

Wilson College Annual Progress Report(2023-24)

DBT STAR College Scheme Strengthening Component

Sanction order: HRD -11011/27/2022-HRD-DBT

1. Name of College: John Wilson Education Society's Wilson College(Autonomous)

2. Name of the Coordinator: Michael Colin D'Souza

Designation: Assistant Professor

Address:(College) : Wilson College, Sea Face Road, Chowpatty, Mumbai -
400007

(Residential): B/304, Vastu Park, Evershine Nagar, Malad(W), Mumbai – 400064

3. Assesment Duration: 16/02/2023 to 31/03/2023

4. Details of Departments Supported:

SI No	Name of Department	Courses (B.Sc./M.Sc./PG Diploma, certificate etc) offered	Regular Faculty members	
			With Ph.D.	Without Ph.D.
1.	Botany	B.Sc., M.Sc.(Research), Ph.D.	Total = 05	
			With Ph.D.=04	Without Ph.D.=01
2.	Chemistry	B.Sc., M.Sc.(papers), Ph.D., Certificate course in Quality Control and Quality Assurance	Total = 16	
			With Ph.D.=12	Without Ph.D.=04
3.	Information Technology	B.Sc., MSc.	Total =03	
			With Ph.D.=00	Without Ph.D.=03
4.	Mathematics	BSc.	Total = 04	
			With Ph.D.=01	Without Ph.D.=03
5.	Microbiology	B.Sc., M.Sc.(papers) , M.Sc.(Research) Ph.D.,	Total = 09	
			With Ph.D.=02	Without Ph.D.=07
6.	Physics	B.Sc., Certificate course in Astronomy	Total = 05	
			With Ph.D.=01	Without Ph.D.=04
7.	Zoology	B.Sc., M.Sc., Ph.D.	Total = 09	
			With Ph.D.=03	Without Ph.D.=06

5. Number & Date of Advisory committee meeting

First meeting was tentatively scheduled for March 2024. Could not be conducted due to unavailability of representative from DBT.

6. Qualitative improvements due to DBT support:

i) Workshops: The following major workshops were conducted during the

academic year:

- Bioinformatics workshop Introduction to user End Bioinformatics (Department of Microbiology, participants- 19)
Outcome:- The students were can use data mining on databases, to analyze the stored nucleic acid and protein sequences, and perform multiple sequence alignment and create phylogenetic trees.
- Online workshop on Planetary Science(Department of Physics, participants - 100)
Outcome:- Participants learnt about recent advances and techniques in planetary science and the various avenues of developing careers in this upcoming field.
- Ethical Hacking Workshop (Department of Information Technology, participants – 88)
Outcome:- Participants learnt debugging techniques and were given knowledge of different cybersecurity issues.
- Demonstrative Workshop on Plant Tissue Culture(Department of Microbiology & Botany, participants – 51)
Outcome:- Students were can select plants, process, design media, use aseptic and incubation techniques for plant tissue culture.
- Molecular Biology Workshop (Department of Microbiology, participants – 27)
Outcome:- Students will be able to extract plant and bacterial genomic DNA and study it using electrophoresis and uv – spectrophotometer
- On Acing the art of document writing by using Latex.(Department of Mathematics, participants – 42)
Outcome:- Students can prepare basic documents in LaTeX. They also learnt use of LaTeX for design and layout of scientific articles, project reports, conference proceedings and presentations. They also learnt how to handle figures and tables which need to be included in documents. Use of BibTeX for creating bivliography, and integration of LaTeX with R and PYTHON programming language was also part of the workshop .
- Hands-on training on construction of Glass aquarium(Department of Zoology, participants – 34)
Outcome:- Students learnt the skill s required for building and maintaining

glass aquariums(this is an important skill to learn for students interested in aquaculture).

- 12 principles of green chemistry(Silver Jubilee year of 12 principles of green chemistry)(Department of Chemistry, participants - 78)

Outcome:- The participants learnt about innovative approaches towards sustainable and environment friendly practices in chemistry.

ii) Projects: Students worked on the following projects under the guidance of faculty members:

- *Isolation of Phenol degraders and their use for bioremediation* in order to find a solution to degrade hazardous aromatic compounds. This (Department of microbiology, students – 5)
- *Isolation of keratinase producing bacteria and their applications for management of keratin rich waste* in order to manage poultry waste(Department of microbiology, students – 5)(Resulted in paper presentation “Awareness and Action Research For Youth Awakening” student research competition at Nirmala Niketan and won 1st Prize)
- *Isolation of agarase producers and to use of Agar-Derived Oligosaccharides* for to testing the antioxidant and antimicrobial properties of oligosaccharides (Department of microbiology, students – 5)
- *Antibacterial activity of flower based honey samples against S. aureus isolated from skin and nasal swabs* in order to control skin infections. (Department of microbiology, students – 5)
- *Bacteriological analysis of ice used to prepare street vended cold beverages* in order to check for enteric pathogens and correlate it to the hygiene levels. (Department of microbiology, students – 5)
- *Antibacterial effect of commercial Tulsi extract (Ocimum tenuiflorum) and Honey against Staphylococcus aureus* to check its efficacy as a remedy against skin infection. (Department of microbiology, students – 3)
- *Obtaining chitin hydrolysate by Microbial management of chitin rich waste* to method for amendment of soil. Department of microbiology, students – 3)
- *Isolation of Chromobacterium violaceum K2PVR22 from waterfall soil* for obtaining violet pigment to use as Bio-ink . (Department of microbiology, students – 3)

- *Testing of water samples obtained along the coastline in Mumbai* in order to document the dangers to human health. (Department of microbiology, students – 3)
- *TiO₂ based catalyst (synthesis)* in order to develop help students learn techniques in synthesis of materials (Interdepartmental between departments of physics and chemistry, students -5)
- *Projectile motion in rotating frame* to obtain an exact solution for a long range projectile on the surface of the earth(Department of physics, student – 1)
- *Problem of massive pulley* in order to gain exposure to solving complex problems. (Department of physics, student – 1)
- *Arduino Bluetooth controlled bot and Motion sensing robot* to help build remote controlled robotics. (Department of physics, student – 4)
- *Synthesis of Cerium and Silver Doped graphitic carbon nitride* in order to synthesize a photocatalyst which is highly efficient in photocatalytic degradation of organic pollutants. (Department of Chemistry, students – 5)
- *Profiling and assessment of immunological peptides from rock oyster Crassostrea madrasensis* in order to assess microplastic in ingested by fishes. (Department of zoology, students – 7)
- *Evaluation of Hydrological parameters of 4 different beaches from Malvan, Sindhudurg(India)* to study the ecological impact of anthropogenic activities on the water at these beaches.(Department of Zoology, students – 07)
- *Comparative Physical Soil Study from various beaches from Malvan, Sindhudurg(India)* in order to study the sedimentation and soil texture on the beaches .(Department of Zoology, students – 07)

iii) New Experiments: The departments under the STAR DBT scheme have introduced a total of 81 new experiments which were not performed earlier.

Outcome:– The students have been exposed to hands on practical training in a much wider area in their subject of study and generate more interest in the subject.

iv) New Courses introduced:

Since the college is autonomous, 60% of the course content taught by the college under various subjects was modified keeping in view the support provided to the college by the DBT grant.

Outcome :– More choice has been offered to students so that students have an enhanced learning experience.

v) **Staff training:** Twenty faculty members were sent to attend training programmes in areas pertaining to their respective subjects.

Outcome :- The faculty member broadened their knowledge about the subject. This enhanced teacher capacity has helped in introduction of newer topics and in design improved methodologies for teaching in the college.

7. Novel aspect introduced or planning to introduce :

- The college with the help of the DBT STAR scheme is introducing projects for students as part of the syllabus. Syllabi of various courses which have been or are going to be revised have introduced a project component, as a routine part of their academic and co-curricular activities(at every level from first year to final year). We expect students to, imbibe a scientific temperament, think analytically, use logical reasoning effectively, develop independent study techniques, perform undergraduate research, work with advanced instruments and explore creative ideas. We hope that this will help students be more involved with their subject, leading to greater motivation for learning, innovation and pursuing in-depth knowledge in their chosen field.
- In the year 2023 and 2024 the science departments conducted various activities on the occasion of National Science Day which is celebrated on 28th of February every year. The activities included talks, exhibitions and competitions for students.
- The college is planning various interdepartmental interactions as part of the support provided by the scheme so that various interdisciplinary programmes are developed.

8. Lessons learned/difficulties faced/suggestions in implementation of DBT grant:

- **Lessons Learnt:** This is the first instance of the college implementing a scheme involving all science departments. We are learning various aspects of coordination, required in implementing various components under the scheme. The faculty members are involved to a greater degree in specific teaching – learning activities which are supported by the DBT grant.
- **Difficulties Faced:** The mode of expenditure under the PFMS was newly introduced and a lot of time was spent learning the use of the software. Procurement process was long due to the gap between sending the proposal and receiving sanction. The college had recently become autonomous(last academic year) and the government asked for a implementation of a new course structure under NEP(present academic year). The process of implementation of autonomy and NEP simultaneously made implementation

of scheme very difficult as time of staff members was divided between these various activities.

- **Suggestions:** We would like to suggest a guidance meeting before the sanction of the grant to help colleges plan implementation of various parts of the scheme in accordance with DBT requirements.

9. Key Performance Indicators

S.no	Indicator	Pre-support		During /After Support		Remarks
		Category	No.	Category	No.	
1.	No. of students admitted	Male		Male		<i>Total Undergraduate Enrollment considered</i>
		SC	29	SC	20	
		ST	7	ST	7	
		OBC	36	OBC	34	
		General	325	General	313	
		Total Male	397	Total Male	374	
		Female		Female		
		SC	30	SC	40	
		ST	2	ST	7	
		OBC	72	OBC	67	
		General	342	General	327	
		Total Female	446	Total Female	441	
		Total Students	843	Total Students	815	
2	Pass Percentage	62.09%		N.A. <i>(Academic year not complete)</i>		<i>Students successfully completing UG programme considered</i>
3	Drop-out rates	25%		25%		<i>Approximate number based on students moving from lower to higher classes</i>
4	No. of students opting for MSc	94		N.A. <i>(Academic year not completed)</i>		-
5	Average marks	50%		50%		Approximate performance in each course

S.no	Indicator	Pre-support	During /After Support	Remarks
6	No. of hands-on experiments being conducted	1105	1144	Total No. of experiments for supported departments
7	No. of new experiments introduced	18	81	Total No. for supported departments
8	Publications (scopus indexed) /patents, if any.	20	24	
9	Training received by faculty	06	20	
10	Exhibitions/seminars /training courses conducted	08	14	
11	Books/journals subscribed from grants	N.A.	Books- 51	
12	Outreach activities (Popular lectures)	08	15	Outreach activities and popular lectures
13	Colleges mentored to apply for DBT Star College grants	N.A.	01	
14	Invited lectures	11	15	

Details of activities above are in attached annexure.

10. Self Evaluation

Department	*Objective (as stated in proposal)	% achieved	Reasons for underachievement	Quantitative metric(2 points per objective)
Botany	-To expose the students to life forms and biodiversity through museum collection.	30%	Apparatus just procured	6/10
	-To enhance microscopic observation skills through specialized microscopes.	50%	Apparatus just procured	
	-To provide hands-on experience to perform plant tissue culture techniques.	NIL	Apparatus not yet procured	
	-To impart experiential learning via microbiological techniques.	100%	-	

Department	*Objective (as stated in proposal)	% achieved	Reasons for underachievement	Quantitative metric(2 points per objective)
	-To analyse and quantify biomolecules using UV-Spectrophotometer.	100%	-	
Chemistry	-To develop analytical abilities for independent thinking which will enable students to take the responsibility as Chemists in the chemical industry and different research laboratories.	50%	Part of the activities conducted.	6/10
	-To add/ensure optimum availability of equipment/facilities in the laboratories to the learners for better practical exposure.	60%	Instruments still being procured.	
	-To inculcate research aptitude among the learners and to motivate the faculty to undertake graduate level research projects.	70%	Work in Progress	
	-To conduct additional experiments besides those included in the regular curriculum which will equip the learners with modern analytical techniques, enhancing their employability skills.	50%	Apparatus just procured	
	-To organize guest lectures to give exposure to the students to the latest developments in the subject.	100%	-	
Information Technology	-To improve the ratio of number of students to available hardware, software and tools.	80%	Apparatus just procured	8/10
	-To do experiments which could not be done within the existing facilities.	100%	-	
	-To improve hands on training on advanced Technology.	100%	-	
	-To improve the ratio of number of students to available hardware, software and tools	100%	-	
	-To develop coding & computational skills of students on various software's, hardware's and computer languages	70%	Apparatus just procured	

Department	*Objective (as stated in proposal)	% achieved	Reasons for underachievement	Quantitative metric(2 points per objective)
Mathematics	-Students can design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.	100%	-	8/10
	-Enhance Programming and mathematical thinking skills and techniques.	100%	-	
	-Identify , fix defects and common security issues in code.	50%	Students have not completed all courses	
	-Make database connectivity in python programming language.	100%	-	
	Knowledge of various types of data, their sources, organization and evaluation of summary measures.	50%	Students have not completed all courses	
Microbiology	-Help students attain competency to qualify for positions in research or academics.	40%	ongoing	8/10
	-Enable students to visit advanced labs, industries and attend workshops to get hands-on training of the extant techniques and improve their technical capabilities.	100%	-	
	-Aid students to promote health and environmental consciousness in bucolic areas.	80%	Further activities in pipeline	
	-Assist the undergraduate research projects, including interdisciplinary projects/ research within the college and with neighboring institutes.	90%	-	
	Develop new protocols of experiments that are not the part of the syllabi to provide greater insight to the students about the subject. Fundamental principles will be strengthened through this activity.	60%	Ongoing activity	

Department	*Objective (as stated in proposal)	% achieved	Reasons for underachievement	Quantitative metric(2 points per objective)
Physics	-To improve the ratio of number of students to available apparatus.	100%	-	10/10
	-To do experiments which could not be done within the existing facilities.	100%	-	
	-To expose students to modern instrumentation at UG level.	100%	-	
	-To improve hands on training on advanced instrumentation.	100%	-	
	-To develop coding & computational skills of students on various software's and computer languages.	100%	-	
Zoology	-To be able to ensure accessibility of laboratory equipment to each student so that they will be able to use them confidently.	100%	-	8/10
	-To provide exposure to students to the state of the art equipment and hands-on training.	100%	-	
	-To inculcate analytical skills and research aptitude among the students.	60%	Students have not completed academic courses	
	-To increase the number of field excursion and Industrial visit for superior subject understanding and better practical exposure.	100%	-	
	-To facilitate better interaction of students with industrial experts and expose them to new industrial developments by organizing periodic workshops and guest lectures.	50%	Some activities yet to be planned	

11. ZBSA Status: (Mark Check Box):

Not opened Under process Opened but not mapped on PFMS Account is functional

Remarks if, any:- -----

12. Sanctioned Budget details:

Head	Total Released Budget from DBT(₹)	Total Expenditure (₹)	Balance as on 31.12.2023 (₹)	Remarks if any
Grants for creation of capital assets (Non-recurring)	5967613/-	5619702/-	347911/-	--
Grants-in-aid General (Recurring)	2100000/-	2110547/-	-10547/-	--
Total	8067613/-	7730249/-	337364	--

Course Coordinator

(With Seal)

Head of the

Institution

(With Seal)