Department of Biotechnology

Progress report (2017-2020) for the evaluation to Star status by colleges supported under Star College Scheme

1. Name of the College : **Bishop Moore College, Mavelikkara**

2. Name of Coordinator, designation, Address, Phone Nos : **Dr. Dinesh Raj R**, Asst. Professor and Head, Dept. of Botany and Biotechnology, Bishop Moore College, Mavelikara
Mob: 9446525492, 7510826695
Email: dineshrajr@gmail.om

Co-convenor : **Dr. Arun Aravind**
Asst. Professor in Physics
Mob: 9447946947
Email: bmcarun@gmail.com

3. Assessment duration : **13/06/2017 to 1 2 /06/2020** Duration in years : **3**

4. Details of Departments Supported

Sl No	Name of Department	Courses (B.Sc./M.Sc./PG Diploma, certificate etc.) offered	Regular Faculty members	
			With Ph.D.	Without Ph.D.
1.	Dept. of Chemistry	B.Sc. Chemistry, M.Sc. Chemistry	4	5
2.	Dept. of Physics	B.Sc. Physics, M.Sc. Physics	6	3
3.	Dept. of Zoology	B.Sc. Zoology	3	1
4.	Dept. of Botany and Biotechnology	B.Sc. Botany B.Sc. Botany an Biotechnology M.Sc. Botany	7	1
Total			30	

5. Number & Date of Advisory committee meeting: Nil

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

1. **Improved Degree Results**: Nine University ranks (first 3) were achieved during the assessment period. The pass percentage for UG improved from 44.6% in the pre DBT STAR period to 64.09% in 2019. The pass percentage of PG also improved from 64.8 in the pre DBT period to 77.6 in the assessment period.

2. Placement for Higher Education: Because of the increased pass percentage, better training and more exposure of students by interacting with eminent scholars, more students are opting post-graduation for higher studies. More number of students (9 students) are admitted to state university centers, central universities, NITs, IITs etc. for Post-graduation than the pre DBT period. Also they choose interdisciplinary courses for their higher studies other than traditional courses (e.g. Ms. Arya A (B.Sc. Physics, 2016-19) joined for M.Sc. Disaster Management at Pondicherry University).

3. **Quality of B.Sc. Project improved**. During 2019-2020, Govt. of Kerala was banned the usage of one time plastic throughout the state. The Department of chemistry with the support of DBT- STAR College Scheme could carry out two projects on the preparation of bioplastic (Preparation and characterization of banana peel powder reinforced soy protein film, Preparation and characterization of Starch/Curcumin composite film). Moisture content is an important parameter to be measured in the case of biopolymer films which determines the efficiency of the biopolymer film to be used in packaging. Two moisture analyser purchased by DBT grant is utilized to measure the moisture content of the prepared biofilm.

4. Conference presentations

Because of the improved exposure both UG and PG Students are presenting their dissertations in conferences. For e.g. B.Sc. Physics student, Mahadev A.V. presented a paper on "Schwarzchild Black Hole Thermodynamics in the National Seminar on Astronomy and Astrophysics organized by Farook College, Kozhikode. Besides him, 25 other PG and UG students have presented their dissertations at conferences during this period.

The increased interactions with eminent scientists and researchers across India encouraged our students to attend various workshops or training programmes offered by Indian Academy of Sciences' and other reputed institutions. Twenty students have availed summer research fellowship in the above category.

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

We would like to introduce the following aspects in the next stage.

- **To setting up a nodal centre of Virtual Labs**: In the COVID scenario, we are planning to set up a facility for virtual lab and simulators for at least selected experiments in the syllabus. Though a good number of experiments and simulators are available with other institutions, many experiments in syllabus cannot be covered solely depending on them. We are also planning to act as a nodal centre and extend the facilities to other institutions as well.
- **Enhance Interdisciplinary Research**: We have a plan to develop strategies to enhance interdisciplinary research among participating Departments as well as with other colleges. As part of this, College will be act as a research hub/centre for outstanding students of nearby colleges. We help them to complete time bound projects using the facilities provided under DBT-STAR College Scheme.

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

1. Proper guidelines in fund utilization starting from the rate of TA/DA of resource persons etc. will simplify the task of fund managers.
2. Fund release in the beginning of the academic year will help us to plan and execute the proposed programmes.

9. Key performance indicators

Sl. No.	Indicator	Pre-support											After support										Remarks
		Course	Total	Male					Female					Total	Male					Female				
				Total	SC	ST	OBC	G	Total	SC	ST	OBC	G		Total	SC	ST	OBC	G	Total	SC	ST	OBC	G	
1	No. of students admitted	B.Sc. Chemistry	33	7	2	-	-	5	26	3	-	5	18	35	4	2	-	1	1	31	3		17	11	Pre support: 2016 admission; After support: 2019 admission
		B.Sc. Physics	31	11	4	-	3	4	20	2	-	4	14	36	16	4	-	1	11	20	2		3	15	
		B.Sc. Zoology	37	9	3	-	3	3	28	9	-	4	15	33	5	2	-	3	-	28	3	-	13	12	
		B.Sc. Botany	36	7	3		3	1	29	5		12	12	38	5	1	-	2	2	33	6	-	18	9	
		B.Sc. Botany & Biotechnology	28	10	3	-	3	4	18	2	-	9	7	27	5	-	-	4	1	22	4	-	10	8	

Sl. No.	Indicator	Dept.	Pre-support	After support	Remarks
2	No. of students passing out (%) Students Admitted/passing out (pass %)	B.Sc. Chemistry	47	75.75	Pre support: 2017 Passout; After support: 2019 passout
		B.Sc. Physics	45	67	
		B.Sc. Zoology	41.17	56.75	
		B.Sc. Botany	32.12	58	
		B.Sc. Botany & Biotechnology	57.8	62.96	
3	Drop-out rates		0.09%	0.04%	Pre support: 2017 Passout; After support: 2019 passout
4	No. of students opting for MSc		39	67	Pre support: 2017 Passout; After support: 2019 passout
5	Average marks	B.Sc. Chemistry	7.97	8.09	Pre support: 2017 Passout; After support: 2019 passout
		B.Sc. Physics	8.16	8.11	
		B.Sc. Zoology	7.88	7.99	
		B.Sc. Botany	7.43	7.65	
		B.Sc. Botany & Biotechnology	8.13	7.48	
6	No. of hands-on experiments being conducted	-		34	

7	No. of new experiments introduced	-	46	
8	Publications (scopus indexed) /patents, if any.	-	37	*Not directly funded by DBT STAR Scheme
9	Training received by faculty	-	52	
10	Exhibitions/seminars /training courses conducted	-	29	
11	Books/journals subscribed from grants	-	17	
12	Outreach activities (Popular lectures)	-	20	
13	Colleges mentored to apply for DBT Star College grants	-	5	
14	Invited lectures	-	51	

Proof for claims point 6-14

6. Hands on experiments

Physics

1. Green Synthesis and Characterization of Zinc Oxide Nanoparticles using leaf Extract
2. Plant Mediated Biosynthesis of Silver Nanoparticles using Leaf Extract
3. Density Functional Theoretical Simulations
4. Determination of Dipole Moment and Dielectric Constant of Organic Liquids
5. Substitutional effect on the structural and optical properties of metal ferrites
6. Synthesis of ZnS nanoparticles by hydrothermal method
7. Investigation on structural and optical properties of Cerium oxide prepared by various method
8. Structural and Optical Properties of Yttrium Substituted ferrites
9. Experimental Study of Zeeman effect and its Applications
10. Synthesis and characterization of CuO Thin film

Chemistry

11. Solvent extraction and chromatographic techniques TLC
12. Green synthesis for conventional organic synthesis
13. Food analysis- Determination of the amount of acetic acid in commercially available vinegars
14. Colorimetric estimation of Nickel, Glucose
15. Effect of water treatment on Water Quality Parameters

Zoology

16. Collection and presentation of biological data using Computer aided statistical techniques.
17. Installation of Aquaponic system and farming of vegetables
18. Cultivation and harvesting of Mushroom.
19. Estimation of DNA by diphenylamine method
20. Analysis of soil texture using micrometry
21. Detection of presence of formalin and ammonia in fish samples
22. Quantitative estimation of protein in fish samples
23. Quantitative estimation of glycogen in fish samples

24. Effect of cow dung inoculant bio compost and vermicompost on the vegetative growth of *Amaranthus tricolor* L.
25. A comparative study on physico-chemical properties and adulteration of commercially available pasteurized milk

Botany and Biotechnology
26. Separation of pigments by column chromatography
27. Phylogenetic tree construction by online bioinformatics tool
28. Embryo isolation and encapsulation- synthetic seed preparation
29. Serial sectioning using Rotory microtome
30. Histochemical localization of primary metabolites in plant tissues
31. Isolation of pure bacterial culture by streak plate method
32. Preparation of culture medium, sterilization and inoculation – plant tissue culture
33. Isolation and estimation of genomic DNA
34. Plant identification and Scientific illustration

7. New experiments introduced

Physics
1. Measurement of absorption spectrum of plant extracts using spectrometer
2. Study of ultrasonic sound in liquids
3. Study of CE and CB Characteristics of a transistor
4. Uniform Bending and Non-uniform bending – Young's modulus of the materials
5. Determination of thermal conductivity of a bad conductor
6. Determination of velocity of sound
7. study of ultrasonic sound in liquids, study of birefringence of quartz crystal
8. Optical Activity studies of materials/crystals
9. Reflected system to study the interference phenomenon
10. To study low pass and high pass, RC filters, CE amplifier
11. To measure dielectric constant of organic liquids like benzene, acetone

Chemistry
12. Separation of compounds using column chromatography
13. Isolation of different plant extracts and their characterization using the technique of column
14. Determination of optical activity of a solution by using polarimeter
15. Analysis of Water Quality in Drinking Water Supply System
16. Demonstration of green synthesis of nanoparticles.
17. Preparation of starch/soy protein based Bioplastic
18. Determination of concentration of solution by using conductivity meter and potentiometer.

Zoology
19. Examination of pond water for different kinds of protozoa
20. Use of ocular micrometer and measurement of micro objects
21. Formulation and preparation of artificial fish food
22. Culturing fresh water fishes in tanks and study their growth performance and variations in hydrological parameters
23. Physico-chemical analysis of well, pond or river water
24. Determination of soil pH, chlorides, nitrates, carbonates and organic carbon
25. Bacteriological analysis of milk- Methylene blue reductase test
26. Bacteriological quality testing of water and wastewater
27. Study of vermicomposting using different types of organic wastes and assessing the quality of compost.
28. Determination of blood clotting time
29. Continuous monitoring of chick development.
30. Taxonomic study of different types of Freshwater ornamental fishes and setting up of aquariums
31. Influence of exposure to pesticides on blood components in selected fishes.

Botany and Biotechnology
32. Maceration of herbaceous and woody stems- separation of different cell types.

33. Permanent slide preparation of double stained free hand sections.
34. Estimation of dissolved oxygen content in water samples.
35. Separation of amino acids by paper chromatography.
36. Isolation and estimation of genomic DNA.
37. Detection of chromosomal aberrations.
38. Basic techniques for the analysis and presentation of data.
39. Physiological identification of CAM in plant species.
40. Chlorophyll survey of plants- Quantification, absorption spectra of chlorophyll and carotenoids using different solvents.
41. Identification and collection of local Bryophyte flora
42. Demonstration of plant extract mediated synthesis of metal nano particles
43. Alcohol production from bio waste.
44. Micropropagation of plants.
45. Estimation of total phenols in selected plants.
46. Estimation of total organic carbon content in soil samples.

8. New publications/Patents etc.

Sl No.	Name of paper	Authors	Journal	Volume and Page number	ISSN
1	Quantitative structure and activity relationship on the biological, nonlinear and the spectroscopic properties of the Schiff base material: 4-chloro-4′bromobenzylidene	Nimmy L. John, Lija K. Joy,M. Saravana Kumar,S. S. Shaiju,A. Subashini &D. Sajan	Molecular Simulation	44,(2018) 40-54	ISSN: 0892-7022 & ISSN: 1029-0435
2	Twisted intramolecular charge transfer investigation of semi organic L-Glutamic acid hydrochloride single crystal for organic light-emitting and optical limiting applications	Lija K. Joy, Merin George, Javeesh Alex, Arun Aravind, D.Sajan,G. Vinitha	Journal of Molecular Structure	1156 (2018)733-744	ISSN: 0022-2860
3	An experimental and computational approach to electronic and optical properties of Diglycine barium chloride monohydrate crystal: Applications to NLO and OLED	Jesby George, D. Sajan, Javeesh Alex, Arun Aravind, G.Vinitha,R.Chitra	Optics & Laser Technology	105(2018) 207-220	ISSN: 0030-3992
4	Optical nonlinearity and charge transfer analysis of 4-[(E)-2-(2,4,6-Trinitrophenyl) ethylidene] benzonitrile adsorbed on silver nanoparticles: Computational and experimental investigations	Jerin Susan John, D. Sajan, Chandrabhas Narayana, T. Sundius	Optics & Laser Technology	107(2018) 454-467	ISSN: 0030-3993
5	Theoretical and experimental approach to the investigation of hyperpolarizability and charge transfer characteristics of NLO active 2′,3,4,4′,5-pentamethoxy chalcone with silver atoms adsorbed	Jerin Susan John, D. Sajan, Chandrabhas Narayana, Nithin Joy, Reji Philip	Optical Materials	84(2018)409-421	ISSN: 0925-3467 (print); 1873-1252 (web)
5	Molecular docking and spectral	Bessy Mary Philip, Jerin	Chemical	711(2018)87-	ISSN: 0009-2614

	analysis of (5,7-Dimethyl-2-oxo-2H-chromen-4-yl)-methyl diethyldithiocarbamate : A potential bioactive agent	Susan John, K. Mahesh Kumar, H. C. Devarajegowda, JacobChandy, D.Sajan	Physics Letters	99	
6	Growth, effect of protonation and hydrogen bonding interactions of L-Histidine nitrate monohydrate, a potential semi organic third order nonlinear optical material	Rejeena V. Rajan, Merin George, Javeesh Alex, D. Sajan, G. Vinitha	Optical Materials	86(2018)198-212	ISSN: 0925-3467 (print); 1873-1252 (web)
7	Directional growth, physicochemical and quantum chemical investigations on pyridinium 2-carboxylate: 4-nitrophenol (P2C4N) single crystal for nonlinear optical (NLO) applications	V Sivasubramani, Jesby George, M Senthil Pandian, P Ramasamy, P Pounraj, KK Maurya, D Sajan	New Journal of Chemistry	42(2018)4261-4277	ISSN: 1144-0546 (print); 1369-9261 (web)
8	Study on growth, electronic structure, topological and nonlinear optical properties of semi organic material sodium sulfanilate dehydrate	BS Arun Sasi, S Alen, Lija K Joy, D Sajan, C James	Journal of Materials Science: Materials in Electronics	29, (2018)17887–17902	ISSN: 0957-4522 (print); 1573-482X (web)
9	Synthesis, crystal structure, optical and third order nonlinear optical properties of phosphoric acid pyridine-1-ium-2-carboxylate	S. Gowri · T. Uma Devi · S. Alen · D. Sajan · C. Surendra Dilip · G. Vinitha	Journal of Materials Science: Materials in Electronics	29, (2018)19710–19723	ISSN: 0957-4522 (print); 1573-482X (web)
10	Vibrational spectra, dielectric properties, conductivity mechanisms and third order nonlinear optical properties of guanidinium 4-aminobenzoate	Jesby George, V. Sasikala, Lija K. Joy, D. Sajan,T.Arumanayagam, P.Murugakoothan ,G. Vinitha	Optical Materials	89(2019) 48-62	ISSN: 0925-3467 (print); 1873-1252 (web)
11	Effect of niobium doping on the dielectric and nonlinear current–voltage characteristics of Na0.5La0.5Cu3Ti4O12 ceramics	A. K. Thomas, Merin George, D. Sajan, Kevin Abraham, JiniThomas,K. V. Saban	Optical Materials	89(2019) 299-307	ISSN: 0925-3467 (print); 1873-1252 (web)
12	Growth and combined experimental and quantum chemical study of glycyl-L-Valine crystal	C. Usha, R. Santhakumari, Lynnette Joseph, D. Sajan, R.Meenakshi,A.Sinthiya	Heliyon	5(2019,) e01574	ISSN :2405-8440
13	Enhanced NLO activity of organic 2-methyl-5-nitroaniline crystal: Experimental and computational investigation with and without silver addition	Jerin Susan John, D. Sajan, P. Prabukanthan, Reji Philip, Nithin Joy	Optics & Laser Technology	113(2019) 416-427	ISSN: 0030-3993
14	Experimental and theoretical studies on the bifurcated hydrogen bonded NLO active material of pure and crystal violet dye-doped L-argininium bis dihydrogen	Reena Ittyachan, Jesby George, Ligi Cherian, Lynnette Joseph, D.Sajan,G. Vinitha	Optical Materials	92(2019) 111-124	ISSN: 0925-3467 (print); 1873-1252 (web)

	phosphate				
15	Proton-induced intermolecular charge transfer in Picolinium Tartrate Monohydrate crystal for OLED and nonlinear optical applications: A combined experimental and computational study	Jesby George, D. Sajan, Javeesh Alex, G. Vinitha	Dyes and Pigments, Volume 165, June 2019, Pages 239-248	165(2019)239-248	ISSN: 0143-7208
16	Growth of Morpholin-4-ium hydrogen tartrate single crystal for optical limiting application	Jesby George, Merin George, Javeesh Alex, D. Sajan, R. Chitra	Optics & Laser Technology	119(2019) 105647	ISSN: 0030-3993
17	Growth, structural, third order nonlinear optical properties, dielectric properties, conductivity mechanisms and spectroscopic characterization of a luminescent material trans-diaqua-bis(pyridine-2-carboxylato)-cobalt(ii) dihydrate for optoelectronic applications	Rejeena V. Rajan, S. Gowri, N. Manopradha, D. R. Leenaraj, Lija K Joy, D. Sajan	Optics & Laser Technology	119(2019) 105664	ISSN: 0030-3993
18	Molecular structure, NLO properties and vibrational analysis of l-Histidine tetra fluro borate by experimental and computational spectroscopic techniques	Nimmy L. John, Sunila Abraham, D. Sajan, Reji Philip, R.Chitra	Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy,	226(2019) 117615	ISSN: 1386-1425
19	Computational analysis of vibrational spectroscopic properties and hyperpolarizability of silver adsorbed organic molecule, N,N' Dimethyl Urea Ninhydrin	Jerin Susan John, D. Sajan	Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy,	(2019) 117698	ISSN: 1386-1425
20	Experimental and DFT/TD-DFT approach on photo-physical and NLO properties of 2, 6-bis (4-Chlorobenzylidene) cyclohexanone	Jesby George, A. K. Thomas, D. Sajan, S. Sathiyamoorthi,P.Srinivasan,Nithin Joy, Reji Philip	Optical Materials	100(2020) 111-124	ISSN: 0925-3467 (print); 1873-1252 (web)
21	Synthesis, physicochemical properties and third-order optical nonlinearities of cadmium (II) dibromide l - Proline monohydrate for optical limiting application	Rejeena V. Rajan, Lija K. Joy, D. Sajan, A. K. Thomas, S.Sathiskumar,T.Balakrishnan,G Vinitha	Journal of Molecular Structure	1204, (2020)109620	ISSN: 0022-2860
22	Crystal growth, dielectric studies, charge transfer and ionic hydrogen-bonding interactions of L-arginine hydrobromide monohydrate single crystal: A novel third order nonlinear optical material for optoelectronic applications	Jerin Susan John, M. Saravana Kumar, Lija K. Joy, D. Sajan, G.Vinitha,N.Vijayan, Nimmy L. John	Optics & Laser Technology	125(2020) 106043	ISSN: 0030-3993

23	Growth and dielectric studies of toluidine tartrate single crystals:A novel organic NLO material	J. Balaji, P. Srinivasan, S. Prabu, Merin George, D. Sajan	Journal of Molecular Structure	(2020)127750	ISSN: 0022-2860
24	Adsorption studies of hydrothermally synthesized tin oxide nanoparticles	S. Athira, D. A. Nayana, K. K. James and Arun Aravind	AIP Conference Proceedings	2082, 030008 (2019)	
25	Synthesis and Third Order Optical Nonlinearity Studies of Toluidine Tartrate Single Crystal supported by Photophysical Characterization and Vibrational Spectral Analysis	Merin George, J.Balaji, D.Sajan, Priya Dominic, Reji Philip, G. Vinitha	Journal of Photochemistry and Photobiology A: Chemistry	393 (2020) 112413	ISSN: 1010-6030
26	Nonlinear optical and photocatalytic dye degradation of Co doped CeO2 nanostructures synthesized through a modified combustion technique	Stephy Elizabeth George, Merin George, Javeesh Alex, Lija K. Joy, Arun Aravind,D.Sajan,Abhishek Thakur,Shamima Hussain, G.Vinitha	Ceramics International	In press	ISSN: 0272-8842
27	Computational analysis of vibrational spectroscopic properties and hyperpolarizability of silver adsorbed organic molecule, N,N' Dimethyl Urea Ninhydrin	Jerin Susan John, D. Sajan	Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy	Volume 2285 March 2020Article 117698	ISSN: 1386-1425
28	Molecular structure, NLO properties and vibrational analysis of l-Histidine tetra fluro borate by experimental and computational spectroscopic techniques	Nimmy L. John, Sunila Abraham, D. Sajan, Reji Philip, R.Chitra	Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy	Volume 2265 February 2020Article 117615	ISSN: 1386-1425
29	Qualitative and quantitative approach towards the molecular understanding of structural, vibrational and optical features of urea ninhydrin monohydrate	V. Sasikala, D. Sajan, K. Chaitanya, Tom Sundius, T. Uma Devi	Materials Chemistry and Physics	Volume 191, 15 April 2017, Pages 20-34	ISSN: 0254-0584
30	Spectroscopic and DFT-based computational studies on the molecular electronic structural characteristics and the third-order nonlinear property of an organic NLO crystal: (E)-N′-(4-chlorobenzylidene)-4-methylbenzenesulfonohydrazide	V.Sasikala, D.Sajan, Lynnette Joseph,J.Balaji,S.Prabu,P.Srinivasan	Chemical Physics Letters	Volume 674, 16 April 2017, Pages 11-27, (Impact factor: 1.815)	ISSN: 0009-2614
31.	The prehistoric Indian Ayurvedic rice Shashtika is an extant early domesticate with a distinct selection history.	Jose, Mariet, R. Dinesh Raj, M. R. Vinitha, Remya Madhu, George Varghese, Jan Bocianowski, Rashmi Yadav et al.	Frontiers in plant science	9 (2018): 1203(Impact factor: 4.402)	Electronic ISSN: 1664-462X
32.	Theoretical and experimental studies on theophylline release from hydrophilic alginate nanoparticles.	Deepa Thomas, Vinish V. Nair, M.S. Latha and K. KurienThomas.	Future Journal of Pharmaceutical Sciences	2019, 5:2	ISSN 23147245

33.	New-fangled sources of cellulose extraction: comparative study of the effectiveness of *Cissus latifolia* and *Ficus benghalensis* cellulose as a filler.	Arunima Reghunadhan, Nayana G. Sivan, Shibina S. K., Siji K. Mary, Rekha Rose Koshy, Janusz Datta and Sabu Thomas.	Mater. Chem. Front	2019 (3) 2025-2031 Impact factor: 1.656	ISSN: 20521537
34.	Synthesis and in vitro evaluation of alginate-4cellulose nanocrystals hybrid n5anoparticles for the controlled oral delivery of rifampicin	Deepa Thomas, M.S. Latha and K. Kurien Thomas.	Journal of Drug Delivery Science and Technology,	2018(46), 392–399 Impact factor: 2.734	1773-2247
35.	Alginate/Chitosan Nanoparticles for Improved Oral Delivery of Rifampicin: Optimization, Characterization and in vitro Evaluation.	Deepa Thomas, M.S. Latha and K. Kurien Thomas.	Asian Journal of Chemistry	2018, 30 (4), 736-740 Impact factor: 3.698	ISSN: 0975-427X (online) ISSN0970-7077(print)
36	Molecular docking and spectral analysis of (5,7-Dimethyl-2-oxo-2H-chromen-4-yl)-methyl diethyldithiocarbamate : A potential bioactive agent.	Bessy Mary Philip, Jerin Susan John, Mahesh Kumar, Davidson Sajan.	Chemical Physics Letters	2018,(711), 87-99 Impact factor: 2.029	ISSN: 0009-2614

Patent

37. Patent on ‘Crystalline chitin nano whisker and composites thereof”, by the Government of India (Patent Number: In329388) on January 2019.

9. Training received faculties.

Name of teacher	Name of Orientation/Refresher Course	Duration
Dr. D.Sajan	Science Academies’ Refresher Course on Quantum Mechanics for Nuclear and Particle Physics	01-15 December 2018.
	6 days’ workshop on " Material Characterization: Structure, Spectroscopy and Microscopy"	19-24 August 2019
	UGC HRDC Refresher Course on Material Sciences	13-26 November 2019
	Winter School on Materials and Molecular Simulations Using Open Source Software: From Theory to Practice	16-22 October 2019
Dr. Lynnette Joseph	UGC HRDC Workshop on MOOCS, E-content Development and Open Educational Resources	19 -21 March 2019
	Science Academies' Refresher Course in Statistical Mechanics	02-16 May 2018
	Three Month Certificate Course in Molecular Docking and Drug Design, Department of Chemistry, Sacred Heart College (Autonomous), Thevara	21 September 2019 to 23 November 2019
	Winter School on Materials and Molecular Simulations Using Open Source Softwares: From Theory to Practice	16-22 October 2019
	Faculty development workshop on teaching and learning of Functional Devices and Materials through Hands on Experience (TLFMD-2020), NIT, Warangal	09-14 March 2020
Mrs. Merin George	UGC HRDC Workshop on MOOCS, E-content Development and Open Educational Resources	19 -21 March 2019
	Science Academies' Refresher Course in Statistical Mechanics	02-16 May 2018
	Winter School on Materials and Molecular Simulations Using Open Source Softwares: From Theory to Practice	16-22 October 2019

Dr. Jerin Susan John	University and PG College MSc Teachers Training Program in Physics, Centre for Excellence in Science and Mathematics Education, IISc, Challakere Campus at Kudapura	07-27 June 2018
	Science Academies' Refresher Course in Statistical Mechanics	02-16 May 2018
	Three Month Certificate Course in Molecular Docking and Drug Design, Department of Chemistry, Sacred Heart College (Autonomous), Thevara	21 September 2019 to 23 November 2019
	Refresher Course in Material Science (Chemistry, Nano Science & Physics), UGC-HRDC, University of Calicut	03-16 December 2019
	Winter School on Materials and Molecular Simulations Using Open Source Software: From Theory to Practice	16-22 October 2019
Dr. Arun Aravind	Science Academies' Refresher Course in Statistical Mechanics	02-16 May 2018
	Workshop on Material Characterization Techniques & Data Analysis, CUSAT	8 – 9 March 2019
	TEQIP-III sponsored faculty development programme on 'Functional Materials & Devices', NIT Calicut	10-15 September 2018
	Refresher Course on "Degree College Teachers Training Program in Physics", Talent development Centre, IISc Challakere Campus at Kudapura	22 November – 12 December 2018
	Science Academies' Refresher Course in Statistical Mechanics	02-16 May 2018
	DST-SERB School on "Advanced Functional Materials at Nano and Atomic Scale", IIT Goa	10 – 28 February 2020
	Winter School on Materials and Molecular Simulations Using Open Source Softwares: From Theory to Practice	16-22 October 2019
	Workshop on Condensed Matter and Materials Science, C-MET Thrissur	20– 22 September 2019
	WWS Master Mentor Training, St. Teresa College for women, Ernakulum	5 September 2019
Mr. Javeesh Alex	UGC HRDC Orientation Programme	13 Nov to 05 Dec 2019
	Winter School on Materials and Molecular Simulations Using Open Source Softwares: From Theory to Practice	16-22 October 2019
Mrs. Ann Mary Jose	Science Academies' Refresher Course in Statistical Mechanics	02-16 May 2018
	Science Academies' Refresher Course in Statistical Mechanics	02-16 May 2018
Dr. Lija K Joy	UGC HRDC Orientation Programme	23 August to 12 September 2019
	Winter School on Materials and Molecular Simulations Using Open Source Softwares: From Theory to Practice	16-22 October 2019
Dr. Tressia Alias Princy Paulose and Ms. Silpa Anu Mathew	One day training programme on **"AAS and GCMS"** at the Cashew Export and Promotion Council of India, Kollam	24th March 2018
Ms. Siji K. Mary and Ms. Bessy Mary Philip	One day training programme on **"HPLC, AAS and GCMS"** at the Cashew Export and Promotion Council of India, Kollam	17th March 2018
Ms. Siji K.Mary, Ms. Rekha Rose Koshy, Ms. Tressia Alias Princy Paulose and Ms. Silpa Anu Mathew (Chemistry) Dr. Reeja Jose and Ms. Somi Cherian (Zoology)	One day training programme on animal handling at Pushpagiri Research center, Pushpagiri Medical College, Thiruvalla	5th July 2019
Ms. Siji K.Mary, Ms. Rekha Rose Koshy, Ms. Tressia Alias Princy Paulose, Ms.Bessy	The Head nurse of infectious control unit of Govt. Hospital, Mavelikara, Ms. Vineetha gave a training for teachers on hand sanitizer preparation according to WHO guidelines.	16th March 2020

Mary Philip,Dr.Deepa Thomas,Dr.Abha K, Ms.Linda E. Jacob,and Ms. Silpa Anu Mathew		
Dr. Depthi GR (Zoology) Dr. Santhi WS Dr. Jisha S. (Botany and Biotechnology)	One Week Faculty Development Programme in Science (Philosophy of Science) organized by Kerala State Higher Education Council at School of Environmental Sciences, M.G. University, Kottayam	August 29 – September 02, 2019
Dr. Reeja Jose	National Workshop on "Recent Advancement in Molecular Immunology Research for Sustainable Aquaculture" organised by Department of Fish Processing Technology (Biochemistry), Kerala University of Fisheries and Ocean Studies.	September 25-27, 2019
Dr. Deepthi G.R. and Dr. Reeja Jose	Workshop on "Innovative Teaching in Zoology and Integrative Biology - WIT 2019" organized by Department of Zoology and Inter University Centre for Evolutionary and Integrative Biology in association with BoS in Zoology and BoS in Integrative Biology at Department of Zoology, University of Kerala, Kariavattom	16th November 2019.
Dr. Deepthi G.R.	UGC Sponsored Refresher Course in Environmental Sciences (Interdisciplinary) Conducted by UGC- HRDC, University of Kerala, Thiruvananthapuram.	January 11 - 24, 2020
Dr. Deepthi G.R., Dr. Reeja Jose and Ms. Somi Cherian	Training in Advanced Molecular Techniques" organized by the CEPC Laboratory & Research Institute Kollam.	March 2- 9, 2020.
Mr. Prathap CY	Training programme in Basic molecular biology organized by in CEPC Laboratory, Kollam	29.10.2018 to 07.11.2018
Dr. Santhi W.S.	National Workshop on "Environmental, waste and Energy auditing" held at the Department of Environmental Sciences, University of Kerala.	21-23, February 2018
Dr. Santhi WS Dr. Jisha S Dr. Prakash G Willimas Dr. Dinesh Raj R	Online course on basic Bioinformatics organized by the CEPC Laboratory & Research Institute Kollam.	May 29-June 04, 2020
Dr. Regy Johnson	Five day FDP programme- Bioinformatics for basic research and teaching organized by School of Biosciences, MG University	28.11.2019 to 03.12.2019
Dr. Prakash G. Williams	Summer School organized by UGC-HRDC, University of Kerala. Trivandrum	23.07.2018 to 13.08.2018
	Short term course organized by UGC-HRDC, University of Kerala. Trivandrum	23.07.2019 to 29.07.2019
Mr. Robert Raju	Orientation programme organized by UGC-HRDC, University of Kannur	11.07.2018 to 07.08.2018
Mr. Robert Raju &Dr.Sivaprasad A.	Refresher course in Botany organized by UGC HRDC, Bharathiar University	12.09.2019 to 25.09.2019
Dr. Sivaprasad A	Short term course organized by UGC HRDC, Patiala	20.08.2019 to 27.08.2019
Dr. Santhi W.S. Dr. Prakash G. Williams Dr. Sivaprasad A.	Short term course organized by UGC-HRDC, University of Kerala. Trivandrum	04.07.2019 to 10.07.2019
Dr. Jisha S.	Refresher Course in Life Sciences organized by UGC-HRDC, University of Kerala. Trivandrum	11.07.2019 to 24.07.2019

10. Exhibitions/ Seminars conducted

Physics

Sl. No.	Name of Event	Resource Person	Beneficiaries	Date
1.	Workshop on IPR and SPSS	Mr. R.S. Praveen Raj, Mr. Rasin R.S.	S6 BSc Physics students (2018-2019)	21-22 March 2018
2.	National Conference on Recent	Prof. Young Mee Jung,	Faculty	25-26 September,

	Advances in Spectroscopy of Advanced Materials	Prof. K. P. Rajappan Nair, Prof. I. Hubert Joe, Dr. R. Ida Malarselvi, Dr. R. Jayakrishnan, Dr. S. Muthu	members and Research scholars (2018-2019)	2018
3.	Workshop on BSc Research Projects	Dr. V. G. Rajeshmon	Selected S6 BSc Physics students (2018-2019)	14-15 October 2019
4.	Workshop on Data Analysis and SPSS	Mr. R. S. Rasin	S6 Physics students (2019-2020	08 March 2020
5.	National Seminar on "Scientific Solutions for Sustainable Rebuilding of Kerala in the Post Flood Scenario"	Dr. M. C. Dathan, Medha Patkar, Dr. K. R. Baiju, Dr. Abhilash S.	Faculty members and Students (2019-2020)	09-10 Jan 2020
6.	Winter School on "Materials and Molecular Simulations using Open Source Softwares: From Theory to Practice	Dr. K. C. Bhamu, Dr. Subramanyam Sappati	Faculty members and Research scholars (2019-2020)	16-22 Oct 2019
7.	One Week E Summer School on "One Week E-Summer School on Advanced Functional Materials for Energy Harvesting, Storage and Biomedical Applications"	Prof. Chandrabhas Narayana, Dr. Rajeev Joshi, Prof. Reji Philip, Prof. S. Anandan, Prof. Mahesh Hariharan, Dr. Vinesh Vijayan, Dr. T. N. Narayanan, Dr. V. M. Biju, Dr. Reji Varghese,	Faculty members and Research scholars (2019-2020)	13-19 May 2020

Chemistry

Sl. No.	Name of Event	Resource Persons	Beneficiaries	Date
1.	One day Seminar on "Nuclear Energy, the Need, the Perception and the Reality"	Shri A. V. Sathish, Scientific Officer, Kudankulam Nuclear Power Plant	Whole students of the Department	12th September 2018
2.	Three-day National Seminar on "Nano science and Nanotechnology	Dr. John Philip, Dr. Nandakumar Kalarikkal, Dr. Bhoje Gowd E Dr. Sajan Daniel George, Dr. Viji Selvaraj, Kuruvilla Joseph	Students, Faculty members and Research scholars	12th to 14th February 2019
3.	National Conference BIORADIANCE 2019 "Toxicity and Current Perspectives" was organized on	Dr.Yogesh Bharat Dalvi, Dr.Philip Mathew, Dr.Prasanth Rathinam, Dr.Nebu George Thomas,	Students, Faculty members and Research scholars	5th – 6thJuly 2019
4.	An invited talk on IPR	Mrs. Uma Bhasker & Mr. Anshal Sourashtri, Senior Consultants and Patent agents, Krishna & Sourashtri Associates, LLP, Bangalore	Students, Faculty members and Research scholars	19th July 2019
5.	A three-day Science Enrichment Program for high school level Govt /Aided students named SASTHRA JALAKAM 2019	Dr.Koshy John, B.Baburaj, Dr.Deepa Thomas	High school level students of Govt /Aided Schools	8th - 10th November, 2019.

Zoology

Sl. No.	Name of Event	Resource Persons	Beneficiaries	Date
1.	Seminar on "Wildlife Conservation"	Mr. S. Balasankar	I, III and V Semester B.Sc.	10.10.2019

			Zoology Students	
2	Seminar on Antibiotic Resistance	Dr. Philip Mathew	I, III and V Semester B.Sc. Zoology Students	24.10.2019
3.	A three-day Science Enrichment Program for high school level Govt /Aided students named SASTHRA JALAKAM 2019	Ms. Somi Cherian	High school level students of Govt /Aided Schools	8th - 10th November, 2019
4.	Programme for Promotion of Excellence among Gifted Children of Mavelikara Educational District	Dr. Deepthi G.R., Dr. Reeja Jose	Selected students from High schools of Mavelikkara	15.02.2020
5.	Webinar on "Echinoderm Diversity of Kerala Coast"	Dr. Deepa R. Pillai	II, IV and VI Semester B.Sc. Zoology Students	18.04.2020
6.	Webinar- "Zoonotic Diseases- Strategies to break the chain of transmission "	Dr. Abhilash R.	II, IV and VI Semester B.Sc. Zoology Students	02.05.2020
7.	Webinar on "Hermit Crabs- The Engineers of Ocean"	Dr. Reshmi R.	II, IV and VI Semester B.Sc. Zoology Students	16.05.2020
8.	Webinar -"Exotic freshwater fishes of Kerala"	Dr. Regi S. R.	II and IV Semester B.Sc. Zoology Students	30.05.2020

Botany and Biotechnology

Sl. No.	**Name of Event**	**Resource Persons**	**Beneficiaries**	**Date**
1.	Workshop on Thesis writing and data presentation	Dr. Suresh KK	VI semester B. Sc. Botany & Biotechnology and VI Semester B.Sc. Botany students	12.03.2018
2	Hands on training programme on "Plant identification and scientific illustration	Dr. Joby Paul	VI semester B. Sc. Botany & Biotechnology and VI Semester B.Sc. Botany students	24.03.2018
3	one day training programme on 'Herbarium techniques	Dr. Thomas V.P.	herbarium keepers and lab assistant of various colleges	26.03.2018
4	Lecture on 'micro RNAs and its significance'.	Dr. Ani V. Das	Whole students in the department	
5	Lecture on 'Biotechnology in Forest Tree Improvement and its significance'	Dr. E.M. Muralidharan	Whole students in the department	
6.	Invited lecture on 'Distribution and diversity of Lichens with special reference to Kerala'	Dr. Stephen Sequeira	Whole students in the department	25.01.2019
7.	Wetlands: Wastelands? Lifeline of future Earth	Dr. Jithesh Krishnan	Whole students in the department	05.02.2019
8.	Consequences of Antimicrobial resistance	Mr. Vishal Philip Sam, Consultant, ReAct Asia Pacific	Whole students in the department	24.10. 2019
9.	The three day National Seminar 'Current Trends and Advances in Biological Sciences (CTAB – 2020)'	Dr. TV Ramachandra, II Sc , Begaluru Dr. Sarith G Bhat, CUSAT Dr. VB Sameer Kumar, Central University of Kerala Dr. Deepa Balan, Dr. T Rajesh, CSIR-	Students, Faculty members and Research scholars	5-7, February, 2020

		NEERI Dr. Reji Varghese, IISER, Thiruvananthpuram Dr. Suresh PS, NIT Calicut		
10.	A three-day Science Enrichment Program for high school level Govt /Aided students named **SASTHRA JALAKAM** 2019	Dr. Sivaprasad A.	High school level students of Govt /Aided Schools	8th - 10th November, 2019.
11.	Programme on Promotion of Excellence among Gifted Children of Mavelikara Educational District	Dr. Regy Johnson	Selected students from High schools of Mavelikkara	February 15, 2020

11. Books/Journals

Chemistry

1. Fundamentals of Molecular Spectroscopy
2. Organic Chemistry 8th Edition-Carey & Giuliano
3. Photochemistry & Pericyclic reaction
4. Elementary Practical Organic Chemistry Part-1
5. Elementary Practical Organic Chemistry Part-2
6. A text book of Organic Chemistry –Bahl & Bahl
7. Selected topics in Inorganic Chemistry-Malik
8. Advanced Inorganic Chemistry Volume 2
9. Advanced Practical Organic Chemistry-Vishnoi
10. Physical Chemistry-Alberty
11. Solid State Chemistry
12. Elementary Practical Organic Chemistry Part-3
13. Text book of Organic Chemistry-3rd Edition
14. Experiments in Inorganic Chemistry
15. Essentials of Physical chemistry
16. Text book of Inorganic Chemistry – Sodhi

Botany

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12. Outreach activities

Physics

1. National Seminar on "Scientific Solutions for Sustainable Rebuilding of Kerala in the Post Flood Scenario" was organized jointly by the Department of Physics, IQAC and DBT STAR College Scheme in association with Directorate of Environment & Climate Change (DoECC), Govt. of Kerala, during **09-10 Jan 2020**. The national seminar was organized to make the local community and students aware of the impact of climate change and factors contributing to the same and the steps to be immediately implemented in the local society to save our environment and stabilize our climatic conditions. Famous activist Smt.Medha Patkar (Indian Social Activist,

Founder member of Narmada Bachao Andolan) and Dr.M.C.Dathan (Scientific Advisor to the Chief Minister of Kerala) delivered the keynote talks. About 116 participants including Kudumbashree members and students from various colleges and host institution attended the two day seminar. As part of the programme, Kudumbashree members were trained for making paper bags and cloth bags in light of the green environment campaign initiated by Government of Kerala.

2. Winter School on Materials and Molecular Simulations Using Open Source Softwares: From Theory to Practice on 16-22 October 2019 for teachers and students from various institutions in India.
3. One Week E Summer School on "One Week E-Summer School on Advanced Functional Materials for Energy Harvesting, Storage and Biomedical Applications" for teachers and students all over India during 13-19 May 2020
4. The Department of Physics organized a National Conference on Recent Advances in Spectroscopy of Advanced Materials for Research Scholars, Post graduate Students and Teachers during 25-26 September, 2018 at Bishop Moore College, Mavelikara
5. **AGNI 2018**: The Department of Physics and the Department of Mathematics celebrated the 87th birthday of the Missile Man of India Dr. A. P. J. Abdul Kalam by hosting the event 'Agni 2018' on 15 October 2018. The exhibition displayed as a part of the event provided information about Kalam sir and the ISRO, which made the students realize the true importance of the day. Students of the college as well as from nearby schools benefitted from the programme. An Inter-departmental presentation competition 'Dream 2020' was also conducted as a part of this event.
6. On 8 November 2019, the Department of Physics hosted the first day of the science enrichment programme "Shasthrajalakam" of the State Institute of Education Technology, Government of Kerala, which was hosted by Bishop Moore College during 8-10 November 2019. Prof. Javeesh Alex (Assistant Professor, Dept of Physics) and Dr. Lynnette Joseph (Assistant Professor, Department of Physics) led the Physics classes on the first day. Hands on session for High School Students from all over the state on various Physics experiments were conducted.
7. The Gifted children programme was initiated by the Education Department, Government of Kerala. The Department of Physics became a part of Programme for the Promotion of Excellence among Gifted Children of Mavelikara Educational District, organized jointly by the Science departments of Bishop Moore College. 60 talented students from Mavelikara Educational District, belonging to VIIth and IXth standards participated in the programme, which included an introduction to the world of Science Experiments by Dr. Lynnette Joseph.

Chemistry

1. On 10th November 2019, the Department of Chemistry hosted the third day of the science enrichment programme "Shasthrajalakam" of the State Institute of Education Technology, Government of Kerala, which was hosted by Bishop Moore College during 8-10 November 2019. Technical sessions and hands on session for High School Students from all over the state on various Chemistry experiments were conducted.
2. The Gifted children programme was initiated by the Education Department, Government of Kerala. The Department of Chemistry became a part of Programme for the Promotion of Excellence among Gifted Children of Mavelikara Educational District, organized jointly by the Science departments of Bishop Moore College. 60 talented students from Mavelikara Educational District, belonging to VIIth and IXth standards participated in the programme. Hands on chemistry practical sessions were conducted for the students
3. Dr. Tressia Alias Princy Paulose served as Resource person in the Annual Chemistry Symposium 2019 (ACS 2019) conducted by the Department of Chemistry, CMS College (Autonomous), Kottayam on 20th – 21st March 2019 sponsored by the DBT Star College Scheme (2017-2020).
4. Dr. Deepa Thomas delivered talk on Supramolecular Chemistry For the association inauguration of Chemistry Department, St.Thomas College, Ranny on 7-8-2019

5. Ms. Siji K. Mary served as a resource person in a seminar organised by CIPET- Kochi 6th National Conference on Biopolymers & Green Composites (BPGC 2019), 18th and 19th, January 2019 at Kochi, Kerala

Zoology

1. An Awareness programme was conducted in connection with "World Water Day" at C.M.S.L.P. School, Kallumala on 26th March 2018. Video shows and slide presentationsregarding the necessity of conservation of water resources were arranged. Pamphlets were distributed among the students
2. On 9th November 2019, the Department of Zoologyjointly hosted the Second day of the science enrichment programme "Shasthrajalakam" of the State Institute of Education Technology, Government of Kerala, which was hosted by Bishop Moore College during 8-10 November 2019. Hands on Zoology practical sessions were conducted for the students.
3. Co-ordinated One Day Workshop on "Programme for Promotion of Gifted children in Mavelikara Educational District" on 15th February 2020. The rare collection of specimens in the department museum were exhibited for the students. Mushroom culture practices was demonstrated.

Botany and Biotechnology

1. A three day National Seminar 'Current Trends and Advances in Biological Sciences (CTAB – 2020)' was held at the Convention Centre, Bishop Moore College, Mavelikara form 5th to 7th February, 2020. Seven invited lectures (Dr. TV Ramachandra, II Sc , Begaluru , Dr. Sarith G Bhat, CUSAT, Dr. VB Sameer Kumar, Central University of Kerala, Dr. Deepa Balan, Dr. T Rajesh, CSIR-NEERI, Dr. Reji Varghese, IISER, Thiruvananthapuram, and Dr. Suresh PS, NIT Calicut) and 70 delegate presentations were there. Around 200 participants from various institutions of Kerala and Tamilnadu have participated.
2. Participated in Shastra Jalaham on 9th November 2019 for selected school children of Alappuzha District.
3. Participated in the Programme for Promotion of Gifted children in Mavelikara on 15th February 2020
4. A training on Mushroom cultivation and marketing was conducted on 24.01.2020. About 100 participants including students, teachers and parents were participated in the training. Smt. Leenarani, a Karshakasree awardee and one of the master trainers from the Krishi Vigjan Kendra, Alapuzha lead the training programme. All the participants had hands on training session during the programme.
5. One day training programme on 'Herbarium techniques' for the herbarium keepers and lab assistant of various colleges was conducted on 26.03.2018. Dr. Thomas V.P. was the resource person for the programme.

13. Colleges mentored to apply for DBT Star College grants.

1. DB College, Sasthamcottah
2. Christian College, Chengannur
3. SN College, Kollam
4. T.K.M.M. College, Nangiarkulangara
5. Sacred Heart College,Chalakudy

14. Invited lectures

Physics

Sl. No.	Topic	Resource Person	Beneficiaries	Date
1.	Lecture cum Interaction session on Career Guidance	Dr. Rajeev Shesha Joshi	S4 and S6 BSc Physics students (2017-2018)	08.03.2018
2	Lecture cum Interaction session on Opportunities and Challenges in Materials Science	Dr. Rajeev Shesha Joshi	S4 and S6 BSc Physics students (2017-2018)	09.03.2018
3	Interactive session and lecture on Fundamentals of Nanoelectronics	Dr. Senoy Thomas	S4 and S6 BSc Physics students (2017-2018)	12-03-2018
4	Lecture cum Interaction session on Basics of Quantum Information	Dr. Anil Shaji	S4 and S6 BSc Physics students (2017-2018)	14-03-2018
5	Lecture cum Interaction session on Fundamentals of Magnetism	Dr. Santhosh P.N.	S4 and S6 BSc Physics students (2017-2018)	16-03-2018
6	Lecture cum Interaction session on Joy of Physics	Dr. C. Vijayan	S4 and S6 BSc Physics students (2017-2018)	20-03-2018
7	Lecture and Interaction session on “The Future and Nature of Employment”	Dr. Jijo P. Ulahannan	S2, S4 and S6 Physics students (2019-2020)	10 October 2019
8	Lecture cum Interaction Session on “Quantum Mechanics: A Lay man Approach”	Dr. C. S. Praveen	S2, S4 and S6 Physics students (2019-2020)	16 October 2020
9	Invited Lecture on “Density Functional Theory”	Dr. R. S. Swati	S4 and S6 Physics students (2019-2020)	17 Oct 2019
10	Lecture and Interaction session on “Science and Technology for a Sustainable Environment”	Shri. V.K. Madhusoodanan	S2, S4 and S6 Physics students (2019-2020)	13 Jan 2020
11	Lecture and Interaction session on “Black Hole Thermodynamics”	Dr. R. Tharanath	S2, S4 and S6 Physics students (2019-2020)	14 January 2020
12	Invited Talk and Interaction Session on “Research and Career Opportunities in India and Abroad”	Shri. Unnikrishnan Potty S.	S6 Physics students (2019-2020)	18 February 2020
13	Workshop on Data Analysis and SPSS	Mr. R. S. Rasin	S6 Physics students (2019-2020	08 March 2020
14	Lecture and Interaction session on “Electrode Materials for Supercapacitor Applications”	Dr. B. R. Rakhi	S2, S4 and S6 Physics students (2019-2020)	26 February 2020

Chemistry

Sl. No.	Name of Guest faculty	Topic	Date
1.	Dr. Anas S.	Organic Chemistry	13/3/2018
2.	Dr. Mangalam S. Nair	Drug Development through centuries	16/03/2018
3.	Dr. Reji Varghese	Supramolecular Chemistry	20/3/2018
4.	Dr. Kuruvilla Joseph	Space and beyond	22/3/2018
5.	Dr.AjayaKumar G.	Lab skill development training for students and lab staf	23/3/2018
6.	Dr. John Philip	Nanomaterials for meeting Present and Future Challenges	14/2/2019

7.	Dr. Prinson P.Samuel	communicate science to all	27/2/2019
8.	Dr. S. Sankararaman	Nano fluids	12/2/2019
10.	Prof. Nebu John	Air Pollution	28-6-2019
11.	Dr. Manikantan Nair.V	Nanomaterials	16-7-2019
12.	Dr. Retheesh Krishnan	General Chemistry	4-12-2019
13.	Dr. Vipin Iype Thomas	Introduction to application of computers in chemistry	10-12-2019
14.	Dr. Yogesh Bharat Dalvi	synthesis and bio medical applications of metal oxide nanoparticles	8-1-2020
15.	Ms Vineetha R	Composites and gels	20-2-2020
16	Ms. Shincy K. Achenkunju	Chromatographic techniques and its applications	3-3-2020
17.	Dr. Rahul Sasidharan	Hands on training in hand sanitizer preparation for teachers	16-3-2020
18.	Ms.Vani Maya	Hands on training in hand sanitizer preparation for Lab staff	18-3-2020

Zoology

Sl. No.	**Name of Event**	**Resource Person**	**Beneficiaries**	**Date**
1.	Invited Talk on Biodiversity for Sustainable Development"	Dr. Oommen V. Oommen	II, IV and VI Semester B.Sc. Zoology Students	26.02.2018
2	Invited Talk- Science and Future	Dr. A. Bijukumar	II, IV and VI Semester B.Sc. Zoology Students	17.03.2018
3.	Invited talk -"Research Methodology"	Dr. Kurian Mathew Abraham	IV and VI Semester B.Sc. Zoology Students	21.03.2018
4.	Invited Talk on "Global warming and Natural calamities"	Dr. Shirly P. Anand	I, III and V Semester B.Sc. Zoology Students	26.09.2018
5.	Invited Talk- "Induced Pluripotent Stem cell (iPSC) derived cells and 3D organoids:- A new platform for Drug Discovery and Regenerative Medicine "	Dr. Sheela Panicker Jacob	I, III and V Semester B.Sc. Zoology Students	26.09.2018
6.	Invited talk -" Conservation of Wetland Ecosystem"	Prof. Vijo Thomas Kurian	Zoology, Botany and Biotechnology Students	05.02.2019
7.	Invited talk -"Taxonomy of Cephalopods"	Dr. Sreeja V.	I, III and V Semester B.Sc. Zoology Students	19.09.2019

Botany and Biotechnology

Sl. No.	Name of Event	Resource Person	Beneficiaries	Date
1.	Lecture on 'micro RNAs and its significance'.	Dr. Ani V. Das	Whole students in the department	19.03.2018
2.	Lecture on 'Biotechnology in Forest Tree Improvement and its significance'	Dr. E.M. Muralidharan	Whole students in the department	19.03.2018

3.	Invited lecture on 'Distribution and diversity of Lichens with special reference to Kerala'	Dr. Stephen Sequeira	Whole students in the department	25.01.2019
4.	Wetlands: Wastelands? Lifeline of future Earth	Dr. Jithesh Krishnan	Whole students in the department	05.02.2019
5.	Consequences of Antimiocrobial resistance	Mr. Vishal Philip Sam, Consultant, ReAct Asia Pacific	Whole students in the department	24.10. 2019
6.	Sustainable management of ecology and environment in Western ghats: strategies and challenges	T V Ramachandra IISc, Bengaluru	Whole students in the department and registered participants of the seminar	05.02.2020
7.	Genomics a significant criteria for bacteriophages as an alternative to alleviate the burden of AMR	Sarita G. Bhat Head, Dept.of Biotechnology, CUSAT	Whole students in the department and registered participants of the seminar	05.02.2020
	Exploring nuclear receptors in health and disease	Suresh P.S Dept. of Biotechnology, National Institute of technology, Calicut.	Whole students in the department and registered participants of the seminar	07.02.2020
9.	DNA nanostructures: addressable nanoscaffolds	Reji Varghese IISER, Thiruivananthpuram	Whole students in the department and registered participants of the seminar	07.02.2020
10.	Nucleic acid mediated inter-cellular communications: learning lessons from exosomalmirnas	V.B. Sameer Kumar Central University of Kerala	Whole students in the department and registered participants of the seminar	06.02.2020
11.	Role of intellectual property rights in biological sciences	Dr. Deepa Balan Scientist CSIR-NIIST Thiruvananthapuram	Whole students in the department and registered participants of the seminar	06.02.2020
12.	Identification of differentially abundant organo-mercurial lyase genes by comparative metagenomics for soil bioremediation	T. Rajesh Biotechnology Division, CSIR-NEERI Chennai	Whole students in the department and registered participants of the seminar	06.02.2020

10. Self-evaluation

Department	***Objective (as stated in proposal)**	**% achieved**	**Reasons for underachievement/If achieved, state in quantitative metrics**
	1. To enhance bench skills of students by undertaking project work and participating summer training & industrial training programmes.	100% 1.New 14 projects done by students 2.Seven UG students did summer project at IIT, Gandhinagar and IIST,	2

		Thiruvananthapuram	
Physics	2.To upgrade the competency of faculty by participating in various faculty improvement programmes/workshops/ seminars etc	100% 1.All faculty attended training programmes (17 training programmes) 2.Two faculty development programmes organized.	2
	3.To empower the non-teaching staff to keep in pace with the rapid changes of their respective fields.	75% 1. Various training programmes were conducted to equip non-teaching staff. 2. An extensive training programme for non-teaching staff on electronic lab and CRO handling was planned to be conducted during 25 to 28 March 2020, but was suspended due to Covid impact.	1.5 (lock down and suspension of academic activities by Covid Spread)
	4.To enhance student interaction with eminent scientists, introducing career opportunities and research methodology	100% 1. Thirteen Interaction sessions with eminent scientists across the globe from reputed institutions. All resource persons were given Career guidance. 2. A workshop on Research Methodology, IPR and SPSS	2
	5. Outreach activities	100% 1. Organised a National Seminar on "Scientific Solutions for Sustainable Rebuilding of Kerala in the Post Flood Scenario", in which 116 participants including Kudumbashree members and students from various colleges and host institution attended.Public lectures by Prof. M.C.Dathan, (Scientific Advisor to Chief Minister) and Medha Patkar (Social Activist) was organised. Training on paper bag making was given to Kudumbasree members. 2. Organized a Winter School for teachers and research scholars from all over India. 3.Organised a National Seminar, in which research scholars and faculty members all over India participated. 4.An exhibition for nearby school students on APJ Abdul Kalam's space mission organised 5. Two programmes for training and hands on sessions organised for selected high school students. 6. A one week online summer school on Materials Science organised in which teachers and students all over India participated.	2
Total Score for Physics Department			**9.5/10**
Chemistry	Objective 1	**100%** **1. Eleven research projects** carried out by undergraduate students. 2. Two day workshop on Radiochemistry organized by Indian Association of Nuclear Chemists and Allied Scientists – Southern Regional Chapter (IANCAS-SRC) was attended by all undergraduate students on 2nd-3rd January 2018	2

		3. One day training programme on "HPLC, AAS and GCMS" at the Cashew Export and Promotion Council of India, Kollam, was attended by 7 students on 17th March 2018. 4. One day training programme on "Chromatographic and Spectroscopic techniques' organized by the Pushpagiri Institute of Medical Sciences and Research Centre, Thiruvalla was attended by 30 students on 5th July 2019 5. Laboratory safety training for all undergraduate students on 23rd March 2018 by Dr. Ajayakumar G., Govt. College for Women, Thiruvananthapuram	
	Objective 2	**100 %** All faculties attended training programmes on different areas (five programmes)	2
	Objective 3	100% All non-teaching staffs (NTS) were attended training. Two such programmes were conducted by the department. Besides these, NTS were participated in training programmes offered by other participating depts. Another training programme scheduled on March is cancelled due to Covid spread	1.5 (lock down and suspension of academic activities by Covid Spread)
	Objective 4	100% 1. Nineteen interactive sessions with eminent scientists or scholars from reputed institutions. 1.Workshop on IPR conducted	2
	Objective 5	100% Two programmes for training and hands on sessions organized for selected high school students and gifted students selected by State govt.	2
Total Score for Chemistry Department			9.5/10
Zoology	Objective 1	100% 1.20 students underwent training at three reputed institutions. 2. All students undertaken projects works	2
	Objective 2	100% All the faculties attended training programmes	2
	Objective 3	50% 1. All non-teaching staff were undertaken training conducted by other participating depts. 2. Another training programme scheduled during March was cancelled due to lock down after Covid spread.	1 (Lock down and suspension of academic activities by Covid Spread)
	Objective 4	100% 1. Fifteen interactive sessions with eminent scientists and scholars. 2. Conducted Hands-on training programme on 'Computer aided statistical techniques. 3. An Invited talk on "Research	2

		Methodology" and career opportunities were organized.	
	Objective 5	100% An awareness programme related to water conservation was conducted for nearby school students. Actively participated in Shastra Jalaham for providing experiential learning to high school students. Took initiative in organizing One Day Workshop for Gifted children of Mavelikara Educational district.	2
Total Score for Zoology Department			9/10
Botany and Biotechnology	Objective 1	100% 1. Fourteen students were attended training at reputed institutions. 2. Several visits were conducted to Industry/ Institute facilities. 3. Hands on training sessions and new practicals introduced	2
	Objective 2	**75 %** All faculties attended training programmes offered by reputed institutions. A faculty training programme scheduled at CEPCI, India were cancelled due to lock down implemented.	1.5 (Lock down and suspension of academic activities by Covid Spread)
	Objective 3	100% All non-teaching staffs (NTS) were attended training (5 staff members, Three training sessions).	2
	Objective 4	100% 1. Sixteen interactive sessions with eminent scientists from reputed institutions. Special Sessions for Career guidance in each of the above class. 2. A lecture on Role and significance of IPR in biological sciences was conducted. 3 Workshop on thesis writing and data presentation was conducted for students.	2
	Objective 5	100% 1.Organized a national seminar –more than 200 registered participants from various institutions. 2.Organised training programme for Herbarium curators and lab assistants of various colleges. 3. conducted a mushromm cultivation training for members of college community including parents. 4. Two programmes for training and hands on sessions organized for selected high school students and gifted students selected by State govt.	2
Total Score for Botany and Biotechnology Department			9.5/10

11. 2 new dimensions that shall be added if accorded Star status (within 200 words).

1. **Implementation of Virtual Lab facility**: In the COVID scenario, we are planning to set up a facility for virtual lab and simulators for at least selected experiments in the syllabus. At present,

even though a good number of experiments and simulators are available with other institutions, many experiments in syllabus cannot be covered solely depending on them. We are also planning to extend the facilities to other institutions as well.

2. **Enhance Interdisciplinary Research**: We have a plan to develop strategies to enhance interdisciplinary research among the participating Departments as well as with other colleges. As part of this, College will be act as a research hub/centre for outstanding students of nearby colleges. We help them to complete time bound projects using the facilities provided under DBT-STAR College Scheme.

Signature of Executive Authority of Institute/ University with seal

Dr. Jacob Chandy
PRINCIPAL

PRINCIPAL
BISHOP MOORE COLLEGE
MAVELIKARA - 690 110

Signature of the Co-ordinator

Dr. DINESH RAJ R.

Head of the Institution
(With Seal)

Course Coordinator
(With Seal)