

ANNUAL PROGRESS REPORT

DBT STAR COLLEGE SCHEME (2018 – 19)

**Submitted
by**



**SACRED HEART COLLEGE, CHALAKUDY
Railway Station Road, Chalakudy
Thrissur (Dt.), Kerala – 680307**

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Department of Biotechnology

Proforma for submission of progress reports by Colleges supported under Star College Scheme

1. Name of the College: **Sacred Heart College, Chalakudy, Kerala**
2. Name of Departments supported: **Zoology, Chemistry and Physics**

Name of Coordinator, designation,
address, phone nos.

Dr. Nijo Varghese
Asst. Professor in Physics
Sacred Heart College, Chalakudy,
Thrissur (Dt.), Kerala, Pin 680307
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3. **No. of regular faculty with Ph.D. in each participating department:**

Department	Name of the faculty	Designation
Zoology	Dr. Tessy K.L.	Assistant Professor
	Dr. V. Neetha	Assistant Professor
Chemistry	Dr. Santhosh Paul	Assistant Professor
	Dr. Laina A.L.	Assistant Professor
Physics	Dr. Sr. Reena Ittyachan	Principal
	Dr. Nijo Varghese	Assistant Professor
	Dr. Salini Jose	Assistant Professor

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

Department	Courses
Zoology	B.Sc. Zoology
Chemistry	B.Sc. Chemistry
	M.Sc. Chemistry (Self Financing)
Physics	B.Sc. Physics.
	M.Sc. Physics (Self Financing)

5. Cut off percentage for admission in different courses in participating departments, positions in university, percentage of result in 2018-19 academic session:

Department	Courses	Cut off percentage*	Univ Position	percentage of result in
Zoology	B.Sc. Zoology	57	--	Result awaiting
Chemistry	B.Sc. Chemistry	70	--	Result awaiting
	M.Sc. Chemistry	70	--	Result awaiting
Physics	B.Sc. Physics.	69	--	Result awaiting
	M.Sc. Physics	77	--	Result awaiting

* Grant received in the current year only

6. List of projects undertaken by students, industrial visits by students, summer training in last one year:

Department of Zoology

Projects undertaken by students

- i. Study of adulterants in different types of milk.
- ii. Occurrence of double parasitism in half beaked fish and isopod infestation on Indian Mackerel.
- iii. Feeding and egg laying efficiency of quail (*Cortunix japonica*).
- iv. Comparative study on dragonfly diversity before and after the flood on 15th August 2018, Kerala, South India.

Industrial visits:

Sl. No.	Date	Duration	Place	Participants
1	11 th -14 th December, 2019	10 days	Dairy Training Center (DTC), Alathur	Final year B Sc. Zoology students
2	17 th December, 2018	1 Day	Cattle feed manufacturing Unit, Palakkad	
3	17 th December, 2018	1 Day	Milma milk processing unit, Palakkad	
4	17 th December, 2018	1 Day	Ornamental fish farm, Palakkad	
5	17 th December, 2018	1 Day	Snake park and Aquarium, Malampuzha	

Department of Chemistry

Project undertaken by students

Final year B Sc. Students (38 nos) were undertaken projects utilizing the newly purchased instruments from star College

- i. Microwave assisted synthesis of silver nanoparticles and photocatalytic degradation studies of different fertilizers.
- ii. Synthesis of biodiesel from deep fried waste cooking oil.
- iii. Synthesis of polyaniline nanofibers and corrosion studies of steel using polystyrene blends.

Industrial visit

- i. Industrial visit for B.Sc. students to the manufacturing unit of Apollo Tyres, Chalakudy, Kerala on 26/01/2019

Department of Physics

Projects undertaken by students

- i. Study of linear attenuation coefficient and half value thickness of various materials using G M Counter.
- ii. Estimation of Sugar Content in different solutions using Polarimeter.
- iii. Determination of Band Gap Energy and temperature sensitivity of diodes.
- iv. Studies on the efficiency of solar cells.
- v. Characteristics of optical fiber and sensors.
- vi. Fourier Optics and spatial filtering.

Industrial visit

- i. Industrial visit for B.Sc. students to the Research Labs, Dept. of Physics, CUSAT on 26/01/2019

7. Training received by faculty from participating departments:

- i. Training on milk products at Dairy Training Center, Alathur – Dr. Tessy K.L., Dr. Sr. Betty K.P., Dr. V. Neetha and Ms. Neenu Joy of Department of Zoology.
- ii. Laboratory safety training programme organized at Chemistry department on 7th February, 2019 attended by the teaching and non-teaching staff of various science departments. Mr. Siyad B, Chemical Inspector, Dept. of Factories and Boilers, Kollam, Kerala was the resource person.
- iii. One day Glass Blowing Techniques training programme at Chemistry department, Sacred Heart College, Chalakudy on 17th January, 2019 attended by the teaching and non-teaching staff of various science departments of the college. Mr. Ramesh (CEO, Nehasil Scientific, Calicut, Kerala) was the resource person.
- iv. Semi Micro Analysis training programme organized at Chemistry lab on 25th March, 2019 attended by the teaching and non-teaching staff of Chemistry departments.

8. List of exhibitions/seminars/training courses conducted by the college:

Department of Zoology						
Sl. No.	Date	Duration	Programme topic	Organizer/s	Participating departments	Venue
1	21 st Nov 2019	2 Days	Aquarium making	Department of Zoology	Students and teachers of department of Zoology	Zoology Practical Laboratory
2	5 th March 2019	1 Day	Vacada Fest – Exhibition on dairy products	Department of Zoology	Students and teachers from other department of the college	Department of Zoology

3	11 th – 12 th March 2019	2 days	Hands on training on DNA isolation and Bar coding	Department of Zoology and DRP molecules, Kalamassery	Final year B Sc. students of department of Zoology	Zoology Laboratory, Sacred Heart College, Chalakudy
4	14 th March 2019	1 Day	Seminar on “Animal Husbandry and Dairy development”	Department of Zoology	Final year B Sc. students of department of Zoology and interested students from other science departments	Clare Hall, Sacred Heart College, Chalakudy
5	22 nd March 2019	1 Day	Water conservation	Department of Zoology	Final year students of all science departments	Clare Hall, Sacred Heart College, Chalakudy

Department of Chemistry						
Sl. No.	Date	Duration	Programme topic	Organizer/s	Participating departments	Venue
1	3 rd Decemb er, 2018	3 hour (half day)	Inter departmental seminar on “Spectroscopy–a versatile tool”	Department of Chemistry	Chemistry and Physics	Clare Hall, Sacred Heart College, Chalakudy
2	11 th January, 2019	1 day	International seminar on “Recent Trends in Nano Science”	Department of Chemistry	Chemistry, Physics and Zoology	Clare Hall, Sacred Heart College, Chalakudy
3	17 th January, 2019	1 day	Inter departmental hands-on training on “Glass blowing techniques”	Department of Chemistry	Chemistry, Physics and Zoology	Chemistry department
4	7 th Februar y, 2019	3 hour (half day)	Interdepartmental seminar and training on “Laboratory safety”	Department of Chemistry	Chemistry, Physics and Zoology	Clare Hall and Chemistry department, Sacred Heart College, Chalakudy
5	21 st Februar y, 2019	3 hour (half day)	Inter departmental seminar on “Recent trends in Electrochemistry”	Department of Chemistry	Chemistry, Physics and Zoology	Clare hall, Sacred Heart College, Chalakudy
6	25 th March, 2019	1 day	Workshop and hands-on training on “Semi micro analysis”	Department of Chemistry	Department of Chemistry	Department chemistry and Chemistry lab

Department of Physics						
Sl. No.	Date	Duration	Programme topic	Organizer/s	Participating departments	Venue
1	31 st January 2019	1 Day	Seminar on “Career Aspects in Physics”	Department of Physics	All students from Physics department	Clare Hall, Sacred Heart College, Chalakudy
2	1 st February 2019	1 day	Seminar on “Probing Dimensions beyond common sense”	Department of Physics	All students from Physics department	Clare Hall, Sacred Heart College, Chalakudy
3	23 rd March 2019	1 day	Workshop on “Experimental Physics”	Department of Physics	All students from Physics department	Physics General Lab, Sacred Heart College, Chalakudy

9. Name, designation, host institute of guest faculty invited:

Department of Zoology				
Sl. No.	Date	Resource person	Designation	Programme
1	21 st Nov 2019	Mr. Saji	Owner, Pet World, Chalakudy	Aquarium making for culturing of ornamental fishes
2	11 th & 12 th March, 2019	1. Mr. Tojo Tharayil 2. Ms. Soja N. J.	Director, DRP Molecules, Kalamassery Research Assistant, DRP Molecules, Kalamassery	Hands on training on DNA isolation and Bar coding
3	14 th March, 2019	Ms. Nandini T	Dairy Extension officer Dairy Development Board, Anthikaad, Thrissur	Seminar on “Animal Husbandry and Dairy development”
4	22 nd March 2019 22 nd March, 2019	Ms. Krishnasree C.S.	Environmentalist	Seminar on “Conservation of Water and Forests – the need of the hour” in connection with World Water Day and World Forest Day

Department of Chemistry				
Sl. No.	Date	Resource person	Designation	Programme
1	3 rd December, 2018	Dr. Leena R	Assistant professor, Department of chemistry, CUSAT	Half day Seminar on "Spectroscopy – a versatile tool"
2	11 th January, 2019	1) Dr. Rajesh Shenoi 2) Dr. Sanal K C	1) Senior Scientist, Interuniversity Centre for Biomedical Research & Super Speciality Hospital, MG University Campus, Kottayam, Kerala 2) Professor-Investigator, Facultad de Ciencias Quimicas Universidad Autonoma de Nuevo Leon, Mexico	One day International seminar on "Recent Trends in Nano Science"
3	17 th January, 2019	Mr. Ramesh	CEO, Nehasil Scientific, Calicut, Kerala	One day workshop and hands-on training on "Glass Blowing Techniques"
4	7 th February, 2019	Mr. Siyad B (M Tech.)	Chemical Inspector, Dept. of Factories and Boilers, Kollam, Kerala	Half day seminar and training on "Laboratory safety"
5	21 st February, 2019	Dr. Sreekuttan M Unni	Scientist, Division of electrochemical power sources, CSIR-CECRI, Karaikudi	Half day seminar on "Recent trends in Electrochemistry"
6	25 th March, 2019	Prof. Murugan S	HOD (Retired), Department of Chemistry, S. T. Hindu College, Nagerkovil, Tamilnadu	One day workshop and hands-on training on "Semi Micro Analysis"

Department of Physics				
Sl. No.	Date	Resource person	Designation	Programme
1	31 st January, 2019	Dr. Roby Cheriyan,	Sacred Heart College, Thevara, Ernakulam,	Seminar on "Career Aspects in Physics"
2	1 st February, 2019	Dr. Reshmi R	Union Christian College, Aluva	Seminar on "Probing Dimensions beyond common sense"
3	23 rd March, 2019	Dr. Rajeshmon	St. Paul's College, Kalamassery	Workshop on "Experimental Physics"

10. Date of Advisory committee meeting:

Advisory committee constituted right after the sanction of the scheme, but meeting not yet conducted

Constitution of advisory committee

Chairman: Dr. (Sr.) Reena Ittyachan, Principal, Sacred Heart College, Chalakudy

DBT Representatives: Dr. Arvind Duggal, Adviser, DBT
Dr. Garima Gupta, Programme officer, Star College Scheme

External Experts: 1) Dr. M K Jayaraj (Professor)
Department of Physics, Cochin University of Science
and Technology, Cochin 22, Kerala
2) Dr. N. K. Sanil (Senior Scientist)
Central Marine Fisheries Research Institute, Kochi-682 018, Kerala

Faculty Members: Dr. Tessy K L, Dr. Neetha V (Department of Zoology)
Prof. Maria Jose, Dr. Santhosh Paul, Dr. Laina A L (Department of
Chemistry)
Ms. Fency K F, Dr. Salini Jose (Department of Physics)

Coordinator Member-Secretary: Dr. Nijo Varghese, Department of Physics

11. List of New Practicals/demonstrations introduced in different departments in last one year:

Department of Zoology				
Sl. No.	New Practicals/Demonstrations introduced using Star Fund	Equipment/ Chemicals used	Experiment/ Demonstration as per syllabus	Experiments done before STAR fund was available
1	Bird watching	Binoculars	Watch birds in their natural habitat and prepare a field note	Birds were observed with naked eye
2	Demonstration of electrophoresis	Electrophoretic apparatus	Study of the principle and applications of Electrophoretic apparatus	Theory classes only
3	Blood pressure determination	Digital blood pressure meter	Determination of blood pressure (Demo)	Theory classes only
4	Haemoglobin content	Haemoglobinometer	Determination of Hb content in man using Haemoglobinometer (Demo)	Theory classes only
5	Body Mass Index calculation	Weighing machine	Determination of body mass index (individuals)	Weighing scale was borrowed from Department of Physical Education
6	Observation of microscopic objects	Binocular microscope Stains such as	Staining of bacterial cell using appropriate bacterial stain. Lacto bacilli	Microscopic objects are easier to identify using a binocular

		crystal violet, safranin and mordant such as potassium iodide	Prepare human blood smear to study the immunologically significant cells.	microscope as against a regular compound microscope
8	Live microscopic organisms	Stereo microscope	Study of marine planktons	Compound microscopes were used
9	Preparation of culture media	Laminar flow chemicals such as agar, agarose	Preparation of culture media for bacteria. (Synthetic Media, Natural Media, Simple Media, Differential Media, Selective Media)	Theory classes only
10	Culture of microbes	Incubator Glassware such as test tubes, culture tubes, conical flask	Study of microbial byproducts	Theory classes only
11	Preparation of chemical solution based on procedure required	Digital Electronic Balance	Chemicals to be prepared for different experiments	Borrowed from department of chemistry
12	Estimation of dissolved O ₂ and p ^H	Water analyser (p ^H and Dissolved oxygen)	Estimation of dissolved O ₂ in pond and tap water. Determination of p ^H using p ^H paper / digital p ^H meter	Conventional titration method was used for determining dissolved oxygen. p ^H paper was used to measure p ^H
13	Estimation of dissolved CO ₂	CO ₂ analyser	Estimation of dissolved CO ₂ in pond and tap water	Conventional titration method was used
14	Micrometry	Ocular micrometer	Measurement of size of microscopic objects using ocular and stage micrometers	Only 5 ocular micrometer were available for 40 students

Department of Chemistry				
Sl. No.	New Practicals/Demonstrations introduced using Star Fund	Equipment/ Chemicals used	Experiment/ Demonstration as per syllabus	Experiments done before STAR fund was available
1	Physical chemistry practical	Digital thermometer	Rast and Transition temperature experiments. Digital thermometer reduce the risk of mercury poisoning	We were using conventional mercury thermometers
2	Physical, Organic and Inorganic practicals	Icematic	Large amount of ice flakes can be prepared in a short period. No need to break the huge ice cubes	Ordinary refrigerator takes long time to make required amount of ice and the ice made by refrigerator is huge in size

3	Organic and inorganic practicals	Fume hood	In order to avoid the exposure to poisonous gases and accidents like explosion, fume hood is a necessary equipment	No fume hood available. Hazardous experiments were conducted in the open lab
4	Green synthesis	Microwave oven	Gas lines and thermal heating can be avoided and speedy synthesis is possible with microwave radiation	Synthesis was dependent on gas lines and thermal heating
5	Preparation of water bath	Induction cooker	Steel and aluminium pots for heating water can be avoided. It reduces the gas consumption and very easy to handle	We were using conventional water bath for conducting practicals.
6	Material characterization	Melting point apparatus	In order to check the purity and identification of prepared samples	No melting point apparatus was available
7	Preparation of DI water	Demineralizer	Demineralization of water to ensure purity for the conductivity studies is much easier. It consumes fewer amounts of power and water.	Distillation unit based electric heater. Continuous monitoring is required and less convenient
8	Heating of silica crucible	Electric Bunsen burner with energy regulator	Controlled and efficient heating for gravimetric analysis	Insufficient number of electric Bunsen burners for all the students
9	Mixing and dissolving chemicals	Magnetic stirrer with hot plate	Easy mixing and preparation of reagents	Mixing and preparation was much time consuming using conventional beaker-glass rod method
10	Preparation of organic and inorganic materials	Heating Mantles	Controlled temperature preparation is now possible	Heating reaction mixture using LPG
11	Semi micro analysis	Semi micro glasswares	Experiments utilizing chemicals in bulk scale	It tremendously reduces the amount of chemicals, hazards, environmental pollution, wastage, usage of LPG, etc. and is highly cost-effective
12	Glass blowing demonstration and training	Oxygen cylinder and glasswares	Purchase of readymade glasswares and change of glasswares when broken	The session was very much informative in making new glasswares and rejoin broken glasswares economically. So it reduces the disposal problem of glasswares

Department of Physics				
Sl. No.	New Practicals/Demonstrations introduced using Star Fund	Equipment/ Chemicals used	Experiment/ Demonstration as per syllabus	Experiments done before STAR fund was available
1	Specific rotation of solutions	Polarimeter	Determination of specific rotation of sugar solution	Instrument was not available with the department
2	Comparison of Capacities	Ballistic Galvanometer	Comparison of Capacities	Insufficient number of equipment for all students
3	Newtons rings	Newtons rings apparatus	Determination of wavelength of sodium light	Insufficient number of equipment for all students
4	LCR Circuits	CRO and Function generator	Determination of the resonance condition in LCR series circuit	Insufficient number of equipment for all students
5	Spectrometer – Quartz prism	6” Spectrometer, Quartz prism, Sodium Vapour Lamp	Determination of refractive indices of quartz for ordinary and extraordinary rays.	Insufficient number of equipment for all students
6	Linear absorption coefficient using beta and gamma source	G M Counter	Demonstration of linear attenuation coefficient and half value thickness using GM Counter	Theory classes only
7	Study of magnetic hysteresis	B H curve apparatus	Demonstration of B-H Curve using standard toroid specimen	Theory classes only
8	Numerical aperture of OFC	Fibre Optics Apparatus, OFC	Determine the numerical aperture, losses and bandwidth in optical fibre	Insufficient number of equipment for all students

12. Details of equipment purchased in each department from DBT grant. (Item, no., cost, date of order placed, purchase/installation)

Department of Zoology					
Sl. No.	Item	Quantity	Date of order placed	Date of purchase / installation	Cost (Rs.)
1	Electrophoretic apparatus	1	22-12-2018	01-04-2019	15930
2	High Volume air sampler	1	22-12-2018	01-04-2019	76700
3	Anemometer	1	22-12-2018	01-04-2019	6844
4	Laminar Flow	1	22-12-2018	28-03-2019	51750
5	Vortex mixer	1	22-12-2018	23-03-2019	4500
6	CO ₂ analyser	1	22-12-2018	20-03-2019	97,940
7	Water analyser	1	22-12-2018	13-03-2019	99000
8	Digital weighing balance	2	22-12-2018	12-03-2019	11280

9	Incubator	1	22-12-2018	12-03-2019	11087
10	Stereo microscope	1	22-12-2018	09-03-2019	56800
11	Binocular Research microscope	2	22-12-2018	26-02-2019	57200
12	Ocular micrometer	10	22-12-2018	23-02-2019	4130

Department of Chemistry					
Sl. No.	Item	Quantity	Date of order placed	Date of purchase / installation	Cost (Rs.)
1	Digital conductivity meter	2	02-02-19	15-03-2019	33,960
2	Digital desktop potentiometer	2	02-02-19	07-03-2019	17,110
3	Rotary shaker	1	02-02-19	Not supplied	36,639
4	Rotary Vacuum pump	1	02-02-19	07-03-2019	25,004
5	Digital thermometer	20	02-02-19	02-02-2019	31,152
6	Bench top laboratory Centrifuge	1	02-02-19	02-02-2019	19,854
7	Bench top Digital P ^H meter	1	02-02-19	Not supplied	22,656
8	Two bed Demineralizer	1	02-02-19	02-02-2019	12,272
9	Digital Melting point apparatus	1	02-02-19	02-02-2019	14,502
10	Spectrophotometer with software	1	02-02-19	02-02-2019	32,214
11	3-digit electronic balance capacity: i) 220 g ii) 420 g	1 each	02-02-19	Not supplied	78,753
12	Water quality analyzer	1	02-02-19	02-02-2019	79,508
13	Electric Bunsen burner with energy regulator	30	02-02-19	02-02-2019	1,00,005
14	Refrigerator (double door)	1	02-02-19	Not supplied	41,300
15	Voltage Stabilizer for refrigerator	1	02-02-19	Not supplied	2,360
16	Distillation unit	1	02-02-19	Not available	
17	Magnetic stirrer with hot plate	2	02-02-19	13-03-2019	36,108
18	Abbe Refractometer	1	02-02-19	13-03-2019	38,940
19	Thermostatic Water bath	1	01-02-19	23-03-2019	6,890.02
20	Standard Fume hood	1	01-02-19	02-04-2019	68,900
21	Heating Mantles–250 ml	6	01-02-19	23-03-2019	13,799.62
22	Digital photo colorimeter	2	01-02-19	12-03-2019	11,514
23	Digital hot air oven	1	01-02-19	12-03-2019	11,999.99
24	Icematic (ice maker) labman	1	01-02-19	12-03-2019	19,439.99

25	IR lamp	5	01-02-19	12-03-2019	1,499.97
26	Microwave oven	1	01-02-19	Not supplied	12,900
27	Induction cooker	2	01-02-19	12-03-2019	7,379.98
28	Heating Mantles–500 ml	4	01-02-19	12-03-2019	9,959.76

Department of Physics					
Sl. No.	Item	Quantity	Date of order placed	Date of purchase/inst allation	Cost (Rs.)
1	Cathode Ray Oscilloscope Dual Trace – 30 MHz	4	18-12-2018	31-01-2019	68970
2	Function generator(3MHz)	4	18-12-2018	27-12-2019	22500
3	Spectrometer 9”	1	18-12-2018	17-01-2019	29028
4	Spectrometer 6”	4	18-12-2018	14-12-2019	33748
5	Polarimeter	4	18-12-2018	21-01-2019	21948
6	Newton's ring apparatus	4	18-12-2018	14-03-2019	33748
7	Ballistic Galvanometer	4	18-12-2018	05-03-2019	35192
8	ExpEyes Kit	4	18-12-2018	05-12-2019	22656
9	Lee’s disc	2	18-12-2018	05-03-2019	18379
10	BH curve apparatus (Without CRO)	4	18-12-2018	05-03-2019	25412
11	G M Counter	1	18-12-2018	23-01-2019	94724
12	DC power supply	6	18-12-2018	31-01-2019	28428
13	Digital IC Trainer	6	18-12-2018	27-12-2019	24390
14	Digital multimeter	6	18-12-2018	21-01-2019	6513
15	Numerical aperture of OFC	2	18-12-2018	05-03-2019	49517
16	Diffraction grating	8	18-12-2018	31-01-2019	8998
17	Circular coil apparatus	2	18-12-2018	05-03-2019	5763
18	Digital balance	2	18-12-2018	17-01-2019	59684
19	Magnetic Stirrer with hot plate	2	18-12-2018	17-01-2019	28320
20	centrifuge 8000 rpm digital	1	18-12-2018	15-01-2019	15930
21	pH Meter	2	18-12-2018	21-01-2019	23364
22	Heating Mantle	4	18-12-2018	21-01-2019	9540

13. Details of books & journals subscribed from DBT grant.

Department of Zoology			
Sl. No.	Name of the book	Author	Price (Rs.)
1	Outlines of Dairy Technology	Sukumar De	595.00
2	Practical Microbiology	Dubey R.C.	250.00
3	Questions and Answers in Biotechnology	Sullia S.B.	380.00
4	Objective Genetics	Phundan Singh	295.00
5	Molecular Biology and Biotechnology	Ramawat	250.00
6	Laboratory Manual and Practical Biochemistry	Pattabiraman T.N.	169.00
7	The fishes of India (set of 2 volumes)	Francis Day	9500.00
8	Understanding Molecular Biology	Preeti Mehta	325.00
9	Basic Immunology functions and disorders of the immune system	Abbas	900.00
10	Principles of Molecular Biology (2 nd edition)	V.B. Rastogi	795.00
11	Principles of biochemistry	Voet	5,232.26
12	Indian Wild life quiz	Deep Narayan	140.00

Department of Physics				
Sl. No.	Title	Author	Quantity	Price (Rs.)
1	Schaums Outlines Linear Algebra 3Ed.	Seymour	2	1,370
2	Electromagnetics Rev Ed	Joseph A	1	675
3	Electromagnetics Rev Ed	Joseph A	1	675
4	Principles of Physics 10ed	Walker	2	1,798
5	A Brief History of Time	Stephen Hawking	2	798
6	Quantum Revolution 2 The Jewel of Physics	Venkataraman G	2	590
7	Why Are Things The Way They Are	Venkataraman G	2	590
8	Bhabha And His Magnificent Obsessions	Venkataraman G	2	790
9	Saha And His Formula	Venkataraman K	2	590
10	Introduction To Microprocessors 3 Ed	Aditya P Mathur	1	875
11	Fundamentals Of Microprocessors And Microcontrollers	Ram B	1	265
12	Statistical Mechanics 3 Ed	Pathria R K	1	610
13	Introductory Methods Of Numerical Analysis	Sastry S S	1	295
14	Classical Mechanics 3ed	Herbert	1	799
15	Field And Wave Electromagnetics 2ed	David K Cheng	1	879
16	Op Amps And Linear Integrated Circuits 4 Ed	Ramakant A	1	539
17	Electronics Lab Manual -Vol 2	Navas K A	1	180
18	Nuclear Radiation Detectors	Kapoor S S And	1	799
19	Nuclear Radiation Detectors	Kapoor S S And	1	799

20	Electronic Communication 4ed	Dennis Roddy And	1	979
21	Digital Signal Processing 4ed	John G Proakis	1	639
22	Kennedys Electronic Communication Systems 6 Ed	George Kennedy	1	750
23	The Avr Microcontroller And Embedded Systems	Muhammad Ali	1	919
24	Quantum Mechanics 4 Ed	Thankappan V K	1	499
25	Quantum Mechanics Concepts And Applications 2 Ed	Nouredine Zettili	1	1,045
26	Concepts In Thermal Physics	Stephen J	2	1,598
27	Introduction To Quantum Mechanics	Griffith	1	649
28	Molecular Structure And Spectroscopy 2 Ed	Aruldhas G	2	900
29	Statistical Mechanics 2ed	Kerson Huang	1	669
30	Modern Physics 3ed	Kenneth Krane	1	789
31	Introduction To Optics 3ed	Frank L Pedrotti S	2	1,898
32	Introduction To Solid State Physics	Charles Kittel	1	795
33	Berkley Physics Course Vol 3 Waves In Si Units	Frank S Crawford	1	795
34	Introduction To Solid State Physics 8ed	Charles Kittel	1	699
35	Introduction To Atomic Spectra	Harvey Elliott	1	895
36	Elements Of Properties Of Matter	Mathur D S	1	495
37	Properties Of Matter And Acoustics	Murugesan R	2	990
38	Introduction To Electrodynamics 4 Ed	David J Griffiths	1	489
39	Electricity And Magnetism 10 Ed	Murugesan	1	425
40	Concepts Of Modern Physics 7 Ed	Arthur Beiser	1	715
41	Quantum Mechanics 2ed	Aruldhas G	1	350
42	Optics 6 Ed	Ajoy Ghatak	1	695
43	Introduction To Microprocessors 3 Ed	Aditya P Mathur	1	795
44	Digital Principles And Applications 8 Ed	Donald Leach	1	625
45	Fundamentals Of Molecular Spectroscopy 5 Ed	Colin N Banwell	1	575
46	Introductory Methods Of Numerical Analysis	Sastry S S	1	295
47	Non Conventional Energy Sources	Rai G D	2	698
48	Principles Of Physics 10 Ed.	Walker	1	899
49	Mathematical Methods For Physicists 7 Ed.	Arfken Weber	1	710
50	Introduction To Solid State Physics 8 Ed.	Charles Kittel	2	1,398

14. Qualitative improvements due to DBT support

Please highlight (5 salient lines)

- The college was highly affected during the floods of 15th – 19th August 2018 with heavy losses of all facilities. Our practical laboratories were also destroyed with complete loss of a number of laboratory equipments and instruments. It is only because of the funds available through the STAR College scheme that these laboratories were reinstalled and made functional within a short period of time. This greatly helped our students to complete their prescribed syllabus for practicals within the stipulated time.

- Practical skill of the students was greatly improved especially in the fields of microbiology, biotechnology and molecular biology with the use of equipments such as laminar flow, incubator and electrophoretic apparatus which were bought using DBT support. Before such a support was available students got to learn only the theoretical knowledge.
- As a part of the syllabus, the subject of bioinformatics requires the students to use computer software and internet. To maintain computers in our laboratory we did not have a sufficient battery backup. With the help of the DBT support it is now possible for students to access bioinformatic tools on the computer
- All the students get a hand on experience in using sophisticated instruments for carrying out practicals and innovative projects. This makes them more interested in the subject, as they learn not only the theory, but now know how to actually use it practically. This makes them enthusiastic to pursue higher education.
- DBT-star College scheme promotes interdisciplinary programmes and so the faculty is also encouraged to introduce innovative courses and as a result interdepartmental collaboration have increased.

15. Problems faced, if any, in implantation of the programme and utilization of DBT grant
(in two-three lines)

- Lack of clear cut and well-defined demarcation of the amount to be utilized under each head (recurring, contingency, etc.)
- We find it difficult to deal with situations, where cheques are not accepted (daily wage laborers, travel by public transport or purchase of low cost items).

Dr. Nijo Varghese

Principal

Co-ordinator