



VIVEKANANDA COLLEGE

College with Potential for Excellence

Residential & Autonomous – A Gurukula Institute of Life Training,

Affiliated to Madurai Kamaraj University

Reaccredited with 'A' Grade (3.59 out of 4.00) by NAAC

DBT Star College Scheme Funded

Managed by Sri Ramakrishna Tapovanam, Tirupparaitturai, Tiruchy District

TIRUVEDAKAM WEST, MADURAI DISTRICT – 625 234, TAMIL NADU



ANNUAL PROGRESS REPORT (2021-2022)

Participating Departments

Botany, Zoology Chemistry, Physics & Mathematics



सत्यमेव जयते

Department of Biotechnology
Government of India

DBT STAR COLLEGE SCHEME

(Sanctioned Order No: **HRD-11011/43/2021-HRD-DBT** dated: **08-12-2021**)

Submitted to

DEPARTMENT OF BIOTECHNOLOGY

Ministry of Science and Technology

Government of India, New Delhi



Department of Biotechnology

Proforma for submission of Annual Progress Report supported under Star College Scheme

Part: A

1. **Name of the College** : **Vivekananda College (Residential & Autonomous)**
2. **Name of Coordinator** : **Dr. V. Parthasarathy**
Designation : Vice Principal & Associate Professor
Address : PG & Research Department of Zoology
Vivekananda College (Residential & Autonomous)
Tiruvedakam West 625234, Madurai District, Tamil Nadu

Phone no : Ph. No. 9942387711
Email: zoopartha@yahoo.co.in
3. **Assessment duration** : 08/12/2021 to 31/03/2022 **Duration in Year** : 2021-2022

4. Details of Departments Supported

Sl. No.	Name of the Department	Courses (B.Sc./M.Sc./PG Diploma, certificate etc) offered	Regular Faculty members	
			Total = 29	
			With Ph.D.	Without Ph.D.
1.	Botany	B.Sc.	4	Nil
2.	Zoology	B.Sc., M.Sc., M.Phil., Ph.D.	7	1
3.	Chemistry	B.Sc., M.Sc., Ph.D.	7	2
4.	Physics	B.Sc.	1	4
5.	Mathematics	B.Sc.	3	2

5. Number & Date of Advisory committee meeting: Nil

S. No.	Nature	Date	Participants
1.	DBT Star College Scheme Implementation	3 rd January 2022	1. Dr. T. Venkatesan, Principal 2. Dr. V. Parathasarathy Vice – Principal & Coordinator, DBT Star College Scheme
2.	Purchase Committee Meeting	21 st March 2022	1. Dr. A. Shajahan External Member Dean of Research & Associate Professor of Botany Jamal Mohamed College, Tiruchirappalli 2. Mrs. Padma External Member Chartered Accountant, Muthupatti, Madurai



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

(You may enumerate 5 minor projects where students were involved and their impact or similar activities and their outcome; this is for representative purpose and coordinator may include details as per own choice; kindly refrain from providing philosophical data. Avoid any introduction. All the justifications must be very crisp like any aspect non-existent pre-STAR Scheme and you achieved after the grant.

- With the financial support of Star College Scheme- Department of Biotechnology, we have purchased new equipments and some more equipments which have been scientifically assisted to improve the quality of the existing curriculum via introducing new practical courses. Owing to this support, each student of our department has obtained a chance to perform experiments/practicals with individual laboratory instruments/equipments
- Good numbers of eminent academic experts, scientists and industrialists have been invited under this DBT Star College Scheme, for different programs including Hands-on training, Workshops, Summer training programmes, Skill Development Programmes and Faculty Enrichment Programmes and all these platforms has provided an excellent and broad academic exposure to both the students and faculties of our college and other institutions.
- By utilizing this source, we have offered interdisciplinary based learning methodology to our and other Department students through hands-on training, group projects, inter-departmental programmes, institutional and industrial visit. The accomplishment of this ideology, the outcome has enabled the students to learn the applications of both basic knowledge and advanced research in their respective fields and invigorate them to pursue a career in interdisciplinary areas with confidence and credence.
- Many outreach programmes like webinars, virtual training programmes have been conducted to popularize the need of science among college and rural youth and they have improved their skills in digital learning and teaching. Good laboratory practices were also taught to laboratory staffs of different disciplines via special training programmes and they have been prompted, prodded and educated themselves to understand the importance of safety cum healthy enriched laboratory practices.

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

- Compulsory student projects have been introduced for all the final year students.
- A series of useful experiments have been introduced to expand our student's knowledge.
- The stakeholders are exposed to lay bare to enhanced apprehension through various workshops cum training programmes have been conducted to the students.
- Under outreach activities, good number of training programmes has been organized to nearby school teachers belonging to our institution.
- Virtual dissection has been introduced through online mode via licensed software and through simulation board.



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

- Created awareness on the importance of practical sessions and hands-on training to bolster critical thinking among the student community. Students now have the confidence of assertiveness and self-possession to carry out many of the newly introduced experiments individually. This has greatly expanded their knowledge, increased their self-confidence and create more interest in the subject.
- Strengthened to realize the importance of interdisciplinary and cross-disciplinary approaches in improving science education at the undergraduate level. As the students come to know the various theoretical and practical knowledge of each course and they learnt through training programme for implementing the ideas to their own fields of interest.
- To inclusion of group projects in the curriculum, which establishes as good environment and interaction among the staffs and students across the various disciplines
- Facilitated the adoption of online platforms for teaching and learning and make judicious use of the both simultaneously.
- To acquired the basic knowledge, employability avenues and entrepreneurial activities via interdisciplinary projects.

Difficulties Faced

- We have faced some difficulties to purchase the laboratory equipments, glassware and chemicals during the pandemic situation within short span time.
- Existed pandemic period led to many difficulties especially in student's admission strength. However, we hope to strengthen the students in the forthcoming years

Suggestions

- The College students were come from rural background, so we faced the difficulties to organize industrial/institutional visit. If travel grant will be allotted little bit more for students, it will be easier to conduct such visit in fruitful way.

Moreover, the fund will be released in the beginning of academic year, it will be great for organizing/conducting the proposed programme in a planned way, otherwise we will hurry up the programme in short period of time.



9. Key performance indicators

S. No.	Indicator	Pre-support (20-21)				During /After Support (21-22)				Remarks
		MALE				MALE				
1	No. of students admitted	Department of Zoology								
		Total = 31				Total = 12				
		SC	ST	OBC	G	SC	ST	OBC	G	
		10	-	21		3	-	9	-	
		Department of Botany								
		Total = 21				Total = 12				
		SC	ST	OBC	G	SC	ST	OBC	G	
		6	-	15		1	-	11	-	
		Department of Chemistry								
		Total = 41				Total = 42				
		SC	ST	OBC	G	SC	ST	OBC	G	
		7	1	32	1	7		35		
		Department of Physics								
		Total =42				Total = 24				
SC	ST	OBC	G	SC	ST	OBC	G			
10		32		2		22				
Department of Mathematics										
Total =19				Total = 25						
5		14		3		22				
2	No. of students passing out (%) Students Admitted / passing out (Pass %)	Department of Zoology								
		Students admitted	% of Admission	Pass Percentage	Students admitted	% of Admission	Pass Percentage			
		27	-	100	21	-	100			
		Department of Botany								
		Students admitted	% of Admission	Pass Percentage	Students admitted	% of Admission	Pass Percentage			
		22	-	100	23	-	95.65			
		Department of Chemistry								
		Students admitted	% of Admission	Pass Percentage	Students admitted	% of Admission	Pass Percentage			
		30	-	100	43	-	90.69			
		Department of Physics								
		Students admitted	% of Admission	Pass Percentage	Students admitted	% of Admission	Pass Percentage			
		35	-	100%	31	-	93.54%			



		Department of Mathematics						
		Students admitted	% of Admission	Pass Percentage	Students admitted	% of Admission	Pass Percentage	
		35	-	100	44	-	100	
3	Drop-out rates	Department of Zoology		: 1.81		2.81		
		Department of Botany		: 2.41		2.06		
		Department of Chemistry		: 0.25		0.02		
		Department of Physics		: 2.04		0.08		
		Department of Mathematics		: 2.55		0.06		
4	No. of students opting for M.Sc.	Department of Zoology		: 12		12		
		Department of Botany		: 06		04		
		Department of Chemistry		: 26		12		
		Department of Physics		: 11		14		
		Department of Mathematics		: 16		17		
5	Average marks	Department of Zoology		: 70.15		73.21		
		Department of Botany		: 70.15		73.21		
		Department of Chemistry		: 68.66		69.74		
		Department of Physics		: 81.10		86.25		
		Department of Mathematics		: 78.20		80.60		
6	No. of hands-on experiments being conducted	Department of Zoology		: 02		03		Workshop & Summer Training Programmes conducted for the Students prescribed in the proposal
		Department of Botany		: 02		02		
		Department of Chemistry		: 02		02		
		Department of Physics		: 01		02		
		Department of Mathematics		: 01		02		
7	No. of new experiments introduced	Department of Zoology		: Nil		09		Practicals were conducted as prescribed in the proposal
		Department of Botany		: Nil		10		
		Department of Chemistry		: Nil		09		
		Department of Physics		: Nil		03		
		Department of Mathematics		: Nil		13		
8	Publications (scopus Indexed) /patents, if any.	Department of Zoology		: Nil		13		
		Department of Botany		: Nil		04		
		Department of Chemistry		: 03		06		
		Department of Physics		: Nil		02		
		Department of Mathematics		: 05		07		
9	Training received by Faculty	Department of Zoology		: Nil		07		
		Department of Botany		: Nil		08		
		Department of Chemistry		: 02		06		



		Department of Physics	: Nil	04	
		Department of Mathematics	: Nil	04	
10	Exhibitions/seminars / training courses conducted	Department of Zoology	: 02	05	Training Programmes conducted for the Students, Faculty and Laboratory Staff as prescribed in the proposal
		Department of Botany	: 02	04	
		Department of Chemistry	: 02	03	
		Department of Physics	: 03	3	
		Department of Mathematics	: 05	04	
11	Books/journals subscribed from Grants	Department of Zoology	: Nil	10	Books and Journals were purchased from DBT contingency grant
		Department of Botany	: Nil	Nil	
		Department of Chemistry	: Nil	Nil	
		Department of Physics	: Nil	Nil	
		Department of Mathematics	: Nil	Nil	
12	Outreach activities (Popular lectures)	Department of Zoology	: 01	03	Outreach activities were conducted for Students, School and College Teachers as prescribed in the proposal
		Department of Botany	: Nil	05	
		Department of Chemistry	: Nil	03	
		Department of Physics	: Nil	02	
		Department of Mathematics	: Nil	02	
13	Colleges mentored to apply for DBT Star College grants	Department of Zoology	: Nil	A.V.V.M.Sri Pushpam College Poondi - 613 503 Thanjavur District Tamil Nadu	
		Department of Botany	: Nil		
		Department of Chemistry	: Nil		
		Department of Physics	: Nil		
		Department of Mathematics	: Nil		
14	Invited lectures	Department of Zoology	: Nil	07	
		Department of Botany	: Nil	05	
		Department of Chemistry	: 02	03	
		Department of Physics	: 01	04	
		Department of Mathematics	: Nil	03	

- Proofs (S. No. 6 – 14 not more than 5 pages, 1.5 line spacing 11 times roman font size) to be provided only attested by Principal and Coordinator



15 Self Evaluation

Department	*Objective (as stated in proposal)	% achieved	Reasons for under achievement / If achieved, state in quantitative metrics
Zoology	<ol style="list-style-type: none">1. Students Skill Development Programme (SSDP): To design curriculum with improvised techniques and methods using ICT, hands on training, expert's orientation, field visits and spot lectures, entrepreneurial skill oriented programme, summer and winter training programme and environmental awareness with focus on ethical, moral and community responsibility.2. Faculty Enrichment Programme (FEP): To conduct specialized Programmes in hands on training, training sessions, national and international3. conferences, seminars, symposiums, workshops, webinars, research activities, orientation and refresher courses, e-content preparation, online courses and inculcating best teaching methods with focus on ethical, moral and community responsibility.4. Laboratory Staff Skill Development Programme (LSSDP): To enhance capabilities of laboratory staffs for inculcating awareness on safety measures in laboratory, handling of instruments in operation, maintenance of museum specimens, preparation of chemicals required for practicals and computer skills.5. Outreach Programme: To organize outreach programme for theory and practicals to faculties of Schools and consortium Colleges. Conducting awareness programme on environmental issues, infectious human diseases, entrepreneurial skill development, ICT Usage and content preparations with focus on ethical, moral and community responsibility.	100 %	2
Botany	<ol style="list-style-type: none">1. To enhance the academic and instrumentation facilities for achieving excellence in teaching and training programme.2. To enhance the quality of the learning and teaching process to stimulate original thinking through 'hands-on training' on experimental work and participation in summer schools.3. To promote share the networking and strengthen ties with nearby institution and laboratories.4. To organize specialized training programmes for faculty improvement and learn optimizing technical outputs.5. To strengthen capabilities of core instrumentation resources by procuring new equipment and upgrading of existing facilities.6. To provide access and exposure to students to research laboratories and industries.	100 %	2



Chemistry	<ol style="list-style-type: none">1. To strengthen the curriculum and physical infra structure for achieving excellence in teaching and learning.2. To enrich quality of teaching and learning to organize hands on training and faculty development programmes3. To develop research activity on waste materials into wealth creation for students under group projects4. To provide practical exposure to students through research laboratories and industries5. To collaborate and tie up with nearby institutes to promote sharing knowledge6. To create on awareness on food adulteration and chemicals in everyday life7. To develop entrepreneurship skills on household things among the students and self help groups.	100 %	2
Physics	<ol style="list-style-type: none">1. To create self employment opportunities.2. To have a hands training on electrical appliances.3. To attend workshop/seminars by the faculty.4. To arrange the guest lecture programme.5. To organize training programme for school teachers and college teachers.6. To create awareness in energy savings, use of alternate energy sources which are non polluting nature.7. By Conducting & Participating Intercollegiate Meet to produce skills among the students.8. Most of our students are first generation learners from rural background who needs scientific schooling in physical sciences oriented enterprises.	100 %	2
Mathematics	<ol style="list-style-type: none">1. To enhance the laboratory exposure for students.2. Modern equipments and skill will enhance the aptitude of the students for higher studies and research.3. To bring about interaction with experts in the academic and industrial field.4. Teaching of the Smart technologies in the concerned fields will increase the learners to obtain high skills and employability.5. To facilitate attending and arranging faculty development programmes.6. Involvements of individuals in designing, analyzing and solving a scientific problems will enhance their self-confidence and personal involvement in subjects.	100 %	2



Self Evaluation Parameters for the year 2021 - 2022

Objectives of DBT Star College Scheme

- To strengthen the academic and physical infrastructure for achieving excellence in teaching and training.
- To enhance the quality of the learning and teaching process to stimulate original thinking through 'hands-on' exposure to experimental work and participation in summer schools.
- To promote networking and strengthen ties with neighboring institutions and other subject related institutions and laboratories.
- To conduct specialized training programmes for faculty improvement for optimizing technical capabilities.
- To increase capabilities of core instrumentation resources by procuring essential and need based equipment and upgrading of existing facilities to make use of them effectively.
- To provide access and exposure to students to research laboratories and industries in the country.
- To help in devising standard curricula and Standard Operating Procedures (SOP's) / kits for practicals.
- To provide more and exposed knowledge through better library facility to students and teachers.



Part: B

6. Hands-on experiments being conducted

Department of Zoology

1. Hands on Training on virtual dissection by using simulation boards on 31st March 2022 (Beneficiaries - 40)
2. Workshop on Genome analysis and protein designing on 21st to 23rd July 2022 (Beneficiaries - 40)
3. Summer Training on Microbial culture techniques and Electroporation (Interdepartment) on 04th to 08th July 2022 (Beneficiaries - 40)

Department of Botany

1. Hands on Training on Preparation of Herbal Products of Nilavembu Kashayam, Kabasura kudineer, Hair oil (Interdepartment) on 22nd to 26th February 2022 (Beneficiaries - 75)
2. Summer Training Programme on Organic Gardening for Sustainable Development and Identification of Wild Vegetables (Interdepartment) on 11th to 15th July 2022 (Beneficiaries -37)



Department of Chemistry

1. Hands on Training on Recent Advances in Chemistry on 15th to 19th March 2022 (Beneficiaries - 44)
2. Summer Training Programme on chromatography Techniques & Spectrophotometer Analysis (Interdepartment) on 11th to 15th July 2022 (Beneficiaries - 55)



Department of Physics

1. Workshop on Household Appliances (Interdepartment) on 15th to 19th March 2022 (Beneficiaries - 50)
2. Summer Training on Instrumentation Studies in Physics on 14th & 15th July 2022 (Beneficiaries - 40)





Department of Mathematics



1. Workshop on Vedic Mathematics on 21st to 25th March 2022 (Beneficiaries - 180)
2. Summer training on Mathematical Software (Interdepartment) on 11th to 15th July 2022 (Beneficiaries - 36)

7. New experiments introduced

Department of Zoology

1. **Practical-1: 09CP23:** 1. Individual simulation boards to be virtual dissection.
2. **Practical-2: 09CP43:** 2. ESR mounting for physiology.
3. Basic hematological techniques and biochemical assays.
4. DNA model building through plastic molecular beads.
5. Comparative human trait analysis (Height, Weight & BMI) by using BMI analyzer
3. **Practical-3: 09CP63:** 6. Protein profile preparation through SDS PAGE. 7. Water sample quality test with multi parameter probe. 8. Analysis of milk quality by milk nutritive value analyzer. 9. Biodiversity and digital documentation of faunal baseline in the local vicinity.



Department of Botany

1. **Practical- II: 08CP43:** 1. Study of polyploidy in onion root tips (Individual Practical). 2. Quantitative estimation of Plant Pigments using Spectrophotometer (Individual Practical). 3. Preparation of Buffer Solution at Different Molar Concentration and Measurement of pH (Individual Practical). 4. Spectrophotometric Estimation of Isolated DNA (Individual Practical). 5. Separation of Proteins by Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis (SDS-PAGE) (Group Practical)
2. **Practical-III: 08CP61:** 6. Isolation of microorganisms (Bacteria) from natural sources by serial dilution and plating methods (Group Practical).
7. Growth Curve of Bacteria (Individual Practical). 8. Isolation of Genomic DNA from Plant Tissues (Group Practical). 9. Agarose gel Electrophoresis (Group Practical). 10. Plant Tissue culture studies in Medicinal Plants (Group Practical)





Department of Chemistry

1. Volumetric Estimation and Organic Preparation (07CP23): 1. Preparation of organic compound using Microwave oven (Green synthesis). 2. Purification of organic compounds using column chromatography. 3. Determination of Melting point using Digital melting point apparatus.
2. Semimicro Inorganic Qualitative Analysis and Organic Estimation (07CP43): 4. Estimation of Ascorbic acid.
3. Water Analysis: 5. Alkalinity, Hardness, Chloride, Dissolved Oxygen, Estimation of TDS, TSS, TS and pH of the given water samples.
4. Gravimetric Estimation and Organic Analysis (07CP62): 6. Estimation of Ni as Nickel (II) dimethylglyoxime. 7. Analysis of purity of organic compound using thin layer chromatography
5. Industrial and Clinical Chemistry: 8. Extraction of Starch from Potato. 9. Extraction of Casein from Milk



Department of Physics

1. Practical-I (06CP23): 1. Study of He-Ne Laser (Group Practical)
2. Practical-II (06CP43): 2. Fabry-Perot Interferometer (Group Practical)
3. Practical (06CP62): 3. Laurent's Half Shade Polarimeter (Group Practical)

Department of Mathematics

1. LATEX (05AP32): 1. Enable Document Class with Margin and Font Setup in Latex. 2. Generate different types of Mathematical Symbols and Nomenclature in Latex. 3. Build Simple Formulas in Latex. 4. Creating Various Tables and Table of Contents in Latex. 5. Insert Figures with Caption and Alignments in Latex. 6. Construct Chapters with Various Levels in Latex. 7. Layout Bibliography (or) Reference in Latex.
2. MATLAB (05AP42): 8. Basic Features in Matlab. 9. 2D Plotting in Matlab. 10. Matrices and Linear Algebra in Matlab. 11. Picard Iteration in Matlab. 12. Finding Solution of Simple Problem in Vector Calculus in Matlab. 13. Solve Basic Problems with Differentiation and Integration in Matlab.



8. Publications (Scopus indexed) / Patents, if any

Department of Zoology

1. Pothiraj C, Balaji P, Shanthi R, Gobinath M, Suresh Babu R, Munirah A A-D, Hatamleh AA, Ramesh Kumar K, Veeramani Veeramanikandan, Ramasubramanian Arumugam (2021) Evaluating antimicrobial activities of *Acanthus ilicifolius* L. and *Heliotropium curassavicum* L against bacterial pathogens: an in-vitro study. *Journal of Infection and Public Health* 14, 1927–1934
2. Priya S, Jaianand K, Jothi RR, Prema P, Ramesh Kumar K, Balaji P, Hamad A. Al-Lohedan, Selvaraj A, Veeramanikandan V (2021) Isolation, Expansion, and Characterization of Placenta Originated Decidua Basalis-Derived Mesenchymal Stromal Cells. *ACS Omega*, 6, 51, 35538-35547.
3. Prema P., Boobalan T., Arun A., Rameshkumar K., Suresh Babu R., Veeramanikandan V., Nguyen V-H, Balaji P. (2022). Green tea extract mediated biogenic synthesis of gold nanoparticles with potent anti-proliferative effect against PC-3 human prostate cancer cells. *Materials Letters* 306, 130882
4. Prema P., Veeramanikandan V., Rameshkumar K., Gatasheh MK., Hatamleh AA, Balasubramani R, Balaji P. (2022). Statistical optimization of silver nanoparticle synthesis by green tea extract and its efficacy on colorimetric detection of mercury from industrial waste water. *Environmental Research* 204. 111915.
5. K. Chinnadurai, P. Prema, V. Veeramanikandan, K. Rameshkumar, Van-Huy Nguyen, NajatMarraiki, Nouf S.S., Zaghloul, P. Balaji (2021). Toxicity evaluation and oxidative stress response of fumaronitrile, a Persistent Organic Pollutant (POP) of industrial waste water on *Tilapia* fish (*Oreochromis mossambicus*). *Environmental Research*. Doi.10.1016/j.envres.2021.112030.
6. M.R. Maya, K. Rameshkumar, V. Veeramanikandan, T. Boobalan, M. Kumar, M. Eyini, A. Arun, Arivalagan Pugazhendhi, P. Balaji (2022) Evaluation of antioxidant, anti-inflammatory, and anti-hyperglycemic effects of *Wattakaka volubilis* Linn. *F. Process Biochemistry* 112. 183–191.
7. P. Prema, S. SubhaRanjani, K. Ramesh Kumar, V. Veeramanikandan, N. Mathiyazhagan, Van-Huy Nguyen, P. Balaji (2022) Microbial synthesis of silver nanoparticles using *Lactobacillus plantarum* for antioxidant, antibacterial activities. *Inorganic Chemistry Communications* 136, 109139.



8. Selvaraj S, Prashanth C, Ponraj G, Rameshkumar K (2022) Antibacterial activities of medicinal plant leaves extract against isolated *Escherichia coli* bacteria from different water sources. *Research & Reviews: A Journal of Microbiology & Virology.*, 11(3):31-40.
9. Maya MR, Ananthi V, Arun A, Kumar P, Govarthanan M, Rameshkumar K, Veeramanikandan V, Balaji P (2022). Protective efficacy of *Capsicum frutescens* fruits in pancreatic, hepatic and renal cell injury and their attenuation of oxidative stress in diabetic Wistar rats. *Journal of Taibah University for Science.* 15, 1232–1243
10. M Pavunraj, K Baskar, S Arokiyaraj, S Ignacimuthu, AA Alqarawi, Hashem, A (2021) Karyomorphological effects of two new oil formulations on *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae). *Saudi Journal of Biol. Sci.* 28 (3), 1514-1518
11. Gokul T, Ramesh T (2021) A note on seasonal migratory movement of *Catopsilia pomona* in the plains of Madurai District, Tamil Nadu. *Journal of Entomological Research.* 45. 749-758
12. Selvaraj S, Prashanth C, Ponraj G, Rameshkumar K (2022) Antibacterial activities of medicinal plant leaves extract against isolated *Escherichia coli* bacteria from different water sources. *Research & Reviews: A Journal of Microbiology and Virology.* 11, 31-40.
13. Krishnamoorthy S, Kamatchi K (2022). Anti-Oxidant Activity and Total Phenolic Content (TPC) Of the Plant Extract of *Abutilon indicum* (Linn)” *Journal of Research in Agriculture and Animal Science.* 9, 33-41.

Department of Botany

1. Ramesh, V, Ramakrishanan, S, Siva, V (2021) Antibacterial activities of endophytic *Xylaria* sp. Strain SR2 from *Araucaria heterophylla* against drug resistant *Staphylococcus aureus* strains. *J. Mycopathol. Res.* 59, 435-44.
2. Ramesh, V (2021) The Natural Warehouse of Bioactive Potential Compounds in the Recent Past Decades Compounds in the Recent Past Decades in Plant derived Drugs and Drug Repurposing: Integrated Publications, 73-60.
3. Ramesh, V (2021) Phytochemical characterization of Marine Macro Algae in Southern Coastal Regions of Tamil Nadu in Research and Innovations in Chemical Sciences – an approach towards qualitative and quantitative studies and applications, Bharti Publications, 186-193.
4. Shamsudheen KM, Musfir Mehaboob V, Faizal K, Raja P, Thiagu G, Soundar Raju C, Shajahan A (2021) Calcium-alginate coated synthetic seed production, storage and assessment of genetic stability in *Alpinia galanga* (L.) Willd. *Vegetos.* Doi: 10.1007/s42535-021-00314



Department of Chemistry

1. Thamarachelvan, M, Ganapathi, M, Harish, H, Venkata Narayanan, NS, Duraipandi, P (2022) Electrocatalytic Oxidation of Hydrazine using a Cobalt Bis (thiosemicarbazone) Complex. Topics in Catalysis. Doi. 10.1007/s11244-022-01584-8
2. Vinothkumar, K, Rajkumar, G, Sethuraman, MG, (2021) Enhancement of protection of copper through electropolymerised poly-2-amino-1,3,4-thiadiazole and its composite films. Materials Chemistry and Physics. 259, 123987
3. Vinothkumar, K, Rajkumar, G, Sethuraman, MG, (2021) Biogenic one-step synthesis of silver nanoparticles (AgNPs) using an aqueous extract of *Persea americana* seed: Characterization, phytochemical screening, antibacterial, antifungal and antioxidant activities. Inorganic Chemistry Communications. 143, 109817
4. Ellairaja Sundaram Abhijit Manna Karthika Lakshmi Servarayan Vairathevar Sivasamy Vasantha (2021) Colorimetric detection and bio-magnification of bisphenol A in fish organs and water sources using 3',6'-bis(diethylamino)-2-((3,4,5-trimethyl benzylidene) amino) spiro [isoindoline - 1,9'-xanthen]-3-one (BTSIXO)-Fe³⁺ ion conjugate., Food Chemistry, 345, 128627.
5. Ellairaja Sundaram, Karthika Lakshmi Servarayan, Vairathevar Sivasamy Vasantha (2022) Optical Detection of Thiocyanate in Human Saliva based on the Colorimetric response of (2-(2-hydroxyphenyl)-1H-benzo[d]imidazol-5-yl)(phenyl) methanone (HBPM)/Co²⁺ ions Conjugate. SpectrochimicaActa Part A, 266, 120423.
6. Shenbagavalli Kathiravan, Karthika Lakshmi Servarayan, Ellairaja Sundaram, Vasantha Vairathevar Sivasamy (2022) Fluorescent Biosensing and Chemosensing Strategies for Food Quality Assessment- Biosensing and Micro-Nano Devices: Design Aspects and Implementation in Food Industries, Springer, Singapore, , ISBN: 978-981-16-8332-9

Department of Physics

1. Jeyasankar P, Jeba Rajasekar RV (2021) Thermal Analysis on Nanocarbon-Cr₂O₃ coated Fins and Solar Collector with Nanostructured Materials. Materials Research Innovations. 26, 176-181.
2. Prahalad Kanti B, Pranshoo U, Ramesh R, Sharad Kumar Y, Latha KVP, Meenakshisundaram N, Pramoda KN (2022) Twist-Dependent Tuning of Excitonic Emissions in Bilayer WSe₂. ACS Omega. 7, 6412–6418.



Department of Mathematics

1. Velmurugan C, Ramachandran V (2022) Design and Development of Algorithm for M Modulo N graceful labeling on Cycle and Complete graph. *Advances and Applications of Mathematical Sciences*. 21, 2283-2300
2. Velmurugan C, Ramachandran V (2022) Designing on secret password by using cryptography and M Modulo N graceful labeling. *Emerging Technologies*. 13(1).
3. Ganesh NV, Kalaivanan R, Al-Mdallal QM, Reena K (2021) Buoyancy driven second grade nano boundary layers over a catalytic surface with reaction rate, heat of reaction and activation energy at boundary. *Case Studies in Thermal Engineering*. 28, 101346
4. Ganesh NV, Al-Mdallal QM, Öztöp HF, Kalaivanan R (2022) Analysis of natural convection for a Casson-based multiwall carbon nanotube nanofluid in a partially heated wavy enclosure with a circular obstacle in the presence of thermal radiation. *Journal of Advanced Research* 39, 167-185
5. Ganesh NV, Al-Mdallal QM, Hirankumar G, Kalaivanan R (2022) Impact of a hot constructal tree-shaped fin on the convection flow of single wall carbon nanotube water nanofluid inside a sinusoidal enclosure. *International Communications in Heat and Mass Transfer*. 137, 106279
6. Ganesh NV, Al-Mdallal QM, Hirankumar G, Kalaivanan R, Chamkha AJ (2022) Buoyancy-driven convection of MWCNT – Casson nanofluid in a wavy enclosure with a circular barrier and parallel hot/cold fins. *Alexandria Engineering Journal*. 61, 3249-3264
7. Kalaivanan R, Ganesh NV, Al-Mdallal QM (2021) Buoyancy driven Flow of a Second-Grade Nanofluid flow Taking into Account the Arrhenius Activation Energy and Elastic Deformation: Models and Numerical Results. *Fluid dynamics and materials processing* 17, 319-332

9. Training received by Faculty

Department of Zoology

1. Dr.K.Ramesh Kumar Participated in One week online Short-Term Training Program on Data Analysis using MS Excel, IBM SPSS and R organized by the HRDC, University of Hyderabad from 14th to 19th June, 2021
2. Dr.K.Ramesh Kumar Participated in “one week short term program on disaster management” organized by the Human resource development centre, University of Hyderabad from 13th to 18th December, 2021.
3. Dr.K.Ramesh Kumar Participated in “Two Weeks International Workshop on Emerging Trends



in the field of Science and Technology” organized by Department of Physics, Sathyabama Institute of Science and Technology, Chennai from 16th to 28th August 2021.

4. Dr.K.Ramesh Kumar Participated in Virtual lecture workshop on “Sustainable aquaculture technologies (SAT-2021)” organized by Department of marine science, Bharathidasan university, held during 9th to 14th August, 2021.
5. Dr.K.Ramesh Kumar Participated in the ten days online faculty development program on “Marine Bio & Nanotechnology” organized by Centre for Ocean Research (COR), Sathyabama Institute of science and technology (SIST) from 01st to 10th December, 2021.
6. Dr T. Ramesh, Assistant Professor of Zoology was successfully completed online NPTEL-AICTE 12 Weeks course on “Essentials of Biomolecules: Nucleic Acids and Peptides” offered by Ministry of HRD, New Delhi, the Government of India April 2021.
7. Dr. K.Kamatchi Participated in the Student Development Programme on “Spirulina Production at Mass level” delivered by Mr.MUTHIAH P, Deputy Manager, Dr.WillmarSchwable India Private Limited, Kodairoad, Dindigul on 18th December, 2021.

Department of Botany

1. Dr. V. Ramesh attended refresher course in Life Sciences form 10th to 26th November 2021 in UGC-HRDC, Sant Gadge Baba Amravati University, Amravati
2. Dr. V. Ramesh participated on week National Level Virtual Faculty Development Programme on NAAC Framework Guidelines for Non-accredited Affiliated Colleges organized by the IQAC, V.O.Chidambaram College, Thoothukudi from 26th to 30th July 2021
3. Dr. V. Ramesh Participated in DBT Star College Scheme sponsored Faculty Development Programme on Thrust Areas of Biofertilizer Producon Technology organized by Department of Botany, VVV College for Women from 16th to 18th February 2022
4. Dr. V. Ramesh participated DST-SERB sponsored National Workshop on Woody Plant Tissue Culture organized by Department of Biology, The Gandhigram Rural University, Gandhigram from 3rd & 4th March 2022
5. Dr. V. Ramesh participated TNSCHE sponsored In Service Teacher Training Programme for Life Science College Teachers organized by Mother Teresa Women’s University, Kodaikanal on 12th & 13th May 2022.
6. Dr. T. Selladurai attended the Refresher course in University of Hyderabad, Telungana, from 13th to 25th September 2021.
7. Dr. T. Selladurai participated in Workshop on Amla cultivation and value addition organized by



EDII – Periyakulam Horti Business incubation forum on 25th June 2022

8. Dr. C. Soundara Raju participated Two weeks “Science Academies Refresher Course’ in “Plant Taxonomy and Ethnobotany” held at Department of Botany, Yogi Vemana University, Kadapa, Andhra Pradesh, India from 2nd to 15th March 2022

Department of Chemistry

1. Sri. B. Servaramuthu Attended the UGC sponsored Online Refresher Course in Chemistry conducted by the UGC – Human Resource Development Centre, Madurai Kamaraj University, Madurai – 625 021 from 10th to 23rd November 2021.
2. Dr.M.Ganapathi has been attended UGC sponsored Refresher course in Chemistry conducted by Devi AhilyaUniverisity, Indore from 11th to 24th January 2022.
3. Dr. G. Rajkumar Participated Two Weeks Online Refresher Course in Chemistry conducted by UGC-HRDC, University of Hyderabad, Hyderabad from 08.11.2021 to 20.11.2021.
4. Mr. A. Dharmanandam successfully finished “Managing Online Classes & Co- Creating MOOCS (level 2) with modules on AI”, an online two - week inter-disciplinary refresher course from 02nd to 16th June 2021
5. Mr. A. Dharmanandam Successfully completed 4-week Swayam NPTEL Course (deemed as a refresher course / FDP by UGC) Body Language: Key to Professional Success from July to August 2021.
6. Mr. A. Dharmanandam Participated in Seven Days International Faculty Development Program on "Art of Effective Education during Pandemic Scenario" jointly organized by Tamil Nadu Teachers Education University, Chennai & Lakshmi College of Education, Gandhigram, Dindigul from 23rd to 29 July 2021.

Department of Physics

1. Sri. P. Jeyasankar Participated in the Raman Optronics Webinar Series 2021: Virtual International Conference on “Double slit quantum mystery and its possible connection to the concepts of speckles”, Organized by the Department of Optoelectronics, University of Kerala, Trivandrum, on 19th November 2021
2. Sri. N. S .Lakshmikanthan Participated in Two day online Faculty Development Programme on Astronomical studies under DBT Star College Scheme organized by PG and Research Department of Physics and IQAC, Jammal Mohammed College, Trichy jointly organize in collaboration with CHIGURU COLAB, Bangalore from 07th to 08th February 2022.



3. Sri. S. Ganeshan Participated in five day online Faculty Development program (FDP) on Recent Trends in Mechanical Engineering organized by ICFAI University, Jaipur in collaboration with IET (UK), Delhi during 20th to 24th July 2021.
4. Dr. N. Meenakshi Sundaram Completed Refresher Course in Physics (Online) Organized by UGC-HRDC, Sambalpur University, Odisha during 16th to 29th September, 2021.

Department of Mathematics

1. Dr. C. Rajan Attended online two weeks interdisciplinary refresher course, organized by Teaching Learning Centre, Ramanujan College, University of Delhi from 02.06.21 to 16.06.21
2. Mr. M. Nagaraj Participated one week workshop on “Basic Documentation using Latex” organized by E.M.G. Yadava Women’s college, Madurai from 20th to 25th October 2021
3. Mr. M. Nagaraj Participated one month CMI – NASI Online workshop on “Linear Algebra and Elementary Number theory” organized by department of Mathematics, MEPCO Engineering College, Sivakasi, from January to February 2022
4. Sri C. Velmurugan attended online course “Geospatial Inputs for Enabling Master plan formulation for AMURT subschema”, Organized by ISRO & IIRS-Dehradun between 11th to 15th October 2021

10. Exhibition / Seminars / Training Courses Conducted

Department of Zoology

1. Faculty Enrichment Programme on Effective Teaching of Science and Class Room Management on 23rd July 2022 (Beneficiaries - 18)
2. Hands on Training Programme on Basic Tools in Bioinformatics on 27th July 2022 (Beneficiaries - 23)
3. Awareness on safety measures of laboratory for Laboratory staff on 29th January 2022 (Beneficiaries - 140)
4. Skill development programme on Computer for Laboratory staff on 25th March 2022 (Beneficiaries - 40)
5. Skill development Programme on Electrophoresis Techniques and their Applications on 03rd March 2022 (Beneficiaries - 77)





Department of Botany



1. Workshop on Information and Communication Technology (ICT) Skill Development on 28th January 2022 (Beneficiaries - 80)
2. Training Curriculum Upgradation and New Practicals on 31st March 2022 (Beneficiaries -35)
3. Awareness Programme on Biosafety measures of Laboratory for Laboratory staff on 29th January 2022 (Beneficiaries - 36)
4. Preparation and Maintenance of Stock Solution for Laboratory staff on 30th March 2022 (Beneficiaries - 30)

Department of Chemistry



1. Faculty Development Programme on Computational Chemistry on 25th March 2022 (Beneficiaries -30)
2. Needs and Metrics of Green Chemistry on 31st March 2022
3. Lab safety and First aid for Laboratory staff on 19th March 2022 (Beneficiaries -40)

Department of Physics

1. Modern Trends in Physics on 29th January 2022 (Beneficiaries - 40)
2. Handling of Practicals with Modern Equipment on 08th July 2022 (Beneficiaries - 40)
3. Skill development on physics Practicals for Laboratory staff on 09th March 2022 (Beneficiaries - 48)

Department of Mathematics



1. Seminar on Mathematical Concepts for Innovation in Modern Sciences on 14th March 2022 (Beneficiaries - 24)
2. Application of Mathematics in Engineering on 29th March 2022 (Beneficiaries - 14)
3. Hands on Training on MATLAB and LATEX on 08th July 2022 (Beneficiaries - 34)
4. Basics Skill in Computes for Laboratory staff on 17th March 2022 (Beneficiaries - 32)



11. Books / Journals Subscribed from Grants

1. Jaya Surya et al. Economic Zoology, Saras publication, Nagarcoil (1 Copy)
2. Jordon Invertebrate Zoology, S. Chand & Co, New Delhi (1 Copy)
3. K Ramadevi, Biochemistry for medical students 2018 ed. Wolters Kluwer, Haryana (1 Copy)
4. R.C. Dubey, Text book of Biotechnology, S. Chand & Co, New Delhi (1 Copy)
5. PD Sharma, Ecology and Environment, Rastogi Publications, Meeturt (1 Copy)
6. E.L. Jordan & P.S. Verma, Chordate Zoology, S. Chand & Co, New Delhi (1 Copy)
7. PD Singh, Fundamentals of Genetics, Kalayani Publication (1 Copy)
8. P.S. Verma, Chordate embryology, S. Chand & Co, New Delhi (1 Copy)
9. PD Sharma, Microbiology, Rastogi Publications, Meeturt (1 Copy)
10. Kotpal R, Invertebrates, Rastogi Publications, Meeturt (1 Copy)

12. Outreach Activities (Popular Lectures)

Department of Zoology

1. Faculty enrichment programme for School teachers on Recent perspectives in biology on 22nd July 2022 (Beneficiaries - 18)
2. Faculty enrichment programme for College teachers on Digital technologies in teaching and e-content preparation on 08th February 2022 (Beneficiaries - 120)
3. Hands on training on mushroom cultivation on 01st April 2022 (Beneficiaries - 80)

Department of Botany

1. Teachers Development programme for School teachers on 17th February (Beneficiaries - 51)
2. Faculty Development Programme for Teaching and Learning Process through E-Resources for College Teachers on 27th January 2022 (Beneficiaries - 100)
3. Awareness Programme on Establishment of School Herbal Garden School Teachers on 28th March 2022 (Beneficiaries -30)





4. Awareness Programme on Herbal preparation and Utilization of against COVID 19 for School and College Teachers on 25th January 2022 (Beneficiaries -140)
5. Skill Development Programme: An Exposure to Plant Research – A Journey of Phytomedicine on 15th March 2022 (Beneficiaries - 72)

Department of Chemistry

1. Basics Concepts of Spectroscopy and it's Applications on 20th July 2022 (Beneficiaries -35)
2. Awareness of Plastic Waste on 28-03-2022 (Beneficiaries -52)
3. Aspects of UV-Visible Spectroscopy and its Applications for College Teachers on 29th March 2022 (Beneficiaries -37)

Department of Physics

1. Lab on Wheels – Outreach Activities for School Students on 02nd March 2022 (Beneficiaries - 150)
2. Lab on Wheels – Outreach Activities for School Teachers on 22nd March 2022 (Beneficiaries - 20)



Department of Mathematics



1. Inter-departmental Applications of Mathematics on 28th January 2022 (Beneficiaries - 56)
2. Recent Trends in Mathematics and Information Technology 18th March 2022 (Beneficiaries - 28)

14. Invited Lectures

Department of Zoology

1. Studies on Marine Biofouling and Control on 20th July 2021, Resource person: Dr. I. Dhinakaran, Head & Scientist- E, Associate Professor, Sathyabama Institute of Science and Technology, Chennai
2. Drosophila- A Versatile model in Biology and Medicine on 30th July 2021, Resource person: Dr. P. Vinayagamorthy, Assistant Professor, Human Genetics & Molecular Biology, Bharathiyar University, Coimbatore
3. Population and Conservation Status of Asian Elephants, Lion and Tigers on 07th August 2021, Resource person: Mr. Shaik Hussain, Freelance Project Scientist, Hyderabad



4. Compressed bio-methane gas from pig farms and elephant grass for transportation on 12th August 2021, Resource person: Dr. Ramesh Prabu, Assistant Dean, School of Renewable Energy, Maejo University, Thailand
5. Emerging and re-emerging microbial diseases on 03rd September 2021, Resource person: Dr. K. Pon Murugan Research Associate, Department of Zoology and Microbiology, College of Sciences, King Saud University, South Arabia
6. Biodiversity of Western Ghats on 09th December 2021, Dr. G. Manikandan, Assistant Professor Department of Botany and Biotechnology, Sri Kaliswari College, Sivakasi
7. Spirulina production in Mass level on 8th December 2021, Resource person: Thiru. Muthiah, Deputy Manager, Dr Willmar Schwable India Pvt. Ltd. Kodai Road, Dindigul

Department of Botany

1. Global Scenario of GM Crops on 16th July 2021, Resource Person: Dr. M. Arun, Assistant Professor, Department of Biotechnology, Bharathiar University, Coimbatore
2. Taxonomy, Biodiversity and Biology of Microalgae on 06th September 2021, Resource Person: Dr. S. Nagaraj, Assistant Professor, Department of Centre for Advanced Study in Botany, University of Madras
3. Wonders of Nature on 22nd September 2021, Resource Person: Dr. G. Manikandan, Assistant Professor, Department of Biotechnology and Botany, Sri Kaliswari College, Sivakasi
4. Preparation of Organic Manures and Biopesticide Preparation on 11th December 2021, Resource Person: Mr. P. Vivekanandan, Executive Director, SEVA, Madurai.
5. Botanical Entrepreneurship – Preparation of Malt Powder on 15th June 2022, Resource Person: Dr. P. Patinathar, Assistant Professor & Head, Department of Economics, Vivekananda College, Tiruvedakam West, Madurai

Department of Chemistry

1. Emerging Trends and openings in chemistry of materials on 28th July 2021, Resource Person: Dr. M. Azhagurajan, Assistant Professor, Saveetha School of Engineering, Chennai
2. Challenges and Opportunities for Chemist India and Abroad on 28th August 2021, Resource Person: Dr. A. Sivanesan Product Manager, (Electrochemistry & Spectroscopy) Met Rohm, Australia
3. My Arduous Journey towards IIT from Vivekananda College on 22nd December 2021, Resource Person: Mr. B. Prabhukumar, Research Scholar, Department of Chemistry, Indian Institute of Technology-Madras, Chennai



Department of Physics

1. Journey to Space on 27th August 2021, Resource person: Mrs. S. Magara Jothi Lakshmi, Head & Assistant Professor, Department of Physics, Sri Sarada College for Women, Thirunelveli
2. Role of Rare Earth in Laser on 30th September 2021, Resource person: Dr. K. Maheshvaran, Assistant Professor of Physics, Kongu Engineering College, Perundurai, Erode
3. Physics for Medical Imaging on 01st October 2021, Resource person Dr. S. Thirunavukarasu M.Sc. (Medical Physics), KRF, Ph.D (South Korea), Raja Muthaiah Medical College & Hospital, Annamalai University, Chidambaram
4. Future for Science Students 08th March 2022, Resource person: Dr. R. Jothimurugan, Assistant Professor, Department of Physics, GTN Arts College, Dindigul

Department of Mathematics

1. Career for Mathematics students on 19th August 2021, Resource Person: Mr. S. Alagupandi, Technical Head, Akkam Industrial training & Research Institute, Coimbatore
2. Online Tutor through CK12 on 09th September 2021, Resource Person: Sri. Suresh Kumar, Software Trainee, Saudi Arabia
3. Personality Development on 24th February 2022, Resource Person: Dr. K. Chellapandian, Assistant Professor and Placement Officer, Department of Commerce, Vivekananda College, Tiruvedakam West, Madurai

Coordinator
Coordinator
DBT-Star College Scheme
Vivekananda College
Tiruvedakam West, Madurai (Dist.)-625 234

Principal
Principal
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