

Department of Biotechnology

Star College Scheme

Progress report for upgradation to Star College status/continuation of support at existing level/discontinuation of support to colleges supported under Star College Scheme

1. Name of the College : Stella Maris College (Autonomous), Chennai

2. Year of Support : 2009 to till date

3. Total grant received during the period of support:

Non Recurring Grant : Rs. 20,00,000/-

Recurring Grant : Rs. 23,61,514/-

4. Recognition by other funding agency e.g. DST-FIST, UGC-COP, AICTE:

- Ongoing Minor and Major Projects (Science departments)

S. No.	Name of the Principal Investigator & Co-investigators	Title of the project	Funding Agency	Duration of the project	Sanctioned Amount (In Rs)
1.	Dr. N.L. Mary and Dr. Revathy Rajagopal Dept. of Chemistry	Synthesis, Characterisation and application of Novel polymer metal nano composites in opto electronics	UGC-Major Research Project	3 years 2013-2016	9,78,800
2.	Dr. Mary George, Ms. Avila Josephine Dept. of Chemistry	Synthesis and humidity sensing properties of nanocomposites of lanthanum mixed metal oxides	UGC-DAE Consortium for Scientific research	3 years 2011-12 onwards	35,000/- for contingency and chemicals per year
3.	Dr. Mary George Ms. Avila Josephine and Ms. Mary Teresita. Dept. of Chemistry	Synthesis and humidity sensing properties of nanocomposites of mixed metal oxides	UGC-Minor Research Project	18 months 2013 -14	1,70,000/-
4.	Dr. Rajini K.H., Dept. of Physics	'Theoretical Studies on P-Waves Super Conductivity in Two Coupled Chains of Spinless Fermions'	UGC-Minor Research Project	18 months 2013-14	1,70,000/-

- Completed Minor and Major Projects (Science departments)

S. No	Department	Title & Agency	Sanctioned Amount	Duration of the Project
1.	Dr. Geetha Swaminathan and Dr. Mary George Dept. of Chemistry	Role of Chemistry in Food Safety – DST, Govt. of India, New Delhi	3,35,000/-	One year 2012-13
2.	Dr. Geetha Swaminathan and Ms. Mary Teresita Dept. of Chemistry	Women Entrepreneurship Development Programme – DST-NIMAT programme, NSTEDB, DST, Govt. of India	1,30,000/-	One year 2011 – 12
3.	Dr. Geetha Swaminathan Dept. of Chemistry	Entrepreneurship Awareness Camps – DST-NIMAT programme, NSTEDB, DST, Govt. of India	81,000/-	One year 2011-12
4.	Dr. Geetha Swaminathan and Dr. Mary George Dept. of Chemistry	Lecture Demonstrations for Popularisation of Science, NCSTC, DST, Govt. of India	78,000/-	One year 2011-12
5.	Dr. Geetha Swaminathan, Dept. of Chemistry and Dr. Priscilla Jebakumari, Dept. of Botany	Eco Initiatives for Environmental Conservation and Health Management, United Board for Christian Higher Education in Asia (UBCHEA)	1,09, 422/-	One year 2011-12
6.	Dr. Geetha Swaminathan, Dept. of Chemistry and Dr. Priscilla Jebakumari, Dept. of Botany	Eco Initiatives for Environmental Conservation and Health Management, United Board for Christian Higher Education in Asia (UBCHEA)	1,09, 055/-	One year 2010-11
7.	Dr. Geetha Swaminathan, Dept. of Chemistry Dr. Chitrlekha Ramachandran, Dept. of Zoology & Dr. Priscilla Jebakumari, Dept. of Botany	Adyar Poonga Project: Strategies for Soil restoration and rejuvenation. Funded by Tamil Nadu Urban Infrastructure Financial Services Ltd, Govt. of Tamil Nadu	2,50,000	Two years 2009-11
8.	Dr. Geetha Swaminathan Dept. of Chemistry	Entrepreneurship Awareness Camps - NSTEDB, DST, Govt. of India	54,000/-	One year 2010-11
9.	Dr. Geetha Swaminathan and Dr. Mary George Dept. of Chemistry	Lecture Demonstrations for Popularisation of Science, NCSTC, DST, Govt. of India	62,700/-	One year 2010-11

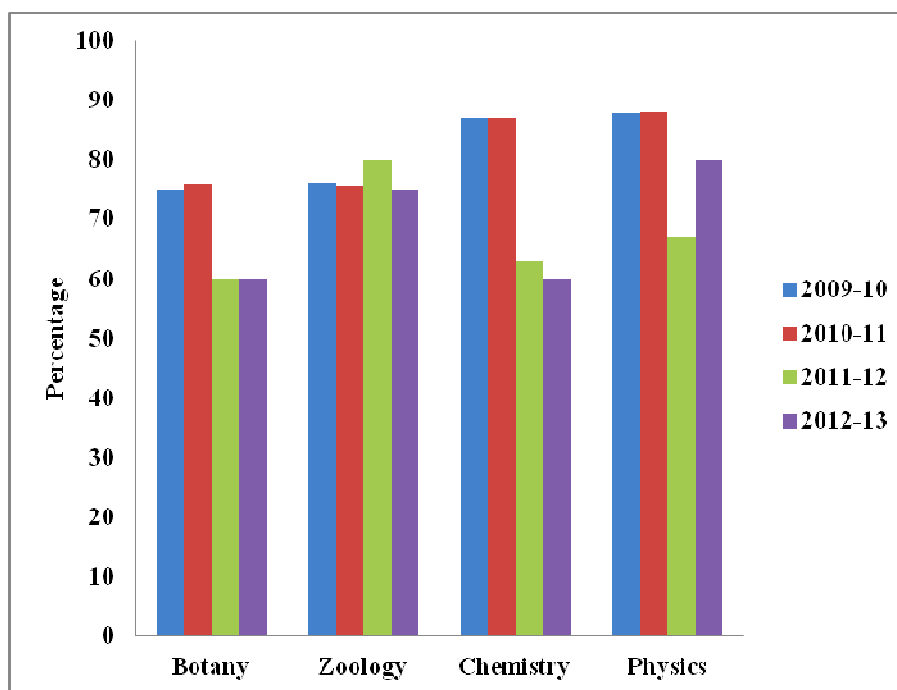
10.	Dr. Geetha Swaminathan Dr. Mary George, Dept. of Chemistry	Lecture Demonstrations for Popularisation of Science, NCSTC, DST. Govt. of India	62,700/-	One year 2009– 10
11.	Dr. Geetha Swaminathan Dept. of Chemistry	Entrepreneurship Awareness Camps - NSTEDB, DST, Govt. of India	67,500/-	One year 2009-10
12.	Dr. Geetha Swaminathan and Ms. Mary Teresita Dept. of Chemistry	Women Entrepreneurship Development Programme – DST-NIMAT programme, NSTEDB, DST, Govt. of India	1,30,000/-	One year 2009-10
13.	Dr. Mary George, Dept. of Chemistry	Synthesis and characterization of TiO ₂ nanoparticles for photocatalytic and other applications, UGC-Minor Research Project	1,45,000/-	18 months 2009-2010
14.	Dr. Mary N. L., Dept. of Chemistry	Novel polymeric materials as Metallomesogens, UGC-Minor Research Project	1,25,000/-	18months 2009-2010

5. Name of Departments supported : Botany, Zoology, Chemistry, Physics

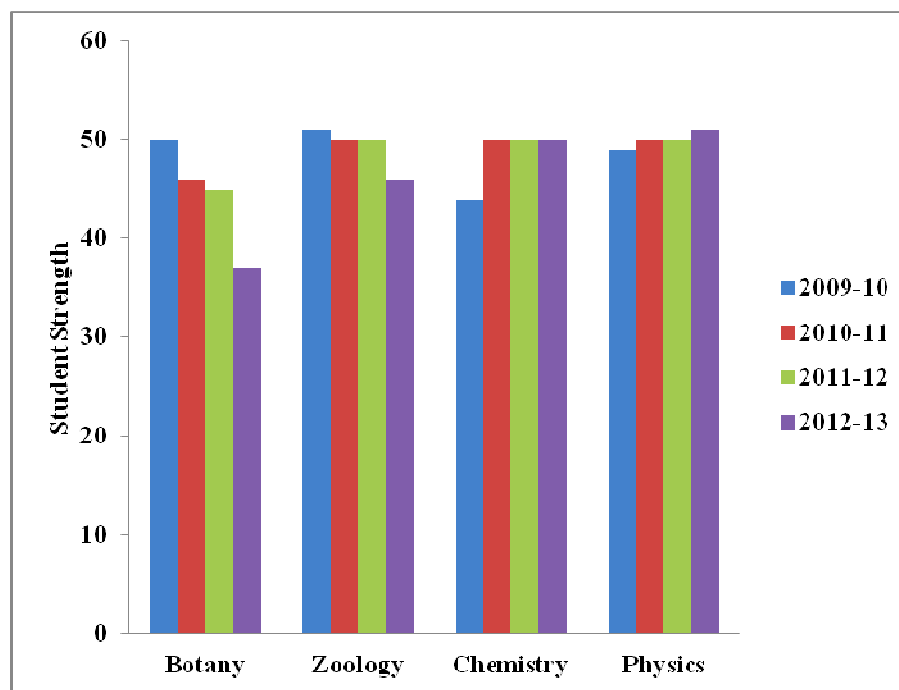
6. Department-wise Performance during the period:

Comparative analysis prior to support and after support in terms of:

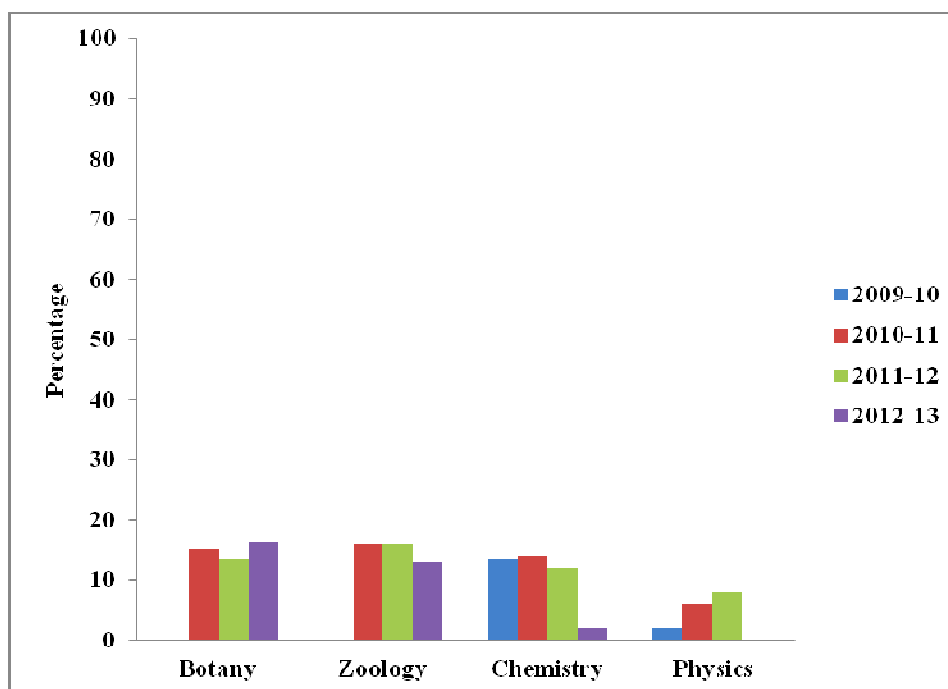
a. Cut off percent for admission



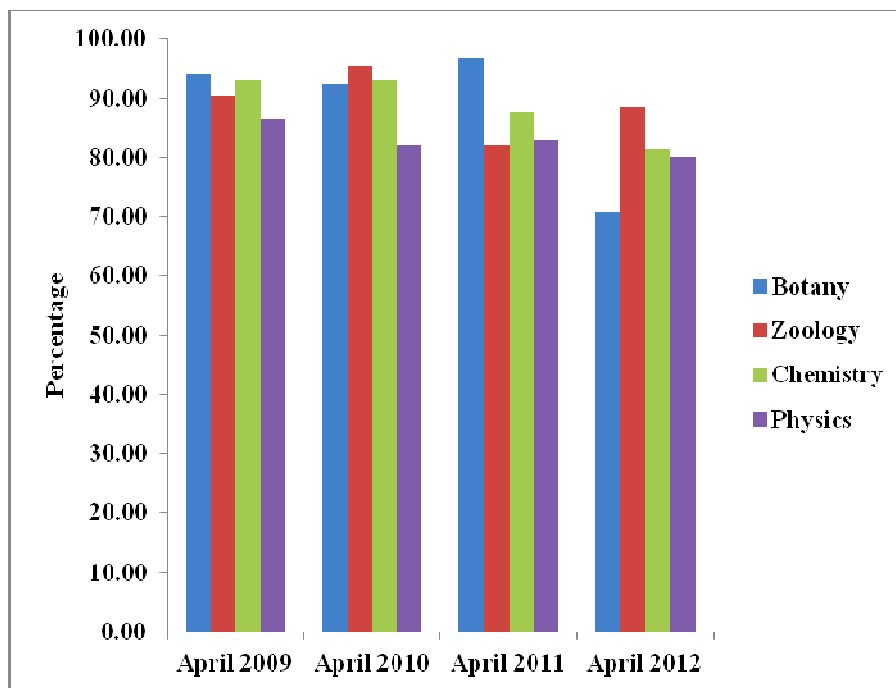
b. Filling of sanctioned seats:



c. Drop-out rate



d. Percent result



e. Position in University: Not Applicable

f. Student enrollment for higher studies

Department	% of Students *
Botany	50
Zoology	50
Chemistry	40
Physics	35

* year wise accurate data not available

g. Performance in competitive exams

Department	No. of Students *
Botany	3
Zoology	3
Chemistry	9
Physics	2

* accurate data not available

7. No. of workshops held for teachers and students (with title, duration and number of participants):

a) For Students

Botany

Title	Date	Duration	No. of Participants
1. Experimental work on “Preparation of Ayurvedic and Siddha Medicine” using medicinal plants to study binomial nomenclature, description of plants, active principle and medicinal properties.	Sep. 2009	1 day	31
2. Training Programme on ‘Bioinstrumentation’	25.1.2010– 28.1.2010	4 days	50
3. Training Programme on “Kitchen Garden, Flower Arrangement and Vegetable Carving”	5.2.2010 and 15.2.2010	2 days	50
4. Training Programme on “Techniques on Molecular Biology and Genetic Engineering”	17.2.2010 and 25.2.2010	2 days	42
5. Training Programme on “Processing of Fruits and Vegetables” (Nutritional Aspects)	Sep. 2010	2 days	31
	Aug. 2011	2 days	31
	2.7.2012 – 5.7.2012	2 days	39
6. Hands on Training on “Mushroom Cultivation” (Life Cycle Study)	12.9.2010	1 day	39
	July 2011	1 day	39
	Sep. 2012	1 day	31
7. Training on “Flower arrangement” to learn the horticultural varieties in flowers, their binomial (names), preservation techniques and commercial uses.	Feb. 2011	1 day	39
8. Training in “Mycological Techniques” (Fungal Isolation, culturing and isolation)	13.2.2012– 15.2.2012	3 days	39
	5.3.2013 – 7.3.2013	3 days	31
9. Training in “Molecular Biology Techniques”	5.3.2012 – 6.3.2012	2 days	50
	6.3.2013 – 7.3.2013	2 days	39
10. Workshop on “Histochemical Tests for Phytoconstituents of Therapeutic Value, Organoleptic study of Medicinal Herbs and Microscopic Analysis of Powdered Drugs”	13.9.2012– 15.9.2012	3 days	39

Zoology

Title	Date	Duration	No. of Participants
1. Workshop on “ <i>Drosophila</i> Culture Techniques”	3.7.2009	1 day	44
	15.7.2010	1 day	41
	22.7.2011	1 day	50
	22.7.2012	1 day	39
2. Workshop on “Crocodile Biology”	18.2.2010	1 day	51
3. Workshop on “Herpetology”	10.1.2011	1 day	42
	18.2.2013	1 day	31
4. Workshop on “Vermiculture and Vermicomposting”	Aug. 2012	1 day	31

Chemistry

Title	Date	Duration	No. of Participants
1. Workshop on “Water Analysis” in collaboration with Exel Water System Pvt. Ltd.	14.9.2009 – 15.9.2009	2 days	38
2. Workshop on “Crystal Growth”	3.9.2009	1 day	97
3. Training Programme on “Water Analysis” at Diet Aqua	Nov 2010	7 days	10
	May 2011	15 days	10
4. Hands on Training on “Fruits and Vegetable Processing”	22.08.2011– 26.08.2011	4 days	22
5. Training on “Food and Water Analysis”	22.08.2011– 24.08.2011	3 days	20
6. Training on “Analysis of Phytochemicals”	24.08.2011– 26.08.2011	3 days	20

Physics

Title	Date	Duration	No. of Participants
1. Workshop on “Microprocessors and Interfacing Techniques”	7.10.2009	1 day	40
2. Workshop on “Computer Hardware, Assembly and Installation”	24.2.2010	1 day	35
3. Workshop on “Learning Principles of Electronic Gadgets”	28.8.2009	1 day	48
	28.9.2011	1 day	46
	15.10.2012	1 day	49
4. Workshop on “Analytical Instruments”	27.2.2012	1 day	47
5. Workshop on “Microprocessor and Microcontrollers Interfacing Devices”	15.3.2012	1 day	48
	6.10.2012	1 day	47
6. Workshop on “Solar Energy”	19.2.2013	1 day	46

b) For Teachers

Dept.	Title	Duration	No. of Participants
Zoology	1. A Workshop on “ Immunological techniques ” for faculty of city colleges on 18 th and 19 th September 2009 in collaboration with Department of Zoology, University of Madras.	2 days	18
Zoology	2. National Workshop on “ Development of an Alternative Laboratory curriculum in Zoology to Replace Animal Dissections and Experiments with Humane Techniques ” on Nov.25 and 26, 2011.	2 days	60
Chemistry	3. Workshop on “ Computing Techniques for Sciences ” was organised for the faculty of the Science departments (both within and outside) from January 20-23, 2009.	4 days	18
Chemistry	4. Training in “ Micro scale experiments in inorganic and organic chemistry ” for the faculty of the department on Feb.11, 2012.	1 day	9
Chemistry and Botany	5. A Three day Workshop on “ Solid and Liquid Waste Management ” for faculty from various departments (Nov.30 – Dec.2, 2011).	3 days	25

8. Number of students taking project vs. total number of students. Please give list of projects department-wise during the support period.

Botany

Year	List of Projects	No. of Students vs. total no. of students
2009-10	<ul style="list-style-type: none"> • Project by Ignatia Shirley and Shiny Catherine, III B.Sc. Characterization of Physical, Chemical and Microbiological aspects of various soil samples from Stella Maris College Campus 	2/42
	<p>Group Projects done by III B.Sc. Microbiology</p> <ul style="list-style-type: none"> • Ammonification in soil 	42/42

Year	List of Projects	No. of Students vs. total no. of students
2009-10	<ul style="list-style-type: none"> • Detection of minerals in soil samples using Flame Photometry • Microbiological analysis of soil samples of the campus • Preparation of wine and estimation of Lactic acid in wine • Effect of Temperature and pH on Microbial growth <p>Plant Physiology</p> <ul style="list-style-type: none"> • Isolation of Chloroplast from Spinach and demonstration of Hills reaction • In vivo assay of Nitrate reductase in bean leaf • Estimation of oil content from Groundnut using Soxhlet method • Enzyme kinetics – amylase activity in Cicer (Bengal gram) <p>Applied Biotechnology</p> <ul style="list-style-type: none"> • Plant tissue culture – Induction of callus from leaf disc (Solanum nigrum) and Anther (Datura) 	<p>42/42</p> <p>42/42</p>
2010-11	<ul style="list-style-type: none"> • Project by S. Divya, III B.Sc. Analysis of Physical, Chemical and Biological parameters of drinking water collected from different parts of the Chennai city. • Project by Komal M. Jain, III B.Sc. Processing and Maturity Effects on Lycopene content and Ascorbic acid contents in few varieties of Tomatoes • Project by Ebciba, III B.Sc. The lead content in few samples of Grass and Milk from different parts of Chennai. <p>Group Projects done by III B.Sc.</p> <p>Microbiology</p> <ul style="list-style-type: none"> • Microbial analysis of Soil collected from 	<p>3/31</p> <p>31/31</p>

Year	List of Projects	No. of Students vs. total no. of students
2010-11	<p>different locations at Stella Maris College</p> <ul style="list-style-type: none"> • Effect of ph, temperature and osmotic potential on the growth of bacteria • Estimation of BOD of various water samples collected from the campus. • Isolation and enumeration of coliforms using different medium (EMB agar) <p>Plant Physiology</p> <ul style="list-style-type: none"> • Enzyme kinetics of Peroxidase enzyme extracted from Radish using colorimeter • Estimation of fatty acid content in oil seed using soxhlet method • Study of Hills reaction – to isolate chloroplast and demonstrate its role in photosynthesis • A comparative study on Lactic acid and acetic acid content in Wine prepared from different grape varieties using titrimetric method. 	31/31
2011-12	<p>Group Projects done by III B.Sc.</p> <p>Plant Physiology</p> <ul style="list-style-type: none"> • Total chlorophyll content in various leaves (green/coloured) by Colorimetric method. • Amylase activity – Enzyme kinetics • Enzyme – Substrate relationship with respect to Peroxidase. • Induction of root in stem cuttings using IAA. • Estimation of proteins from pulses by colorimetric method. • Estimation of oil content from Groundnut using soxhlet method 	50/50
2012-13	<ul style="list-style-type: none"> • Project by Sr. Sherin, III B.Sc. <p>Studies on Antimicrobial activity of <i>Vitexnegundo</i> Linn. and combined action of Ethyl acetate extract of <i>Vitexnegundo</i> Linn. <i>Azadirachta indica</i> A. Juss and <i>Piper betel</i> Linn. on some bacterial pathogens</p>	5/39

Year	List of Projects	No. of Students vs. total no. of students
2012-13	<ul style="list-style-type: none"> • Project by Marshia, III B.Sc. Studies on Antimicrobial activity of <i>Azadirachtaindica</i>A.Juss and combined action of Ethyl acetate extract of <i>Azadirachtaindica</i>A.Juss, <i>Vitexnegundo</i> Linn., and <i>Piper betle</i> Linn.on some bacterial pathogens • Project by S.M. Madhumita, III B.Sc. Studies on Antimicrobial activity of <i>Piper betel</i> Linn. and combined action of Ethyl acetate extract of <i>Piper betel</i> Linn.,<i>Azadirachtaindica</i> A..Juss and <i>Vitexnegundo</i>Linn.,on some bacterial pathogens • Project by Sr. Jaicy Thomas, III B.Sc. Antioxidant Activity of Some Fresh Vegetables • Project by Rose Maria, III B.Sc. Determination of Antioxidant Efficacy in few Vegetables and a comparative study of the components contributing to Antioxidant Activity <p>They presented papers based on their project work in the National Conference on “Role of Traditional Knowledge in Biodiversity Conservation, Livelihood and Sustainable Development”.</p> <p>Group projects done by III B.Sc. Plant Physiology</p> <ul style="list-style-type: none"> • Total chlorophyll content in various leaves (green/coloured) by Colorimetric method. • Amylase activity – Enzyme kinetics • Enzyme – Substrate relationship with respect to Peroxidase. • Induction of root in stem cuttings using IAA. 	39/39

Year	List of Projects	No. of Students vs. total no. of students
2009-10	<ul style="list-style-type: none"> • Regeneration of tail and limb in Tadpole • Effect of Thyroxine and Iodine on Tadpole Development of Frog • Protein Estimation in Egg Albumen of Different Bird Species 	
2010-11	<p>Group Projects done by III B.Sc.</p> <p>Genetics:</p> <ul style="list-style-type: none"> • Verification of Mendel's monohybrid cross ratio • Induction of mutation in <i>Drosophila</i> sp. by using formaldehyde • Verification of test cross ratio • Effect of lead acetate on the development of <i>Drosophila</i> sp. • Study of inheritance of eye colour in <i>Drosophila</i> sp. • Effect of caffeine on <i>Drosophila</i> sp. • Effect of Betnesol on the life cycle of <i>Drosophila</i> sp. <p>Animal Behaviour</p> <ul style="list-style-type: none"> • Study on the effect of music on cats • Behavioural studies on <i>Rhesus macaque</i> • Behavioural studies on Rosy pelican under captivity • Behavioural studies on Eurasian otter (<i>Lutra lutra</i>) • Effect of light on Red-eared Slider • Study on Dog intelligence • Study on Budgerigers (Parakeets) <p>Developmental Biology</p> <ul style="list-style-type: none"> • Comparative study of Protein Content in the eggs of Hen, Quail and Turkey • Comparative study of Albumin content 	<p>41/41</p> <p>41/41</p> <p>12/41</p>
2011-12	<p>Group Projects done by III B.Sc.</p> <p>Genetics:</p> <ul style="list-style-type: none"> • Verification of Mendel's monohybrid cross 	51/51

Year	List of Projects	No. of Students vs. total no. of students
2011-12	<p>ratio</p> <ul style="list-style-type: none"> • Verification of test cross ratio • Verification of Sex – linked inheritance • Study of linkage phenomenon • Effect of Green tea and Aloevera extract on the development of <i>Drosophila</i> sp. • Effect of curcumin powder on the development of <i>Drosophila</i> sp. • Effect of benzaldehyde on the development of <i>Drosophila</i> sp. <p>Animal Behaviour</p> <ul style="list-style-type: none"> • Behavioral analysis of guinea pigs. • Feeding behavior in pigeon • Behavior patterns in rabbit • Study on domesticated geese. • Amazing Ants • Aggression in male fruit flies • Camouflage pattern in <i>Chameleo zeylanicus</i> with respect to temperature, humidity and light intensity • Study of behavior in Ancona ducks at Semmozhi Poonga. • Aggressive behavior of fighter cock and hen. 	51/51
2012-13	<p>Group projects done by III B.Sc.</p> <p>Genetics</p> <ul style="list-style-type: none"> • Effect of green tea extract on the life cycle of <i>Drosophila</i> sp. • Effect of alovera extract on the life cycle of <i>Drosophila</i> sp. • Effect of nicotine extract on the life cycle of <i>Drosophila</i> sp. • Effect of vitamin supplementation on the life cycle and life span of <i>Drosophila</i> sp. • Study of fruit preference in <i>Drosophila</i> sp. • Verification of sex linked inheritance • Study on attraction of mutant flies to different odours • Prefer natural esters to artificial esters – a 	42/42

Year	List of Projects	No. of Students vs. total no. of students
2012-13	<p>study in <i>Drosophila</i> sp.</p> <ul style="list-style-type: none"> • Maternal manipulation of offspring sex ratio in <i>Drosophila</i> sp. • Larval phototaxis in <i>Drosophila</i> sp. <p>Animal Behaviour</p> <ul style="list-style-type: none"> • Mating and other common behaviours in Guppies • A study on the behavioural pattern of Goldfish • A study of the behavior of Rhesus monkey • A study on the behavior of Jackals in captivity • A study of the behavior of the spotted deer at IITM • Study of aggression, interaction and mate selection in Budgerigar love birds • A comprehensive study of the behavior of a rescued dog • The general behaviours of Catfish • A study on the behavior of Ducks <p>Group projects done by I B.Sc.</p> <ul style="list-style-type: none"> • Effect of Vermicompost on the growth of Fenugreek (<i>Trigonella Foenum Graecum</i>) 	<p>42/42</p> <p>40/40</p>

Chemistry

Year	List of Projects	No. of Students vs. total no. of students
2009-10	<p>Group Projects</p> <ul style="list-style-type: none"> • Detection of Adulterants in Food Commodities from home and neighbouring areas. The results of the analysis were communicated for proactive measures • Students of II B.Sc. were given special training in Water Analysis. Ten students brought samples from different localities and analysed the potability of the water samples. 	<p>30</p> <p>10/26</p>

Year	List of Projects	No. of Students vs. total no. of students
2011-12	<ul style="list-style-type: none"> • Project by S. Shamily and K.R. Radhaa, III B.Sc. Analysis of Food and Water samples 	2/38
2012-13	<ul style="list-style-type: none"> • Project by Shamala M., Stephy Graph. P and Banupriya. N, II B.Sc. Qualitative Study of Packaged Drinking Water and Packaged natural Mineral Water by Physio-organo Chemical and Microbiological Analysis • Detection of Adulterants in Food Commodities for III B.Sc. Major Elective students 	3/44 22/43

Physics

Year	List of Projects	No. of Students vs. total no. of students
2009-10	Learning Electronics through Mini projects by I B.Sc. <ul style="list-style-type: none"> • Automatic night alarm with morning alarm. • Battery level indicator • Automatic door bell • Automatic low power emergency lamp • Infrared music transmitter and receiver • Optical smoke detector • Traffic controller • Automatic phase changer • Water level indicator. 	48/48

9. **List of New Practicals/demonstrations introduced for UG students of each batch (Ist, IInd and IIIrd year) in different departments supported under Star College Scheme during the period which had not been conducted prior to support:**

Botany

Year	List of New Practicals / Demonstrations introduced
I year	2009 <ul style="list-style-type: none"> • Mushroom Cultivation – <i>Pleurotus</i> (Study of Life Cycle) • Citric acid preparation using <i>Aspergillus</i> • Preparation of Maceration, Leaf clearing and Micrometry to study

Year	List of New Practicals / Demonstrations introduced
I year	<p>anatomy of leaf</p> <ul style="list-style-type: none"> • Permanent Mounting of Hand sections (Single and Double staining) • Estimation of Protein/ Amino acid using Spectrophotometer • Estimation of Amylase activity using Photo-colorimeter – enzyme kinetics • Separation of Proteins by Electrophoresis • Isolation of Chloroplast by Centrifuge • Vegetative propagating methods – Cutting/ layering/Grafting • Potting/ Pot culture to enhance skill sets (Growing annuals) • Terrarium, Bonsai, Flower Arrangement (Fresh and Dry) – preservation of flowers • Kitchen Garden, Rock Garden and Vegetable Carving – cultivation methods <p>2011</p> <ul style="list-style-type: none"> • Preparation of Agar, Alginate Beads- Immobilization Technique • Antimicrobial activity of a few Marine and Fresh water Algal Extracts • Effect of pH on enzymatic browning in Potato and Apple • Estimation of percentage of water content in Orange • Estimation of sugar content in Fruits using Refractometer • Preparation of Sauerkraut – process of hetero fermentation <p>Demonstrations</p> <ul style="list-style-type: none"> • Bonsai technique, Vegetable carving Techniques, Grafting & Budding
II year	<p>2009</p> <ul style="list-style-type: none"> • To identify ingredients based on its binomial nomenclature, active principle and medicinal properties (Preparation of the Ayurveda/Siddha Medicine for common ailments – Infusion and Decoction, Poultice, Salves and Creams, Mouthwash and Herbal Tooth Powder, Tailam and Churnam) • Microscopic and qualitative analysis of Herbal drug (Churnam) • Identification of Micro-organism from spoiled foods like rotten fruits and vegetables • Measurement of pH in Fruits and Food samples • Principle of Fermentation –Yeast • Isolation and enumeration of microbial load from Cereals, Vegetables, Fruits, Fish and Utensils

Year	List of New Practicals / Demonstrations introduced
II year	<p>2011</p> <ul style="list-style-type: none"> • To identify the ingredients in salads based on its binomial name, pharmaceutical and neutraceutical aspects – Salads
III year	<p>2009</p> <ul style="list-style-type: none"> • Inoculation techniques - Slant, Pour Plate, Streak Plate and Stab • Isolation of bacteria or Fungi from Soil on various media; Enrichment, Selective and Differential media. • Antimicrobial property of Heavy metals/ Turmeric • Wine production and estimation of Lactic acid • Test for Coliforms – potability of water • Estimation of BOD – microbial load in water samples • Vermitechnology – composting process using earthworms • Methylene Blue Reductase Test for various milk samples • Construction of quadrat, Belt and Line Transect – Calculation of frequency, Percentage, Density and Abundance – quantitative ecological studies • Effect of toxic substances (Chemicals) on mitogenic property of Onion root • Morphological and structural adaptations of hydrophytes, Xerophytes and Halophytes (any one in each category) <p>2011</p> <ul style="list-style-type: none"> • Life cycle of <i>Drosophila</i> (cultural studies- Hands on) • Separation of proteins by Electrophoresis • Estimation of protein using Spectrophotometer

Zoology

Year	List of New Practicals / Demonstrations introduced
I year	<p>2009</p> <ul style="list-style-type: none"> • Mouth Parts of <i>Anopheles</i> sp. and Honey Bee • Sting apparatus of Honey Bee • Computer Simulated Frog Dissection <p>2011</p> <ul style="list-style-type: none"> • Appendages of shrimp • Computer Simulated Earthworm Dissection • Culture of <i>Paramecium</i> sp. • Dissection – Fish: Observation of viscera, Digestive System, Arterial System • Study of fauna in the Stella Maris College campus – A Report

Year	List of New Practicals / Demonstrations introduced
I year	<p>2012</p> <ul style="list-style-type: none"> • Vermiculture, Study of the life history stages of <i>Lampito Maurittii</i> and <i>Perionyx Excavatus</i> • Study of the life cycle of frog • Mount – Ctenoid Scale (Mullet) • Testing the quality of honey
II year	<p>2009</p> <ul style="list-style-type: none"> • Coliform Count in drinking water samples by Membrane Filter Technique • Hanging drop technique to observe the motility of Bacteria <p>2011</p> <ul style="list-style-type: none"> • Genomic DNA Extraction • Total RNA Extraction <p>2012</p> <ul style="list-style-type: none"> • IMViC Test to differentiate lactose fermenters and non lactose fermenters • Buccal Smear to observe Barr body • Study of any 5 Mendelian Traits • Hardy Weinberg Equilibrium – Calculating Gene Frequency and Genotypic Frequency Using Bead Experiments <p>Demonstrations</p> <ul style="list-style-type: none"> • PCR technique • Bacterial growth curve • Agarose gel electrophoresis • Plasmid DNA extraction
III year	<p>2009</p> <ul style="list-style-type: none"> • Determination of BOD • Widal Slide Agglutination Test For Typhoid • VDRL Slide Flocculation Test For Syphilis • Elisa – Qualitative Test For Pregnancy <p>2011</p> <ul style="list-style-type: none"> • Qualitative Field Test For Soil Nitrates and Carbonates <p>2012</p> <ul style="list-style-type: none"> • Assesing digestion of proteins, carbohydrates and fats using Physio Ex.8.0

Year	List of New Practicals / Demonstrations introduced
III year	<ul style="list-style-type: none"> • Study of frog cardio vascular physiology using Physio Ex 8.0, • Determination of soil porosity, soil moisture, soil pH, soil texture and soil organic matter with different soil samples. • Quadrate Analysis – Population Study • Study of the early developmental stages of <i>Hydroides elegans</i> <p>Demonstrations</p> <ul style="list-style-type: none"> • Estimation of Sodium and Potassium Content – Flame Photometer • Anatomical location of various immune tissues and organs in rat • Isolation of Lymphocytes • Demonstration of Protein Separation –SDS Page

Chemistry

Year	List of New Practicals / Demonstrations introduced
I year	<p>2009</p> <ul style="list-style-type: none"> • Water analysis using pH meter, colorimeter, Nephelometer, TDS meter, volumetric and spectroscopic techniques <p>2011</p> <ul style="list-style-type: none"> • Micro scale techniques used in semi micro qualitative analysis
II year	<p>2009</p> <ul style="list-style-type: none"> • Analysis of Water Samples in Volumetric Analysis practical <p>2011</p> <ul style="list-style-type: none"> • Estimation of Total Hardness of Water for allied course for physics students • Determination of equivalent conductance at infinite dilution for strong electrolyte conductometrically • Determination of rate constant for acid catalysed ester hydrolysis under group experiments • Micro scale techniques used for analysis of functional groups in organic chemistry practical <p>Demonstrations</p> <ul style="list-style-type: none"> • Analysis of functional groups and derivative preparation of organic compounds. • Skin and hair care for general elective course cosmetics and personal care.

Year	List of New Practicals / Demonstrations introduced
III year	<p>2009</p> <ul style="list-style-type: none"> • Determination of copper/ phosphorus/ nickel/ by colorimetric method in Physical Chemistry practical. • Evaluation of experimental data by using computer (plots, graphs for chemical kinetics, phase rule, analytical chemistry, etc). • Biochemistry practical - Introduced this new practical involving organic analysis (analysis of carbohydrates, amino acids and proteins) and laboratory assays (extraction and estimation of DNA and RNA; estimation of glucose, urea, creatinine, cholesterol, triglycerides, HDL, LDL, enzyme alkaline phosphatase in biological sample-blood; estimation of ascorbic acid, saponification value of an edible oil, acid value and iodine value. • Liver, renal, pancreatic and cardiac function test as part of Fundamentals of Clinical Biochemistry course. • Detection of adulteration in food samples; sensory assessment of food quality as part of food analysis and quality control course. <p>2011</p> <ul style="list-style-type: none"> • Micro scale techniques for experiments in Electro Chemistry and determination of partition coefficient. • Physical Chemistry practical Conductometric acid base titration (weak acid Vs strong Base/ strong acid Vs weak Base/ strong acid Vs strong base/ weak acid Vs weak base). • Comparison of strength of acids; verification of Henderson's equation; analysis of pH of food /water/soil samples. • Calibration of concentration Vs absorbance to determine unknown concentration of NO_2^- using spectrophotometer; determination of concentration of Na/K using flame photometer. <p>Demonstrations</p> <ul style="list-style-type: none"> • Demonstration of basic analytical operations like solvent extraction and chromatographic techniques - TLC & Column chromatography. • Demonstration of detection of counterfeit currency notes using UV light, effect of UV light on dyes and drugs. • Demonstration of analysis of Physical Chemistry experimental results using Microsoft Excel.

Physics

Year	List of New Practicals / Demonstrations introduced
I year	<p>2009</p> <ul style="list-style-type: none"> • Young's modulus – Koenig's Method.

Year	List of New Practicals / Demonstrations introduced
I year	<p>2011</p> <ul style="list-style-type: none"> • Potentiometer – Ammeter calibration (high range and low range).
II year	<p>2009</p> <ul style="list-style-type: none"> • Spectrometer – grating – normal incidence (i) standardization of the grating (N) (ii) determination of the wavelength of the prominent lines of the mercury spectrum. (iii) dispersive power of the grating. • Multimeter Principle – conversion of millimeter to (i) an ohmmeter (ii) a low range voltmeter. FET and UJT characteristics • Study of basic application in operational amplifier 741 (adder, subtractor, source follower, multiplier, differentiator and integrator) • Square wave generation using 555 timer and operational amplifier 741. • Spectrometer - dispersive power of the prism and Cauchy's constants. • Air wedge – thickness of the wire – LASER • Polarimeter – determination of specific rotatory power. • Determination of Self inductance using LCR resonance circuit. <p>2011</p> <ul style="list-style-type: none"> • Field along the axis of the coil carrying current - Determination of M and m. • Multimeter Principle – conversion of milliammeter to (i) an ohmmeter (ii) a low range voltmeter (iii) conversion of a milliammeter of low range to a milliammeter of high range • Joule's calorimeter – determination of specific heat capacity of a liquid – Barton's correction- Use P.O box to find resistance of the coil. • Zener diode characteristics- voltage regulation
III year	<p>2009</p> <ul style="list-style-type: none"> • Solving simultaneous equations using operational amplifier 741 • Study of DAC (R-2R ladder network) 1408 / 0808. • Spectrometer – grating – oblique incidence. • Ballistic galvanometer – Self inductance by Anderson's method. • Michelson's Interferometer. <p>2011</p> <ul style="list-style-type: none"> • Copper voltameter – determination of e.c.e of copper – T. G • Carey Foster's Bridge- Verification of laws and Specific resistance.

Year	List of New Practicals / Demonstrations introduced
III year	<ul style="list-style-type: none"> • Construction of regulated power supply 5V and (12-0-12)V • Field along the axis of the coil – Determination of B H using Vibration magnetometer. • Carey Foster’s Bridge- temperature coefficient.

10. Interdepartmental activities conducted:

❖ WORKSHOPS

2009-10

- A batch of 30 students from Botany, Chemistry and Zoology were given Hands on Training on ‘**Analytical Instrumentation Techniques**’ during summer from April 19-23, 2010. The students learnt the principle, procedure and application of various techniques / instruments like UV-Visible spectrophotometer, Flame photometer, Photo colorimeter, Electrophoretic techniques, Laminar air flow for microbial culture techniques, Chromatographic techniques, Advanced Binocular and Trinocular microscope with camera attachment. The training enhanced their practical skill and infused in them a yearning for scientific research.

2010-11

- One week workshop on **Basic Concepts of Bioinformatics** was organised for II B.Sc. Zoology students on the third week of June 2010 in collaboration with the Department of Bioinformatics, Stella Maris College.

2011-12

- One week **Workshop on Instrumentation Techniques** for 30 students from the departments of Botany, Chemistry, Zoology and Physics from 13.2.2012 to 18.02.2012. Training on Electrophoretic techniques, Chromatography, Flame photometry, Photomicrography, Fluorimetry and Spectrophotometry.
- A Hands-on–training on “**Bioinformatics Tools for Sciences**” for 20 students from the departments of Botany, Chemistry, Zoology and Physics from March 6 to 8th, 2012. Hands on training on
 - a) BLAST tool which helps to find the similarity between the sequences.
 - b) Multiple Sequence Alignment and Phylogenetic analysis
 - c) Visualizing the biomolecules using Rasmol

2012-13

- A Hands-on–training on “**Bioinformatics Tools for Sciences**” for 18 students from the departments of Botany, Chemistry, Zoology and Physics from January 18th to 21st, 2013. Hands on training on
 - a) BLAST tool which helps to find the similarity between the sequences.
 - b) Multiple Sequence Alignment and Phylogenetic analysis
 - c) Visualizing the biomolecules using Rasmol

❖ EXHIBITION

2010-11

- Exhibition on Bonsai Plants in collaboration with Bodhi- Chennai Bonsai Association was organised by the Department of Botany.

2011 - 12

- All the Science departments conducted an exhibition on August 26, 2011 to popularize basic sciences and its relevance in day to day life with special emphasis on environmental issues and healthy diet which was open to the students and faculty of the college.
 - **Botany** - Exhibition on Nutritional aspects of Mushroom and its cultivation, Nutraceutical and Pharmaceutical properties of spices and condiments.
 - **Zoology** - Exhibition to create awareness on Anemia, healthy, diet to prevent anemia, diet for Anemic patients and anemia screening.
 - **Chemistry** - Exhibition on Testing of Food Adulteration, Food colours and food additives, Reverse Osmosis Plant, Potability of water.
 - **Physics** - Exhibition on Water Pollution and Harmful effects of Industrialisation.

2012-13

- Exhibition of Traditional Cereals and Grains, Tribal Medicines, Products and Practices was organized in connection with the National Conference on “**Role of Traditional knowledge in Biodiversity Conservation, Livelihood and Sustainable Development**” from February 5-6, 2013.
- An Exhibition was conducted by students of Zoology, Botany and Chemistry on February 13th to 14th, 2013 to create awareness on ‘Water Security, Healthy Food and Environmental Issues’.
 - **Botany** – Students explained the significance of inclusion of Navadhanya in everyday diet.
 - **Zoology** – Wildlife Conservation and Waste Management (Vermicompost)
 - **Chemistry** – Testing of Food Adulteration and Water Analysis

EXZOOBITION – Annual Event

- An exhibition on various facets of zoology is organised every year involving I, II & III B.Sc. Zoology students. This event is an experiential learning process and the thrust areas are Chordata, Applied Zoology, Microbiology, Environmental Biotechnology, Physiology, and Environment related issues.

11. Resources generated; SOP's, Lab manuals, teaching kits etc.:

Botany

- Workshop manual on Mycological Techniques (2011-12)
- Workshop manual on Molecular techniques (2011-12)
- Laboratory manual on Food Microbiology (2011-12)

- Workshop manual on Histochemical Tests for Phytoconstituents of Therapeutic Value, Organoleptic study of Medicinal Herbs and Microscopic Analysis of Powdered Drugs (2012-13)

Zoology

- Workshop manual on “Drosophila Culture Techniques” (2009-10)
- Workshop manual on “Immunological Techniques” (2009-10)
- Laboratory manual on “Microbiology” (2009-10)
- Laboratory manual on “Medical Laboratory Technology and Immunology” (2010-11)
- Laboratory manual on “Cell and Molecular Biology, Genetics and Genetic Engineering” (2011-12)

Chemistry

- Laboratory manual on “Semimicro Qualitative Analysis” (2009-10)
- Laboratory manual on “Volumetric Estimation and Organic Evaluation” (2010-11)
- **Teaching Kit – Micro Electrode Kit** designed by two faculty of the Chemistry department.

It is a mini electro chemical cell with an inbuilt salt bridge. The main feature of it is the use of 1 to 2 ml. of solution, thereby facilitating minimal use of chemicals. The kit can be easily cleaned and reused. It has a high wear and tear. It is cost effective and environment friendly. This kit is used by both UG and PG students in their Electro Chemistry Practicals.

12. Collaborative activities with neighboring colleges:

- ❖ **Intercollegiate Competitions organised** – Several competitions were organized by the Science departments to make the students experience fun filled learning in their own disciplines. This event provided an opportunity for the students to meet one another, exchange ideas and views, and showcase their talents and organizational ability. The various events included Adzap, Dumbcharades, Junk Art, Debate, Creative Writing, Photography, Paper and Poster Presentations, Collage, Crossword, Myriad, JAM and Quiz. Students from 10 to 15 neighboring Colleges participated in this event.

Department	Year	Date
Botany – Astera	2009-10	January 29, 2010
	2012-13	October 3, 2012
Zoology - Synapse	2009-10	December 15, 2009
	2010-11	September 7, 2010
	2011-12	September 8, 2011
	2012-13	September 11, 2012
Chemistry - Reactions	2009-10	January 12, 2010
	2010-11	September 16, 2010
	2011-12	December 2, 2011
	2012-13	September 28, 2012

Department	Year	Date
Physics - Electra	2009-10	February 1, 2010
	2010-11	October 14, 2010
	2011-12	September 19, 2011
	2012-13	September 7, 2012

- ❖ **Panel Discussion** - The department of Chemistry organized an intercollegiate panel discussion entitled “**Chemical Education - Perspectives and Future**” on Feb. 22, 2011.
- ❖ **“DEMO Experiments and QUIZ”** was conducted on March 11, 2011 by a team of scientists from IGCAR, who enabled the participants from various colleges to relish and cherish chemistry through colourful and luminating demonstration of experiments. This activated the students’ intellect and the senses of sight, sound, smell and touch.
- ❖ **Intercollegiate Competitions participated** - Students from all the departments of the science stream have been regularly participating in intercollegiate competitions conducted by some of the neighbouring colleges such as Madras Christian College, Women’s Christian College, Loyola College, Ethiraj College, Vivekananda College etc. They participate in various events like Debate, Creative Writing, Photography, Paper and Poster Presentations, Collage, Crossword, Quiz etc. which helps them to develop their knowledge and sharpen their skills, apart from bringing laurels to the College.
- ❖ **Guest Faculty** - Science departments regularly invite resource persons from neighbouring colleges to deliver Guest Lectures which enhances the learning process and to gain knowledge on various techniques and current trends.

Department	Year	No. of Guest Faculty
Botany	2009-10	10
	2010-11	4
	2011-12	3
	2012-13	1
Zoology	2009-10	6
	2010-11	8
	2011-12	6
	2012-13	7
Chemistry	2009-10	13
	2010-11	1
	2011-12	2
	2012-13	14
Physics	2009-10	9
	2010-11	7
	2011-12	5
	2012-13	3

❖ **Conferences organised**

Department	Details
Botany	<ul style="list-style-type: none"> • National Conference on “Role of Traditional Knowledge in Biodiversity Conservation, Livelihood and Sustainable Development” in collaboration with C.P.R. Environmental Education Centre on February 5 & 6, 2013.
Zoology	<ul style="list-style-type: none"> • Two day National Conference on “Perspectives in Ethology” from November 30 to December 1, 2012.
Chemistry	<ul style="list-style-type: none"> • National Conference on “Micro Scale Experiments in Physical Chemistry” organized in collaboration with Central Leather Research Institute, Chennai on November 24-25, 2012. • A two day National Conference on “New Frontiers Inorganic Chemistry and Process Research (NFOCPR- 2013)” was organized in collaboration with Shasun Pharmaceuticals Ltd. on January 24-25, 2013.

❖ **Visit to neighbouring Colleges/Institutes/Laboratories/Industries** – The following visits have been organised during the support period.

Botany

- Spirulina and Mushroom Farm, Nallayan Research Centre for Sustainable Development, Navaloor
- Plant Tissue Culture Laboratory, Loyola College
- Plant Tissue Culture laboratory, Noni Biotech Pvt. Ltd., Sholinganallur
- Irulas Tribal Women’s Welfare Society (Research Institute), Chengalpet
- Laboratory visit at School of Biotechnology, Sathyabama Deemed University

Zoology

- Sri Ramachandra University to learn the latest techniques in Genetic Engineering, Genetics, Cell Biology & Medical Lab technology.
- Central Leather Research Institute (CLRI)
- Zoological Survey of India
- Tamil Nadu Veterinary and Animal Sciences University, Chennai
- Scansworld

Chemistry

- Indian Institute of Technology Madras
- Central Leather Research Institute (CLRI)
- Anabond

- Diet Aqua & Excel water systems
- M/s.Metalloys Ltd., Ambattur

Physics

- Walsam Industries and AMPITRON Products, Taramani
- Birla Planetarium

13. Qualitative improvements due to DBT support (please highlight 5 salient lines):

1. There is a better understanding of the principles and significance of basic sciences through various programmes conducted under Star College Scheme, which has motivated students to pursue higher studies in basic sciences.
2. Financial assistance provided by the Scheme has helped in the purchase of several new equipments in more numbers and also consumables like reagents, glassware, specimens and other requirements. This made it possible for every student to handle the equipment and **perform the experiments individually**. It has enhanced their practical curriculum and broadened the scope of studies.
3. Conduct of more Workshops, Training Programmes, Demonstrations, Guest Lectures and Field visits for students has helped in upgrading practical knowledge and improving their analytical and technical skills, thus enriching the Teaching-Learning process.
4. The scheme has enabled publication of **practical and workshop manuals** which serves as ready reckoners to both students and faculty and also to update the **Departmental Library** by purchasing relevant books for new courses.
5. Individual and group projects have instilled a quest for scientific inquiry among students, which enkindled passion towards research. It also facilitated the students to present papers and posters in conferences.

14. Strengths and weaknesses of each department (3 each)

❖ Strengths

Botany

- Thrust area of the department includes Taxonomy of Angiosperms, Phytotherapy and Ethnobotany. A well maintained herbal garden and eighty different species of trees and shrubs on campus facilitate experiential learning in this area.
- All faculty hold doctoral degree.
- Curriculum includes both classical and contemporary courses, with a provision for undertaking projects.

Zoology

- At the Undergraduate level, the department provides excellent base and a broad foundation in animal biology.
- Opportunity to carry out group projects creates an aptitude for research among students and motivates them to take up a career in research both in India and abroad.

- Our alumni who have distinguished themselves as researchers, teachers, naturalists, entrepreneurs share their expertise, which provides the students with valuable career guidance.

Chemistry

- Offers good academic programme at UG & PG level. The syllabus is also structured in view of competitive exams – JAM, UGC NET, CSIR, GATE.
- Organizing Conferences, Workshops and Seminars expose the students and faculty to recent trends in Chemistry and Academia – Industry linkage with various industries and research organizations like CLRI, IGCAR.
- UGC Major and minor research projects.

Physics

- Well structured syllabus.
- The department organizes various programmes such as workshops, popular lectures, field visits and interaction with eminent Scientists regularly, which unravel the mysteries of Physics.
- Keeping abreast with advanced knowledge using ICT component.

❖ Weaknesses

Botany

- A large number of students are first generation learners and also come from regional language medium schools.
- To enhance collaborations with research institutions.

Zoology

- To strengthen tie ups with industries.
- Lack of space and funds to introduce more skill based courses and to update laboratories. to utilize computer simulation software.

Chemistry

- Need for funds for procurement of sophisticated instruments.
- Escalating cost of chemicals.

Physics

- Faculty not able to spend much time on research.
- Peer evaluation for the faculty is needed periodically.
- Catering to the spectrum of students who hail from diverse backgrounds.

ACKNOWLEDGEMENT

The College places on record its sincere thanks to the Department of Biotechnology (DBT), Ministry of Science & Technology, Government of India, for the financial support and opportunity given to strengthen the Basic Sciences. About 1920 undergraduate students and faculty from four departments have been benefitted through this scheme in the last four years and we hope that similar financial assistance will help the student community to pursue higher studies, plan a challenging career in the field of research and thereby benefit the society at large.

**Dr. Juliana Joe
Coordinator
Star College Scheme**

**Dr. Sr. Jasintha Quadras fmm
Principal**