

Department of Biotechnology

Star College Scheme

Progress report by Stella Maris College (Autonomous) Chennai

For the academic year 2010-11

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

2. **Name of Departments supported :** Botany, Zoology, Chemistry, Physics

Name of the Principal : Dr. Sr.Jasinth Quadras fmm
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Name of Coordinator, designation, address, phone nos. Dr. Juliana Joe
Associate Professor & Head
Dept. of Zoology
joejuliana@gmail.com
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3. **No. of regular faculty with Ph.D. in each participating department:**

S. No	Department	No. of Faculty	
		Aided	Management
1	Botany	5	-
2	Zoology	5	1
3	Chemistry	6	-
4	Physics	1 + 2* (*pursuing Ph.D.)	1* (*pursuing Ph.D.)

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

Department	Regular Course	Certificate Course
Botany	B.Sc. Plant Biology and Plant Biotechnology	Herbal Therapy and Beauty Care (UGC Sponsored)
Zoology	B.Sc. Advanced Zoology and Biotechnology	Medical Biotechnology
Chemistry	B.Sc. Chemistry M.Sc. Chemistry (Self Financing)	-
Physics	B.Sc. Physics	-

5. Admission in different courses in participating departments in 2010-11 academic session:

S.No.	Department	Cut off % for admission					No. of students admitted	No. of drop out students
		OC	BC	MBC	SC/ST	RC		
1	Botany	75.88	61.88	59.75	57.63	43.88	46	7
2	Zoology	75.63	64.13	59.75	54.25	55.63	52	12
3	Chemistry	87	68.13	63.25	56.1	50.38	52	5
4	Physics	88.13	70.38	59.13	52.88	50.5	52	6

6. Activities carried out during the year (department wise):

A) Student activities

i. Industrial visit / Field Visits

Department	Particulars
Botany	<ul style="list-style-type: none"> • Visit to Kovalam Seashore to study the habitat of sea weeds and to learn Herbarium techniques for Marine Algae • Visit to Irulas Tribal Women's Welfare Society at Chengalpet to study the medicinal value of herbs and visit to the seed bank centre • Visit to Thandarai, Chengalpet to study biodiversity of higher plants and for the collection of plants for herbarium preparation • Organised Tree Walk along with Nizhal at different locations of the city
Zoology	<ul style="list-style-type: none"> • Field trip to Indian Institute of Packaging, Perungudi for the II Yr. Vocational (Food Science) students on 7th February 2011. There was a Lecture cum demonstration on "Quality Testing of Packaging Materials". • 'Nature Walk' for the I B.Sc. Zoology students at the Guindy National Park on September, 4th, 2010. This National Park is home to the Black buck an endangered species, and also boasts several rare species of flora. Therefore the trip was an eye opener to the students to understand the Principles of Conservation. • Visit to Central Leather Research Institute (CLRI) on February 21, 2011 for the I Year Major Elective –Applied Zoology students. They gained knowledge on the various machinery used in the processing of leather. They visited the microbiology lab and the Environmental Engineering Department to know about the treatment of tannery effluents. This visit and the observations made enriched their knowledge on leather technology and waste water management.

Zoology	<ul style="list-style-type: none"> • Laboratory Visit on 6th September 2010 for III years to Ramachandra University to learn the latest techniques in Genetic Engineering, Genetics, Cell Biology & Medical Lab technology. • The III year General Elective students visited the Museum and Aquarium in the Zoological Survey of India on July 21, 2010
Chemistry	<ul style="list-style-type: none"> • Industrial visits to Indian Institute of Technology Madras, Central LRI, Anabond, Diet Aqua & Excel water systems. The visit gave the students firsthand knowledge about analytical instrument technique, polymer chemistry and principles of water analysis

ii. List of projects taken by students

Department	Details
Botany	<ul style="list-style-type: none"> • Analysis of Physical, Chemical and Biological parameters of drinking water collected from different parts of the Chennai city. • Effect of processing techniques on antioxidant activity in few varieties of Tomato. • Study on Lead content in grass and milk collected from cattle grazing in the same area • Microbial analysis of Soil collected from different locations at Stella Maris College • 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. • 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)
Zoology	<p>After learning the “<i>Drosophila</i> Culture Techniques” the following projects have been carried out by III Year students.</p> <ul style="list-style-type: none"> ❖ Verification of Mendel’s monohybrid cross ratio ❖ Induction of mutation in <i>Drosophila sp.</i> by using formaldehyde ❖ Verification of test cross ratio ❖ Effect of lead acetate on the development & metamorphosis of <i>Drosophila sp.</i> ❖ Study of inheritance of eye colour in <i>Drosophila sp.</i> ❖ Effect of caffeine on <i>Drosophila sp.</i> ❖ Effect of Betnesol on the life cycle of <i>Drosophila sp.</i>

Zoology	<p>Projects on 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 ❖ Dog intelligence ❖ Study on Budgerigers (Parakeets) <p>Projects on 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
Chemistry	<ul style="list-style-type: none"> • Analysis of Physico chemical parameters of Soil samples

iii. Excursion

- The III B.Sc. students of Botany, Zoology and Chemistry went on an excursion to Wayanad and Physics students to Yercaud.

B) Teachers activity

i. Workshop, seminar conducted / attended

Department	Details
Botany	<ul style="list-style-type: none"> • Dr. Beulah Vijayakumar attended a Lecture cum demonstration in the Art of Bonsai organised by the Bodhi- The Chennai Bonsai Association on 4th July 2010. • Dr. Geradette Davey attended a Workshop on Quality Management In Setting Question Papers and Evaluation of Answer Scripts organised by the IQAC of P.S.G.R.Krishnammal College for Women on 27th August 2010 • Dr. Geradette Davey attended the Orientation Programme on “Campus Environmental Audit” at Bishop Heber College, Tiruchirapalli on 28th & 29th October 2010. • Dr. Geradette Davey attended seminar on “Curriculum Development on Peace Education” at Madras Christian College, Tambaram on 3rd & 4th December 2010 and seminar on “Rejuvenating Intellectual Curiosity Among Teacher Education” at Stella Matutina College of Education on 28th & 29th January 2011.
Zoology	<ul style="list-style-type: none"> • Dr. Miriam Vassou attended a National Seminar on ‘Recent Trends in Environmental Toxicology’ organized by Sir Theagaraya College, Chennai on 28th and 29th January 2011. • Dr Juliana Joe, Dr. Rita Jeyraj, Dr. Kalpana Jeyaraman attended a one week workshop on ‘Basic Concepts of Bioinformatics’ from June 28th to July 2nd, 2010

Chemistry	<ul style="list-style-type: none"> • In view of the International year of chemistry 2011, the department organized an intercollegiate program - The panel discussion entitled “Chemical education- perspectives and future” on 22 Feb 2011. The program was informative and interactive, spear headed by the team of eminent scientists. Dr. K. K. Balasubramaian, Shasun Drugs and Chemicals Pvt. Ltd emphasized on ways to prepare oneself to be a good chemist, Dr. Pradeep, IITM, on Nucleation of collaboration research in colleges, Dr. Aruna Dhattathreya, CLRI, on Women and Research- limitations and tips to overcome the obstacles, Prof. Sriman Narayan on Higher education and research in chemistry and Dr. Bhuvanewari on Scope for Women scientists in industry. • “DEMO Experiments and QUIZ” on 11 March 2011 was conducted by a team of scientists from IGCAR who enabled the participants from various colleges to relish and cherish chemistry through colourful, luminating demonstration of experiments which activated our intellect and the senses of sight, sound, smell and touch.
Physics	<ul style="list-style-type: none"> • Ms. Belina Xavier attended a Symposium on Bio Nanotechnology and presented a paper titled “The study of the role of Sodium dodecyl sulphate in the synthesis of Gold nanoparticles” conducted by chettinad hospital and research institute, Chennai on 15th and 16th July 2010. • Ms. Suganthi Lark Josephine A and Ms. Neeraja attended a refresher course in “Environmental science” conducted by UGC-Academic staff college, University of Madras. 5th to 25th of August 2010. • Ms. Anceila D attended “Value Based Orientation camp for the effective communication and teaching based on Christian principles” organised by Xavier Board of Higher Education in India in Andhra Loyola College, Andhra Pradesh from 28th to 30th December 2010. • Ms. Belina Xavier attended a “ First International conference on composites and Nanocomposites” and gave an invited lecture on “Studies on Solvo thermally synthesized Au @ TiO₂ nanocomposites” organized by Institute of Macromolecular Science and Engineering along with Centre for Nanoscience and Nanotechnology, Mahatma Gandhi University, Kerala from 7th – 9th January 2011. • Ms. Mercy Jennifer attended a programme on “Environmental issues” held at Stella Maris College on 10th and 11th of December 2010. • Dr. Rajini, K.H, attended “National Conference on Examination reforms in Higher education” and presented a Paper on “Prevailing credit Based systems, advantages and disadvantages” in Christ college, Bangalore , on 15th, 16th and 17th of December 2010.

ii. Training course conducted / attended

Department	Details
Botany	<ul style="list-style-type: none"> • One day training programme on Processing of Fruits and Vegetables to learn various preservation techniques and their nutraceutical value at Rajaji Bhavan • Hands on Training on Mushroom Cultivation to learn the life cycle and economic importance of fungus (<i>Pleurotus</i> sp) • Training with respect to Horticulture a skill based course on flower arrangement to learn the horticultural varieties in flowers, their binomial (names), preservation techniques and commercial uses.
Zoology	<p>WORKSHOPS</p> <ul style="list-style-type: none"> • One week workshop on Basic Concepts of Bioinformatics was organised for II year students on the third week of June 2010 in collaboration with the Department of Bioinformatics, Stella Maris College • A workshop on “Drosophila Culture Techniques” was organized on July 15, 2010 for the III year students of Zoology. The resource person was Ms. Sri Devi, Research Scholar, Dept. of Genetics, PGIBMS, University of Madras. • A workshop on Herpetology was organized for the I Yr students in collaboration with the Madras Crocodile Bank on 10th January 2011.
Chemistry	<p>TRAINING PROGRAMME</p> <ul style="list-style-type: none"> • A group of ten II UG students underwent one week training at Diet Aqua, on analysis of the quality of water samples in Nov 2010. They were trained on estimating TDS, pH, chloride, fluoride, nitrite, ammonia and microbial aspects.

iii. Guest lectures (Please mention Name, Designation, host institute of guest faculty invited)

Botany

Name of the External Expert	Designation	Host Institute
Dr. Mujeera Fathima - “Environmental Biomonitoring”	Associate Prof. and Head, Dept. of Plant Biology and Plant Biotechnology	, Govt. Arts College, Nandanam, Chennai
Dr. Bhavani, T - Lecture cum demonstration on Fermentation - Yoghurt and Wine Preparation	Associate Professor, Dept. of Botany	Women’s Christian College, Chennai
Dr. Agustian - Lecture cum demonstration on Mushroom Cultivation	Associate professor, Dept. of Botany	Loyola College, Chennai
Dr. Uma Rajan - Practical demonstration on Environmental Toxicology	Associate Professor	Pachaiappas College, Chennai

Zoology

Name of the External Expert	Designation	Host Institute
Dr. Kalpana Gowrishankar - “Birth Defects & Genetic Counselling”	Genetics Consultant	Child Trust Hospital, Chennai.
Ms Krithika Rao - “Scope of Cell and Molecular Biology” -	Research Scholar	
Dr. P. Gandheeswari - Biomedical Instrumentation	Head, Dept. of Biomedical Instrumentation	Loyola College
Dr. Kadharbatcha S. - Saleem NeuroScience research in Primates	Scientist	National Institute of Mental Health (NIMH/NIH) Lab
Dr. Sathyanarayana -Animal Protection Acts & Methods to study Animal Behavior	Head of the Wild Life Biology Department,	AVC College, Mayiladathadurai
Dr. T.V. Sairam - Music and behaviour	Chairman and CEO	Nada Institute of Music therapy
Dr. Arivudai Nambi - Impact of Climate change and lessons for the future	Project Director (Climate Change)	M.S. Swaminathan Research Foundation, Chennai
Dr. K. Venkataraman - Biodiversity in India	Additional Director,	Marine Biology Research Center, Zoological Survey of India

Chemistry

Name of the External Expert	Designation	Host Institute
Dr. N. Chandrakumar - “From science to society- the discovery continuum exemplified by spins”	Professor, Department of Chemistry	IIT Madras

Physics

Name of the External Expert	Designation	Host Institute
Dr. Ram Prabhu - General Nanotechnology	Professor, Department of Physics,	IIT, Chennai
Dr. Prem Bisht - Application of ultrafast laser in science and technology	Professor, Department of Physics,	IIT, Chennai
Dr. Gautam Menon - Superconductivity	Professor, Department of Physics,	The Institute of Mathematical Sciences, Chennai

Dr. Barnabas Tiberius - Perspectives of Science in reality	Ex. President	Asia Pacific MNC
Dr. Kumar Sathian - Programming Techniques in microprocessor 8085,	Retd. Professor,	Madras Christian College, Chennai
Mr. John Basco - Photography in Modern world	Head Master	Panchayat Union Middle School, Cuddalore
Mr. Satish - lecture cum demonstration on film developing techniques in Black and White and Colour photography	Professional Photographer	Proprietor Satyam Studio

iv. Exhibition

Department	Details
Botany	Exhibition on Bonsai Plants in collaboration with Bodhi- Chennai Bonsai Association
Zoology	'EXZOOBITION' - Exhibition on various facets of Zoology was organized by students of I, II & III B.Sc. Zoology on February 11, 2011. This event is an experiential learning process and the thrust areas were Chordata, Applied Zoology, Microbiology, Environmental Biotechnology, Physiology, and Environment related issues.
Chemistry	Exhibition on Principles of Analytical Chemistry by II UG Students which enabled experiential learning.

v. Any Other: Paper Presentations / Resource Persons

Department	Details
Zoology	<ul style="list-style-type: none"> • Dr. Rita Jayaraj presented two papers – 'Phytoremediation – A Focus' and "Assessment of Water Quality in different parts of Chennai city" in a National Seminar on 'Recent Trends in Environmental Toxicology' organized by Sir Theagaraya College, Chennai on 28th and 29th January 2011 • Dr. Chitrlekha Ramachandran - Invited to be a resource person for a one day workshop on Alternatives to the Use of animals in Life Science Education held by the PG. Dept. of Zoology, Nirmala College, Muvattupuzha, Kerala on 7th January 2011. • Dr. Chitrlekha Ramachandran - Invited by the Ecoscience research foundation to be a resource person for the program on Simple Tasks, Great concepts organized for school teachers from all over India – 19th to 21 January 2011.

Chemistry	<ul style="list-style-type: none"> • Dr. Rukmani Srinivasan was an invited speaker for Chennai Chemistry Conference held at IIT-M and delivered a lecture on Chemical Education. • Dr. Mary George presented a paper on “Complexing ligand directed synthesis of size controlled and oriented anatase TiO₂ nanoparticles underhydrothermal treatment” and a poster on “Simple synthesis of metal ferrite (MFe₂O₄, M = Co, Cu, Mg, Ni, Zn) nanoparticles as humidity sensor materials” at the National Seminar on Advances in Material Chemistry organized by the Guru Nanak College in February 2011. • Ms. Avila Josephine & Ms. Mary Teresita presented a poster on “Synthesis, characterisation and humidity sensing properties of nanocomposites of Lanthanum mixed metal oxide” at the National Seminar on Advances in Material Chemistry organized by the Guru Nanak College in February 2011. • Dr. Mary George has published a research paper titled “Indirect spectrophotometric determination of sulfamic acid in electroplating effluents” in the International Journal of Electroplating and Finishing. • Dr. Mary N.L. has published a research paper titled “(N¹E,N²E)-N¹,N² – Bis (4-hydroxy-3-methoxybenzyl-idene) ethane – 1, 2-diamine” in the International Journal Acta Cryst.
Physics	<ul style="list-style-type: none"> • Sr. Francisco Nirmala and Ms. Anceila D delivered a lecture to students of High school and Higher Secondary of The Indian Public school in Erode with regard to the “Environment and the Social responsibility” on 28 October 2010 .

7. Advisory committee meeting: ---

A) Constitution of advisory committee:

Chairman	Principal
DBT Representatives	1. 2.
External Experts (Members)	Prof. Ramamurthy, Dept. of Chemistry, Loyola College Dr Kaleena P.K., Dept. of Zoology, Presidency College - Member
Faculty Members (from all participating departments)	Dr Geetha Swaminathan, Vice Principal & Associate Professor, Dept. of Chemistry Dr Priscilla Jebakumari, Associate Professor, Dept. of Botany Dr Rita Jeyaraj, Assistant Professor, Dept. of Zoology Dr Shiny John, Associate Professor, Dept. of Chemistry Ms Belina Xavier, Assistant Professor, Dept. of Physics
Coordinator	Dr Juliana Joe, Head, Dept. of Zoology

B) Advisory committee meeting conducted after implementation of scheme:

It is scheduled on November 2011.

8. 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 in last one year:

The Science departments continued to conduct the new practicals introduced in 2009-10 for enhancing the experiential learning and the understanding of the basic principles involved in various practicals.

Department	Details
Botany	<ul style="list-style-type: none"> • Isolation of photosynthetic pigments using different leaves by paper chromatography • Isolation and enumeration of bacteria and fungus by using different isolation techniques • Microscopy – sectioning techniques of various plant parts and double staining of the same for microscopic studies of stems, roots and thallus of few plants • Maceration technique to study the vascular elements • Estimation of protein through colorimeter • Preparation of Yoghurt, Grape wine & Apple wine – Industrial Microbiology • Production of Citric acid using fungus <i>Aspergillus niger</i> • Laying and maintaining the Kitchen Garden and Herbal garden • Vegetable carving – Techniques – Horticulture • Grafting & Budding – Demonstration - Horticulture • Preparation of Ayurvedic and Siddha medicines to learn pharmacognosy (study involved learning of binomial names, active principle, morphology and extraction process of plants) • Demonstration on Grafting and Budding propagation techniques used in Horticulture • Demonstration of protein separation using electrophoresis • Demonstration of composting techniques to learn the principle of biodegradation and to identify local earthworm varieties and their role in biodegradation
Zoology	<ul style="list-style-type: none"> • Coliform count Presumptive test in drinking water samples by membrane filter technique • Hanging drop technique to observe the motility of Bacteria • Widal Slide agglutination test for Typhoid • VDRL Slide Flocculation test for Syphilis • Anti-A and Anti-B titration test • Direct Coombs test • ELISA – Qualitative test for pregnancy • DNA extraction in Papaya <p>DEMONSTRATIONS :</p> <ul style="list-style-type: none"> • Antibiotic sensitivity test (Kirby Bauer diffusion method) • Bacterial growth curve

Zoology	<ul style="list-style-type: none"> • Isolation of Lymphocytes • Isolation of RNA from Yeast • Agarose gel electrophoresis • Plasmid DNA extraction
Chemistry	<ul style="list-style-type: none"> • Skill development major elective course, “Clinical Biochemistry” was introduced this academic year, 2010-11. This gave an insight into diagnostic testing and enabled skill development for clinical analysis by the students. The students were exposed to collection and processing of blood and determination of various metabolic analytes like carbohydrates, proteins, lipids and enzymes. • Water analysis using pH meter, colorimeter, Nephelometer, TDS meter, volumetric and spectroscopic techniques [I &II B.Sc. Chemistry Students]. • Analysis of functional groups and derivative preparation of organic compounds [II B.Sc. Chemistry Students]. • Demonstration of basic analytical operations like solvent extraction and chromatographic techniques- TLC & Column chromatography [III B.Sc. Chemistry Students] • Demonstration of detection of counterfeit currency notes using UV light, effect of UV light on dyes and drugs [III B.Sc. Chemistry Students]. • Demonstration of growth of potassium chloride crystals. • Demonstration of analysis of physical chemistry experimental results using Microsoft Excel [III B.Sc. Chemistry Students].
Physics	<ul style="list-style-type: none"> • Op amp mini trainer kits were used to perform basic operations like adder, subtractor, source follower etc. • Equipments like Abbe refractometer, visible spectrophotometer, Conductivity Bridge were introduced to students through mini projects. • Laser experiments were introduced for practicals

9. DBT grant utilization:

A) Non-recurring (Equipment and Books & Journals): NIL

B) Recurring:

Recurring Expenses	Amount in Rs.
Consumables	3,123
Contingency	81,182
Visiting Faculty	11,100
Travel	145
Training	3,204
Total	98,754

Opening balance from 2009-10	:	Rs. 18,486
Advance by the College	:	Rs. 80,268
Total	:	Rs. 98,754

The II year grant for the implementation of the project for strengthening of Life Science and Biotechnology Education and Training at Undergraduate level under Star College Scheme was released only on 23/3/2011. Therefore the grant is being utilized for the current academic year 2011-2012.

10. Qualitative improvements due to DBT support

- Due to better infrastructure students were able to gain hands-on experience with respect to practicals.
- Several training programs / demonstrations were organized which helped in upgrading our knowledge.
- Guest lectures were organized to enhance the learning process and to gain knowledge on various techniques and current trends.
- Field trips have helped the students to understand and appreciate various concepts and their applications.
- The fund was also beneficial in compiling Manuals for Practicals which will be a ready reckoner for the students.
- The projects undertaken by the students helped to rekindle a passion to study basic sciences and also motivated the students to undertake research.

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

As we received the second year funds only in March 2011 we could not organize various activities. Timely release of grant would help us to organize various activities throughout the academic year.

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. This scheme has benefited nearly 450 undergraduate students and we are sure that similar financial assistance will help the young scientists to pursue higher studies and research which will benefit the society at large.

Dr. Juliana Joe
Coordinator

Dr. Sr. Jasintha Quadras fmm
Principal