

**Department of Biotechnology  
Star College Scheme**

**Progress report 2017-2018**

**1. Name of the College** : NES Ratnam College of Arts, Science  
& Commerce, Bhandup(West), Mumbai-78

**2. Name of Departments supported:** Botany, Zoology, Chemistry, Physics,  
Mathematics & Statistics  
ratnam\_college@rediffmail.com  
022-25951381

**Name of the Coordinator** Dr.Sunita Chahar

**Designation, address, phone nos.** Head & Associate Professor Dept.of Botany  
sunitachahar@rediffmail.com  
9969411124

**3. No. of regular faculty with Ph.D.in each participating department:**

S.No	Department	Staff with Ph.D
1	Botany	1 & 2 pursuing
2	Zoology	2
3	Chemistry	4
4	Physics	2
5	Mathematics & Statistics	1& 1 pursuing

**4. List of courses (B.Sc./M.Sc./PG Diploma, certificate etc) run by different participating departments:**

Department	Regular Course	Certificate Course
Botany	➤ B.Sc. ➤ Ph.D	Nutrition & Dietetics
Zoology	➤ B.Sc.	Nutrition & Dietetics
Chemistry	➤ B.Sc. ➤ M.Sc.(Analytical Chemistry)	Instrumental & Analytical Techniques

Physics	<ul style="list-style-type: none"> <li>➤ B.Sc.</li> <li>➤ M.Sc. Physics (Microprocessors &amp; Microcomputers)</li> </ul>	Microprocessors & Microcontrollers
Mathematics & Statistics	➤ B.Sc.	–

**5. Admission in different courses in participating departments in 2017-18 academic session:**

S.No.	Department	Cut off % for admission	No. of students admitted	No. of drop out students	% of results
1	Botany	50%	62	Nil	100%
2	Zoology	50%	62	Nil	100%
3	Chemistry	50%	129	Nil	93.75%
4	Physics	50%	81	Nil	78.6%
5	Mathematics & Statistics	50%	53	Nil	71.4%

**6. List of projects undertaken by students, industrial visits , summer training in last one year. Activities carried out during the year (department wise):**

**Students activities**

**I) List of projects taken up by students**

S.NO	Supervisor	Class & Number of Beneficiaries	Title of the Project	Equipments Used
<b>Department – Botany</b>				
1	Dr.SunitaChahar	TYBSc - 4	Digital Herbarium preparation	Computer with internet facility and printer
2	Dr.SunitaChahar	TYBSc - 4	Study of pollen grains from local flora	Labomed trinocular microscope, Camera attachment, Hot plate
3	Dr.SunitaChahar	TYBSc - 2	Butterfly loving plants	Computer, printer & reference books
4	Dr.SunitaChahar	TYBSc - 2	Phenology of <i>Lantana</i> &	Stereozoom

			<i>Stachytarpheta</i>	microscope, Camera attachment
5	Dr.SunitaChahar Ms. Shweta Belose	FYBSc - 25	Leaf Herbaria	Reference Books
6	Ms. Shweta Belose	FYBSc - 20	Algal diversity from pond	Labomed trinocular microscope, Camera attachment
7	Ms.Mamta Yadav	FYBSc - 35	Plant Resource Utilization	Computer with internet facility and printer.Reference Books
8	Ms. Shweta Belose	SYBSc -15	Survey of Flowering Plants (Family : Leguminosae)	Computer with internet facility and printer.Reference Books
9	Ms.Mamta Yadav	SYBSc- 18	Antimicrobial screening of medicinal Plants	Reference Books
10	Ms.Mamta Yadav	TYBSc - 2	Biomediated Synthesis of Silver Nano particles	Reference Books
<b>Department – Zoology</b>				
1	Dr.Jayasree Sasangan	TYBSc - 1	Biodiversity of Kunkavale Village and Bhandup	Computer with internet facility and printer
2	Dr.Jayasree Sasangan	TY BSc &SYBSc - 5	Ornamental Fish Breeding and Management	pH meter andMicroscope
3	Dr.Meenakshi K	SY BSc - 5	Vermiculture and Vermicomposting	pH meter
4	Ms.Chetna Sharma	FY BSc -03	Identification of Foraminiferan shells	Binocular microscope and compound microscopes
<b>Department – Chemistry</b>				
1	Dr.Phebe.K	TY BSc - 12	Determination of total acid content ( Fresh and Commercial samples)	Electronic Balance pH meter, Mortar Pestle

2	Dr.Phebe.K	TY BSc - 12	Determination of sugar /acid ratio of fruit ( Fresh and Commercial samples)	Mortar Pestle
3	Dr.KiranUpar & Lakshmi.P	TY BSc - 8	Preparation of amine and ethylene diamine complexes of copper (II) and $\mu_{max}$ value	Colorimeter, Electronic Balance
4	Dr.KiranUpar & Phebe.K	TY BSc - 8	Preparation of Ni DMG and Ni ( II) ethylene diamine complexes, determination of their $\mu_{max}$ value and molar absorptivity	Spectrophotometer, Electronic Balance
5	Dr.Kiran Upar	SY B Sc - 4	Preparation and determination of percentage of purity of Nickel dimethyl glyoxime complex	Electronic Balance, Water bath, Oven
6	Dr.Kiran Upar	SY B Sc - 4	Preparation and determination of percentage of purity of Tris (ethylene diamine) nickel (ii) thiosulphate	Electronic Balance Water bath, Oven
7	Dr.Kiran Upar	SY B Sc - 4	TLC Preparation( glass plate) Separation of plant pigments on TLC.( Spinach)	TLC Chamber, Column
8	DrMedha .S	SY B Sc - 4	Chemical parameter- organic carbon and calcium carbonate	Water bath, Oven, Electronic Balance, Water bath, Oven
9	DrMedha .S	SY B Sc - 6	Physical parameter – pH, Conductance and Water holding capacity	pH meter , Conductivity Bridge
10	Dr Jayashree .G	FY B Sc - 49	Literature Survey	Computer & reference books
11	Dr Jayashree .G	FY B Sc - 100	Calculation of order and rate of reaction -Using POGIL Approach	
12	Dr Jayashree .G	FY BSc - 6	Direct Dyeing of a fabric using different dyes	
13	Ms V. Lakshmi.P	TYBSc - 10	Determination of vitamin C in fruit juices ( Fresh and Commercial samples)	
<b>Department – Physics</b>				

1	Ms. Presentia Aloysious	FYBSc - 07	Make your own Microscope	
2	Ms.Pratibha Singh	FYBSc - 5	Make Electromagnets of different strengths	Sensor Test, Electromagnet
3	Dr. Vinita Dhulia	FYBSc - 5	Measuring noise levels in the locality and making a comparative study	Decibel App, Sound meter
4	Mrs. Presentia Aloysious	FYBSc - 07	Testing the purity of water by measurement of Surface Tension	Travelling Microscope with 3 motion
5	Dr.Rupali Patel	FYBSc- 06	Comparative study of the force generated by varying magnetic field	
6	Dr.Vinita Dhulia	SYBSc - 7	Make a 5Volt Power Supply	Soldering Iron 25watt
7	Mrs.Pratibha Singh	SYBSc - 10	h/e using Plank's constant	Plancks constant apparatus model101
8	Mrs.Presentia Aloysious	SYBSc - 6	Measure the tensile strength of various materials	
9	Dr.Rupali Patel	SYBSc -8	Synthesis of nanomaterials	Muffle Furnance with PID 1150c size 9x4x4cm, Electric Oven
10	Dr. Vinita Dhulia	TYBSc- 6	PCB designing of the given circuit	
11	Mrs.Pratibha Singh	TYBSc - 5	Measuring Mobility of charges in semiconductor using Hall Effect	Hall effect Apparatus Mark control system
<b>S.NO</b>	<b>Department – Mathematics &amp; Statistics</b>			
1	MsS.Karthiyaini	F. Y. B. Sc-02	Magic Squares	Computer and Reference Books
2	MsS.Karthiyaini	F. Y. B. Sc-04	Weighing Functions in Linear Algebra	Computer and Reference Books
3	MsS.Karthiyaini	F. Y. B. Sc-05	Fractals	Computer and

				Reference Books
4	MsS.Karthiyaini	F.Y.B.Sc-06	Maths Sum Games	Computer and Reference Books
5	Dr. (Ms) Nithya S.	F.Y.B.Sc-04	Pell's Equation	Computer and Reference Books
6	Dr. (Ms) Nithya S	F.Y.B.Sc-05	Catalan Numbers	Computer and Reference Books
7	Dr. (Ms) Nithya S.	F.Y.B.Sc-06	Golden Ratio	Computer and Reference Books
8	Dr. (Ms) Nithya S.	F.Y.B.Sc-04	Cryptography	Computer and Reference Books
9	MsVeena B. Kamat& Ms Bhakti Velankar	S.Y.B.Sc-02	Euler's Formula, Platonic Solids and Polyhedra without Diagonals	Computer and Reference Books
10	MsVeena B. Kamat& Ms Bhakti Velankar	S.Y.B.Sc-02	Game Theory	Computer and Reference Books
11	Ms Bhakti Velenkar	S.Y.B.Sc-02	GPS	Computer and Reference Books
12	MsVeena B. Kamat	S.Y.B.Sc-02	Lagrange Multiplier	Computer and Reference Books
13	MsVeena B. Kamat & Mrs Bhakti Velankar	T.Y.B.Sc-07	Traversal of a Graph	Computer and Reference Books

## II) Industrial visit /Field Visit

Department	Date	Place of visit	Class &Beneficiaries
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<b>Botany</b>	29.07.17	Empress Botanical Garden, Hadapsar, Pune	TYBSc - 22
	25.09.17	National Institute of Post Harvest Technology NIPHT , Talegaon, Pune	FYBSc-54
	30.11.17	Ovalekar Wadi , Butterfly Garden, Ovale village, Thane(West)	SY BSc & TY BSc – 32
	16.03.18	Blatter Herbarium, St.Xavier’s College	<b>SY BSc- 20</b>
<b>Zoology</b>	23.09.17	Fish landing centre – Bhaucha Dakka, Byculla	TY BSc- 20
	29.07.17	Empress Garden, Hadapsar, Pune	TY BSc- 20
	02.10.17	Ovalekarwadi Butterfly Park, Ghodbunder Road,Thane	FYBSc 40
	08.02.18	Godrej Mangrove Centre, Vikhroli	SY BSc – 28 } 48 TYBSc - 20 }
	28.03.18	Mangrove walk at Bhandup Pumping station	FY, SY & TYBSc- 27
<b>Chemistry</b>	22.08.17	<b>Industrial visit to</b> Effluent Treatment Plant at RCF, Chembur	T.Y.B.Sc (6 units) :30
	29.09.17	<b>Industrial visit to</b> common effluent treatment plant (CETP), Kopar khairne , Navi Mumbai	F.Y.B.Sc : 49
	20. 12.17 - 21.12.17	National level Forensic Ex Po – ‘A glimpse in to the world of Investigation’( Institute of Forensic Sciences, Mumbai)	TY B.Sc- (6 & 3 units):47
	12.01.18	<b>Participation in the</b> convention of 60 <sup>th</sup> anniversary of Indian rubber Manufacturers Research Association, Thane	F.Y.B.Sc : 12
	20.03. 18	Visit to IISER, Pune	TYBSc.(6 units) : 29
<b>Physics</b>	18.07.17	‘Science Train’ parked at CST-a Government of India initiative	TYBSc- 11
	17.08.17	A visit to C-DAC Centre , Pune	TYBSc- 11 }

	07.09.17	Science and Technology Park & Inter University Centre for Astronomy & Astrophysics (IUCAA),Pune	TYBSc - 11 SYBSc - 32 43  TYBSc - 07 SYBSc - 02 } 11 FYBSC - 02
	28.02.18	Visted Homi Bhabha Centre for Science Education (HBCSE) to mark the occasion of National Science Day	TYBSc - 10 SYBSc - 02 } 14 FYBSC - 02
<b>Mathematics</b>	17.08.17	C-DAC, (Super Computing facility) - Pune.	T.Y.B.Sc-07 S.Y.B.Sc-10 F.Y.B.Sc- 21
	07.09.17	IUCAA, Pune organized by the Dept. of Physics.	T.Y.B.Sc-07

### III) Summer training for students / Certificate Course

Date	Summer training	Institute	Beneficiaries
<b>Department of Chemistry</b>			
26.12.17 to 31.12.17	Chromatography	GNIRD – Khalsa College, Matunga, Mumbai	08
21.06.17, 28.06.17, 05.07.17, 12.07.17, 02.08.17 & 23.08.17	Training Session for higher studies (JAM ): Three colleges ( Ratnam college, Menon & Vaze College)	<ul style="list-style-type: none"> <li>➤ Dr.Jayasree .G (Dept of Chemistry)</li> <li>➤ Dr.Phebe Kingsley (Dept of Chemistry)</li> <li>➤ Dr.Kakule (V.K.Menon College, Bhandup)</li> <li>➤ Dr.Gomathi.S (V.K.Menon College, Bhandup)</li> </ul>	15 (In house) 15 (External)
<b>Department of Physics</b>			
9.12.17 (Conducted on Saturdays)	Training Sessions (UG & PG) for competitive examinations	Mr.Nishchal Dwivedi, Research Scholar, BARC	45

### IV) Outreach Programme for Schools, Junior & Degree Colleges conducted by the college

Date	Name of the Resource Person	Designation	Title	Beneficiaries
06.10.17	Dr.Rashmi Develekar	Occupational therapist, Fortis	Breast Cancer Awareness	Teaching & Non-teaching Staff -50



		Hospital		
28.11.17	Dr.Prabodh Chobey	Regional Director of YCMOU & Former chief mentor of Innovation hub, Nehru Centre	Science is Fun	<ul style="list-style-type: none"> <li>➤ School students- 30</li> <li>➤ NES Junior College -57</li> <li>➤ Ratnam College -21</li> <li>➤ Other Colleges-36</li> </ul>
28.11.17	Ms.Meena Kharatmal	Scientific advisor, HomiBhabha Centre of Science	Collaborative Learning & Experimenting	<ul style="list-style-type: none"> <li>➤ School students-30</li> <li>➤ NES Junior College -57</li> <li>➤ Ratnam College -21 students</li> <li>➤ Other Colleges- 36</li> </ul>
05.01.18	Dr. G.S. Rautela	Former Director General, National Council of Science Museums	Innovations in Science (Dr. A.P.J. Abdul Kalam Memorial Lecture Series)	<ul style="list-style-type: none"> <li>➤ Ratnam College -105</li> </ul>
05.01.18	Dr. A.P. Jayaraman	Former Scientist B.A.R.C	Anatomy and Physiology of Future Science(Dr. A.P.J. Abdul Kalam Memorial Lecture Series)	<ul style="list-style-type: none"> <li>➤ Ratnam College -105</li> </ul>
29.01.18	Dr. Bharat Patodia	Senior Clinical Associate, Medical Oncology, P.D.Hinduja Hospital Mumbai	Awareness of tobacco-induced Cancers and general cancers	NSS Volunteers of all faculties-100
08.02.18	Dr.Monica Mary Grady	Professor of Planetary and Space Sciences at the Open University, Milton Keynes. London	<ul style="list-style-type: none"> <li>➤ Collisions and Catastrophes</li> <li>➤ Astronomy by Microscope and Mass Spectrometer</li> <li>➤ Landing on a Comet</li> <li>➤ Life beyond Earth:</li> </ul>	<ul style="list-style-type: none"> <li>➤ Student Participants(500)</li> <li>➤ NES RatnamCollege (Science –FY,SY,TYBSc)</li> <li>➤ NES Junior College</li> <li>➤ NES Ratnam Junior College</li> </ul>

			Prospects and Possibilities	
08.2.18	Ian Wright	Professor of Planetary and Space Sciences at the Open University, Milton Keynes. London	<ul style="list-style-type: none"> <li>➤ What is the chemical composition of a comet?</li> <li>➤ How would you measure it?</li> <li>➤ “Cosmochemistry” &amp; “meteoritics”</li> </ul>	Student Participants(500) <ul style="list-style-type: none"> <li>➤ NES Ratnam College (Science –FY, SY, TYBSc)</li> <li>➤ NES Junior College</li> <li>➤ NES Ratnam Junior College</li> </ul>
20.2.18 to 24.2.18	National Science Fest	All Five Science Departments	Display of Equipments/ Experiments for School Children	<ul style="list-style-type: none"> <li>➤ NES High School -300</li> <li>➤ Oxford School-100</li> </ul>
13.03.18	Prof.Chakradev	Former HOD, Dept of Physics, CHM College	Fun with Physics	NES School for Hearing Impaired- 25

### V) Inter- departmental Activities for Students

<b>1) SCI-TREK an Annual Intra - collegiate science festival</b>		
<b>Date</b>	<b>Department</b>	<b>Competition</b>
06.01.18	Botany	Tiara making/ Dream Catcher making
	Zoology	Shoot at sight/Photography
	Chemistry	Crossword Puzzle
	Physics	Crack-d-Code
	Mathematics	Crossword Puzzle
<b>2) Research Convention</b>		
<b>Date</b>	<b>Department</b>	<b>Projects presented</b>
	<b>Zoology</b>	<ul style="list-style-type: none"> <li>➤ Identification of Foraminiferan shells from sand collected from Kashid Beach, Maharashtra</li> <li>➤ Estimation of acid value of various edible oils</li> <li>➤ Comparison of vitamin C in different juices</li> <li>➤ Ornamental fish breeding and management</li> <li>➤ Vermiculture and vermicomposting</li> </ul>
	<b>Chemistry</b>	<ul style="list-style-type: none"> <li>➤ Determination of Vitamin C in fresh and commercial fruit juices</li> <li>➤ Determination of acidity of fresh and commercial fruit juices</li> <li>➤ Determination of Sugar/Acid Ratio</li> <li>➤ Determination of Juice Content</li> <li>➤ Preparation and spectrophotometric analysis of Complexes</li> </ul>

31.03.18		<p>(Tetraammine Copper (II) sulphate, Bis (ethylene diamine), Copper (II) sulphate, Nickel dimethyl glyoximate, Tris (ethylene diamine) Nickel (II) thiosulphate, Nickel (II) hexamine chloride)</p> <ul style="list-style-type: none"> <li>➤ Preparation and determination of percentage yield of Nickel complex (Nickel dimethyl glyoxime, Tris (ethylene diamine) Nickel (II) thiosulphate)</li> <li>➤ Separation of Plant Pigments by Thin Layer chromatography</li> <li>➤ Soil analysis: pH, Conductance, Water holding capacity, Calcium carbonate, Organic Matter of soil sample.</li> <li>➤ Dyeing of cotton fabric.</li> </ul>
31.03.18	<b>Physics</b>	<ul style="list-style-type: none"> <li>➤ Make your own Microscope</li> <li>➤ Make Electromagnets of different strengths</li> <li>➤ Comparative study of the force generated by varying magnetic field</li> <li>➤ Testing the purity of water by measurement of Surface Tension</li> <li>➤ Measuring noise levels in the locality and making a comparative study,</li> <li>➤ <math>h/e</math> using Plank's constant</li> <li>➤ Synthesis of nanomaterials</li> </ul>
	<b>Mathematics &amp; Statistics</b>	<ul style="list-style-type: none"> <li>➤ Magic squares</li> <li>➤ Catalan numbers</li> <li>➤ Traversal of a Graph</li> <li>➤ Game theory</li> <li>➤ Euler's formula, Platonic solids and polyhedral without diagonals</li> <li>➤ GPS</li> <li>➤ Pell's equation</li> <li>➤ Golden Ratio</li> <li>➤ Cryptography</li> <li>➤ Fractals</li> <li>➤ Math Sum Games</li> </ul>

**7) Training received/provided to faculty from participating departments & External teachers**

**A) Teaching Faculty ( In-house & External )**

Date	Workshop	Resource Person & Institute	Beneficiaries
<p><b>Department of Mathematics</b>  <b>Latex and Mathematical Software for Teaching and Research</b></p>			

18.12.17	Maple Software in teaching and learning of Mathematics	Mr.DeepakGarud, Mr.Zaighum Hasan	09-Inhouse 18-External
19.12.17	Hands on session on basic of maple Software	Mr. SwapnilBudhwarkar	09-Inhouse 18-External
19.12.17	Google Class Room	Mr.SachinGadkar	09-Inhouse 18-External
20.12.17	Mathematical LaTeX typesetting	Dr. Abhaya Patil & Mr.MhandarKhasnis	09-Inhouse 18-External
20.12.17	Class Room Teaching using Smart Boards	Mr. HarjeetLagotia	09-Inhouse 18-External
21.12.17	Sage software in Linear Algebra, Calculus, Real Analysis	Dr.Ajit Kumar	09-Inhouse 18-External
21.12.17	Python Programming for SAGE	Dr.Ajit Kumar	09-Inhouse 18-External
23.12.17	Beamer presentation in Latex	Dr. Abhaya Patil	09-Inhouse 18-External
23.12.17	Use of Exam module	Mr.Mhandar Khasnis	09-Inhouse 18-External
<b>Department of Zoology</b>			
06.10.17	Self examination for cancer, Symptoms & video presentation	Dr. Rashmi Devlekar, Occupational Therapist, Fortis Hospital, Mulund.	<b>Teachers (55 Participants)</b> <ul style="list-style-type: none"> <li>• NES Sunbeam School</li> <li>• NES Primary School</li> <li>• NES Junior College</li> <li>• NES Ratnam Junior</li> <li>• Teaching &amp; non teaching staff of Ratnam College</li> <li>• Nurse of NES medical Centre</li> </ul>
<b>Science Faculty</b>			
28.11.17	How to teach Basic Sciences	Dr.Prabodh Chobey Regional Director of YCMOU & Former chief mentor of Innovation hub, Nehru Centre	<b>Teacher Participants(35)</b> <ul style="list-style-type: none"> <li>• NES Junior College</li> <li>• NES Ratnam Junior</li> <li>• Ratnam College(Science)</li> </ul>

**B) Training conducted for Non -Teaching Faculty ( In-house )**

<b>Date</b>	<b>Workshop</b>	<b>Resource Person &amp; Designation</b>	<b>Beneficiaries</b>
19.03.18	Maintenance of Laboratory Equipments	Mr.Dhaval Panchal	17 (In house)

		(Proprietor, Pulse Life Sciences) Mr.Rajendra Darshatkar	10(Inhouse)
23/03.18	Enhancing Productivity and Efficiency at Workplace  Use of Technology for enhancing Productivity and Efficiency at Workplace  Fundamentals of Productivity and Efficiency at Workplace  Psychological Aspects of Productivity and Efficiency at Workplace	Mr Tushar Sambare (SM Shetty College)  Dr Mary George (Managing Director- Carewell Holostic ,IHC)  Mr Swapnil Pange (Psychologist)	32 (19 colleges)

### C) Training/Seminars/Conference participated by Teaching Faculty

#### Department of Botany

- Dr.SunitaChahar: Presented research papers in the National Conference on “ Emerging Trends in Mycotechnology” at G.M.Momin College, Bhiwandi, on 5<sup>th</sup> and 6<sup>th</sup>January 2018 and received third prize in oral presentation category.

#### Papers presentation titled:

1. Sructural diversity of AM Fungi in the roots of *Lantana camara* and *Stachytarpheta indica* by Sunita Chahar
2. Mycorrhiza Inoculum Potential of Glomusmosseae in *Zea mays*, *Triticum aestivum* and *Sorghum bicolor*. By Vivekanand Mishra and SunitaChahar

#### Department of Physics

- Mrs. Pratibha Singh attended two weeks Refresher Course on Experimental Physics organized at Ruia College in association with Academy of Sciences from 25/09/17 to 11/10/17.
- Mrs. Pratibha Singh attended workshop on ‘Non-Linear Dynamics-Chaos’ on 9.2.18 at R.Jhunjhunwala College.
- Dr.Vinita Dhulia completed 12 week online certification course on ‘Embedded Systems Design, conducted by IIT Kharagpur under National Programme for Technology Enhanced

#### Department of Chemistry

- Dr Medha.S attended one week short term course on 6.03.2018 to 11.03.2018 at Academic Staff college, University of Mumbai on Renewable energy and its application organized by UGCand RUSA

#### Department of Mathematics & Statistics

- Ms Bhakti Velankar and Dr Nithya S. attended an International Conference in Mathematics celebrating centenary year of S.S.Shrikhande ‘Dept. of Mathematics, University of Mumbaifrom 22/01/2018 to 25/01/2018:

8) List of Exhibitions/Seminars/training courses conducted by the college for students:

I) Conducted by the college

Date	Workshop	Resource Person	Designation of Resource Person	Beneficiaries
<b>Department of Botany</b>				
7.9.17 to 9.9.17	Fungi around us –Their isolation, identification and cultivation	Dr. Lalsaheb Yadav,	Assistant Professor, C.H.M. College, Ulhasnagar	21 (In-house) 36 (External)
16.1.18	Sources of Household Pollution & Composting Technique	Ms. Priyanka Sarkar Mr. Jayant Joshi	Sampoorna Earth Solutions.	70 (In house)
30.1.18 & 31.1.18	Techniques in Horticulture ➤ Hydroponics  ➤ Various Propagation Techniques and flower arrangement  ➤ Vegetable and Fruit Carving.  ➤ Bonsai Making	Mr. Sameer Pokale  Dr. Shrutika Kumthekar,  Dr. Meenakshi Vora  Ms. Vijaya Dole & Ms. Bharathi Nagraj	Techxellance Solutions Pvt. Ltd  Assistant Prof., Gurunanak College  Associate Prof., Mithibai College  Indian Bonsai Society	93 (In-house) 10 (External)
16.2.18	Electrophoresis	Ms. Yogita Narvekar.	Technocraft company	20 (In house)
27.2.18	Preparation of eco-friendly holicolours	Ms. Purnima Shirgaonkar	Paryavarana Dakshata Mandal.	63 (In house)
<b>Department of Zoology</b>				
27.12.17	Basic Concepts in Biostatistics and <i>In-silico</i> Approach to understand them	Mr. Nitin Wasnik	Assistant Professor, Ruparel College, Matunga, Mumbai	25 (In house) & 10 (External)
17.02.18	Preparation for the Changing World (Interdisciplinary	Mr. Ravikant Maurya	Proprietor, Ravi Consultant and Alumnus of the	TYBSc -12 TYBCom-10 TYBMS -02

	Interpersonal Skill Development)		Department	&TYBBI -05
<b>Department of Chemistry</b>				
23.11.17	'Spoken tutorials – Avaogadro and Jmol'	Dr. Snehalatha Kaliappan,  Ms.Madhuri Ganapathi,	Senior Research Scientist ,Spoken Tutorial Project,IIT  Senior Research Scientist , Spoken Tutorial Project, IIT	60(In house)
04.12.17	Learning Chemistry is Fun	Dr.Prabodh Chobe	Ex Sr Gen. Manager, BASF.	60 (In house)
03.01.18	Organic Reaction Mechanisms	Dr.Lakshmy.R  Dr Gomati .S	Vaze Kelkar College, Mulund V.K.Menon College, Bhandup	32(Inhouse) & 63 (External)
<b>Department of Physics</b>				
	Bridge Course was conducted for SY/TY students ➤ Electronics ➤ Units & Dimensions ➤ Optics ➤ Mathematical Physics	Dr. Vinita Dhulia Mrs. Presentia. A Dr. Rupali Patel Ms. Pratibha Singh	Department of Physics	43
09.2.18 & 10.2.18	Interdisciplinary workshop was conducted on 'PCB Making'.	Mr.Maheshwar Falake	Asst. Professor, SIES College	43
<b>Department – Mathematics &amp; Statistics</b>				
18.07.17	Screening of the movie 'The Man Who Knew Infinity'	Life of a genius Mathematician Srinivasa Ramanuja	Movie based on a book by Robert Kanigel	(In house)
22.09.17	Cyber Security and Ethical hacking	MrSachin Dedhia	Ethical Hacker, SKYNET Secure	101(In house) & 28(External)
19.01.18	Abstract Thinking	Mrs. Jayasree. S	Research Scholar HBCSC, Mumbai	45(In house) 33(External)

21.02.18 to 24.02.18	Python Programming  Basic Introduction to Python & Python in Scientific Computations  Data Analysis with Python  Symbolic Computations in Python	Dr. Ajit Kumar,  Dr. V.H. Dalvi,  Mr. Kamlesh Sutar  Dr. Venkata Reddy  Dr. Sivaramkrishnan S.	ICT- Mumbai  ICT-Mumbai  ICT-Mumbai  Statinfer-Bangalore  IITB, Mumbai	10(In house) & 22(External)
02.01.18	Training Programme in Madhava Competition	Mr. Shriprasad Tambe	HBCSE, Mankhurd	30(Inhouse) & 2(External)
<b>Bridge Course</b>	Mathematical Proofs History of Number System and Applications of Mathematics	DrNithya.S	Dept of Mathematics	52 (FY –In house)
	Logic, Set Theory, Binary Operations, Complex Number Systems	Mrs S. Karthiyaini	Dept of Mathematics	48(FY – Inhouse)
	Real Analysis	Mr.Ashish Gunjan Chakraborty	Menon College, Bhandup– E,Mumbai	43(FY – Inhouse)
<b>Bridge Course</b>	Algebra	Mrs.Asha Chugh	CHM College ,Ulhasnagar, Thane	43(FY –In house)
	Permutations	Mrs.Veena B. Kamat	Dept of Mathematics	12 (SY – Inhouse)
	Techniques of Integration	Mr.Bhakti Velankar	Dept of Mathematics	12(SY – Inhouse)
	Real Analysis	Mr. Ashish GunjanChakraborty	Menon College, BhandupE, Mumbai	12(SY – Inhouse)
	Algebra	Mrs.Asha Chugh	CHM College Ulhasnagar, Thane	12(SY – Inhouse)



	Conic Sections Techniques of Integration	Mrs. Bhakti Velankar	Assistant Professor ,Dept of Mathematics	07(TY – Inhouse)
	Real Analysis	Mr. Ashish GunjanChakraborty	Menon College, Bhandup -E Mumbai	07(TY – Inhouse)
	Algebra	Mrs.Asha Chugh	CHM College, Ulhasnagar, Thane	07(TY – Inhouse)
09.08.17	Eigen values	Mrs. Bhakti Velankar	Assistant Professor ,Dept of Mathematics	50
16.08.17 & 23.08.17	Introductory Session, Analysis M.Sc –IITB, Mumbai	Mr. Shriprasad Tambe	HBCSE, Mankhurd	50
06.09.17 & 13.09.17	Linear Algebra	Mrs. Umalaxmi Patne	Assistant Professor, B.N.Bandodkar College of Science,Thane	50
27.10.17 & 04.11.17	Limits & Continuity, Differentiability	Mr. Mandar Khasnis	Assistant Professor, CHM College, Ulhasnagar	50
22.11.17 & 29.11.17	Double Integration & Triple Integration	Mrs. Saeed Joshi	Assistant Professor, RamnarainRuia College,Mumbai	50
06.12.17 & 13.12.17	Line Integrals & Surface Integrals	Mr. Laxman Naik	Assistant Professor, Mithibai College, Mumbai	50
10.01.18 & 24.01.18	Differential Equation M.Sc –IITB, Mumbai	Ms.Komal Wategaonkar	Assistant Professor, Royal College, Mira Road	50
31.01.18 & 07.02.18	Complex Analysis & Number theory	Mr. Makarand Niphadkar	Associate Professor, K.J. Somaiya college of Science & Commerce Mumbai	50

**II) List of Exhibitions/Seminars/training courses attended by the Students in other Institutes:**

S.No	Title	Institute	Resource Person	Beneficiaries
<b>Department of Zoology</b>				
06.03.18 & 07.03.18	Techniques in Molecular Biology	Homi Bhabha Centre for Science Education	Dr. Rekha Vartak Head Biology Olympiad Unit	19
<b>Department of Chemistry</b>				
11.05.17	Construction of a Bio Gas Plant	Appropriate Rural Technical Institute (ARTI) Phaltan, Satara district, Maharashtra	Mr Sunil Hegde Project Manager, ARTI, Phaltan	09
<b>Department of Physics</b>				
23.9.17.	Interdisciplinary National Workshop on 'Electron Microscopy of nanoparticles'	Department of Physics of SIWS College in association with National Centre for Nanosciences & Nanotechnology, University of Mumbai	Dr. Pushyan Ayyub, TIFR, Mumbai  Dr. Deepa Kushalani TIFR, Mumbai  Dr Andy Sen, ICON Mumbai	SY : 04 & FY : 02
10.04.17	Theoretical Physics	Indian Association of Physics Teacher at KJ Somaiya College	Members of Indian Association of Physics Teachers (IAPT)	04

**9. Name, designation, host Institute of guest faculty invited:**

Date	Name of the Guest Faculty	Designation & Institute of the Guest Faculty	Title of the Guest lecture
<b>Department of Botany</b>			
7.07.17	Mr. Chaitanya .S. Magar,	Research scholar from KET's Vaze College, Mumbai	Algal Biotechnology"
2.12.17	Dr. Pratap Naikwade	Asst. Professor, ASP College, Devrukh (Post Doc from Arizona state)	Climate change-An emerging environmental issue
9.12.17	Dr. Nitin Labhane	Associate. Professor, Bhavans	Studies on

		College Mumbai ( Post Doc from Hungary)	Auxintransporters in Arabidopsis thaliana using mutants .
17.01.18	Dr. Shilpa Verekar	Head – Technical Projects Microchem Silliker Pvt Ltd, Mumbai.	Endophytes in Plants
21.03.18	Dr. Mahavir Gosavi	Asst. Professor, SIES College, Mumbai	Bioinformatics
<b>Department of Zoology</b>			
01.07.17	Dr. Shashibhal Pandey,	Assistant Professor, Smt. C.H.M. College, Ulhasnagar”.	Basic Concepts of Bioinformatics
01.09.17	Mr. Bicheesh Balan	Asst. Professor, Mithibai College, Mumbai	An Introduction to Bird Watching and Photography
15.02.18	Dr. Akshata Handigund	Orthodontist.	Dental Disorders
16.02.18	Dr. Jyoti Vora	Head, Dept. of Biochemistry and Food Science and Quality Control, Ramnarain Ruia College	Good laboratory Practices
16.02.18	Mrs. Yogita Narwekar	Proprietor, Technocraft	Entrepreneurship Opportunities
03.03.18 &17.03.18	Dr. Shagufta Shaikh	Scientific Officer, Cytogenetics & Molecular Genetics, Pathology Unit, BARC Hospital, Mumbai	Genetic disorders and their identification
20.03.18	Mr. Chinmay Pravin Joshi	Member, Res Qink Association for Wildlife Welfare (RAWW)	Urban Wildlife
<b>Department of Chemistry</b>			
13.07.17	Dr. Nandita Madavan ,	Associate Prof, IIT, Bombay	‘Molecular Machines’
20.11.17	Mr. Chandu Babu Konikineni	RCF Ltd (Govt. of India Undertaking)	Environmental Impact of solid fertilizer industry
09.01.18	Dr C. Subramaniam	Assistant Professor ,Dept of Chemistry, IIT, Powai	Feynman’s Dream Today’s reality
18.01.18	Mr. Hiren M Shah	Ex. Marketing Manager, A.M. Ozonics Pvt. Ltd	Use of Ozone (Green Technology) ‘for drinking water & waste water treatment’
28.03.2018	Mr. Rakesh Sinha	Sr. Manager (Fire & Safety) , Rashtriya Chemicals & Fertilizers Ltd.	Scientific Disposal of Hazardous Chemicals

<b>Department of Physics</b>			
24.8.17,31.8.17, 23.9.17 & 5.10.17	Prof.Anand Ambadekar	Assistant Professor at SIES College, Mumbai	Scopes of Biophysics
12.1.18	Mrs.Pratibha Pai	HOD,Physics Deptment of SIES College	8085 Microprocessor
13.3.18	Prof.Chakradev	Former HOD,Physics Deptment of CHMCollege Associate. Professor, Bhavans College, Mumbai	Fun with Physics
<b>Department of Mathematics &amp; Statistics</b>			
19.07.17	Mr. Mahmood Khan	Alumnus of the Dept. Student of M.Sc at Dept. of Mathematics, University of Mumbai	Number of Homomorphisms from $\mathbb{Z}_n$ to $\mathbb{Z}_n$
16.02.18	Dr. Narasimhan Chari	Retired Head and Professor of Mathematics, D.J.Sanghvi College of Engineering	Mathematical Trading Strategies
01.03.18	Dr. Sivaramakrishnan.S.	Associate Professor, Dept. of Mathematics IITB, Mumbai	Linear Algebraic Methods in Combinatorics'

**10. Date of Advisory committee meeting: 07.07.2018 (Mentoring meet)**

**A) Constitution of Advisory committee:**

ChairPerson	I/C Principal Dr.Mary Vimochana
DBT Representative	Dr.Garima Gupta
External Experts (Members)	Dr.A.P. Jayaraman, Ex-Nuclear Scientist, BARC, Mumbai. Dr.Sunita Shailajan, Head, Department of Botany, Ramnarain Ruia Autonomous College, Matunga, Mumbai.

Members (Departmental Coordinators - from all participating departments)	Dr.Vinita Dhulia – Physics Mrs.Lakshmi Prasunna - Chemistry Mrs.Veena B. Kamat - Mathematics & Statistics Dr.Jayashree Sasangan - Zoology Dr.Sunita Chahar - Botany
Coordinator – Member	Dr.Sunita Chahar

**B) Advisory committee meeting conducted after implementation of scheme:**

1. Advisory Committee meeting with the advisors ( Dr. A.P. Jayaraman, Dr.Sunita Shailajan ) & Department coordinators : 24.08.17
2. Mentoring meeting with the advisors ( Dr. A.P. Jayaraman, Dr.Sunita Shailajan ), Department coordinators and Science staff of five departments : 07.07.18
3. Apart from this monthly meetings were held of all the departmental coordinators.

**11. List of New Practical's/demonstrations introduced for UG students of each batch (I, II and III year) in different departments supported under Star College Scheme in last one year:**

The Science departments continued to conduct the new practical's introduced in 2017-18 for enhancing the experiential learning and the understanding of the basic principles involved in various practical's.

**List of New Practical's**

Sr. No.	New Practicals	Class	Equipments used
<b>Department of Botany</b>			
1.	To study different types of placentation.	FYBSc	Dissecting microscopes
2.	Absorption Spectrum of Chlorophyll pigment	FYBSc	Spectrophotometer, mixer grinder
4.	Study of morphology of starch grains from various plants	FYBSc	Ordinary Compound microscope, mixer grinder
5.	Extraction of carotenoids from different fruits	FYBSc	mixer grinder
6.	Mitotic Index	FYBSc	Labomed trinocular microscope, Computer
7.	Study of family Leguminosae from Bhandup area	SYBSc	Computer, Internet

8.	Microbiology Experiments :	SYBSc	
	i) Sterilization techniques	SYBSc	Autoclave, oven, Laminar air flow
	ii) Media and Slant preparation and pouring methods	SYBSc	Autoclave, water bath
	iii) Preparation of soil suspension by serial dilution method	SYBSc	
	iv) Isolation of fungi from soil	SYBSc	Stereozoom microscope
	v) Preparation of pure culture of fungi	SYBSc	Refrigerator, Water bath
	vi) Study of aeromycoflora	SYBSc	Autoclave
	vii) Antimicrobial effect of garlic and turmeric on fungi	SYBSc	Autoclave
9.	Study of fungal diseases in plants	SYBSc	Ordinary Compound microscope
10.	Micrometry	SYBSc	Stage micrometer, Occular micrometer, Ordinary Compound microscope
11.	Study of Dicot embryo	TY/SY/ FYBSc	Dissecting microscope
12	Study of Fruit Morphology	TYBSc	
	<b>EXTENDED PRACTICALS</b>		
13.	Evaluation of pH of Garden Soil	SYBSc	pH meter
14.	Estimation of Iron in leafy vegetables	TYBSc	Heating mantle, oven, Colorimeter
15.	Determination of NR activity in leaf disc	TYBSc	Waterbath, Colorimeter
16.	Estimation of RNA from plant sample	SYBSc	Centrifuge, Colorimeter
<b>Department of Zoology</b>			
1.	Estimation of acid value of various domestic edible oils	FY BSc	Waterbath
2.	Estimation of Vitamin C in lemon juice	FY BSc	Titration
3.	Estimation of peroxide value of edible oils.	FYBSc	Titration

4.	Estimation of Ca from milk powder.	FYBSc	Titration
5.	Determination of carbohydrates by Anthrone method.	FYBSc	Colorimeter
6.	Study of heart beat of <i>Daphnia</i> .	SYBSc	Microscope
7.	Estimation of protein from milk	SYBSc	Colorimeter
8.	Making honey crystals	SYBSc	Oven
9.	Immobilization of enzymes or whole cells.	TYBSc	Refrigerator
10.	Assay of immobilized invertase in yeast cells.	TYBSc	Waterbath and Oven
11.	Effect of pH variation on alkaline phosphatase activity	TYBSc	Spectrophotometer and Oven
12.	Effect of varying enzyme concentration on alkaline phosphatase activity	TYBSc	Spectrophotometer and Oven
<b>Department of Chemistry</b>			
1	Chemical kinetics of Acetone vs Iodine	FYBSc	Glass ware
2	Enthalpy of solutions and heat of reactions (KNO <sub>3</sub> , NaOH, NH <sub>4</sub> NO <sub>3</sub> , NH <sub>4</sub> Cl, CaCl <sub>2</sub> , MgSO <sub>4</sub> )		Calorimeter, glass ware
3	Preparation of standard solutions (Succinic acid, oxalic acid, EDTA, NaOH, KOH, Na <sub>2</sub> CO <sub>3</sub> , CuSO <sub>4</sub> .5H <sub>2</sub> O)	FYBSc	Electronic balance Standard flasks , funnels
4	Estimation Fe <sup>+2</sup> solution using Ce <sup>4+</sup> ions – Redox titration	SYBSc	Electronic balance, Potentiometer, Standard flasks , funnels
5	Estimation of weak acid by conductometry	SYBSc	Conductometer
6	Preparation of Orange dye - Orange I & Orange IV	TYBSc	Thermostat, Glass ware
7	Separation of organic mixtures ( solid – Solid)	TYBSc	Glassware
8	Development of ion exchange column	TYBSc	Ion Exchange column
9	Determination of ion exchange capacity	TYBSc	Ion Exchange column
10	The exchange efficiency of the given cation exchange resin	TYBSc	Ion Exchange column

11	Determination of $\lambda_{\text{max}}$ and $\text{Cu}^{+2}$	TYBSc	Colorimeter and Spectrophotometer
<b>Department of Physics</b>			
1.	Melting point of solids	FYBSC	Electric oven, Digital Multimeter Mastech 830L
2.	Friction between solid surfaces and Determination of acceleration due to gravity	FYBSC	Slotted weights 5x50 gms brass
3.	The Cornu's method for determining the elastic constants of a transparent beam	FYBSC	Travelling Microscope with 3 motion for Newton's Rings
4.	Vector Algebra-physical significance using PC simulations	FYBSC	Intel core i3 4th generation Processor, Acer LED Monitor model E1900Hq and MAPEL software
5.	Half wave and Full wave Rectifier	FYBSC	CRO 30 MHz dual trace, Signal Generator Testronix make 100 KHz
6.	Determination of thickness of thin transparent sheet using Michelson Interferometer	SYBSC	Michelson Interferometer
7.	Determination of wavelength of laser light source using transmission grating	SYBSC	Diffraction grating 3 in 1, He-Ne laser source 2mw Red with built power supply
8.	Specific Rotation – Polarimeter	SYBSC	Polarimeter half shade
9.	Study of Double slit diffraction pattern	SYBSC	Double slit
10.	To measure the propagation or attenuation loss in an optical fibre.	TYBSC	Optical fibre kit
<b>Department of Mathematics &amp; Statistics</b>			
1.	Introduction to Maple Commands-I	FY/SY/ TYBSC	Maple Software
2.	Introduction to Maple Commands-II	FYBSC	Maple Software
3.	Polynomials	FYBSC	Maple Software
4.	Sequences and Series	FYBSC	Maple Software
5.	Properties of Vectors, System of linear	FY/TYB	Maple Software



	Equations	SC	
6.	Limits Continuity and Differentiability	FYBSC	Maple Software
7.	Mean Value Theorem, Extreme Values and Taylors Polynomial	FY/TYB SC	Maple Software
8.	Basic Algebra	FYBSC	Maple Software
9	Properties of Vectors, System of linear equation	SYBSC	Maple Software
10	Differential Equations	SYBSC	Maple Software
11	Drawing Graphs	SYBSC	Maple Software
12.	Complete Graphs & Shortest paths	SYBSC	Maple Software
13.	Different types of Graphs	SYBSC	Maple Software
14	Properties of Vectors, System of linear equations	TYBSC	Maple Software
15.	Simplex Method	TYBSC	Maple Software
16.	Sequences and Series	TYBSC	Maple Software
17.	Mean Value theorem, Extreme Values and Taylor's polynomial	TYBSC	Maple Software
18	Programming in Maple	TYBSC	Maple Software
19.	Sequential Continuity of scalar fields	SYBSC	Reference Books
20.	Lagrange Multiplier Method for extreme values	SYBSC	Reference Books
21	Permutations	SYBSC	Reference Books
22	Group of Symmetries of Plane Figures	SYBSC	Reference Books
23	Tree Traversals	SYBSC	Reference Books
24	Matrices and Boolean Properties	SYBSC	Reference Books &Computer
25	Change of Variable in Triple Integral	TYBSC	Reference Books
26	Quadratic Forms and Conic Sections	TYBSC	Reference Books
27	Properties of Cantor set	TYBSC	Reference Books

28	Conditional Variance	TYBSC	Reference Books
29	C-Programs on shortest searching, sorting and shortest path problems in Graph Theory	TYBSC	Software-Turbo C
30	Java programs for finding numerical solutions of algebraic equations using Bisection method and Newton Raphson method.	TYBSC	Software-jdk 1.3 for JAVA

## 12. Details of Equipment purchased in each Department from DBT grant (Item No, Cost, Date of order placed, Purchase /Installation

### Department of Botany

Sr. No	Name of the Equipment	Qty	Item wise cost(Rs)	Total Amount (Rs)	Date of order Placed	Date of Purchase of Equipment
1	Computer & Printer	01	34,300	<b>34,300.00</b>	29.06. 17	30.06.17
2	Heating Mantle	01	1670.40	1,670.40	18.01. 18	18.01. 18
3	Remi Cyclomixer	01	3910	3,910.00	18.01.18	18.01. 18
				CGST 502.24		
				SGST 502.24		
				Round off 2.12		
				<b>6,585.00</b>		
4	Electrophoresis Kit	01	41,949	<b>41,949.00</b>	24.01.18	02.02.18
5	Electric Bunsen Burner	01	3037.50	3,037.50	18.01.18	15.02.18
6	Distilled Water Plant	01	17,465.40	17,465.40	18.01.18	15.02.18
				CGST 1,845.00		
				SGST 1,845.00		
				<b>24,193.00</b>		
7	Water Bath	01	10,395	<b>10,395.00</b>	18.01.18	19.02.18
8	Student Microscope	08	3250	26,000.00	18.01.18	19.02.18
9	Dissecting Microscope	06	1500	9,000.00	18.01.18	19.02.18

10	Autoclave	01	15,000	15,000.00	18.01.18	19.02.18
11	Hot Air Oven	01	30,000	30,000.00	18.01.18	19.02.18
				CGST 7,200.00		
				SGST 7,200.00		
				<b>94,400.00</b>		
12	Spectrophotometer	01	26,600	26,600.00	18.01.18	13.02.18
13	pH Meter	01	9,500	9,500.00	18.01.18	13.02.18
14	Colorimeter	01	9,975	9,975.00	18.01.18	13.02.18
15	Hot Plate	01	5,922.90	5,922.90	18.01.18	13.02.18
				CGST 4,679.81		
				SGST 4,679.81		
				Round off 0.48		
				<b>61,358.00</b>		
16	Remi Micro Centrifuge	01	26,550	<b>26,550.00</b>	18.01.18	24.02.18
17	Teachers' Mike	03	600	1,800.00	03.03.18	09.03.18
18	Extension Board	01	200	200.00	03.03.18	09.03.18
19	Spike Guard	01	300	300.00	03.03.18	09.03.18
20	I-ball Speaker	01	800	800.00	03.03.18	09.03.18
21	32 GB Pendrive	04	650	2600.00	03.03.18	09.03.18
22	Table Lamp	02	400	800.00	03.03.18	09.03.18
23	I-ball Mouse	01	300	300.00	03.03.18	09.03.18
24	External Hard Disk	01	4200	4200.00	03.03.18	09.03.18
25	Bajaj Mixer grinder	01	2400	2400.00	03.03.18	09.03.18
				<b>13,400.00</b>		
26	Trinocular Microscope	01	30455	30,455.00	24.01.18	18.04.18
27	Trinocular Stereo Zoom Microscope	01	43137	43,137.00	24.01.18	18.04.18
				CGST 6,623.00		
				SGST 6,623.00		
				<b>86,838.56</b>		

28	Digital Camera for microscope	01	20500	<b>20,500.00</b>	26.04.18	26.04.18
29	Refrigerator	01	13800	<b>13,800.00</b>	27.06.18	28.06.18
				<b>Rs.4,34,268.56</b>		

**Department of Zoology**

S.N	Name of Equip	Qty	Item wise cost(Rs)	Total Amount (Rs)	Date of order placed	Date of purchase of equipment
1	Computer	1	26450	<b>26450</b>	29/06/17	30/06/17
2	Epson projector	1	28750	<b>28750</b>	29/06/17	30/06/17
3	Refrigerator	1	21850	<b>21850</b>	29/06/17	12/07/17
4	Colorimeter	2	9300	18600	04/08/17	11/08/17
5	Water bath	1	9150	9150	04/08/17	11/08/17
6	Oven	1	18760	18760	04/08/17	11/08/17
7	Ph meter	2	8700	17400	04/08/17	11/08/17
8	Mortar pestle	2	90	180	04/08/17	11/08/17
9	Spectrophotometer	1	43,338	43,338	04/08/17	11/08/17
				1,07,428		
			CGST@9%	8829		
			CGST@14%	1306		
			SGST @9%	8829		
			SGST@14%	1306		
				<b>1,27,698</b>		
10	Digital Balance	1	18950	<del>18950</del>	04/08/17	11/08/17
			CGST	2653		
			SGST	2653		
				<b>24,256</b>		
11	Binocular Microscope	5	10800	54,000	22/09/17	04/10/17
12	Compound Microscope	5	4300	21500	22/09/17	04/10/17
			CGST	10570		
			SGST	10570		
				<b>96,640</b>		
13	Vertical Electrophoresis	1	9152	9152	11/12/17	11/01/18
			GST 18%	1647		
				<b>10,799</b>		
				<b>3,36,443</b>		

Sr.No	Name of Equipments	Quantity	Cost (Rs.)	Date of Order	Date of Purchase
1	Computer	01	<b>26,450/-</b>	29/06/17	30/06/2017
2	Speakers(Zeus Electra)	01	<b>3500/-</b>	29/06/17	30/06/2017
3	Instruments 1)Spectrophotometer 2)Colorimeter(EQ650) 3)pH Meter(EQ-614) 4)Conductometer (EQ-660) 5)Heating Mental(1LTR) 6)F.B.Flask 7)Morter& Pestle 8)Water Bath	01 02 02 02 01 01 03 01	43338/- 18600/- 17400/- 15400/- 1700/- 2765/- 2850/- 9150/- (111203/- ) (+21386/-GST) <b>1,32,589/-</b>	02/08/17	11/08/2017
4	Electric Digital Balance(CA-123)	01	<b>24,256/-</b>	02/08/17	12/08/2017
5	Vaccum Pump-75Ltr	01	<b>36,800/-</b>	02/08/17	09/09/2017
6	1)Digital Colorimeter(EQ-650-A) 2)Digital Potentiometer(EQ-603) 3)Digital Conductivity Meter(EQ-660-B)	01 01 01 01	10384/- 6490/- 10030/- 1121/- <b>28,025</b>	11/06/18	28/03/2018
7	Refrigerator (Double Door)	01	<b>21,000/-</b>	27/06/18	28/06/2018
8	Microwave Oven(LG-20L)	01	<b>6300/-</b>	27/06/18	28/06/2018
<b>Total</b>			<b>2,78,920</b>		

### Department of Physics

Sr No	Name of Equipment	Qty	Item wise cost (Rs)	Total Amount(Rs)	Date of order placed	Date of purchase of equipment
1	Electric oven 14x14 x14 Inner SS Digital	1	16000	16000	20.06.2017	27.06.2017
2	Force Measurement Kit	1	14000	14000	20.06.2017	27.06.2017
3	Travelling microscope 3 motion best quality	4	9500	38000	20.06.2017	27.06.2017
4	Double slit	1	2500	2500	20.06.2017	27.06.2017
5	Diffraction Grating 15000 LPI Best Quality	2	3500	7000	20.06.2017	27.06.2017
6	Diffraction Grating 3 in 1	4	1500	6000	20.06.2017	27.06.2017
7	He – Ne Laser Source 2mw Red with Built in power supply	1	22000	22000	20.06.2017	27.06.2017
8	Polarimeter Half shade	1	10000	10000	20.06.2017	27.06.2017
9	Optical Fibre kit	1	14000	14000	20.06.2017	27.06.2017
10	Photo Detector & Emmiter Characteristics kit	1	8000	8000	20.06.2017	27.06.2017
11	Flux meter	1	6000	6000	20.06.2017	27.06.2017
12	Lux meter Lutron LX	1	3500	3500	20.06.2017	27.06.2017
	-101					
13	Muffle Furnace with PID 1150c size 9X4X4 cm	1	20000	20000	20.06.2017	27.06.2017

14	Ph Meter Equiptronics EQ-610	1	8500	8500	20.06.2017	27.06.2017
15	Plancks constant Apparatus model PC101	1	34000	34000	20.06.2017	27.06.2017
16	Hall Effect Apparatus Mark control systems	1	24500	24500	20.06.2017	27.06.2017
17	Microprocessor 8085 Dynalog make model Dyna 85	2	6800	13600	20.06.2017	27.06.2017
18	Spectrometer 7” protected circle Best Quality	1	10500	10500	20.06.2017	27.06.2017
			Total	258100		
			VAT 13.5%	34844		
				<b>292944</b>		
19	Cathode ray Oscilloscope 30 Mhz Dual trace Caddo 801	3	22500	67500	20.06.2017	28.06.2017
20	Signal Generator Testronix make 100Khz	5	4500	22500	20.06.2017	28.06.2017
21	Signal Generator Aplab make 2 MHZ	1	12000	12000	20.06.2017	28.06.2017
			Total	102000		
			VAT 6%	6120		
				<b>10,8120</b>		
22	Intel core i3 4 <sup>th</sup> generation processor	1	19811	19811	25.06.2017	30.06.2017
23	18.5 Acer LED Monitor model E1900Hq	1	5141	5141	25.06.2017	30.06.2017

24	Canon LBP 2900 Laser Printer	1	7406	7406	25.06.2017	30.06.2017
			Total	32358		
			VAT 6%	1942		
				<b>34300</b>		
25	Digital Multimeter kusum meco 603	4	1310	5240	24.02.2018	14.03.2018
26	Kater's pendulum mild steel	1	2275	2275	24.02.2018	14.03.2018
27	Lamp 35wSox	3	2600	7800	24.02.2018	14.03.2018
28	35 Watt Chowk	3	900	2700	24.02.2018	14.03.2018
			Total	Rs 18015		
			CGST	Rs 621.35		
			SGST	Rs 621.35		
				<b>21257.70</b>		
29	Discharge Tube Power supply	1	10000	10000	25.06.2017	20.03.2018
			Total	10000		
			CGST	900		
			SGST	900		
				<b>11800</b>		
			<b>Total</b>	<b>4,68,421</b>		



**Department of Mathematics and Statistics**

<b>Sr. No</b>	<b>Name of Equipment</b>	<b>Quantity</b>	<b>Cost (Rs.)</b>	<b>Date of placing the order</b>	<b>Date of purchase of equipment</b>
1	Maple 2017 Multi User Non Floating Licence (Binary Semantics )	03 (user Licenses)	2,25,869/-	19/06/17	14/07/2017
2	CYBERNETYX Eyries Interactive White Board Model No. 8090UST	01	42,495/-	29/06/17	14/07/2017
3	(i) Intel core i3 4 <sup>th</sup> generation processor Gibbyte H81 Motherboard, 4GB DDR3 Ram, 1TB Seagate sata hard Disk Drive, DVD writer, ATX cabinet with SMPS, circle keyboard & mouse. (ii) 18.5" ACER LED Monitor model E1900Hq (iii) HP 203 DN Duplex Printer	06	1,58,701/-  12,650/-	29/06/17	28/07/2017
4	Thin Computing	01	20,564/-	29/06/17	27/09/2017
5	Black board and White Magnetic Board	02	10,900/-	26/10/17	28/10/2017
			<b>TOTAL - 4,71,179/-</b>		

**13. Details of lists of Books & Journals Purchased under the Star College Scheme**

<b>S.No.</b>	<b>Name of the Books</b>	<b>Name of the Author</b>
<b>Department of Botany</b>		
1	Plant Growth & Development	B.P Nautiyal
2	Biostatistics 3ED (PB)	Veer Bala Rastogi
3	3000 Solved Problems in Biology	Ruth Bernstein & Stephen Bernstein
4	Zubays Principles of Biochemistry 5/Ed	Veer Bala Rastogi & K.R. Aneja
5	Plant Tissue Culture- Techniques & Experiments	Roberta H Smith
6	Easus Plant Anatomy Meristems cells & tissues of plant	Ray F. Evert

7	Textbook of systematic Botany	B.P Nautiyal
8	Plant Diseases Including MCQ	R.S. Singh
9	Botany for Degree students II	Dr.B. P Pandey
10	Modern Practical Botany Vol- II	Dr. B.P Pandey
11	Genetics	P S Verma , V.K Agarwal
12	Environmental Biology	Dr.P S Verma & Dr.V K Agarwal
13	A text book of Biotechnology	Dr.R.C Dubey
14	Plant Pathology : Pathogen & Plant Disease	Dr.B .P Pandey
15	Botany for Degree students- Gymnosperms	Dr. P.C Vasistha , Dr. A.K Sinha
16	Modern Practical Botany V-I	Dr.B.P Pandey
17	Cell Biology	P S Verma , V.K Agarwal
18	A textbook of Plant Physiology Biochemistry & Biotechnology	Dr.S.K Verma & Mohit Verma
19	Fundamentals of Plant Physiology	Dr.V K Jain
20	Cytogenetics, Evolution Biostatics & Plant Breed	Dr.R.S Shukla & Dr.P.S Chandel
21	Botany for Degree Students - Bryophyta	B.R Vashishta & A.K Sinha
22	College Botany Volume-1	Dr.B.P Pandey
23	College Botany Volume-2	Dr.B.P Pandey
24	Botany for Degree Students First Year	Dr.B.P Pandey
25	Botany for degree- Algae	B.R Vashishta & A.K Sinha
26	Botany for degree- Pteridophyta	Dr.P C Vashishta , Dr.A.K Sinha
27	College Botany 3	Dr.B .P Pandey
28	TB of Botany -Angiosperms	Dr.B .P Pandey
29	Ecology & Utility of Plants	R.S Shukla & P.S Chandel
30	Introduction to Biostatistics	Dr.Pranab Kumar Banerjee
31	Botany for Degree Students	Dr.B.P Pandey

32	Botany for Degree Fungi	B.R Vashishta & A.K Sinha
33	Enviromental Pollution	Dr. R. K Khitoliya
34	Textbook of Microbiology	DR.R.C Dubey & Dr.D.K Maheshwari
35	Modern Practical Botany 3	Dr.B .P Pandey
36	Laboratory Manual for Biotechnology	Ashish S Verma , Surajit Das & Anchal Singh
37	Cytology	P.S Verma & V.K Agarwal
38	Taxonomy- Evolution at work	M Daniel
39	Principles of Nanoscience & Nanotechnology	M.S.Shah & Tokeer Ahmad
40	Crop Evolution & Genetic Resources- Agricultural crops	Darbeshwar Roy
41	Plant Biochemistry- An introduction	Biju Dharmapalan
42	Microbial Biochemistry	M.L.Srivastava
43	Recombinant DNA Techniques A Text book	Monika Jain
44	Molecular physiology & Biotechnology of Flowering plants	A Rashid
45	Fungi	Geeta Sumbali
46	Bioanalytical techniques	M .L Srivastava
47	Introductory Practical Microbiology	Jayababu Mudili
48	Molecular Biology	A.V.S. S Sambamurthy
49	Microbiology	Dushyant Kumar Sharma
50	Natural products : Chemistry & Applications	Sujata V Bhat , B.A Nagasampagi
51	Genetics	A.V.S S Sambamurthy
52	Modern Plant Physiology	R. K Sinha
53	Plant Pathology : Pathogen & Plant Disease	Dr.B.P Pandey
54	Cell Biology	P.S Verma & V.K Agarwal
55	Fundamentals of Plant Physiology 19/Ed	Dr.V K Jain

56	Cell Biology	S.C Rastogi
57	Luck- Plant Biology	Andrew Lack & David Evans
58	Useful Indian Herbs	Sudha Prakash
59	Basics in Environmental Studies	Dr.Pushpendra , Dr.R.P Singh
60	Experiments in Microbiology plant Pathology - tissue culture	K R Aneja
61	Aneja - Introduction to Micology	K.R.Aneja & R.S Mehrotra
62	Fungal Diversity	K R Aneja & R S Mehrotra
63	Appling Biochemistry concepts & Applications	Dean R Appling , Spencer J. Anthony Cahill
64	Botany Paper- I Semester -III- Revised Mumbai University	Dr.Avinash Patil & Dr.Bindu Gopalkrishnan
65	Botany Paper- II Semester -III- Revised Mumbai University	Dr.Avinash Patil & Dr. Aruna Rai
66	Botany Paper- III Semester -III- Revised Mumbai University	Dr.Darshanan Patil
67	Botany Paper- I Semester -IV- Revised Mumbai University	Dr.Lalsahab Yadav & Dr.Anil Avhad
68	Botany Paper- II Semester -IV- Revised Mumbai University	Dr.Darshanan Patil & Dr.Mahavir Gosavi
69	Botany Paper-II I Semester -IV- Revised Mumbai University	Dr.Bindu Gopalkrishanan & Dr.Aruna Rai
70	FYBSc Botany Practical Text books	Sunita Chahar , Charuta Vaidya

### **Department of Zoology**

1	Quantitative Zoology	Sanjay Madan
2	Birds ( Biology and Behaviour )	Jonathan Elphick
3	Animal Diversity	Hickman / Roberts
4	Bats	Phil Richardson
5	Hole's Human Anatomy And Physiology	David Shier / Jackie Butler/Ricki Lewis
6	Birds Of The Indian Subcontinent	Richard Grimmett/ Carol Inskipp / Tim Inskipp
7	Mahajan's Methods in Biostatistics	Arun BhadraKhanal
8	Nutrition and Dietetics	Shubhangini .A. Joshi

9	Introductory Practical Biochemistry	S.K.Sawhney / Randhir Singh
10	An introduction to Practical Biochemistry	David T Plummer
11	Research Methodology Methods and Techniques	C.R.Kothari / Gaurav Garg
12	Laboratory Manual in Biochemistry	J.Jayaraman
13	Applied Entomology	P.G.Fenemore; Alka Prakash
14	Laboratory Manual of Entomology	Alka Prakash
15	Statistical Analysis of Quantitative Genetics	B.L.Agrawal / S.P. Agrawal
16	Animal Studies	G.Saravanan; P.Ponmurugan
17	Principles of Animal Taxonomy	Ashok Verma

### Department of Chemistry

1	Organometallic Chemistry of the Transition Metals	Crabtree .R.H
2	Organic Chemistry,2/Ed	Jonathan Clayden
3	Organic Synthesis through Disconnection Approach	P.S.Kalsi
4	Modern Methods of Organic Synthesis	William Carruthers & Iain Coldham
5	Safety & Hazards Management in Chemical Industries	Prof M.N.Vyas
6	Alternate Energy Processes in Chemistry synthesis	Ahluwalia V.K.& RS Varma
7	Chemistry for Engineers	Chopra H.K
8	Fundamental Concepts of Environmental Chemistry	Sodhi,G.S.
9	Green Solvents for organic Synthesis	V.K.Ahluwalia&RajenderS.Varma
10	Inorganic Chemistry-A Laboratory Manual	Nath. M
11	Organic Chemistry: A Laboratory Manual	Mumtazuddin,S
12	Organic Name reaction & Rearrangement	Jena,A.K
13	Sewell:Chromatographic Separation	Peter.A.Sewell
14	Chemistry for Engineers	H.K.Chopra & AnupamaParmar
15	Principal of Organic Synthesis	Brian.W.Pfenning
16	Spiro-chemistry of the Environment	Thomas.G.Spiro
17	Principals Inorganic Chemistry	R.O.C.Norman

### Department of Physics

1	Semiconductor Materials & Devices	D N Bose
2	Introductory Biophysics	James Claycomb
3	Nuclear and Particle Physics	S L Kakani
4	Physics for Science and Engineering	Pramod V. Naik
5	Introduction to Atomic and Molecular Spectroscopy	Vimal Kumar Jain
6	Atoms and Molecules in Laser and External Fields	Man Mohan
7	Physical Chemistry – A Laboratory Manual	Shailendra K. Sinha
8	Physical Chemistry –A Problem solving Approach	RamprasadMisra
9	Basic and Applied Physics – Recent Advances	Ramesh Chandra Tiwari
10	Nuclear Physics , second Edition	V. Devanathan
11	Energy storage and conversion Materials and Devices	Asok Kumar

12	Nanotechnology Nanomaterials&Nanodevices	G. Mohan Kumar
13	Modeling & Simulation 2/e	PratikshaSaxena
14	Research Methodology 2/e	Suresh Chandra
15	Quantum Mechanics	John L Powell
16	Numerical problem in Physics Volume 1 Optics, Waves and Oscillations, Electromagnetic Field Theory	Shashi Kant Pandey.
17	Numerical problem in Physics Volume II Mechanics, Thermal Physics, Circuit Fundamentals	Shashi Kant Pandey.
18	Nuclear & Particle Physics	Suresh Chandra
19	Engineering Physics 4/e	Uma Mukherji
20	Renewable Energy Technologies	M.K. Ghosal
21	Elementary Biophysics 2/e	P. K Srivastava
22	Applications of Light & Energy Management	O.N Awasthi
23	Non Conventional& Energy Sources	S. S. Thipse
24	Fundamentals of Geology	A.B.Roy
25	Numerical problem in Solid state Physics	M.A. Wahab
<b>Department of Mathematics &amp; Statistics</b>		
1	Graph Theory	Frank Harray
2	Textbook of Real Analysis	R.LGupta
3	Fundamentals of Modern Mathematics	David.B.Macnell
4	Abstract Algebra 2 <sup>nd</sup> Edition	Dan Saracino
5	A course in Real Analysis	Sayed Ali Ahmed
6	Abstract Algebra 2 <sup>nd</sup> Edition	Dan Saracino
7	Higher Mathematics Differential & Integral Calculus	Ya.S.Bugrov
8	Discrete Mathematics	H.V.Keshavan
9	Discrete Mathematics P/B	Ping Zhang&Gary Chartrand
10	Mathematical Modelling with Excel	Brian Albright
11	A Foundation Course inMathematics	AjitKumar,S. Kumaresan Bhaba Kumar Sharma
12	Group Theory & Its Applications	Patra, P.K
13	Latex For Beginners	Nambudiripad, K.B.M
14	Computational Methods for Physics & Mathematics with Fortran & C++ Programs	Singh, N.
15	Mathematics For Biologists	Arun Kumar
16	Statistics Using R 2/e	Purohit, S.G
17	Numerical Analysis	Bhat. R.
18	Algebra	Santhanam, G.
19	Mathematical & Computational Sciences	George, S.
20	Mathematical Modelling, Optimization & their Applications	Jha P.C
21	Course in real Analysis, A	Mukherjee, M.

22	Foundation of Complex Analysis 2/e	Ponnusamy, S.
23	Fundamentals of Complex Analysis	Bhat, V.K
24	Introduction of Matrix Theory	Sinha, Vinit K.
25	Calculus with Maple Labs	Krawcewicz W

#### **14. Qualitative improvements due to DBT support**

The Financial assistance provided by the Star College Scheme helped in the following ways:

- Purchase of several new Equipments in more numbers. This made it possible for every student to handle the equipment and perform the experiments individually.
- It enhanced our practical curriculum and broadened the scope of studies.
- Assisted in the conduct of Workshops and Seminars for both students and faculty which has helped in upgrading the knowledge.
- It made possible the publication of Practical Manuals, which serve as ready reckoners to both students and faculty.
- Enabled the department to enrich the library with additional reference books
- Organize more field trips which enhanced teaching and learning process.
- Enhanced Experiential Learning and understanding through hands on training and facilitated exposure to instrumentation techniques for both faculty and students.
- Through training programmes organized, the students gained practical knowledge on various principles, working and application of instruments
- Enabled the department to procure new equipments and it aided in upgrading existing teaching resources which have in turn improved the 'hands on' experimental exposure of the students.
- Introduction of Additional practical's to understand theoretical concepts.
- Guest lecturers delivered by renowned Scientists/ Professors in their respective fields were invited to promote exchange of knowledge and enrich students with the latest updates of technology and inventions.
- The grant has enabled the department to organize workshops, training programs and other activities.
- The improvement of ICT facilities has motivated students and teachers to technology in teaching and learning process. It has also helped the non teaching staff to improve their skills .

**15. Problems faced, if any, in implementation of the programme and utilization of DBT grant:**

- No specific problem was encountered. However financial assistance for few more years will assist in enhancing the programme and sustaining various activities
- Though few workshops have been arranged there is still scope for developing an inter disciplinary approach.
- Working through PFMS was a real challenge. Still many things are not clear and require further training.

**ACKNOWLEDGEMENT:**

The College places on record its sincere thanks to the Department of Biotechnology(DBT), Ministry of Science & Technology, Government of India, for the Financial support and opportunity given to strengthen Basic Sciences. We also thank the advisors Dr.A.P. Jayaraman and Dr.Sunita Shailajan for the timely advise.

We also thank management, principal, departmental coordinators, all the science teaching and non-teaching staff for their whole hearted cooperation.

This scheme has benefited more than 300 undergraduate students and enhanced the quality of teaching and learning of the students and teachers. It has helped students to pursue higher studies and research which will benefit the society at large.