

**Department of Biotechnology  
STAR COLLEGE SCHEME**

Sanction no.: BT/HRD/11/09/2014; dated 06 August, 2014

***Progress Report  
(2016-2017)***

***Upgradation to Star College status/continuation at existing level  
under Star College Scheme 2018***



***Submitted by***

**Hindi Vidya Prachar Samiti's**

**RAMNIRANJAN JHUNJHUNWALA COLLEGE OF ARTS, SCIENCE AND COMMERCE  
(RJ College of Arts, Science and Commerce)**

**Ghatkopar (West), Mumbai - 400 086**

**NAAC Reaccredited 'A' Grade, CGPA 3.50 (3<sup>rd</sup> Cycle)**

**Department of Biotechnology**  
**Star College Scheme**

1. **Name of the College:** Hindi Vidya Prachar Samiti's Ramniranjan Jhunjhunwala College of Arts, Science and Commerce, Ghatkopar West, Mumbai 400086.  
NAAC Accredited 3<sup>rd</sup> cycle A grade CGPA 3.50

2. **Year of Support:** BT/HRD/11/09/2014 dated 06.08.2014

3. **Total Grant Received during the Period of Support:**

Year	Non-Recurring	Recurring#	Total
2014-15	2000000.00	900000.00	2900000.00
2015-16	Nil	719600.00	719600.00
2016-17*	Nil	835600.00	835600.00
Total	20,00,000.00	24,55,200.00	44,55,200.00

(\*released in 2017-18; # includes funds for travel grant)

4. **Recognition by other funding agency:**

Recognition	Agency
FIST	DST
Career Oriented Courses	UGC
Bachelor of Vocation	UGC
Research Programmes	UGC, DST, CSIR, University of Mumbai, Hindustan Unilever Ltd.

**Details of extramural projects received from different funding agencies**

No.	Academic Year	Project	Type (Major/Minor) and Funding Agency	Grant Amount Sanctioned	Status (Ongoing/ Completed)
1.	2016-18	Forensic study of CNS drugs in food samples in duping cases by using TLC, HPTLC and HPLC <i>Dr. Abhay Sawant</i>	Minor U.G.C.	2,85,000/-	Ongoing
2.	2016-18	Effect of solvent on micelles of binary surfactant systems <i>Dr. Manisha Bhattacharya</i>	Minor U.G.C.	1,60,000/-	Ongoing
3.	2016-18	Synthesis, characterization & Evaluation of new triazole derivatives and evaluation of their antimicrobial activity <i>Dr. Asawari Mokal</i>	Minor U.G.C.	4,00,000/-	Ongoing
4.	2016-18	Improving Management and trade of ornamental fish keeping by early diagnosis and treatment of diseases <i>Dr. Geeta Joshi</i>	Minor U.G.C.	2,35,000/-	Ongoing
5.	2016-17	Theanine production from tea callus <i>Dr. Usha Mukundan</i>	HUL	4,00,000/-	Completed

6.	2016-18	Unraveling physical chemistry of drug-DNA interaction: essential steps towards rational drug design <i>Dr. Palak Chawla</i> <i>(nee Dr. Neelam Keshwani)</i>	DST	35,97,000/-	Ongoing
7.	2016-18	Development of local fractional calculus or fractals <i>Dr. Kiran Kolwankar</i>	CSIR	15,00,000/-	Ongoing

#### Minor Projects

No.	Funding Agency	Name	Sanction Date	Sanction Amount
1.	UoM MRP	Chemistry Dept. Dr. Sandesh K Divekar	15.02.2016	25,000
2.	UoM MRP	Chemistry Dept. Dr. Abhay D Swant	15.02.2016	25,000
3.	UoM MRP	Physics Dept Mrs. Vaishali Raikwar	15.02.2016	32,000
4.	UoM MRP	Zoology Dept. Mrs. Sushma V Singh	15.02.2016	25,000
5.	UoM MRP	Zoology Dept. Mrs. Sanika Gupte	15.02.2016	25,000
6.	UoM MRP	Botany Dept. Dr. Dan Bahadur R Singh	15.02.2016	25,000
7.	UoM MRP	Botany Dept. Mr. Pravin G Nayak	15.02.2016	25,000
8.	UoM MRP	Botany Dept. Dr. Anil E Avhad	16.01.2017	35,000
9.	UoM MRP	Botany Dept. Dr. Nisha Muni	16.01.2017	30,000

*UoM = University of Mumbai*

**5. Name/s of Departments supported:**

- Botany
- Chemistry
- Physics
- Zoology

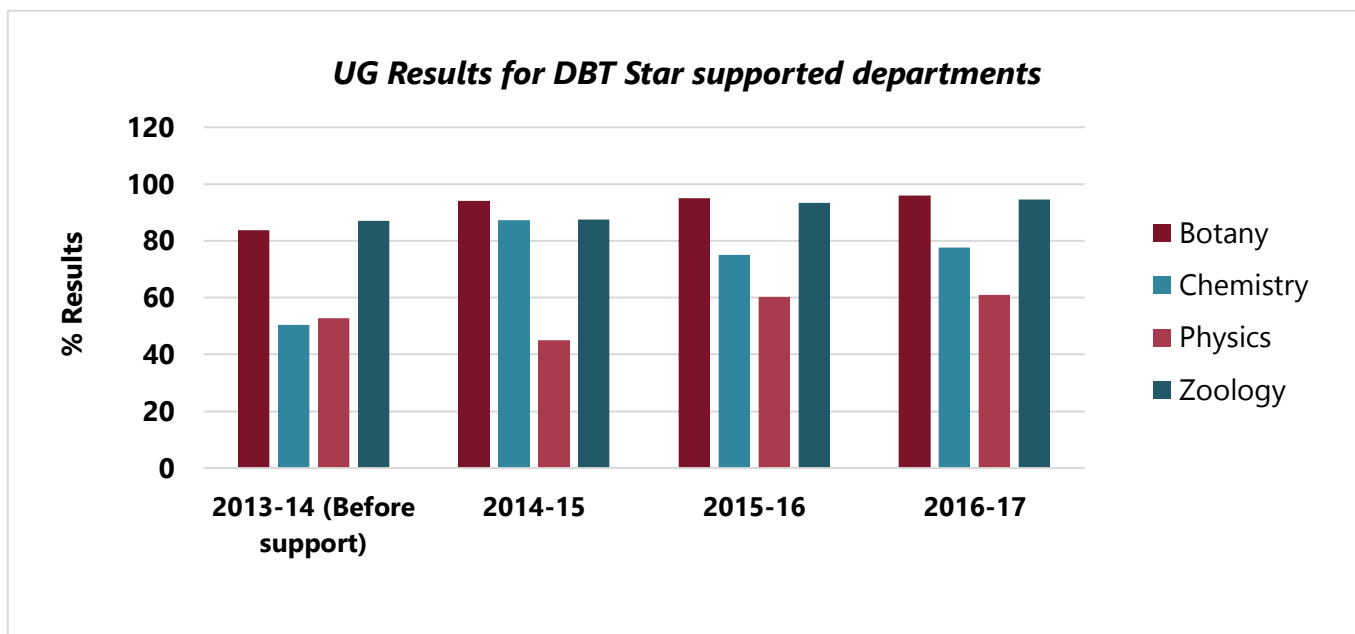
**6. Department-wise Performance during the Period: (only graphical representation)  
Comparative analysis prior to support and after the support in terms of:**

**a. Cut off percent for admission Bachelor of Science (B.Sc.) 2014-15**

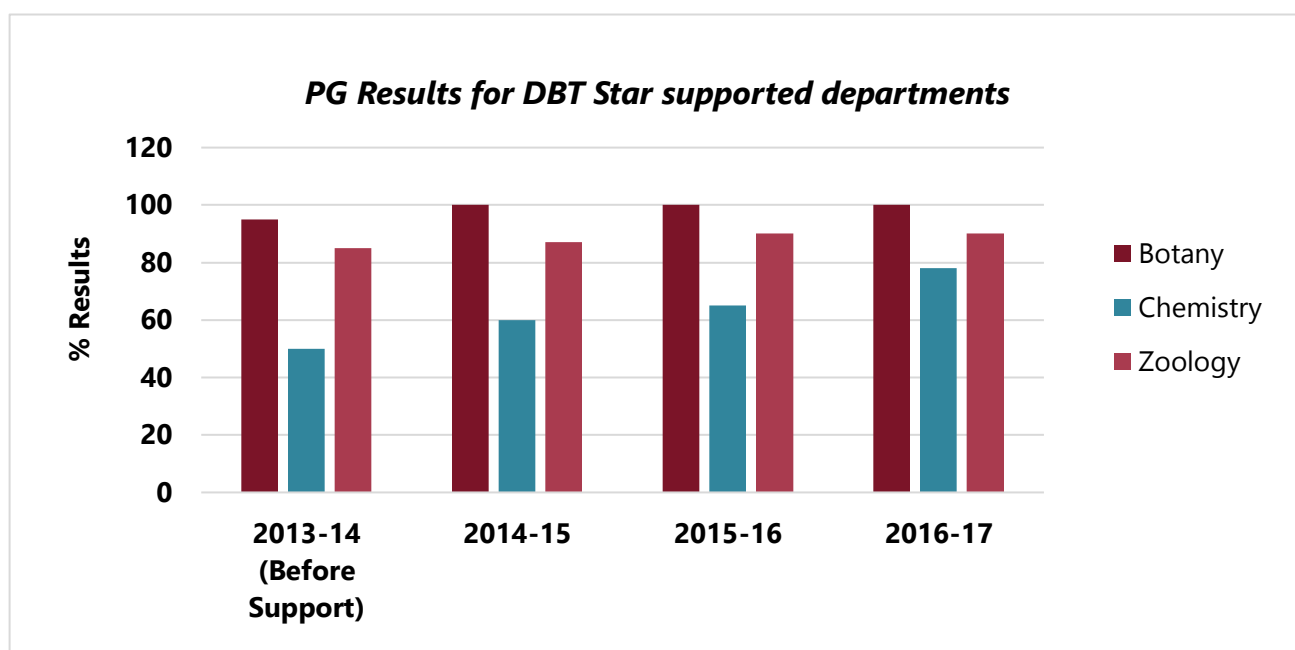
	Before Support	After Support			Remarks
	2013-14	2014-15	2015-16	2016-17	
<b>Botany</b>	50%	55%	60%	60%	Incremental change
<b>Chemistry</b>	55%	65%	65%	65%	Significant increase
<b>Physics</b>	55%	60%	60%	60%	Significant increase
<b>Zoology</b>	50%	55%	55%	55%	Significant increase

**\*Significant observation from 2014-15 the demand ratio for FYBSc Science admissions has seen on increase due to which we have been requesting University for 10% increase in total number of seats and all seats are filled. There are no drop-outs after student enrollment.**

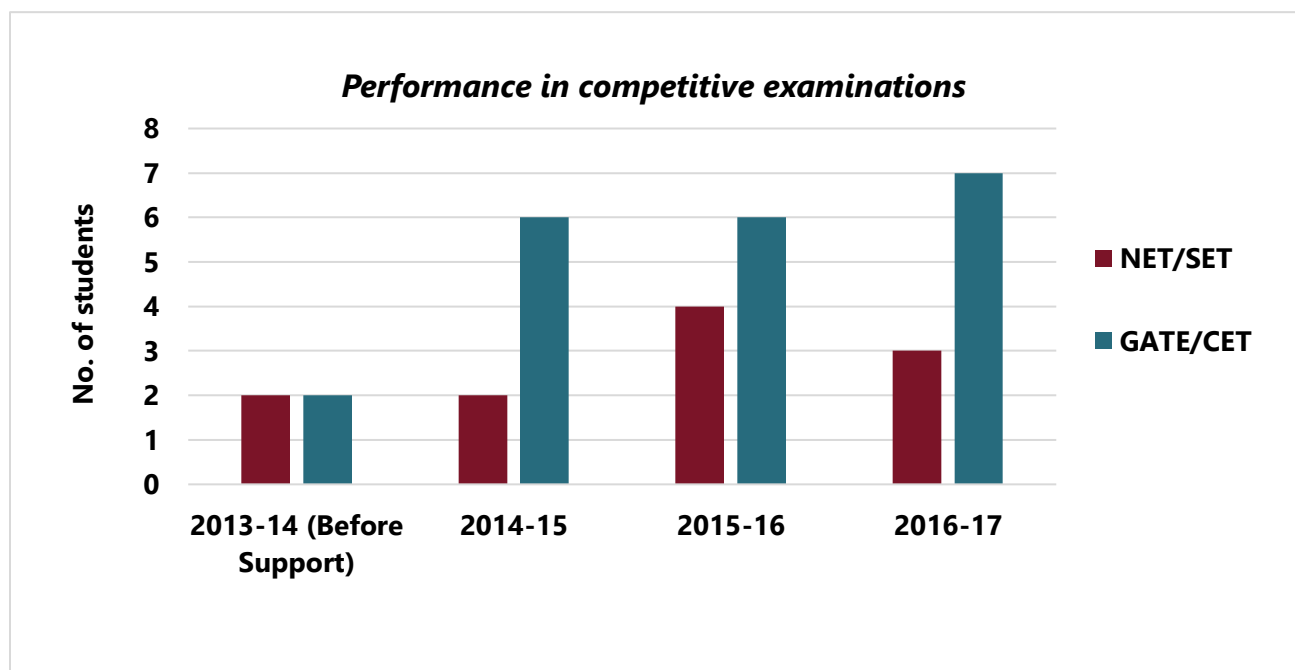
**Drop-out percentage: NIL**



Department	Before Support	After Support			Remarks
	2013-14	2014-15	2015-16	2016-17	
Botany	17	17	17	17	Seats are filled by University through Centralized admission
Chemistry	12	12	12	12	Seats are filled by University through centralized admission
Physics	0	0	0	20	M.Sc. Physics was introduced in 2016-17 and in 2017-18 the enrollment was 22 (10% additional seat)
Zoology	10	10	10	10	Seats are filled by University through centralized admission



(NOTE: Dept. of Physics started the PG program in 2016-17 so first batch will pass out in June 2018)



**7. Number of workshops held for teachers and students (with title, duration and number of participants):**

**BOTANY:**

**For students**

No.	Title	Duration	No. of participants
<b>2016-2017</b>			
1.	Workshop on identification of wild vegetables along with exhibition of wild vegetables (Interdepartmental)	1 day 30/7/2015	40
2.	Waste Management include e waste management (Interdepartmental)	1 day 1/10/2016	79
3.	Workshop on micro propagation (Interdepartmental)	6 days 20/4/2017 to 25/4/2017	30 (2 batches of 15 each)
4.	Climate Mapping hands on training using maximum and Minimum thermometer, Barometer, Rain Gauge and Hygrometer	1 day 3/7/2017	55 students 20 students visited 10 schools and created awareness among school children about climate change

**For Teachers**

No.	Title	Duration	No. of participants
<b>2016-2017</b>			
1.	Post-harvest technology under skill India theme (Interdepartmental)	2 26- 27/04/2017	20
2.	Workshop on revised syllabus in Botany of TY B Sc. (Botany)	1 day 11/7/2016	130 teachers from all colleges affiliated to University of Mumbai. New Practicals were also done by the teachers and this was possible only due to the glasswares, electrophoresis equipments and chemicals purchased from DBT star

			College funds
3.	Refresher course for Junior college teachers (Lectures on emerging areas in Biological science) Botany and Zoology Department organized it under the aegis of University of Mumbai HRDC and was possible only due to availability of instruments like pH meter, colorimeter, electrophoresis units in multiple numbers	20 days	30 teachers from different colleges and our teachers were resource persons

### Workshops held after completion of three years

1. Histochemical localization of secondary metabolites
2. Tissue printing as a tool for localization of proteins
3. Exhibition cum workshop on Bonsai and landscape preparation was conducted on 3<sup>rd</sup> and 4<sup>th</sup> March, 2018. The exhibition was open to general public. 40 students and teachers were trained in the art of making a Bonsai, in addition the event was webcasted live through Facebook
4. Making a Terrarium workshop one day (25 students) March 2018

### CHEMISTRY

#### For students

No.	Title	Duration	No. of participants
<b>2016-2017</b>			
1	Workshop on GLP and Green Chemistry	6 days 27 <sup>th</sup> June to 2 <sup>nd</sup> July, 2016	120
2	Basic technique and safety aspects in laboratory	6 days 27 <sup>th</sup> June to 2 <sup>nd</sup> July 2016)	224
3	Safety Aspects in Laboratory	6 days 25 <sup>th</sup> July to 30 <sup>th</sup> July, 2016	400
4	Introduction to Indian Pharmacopoeia Vol I, II, III 2010 edition	6 days 1-5 <sup>th</sup> August, 2016	400
5	Workshop on Mass Spectrometry in association with ISMAS (Indian Society for Mass Spectrometry)	1 day 9 <sup>th</sup> December, 2016	120

#### For teachers

No.	Title	Duration	No. of participants
<b>2016-2017</b>			
1.	Green Chemistry		
2.	Operation and maintenance of analytical instruments with WRIC Mumbai (Intercollegiate)	5 days 17/10/2016 to 21/10/2016	23 (11 colleges)

3.	Workshop on using and demonstration on recording and spectral analysis on FTIR instrument (Brucker, Germany)	1 day 28/2/2017	12
4.	Mass Spectrometry (ISMAS) (Intercollegiate)	1 day	21
5.	Refresher course for Junior college teachers under aegis of HRDC University of Mumbai theory and practical session our teachers were resource persons	10 days 14/12/2016 to 24/12/2016	30 teachers from various colleges

After completion of three years

Workshop on careers in Chemistry 8<sup>th</sup> to 14<sup>th</sup> March 2018 for final year students

Workshop on preparing table reagents and using them in micro quantities (green chemistry)

## PHYSICS

No.	Title	Duration	No. of participants
<b>2016-2017</b>			
<b>For Students</b>			
1	Introduction to basics of Physics and fun of Physics	6 days	
2	A voyage from circuits to system Electronics	1 day 16/7/2016	72+10 teachers
3	YeSYou can do it "Anand Ghaisas" Keen observation and critical analysis during exploration in science (Interdepartmental)	1 day 3/12/2016	100 students + 20 teachers
4	Managing Gmail and Google Drive	1 day 19/8/2016	40 students and 9 teachers
<b>For teachers</b>			
1	Refresher course for Junior College teachers (Intercollegiate). Was possible only because of apparatus and consumables procured from DBT star college funds	10 days 14/12/2016 to 24/12/2016	25 teachers from various colleges

After completion of three years: Designing innovative experiments to explain basic of physics. IIT students demonstrated interesting experiments related to Physics for the students of our college. The IIT student demonstration was streamed live at Devrukh College, Ratnagiri.

## ZOOLOGY

No.	Title	Duration	No. of participants
<b>2016-2017</b>			
<b>For students</b>			
1	Blood measurement by Sphygmomanometer	1	40
2	Detection of blood sugar by glucometer	1	42
3	Workshop on basic satellite imagery and hands on training on basic map making (Interdepartmental)	1day 14/7/2016	50 students and teachers
4	Hands on training on use of spreadsheet for Biostatistics	1 day 25/2/2017	50 staff and students
5	Preparation of herbaria to preserve marine algae	1 day	20 students



		21/2/2017	
6	Identification of Avifauna in Keola Deo Ghana National Park Rajasthan	2 days 6 <sup>th</sup> and 7 <sup>th</sup> Jan, 2017	37 students+ 4 staff
<b>2016-2017</b>			
	<b>For teachers</b>		
1	Refresher course for Junior college biology teachers along with Botany Department. Experiments were done by teachers and this was possible only because of availability of multiple units of equipments and consumables from DBT star college funds	10 days 14/12/2016 to 24/12/2016	30 teachers
2	To make power point more effective as a presentation skill (staff and students)	1 day 14/2/2017	9+80
3	Microtomy why and how (tissue processing, embedding, ribbon and staining)	3 days 15/6/2017	10

After completion of three years: Identification of insects and hands of training in pinning dead insects in field one day (18/1/2018) by Mr Parag Rangnekar at Tambdi-Surla Goa

Note: It has been observed that there is a significant increase in the number of workshops being organized by all departments after implementation of the star college scheme

**8. Number of Students undertaking Project vs. Total Number of Students. Please give list of Department-wise Projects that were carried out during the Support Period.**

**BOTANY**

2016-2017		
	<b>FY BSc (250)</b>	
1.	All students collected sample from water from their areas, wall scrappings, scrapping from wells etc. and microscopically identified the type of thallus, genus with help of key, documented the chloroplast type, pyrenoids and other cell contents if any	All
	<b>SY BSc (125)</b>	
1.	To find BMI of the student and suggest a diet plan (interdepartmental)	15
2.	Know your institution ICRISAT (Arid crops in view of drought in Maharashtra)	
3.	Pulse research Institute (International year of pulses)	10
4.	Collection of Yams and tubers from field and market botanical names, nutritional value recipes	10
5.	Exotic fruits botanical names and nutritional value	10
6.	Unconventional pulses and common pulses	
7.	Recycle and make it green: Banana peels/orange peels/lemon peels	10
8.	Tissue printing for localizing mechanical tissues in coleus stem	06
	<b>TY BSc (35)</b>	
1.	Tissue printing localization of H <sub>2</sub> O <sub>2</sub>	02
2.	Study of enzyme tyrosinase	02
3.	To find out the moisture content in commercial moisturizer using Rose petals (interdepartmental)	02
4.	Phytochemical analysis of <i>Syzygium jambolina</i> leaves	02
5.	Estimation of vitamin C content from <i>Moringa</i> leaves	02
6.	Separation of seed proteins using PAGE	02
7.	Study of enzyme peroxidase from <i>Trigonella foenum-graecum</i>	02
8.	Study of Tyrosinase activity from Mushroom (Interdepartmental)	02
9.	Pollen viability in different varieties of Bougainvillea	02
10.	Pollen morphology of Bignoniaceae members	02
11.	Study of SOD activity extracted from <i>Portulaca</i> leaves (Interdepartmental)	
12.	Estimation of polyphenol content in <i>Emblica</i> fruits obtained from garden and market (Interdepartmental)	02
13.	Extraction of pectin from orange peels using microwave and its estimation of pectin	02
14.	Study of absorption pattern of betalains using spectrophotometer	02
15.	Study of antimicrobial activity of coconut oil (Interdepartmental)	02
16.	Extraction of essential oil from <i>Anethum graveolens</i> and separation by TLC	01
17.	Histochemical localization of storage content of Maize grain	02
18.	Arrangement of mechanical tissues in leaves	02

**CHEMISTRY:**

<b>2016-2017</b>		
1.	Project on understanding the principle of slow burning of firecrackers FY BSc	420
2.	To estimate the acid value of vegetable oil brought by individual student purchased from the market (SYBSc)	225
3.	Milk testing in association with consumer guidance society of India (Interdepartmental project), fat%, solid non-fat%, density, protein, lactose, water content temperature, freezing point, salts% statistical analysis of data	146 students, branded and non-branded milk
4.	To record IR spectrum on FTIR of the given compound and to do the spectral analysis from the spectrum obtained Students were given unknown compounds for recording of the spectra (TYBSc)	120 students

**PHYSICS**

<b>2016-2017</b>		
	SY BSc and TY BSc (200)	
1.	Clap switch	10
2.	The proportional counter	10
3.	The Gauss Gun	10
4.	Sterling Engine	10
5.	Motion sensor using LDR	10
6.	Easy D C generator	10
7.	A simple radio set	10
8.	Dark sensors	10
9.	Hover Board	10
10.	Human body as battery	10
11.	Laser sensor security alarm	10
12.	Optical fibre	10
13.	555 timer chip musical instruments	10
14.	Perpetual motion (impossibility of) wheel	10
15.	Total internal reflection	10
16.	Free energy and conductivity	10
17.	To demonstrate Newton's third Law	10
18.	Automatic street light	10
19.	Hydraulic Bridge	10
20.	Free energy and conductivity	10

**ZOOLOGY:**

<b>2016-2017</b>		
1.	Separation of plasma proteins by PAGE (TYBSc)	5
2.	Comparative study on the effect of commercial products on hair keratin (TYBSc)	5
3.	Study of nematodes from different soil sample (TYBSc)	5
4.	Study of Ecological status of Bhandupeshwar kund (TYBSc)	5
5.	Comparative studies of nutrient contents of health drinks (FYBSc)	5
6.	Electrophoresis of haemoglobin in alkaline gel (TYBSc)	5
7.	Study of pre- and post-monsoon physiochemical parameter of Ulhas River (TYBSc)	5

**Major Project Highlights done by all departments in collaboration with each other and student participation in research meet, Avishkar (University of Mumbai intercollegiate research meet),**

**paper/poster presentation in seminars, conferences and continued project work from FY BSc till date and many students have progressed to M Sc**

1. Sayali Parab Cleaning waste by waste Avishkar 2017, National convention held at Maitreyi College, New Delhi 2017
2. Ms Vrushali : Study of starch grains in different pulses and development of a key for identification of pulses. Participated in Avishkar 2016
3. Susmita Gudulkar Plant system as a tool for validating ethnobotanical claims for kidney stone presented paper/poster at Avishkar 2016, Presented paper at National convention held at Maitreyi College, New Delhi and won first prize, 2017. Presented paper at DBT research convention 2016, VES college Chembur intercollegiate research meet. Continues the project by doing the phytochemical analysis of plants claimed to be having lithotropic properties
4. Ankit Nayak Dye removal using *Oscimum basilicum* seeds Avishkar 2017
5. Trimple Pandey Characterisation of enzyme catalase extracted from purple cabbage Avishkar 2017
6. Rishab Mishra Characterisation of enzyme tyrosinase extracted from banana peels
7. Susmita Gudulkar Extraction of shikimic acid from star anise using kitchen appliances (microwave, espresso coffee machine) presented at Avishkar 2017
8. Upasana Gupta did a year-long project on nonlinear stiffness properties of plants at different branching levels presented at competitions St Xavier's College 2017

**Projects in progress**

1. Interdisciplinary project: Dendritic patterns formed in biological fluids as a result of irradiation by low powered laser in collaboration with TIFR four students are working with highly sophisticated instruments. Pattern analysis by measuring the distribution of angles in different patterns.
2. Extraction of secondary metabolites using kitchen appliances characterization by HPTLC
3. Dyeing of fabrics using natural dyes extracted from teak leaves
4. Purification of proteins by ion exchange chromatography

9. List of new practical/demonstrations introduced for UG students for each class in different departments supported under Star College Scheme during the period which were not conducted prior to the DBT support: Practicals are for FY, SY and TY BSc all batches and all students performed the new practicals

#### BOTANY

No.	Title
<b>2014-15</b>	
1	To study the change in color of anthocyanin pigments depending on pH of the medium
2	Study of leaf morphology, preservation in the form of herbarium
3	Determination of stomatal frequency
4	DNA isolation and estimation from different plant materials
5	Identification of body types by Prakruti Nidan
6	Preparation and sterilization and plate pouring of medium for bacterial and fungal cultures
7	Study of aeromycoflora using plate exposure technique
8	Study of plant tissue by double staining technique: safranin and haematoxylin and differential staining using single stain Toluidine blue O
9	Use of micrometry to measure length of plant fibre, stomatal measurement
10	Separation of amino acids by paper chromatography
<b>2015-2016</b>	
<b>The above mentioned practicals were carried out and new practicals mentioned below were added</b>	
1	To study inflorescence of the specimen collected by each student Identification and documentation
2	The practical of change in Anthocyanin pigment depending on pH medium New dimension addition of anthocyanin pigment extracted from purple cabbage and addition to different liquid like fruit juice, milk, rancid oil and conclusion to be drawn
3	Study of plant community by quadrat method (field based experiment) List quadrat and chart quadrat
4	Data analysis using statistical tools
5	Use of GPS and carbon sequestration rate of a tree
6	Identification and preparation of key for identification of plants in R J College campus
7	Study of cell contents (Ergastic matter) in different plant cells: starch grains, aleurone grains, oil globules, raphides, spaeraphide, cystoliths, plasmodesmata.
8	Statistical analysis of data using Excel
9	Study of enzyme amylase and use of POGIL
<b>2016-2017</b>	
<b>The above mentioned practicals were carried out and new practicals mentioned below were added</b>	
1	Separation of plant pigments using paper chromatography
2	Measurement of Q10 of germinating seeds using anthocyanin (instead of phenol red indicator)
3	Extraction and estimation of proteins using Lowry's method. Standard graph and quantification of plant protein (students could do it individually due to availability of multiple instruments and consumables from DBT star college funds)
4	Study of Pollen morphology of different flowers collected by the students (good microscope purchased from DBT star college funds)
5	Morphological study of different types of fruits (visit to vegetable and fruit market) Botanical names and type of fruit to be identified and described by the student.

#### CHEMISTRY:

No.	Title
<b>2014-15</b>	
1	Determination of percentage purity of AR and LR grade Na <sub>2</sub> CO <sub>3</sub> by using IP assay
2	To study the effect of heat on hydrated CuSO <sub>4</sub> crystals
3	Preparation of different types of papers used in chemistry laboratory: DMG paper, ferrocyanide paper, potassium dichromate paper and potassium thiocyanate paper

4	Detection of Ni <sup>2+</sup> , Fe <sup>2+</sup> , Cu <sup>2+</sup> , Fe <sup>3+</sup> , SO <sub>3</sub> <sup>2-</sup> ions
5	To prepare acetanilide from aniline using microwave
6	Potentiometric titration of HCl v/s NaOH
7	To determine percentage of chloride present in the given sample
8	To determine calcium content in market samples of calcium tablets
9	To make use of quinhydrone electrode for emf measurement
10	To determine percentage composition of strong acid and weak acid in the given mixture
<b>2015-2016</b>	
<b>The above mentioned practicals were carried out and new practicals mentioned below were added</b>	
1	To prepare solutions concentrations from the given stock solution
2	To check the concentration of various solutions prepared by diluting stock solution by titrating against primary standard
2	To estimate the amount of vitamin C in the given sample using ceric ammonium sulphate
3	To estimate the amount of lead in the given sample using EDTA
4	To study the inversion of cane sugar using polarimeter
5	To study the effect of separation of Cu(II) and Fe(II) from a given mixture using solvent extraction
6	Separation of Ternary mixture
7	Estimation of paracetamol by Indian Pharmacopoeia (I P)
8	Molecular modeling exercise in stereochemistry
9	Synthesis of coumarin using microwave
10	Titration of maleic acid against NaOH pH metrically
11	Titration of phosphoric acid against NaOH using pH meter
<b>2016-2017 (The above practicals were consolidated)</b>	

#### PHYSICS:

No.	Title
<b>2014-15</b>	
<b>FY BSc (378 students)</b>	
1	Newtons rings
2	Lissajous Figures (was possible due to DBT star college funds)
3	Surface tension of different liquids
<b>SY BSc (184 students)</b>	
1	Laser attached Spectrometer
2	Fibre optics
3	Ultrasonic Interferometer (was possible due to purchase of instrument from DBT star college funds)
4	Chaos circuit
<b>TYBSc (45 students)</b>	
1	Speed of light
2	Michelson Interferometer (was possible only due to purchase of instrument from DBT star college funds)
<b>2015-2016</b>	
<b>The above mentioned practicals were carried out and new practicals mentioned below were added</b>	
<b>FYBSc (358) students</b>	
1	Newton's Rings with least aberration effects (was possible due to purchase of equipment form DBT Star college funds)
2	Variation of intensity with distance using cylindrical wave front
3	Determination of low resistance using bridge network with post office box
4	Characteristics of solar cell
<b>SYBSc (111) students</b>	
1	Launching of light in an optical fibre
2	Determination of i) Angle of Prism ii) wavelength of LASER USING laser attached Spectrometer
<b>TYBSc (42) students</b>	
1	Hands on training on instruments used for synthesis of nano-materials

2	Four probe method for characterization of nano materials
3	Low cost experiment on measuring speed of light
4	Detection and comparison of positive and negative crystals using double refraction
<b>2016-2017 (The above practicals were refined and consolidated)</b>	

#### ZOOLOGY:

No	Title
<b>2014-15</b>	
1	Identification of sugars using Thin-layer chromatography
2	Culture of <i>Paramecium</i>
3	Observation of succession of microzoons in stagnant pond water
4	Estimation of proteins and lipids from milk samples brought by students
5	Detection of adulterants in milk brought by students
6	Technique of separation of proteins using PAGE (was possible only because multiple electrophoresis units purchased from DBT star college grants)
7	PAGE electrophoresis of plasma samples obtained from different individuals during blood donation drive
8	Trypsinization and viable count cells
9	Preparation and standardization of reagents
10	Estimation of amylase effect of pH
<b>2015-2016</b>	
<b>The above mentioned practical's were carried out and new practical's mentioned below were added</b>	
1	To study the section of kidney, liver, ovary, thyroid, stomach, thymus, bone and cartilage (Microscope purchased in DBT grant was extensively used)
2	To determine water quality of water samples collected from Thane creek (possible due to consumable purchased from DBT star college fund) Before and After Ganesh festival
3	To determine blood group and counsel students the importance of knowing your blood group, importance of blood donation and creating awareness about blood banks
4	Study of genetic traits in human population
5	Technique of media preparation, culturing and maintenance of Drosophila cultures
6	Study of morphological characters of Drosophila normal and mutants
7	To determine the quality of sediments collected from Thane creek
8	Use of Bioinformatic tools in sequence analysis
<b>2016-2017</b>	
<b>The above mentioned practicals were carried out and new practicals mentioned below were added</b>	
1	Studies on cyclosis and irritability in <i>Paramecium</i>
2	Estimation of calcium and silica content from sand samples
3	Identification of blood cells by differential staining technique
4	Study of population density by capture-recapture method
5	Study of DNA hyperchromicity

#### 10. Inter-departmental Activities Conducted:

	2016-2017	Participating Departments
1	Identification of medicinal plants	Chemistry, Botany, Zoology, Physics
2	Solid waste and e-waste management	Chemistry, Botany, Zoology, Physics, IT, Computer Science, Biotechnology
3	Workshop in spectroscopy	RJ College students and other college students
4	Optics revisited	Botany, Zoology, Physics
5	Preparation of nanoparticles and characterization	Botany, Zoology, Chemistry, Physics and Maths
6	Cleaning of Juhu beach and creating awareness about marine ecosystem	RJ college students and other college students

Major Impact of DBT Star College is all departments started working together and every year in November to December One week is Year marked for DBT Star College Science Week and each department organizes interdepartmental activities which are also visited by school children thus creating interest among school children, these include the fests Botanica, Chem Bond, Chem Carnival, Zoofest, Tech fest, Physitech. These activities have also seen participation from Arts and Commerce students creating awareness among them about energy saving, environmental issues, water conservation, biodiversity, scientific explanation for prevailing myths

#### **COURSE / TRAINING FOR NON-TEACHING/ LABORATORY STAFF UNDER DBT STAR COLLEGE SCHEME**

1. Twice a year training in computers for members of supporting staff in computer literacy
2. Training in Lab safety procedures, firefighting, disaster management
3. Training of laboratory staff in using balances, pH meter, colorimeter, potentiometer, conductometer
4. Maintenance of microscopes
5. Proper handling and storage of chemicals, preparation of standard solutions.
6. Use of spread sheet for maintaining stocks
7. Yoga and meditation, stress management and healthy eating



**11. Resources Generated: SOPs, Lab manuals, teaching kits etc.:**

No	Title
<b>Botany Department</b>	
<b>2016-2017</b>	
1	Manual for bridge course in Botany
2	Lab manual SY BSc
<b>Chemistry Department</b>	
<b>2016-2017</b>	
1	Manual for FY, SY, TY BSc
2	Manual for fire safety
<b>Physics</b>	
<b>2016-17</b>	
1	Manual of newly introduced practical's
2	Lab manual for FY, SY and TY BSc
3	Manual for maintenance of Instruments

*Web page created on RJ College website for all the above-mentioned SOPs and Lab Manuals  
(accessed at: <http://www.rjcollege.edu.in/dbt-star-college/>)*

## 12. Collaborative Activities with Neighboring Colleges:

### BOTANY:

No.	Title	Neighboring college/ Institution/Laboratory	No. of participants
<b>2016-2017</b>			
1	Botanica 2016	Neighbouring schools and colleges	About 800
2	Solid waste management in Sweden	Mrs Anna Daneberg, Future Earth (Climate Ambassador), Sweden	100 students from different colleges
3	Soft skill development training students for Avishkar	Research lab	10 students from 2 colleges
4	Visit and training in plant tissue culture laboratory	Plant tissue culture lab	Batches of 20 students from Somaiya College, Wilson College and one student from IISER Mohali spent one month for a short term project
5	Mangrove awareness trail	In collaboration with Soonabai Pirojsha Godrej Marine Ecology Centre, Mumbai	40 participants from various colleges

**CHEMISTRY:**

No.	Title	Neighboring college/ Institution/Laboratory	No. of participants
<b>2016-2017</b>			
1	Operations and maintenance of Analytical Instruments	WRIC, Mumbai	23 teaching and non-teaching staff members from 11 colleges
2	Special lectures : Innovations, Radioactivity, misconcepts in organic chemistry, chemical kinetics, Practicals Paper chromatography, polyacrylate superabsorbent , fire without match stick concept of density, conductometric titrations, complexometric tirtrations, determination of equivalence point Industrial visit to Centre for excellence in basic-DAE, sciences and HBCSE	HRDC University of Mumbai 10 days	32 teachers from different colleges, special lectures by eminent scientist and lab sessions

**PHYSICS**

No.	Title	Neighboring college/ Institution/Laboratory	No. of participants
<b>2016-2017</b>			
1	Mumbai Area Physics meet	TIFR, IISER, BARC, IITB	70 students and teachers from various colleges
2	Seminar on Anderson localization in random lasers	TIFR	50 students from various colleges
3	Nonlinear dynamics	In collaboration with Ruparel College	60 staff and students from various colleges

**ZOOLOGY:**

No.	Title	Neighboring college/ Institution/Laboratory	No. of participants
<b>2016-2017</b>			
1	Refresher course for Junior college teachers Lectures by eminent scientists Dr Krishna Iyer, Dr Shyam Kishore (KEM hospital), Dr Ketu Ghate (ecologist), Dr Deepak Modi. Practical sessions paper chromatography for separation of plant pigments, amino acids, Hands on training on extraction of DNA and agarose gel electrophoresis , separation of proteins by PAGE, plant tissue culture technique, microtomy animal tissue, designing of experiments using <i>Paramecium</i> , concept of	University of Mumbai Departments of Botany and Zoology	40 participants from various colleges

	science through investigation		
2	Zoofest	Neighbouring school students attend the fest to observe the exhibits created by the students	

The DBT Star college supported departments help train the teacher mentors and students to conceptualize research projects to be carried out by the school children and help them to compete at various science fairs at national and international levels. Noteworthy achievements are:

2016-17: Mr. Subarnonath Roy from Pawar Public School, Bhandup received gold medal at International Chemistry Olympiad, trained by our teachers in the practicals

**In addition to the above lectures, general public lectures were organized for students and staff of different college numbers. More than 600 participants attended the lectures. Some of the lectures were:**

1. Padma Vibhusan Dr Jayant Naralikar: Science popularization through regional languages
2. Dr Lalit Kumar Ananda, Chief Medical Officer, Sewri Tuberculosis hospital: How to control the spread of TB and role of nutrition along with medicine to cure TB
3. Dr Avani M Ghuri, Rotarian: Say no to tobacco
4. Dr Deepak Dalvi: Control of Malaria and Dengue in the city of Mumbai
5. Dr Amit Gandhi, Onco-surgeon, Zynova hospital: Cancer detection and care

**Guest Lectures organized by the department – Other neighboring colleges invited for participation**

No	Title	Name of the Expert
<b>BOTANY</b>		
<b>2016-2017</b>		
1	Green Buildings	Dr Anjana Dewasthale, Horticulturist
2	DNA barcoding in Plants	Dr Shashi Babbar, Professor University of Delhi
3	Landscape gardening	Mr Ramnivas Rathore, Deputy General Manager, Landscape and Horticulture Raheja Universal Pvt Ltd. Mumbai
4	Wild vegetables in Maharashtra	Mr Bharat Godambe, Paryavaran Dakshata Manch
5	Managing domestic waste	Mr Akshay Hudar, Triton Technology
6	Segregation of processing of waste	Mrs Poonam Hudar, Environmental Green Lines
7	An overview of LC MS	Mr Subodh Chavan,
<b>CHEMISTRY</b>		
<b>2016-2017</b>		
1	Safety in chemistry laboratory	Dr P Chaube , Former scientist BASF, Regional Director YCMOU
2	Misconcepts in chemistry	Dr B Samant ICT Mumbai
3	Electrochemistry	Dr P A Sathe, R Ruia College
4	Chemical Bonding	Dr Balakrishnan, Professor, IIT Mumbai
5	Drug Discovery	Dr Krishna Iyer, Bombay College of Pharmacy
4	Thermodynamics	Dr Radha Jairam ICT Mumbai
5	EDTA-A wonder reagent	Prof V B Kulkarni, R J College
<b>PHYSICS</b>		
<b>2016-2017</b>		
1	Appreciating 100 years old modern Physics	Dr Mahesh Shetty
2	Nuclear properties and radioisotopes	Dr Reddy, Former Head ACD BARC
3	Golden ratio and centre mass	Dr Vijay Singh, raja Ramanna Fellow faculty CBS, Mumbai University
4	Particle accelerators : engine of discovery	Prof Siddharth Kasturirangan, Indian Institute of Geomagnetism
5	Space research at IIGM and future perspectives	Dr Bharati Kakad , Indian Institute of Geomagnetism
4	A voyage from circuits to system in Electronics	Prof Rajan Chitale, Faculty, Centre for Basic Science Univ of Mumbai
5	YeSYou can do it	Mr Anand Ghaisas, HBCSE
6	Non linear dynamic and brain functioning	Dr Kiran Kolwankar Faculty, R J college
<b>ZOOLOGY</b>		
<b>2016-2017</b>		
1	Human Genome sequencing	Dr Krishna Iyer, Bombay College of Pharmacy
2	Animal breeding	Dr Arjun shinde, Veterinary doctor, ATRECT
3	Polymerase chain reaction	Dr Deepak Modi, Scientist NIRRH
4	Research Inquiry	Dr P G Kale, HOD Zoology
5	Molecular diagnostics	Dr Savita Kulkarni, BARC

**Field trips/ excursions/ Industrial visits:**

<b>BOTANY</b>	
<b>2016-2017</b>	
1	Jummapatti, Neral
2	Kaas Plateau and Panchagani
3	Delphi Terrace Garden and Hiranandani Gardens, Powai
4	Ankur Theme Park, Kalwa
5	Wai: visit includes a trip to the Sugar factory, horticulture park, Nakshatra garden, turmeric processing units, field cultivation of brocolli, fish breeding, sericulture, apiary
6	Soonabai Pirojsha Godrej Marine Ecology Centre, Mumbai
<b>CHEMISTRY</b>	
<b>2016-17</b>	
1	Universal Health Care, Silvassa
2	Parle G Factory, Silvassa
<b>PHYSICS</b>	
<b>2016-2017</b>	
1	Nehru Science Centre, Worli
2	Indian Institute of Geomagnetism, Panvel
3	Night sky observation Mamnoli Kalyan, in collaboration with Akash Mitra Mandal
4	Tata Institute of Fundamental Research
<b>ZOOLOGY</b>	
<b>2016-2017</b>	
1	Chatrapati Shivaji Vastu Sangrahalaya
2	Vivek Agro farm Virar
3	Ankur Theme Park, Kalwa
4	Marine biodiversity study at Alibag
5	Bhartpur Bird Sanctuary and Ranthombore Sanctuary, Rajasthan

**Training/seminar /workshop attended by the faculty member of the college****BOTANY**

<b>No.</b>	<b>Name of the faculty</b>	<b>Title</b>	<b>Venue/trained by</b>
<b>2016-2017</b>			
1	Capt Pravin Nayak and Dr Anil Avhad	Remote Sensing	R J College , 14/7/2016
2	Dr Veena Kelkar	HPTLC and Nano particle characterization	Institute of Science in collaboration with ANCHROM , 5/10/2016
3	Capt Pravin Nayak and Dr Anil Avhad and	National seminar on " Know your Pulses"	Guru Nanak College, 11/7/2016
4	Dr Anil Avhad	Standardisation of medicinal plants	Agarkar research institute Pune, 8 <sup>th</sup> and 9 <sup>th</sup> Nov, 2016
5	Capt Pravin Nayak	Statistical tools in research	R J College, 30 <sup>th</sup> to 30 <sup>th</sup> Oct , 2017

**CHEMISTRY**

<b>No.</b>	<b>Name of the faculty</b>	<b>Title</b>	<b>Venue/trained by</b>
<b>2016-2017</b>			
1	Dr R S Dubey	Recent advances in microfluides & SAW sensors for human health care	19-25 <sup>th</sup> Oct, 2016
2	Shri P P Kamble		
3	Shri J D Girase		
4	Shri Prabijna Babu	Refresher course in chemistry	HRDC Ravi Shankar University 2-22 <sup>nd</sup> July, 2016
5	Shri Amol Kadam	Refresher Course in chemistry	

6	Dr Vaishnavi Sridhar	Research Methodology	HRDC University of Mumbai R J College, 20 <sup>th</sup> Nov to 25 <sup>th</sup> Nov, 2017
7	Dr Asawari Mokal	Research Methodology	HRDC University of Mumbai R J College, 20 <sup>th</sup> Nov to 25 <sup>th</sup> Nov, 2017
8	Dr Abhay Sawant	Role of Marathi terminology in Science Education	Commission scientific and technical terminology (HRD), 8 <sup>th</sup> and 9 <sup>th</sup> Dec 2017
9	All staff member (21)	Training in recording spectrum on FTIR	ISMAS 28/2/2017

### PHYSICS

No.	Name of the faculty	Title	Venue/trained by
<b>2016-2017</b>			
1	Ms Ratna Jadhav, Dr Neeta Srivastava and Dr Vaishali Raikwar	Training in curriculum upgradation and new practicals	Jai Hind College, Mumbai 7/7/2017
2	Ms Rekha Ghorpade	Resource generation and predeparture training International Physics Olympiad	HBCSE RGC March 17 <sup>th</sup> to 20 <sup>th</sup> 2017 OCSC May 24 <sup>th</sup> to June 5 <sup>th</sup> PDT : 3 <sup>rd</sup> July -14 <sup>th</sup> July
3	MS Rekha Ghorpade	Curriculum upgradation	10 <sup>th</sup> July, 2017 Pali Raigad 30 <sup>th</sup> July , 2017, Gogate Joglekar Ratnagiri
4	Dr Devraj Pawar	Data Intensive Science workshop	IUCAA, Pune, 13-18 <sup>th</sup> February, 2017
5	Dr. Devraj Pawar	Visit for data collection	Bera Observatory, Milan, Italy 30 <sup>th</sup> September to 10 <sup>th</sup> October, 2017

### ZOOLOGY

No.	Name of the faculty	Title	Venue/trained by
<b>2016-2017</b>			
1	Dr Geeta Joshi	Curriculum implementation	Kirti College, 10/7/2016
2	All faculty members	Basic course in remote sensing with hands on training on map making and interpretation	R J college, 14/7/2016
2	Mr Deepak Poojary	Molecular Biology techniques in diagnostics	R Ruia College , 19-30 <sup>th</sup> Sept, 2016
3	Mrs Sushma Singh	Training on DNA barcoding	PHCDBS Aurangabad, 10-17 <sup>th</sup> June, 2016
4	Dr Bindu Achary and Ms Sanika Gupta	Concept of Science through Investigation	R J College in collaboration with HBCSE 14/12/2016
5	Ms Sanika Gupte and Ms Sushma Singh	Statistical tools in Data analysis	R J college 23 <sup>rd</sup> Oct to 30/10/2017



## **12. Qualitative Improvements due to DBT Support (please highlight 5 salient points):**

### **Botany**

1. The department with a strong research culture was enthusiastic in implementation of new practicals which enabled students in learning by doing
2. Practical during field trips made learning botanical names easy. More number of students could join the field trip since some funds were available from DBT star college scheme.
3. Visiting premier institutes motivated students to pursue higher studies. Students have a sense of pride especially when they receive the DBT star award during competitions.
4. Students could perform all molecular biology and biochemistry practical's individually due to purchase of multiple units of electrophoresis, pH meters, balances, micropipettes, colorimeters from DBT star college funds and they were motivated to take up project work.
5. Students from star college scheme have given feedback as to how UG projects have helped them in PG project work since. Increase in PG progression increased from 50% to 70%

### **Chemistry**

1. Purchase of chemicals enabled the students to perform practicals individually. Student number being large all of them had the opportunity to perform practicals and at least one project individually due to availability of instruments and consumables procured from DBT star college funds.
2. Purchase of instruments in multiple numbers like colorimeter, pH meter, conductometer, potentiometer helped each student to handle the instrument and do the practical
3. Teachers were trained in emerging areas and were enthusiastic about designing new practicals. Environmental awareness through implementation of green chemistry was done.
4. Guest faculty from industry also helped in developing project based learning skills since we could pay the resource persons. This motivated students to join PG programs.
5. UG to PG progression has increased from 50 to 70%

### **Physics**

1. Purchase and fabrication of new instruments from DBT star college funds enabled introduction of new practical's
2. These new practical's helped students in critical thinking and setting up of experiments and led to project design. Students showed more readiness to do project work and team work for problem solving, since resources were not a limiting factor.
3. Faculty involvement in practicals and projects created a congenial learning environment
4. Students were motivated for progression to PG studies and in view of the demand the department applied to the Government and University of Mumbai and started MSc in Physics.
5. The department with high level research culture established a research center for enrolling students for doctoral programmes

### **Zoology**

1. DBT Star college scheme enabled teachers to design new experiments bypassing animal dissections
2. Molecular biology experiments could be done individually because of procurement of many small electrophoresis units and availability of micropipettes, chemicals.
3. Students learn to standardize instruments individually and research culture percolated to under graduate section of the college.
4. Interdepartmental activities and sharing of resources enabled optimum utilization funds and resources
5. Student involvement increased in all areas. New practicals and projects done in field studies made learning enjoyable.

### **Overall Impact**

The DBT Star College Scheme has brought in the feeling of natural sciences among teacher and students. It has facilitated free flow of information among the departments. The research ties have been strengthened due to sharing of resources, collaborative work among the departments. Guest lectures by eminent personalities brought students from all streams under one umbrella and they learnt to work as a team.

Students enjoyed science since they were not mere spectators but were actually doing the projects and practicals due to availability of instruments, glassware's and chemicals. Increase in student enthusiasm to learn by doing independent working in projects and also helping each other during project work.

There is a noticeable change in the curiosity about different aspects of the subject thinking beyond class room and students have started asking interesting question which has led to teachers getting involved more in interacting with the students. Learning by doing has made learning process enjoyable.

The publication of SOPs, manuals by all the participating departments has standardized the protocols enabling students to be industry ready. Departments have adopted ecofriendly ways and green chemistry is widely practiced by staff and students. This has been possible due to repeated workshops being organized to emphasize and reemphasize the urgent need to follow green practices.

Students were desirous to showcase their projects to the staff and students of other colleges. There has been a marked increase in the participation of our students in seminars, research events and various competitions, and they have won prizes for their projects.

The ultimate outcome of DBT Star College Scheme is clear inculcation of research culture in undergraduate students and total involvement of teachers in designing new practical's and readiness to be a lifelong learner.

### 13. Strengths and Weaknesses of Each Department (3 each)

#### BOTANY

Strength	Weakness (Challenge)
<ul style="list-style-type: none"> <li>Committed and highly motivated staff members</li> </ul>	<ul style="list-style-type: none"> <li>Very high student teacher ratio</li> </ul>
<ul style="list-style-type: none"> <li>Research culture prevalent from the inception of the college. Recognized research centre. Total staff involvement in star college activities</li> </ul>	<ul style="list-style-type: none"> <li>Diverse student population in terms of academics, medium of study, economically challenged</li> </ul>
<ul style="list-style-type: none"> <li>Laboratories and departmental library open on all days and extended timing</li> </ul>	<ul style="list-style-type: none"> <li>Space constraint</li> </ul>

#### CHEMISTRY

Strength	Weakness (Challenge)
<ul style="list-style-type: none"> <li>Illustrious faculty some them with industry experience</li> </ul>	<ul style="list-style-type: none"> <li>Very high student teacher ratio</li> </ul>
<ul style="list-style-type: none"> <li>Mixed age group of staff and all specialization are available. All the staff members contribute to new practical's designed</li> </ul>	<ul style="list-style-type: none"> <li>Diverse student population in terms of academics, medium of study, economically challenged</li> </ul>
<ul style="list-style-type: none"> <li>Highly supportive non-teaching staff members</li> </ul>	<ul style="list-style-type: none"> <li>Non availability of online research articles due to their high cost.</li> </ul>

#### PHYSICS

Strength	Weakness (Challenge)
<ul style="list-style-type: none"> <li>Committed staff members department has an Humboldt fellow and a IUCAA Associate</li> </ul>	<ul style="list-style-type: none"> <li>Low commitment level of students</li> </ul>
<ul style="list-style-type: none"> <li>Starting of PG and research centre</li> </ul>	<ul style="list-style-type: none"> <li>Diverse student population in terms of academics, medium of study, economically challenged</li> </ul>
<ul style="list-style-type: none"> <li>Highly supportive and talented non-teaching staff members</li> </ul>	<ul style="list-style-type: none"> <li>Non availability of online research articles due to their high cost.</li> </ul>

#### ZOOLOGY

Strength	Weakness (Challenge)
<ul style="list-style-type: none"> <li>Committed faculty members</li> </ul>	<ul style="list-style-type: none"> <li>Very high student teacher ratio</li> </ul>
<ul style="list-style-type: none"> <li>Symbiotic relationship with Botany department for sharing of resources</li> </ul>	<ul style="list-style-type: none"> <li>Diverse student population in terms of academics, medium of study, economically challenged</li> </ul>
<ul style="list-style-type: none"> <li>Laboratories and departmental libraries open all days for extended hours</li> </ul>	<ul style="list-style-type: none"> <li>Space constraint</li> </ul>

**List of Instruments Purchased under DBT STAR COLLEGE SCHEME (Botany)**

1	2	3	4	5	6	7	8
Sr. No.	Instrument Name	Make (if any)	Rate	Quantity (Nos.)	Total Cost	College Voucher No. or Dept. Statement No.	Date of purchase
1.	PLS Smart 3 Trinocular Microscope with LCD Screen for Microscope	Pulse	120000	1	135000	3011	13/02/2015
2.	Equiptronics Digital Calorimeter Model EQ 650 A	Equiptronics	8200	8	68265	3023	11/03/ 2015
3.	7020 Mini Submarine Electrophoresis Unit	Tarson	12696	6	77128	3036	21/03/2015
4.	Vertical Electrophoresis Unit	Slimpage D	9350	4	58523	3046	19/03/2015
5.	Power Supply (power pack for electrophoresis units)	Electravolt	5100	4			
6.	Microcentrifuge Spinwin	Tarson	28800	1	159889	3037	20/03/2015
7.	Digital pH Meter	Equiptronics	7990	1			
8.	Ultrasonic Bath Complete	Dakshin	12400	5			
9.	Glass Thermometer	Zeal	225	1			
10.	Digital Balance EWT 223	Eureka	28000	1			
11.	Digital Balance EWT 610	Eureka	19000	1			
12.	Digital Balance EWT 5000	Eureka	22500	1			
13.	Hair Drier		1200	1			
14.	Digital Colorimeter Model 253	Hans Vidyut	8100	1	26480	3071	25/03/2015
15.	Laboratory Air Oven	Metalab	21700	1			

16.	Bacteriological Incubator Digital Temp	Metalab	21700	1	26480		
17.	Revolutionary General Centrifuge R-8c	Remi	30519	1	30900		
18.	Visi Cooler 2°C to 8°C	Blue Star	45970	1	46545		

**List of Instruments Purchased under DBT STAR COLLEGE SCHEME (CHEMISTRY)**

1	2	3	4	5	6	7	8
<b>Sr. No.</b>	<b>Instrument Name</b>	<b>Make (if any)</b>	<b>Rate</b>	<b>Quantity (nos)</b>	<b>Total Cost</b>	<b>College Voucher No. or Dept. Statement No.</b>	<b>Date of purchase</b>
1.	3 Phase 10 KVA Servo Stabilizer	Automate Instruments	26500	1	29812.5	3047	5/3/2015
2.	Platinum electrode	Equiptronics	1140	4	5130	3048	16/3/2015
3.	Digital Polarimeter with electronic sensor and unbreakable 20 cm & 10 cm tubes EQ/801	Equiptronics	21600	2	48600	3049	19/3/2015
4.	Drying Cabinet fitted with R.I. Heating bulb & dimmer		3400	6	22950	3050	21/3/2015
5.	Medico centrifuge with 8 x 15 ml tube adapter model R - 303 (Sr. No. 2 BAN.1163, 1164, 1165, 1166, 1168, 1178)	Remi	5040	6	34020	3051	25/3/2015
6.	Premier Electronic Balances Model : PSP103 Capacity : 100 g Accuracy : 0.001 g Sr. No.:15034008,9,11,12, 13 Ver. Q. : A/15	Premier	18000	5	101250	3056	30/3/2015
7.	Multiparameter meter for water analysis supplied with required electrodes & a stand model CMP - 01	Contech	98800	1	111150	3057	30/3/2015
8.	Digital colorimeter with disc type 8 built in filters EQ/650 A	Equiptronics	6764	1	7609.5	3058	30/3/2015
9.	Digital conductivity meter with cell K = 1 EQ/660 B	Equiptronics	6262	1	7044.75	3058	30/3/2015

10.	Digital potentiometer EQ/603	Equiptronics	4230	1	4758.75	3058	30/3/2015
11.	Digital pH meter with built in mag. Stirrer supplied with electrode EQ/614 A	Equiptronics	6973	2	15689.25	3058	31/3/2015
12.	Spare Filters for Flame Photometer (a) Calcium (b) Lithium (c) Strontium (d) Magnesium	Equiptronics	3472 3472 3472 3472	1 1 1 1	15624	3059	30/3/2015
13.	Digital pH meter with built in mag. Stirrer supplied with electrode EQ/614 A	Equiptronics	6973	1	7844.625	3062	31/3/2015
14.	Atharva Water Ring Vacuum Pump Model AWR - 75	Atharva	95000	1	97988	3070	30/3/2015
15.	Pen Drive	Transcend	260	1	260	3004	9/1/2015

**List of Instruments Purchased under DBT STAR COLLEGE SCHEME (PHYSICS)**

1	2	3	4	5	6	7	8
Sr. No.	Instrument Name	Make (if any)	Rate	Quantity (nos)	Total Cost	College Voucher No. or Dept. Statement No.	Date of purchase
1.	500 Gm Electronic Balance	-	25500	1	58500	3024	12/02/2015
2.	Single Phase 10 kva Servo Stabilizer	Servo	26500	1			
3.	CIE Brand Digital Multimeter Model 122	CIE	21500	10	21500	3025	16/02/2015
4.	Hall Effect Apparatus		5000	2	219712	3026	28/02/2015
5.	Travelling Microscope 3 Motion SS Scale	Ajanta	8000	4			
6.	Spectrometer 7" PC SS Scale 1 min	Ajanta	8500	5			
7.	Signal Generator 2MHz with digital display Vavcord GSS2 MD		7800	5			
8.	LVDT Trainer		10000	2			
9.	Starin Guage Trainer		10000	2			
10.	Newton's Ring Microscope cat. No. 1573		8500	1			
11.	Newton's Ring Apparatus cat. No. 1571		800	1			
12.	Newton's Ring Apparatus cat. No. 1572		500	1			
13.	Nicol Prism		4000	2			
14.	Calcite Prism		6000	1			
15.	Quartz Prism		4000	2			
16.	Microprocessor KIT ANSHUMAN-8085		6500	2	13650	3027	17/02/2015
17.	Travelling Microscope		8500	1	23062.50	3028	05/03/2015
18.	SCMOS 2MP		12000	1			
19.	Optical Bench 11/2 Mtr long Complete		69500	1	78187	3032	07/03/2015



	Set						
20.	Kater's Pendulum with brass square rod		16500	2	56812.50	3042	14/03/2015
21.	Kater's Pendulum with SS square rod		17500	1			
22.	Startracker 150/750 EQ2		17778	1	22599	3043	20/03/2015
	Carry bag Padded for Ota		1560	1			
	Carry bag Padded for EQ		750	1			

**List of Instruments Purchased under DBT STAR COLLEGE SCHEME (ZOOLOGY)**

1	2	3	4	5	6	7	8
Sr. No.	Instrument Name	Make (if any)	Rate	Quantity (nos)	Total Cost	College Voucher No. or Dept. Statement No.	Date of purchase
1.	BOD Incubator 5°C to 6°C	Metalab	81300	1	80030	3071	25/03/2015
2.	Printer Laserjet	Canon	7523	1	7900	3001	18/09/2014
3.	PLS LCD 450 with 3.6" LCD Display Monitor Digital Screen Microscope	Pulse	26000	1	29250	3010	15/02/2015
4.	pH Meter EQ610	Equiptronics	6800	1	64204	3020	8/03/2015
5.	Calorimeter EQ650	Equiptronics	7170	1			
6.	Pan Type pH Meter	Hanna	900	1			
7.	Digital Sound Level Meter 35 to 130 DB		5800	1			
8.	UV Cabinet	Bioethinics	5500	1			
9.	Dissecting Microscope Brass Parts Superior	MVTEX	975	12			
10.	Muffle Furnace Digital	Bioethinics	16500	1			
11.	Bunsen Burner	Bioethinics	2700	1			
12.	Camera Nikon 229 with 8Gb Card	Nikon	4619	1	4850	3044	20/03/2015
13.	Ecopage-D Ready Vertical Electrophoresis Unit		11110	5	148635	3045	23/03/2015
14.	Ecosub-D Electrophoresis Unit with UV Transparent Tray		12250	5			
15.	Slimsub-D Electrophoresis Unit with UV Transparent Tray		9600	1			

16.	Electravolt Power Supply		5100	4			
17.	UCONCAL5 Analab Conductometer	Analab	11800	1	10620	3052	26/03/2015
18.	LG Microwave Oven 32 L with Convection	19000	19000	1	21375	3068	31/03/2015
19.	Digital Lux Meter		1500	1	-	3035	16/03/2015
20.	Digital Sound Level meter		5800	4			
21.	Calorimeter EQ650		7170	4			
22.	pH Meter EQ610		6800	4			
23.	Pen Type pH Meter		900	4			
24.	Haemocytometer Set		1100	20			
25.	Gel Rocker		21080	1			
26.	Dissecting Microscope		975	12			

### List of Advisory Committee Members

Dr Suman Govil	DBT Representative: Adviser DBT
Dr Sandhya Shenoy	DBT Representative: Scientist DBT
Dr Garima Gupta	DBT Representative Scientist DBT
Dr Usha Mukundan	Principal Chairman
Dr Suhas Pednekar	External Expert, Member, Principal R Ruai College
Dr K K Rao	External Expert, Member, I I T Mumbai
Dr Mrunalini Date	Coordinator Botany Department-Member
Dr P G Kale	Coordinator HOD Zoology, Member
Mr V B Kulkarni	Coordinator HOD Chemistry, Member
MS Maneesha Oak	Coordinator Physics department
Dr Bindu Achary	Zoology Department-Member
Mr Raghu Pillai	HOD Physics Department, Member
Mr P N Anchaliya	Coordinator Physics Department-Member
Dr Himanshu Dawda	Overall coordinator

**Dates of meeting: 12/1/2015, 22/3/2016 and 21/10/2016**

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**Dr Himanshu Dawda**  
Coordinator  
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**Dr Usha Mukundan**  
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