Eds) | _ISBN: 978-0-323-91675-2,Chapter 7, pp. 159-184,DOI: https://doi.org/10.1016/B978-0-323-91675-2.00005-6 | Academic Press, Elsevier. London, USA, |

## GLIMPSES OF EVENTS DONE UNDER DBT STAR SCHEME

The PG Department of Mathematics of Hans Raj Mahila MahaVidyalaya organized **One day Workshop-cum-Extension Lecture on "Mathematical Computations using SCILAB and MATLAB and it's Applications** " under DBT Star Scheme of Colleges .The resource person for the workshop **was Dr. R. Sivaraj, Associate Professor, Department of Mathematics and Computing, Dr. B.R Ambedkar NIT, Jalandhar**. Prof. Sivaraj gave the lecture on the topic "Mathematical Computations using SCILAB and MATLAB and it's Applications".

Chandrayaan Vipnet Club of PG Department of Physics celebrated National Space Day under DBT Star scheme. The **theme of National Space Day is "Touching Lives while touching the moon."** The aim of the celebration was to aware the students about the various milestones achieved by ISRO and motivate them to make their career in the space field.

CV Raman Science Society organized **Expert talk on "Biological Hydrogen Production from Organic Wastes: Bioprocess Engineering and Biorefinery** approaches" under DBT Star Scheme, Govt. of India. The resource person was Dr. **Nitai Basak, Associate Professor, Department of Biotechnology, Dr. B. R. Ambedkar, NIT, Jalandhar.**

PG Department of Bioinformatics and Biotechnology of Hans Raj Mahila Maha Vidyalaya, Jalandhar organized **an International Webinar on "An Amazing World of Scientific Illustrations: A Journey from Research to Entrepreneurship"** under the aegis of DBT Star Scheme, Govt. of India**. Dr. Radhika Patnale, Director Sci-illustrate, Founder and CEO, Endosymbiont, GmbH, Munich Germany** was the resource person of the webinar.

The PG Department of Mathematics of Hans Raj Mahila Maha Vidyalaya Jalandhar celebrated **π-day and International Mathematics day.** On this occasion, Mathematics Department organized (under DBT Star scheme) a Poster Making and Power-Point Presentation competition

PG Department of Physics and Department of Zoology organized **a seminar on Indigenous Cancer Care Equipments for Societal Benefits** under the aegis of IQAC in collaboration with IAPT RC-02 under DBT Star Scheme, Govt. of India. **The resource person was Sardar Manjit Singh, Ex-Director of Design, Manufacturing and Automation Group, BARC Mumbai**

Hans Raj Mahila Maha Vidyalaya's Visual and Performing Arts and Sciences departments successfully concluded the two-day DBT-sponsored Interdisciplinary **International Workshop on the Science of Sustainability, titled "Art Eco 2024."** This significant event was held in collaboration with the esteemed Shryansy International Art and Culture organization, India,