

SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING
[DEEMED TO BE UNIVERSITY]



THE ANNUAL QUALITY
ASSURANCE REPORT
(AQAR) SUBMITTED BY
THE INTERNAL
QUALITY ASSURANCE
CELL (IQAC)

2013-14

Vidyagiri, Prasanthi Nilayam – 515 134
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SSSIHL

The Annual Quality Assurance Report (AQAR) of the IQAC (2013-14)

Part – A

1. Details of the Institution

1.1 Name of the Institution

Sri Sathya Sai Institute of Higher Learning
(Deemed to be University)

1.2 Address Line 1

Vidyagiri, Prasanthi Nilayam

Address Line 2

Anantapur District

City/Town

Puttaparthi

State

Andhra Pradesh

Pin Code

515134

Institution e-mail address

registrar@sssihl.edu.in

Contact Nos.

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Name of the Head of the Institution:

Prof. J Shashidhara Prasad

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Name of the IQAC Co-ordinator: Prof. V Chandrasekaran

Mobile: +91 9866537010

IQAC e-mail address: vchandrasekaran@sssihl.edu.in

1.3 NAAC Track ID (For ex. MHC0GN 18879) SSSIHL11303

1.4 NAAC Executive Committee No. & Date: EC/54/RAR/076 Date: January 08, 2011
(For Example EC/32/A&A/143 dated 3-5-2004.
This EC no. is available in the right corner- bottom
of your institution's Accreditation Certificate)

1.5 Website address: www.sssihl.edu.in

Web-link of the AQAR: <http://sssihl.edu.in/sssuniversity/ResourcesHelp/Publications.aspx>

For ex. <http://www.ladykeanecollege.edu.in/AQAR2012-13.doc>

1.6 Accreditation Details

Sl. No.	Cycle	Grade	CGPA	Year of Accreditation	Validity Period
1	1 st Cycle	A++	96%	2003	2008
2	2 nd Cycle	A	3.63	2011	2016
3	3 rd Cycle				
4	4 th Cycle				

In the first accreditation on 21st March 2003, the Sri Sathya Sai Institute of Higher Learning (Deemed to be University) was one of the very few Universities in India to be awarded an A++ rating (95 to 100 percentile) by the National Assessment and Accreditation Council (NAAC).

In January 2011, NAAC reaccruited Sri Sathya Sai Institute of Higher Learning (Deemed to be University) with an 'A' Grade and a Cumulative Grade Point Average (CGPA) of 3.63 (on a scale of 4.00). This puts the Sri Sathya Sai Institute of Higher Learning among the top 4% of the 175 Universities accredited by NAAC.

1.7 Date of Establishment of IQAC: DD/MM/YYYY 13/01/2006

1.8 AQAR for the year (for example 2010-11): 2013-14

1.9 Details of the previous year's AQAR submitted to NAAC after the latest Assessment and Accreditation by NAAC ((for example AQAR 2010-11 submitted to NAAC on 12-10-2011)

- i. AQAR 2010-11 _NAAC/JP/SR/AQAR/2012/Ack/dt. 26/03/2012_(DD/MM/YYYY)
- ii. AQAR 2011-12 EC_54_RAR_076 dated Date 01-08-2011 Sri Sathya Sai Institute of Higher Learning AQAR for 2011-12 21/09/2015__ (DD/MM/YYYY)
- iii. AQAR 2012-13 EC_54_RAR_076 dated Date 01-08-2011 Sri Sathya Sai Institute of Higher Learning AQAR for 2012-13 23/09/2015__ (DD/MM/YYYY)
- iv. AQAR_____ (DD/MM/YYYY)
- v. AQAR_____ (DD/MM/YYYY)

1.10 Institutional Status

University State Central Deemed Private

Affiliated College Yes No

Constituent College Yes No

Autonomous college of UGC Yes No

Regulatory Agency approved Institution Yes No

(eg. AICTE for Management Courses and NCTE for Teacher Education Courses)

Type of Institution Co-education Men Women

Urban Rural Tribal

Financial Status Grant-in-aid UGC 2(f) UGC 12B

Grant-in-aid + Self Financing Totally Self-financing

1.11 Type of Faculty/Programme

Arts Science Commerce Law PEI (Phys Edu)

TEI (Edu) Engineering Health Science Management

Others (Specify)

1.12 Name of the Affiliating University (for the Colleges)

Not applicable

1.13 Special status conferred by Central/ State Government-- UGC/CSIR/DST/DBT/ICMR etc

Autonomy by State/Central Govt. / University	<input type="text" value="Central Govt."/>		
University with Potential for Excellence	<input type="text"/>	UGC-CPE	<input type="text"/>
DST Star Scheme	<input type="text"/>	UGC-CE	<input type="text"/>
UGC-Special Assistance Programme	<input type="text" value="Yes"/>	DST-FIST	<input type="text" value="Yes"/>
UGC-Innovative PG programmes	<input type="text" value="Yes"/>	Any other (<i>Specify</i>)	UGC Major Research Projects DBT Project DAE Project
UGC-COP Programmes	<input type="text"/>		

2. IQAC Composition and Activities

2.1 No. of Teachers	<input type="text" value="19"/>
2.2 No. of Administrative/Technical staff	<input type="text" value="0"/>
2.3 No. of students	<input type="text" value="0"/>
2.4 No. of Management representatives	<input type="text" value="4"/>
2.5 No. of Alumni	<input type="text" value="4"/>
2.6 No. of any other stakeholder and Community representatives	<input type="text" value="0"/>
2.7 No. of Employers/ Industrialists	<input type="text" value="0"/>
2.8 No. of other External Experts	<input type="text" value="2"/>
2.9 Total No. of members	<input type="text" value="21"/>
2.10 No. of IQAC meetings held	<input type="text" value="1"/>
2.11 No. of meetings with various stakeholders:	
	No. <input type="text" value="1"/> Faculty <input type="text" value="21"/>
Non-Teaching Staff <input type="text" value="0"/> Students <input type="text" value="0"/> Alumni <input type="text" value="4"/> Others <input type="text"/>	

2.12 Has IQAC received any funding from UGC during the year? Yes No

If yes, mention the amount

NA

2.13 Seminars and Conferences (only quality related)

(i) No. of Seminars/Conferences/ Workshops/Symposia **organized by the IQAC**

Total Nos. International National State Institution Level

(ii) Themes

Note: The University centrally organizes various seminars/conferences/workshops/symposia under the respective departments wherein majority of IQAC members are part of it.

2.14 Significant Activities and contributions made by IQAC

i. Feedback mechanism for sustaining and improving Quality of Teaching:

As a part of the university's initiative to improve and maintain teaching quality, a formal and structured student OMR based feedback mechanism was introduced. The feedback, after analysis is communicated to each individual teacher for their perusal and improvement. The Heads of departments and Directors of Campuses also receive the feedback report of teachers of their department /campus.

An online feedback mechanism to elicit feedback from students has been initiated from the winter semester of 2013-14. This has been very effective in getting accurate feedback from students maintaining complete confidentiality.

i. Promoting Excellence in Research and Teaching:

The "*Sai Krishna Award for excellence in research and teaching*" has been instituted to recognize the prominent researchers and teachers at the Sri Sathya Sai Institute of Higher Learning each year. This award is given for excellence in Research for a given year and for excellence in teaching the next year and so on, alternately.

The research awards are given for excellence in research in three categories viz., **a.** Sciences **b.** Management, Commerce, Economics and Education **c.** Languages and Philosophy.

The teaching awards are given, one for each campus of the University.

The IQAC summarized the quality goals and objectives as "Excellence in Everything We Do". This was further divided into the following focus areas:

- Values-based All Round Personality Development of Students.
- High Quality Research
- Innovative Teaching and Enhanced Learning
- Efficient Administration
- Continuous Process Improvement

IQAC coordinator made a presentation on the **overall trends of SSSIHL** for the past three years which highlighted the following achievements:

- Teaching Staff strength rose from 115 (2010) to 146(2011) and 157(2012) indicating a steady increase of investment from SSSIHL.
- Total number of Journal Papers published increased from 64 (2010) to 110 (2011) and 127(2012), a 100% increase indeed.
- Number of peer-reviewed conference papers published rose from 81 (2010) to 126 (2011) and 119(2012), an increase of 50%.
- Number of national and international conferences conducted by SSSIHL also grew from 9 in 2010 to 24 in 2012. Also the total number of staff who have participated in workshops and conferences outside SSSIHL rose from 23 in 2010 to 32 (2011) and 43 (2012).
- Similarly the number of colloquium by departments increased to 109 in 2012 from 75 in 2011 and the invited talks given by SSSIHL staff in the external conferences rose to 24 in 2012 from a mere 6 in 2010.
- The new project funding is doubled from Rs.169.07 lakhs in 2010 to Rs.342.6 lakhs in 2012.
- The total number of PhD scholars have gone up to 58 in 2012 from 35 in 2010.
- While the total number of books published remained around 6-8, the number of Chapters increased from 9 in 2010 to 18 in 2011 and 14 in 2012.
- Percentage of Students' achievements in GATE, CSIR/UGC NET is around 15-18% which is much above the national average.

The specific initiatives undertaken in the year 2013-14:

- **Promoting Excellence in Research and Teaching:** The SSSIHL Instituted "*Sai Krishna Award of Excellence in Research and Teaching*" to recognize prominent researchers and teachers of SSSIHL. These awards are given for research in three categories viz. a) Sciences b) Management c) Languages and Philosophy. The award is given for teaching and research in every alternate years.
- **Feedback Mechanism for sustaining and improving Quality in Teaching:** As a part of the university's initiative to improve and maintain teaching quality, the SSSIHL has introduced a formal and structured OMR-based Student Feedback mechanism and the analysis are communicated to individual teachers for their self-introspection and development. Online feedback mechanism has started from the winter semester of 2013-14 to ensure that the feedback is given in a strictly confidential manner.
- **Collaborative Research with National and International Agencies to give a fillip to research quality:**
 - The department of Physics and Biosciences have jointly signed a MOU with Centre of Biologics Evaluation and Research (CBER), FDA, USA.
 - Active Collaboration between the department of Physics and Kinard Laboratory of Physics, Clemson University, USA.
 - The department of Biosciences and Orthopedics Department of SSSIHMS has operationalized a new cell culture facility to culture human chondrocytes / chondral lesions to avoid total knee-replacement surgery.
- **Academic Administrative Audit Committee has been constituted for objective auditing of Teaching-Learning-Research and Administration:** The Committee visited three of the four campuses. They will be visiting the fourth campus shortly. The report is then expected by end of this year.

- **Faculty Training in-House and in Other External Agencies:** The training for young faculty was given in question paper setting, evaluation, and other rules of engagement.
- **Engaging Young Faculty Members in Research:** This initiative was intended to bring in fresh thinking and vigour in quality research. Number of young faculty have been approved as research supervisors for PhD and MPhil Candidates.
- **Well-Structured UG-PG-MTech-PhD Programs and augmenting with new programs:** This initiative was undertaken to make the curriculum attractive with well-defined career paths for students of SSSIHL. The following were initiated to fill-in some of the gaps:
 - Commencement of M.Tech.(Analytical Methods Chemical Instrumentation) programme in 2013-14.
 - Commencement of M.Tech.(Nuclear Medicine) programme in 2013-14.
 - Addition of new M.Ed. programme in Education department has commenced in 2013-14.
- **Promoting Public Awareness of SSSIHL’s Contribution and Quality Education:** This initiative is to publicize SSSIHL’s contribution for the advancement of science so as to attract bright students to pursue science education in SSSIHL.
 - Awareness with 11th and 12th class students of Sri Sathya Sai Higher Secondary School, Prasanthi Nilayam campus.
 - Advertisement in full colour in leading newspapers viz., Times of India and The Hindu in their Education Supplement.
 - 1100 A3 size information poster on SSSIHL distributed to other Institutions through Sri Sathya Sai Seva Organizations all over India.
 - Posters were sent to 313 colleges and universities and 118 schools directly.
 - Admission process through Z-score normalization and a uniform threshold to select the candidates was applied in 2013-14 admission.

Some of the resultant outcomes of the quality initiatives taken by the University are listed below:

- Dr. D K K Vamsi, DMACS received Dr. K V Rao received ‘**Young Scientist Award**’ (2nd Place) for Mathematics in 2012.
- Dr. Pallav Kumar Baruah was recognized as “**Academic Partner**” under the Professor in Partnership (PPP) program of NVIDIA and SSSIHL is now the Teaching and Research Center on CUDA.
- Dr. B E Pradeep, Department of Biosciences was selected for an 8 week Summer Research Fellowship (April-May 2012) of the Indian Academy of Sciences to work in Dr. Krishnaveni Mishra’s Lab in the Dept. of Biochemistry, University of Hyderabad.
- Ms. R Pushkala, PhD Research Scholar was selected for an 8 week Summer Fellowship (April-May 2012) of the Indian Academy of Sciences to work in Madras Diabetic Research Foundation.
- Dr. Shashank Shah, Post-Doctoral student, Department of Management Studies, was invited as visiting scholar to the center for Corporate Social Responsibility, Copenhagen Business School, Denmark (31 Oct-8 Nov 2011).
- Dr. P L Rani, Assistant Professor, Department of English & Literature was winner of British Council “**Writing Challenge**” and was selected as one of the roving partners sponsored by British Council for the second International Conference for ELT Educators.

2.15 Plan of Action by IQAC/Outcome

The plan of action chalked out by the IQAC in the beginning of the year towards quality enhancement and the outcome achieved by the end of the year *

Plan of Action	Achievements
<p>The initiatives that the University needs to take in order to improve and sustain quality in teaching and research were discussed in the meeting of IQAC. The points that emerged from this discussion are listed below.</p> <ul style="list-style-type: none"> • Constitution of an Academic and Administrative Audit Committee: • Promoting Excellence in Research and Teaching: • Collaborative Research with National and International Agencies to give a fillip to research quality • Faculty Training in-House and in Other External Agencies: • Engaging Young Faculty Members in Research • Faculty Training in-House and in Other External Agencies: • Engaging Young Faculty Members in Research • Well-Structured UG-PG-MTech-PhD Programs and augmenting with new programs: • Promoting Public Awareness of SSSIHL's Contribution and Quality Education 	<p>Implemented in the year 2012</p> <p>Dr. R Sai Sathish → Winner of the Sai Krishna Award for Excellence in Research in Sciences (2012/13) and Dr. R Prabhakar Rao → Winner of the Sai Krishna Award for Excellence in Research in Management, Commerce, Economics and Education (2012/13)</p> <p>Achieved in in 2012-13. Please see last para in page no.6.</p> <p>Yearly faculty workshops were organized. The training for young faculty was given in question paper setting, evaluation, and other rules of engagement.</p> <p>Please see answer given in last para in page no.7. Young faculty members were also encouraged to enrol for doing PhD and those faculty with Ph.D. qualifications were encouraged to undertake supervision of research work either through projects or by research scholars.</p> <p>Please see answers given in page no.6 & 7.</p>

* Attach the Academic Calendar of the year as Annexure-i.

PS: Faculty achievements are given in the Annual Report Page nos.43 to 45 which is given in the website under the URL <http://sssihl.edu.in/sssuniversity/ResourcesHelp/Publications.aspx>

2.15 Whether the AQAR was placed in statutory body Yes No

Management Syndicate Any other body

Provide the details of the action taken

The points stated in AQAR reflects in the newly designed Annual Report of the University. The key points and achievements are figured in comparison with the National averages in the Annual Report. The infographics provides qualitative status w.r.t. NAAC parameters and national averages.

Part – B

Criterion – I

1. Curricular Aspects

1.1 Details about Academic Programmes

Level of the Programme	Number of existing Programmes	Number of programmes added during the year	Number of self-financing programmes	Number of value added / Career Oriented programmes
PhD	9	0	0	0
PG	8	2	0	0
UG	9	2	0	0
PG Diploma				
Advanced Diploma				
Diploma				
Certificate				
Others				
Total	26	4	0	0
Interdisciplinary	1			
Innovative				

1.2 (i) Flexibility of the Curriculum: ~~CBCS~~/Core/Elective option / Open options

(ii) Pattern of programmes:

Pattern	Number of programmes
Semester	All
Trimester	
Annual	

1.3 Feedback from stakeholders* Alumni Parents Employers Students
(On all aspects)

Mode of feedback : Online Manual Co-operating schools (for PEI)

**Please provide an analysis of the feedback in the Annexure*

Alumni contribute to the development of the institution in many ways. They provide valuable feedback regarding various courses and also help in updating. They help the alma mater in the conduct of annual workshops, seminars, and conferences. They provide liaison for placement of outgoing batch of students each year. They also help in the acquisition of books, journals, etc. as and when required by providing the list of latest references followed in in similar programmes of international universities.

The feedback from different stakeholders are factored in the curricular design and up-gradation, measured in terms of the number of new courses that have been added to the curriculum and new chapters to the syllabi of several courses in various disciplines.

Students: Through formal and informal interactions in and outside the classroom and also thorough written course-wise feedback every semester.

Alumni: Through formal feedback in the written format at the time of periodical alumni get-togethers.

Community: Visits to their places for extension work, data collection during research, and industrial visits.

Academic Peers: When the faculty, research scholars, and students attend conferences, workshops, and student meets, away from the university and when members from academia visit the University.

Industry: When M.B.A and M.Tech. Students visit industry either during industrial visit programme or go for data collection during summer project work period or research and also when senior Executives visit the University as Visiting Faculty.

Parents: When they come to meet their wards during vacations or other larger congregations during festivals.

1.4 Whether there is any revision/update of regulation or syllabi, if yes, mention their salient aspects.

Changes in the syllabus and academic regulations were proposed by the following departments in the year 2013-14 in the Academic Council meeting:

- Approval of syllabi of new Programmes such as M.Tech.(Nuclear Medicine) Programme.
- Approval of revision of syllabi for B.Ed., BCA, B.Sc. (Hons.) in Mathematics, M.Sc.(Mathematics), M.Tech.(Computer Science), M.Sc.(Physics), M.Tech. (Optoelectronics and Communications), B.Sc. (Hons.) in Chemistry, M.Sc. (Chemistry), M.Tech. (Analytical Methods and Chemical Instrumentation), B.Sc. (Food Science and Nutrition), B.Sc. (Food Technology), M.Sc. (Food Science and Nutrition), M.Sc.(Food Technology), B.Com.(Hons.), BBM, MFM, BA/BA(Hons.) /B.Sc. (Hons.) in Economics, M.A. (Economics), B.A. (Optional English), and M.A. (English Language and Literature).
- Regulations changes were proposed by the following departments: Mathematics and Computer Science, Home Science and Economics

1.5 Any new Department/Centre introduced during the year. If yes, give details.

Nil

Criterion – II

2. Teaching, Learning and Evaluation

2.1 Total No. of permanent faculty

Total	Asst. Professors	Associate Professors	Professors	Others
155	84	33	25	16

2.2 No. of permanent faculty with Ph.D.

94

2.3 No. of Faculty Positions Recruited (R) and Vacant (V) during the year

Asst. Professors		Associate Professors		Professors		Others		Total	
R	V	R	V	R	V	R	V	R	V
11	-	1	-	1	-	-	-	13	-

2.4 No. of Guest and Visiting faculty and Temporary faculty

0

162

-

2.5 Faculty participation in conferences and symposia:

No. of Faculty	International level	National level	State level
Attended	3	1	
Presented papers	1	3	
Resource Persons	1	4	

2.6 Innovative processes adopted by the institution in Teaching and Learning:

THE CORE PURPOSE OF THE UNIVERSITY IS:

- To impart true, ideal education, and mould students as ideal citizens wedded to the service of society.
- To provide the youth with an education which, while cultivating their intelligence, will also purify their impulses and emotions and equip them with the physical and mental disciplines needed for drawing upon the springs of calmness and joy that lie in their own hearts.
- To help students to cultivate self-knowledge and self-confidence, so that each one can learn self-sacrifice and earn self-realization.
- To blossom students as true representatives of *Bharatiya Samskriti*- Indian Culture, spreading tolerance, charity and brotherhood throughout the World.

- To equip students for the role of future leaders of India, as persons of integrity and character, as embodiments of truth, justice (righteousness), peace and love; and to confer on them the courage to stand up against injustice, indiscipline, immorality and falsehood. Elaborating the purpose and philosophy of the University, the Revered Founder Chancellor says, *“This Institute has not been established just to prepare you for earning degrees...Teaching you the University curricula, preparing you for the university examinations, and awarding you university degrees – these are only means employed for the end, namely – spiritual uplift, Self-discovery and social service through love and detachment. Our objective is to provide the youth with an education, which while cultivating their intelligence will also purify their impulses and emotions, and equip them with the physical and mental disciplines needed for drawing upon the springs of calmness and joy that lie within their own hearts. Our hope is that by their lives, they will be shining examples of spiritual awareness and its beneficial consequences to the individual and society.”*
- The University operationalizes its goals and objectives through the Sri Sathya Sai System of Values-based Integral Education.
- The Sri Sathya Sai values-based integral education system aims to seamlessly blend high academic standards along with the inculcation of basic human values in its students. This university is a modern *Gurukula*, a place where teachers and students live and grow together in love and wisdom.
- To help achieve this, the university has a compulsory residential policy whereby all students (at all campuses) reside in a hostel during the entirety of their stay at SSSIHL. The teacher-student interaction goes beyond just the classroom and occurs in the backdrop of the process of integral education that includes the five dimensions: Intellectual, Cultural, Physical, Service and Devotional.
- Adherence to discipline and appropriate behaviour are two important aspects that encompass these interactions. The five human values of truth, right conduct, peace, love and non-violence form the undercurrent of all the dimensions of integral education.
- The inputs on all these dimensions along with the unique ambience of the modern *Gurukula* brings to the fore the goodness that is latent in the teacher and the taught. Following this way of life on a day-to-day basis, channelizes the energies of students and helps to develop a wholesome and balanced personality – one where academic competence is supplemented with good character, noble attitudes and values, social sensitivity and spiritual awareness.

Apart from Integral Education following are the innovative activities w.r.t. teaching and learning:

- With the help of Multimedia Learning Centre established in all the campuses of the University the video conferencing facility is widely used for teaching and conducting workshops/conferences etc.
- English Language Lab has been established in all the Campuses

Students learn to work as part of a Team and independently: (i) Community living: The University has a residential nature of living where every student feels a home away from home. The motto of the hostel living is “where each lives for the other and all live for God”. The community living inculcates in students the ability to strive for personal excellence along with the ability to effectively work in a team. Students acquire the virtues of adaptability, team-work, empathy, self-reliance and self-confidence. The maintenance of hostel is done entirely by the students with the guidance of residential teachers such as plumbing, gardening, electrical works, cooking, health services etc. (ii) Grama Seva (Village Service) (iii) Students participation in different cultural and sports activities.

Numerical Skills: The Department of Mathematics and Computer Science regularly organizes workshops and seminars to promote numerical skills. Students contribute various articles in one of the e-journal created by the department. Special coaching is imparted to students of to hone their numerical skills to appear for the various competitive examinations.

Communication Skills: The Language Lab (all the four campuses of the University) ensures every student acquires good communication skills at the Undergraduate level. Students are regularly exposed to Seminars, talks, debates, elocution, dramatics, public speak on different occasions. The dormitory style of living at hostel promotes communication skills as students from various backgrounds stay together.

Group Dynamics in living and Empathy in Life skills: It is compulsory for all students to stay in the hostel to ensure that they follow a disciplined pattern of activities, learn to live together with mutual respect and concern for each other, develop skills to manage the hostel with minimum number of paid employees and benefit from each other in terms of their academic and other pursuits. Since a fairly large number of younger faculty members also stay in the hostel, students do receive considerable guidance with regard to their curricular, co-curricular and extra-curricular activities.

Students are engaged with following items to improve their skills and enhance community living with a sense of brotherhood.

- Promotion of Music
- Spirit of respect for all religions by emphasizing aspects relating to service to society and essence of pure Love.
- Dramatics
- Public speaking
- Dare-devil sports
- Various kinds of games
- Playing the band
- Organizing cultural pageants, etc.
- Multimedia facilities
- Video and audio equipment facilities
- Medical facilities
- Mutual Self Service

The students also participate in:

- Cleaning & upkeep of the hostel
- Assisting in Dining Hall and Medical Dispensary.
- Co-operative stores, maintaining the kitchen garden, etc.
- Looking after the sick in the sick room of the hostel.
- Building art settings, etc., for sports and other festivals.
- Serving in Mandir during Festivals.

The students who pass out will acquire the above skills which will be of immense use in their daily life and societal living.

Team building and Leadership skills: Throughout the academic year, at each campus of SSSIHL, students participate in a host of cultural activities. Examples of these include:

- Music, devotional singing, dance, drama, quiz, panel discussion and elocution
- Competitions in Vedam chanting, Stotram recitation, teachings of the Bhagavad Gita (to promote among students a deep understanding and appreciation of India's rich and ancient culture and spiritual heritage)

- Painting, sketching/drawing, card making, bookmark-making and preparation of useful articles out of waste
- Participation by students is dependent on a student's level of skill or interest.
- With so many cultural activities throughout the year, everyone gets a chance to get involved.

For example, during dramas and the preparation leading to dramas, a number of students are involved in music, sets, lighting, costumes, makeup, etc. - all of which hone their team-building and leadership skills in organizing such functions.

Students are also encouraged to come forward and speak in front of the university community on topics ranging from science to metaphysics, thus giving them an appropriate platform to develop their public speaking skills and to refine their thought process.

Capacity to Learn and oratorical skills: The Sri Sathya Sai System of Integral Education of residential in nature moulds students to develop into self-reliant wholesome personalities as at the classroom and the hostel. The curricular and co-curricular activities are designed to make every student stand on par with others in the society and also be imbued with human values and a spiritual foundation.

There are Awareness courses offered at all undergraduate and postgraduate programmes. The Awareness classes at the Postgraduate level are more of participatory nature, where considerable emphasis is laid on looking at ways of resolving issues and dilemmas of inter-personal and social relevance. The students are encouraged to organize Quiz, Seminars, Skits, etc. having cultural, ethical and moral slant. These sessions provide them with enough practice to gain excellence in oratorical skills, quizzing, and histrionics.

Use of Information Technology: The University curriculum gives opportunity for students to learn Computer Skills in learning languages, OS, hardware, design and algorithms, circuit design, high-performance computing, speech recognition, statistical analysis etc., at various levels of study.

Experiential skills: The department of Physics makes students to do mini Projects in circuit design, communication tools, electronic gadgets etc which enthuse them to think ahead and ignite innovative ideas. The department of Education makes teacher education students to make Value based lesson plans and bulletin boards which promotes awareness and creative skills. The education in Human values programme aims at the development of an integrated personality of the students. All the activities and experiences to which students are exposed either in the classroom, outside the classroom, on the play field, in the laboratory and the library are value oriented. On the bulletin board a value-oriented quotation is written by the students as Thought for the day or week. Students are divided into groups' house wise and each group prepares charts and posters on value themes or themes of social relevance. This activity develops their aesthetic sense and creativity. The value of team spirit, cooperation, initiative and discipline are imbibed by the students.

2.7 Total No. of actual teaching days during this academic year 195

2.8 Examination/ Evaluation Reforms initiated by the Institution (for example: Open Book Examination, Bar Coding, Double Valuation, Photocopy, Online Multiple Choice Questions) Double Valuation

2.9 No. of faculty members involved in curriculum restructuring/revision/syllabus development as member of Board of Study/Faculty/Curriculum Development workshop/Academic Council All

2.10 Average percentage of attendance of students

85 to 99%

2.11 Course/Programme wise distribution of pass percentage:

Title of the Programme	Total no. of students appeared	Division				
		Distinction %	I %	II %	III %	Pass %
Ph.D	5					100
M.Phil.	7					100
M.B.A	27	29.62	51.85	18.51		100
M.B.A in Finance	20	45	55			100
M.Tech. in Computer Science	17	100				100
M.Tech. in Applied Optics	8	100				100
M.Sc. in Mathematics	12	100				100
M.Sc. in Physics	13	100				100
M.Sc. in Nanoscience and Nanotechnology	4	100				
M.Sc. in Chemistry	16	87.50		6.25		93.75
M.Sc. in Biosciences	15	100				100
M.Sc.(Food Science and Nutrition)	5	80	20			100
M.Sc.(Food Technology)	6	66.66	33.34			100
M.A. in English Language & Literature	6	16.67	83.33			100
M.A. in Telugu Language & Literature	2	50	50			100
M.A. in Economics	8	75	25			100
B.A.	25	24	68	8		100
B.A.(Hons) Economics	5	20	80			100
B.Sc. (Hons.) Economics	5	20	80			100

B.Sc. Home Science	5	40	60			100
B.Sc. (Hons.) Biosciences	24	65.66	27.16	3.18		96
B.Sc. (Hons.) Chemistry	12	75	25			100
B.Sc. (Hons.) Mathematics	34	47.05	35.29	11.76		100
B.Sc. (Hons.) Physics	24	66.66	29.16	4.16		100
B.Com.(Hons.)	79	27.11	54.69	12.18		96
B.Ed.	12	75	16.66	8.33		100

2.12 How does IQAC Contribute/Monitor/Evaluate the Teaching & Learning processes:

Through departmental committees held at every month, Research Advisory Board, Academic Council meetings, Examination Committee, and performance of students results, performance of students at national level exams etc.

2.13 Initiatives undertaken towards faculty development

<i>Faculty / Staff Development Programmes</i>	<i>Number of faculty benefitted</i>
Refresher courses	
UGC – Faculty Improvement Programme	
HRD programmes	
Orientation programmes	
Faculty exchange programme	
Staff training conducted by the university	All via Annual Faculty Development Programme
Staff training conducted by other institutions	
Summer / Winter schools, Workshops, etc.	All
Others	

2.14 Details of Administrative and Technical staff

Category	Number of Permanent Employees	Number of Vacant Positions	Number of permanent positions filled during the Year	Number of positions filled temporarily
Administrative Staff	58	0	0	0
Technical Staff	5	0	0	0

Criterion – III

3. Research, Consultancy and Extension

3.1 Initiatives of the IQAC in Sensitizing/Promoting Research Climate in the institution

The “*Sai Krishna Award for excellence in research and teaching*” has been instituted to recognize the prominent researchers and teachers at the Sri Sathya Sai Institute of Higher Learning each year. This award is given for excellence in Research for a given year and for excellence in teaching the next year and so on, alternately.

The research awards are given for excellence in research in three categories viz., **a. Sciences b. Management, Commerce, Economics and Education c. Languages and Philosophy.**

The teaching awards are given, one for each campus of the University.

The Research Advisory Board of the University monitors and gives inputs to faculty in Research, Consultancy and Extension.

3.2 Details regarding major projects

	Completed	Ongoing	Sanctioned	Submitted
Number	1	12	6	4
Outlay in Rs. Lakhs	8.13	811.91	142.69	

3.3 Details regarding minor projects

	Completed	Ongoing	Sanctioned	Submitted
Number			1	0
Outlay in Rs. Lakhs			1.91	

3.4 Details on research publications

	International	National	Others
Peer Review Journals	16	65	20
Non-Peer Review Journals			
e-Journals			
Conference proceedings	54	58	

3.5 Details on Impact factor of publications:

Range Average h-index Nos. in SCOPUS

Not available

3.6 Research funds sanctioned and received from various funding agencies, industry and other organisations

Nature of the Project	Duration Year	Name of the funding Agency	Total grant Sanctioned (Rs. in lakhs)	Received (Rs. in lakhs)
Major projects	3	DRDO ER & IP, Delhi, India	48.76	447
	3	Zentron Labs Bangalore	10	
	3	DRDO (ER and IPR)	24.84	
	3	ISRO-RESPOND	17.7	
	3	DRDO	41.4	
	1	UGC	20	
	5	DST	189	
	3	DST	162	
	3	DAE-BRNS	70	
	3	VGST, DST, Govt. Karnataka	30	
	2	DST	29.12	
	3	DRDO	24.84	
	3	DAE-BRNS	24.49	
	3	UGC-DAE-CSR	8.13	
	5	DST INSPIRE Faculty Award	35	
	3	Department of Biotechnology	39	
	5	Department of Biotechnology	77	
	3	DST	12	
2	UGC-Start up grant	6		
5	UGC SAP DRS LEVEL II	71.85		
2	DST-SERB	19.8		
2	UGC	2		
Minor Projects	3	NBHM/DAE	1.91	1.91
Interdisciplinary Projects				
Industry sponsored				
Projects sponsored by the University/ College				
Students research projects <i>(other than compulsory by the University)</i>				
Any other(Specify)				
Total				448.91

PS: More details can be referred in Institute website www.sssihi.edu.in under the URL <http://sssihi.edu.in/sssuniversity/ResourcesHelp/Publications.aspx> (Page nos. 52, 55, 58-76 of the Annual Report 2013-14))

3.7 No. of books published i) With ISBN No. Chapters in Edited Books

ii) Without ISBN No.

3.8 No. of University Departments receiving funds from

UGC-SAP CAS DST-FIST
 DPE DBT Scheme/funds

3.9 For colleges

Autonomy CPE DBT Star Scheme
 INSPIRE CE Any Other (specify)

Not applicable

3.10 Revenue generated through consultancy

Nil. As a matter of policy, the innovations are conceived as contributions of knowledge for the benefit of the society. The Institute provides education at all levels and in all disciplines TOTALLY FREE OF COST. And hence the outcomes of any innovation is also made available for all those who can benefit from them, without any charge. The innovations are focused on the regional and socio-economic needs in the neighbourhood areas of the Campuses and also on the needs of the state(s). They are not pursued with the objective of commercial exploitation.

3.11 No. of conferences organized by the Institution

Level	International	National	State	University	College
Number		1 *		1**	
Sponsoring agencies		SSSIHL		SSSIHL	

* Indian Economy- Perspectives and Challenges

** Integrated Chemistry Conference

PS: Conferences/Seminars etc conducted are given in the Annual Report Page nos.46 to 49 which is given in the website under the URL

<http://sssihl.edu.in/sssuniversity/ResourcesHelp/Publications.aspx>

3.12 No. of faculty served as experts, chairpersons or resource persons- 12

3.13 No. of collaborations International National Any other

3.14 No. of linkages created during this year

Ref: Annual Report Page Nos.58 to 86 given in the website under the URL

<http://sssihl.edu.in/sssuniversity/ResourcesHelp/Publications.aspx>

3.15 Total budget for research for current year in lakhs:

From Funding agency From Management of University/College
 Total

3.16 No. of patents received this year

Type of Patent		Number
National	Applied	0
	Granted	0
International	Applied	0
	Granted	0
Commercialised	Applied	0
	Granted	0

3.17 No. of research awards/ recognitions received by faculty and research fellows
 Of the institute in the year

Total	International	National	State	University	Dist	College
4		1		3	NA	NA

Ref: Annual Report Page No.42, 132 & 155

3.18 No. of faculty from the Institution who are Ph. D. Guides
 and students registered under them

3.19 No. of Ph.D. awarded by faculty from the Institution

3.20 No. of Research scholars receiving the Fellowships (Newly enrolled + existing ones)

JRF SRF Project Fellows Any other*

* NET, GATE , CSIR , AP-SLET, DRDO Fellowship

3.21 No. of students Participated in NSS events:

University level State level
 National level International level

3.22 No. of students participated in NCC events:

University level State level
 National level International level

3.23 No. of Awards won in NSS:

University level State level
 National level International level

3.24 No. of Awards won in NCC:

University level State level
National level International level

Note: The Sri Sathya Sai System of Integral Education that has been developed and is being followed at this University has a packed schedule that includes academics and participation in various curricular and co-curricular activities throughout the year that include Sports and Games, participation in cultural activities (music, dramatics, etc.), Social Service (Grama seva) etc. The University aims at producing students who are academically sound, socially responsible and spiritually aware. The way of life at this University leaves little time available for students to participate in external activities and holistically provides the necessary foundations to produce good citizens.

The University thus does not desire to participate in National University games, NSS, NCC etc.

3.25 No. of Extension activities organized

University forum * College forum**
NCC NSS Any other

* Grama Seva

** Every campus conducts their own extension activities like river cleaning up, leper colony service, poor feeding, village adoption programmes etc.

3.26. Major Activities during the year in the sphere of extension activities and Institutional Social Responsibility

- GRAMA SEVA / VILLAGE SERVICE

Manava Seva is Madhava Seva (Service to man is service to God).
Bhagawan Sri Sathya Sai Baba, Revered Founder Chancellor

For 1200+ young University students (and their teachers), nine days of their academic year is spent in the service of village folks from over 150 villages in one of the most poverty-stricken districts in India. This includes distribution of food packets, clothes and other items, along with devotional singing, in a manner that carries a message of hope.

The entire project - the planning, resourcing, organizing and implementation - is largely managed by the University students and teachers from start to finish. Women students spend most of the night packing tens of thousands of food packets. The Men students spend the better part of each day going to individual homes in each village to personally serve this prasadam to the villagers for ten continuous days.

Why is this part of the University curriculum?

The Revered Founder Chancellor, when initiating this project in the year 2000, stressed that the greatest beneficiaries of this are not the villagers, but to the students and teachers, who not only realize the current state of affairs of the less fortunate (and are humbled in the process), but also get

inspired to live their lives along a higher ideal. As He often said, education is for life and not merely for a living.

GRAMA SEVA 2014

No. of People Served	3,00,000	Food packets distributed	285,250
Villages Covered	153	Dhotis distributed	44,255
Students involved	1321	Sarees distributed	46,885
Teachers involved	160		
Sevadals (volunteers)	450		
Vehicles & drivers	52		

The Anantapur Campus faculty of the departments of Bioscience and Home Sciences visit the neighbouring areas to advice women and others about health and cultivation. This enhances the development of appropriate fruit and vegetable preservation technologies for providing avenues for self-employment to rural women. They also taught the newer packaging technologies for rural level product developments (2007 onwards)

- This UGC projects viz. ‘Food and nutraceutical applications of *Aloe Vera* gel’ & ‘Impact of gamma irradiation on shelf life extension of selected fruits and vegetables grown in Anantapur District’ (2012-14) which have social relevance in the development of therapeutic food products that are beneficial especially to diabetics as a natural alternative therapy; and have commercial application of radiation technology for the preservation of fruits and vegetables and is very useful technology to farmers, exporters and consumers respectively.
- Adoption of a lepers colony of 25 families near the town of Anantapur for the last twenty five years where the students render service once in a month taking care of various dimensions of health and hygiene, education, social issues, self-sufficiency etc.
- Students under the able guidance of the teachers, participate regularly in ‘Village Integrated Programmes’ and take up service activities namely providing smokeless *chulhas*, solar bottle bulbs, painting the school and houses, enacting street plays on social and health issues, sanitation etc.
- Students and staff of the institute are regular donors of blood to the blood banks of the two Super Speciality Hospitals in Prasanthi Nilayam and Bangalore.

The following activities are being undertaken by the alumni under the aegis of Sri Sathya Sai Institute of Higher Learning-

- Regular medical camps are conducted all over the globe where treatment and medicines are given totally free of cost. Narayan Seva- mass feeding is also a part of these camps.
- Establishing and running of 2 children’s homes and 3 schools in different parts of the country imparting value education free of cost to underprivileged children.
- An ongoing tree plantation initiative in the three mandals in and around Puttaparthi for the last 7 years in which a total of 32,000 plants have been planted till date out of which 5000 are coconut plants.
- Distribution of blankets and warm clothing to the less fortunate in major cities all over the country every year, at the onset of winter.

Criterion – IV

4. Infrastructure and Learning Resources

4.1 Details of increase in infrastructure facilities:

Facilities	Existing	Newly created	Source of Fund	Total
Campus area	**		##	
Class rooms	154	24 &&	UGC and SSSCT	178
Laboratories	35			35
Seminar Halls	5			5
No. of important equipments purchased (\geq 1-0 lakh) during the current year.		24	###	
Value of the equipment purchased during the year (Rs. in Lakhs)		372.83		
Others		\$\$		

&& Another new building is being ready for operation by Nov. 2014. This 44,000 sq. ft. Extension Building (ground plus two floors) will house 24 classrooms (including 6 smart classrooms), a 250-seat conference facility, computer center, and staff rooms along with an enclosed quadrangle of around 3,500 sq. ft.

Sri Sathya Sai Central Trust, UGC

UGC and other agencies like DRDO, DST etc...

\$\$ 1) Hostel Extension buildings were augmented at Prasanthi Nilayam Campus and Anantapur Campuses.

2) DST-FIST: FIST (Fund for Improvement of Science & Teaching Infrastructure)

The Scheme is intended to provide basic infrastructure and enabling facilities for promoting R&D activities in new and emerging areas and attracting fresh talents in universities. The Scheme will provide optimal infrastructure facilities for post-graduate teaching and research, such as, renovation of existing laboratory space, modernization of laboratories involved in PG teaching and research, acquisition of essential equipment, networking & computational facilities including software & databases, maintenance & refurbishing of existing and new facilities. The facilities provided under the FIST Program are intended to support the efforts of faculty members in the Department.

** **Total Area:** The Sri Sathya Sai Institute of Higher Learning (Deemed to be University) comprises three Campuses viz.,

- 1) Prasanthi Nilayam Campus for men at Prasanthi Nilayam, Anantapur District, Andhra Pradesh
- 2) Anantapur Campus for women at Anantapur, Anantapur District, Andhra Pradesh
- 3) Brindavan Campus for men at Kadugodi, Whitefield, Bangalore, Karnataka and
- 4) Muddenahalli Campus for men at Muddenahalli, Chickballapur district, Karnataka

[Total area in acres]

- 1) Prasanthi Nilayam Campus for men = 20.53 acres
(Academic area=5.20 acres + Playground=7.71 acres + Planetarium=2.13 acres + Stadium=5.49 acres)
- 2) Anantapur Campus for women = 82.6 acres
- 3) Brindavan Campus for men = 35.55 acres
- 4) Muddenahalli Campus for men at Muddenahalli, Chickballapur district, Karnataka (in 8.10 acres)

Total Constructed area: [In sq m]

- 1) Prasanthi Nilayam Campus for men = 52,344.381 sq.m.
(Main building= 44,638 sq.m, Annexe = 27,676.6 sq.mt. (44,000 sq. ft.). + (Humanities building=1,744 sq.m). + (Library=5,018 sq.m). + (Green house=215 sq.m) + (Planetarium = 729.381 sq.m.)
- 2) Anantapur Campus for women = 20,018 sq.m. (3 buildings)
- 3) Brindavan Campus for men = 29,874 sq.m. (2 buildings)
- 4) Muddenahalli Campus for men = 53,600 sq.ft. in 8.10 acres

University Administrative building = 4025 sq.m. in 2.25 acres

Note: Another new building is being contemplated and will be made ready by Nov. 2014. This 44,000 sq. ft. Extension Building (ground plus two floors) will house 24 classrooms (including 6 smart classrooms), a 250-seat conference facility, computer center, and staff rooms along with an enclosed quadrangle of around 3,500 sq. ft.

4.2 Computerization of administration and library

University Management System (UMS) has been initiated in the year 2011-12. Examination's tabulations marks and grades are computerized. The other modules such as Accounting and Finance, Hostel maintenance, administration, Back-office, etc., are being developed.

4.3 Library services:

	Existing		Newly added		Total	
	No.	Value	No.	Value	No.	Value
Text Books	134415	4699767	1792	1077171		
Reference Books	3657	435782	48	13304		
e-Books	--	--	--	--	--	--
Journals	187	248518	13	18556		
e-Journals *	--	--	--	--	--	--
Digital Database	EBSCO, SCI.FINDER	2027872			EBSCO, SCI.FINDER	2027872
CD & Video	700	--	--	--	700	--
Others (specify)	--	--	--	--	--	--

Note: * E-journals- The Central Library of the University is fully networked with INFLIBNET/INFONET with VSAT connectivity with extension of network to other departments initially by the UGC. The UGC INFONET - WAN networks all the universities in India. EBSCO & Scifinder: More importantly it offers a consortia subscription to the online content of many important periodicals relevant to the research community. The package includes access to a bouquet of around 10,000 journals covering all disciplines. The new addition of EBSCO collection and databases and Science finder are also available in the University.

All these Journals are available to all the students and staff over our University campus network. These Journals cover various teaching and research disciplines actively pursued by the departments.

4.4 Technology up gradation (overall)

	Total Computers	Computer Labs	Internet	Browsing Centres	Computer Centres	Office	Departments	Others
Existing	564	309	All the computers in the institute have internet browsing facility		--	44	440	45
Added	274							
Total	838							

4.5 Computer, Internet access, training to teachers and students and any other programme for technology upgradation (Networking, e-Governance etc.)

The University has provided Laptops for all the Research Scholars, and PC for teachers. The University has established Multimedia Learning Centre and English Language Labs at Prasanthi Nilayam, Anantapur and Brindavan Campuses to cater to the needs of video-conferencing. The University is in the process of establishing Multimedia Learning Centre and English Language Lab at Muddenahalli Campus too. All the Campuses are centrally provided with the Computer Centres. The computer-student ratio is 2.5 : 1 (1259:492).

Central Library=5,018 sq.m

E-journals- EBSCO & Scifinder: The Central Library of the University is fully networked with INFLIBNET/INFONET with broad band VSAT connectivity with extension of network to other departments initially by the UGC. The UGC INFONET - WAN networks all the universities in India. More importantly it offers a consortia subscription to the online content of many important periodicals relevant to the research community. The package includes access to a bouquet of around 10,000 journals covering all disciplines.

We have a well-established Computer Centres at the Prasanthi Nilayam Campus which are fully networked. The Central Library is also networked with INFLIBNET/INFONET with 1 Gbps NKN/NMEICT connectivity and the internet connectivity is 100Mbps.

This facility has been extended to other campuses as well by a mpls connection cloud with 2 mbps spoke connections to each offsite campus. Using the NKN connection we have access to around 7000 journals and databases provided by the inflibnet. The same network also helps us access other online resources subscribed by us like EBSCO (1200 journals mainly from management stream), scifinder, capitaline corporate database.

All these Journals are available to all the students and staff over our university campus network. These Journals cover various teaching and research disciplines actively pursued by the departments.

4.6 Amount spent on maintenance in lakhs :

i) ICT	9.11
ii) Campus Infrastructure and facilities	14.51
iii) Equipments	4.81
iv) Others	0.09
Total :	28.52

Criterion – V

5. Student Support and Progression

5.1 Contribution of IQAC in enhancing awareness about Student Support Services

The core competence of the university is the development of multi-skills and multi-tasking among students and teachers. There is no separate dedicated maintenance department within the university to look after the Maintenance of various equipment, amenities, and facilities available in the university, which is done mostly by students. Students who live in the hostel have self-reliance departments (mechanical, electrical, plumbing, photo-copying, computers, multi-media-centre, publications, medical and health care, landscaping which work under the overall coordination of hostel resident teachers and warden. The university involves all its students and teachers during the annual Gram Seva, and the Annual Sports and Cultural Meet, wherein all the students under the active guidance of teachers conceive the plans, conceptualize the programmes, train the students, prepare the sets and costumes, write the script and dialogues, do the make-up for cultural items, and execute the functions. All this facilitate a great amount of multi-skill-development.

5.2 Efforts made by the institution for tracking the progression

The compulsory residential hostel system wherein all the students and some of the younger faculty members stay, lends the possibility for the university to mold their character on lines of the university vision and mission statement – deliver the finished unique brands capable of delivering the goods for any organization under pressure and amidst cross-currents. It should be understood that such unique brands would not come into existence without many rigorous refinements at various stages. No pain – No gain is the punch line for such rigorous refinement processes. As such it should be mentioned that the students do have to go through systematic refining process – well intended for the welfare of the community, society and nation. Counseling is done by senior students who have gone through the system for more years to junior students on an informal basis and also by the residential hostel teachers who act as wing teachers to those staying in that wing. Counseling also happens in the mentoring sessions besides group counseling in the awareness classes and larger group counseling in Bhagavan's discourses and also at times to some at the physical and non-physical plane.

Mentoring system: Unlike other Universities, where access to teachers (outside of class) is restricted to designated office hours, at SSSIHL, the environment is such that students can approach teachers at various times during the day and can freely discuss both academic issues and personal matters with them - ranging from spirituality to family issues back home - in confidence. As facilitators and mentors, teachers set an example by following the values- based education system as laid out by the Founder Chancellor, Bhagawan Baba.

5.3 (a) Total Number of students	UG	PG	Ph.D.	Others (M.Phil.)
	918	317	63	23

(b) No. of students outside the state (out of 1321)

(c) No. of international students

No	%
832	63

Men

No	%
489	37

Women

Last Year (2012-13)					This Year (2013-14)						
General	SC	ST	OBC	Physically Challenged	Total	General	SC	ST	OBC	Physically Challenged	Total
332	18	27	104		481	346	17	19	84	-	466
Demand ratio: 1 of 5 admitted					Dropout %: 0.05 Admissions						

5.4 Details of student support mechanism for coaching for competitive examinations (If any)

No. of students beneficiaries

5.5 No. of students qualified in these examinations

NET	<input type="text" value="9"/>	SET/SLET	<input type="text" value="1"/>	GATE	<input type="text" value="19"/>	CAT	<input type="text" value=""/>
IAS/IPS etc	<input type="text" value=""/>	State PSC	<input type="text" value=""/>	UPSC	<input type="text" value=""/>	Others *	<input type="text" value="3"/>

* DRDO Fellowship, CSIR, JRF

5.6 Details of student counselling and career guidance

No. of students benefitted

5.7 Details of campus placement – Not Applicable

<i>On campus</i>		<i>Off Campus</i>	
Number of Organizations Visited	Number of Students Participated	Number of Students Placed	Number of Students Placed

As a matter of policy, the Institute does not encourage Campus Interviews. Our Placement Officer has close interaction with Business and Industry and, therefore, many organizations are aware of the University's Philosophy and functioning. They also know of the uniqueness of the

Integral Education system of the University, with its special emphasis on moulding the students into a wholesome and balanced personality, academically Sound and Spiritually Aware. Many organizations, who have employed our students and observed their competence and sense of commitment to basic values, seek out our graduates repeatedly. Most of these graduates are occupying good and rewarding positions in India and abroad and many of them have progressed to very senior levels.

The alumni of the university play an important role in helping graduating students find suitable employment opportunities in their chosen vocation.

They achieve this through an outreach programme called CATALYST (Corporate Aptitude Training – an Arena to Leverage Your Skills and Talents) where graduating students are coached in preparing résumés, the application process, interview techniques, networking and the like. The programme has been very successful.

5.8 Details of gender sensitization programmes

In awareness courses the inputs relating to gender sensitivity are provided.

5.9 Students Activities

5.9.1 No. of students participated in Sports, Games and other events

State/ University level* National level International level

No. of students participated in cultural events

State/ University level* National level International level

*All students participate in the university Annual Sports and Cultural Meet.

Please refer to answer given under 3.24.

Note: Participation in sports, cultural and literary activities is mandatory for all students at all campuses and is indeed an integral part of the learning process. This is remarkably demonstrated by the Annual Sports and Cultural Meet which climaxes from 11th to 15th January every year with athletic and sports competitions and by the high quality of dramas and musical programmes presented to thousands of visitors in the Sai Kulwanth Hall. It may be reiterated that this kind of participation of students in sports, cultural and other activities is rather rare even in the best of our universities.

The infrastructural and other facilities needed for sports and cultural activities available to students and faculty at the SSSIHL are exceptionally good. These include a world class indoor stadium, tennis courts, a well-maintained hill view open stadium including a cricket ground, an excellent gymnasium along with well-equipped sports facilities in each campus.

5.9.2 No. of medals /awards won by students in Sports, Games and other events

Sports: State/ University level National level International level

Cultural: State/ University level National level International level

5.10 Scholarships and Financial Support

	Number of students	Amount
Financial support from institution	All*	
Financial support from government	0	0
Financial support from other sources	0	0
Number of students who received International/ National recognitions		

* Education is provided totally free of cost to all the students of the university following the philosophy of Revered Founder Chancellor.

5.11 Student organised / initiatives

Fairs : State/ University level National level International level

Exhibition: State/ University level National level International level

5.12 No. of social initiatives undertaken by the students

Please see answer given under 3.26 above

5.13 Major grievances of students (if any) redressed: _____Nil_____

Criterion – VI

6. Governance, Leadership and Management

6.1 State the Vision and Mission of the institution

THE VISION

To assist generations of students acquire Self-knowledge (*Atma Vidya*) and Self-confidence (*Atma Vishwas*), so as to cultivate Self-sacrifice and earn Self-realisation; thereby moulding them into leaders who will benefit society.

THE MISSION

To mould well-rounded holistic individuals – professionally sound, socially responsible and spiritually aware – who embody noble values and a right attitude, through Educare (*Integral Education based on Human Values*) that caters to the physical, intellectual, emotional, psychological and spiritual dimensions of the human personality.

THE UNDERLYING PHILOSOPHY

The Sai educational institutions have been established not merely to enable students to earn a living but to make them acquire good traits, lead ideal lives, and give them ethical, moral and spiritual strength. I have established them with a view to inculcate love and teach good qualities to students. They will learn here humility, discipline and faith.

I have established these institutions to impart spiritual education as a main component and worldly education as a secondary one. Education should enable one to cultivate good qualities, character and devotion. The teaching of the university curricula is only the means employed for the end, namely, spiritual uplift, self-discovery and social service through love and detachment.

This will be a Gurukula - a place where teachers and taught will grow together in love and wisdom - and like the ancient system of education, it will develop in its students a broad outlook and promote virtues and morals, which serve to foster noble ideals in society.

This Institute will be a temple of learning where youth are shaped into self-reliant, contented and enterprising heroes of action and self-sacrifice, for the purpose of serving humanity.

Sri Sathya Sai Baba
Revered Founder Chancellor

THE CORE PURPOSE OF THE UNIVERSITY IS:

- To impart true, ideal education, and mould students as ideal citizens wedded to the service of society.
- To provide the youth with an education which, while cultivating their intelligence, will also purify their impulses and emotions and equip them with the physical and mental disciplines needed for drawing upon the springs of calmness and joy that lie in their own hearts.
- To help students to cultivate self-knowledge and self-confidence, so that each one can learn self-sacrifice and earn self-realisation.
- To blossom students as true representatives of Bharatiya Samskriti, spreading tolerance, charity and brotherhood throughout the World.

- To equip students for the role of future leaders of India, as persons of integrity and character, as embodiments of truth, justice (righteousness), peace and love; and to confer on them the courage to stand up against injustice, indiscipline, immorality and falsehood.

Elaborating the purpose and philosophy of the University, the Revered Founder Chancellor says, *“This Institute has not been established just to prepare you for earning degrees...Teaching you the University curricula, preparing you for the university examinations, and awarding you university degrees – these are only means employed for the end, namely – spiritual uplift, Self-discovery and social service through love and detachment. Our objective is to provide the youth with an education, which while cultivating their intelligence will also purify their impulses and emotions, and equip them with the physical and mental disciplines needed for drawing upon the springs of calmness and joy that lie within their own hearts. Our hope is that by their lives, they will be shining examples of spiritual awareness and its beneficial consequences to the individual and society.”*

6.2 Does the Institution has a management Information System

Yes. The University is in the process of implementing a computer based University-wide Management System (UMS) that include modules for managing the Examination Section, Admissions, University Administration, Hostel etc.

6.3 Quality improvement strategies adopted by the institution for each of the following:

6.3.1 Curriculum Development

To supplement the conventional classroom chalk-talk method, the following avenues are created by the University for effective learning of the subject by the students.

- a) Class projects for students to extend and reinforce understanding of the concepts taught in the class.
- b) Dissertation/Project Work is compulsory for all the postgraduate/professional courses in their final year curriculum. This trains the students to develop the capacity to analyze large amounts of data and draw conclusions. It also cultivates the ability to clearly define a research problem and choose an appropriate research methodology to address the research problem.
- c) Industrial tours/corporate visits are organized in all the professional programmes to complement classroom teaching. These are usually organized at the end of the first year during the summer holidays. The objective of the industry visit is to enable the student to see the relevance of the concepts studied and expose them to different/emerging technologies. These visits also give them opportunities to interact with technical experts and carry out their final year projects in the areas of current interest to the Industry. It also builds a bridge between academia and industry.

- d) Class projects for students to extend and reinforce understanding of the concepts taught in the class.
- e) Dissertation/Project Work is compulsory for all the postgraduate/professional courses in their final year curriculum. This trains the students to develop the capacity to analyze large amounts of data and draw conclusions. It also cultivates the ability to clearly define a research problem and choose an appropriate research methodology to address the research problem.
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- g) Each department organizes at least one or two seminars/workshops per year and International Seminar/Workshops periodically in focused Thrust areas of Research. These facilitate the exposure of students to the current research/market trends and equip the students to face the real challenges in the World after they complete Undergraduate and Postgraduate studies.
- h) Internal workshops, special guest lectures are also organized by various departments periodically to make students appreciate industry's perspective to learning.
- i) The final year professional programmes students are allowed to attend and present high quality research papers in national and international conferences organized by other institutions. (Number of M.Tech. students have attended and presented papers and demonstrations in IEEE and Hi-PC Conferences.)
- j) Students are also encouraged to write articles and publish papers based on the Research Work they undertake as part of their course curriculum or otherwise.

6.3.2 Teaching and Learning

FEEDBACK MECHANISM FOR SUSTAINING AND IMPROVING QUALITY IN TEACHING

To improve and maintain teaching quality, the SSSIHL carries out a formal and structured OMR Student Feedback mechanism and the analysis is communicated to individual teachers for their self-introspection and development. An online mechanism of the same has been implemented from winter semester of 2013-14.

6.3.3 Examination and Evaluation

The University has an online process in place for getting information from the faculty regarding their activities and achievements in every academic year. This is called Annual Faculty Evaluation. (ii) To make the student feedback for measuring teaching quality impartial, prudent and confidential an online feedback mechanism is followed. (iii) The whole admissions and examination process is conducted through University Management System (UMS) package. UMS is a well-protected and composite software package initiated by the University. (iv) The University has an intranet e-guru knowledge portal for exchange of valuable information for students and faculty.

All the documents and files related Examination Section are stored as a NAS storage device to ensure strict confidentiality and timely creation of snapshots and backups for retrieval in case of data loss.

Examination Committee monitors and advises administration regarding performance of students and identify weakness if any.

6.3.4 Research and Development

Research Advisory Board and departmental Research Committee gives valuable input to the research faculty and students.

- The faculty members are encouraged to participate in Orientation / Refresher courses conducted by UGC recognized Academic Staff Colleges.
- Teachers are also encouraged by the Institute to attend the International / National Conference, Seminars, Workshops and training Programmes organized by various Universities/Institutions for enhancing their knowledge in Research and Teaching.
- Regular Seminars, Workshops are organized by each department in their chosen contemporary areas of interest.

- All the faculty have access to computers and are encouraged to explore various knowledge data bases. The University has 1Gbps Internet connectivity under the aegis of the National Knowledge Network (NKN), for academic and research pursuits of staff and students. All the campuses of the University are interconnected via 2Mbps leased lines. The University is part of INFONET, E-Journal Consortium. We therefore get access through INFLIBNET to nearly 10,000 online Journals in various disciplines, from fifteen International Publishers. All these Journals are available to all the students and staff over our University campus network. These Journals cover various teaching and research disciplines pursued by the department.
- A weekly interdepartmental Science Colloquium is conducted on Saturdays from 2.45 to 3.45 p.m. The colloquium provides an opportunity for doctoral research scholars and the teaching faculty to share their research experiences with fellow researchers.
- Visiting Scientists, Educationists and Executives from Industry visit the University regularly and interact with faculty members and research scholars thereby, making them aware of recent developments in their respective subject areas.

6.3.5 Library, ICT and physical infrastructure / instrumentation

- Infrastructural facilities are revered as aids of the system by everybody in the university and are used very judiciously with great care and devotion. Any perceived scarcities, shortages, shortfalls, deficiencies, etc though cause some discomfort, uneasiness, and concern however are not viewed as problems but as challenges to be taken in one's own stride and yet accomplish goals without any compromise on quality which symbolises the spirit at work of this university.
- The self-reliance system that is in place in the university to maintain various facilities, amenities, equipment, appliances, and installations in the hostel and the university campus not only makes the maintenance of everything an important activity but also creates the right attitude for students as well as faculty and support staff towards infrastructure to use everything as trustees in the right manner for the right cause. So even if there are any disruptions or breakdowns all people react earnestly in a responsible manner without any confrontational overtones.

- Teaching aids do facilitate effective teaching as well as learning, and all the required facilities like LCD projectors, OHPs, Magnetic White Boards, Smart Class rooms etc are available, but most important thing is, it is borne in mind that they are not substitutes for committed teachers but only aids that help effective teachers and sincere students. They are all used a great deal by both teachers as well as students but bearing in mind their subordinate status before effective teachers.
- Library is one of the finely equipped libraries comparable to the best in a similar category of small university system. The architecture of the building of the Library is similar to that of a temple and its ambience is also akin to that. Library intentionally does not keep any unwanted reading material or those that fall in the grey area. Library in the hard and electronic form is used extensively by teachers as well as students. Library books Purchase Committee decides the quality and need for purchasing books and journals. The central administration decides based on the recommendations of the Committee with Vice-Chancellor as the Chair-Person.
- Women students of the university at its campus in Anantapur are equally good in every respect if parallels have to drawn with either men or women of other educational institutions anywhere in the world. In fact they are acclaimed as a shade better than the mean sample in the contemporary society, in terms of knowledge, skill-sets, dynamism, awareness, and competencies. One should come to the exhibition programme of Annual Sports and Cultural Meet on 11th January and witness when they perform dare devil items on jeeps and sturdy motor-cycles and martial arts besides gracious dances and other forms of traditional Indian art.

6.3.6 Human Resource Management

- It is very special to have somebody of the stature of Bhagavan Sri Sathya Sai Baba as the Founder Chancellor of this university, which may not be possible for normal universities. He says “My life is my message”. Bhagavan’s love, omniscience, omnipotence, and omnipresence and his love of one thousand mothers (characteristic expression used by him) for the students and teachers of his university makes a great deal of difference. As such students, teachers, administrators, support staff, and award staff who have experienced the power of his love would do things of their own volition irrespective of mundane considerations. All people are aware through some personal experience at one time or other that positive and negative actions done would return as positive and negative consequences.

The Divine Vision and will are ultimate which need no revision or review with the passage of time. This all powerful leadership keeps everybody alert and motivates him/her primarily on account of love for him and also enlightened self-interest. This mind-set also causes internal motivation in all people, which facilitates the accomplishment of objectives without any or minimum resistance. So this leadership and the associated style should not be described simply as mere the best practice but possibly termed as the ultimate one. Therefore this university under the able leadership of this unique Founder Chancellor is able to achieve sustainable progress in a silent manner. This ensures that everything the university needs is made available to the concerned campus, department, or individual judiciously and frugally at the right time in the right way, making work-life very challenging always, which however does not unnerve them but makes them more mellowed.

- The university has a diverse management culture. Bhagavan says that “There is only one Caste – The Caste of Humanity”. As Gita says “*Panditah Samadarshinaha*” – which means that scholars (knowledgeable people) view everybody with the same vision and perspective, he visualizes the same divine substance as the fundamental basis in everybody. So all are treated as the children of God and as such the societal discriminations and distinctions do not find a place in day-to-day life transactions and experiences in any campus of the university or other sister institutions. People of all regions, religions, languages, etc mingle with one another as one extended family akin to different limbs and organs of the human body and function in a synergetic way – one coexisting with another with genuine concern, empathy and dynamic balance.
- The university admits the best students from all over the country teaching whom poses a great challenge for teachers. Since necessity is the mother of invention – teachers who are highly qualified with good work experience in the concerned disciplines would leave no stone unturned to update/sharpen their knowledge, information, and skills using all possible avenues and opportunities. Thus the university creates the n-ach for both teachers as well as students who vie with each other to make learning and teaching challenging. Richness of the library equipped with INFLIBNET/INFONET, interaction with the best people in the respective disciplines visiting the university, attending various seminars, workshops, and conferences would provide the opportunities to equip themselves for bigger challenges.
- Senior executives from various organizations where the alumni of the university are working or have worked in the past, provide valuable feedback during their visits to Prasanthi Nilayam regarding them (alumni) and also about the inputs and skills to be provided to the students in future. They also give suggestions regarding curriculum updation.

6.3.7 Faculty and Staff recruitment

Through Selection Committee as prescribed by the UGC under the regulations of Deemed to be Universities, 2010.

6.3.8 Industry Interaction / Collaboration

The research output at the university has seen a significant rise in the past few years. The number of doctoral research scholars has seen a 53% increase in three years from fifty-one in 2011 to seventy-eight in 2014. Research Scholars represent almost 8% of the current student population at SSSIHL, a figure far above the national average. New research collaborations in the Sciences between the university and external institutions like the FDA (USA), as well as collaborations on multiple research projects with the Sri Sathya Sai Institute of Higher Medical Sciences (SSSIHMS) are testimonial to the rise in the quality of research at the university. Grants for ongoing research projects across departments total upwards of Rs.956 lakhs, of which Rs. 447 lakhs is from projects sanctioned in 2013/14.

The university has taken many steps in the past few years in bringing the various disciplines at the university and SSSIHMS together to discuss issues from various perspectives and identify projects that will benefit society. This has led to interdisciplinary collaborations of SSSIHL with SSSIHMS and external agencies in areas such as the rapid detection of endemic diseases, diabetic retinopathy, development of a cost effective multi-modal microscope, regenerative medicine and tissue engineering, etc.

o **Collaboration with external agencies:**

The Dept. of Mathematics & Computer Science has research collaborations with the following organizations:

- o ARM
- o Zentron Labs
- o NVIDIA (We are recognized by NVIDIA as CUDA Teaching and Research Centre)
- o IBM
- o DRDO: ADE
- o ISRO: ADRIN

o FDA Collaboration

The Dept. of Physics along with Dept. of Biosciences have an active collaboration with the Food and Drug Administration (FDA), Bethesda, MD, USA in the area of rapid detection of endemic diseases using Fluorescent Nanomaterials. Prof. K Venkataramaniah, Dept. of Physics, SSSIHL and Dr. B E Pradeep, Dept. of Physics, SSSIHL are collaborating with Dr. Indira Hewlett and Dr. Mohan H, Center for Biologics Evaluation and Research (CBER), FDA in this frontier area of medical diagnostics. Additionally, Sri L A Avinash Chunduri, Doctoral Research Scholar, Dept. of Physics, SSSIHL went for a training program to FDA for a period of three months.

o Lab Engineers Collaboration

The Dept. of Physics has an active collaboration with a Bangalore-based Microscope Manufacturing Company, Lab Engineers (India) in the area of development of a cost effective Multimodal Microscope.

6.3.9 Admission of Students 408

6.4 **Welfare schemes-** Education is imparted completely FREE OF COST in this institute and for those students who are under privileged, the mess charges are also waived. There are proper residential facilities for teachers and non-teaching staff of the institute. Two super specialty hospitals and two general hospitals one each in Prasanthi Nilayam and Bengaluru cater to the health needs of the students, teachers and non-teaching staff of the institute.

6.5 Total corpus fund generated Around Rs. 44 crores

6.6 Whether annual financial audit has been done Yes No

6.7 Whether Academic and Administrative Audit (AAA) has been done?

Audit Type	External		Internal	
	Yes/No	Agency	Yes/No	Authority
Academic	Yes	Constituted by VC		
Administrative	Yes	Constituted by VC		

6.8 Does the University/ Autonomous College declares results within 30 days?

For UG Programmes Yes No
 For PG Programmes Yes No

Note: Double evaluation of scripts takes more than 30 days.

6.9 What efforts are made by the University/ Autonomous College for Examination Reforms?

Examination Reforms Unit sponsored by UGC existed from 1985-1992. The activities of it are being carried on.

6.10 What efforts are made by the University to promote autonomy in the affiliated/constituent colleges?

Not applicable

6.11 Activities and support from the Alumni Association

Please see answer given under 5.2

6.12 Activities and support from the Parent – Teacher Association

Not applicable

6.13 Development programmes for support staff

Career Advancement Scheme promotes teaching and non-teaching staff. Faculty Development Workshop conducted every year in the last week of May. Teachers are encouraged to participate in seminars/workshops/conferences and professional development programmes such as orientation programmes and refresher courses.

6.14 Initiatives taken by the institution to make the campus eco-friendly

All the Campuses have facilities like use of biogas, vermicomposting, use of eco-friendly briquettes for cooking, solar heaters for hot water, water harvesting facility, proper waste disposal. The university also promotes students to take up tree plantation programmes on a regular basis.

Criterion – VII

7. Innovations and Best Practices

7.1 Innovations introduced during this academic year which have created a positive impact on the functioning of the institution. Give details.

Please see answer given under 3.10

7.2 Provide the Action Taken Report (ATR) based on the plan of action decided upon at the beginning of the year

Yes. The statutory committees provides action taken reports.

7.3 Give two Best Practices of the institution (*please see the format in the NAAC Self-study Manuals*)

- 1) Values based Integral Education
- 2) Grama Seva (Village Service)

**Provide the details in annexure (annexure need to be numbered as i, ii, iii)*

Please see Annexure-ii (As specified in the previous AQAR report 2012-13)

7.4 Contribution to environmental awareness / protection

A two credit Environmental Awareness is offered in the first and second semester of all the Undergraduate students. The department of Biosciences offers elective courses in Environment.

7.5 Whether environmental audit was conducted? Yes No

Note: Informal way of environmental audit is done at all the Campuses and Hostels.

7.6 Any other relevant information the institution wishes to add. (for example SWOT Analysis):
Nil

8. **Plans of institution for next year:**

Road Map Ahead:

The quality initiatives SSSIHL needs to take in order to improve and sustain quality in teaching and research were discussed. The points that emerged from this discussion are listed below.

- **Attracting bright Students to the University (ongoing):** It was proposed that measures be taken to increase awareness of this institution among the larger public and communicate the uniqueness of SSSIHL in offering the values-based integral education viz. blending of spiritual values coupled with excellence in academics and research with availability of excellent infrastructure, in order to attract good students to the University.
- **Establishment of an Internal Quality Review Team to meet every semester for quality assurance:** It was proposed to constitute an internal team in each campus of the University to study and discuss all matters pertaining to teaching and research quality and suggest improvements for consideration by the administration.
- **Faculty Training in-House and by deputation to other External Institutions (National and International) (ongoing):** SSSIHL's commitment towards this initiative is already seen via the progress report. A sustained effort will bear fruits in the long run.
- **Well-Structured UG-PG-M.Tech-PhD Programs and augmenting with new programs (ongoing):**
 - Restructuring PG courses based on the above – Ongoing Process. It was proposed to re-look at the Undergraduate and Postgraduate programmes in a comprehensive manner with a view of improving the quality of students and encouraging them to pursue Doctoral Research.
 - Due to introduction of MCA programme, the syllabus of M.Sc. Mathematics and M.Tech.(Computer Science) required a revamp.
- **Alignment of thrust areas of teaching and research with SSSIHL Vision.**
- **Documenting and sharing best practices across Departments for adoption:** It was proposed to initiate a process to document the best practices in each of the department in order that these can be shared university-wide.
 - For example: DMACS has the unique process of appointing a class teacher to address problems of concerns specific to that class in a speedy manner.

- **Focusing on ground-breaking socially relevant research outcomes (ongoing):** This initiative is important to channelize research efforts to result in international recognition.
 - Focused Research in Socially Relevant Areas
 - Research Scholar Admissions
 - Policies of Young Faculty Involvement in Research Supervision
- **Enhancing Industry collaboration in Research (ongoing):** It was suggested to consider the establishment of an industry liaison cell headed by Dean R&D, who could coordinate research activities and liaise with Industry. The Vice Chancellor opined that a suitable administrative structure would be created once the proposed Advanced Research Centre begins operation.

Signature of the Coordinator, IQAC

Name: Prof. V Chandrasekaran

Signature of the Chairperson, IQAC

Name: Prof. J Shashidhara Prasad



Annexure-i



SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING
(Deemed to be University)

Academic Calendar 2013/14

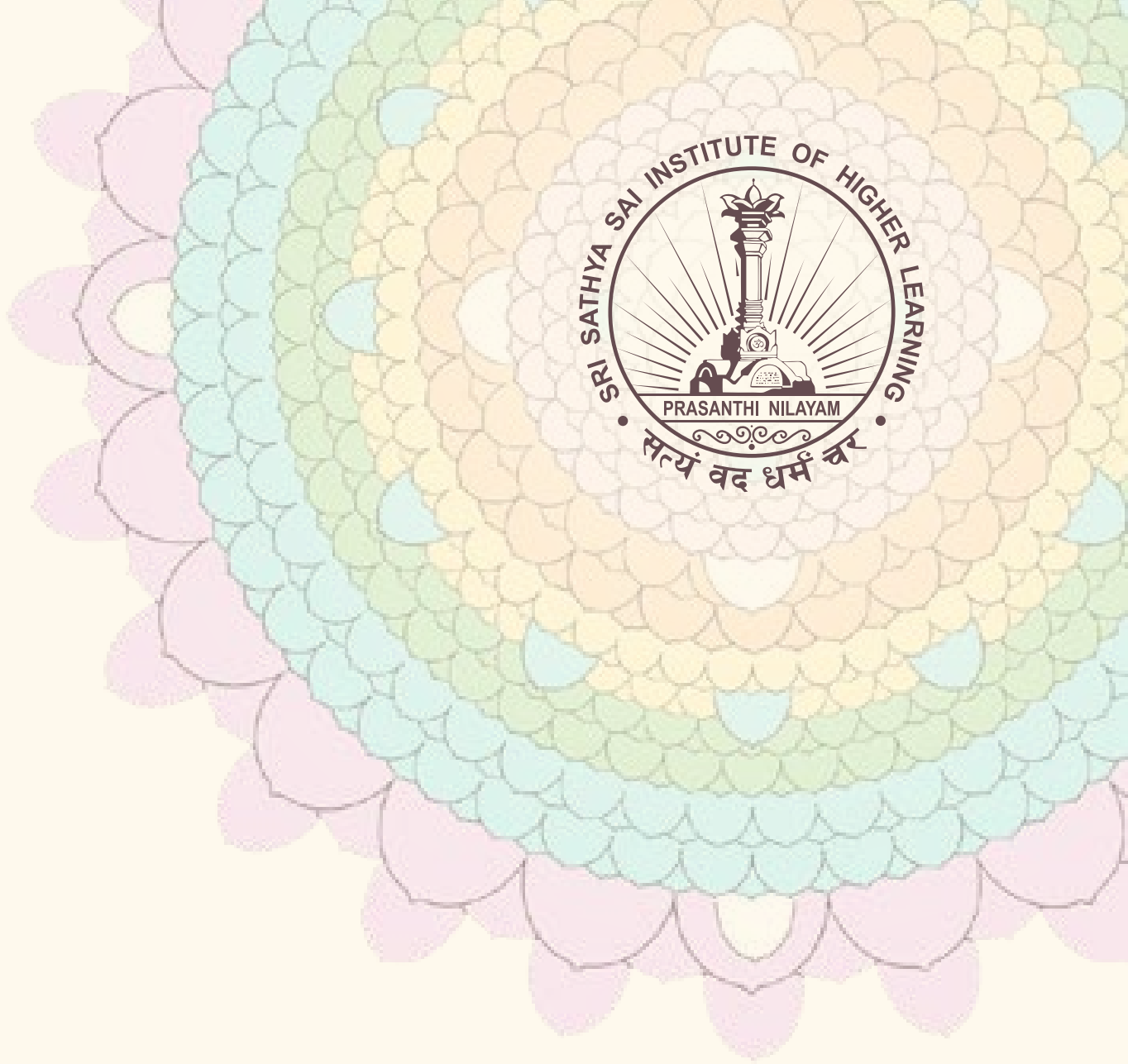
SUMMER SEMESTER		
JUNE		
1	Sat	SUMMER SEMESTER BEGINS
8-10	Sat-Mon	Summer Course in Indian Culture & Spirituality
JULY		
17-20	Wed-Sat	Supplementary End Semester Examinations
22	Mon	<i>Guru Poornima*</i>
AUGUST		
9	Fri	<i>Eid al-Fitr*</i>
15	Thu	<i>Independence Day*</i>
28	Wed	<i>Sri Krishna Janmashtami*</i>
SEPTEMBER		
9	Mon	<i>Ganesh Chaturthi*</i>
21-26	Sat-Thu	Study leave for End Semester Examinations
Sep 27-Oct 3	Fri-Thu	Summer End Semester Examinations: Phase-1
OCTOBER		
2	Wed	<i>Gandhi Jayanthi*</i>
5-14	Sat-Mon	Dasara Celebrations Grama Seva Activities
12	Sat	<i>Durgashtami*</i>
13	Sun	<i>Mahanavami*</i>
14	Mon	<i>Vijayadasami*</i>
15-18	Tue-Fri	Study leave for End Semester Examinations
19-23	Sat-Wed	Summer End Semester Examinations: Phase-2
23	Wed	SUMMER SEMESTER ENDS
24 October - 6 November WINTER VACATION		

* Holidays

Note: The University will remain closed on Sat, 1 March 2014, the day after Mahashivaratri.

WINTER SEMESTER		
NOVEMBER		
3	Sun	<i>Deepavali*</i>
7	Thu	WINTER SEMESTER BEGINS
9-10	Sat-Sun	<i>Akhanda Bhajan</i>
14	Thu	<i>Muharram*</i>
22	Fri	SSSIHL 32 nd Annual Convocation
23	Sat	<i>Bhagawan Baba's 88th Birthday*</i>
DECEMBER		
25	Wed	<i>Christmas*</i>
JANUARY		
1-15	Wed-Wed	Annual Sports & Cultural Meet
13	Mon	<i>Bhogi*</i>
14	Tue	<i>Makarāsankranti*</i>
26	Sun	<i>Republic Day*</i>
FEBRUARY		
19-22	Wed-Sat	Supplementary End Semester Examinations
28	Fri	<i>Mahashivaratri*</i>
MARCH		
26-31	Wed-Mon	Study leave for End Semester Examinations
31	Mon	<i>Ugadi*</i>
APRIL		
8	Tue	<i>Sri Ramanavami*</i>
1-15	Tue-Tue	Winter End Semester Examinations
15	Tue	WINTER SEMESTER ENDS
18	Fri	<i>Good Friday*</i>
24	Thu	Sri Sathya Sai Aradhana Mahotsavam

16 April - 31 May	SUMMER VACATION
17-30 April	SSSIHL Admissions Tests
28-29 May	Annual Workshop for Teachers
Mon, 2 June 2014	Academic Year 2014/15 commences. Students to report on 1 st June.



ANNUAL REPORT

2014



The Underlying Philosophy

The Sai educational institutions have been established not merely to enable students to earn a living but to make them acquire good traits, lead ideal lives, and give them ethical, moral and spiritual strength. I have established them with a view to inculcate love and teach good qualities to students. They will learn here humility, discipline and faith.

I have established these institutions to impart spiritual education as a main component and worldly education as a secondary one. Education should enable one to cultivate good qualities, character and devotion. The teaching of the university curricula is only the means employed for the end, namely, spiritual uplift, self-discovery and social service through love and detachment.

This will be a *gurukula* - a place where teachers and taught will grow together in love and wisdom - and like the ancient system of education, it will develop in its students a broad outlook and promote virtues and morals, which serve to foster noble ideals in society.

This institute will be a temple of learning where youth are shaped into self-reliant, contented and enterprising heroes of action and self-sacrifice, for the purpose of serving humanity.







Vice-Chancellor's Foreword

The Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba defined *Educare* as 'drawing out from within'. The idea is to draw out what is already latent within human beings. The Sri Sathya Sai System of Values-based Integral Education, with equal stress on academics and inculcation of human values, has been envisaged by Bhagawan Baba.

The entire system is based on the *Gurukula* system, where a good number of teachers stay with the students in the hostel and guide them. Participation in *suprabhatam*, games, yoga, cultural activities, awareness classes, *Grama Seva* (village service), self reliance activities, Annual Sports and Cultural Meet and daily prayers are mandatory for all students and teachers. In addition, Bhagawan Baba expected both the students and teachers to wear a saree or a white dress- symbolizing purity, and also practice simple living.

Many a time these guidelines may appear archaic to people who are not well tuned to this system of education. I would like to stress that the Sri Sathya Sai System of Values-based Integral Education has been operational for more than three decades. It has stood the test of time and the quality of the students, who have passed out from this hallowed Institution—founded by the Divine Himself—are testimony to the success of this education system, which is the only one of its kind.

The teachers, students and the administrators have consciously made

efforts to sustain this unique system of education as a loving tribute to the Divine Master, even after He left His mortal coil.

This does not in any way imply that the secular academic activities are at stake. According to the latest statistics of National Assessment and Accreditation Council (NAAC)— a government watchdog that monitors and evaluates the quality of Higher Education in India—Sri Sathya Sai Institute of Higher Learning is ranked number 8 among over 250 universities accredited to date. The student-teacher ratio, student-computer ratio and the pass percentage in all the courses continue to be far above the national average. The major recommendations of several High Power Commissions on the higher education system—and in particular Deemed to be Universities—have been implemented in letter and spirit at Sri Sathya Sai Institute of Higher Learning. The students of the university represent twenty-five states of India.

One of the expectations of Swami was to strengthen socially relevant research activities at the university. This required an interdisciplinary approach to research. This was achieved by academically integrating the university with the free high tech hospitals founded by Bhagawan. It is with His Grace that the faculty of the university and the doctors of the hospitals are undertaking research in tandem, resulting in a number of significant results.

The number of research scholars has increased by 53 percent over the last three years. Research and teaching grants have tripled. The pass percentage of our students in GATE and CSIR-UGC/NET examinations continues to be much above the national average. Research grants from funding agencies have more than doubled over these three years. Research publications in reputed journals have more than doubled during the same period. A good number of workshops and conferences have been conducted (as in previous years) and laboratories have been strengthened.

The Annexe of the Prasanthi Nilayam campus has been inaugurated and will take care of the required additional space for the expanding laboratories and increased requirement of classrooms. As per the vision of Baba, the construction of a building to house the Sri Sathya Sai Centre for Advanced Studies is underway.

I am sure with the Grace and Blessings of our beloved Swami, His Institution will continue to grow in stature in the realm of higher education and serve the purpose for which it was founded. Let us pray to Him to bless all of us to enable us to carry forward His vision and mission.



PROF. J SHASHIDHARA PRASAD
VICE-CHANCELLOR

SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING
ANNUAL REPORT 2013/14

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In this age, students have to imbibe the nine important qualities which are nine precious gems. These are spirit of sacrifice, humility, the spirit of selfless service to society, friendliness, discipline, commitment to integrity and truth, love, non-violence and faith in God.

Bhagawan Sri Sathya Sai Baba
Revered Founder Chancellor

INTEGRAL EDUCATION

2013/14

1

Overview

INTRODUCTION

Sri Sathya Sai Institute of Higher Learning (SSSIHL), with its headquarters in Prasanthi Nilayam (Andhra Pradesh) in India, is a visible manifestation of Bhagawan Sri Sathya Sai Baba's vision of education for human transformation. The National Assessment and Accreditation Council (NAAC) currently ranks SSSIHL amongst the top ten universities in India.

The university hosts over 1300 students across four campuses:

For Women students:

- > Anantapur Campus at Anantapur, Andhra Pradesh

For Men students:

- > Prasanthi Nilayam Campus, at Puttaparthi, Andhra Pradesh
- > Brindavan Campus, at Whitefield, Bangalore, Karnataka
- > Muddenahalli Campus at Muddenahalli, near Chickaballapur, Karnataka

The university has a merit-based open admissions policy for all, irrespective of income, religion or region.

SSSIHL provides free education to all programmes of study. This includes waiver of all fees- including tuition, examination, laboratory, library, sports and medical.

Programmes offered include undergraduate, postgraduate, professional and research.

A MODERN GURUKULA

Sri Sathya Sai Institute of Higher Learning was founded on the basis that ethics and values must form the undercurrent of every subject taught to students. Here, the development of a student's character is just as important as earning degrees.

This holistic development of students can only be possible in an environment that develops the student's mind, body and spirit simultaneously.

To facilitate this, the university has a compulsory residential policy for all students, including those pursuing research. The environment is similar to the ancient Indian 'gurukula' system of education, in a modern context. Teachers and students live and grow together in an atmosphere of mutual

trust and unity in the spirit of sacrifice.

Most students typically spend between two to five years pursuing an education at SSSIHL. However, what differentiates them from graduates of other universities is the transformation of their hearts, not just the training of their minds.

An impact survey in 2010* of over thirty years of SSSIHL alumni (women and men) highlighted the following facts:

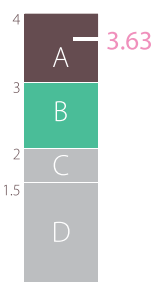
- > **Impact on the Workplace:** Over 50% of alumni are middle or senior managers, with over 80% of companies interviewed reporting 'high contribution' of SSSIHL alumni.
- > **Impact on Society:** Alumni (both in India and abroad) spend considerable amounts of their weekly time on service activities in the community.
- > **Impact on Personal Transformation:** Over 80% of alumni spend time on spiritual activities on a daily basis.

In this manner, the university achieves its objectives of enabling students to be professionally sound, socially responsible and spiritually aware.

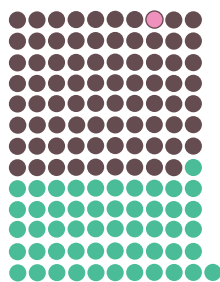
*See page 16 for more details

ACCREDITATION

'A' Grade Re-accreditation by NAAC



Cumulative Grade Point Average



SSSIHL ranks amongst the **top 10** universities re-accredited by NAAC under the new methodology

The National Assessment and Accreditation Council (NAAC) is an organization that assesses and accredits institutions of higher education in India. It is an autonomous body funded by the University Grants Commission, Government of India.

The assessment criteria include: Curricular aspects, Teaching-learning and Evaluation, Research, Consultancy and Extension, Infrastructure and Learning Resources, Student support and Progression, Governance and Leadership and Innovative practices.

The top ranking of an 'A' grade institution was awarded to SSSIHL on 8 Jan 2011.

Source: National Assessment and Accreditation Council (NAAC), 24 Sep 2014

Facilities & Infrastructure

OPTIMAL RESOURCES

The university continues to invest in providing the best infrastructure and resources to students- for academic, research and integral education activities.

During the past three academic years, ₹22 crores have been spent on equipment and infrastructure.

The expenditure ensures that students have access to the most modern infrastructure which will give them a high quality university education. This includes cutting-edge research laboratories, digital classrooms, high speed broadband connectivity, superb IT equipment, well-equipped libraries and world-class sports facilities.

NEW INFRASTRUCTURE

SRI SATHYA SAI CENTRE FOR ADVANCED STUDIES (SSSCAS)

The *Bhumi Pooja* for a new, modern 43,000 sq ft (4000 m²) centre at the Prasanthi Nilayam Campus, SSSIHL was performed on 17 February 2014.

The centre's major focus will be on interdisciplinary research in the field of Computer Sciences, Nanoscience, Medicinal Chemistry, Cell Biology and Structural Biology. It will also encompass advanced studies in Management, Economics, Leadership & Human Values, Philosophy and Indian Culture. The centre will have a service-based attitude in line with the Founder Chancellor's vision. It will undertake research that helps people and benefits humanity.

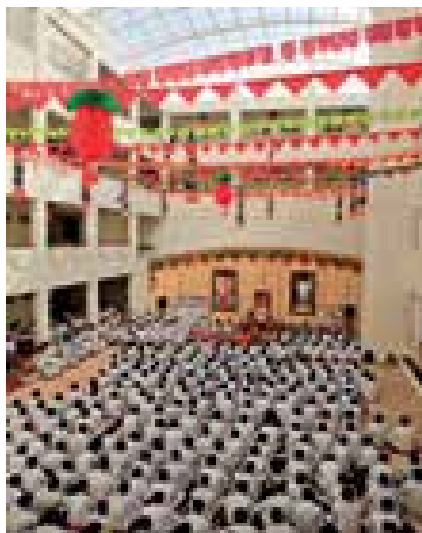


View of proposed Research Centre

THE ANNEXE

The increase in student strength and a 50% increase in the number of researchers in the past three years has led the university to sanction an extension building - The Annexe - adjacent to the main building (at Prasanthi Nilayam Campus). The inauguration ceremony for the Annexe took place on site on 12 March 2014.

The 44,809 sq ft, beautifully lighted building spans over three floors. It hosts a number of classrooms, a conference hall, offices and an atrium that will be used for morning assembly and prayers.



EXPENDITURE ON EQUIPMENT & INFRASTRUCTURE

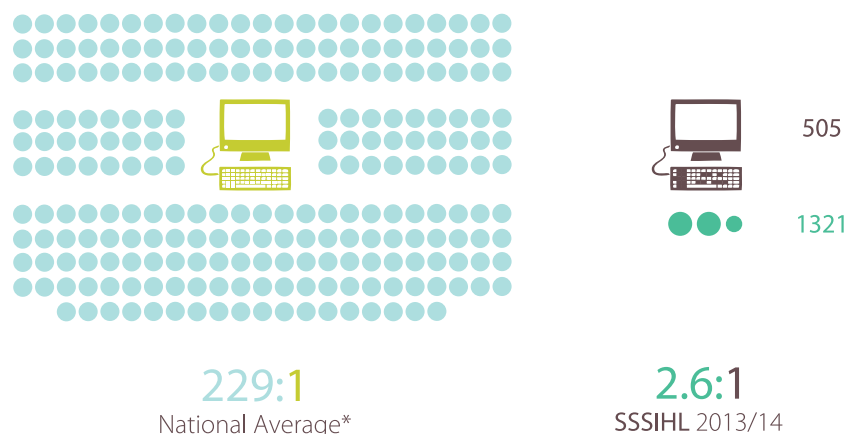


HOSTEL FOR TEACHERS & QUARTERS FOR WORKERS

The inauguration ceremony for new buildings—a hostel building for teachers and clusters of quarters for contingent staff—at SSSIHL, Anantapur Campus took place on site on 14 March 2014.

The buildings accommodate the growing needs of the biggest and only women's campus of the university.

STUDENT-COMPUTER RATIO



*Source: UGC Report, Strategies and Schemes during Eleventh Plan Period (2007-2012) for Universities and Colleges, 2011

University Governance

Sri Sathya Sai Institute of Higher Learning (Deemed to be University) is an independent and self-governing institution. It was established by the Sri Sathya Sai Institute of Higher Learning (Public Charitable Trust), which in turn has been established by the Sri Sathya Sai Central Trust. Bhagawan Sri Sathya Sai Baba is the founder of these Trusts.

THE TRUST

The Sri Sathya Sai Institute of Higher Learning (Public Charitable Trust) was founded to foster the composite culture of India and promote in the students and teachers, an awareness and understanding of the social needs of the country; with special awareness to the needs of the rural population. It is aimed to inculcate in students a world perspective; an international outlook imbibing human values along with a spiritual and scientific education. Its members for 2013/14 were:

- > Sri Indulal H Shah, Former Chairman, SSS Seva Organisation
- > Sri V Srinivasan, All India President, SSS Seva Organisation
- > Justice A P Misra, Former Judge, Supreme Court of India
- > Prof. S P Thyagarajan, Former Vice-Chancellor, University of Madras
- > Sri S S Naganand, Member, Sri Sathya Sai Central Trust
- > Sri R J Rathnakar, Member, Sri Sathya Sai Central Trust

The Trust met on 22 November 2013.

THE PRINCIPAL BODIES

Sri Sathya Sai Institute of Higher Learning (Deemed to be University) is an independent and self-governing institution.

The administrative and academic functioning of the university is carried out by the following two principal bodies:

1. The Board of Management
2. The Academic Council

BOARD OF MANAGEMENT

The Board of Management is the principal authority of the university, responsible for its general management and administration. This includes: framing of rules, creation of posts (teaching and non-teaching), appointment and suspension/dismissal of members, constitution of committees, review and evaluation of teaching and research. It also has the power to constitute and lay down the functions and powers of the Selection Committees for the purpose of employing teaching and non-teaching staff, and other such committees as it may deem necessary. It meets four times a year. Its external members for 2013/14 were:

- > Sri S S Naganand, Member, Sri Sathya Sai Central Trust Nominee, SSSIHL (Public Charitable Trust)
- > Prof. K S Rangappa, Vice-Chancellor, University of Mysore, Mysore
- > Sujata Ramadorai, Professor of Mathematics, Tata Institute of Fundamental Research
- > Prof. D Swaminadhan, Chairman, Dr. D Swaminadhan Research Foundation (DSRF)
- > Sri Mohan Kanda, Former Chief Secretary, Govt. of Andhra Pradesh (Nominee, MHRD, Govt. of India)

The 2013/14 meetings took place on 20 July 2013, 19 September 2013, 22 November 2013 and 15 February 2014.

THE ACADEMIC COUNCIL

The Academic Council is the principal academic body of the university. It has general control over and is responsible for the maintenance of standards of teaching, research and training, approval of syllabus, coordination of research activities, examinations and tests within the university. Its external members for 2013/14 were:

- > Prof. G K Karanth, Professor of Sociology, Institute for Social and Economic Change, Bangalore
- > Prof. V Nagaraja, Dept. of Molecular and Cell Biology, Indian Institute of Science, Bangalore
- > Prof. K A Suresh, Director, Centre for Nano

and Soft Matter Sciences, Bangalore

- > Prof. M P Vithal, Professor of Finance and Strategy, Indian Institute of Plantation Management, Bangalore
- > Prof. N S Nagaraj, Head, Dept. of Computer Science & Engineering, Don Bosco Institute of Technology, Bangalore
- > Prof. M Madhusudhana Rao, Dept. of English, Acharya Nagarjuna University, Andhra Pradesh

The Academic Council met on 15 October 2013.

THE BOARDS OF STUDIES

The Boards of Studies are responsible for framing, initiating, or revising courses of studies and teaching methods at the university. They also makes suggestions regarding evaluation procedures and other academic matters concerning their subjects. Suggestions and recommendations of the departments are deliberated upon in the Boards of Studies meetings. The recommendations and suggestions of the Boards of Studies need to be approved by the Academic Council.

In 2013/14, the proposals of the Board of Studies were presented to the Academic Council on 15 October 2013.

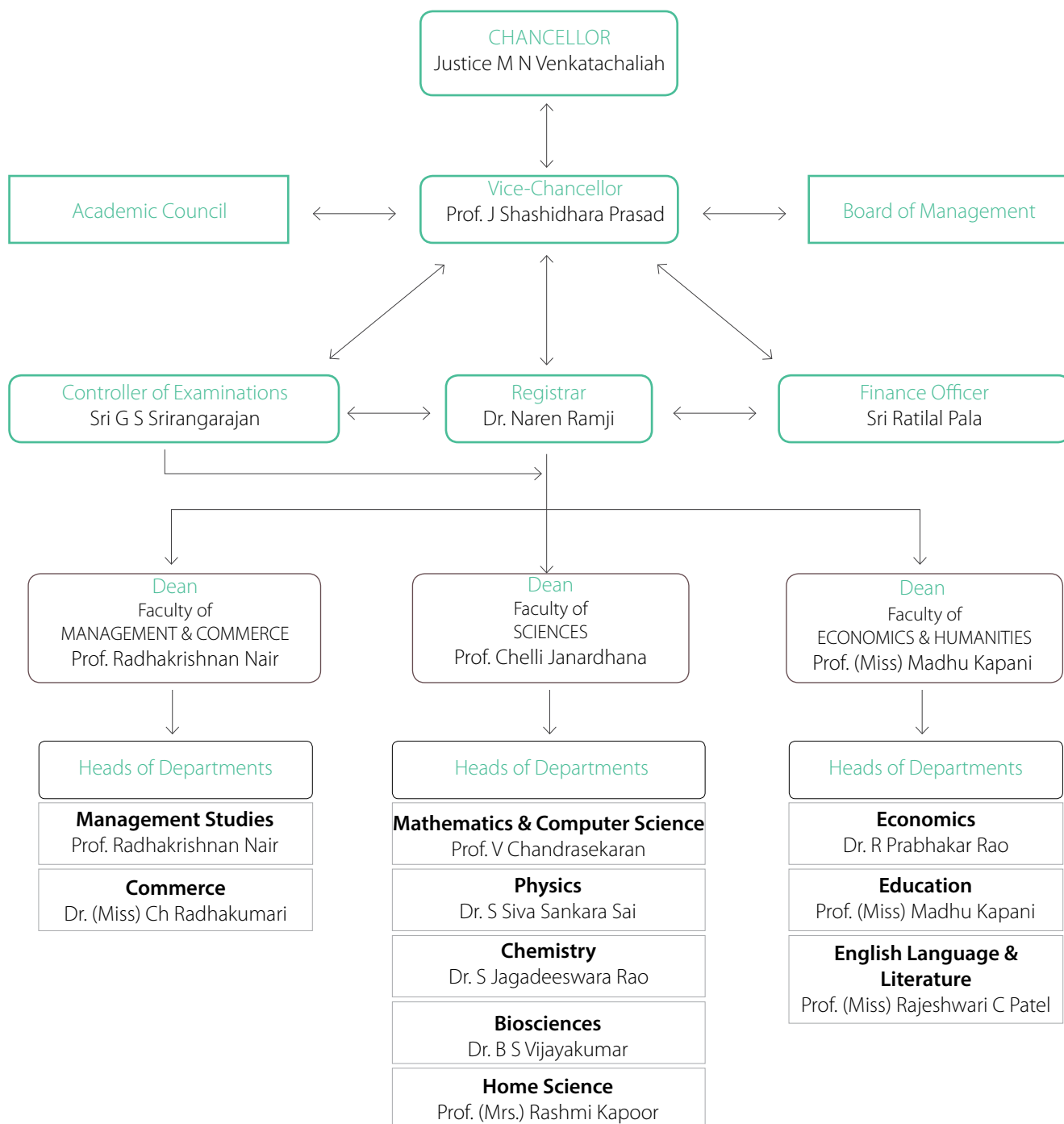
IMPORTANT COMMITTEES

In addition to the principal bodies that govern the university, there are various committees that have been set up to ensure that the areas of academics and administration such as research and qualitative aspects, and buildings and library maintenance are in accordance to the highest standard that SSSIHL has striven to consistently maintain. Some of these include:

- > Finance Committee
- > Planning and Monitoring Board
- > Internal Quality Assurance Cell
- > Research Advisory Board
- > Departmental Committee
- > Examinations Committee
- > Institutional Ethics Committee
- > Institutional Biosafety Committee
- > Library Management Committee

University Structure

REVERED FOUNDER CHANCELLOR
BHAGAWAN SRI SATHYA SAI BABA



Sri Sathya Sai Institute of Higher Learning (Deemed to be University) is established by Sri Sathya Sai Institute of Higher Learning (Public Charitable Trust), which in turn has been established by the Sri Sathya Sai Central Trust. Bhagawan Sri Sathya Sai Baba is the Founder of these Trusts.

Sri Sathya Sai Values-based Integral Education

INTEGRAL EDUCATION

In the words of the Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba:

In this university the medium of instruction is discipline. The first, second and third languages are love, service and sadhana (spiritual discipline)...

...Do you know why you have such a tight schedule in the hostel? This schedule is not structured by the Trust. Swami has personally structured this schedule. I have ordered the syllabus to be tight. Why is it so?

The minds of today's children, if given time, will turn into a devil's workshop. When the daily routine is tight, your mind cannot wander here and there.

At Sri Sathya Sai Institute of Higher Learning, the development of a student's character is just as important as earning degrees.

Bhagawan Baba has designed the Sri Sathya Sai Values-based Integral Education in such a manner that between the time an 18-year old student joins the university and the time when she or he graduates (at the age of 21 or 23) there is an inner transformation that takes place deep in the student's being. This concept is very unique at the university level.

Therefore, while SSSIHL is one of the top ranked universities in India (see page 10), its compulsory residential character with the system of Values-based Integral Education makes it a modern *Gurukula*—a place where teachers and students live and grow together in love and wisdom.

This teacher-student interaction that occurs in the backdrop of the system of Integral Education includes five dimensions: Intellectual, Devotional, Cultural, Physical, and Service.

Adherence to discipline and appropriate behaviour are two important aspects that encompass these interactions. The five human values of Truth, Right Conduct, Peace, Love and Non-violence form the undercurrent of all the dimensions of integral education.

The objective of Sri Sathya Sai Values-based Integral Education is to bring to the fore the human values latent in both students and teachers. This is what Bhagawan Baba calls Educare.

PROCESS

So, what does the process of Sri Sathya Sai Values-based Integral Education entail? What do the students really do over these years at SSSIHL that brings about this transformation within them?

The diagram on the opposite page summarizes the process of Sri Sathya Sai Values-based Integral Education. An introduction to all the dimensions and the key activities in each, is given below.

DEVOTIONAL DIMENSION

- > Daily Bhajans (*Sankeertan*)
- > Daily Vedic chants
- > *Stotrams*
- > Daily Meditation & Silent sitting
- > Daily *Suprabhatam* (prayer at dawn)
- > Daily Assembly (college prayer)
- > *Brahmarpanam* (Food prayer)
- > Daily *Kshama Prarthana* (prayer before sleep)

The activities of the devotional dimension enable a student to connect to his/her Divine inner Self. This inner connection opens the heart and brings forth the feeling of love, compassion and empathy for fellow human beings. Over a period of time, this results in a calm, focused and intuitive mind which benefits students, both in their academics and other pursuits.

CULTURAL DIMENSION

- > Celebration of festivals
- > Brass Band
- > *Nadaswaram* & *Panchavadyam* ensemble
- > Annual Sports & Cultural Meet
- > Performing Arts: Music programmes, Drama & Dance
- > Fine Arts: *Rangoli*, Card making, Photography, Altar making
- > Public Speaking
- > Debates
- > Elocution

From the performing arts to public speaking to the fine arts – the cultural dimension is designed to give students wide opportunities to find an avenue to their individual artistic expression.

The university makes every effort to provide the best possible resources—both material and human—so that students excel at their chosen activity.

Festivals of all major world religions are celebrated, reinforcing the unity among all faiths. Every student is involved in one way or another in the celebration of these festivals.

PHYSICAL DIMENSION

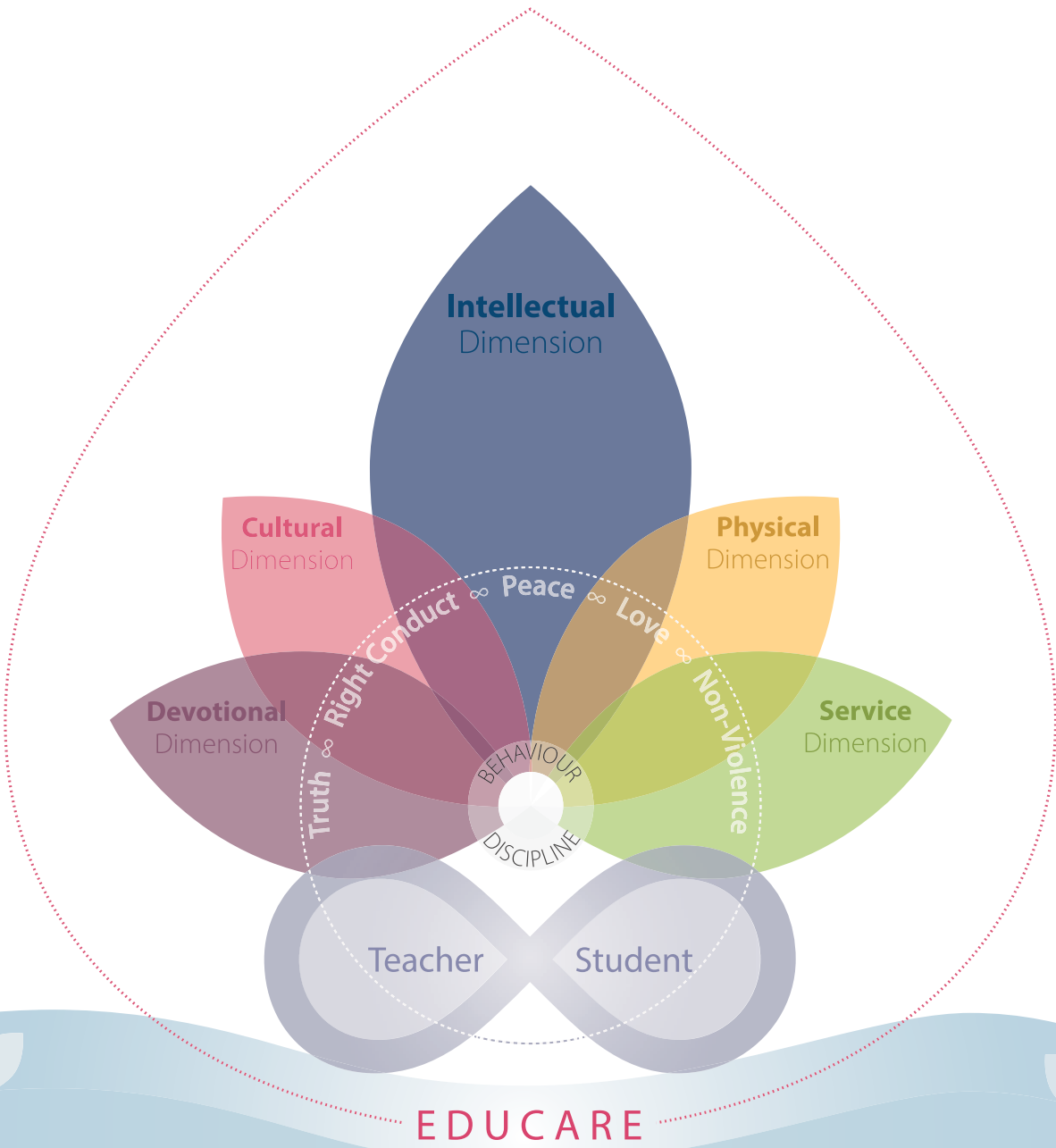
- > Sports
- > Games
- > Jogging
- > Exercises
- > *Yogasanas*
- > Annual Sports & Cultural Meet

Sports and games are a part of the daily routine of all students. From yoga classes to fitness training, from team sports to individual sports, students are encouraged to overcome their limitations and excel in these activities.

All campuses of the university are well equipped with sports facilities. These include cricket grounds, playing fields and basketball courts.

A multi-purpose outdoor stadium, the Sri Sathya Sai Hill View Stadium (with

Spiritually Aware
Socially Responsible
Professionally Sound



Modern Gurukula

a viewing gallery that accommodates 25,000 spectators) is used on many occasions, especially during the Annual Sports & Cultural Meet on 11 January.

The university also has an outstanding multi-discipline indoor stadium with a spectator capacity of 4,000. Facilities include basketball, volleyball, tennis, squash, table-tennis, badminton, gymnastics, yoga and a well-equipped gymnasium for aerobics and strength training.

SERVICE DIMENSION

- > Self-Reliance departments:
 - Electricals
 - Plumbing (water supply)
 - Audiovisual
 - General store
 - Dispensary
 - Dietary services
 - Hostel Mess
 - Arts & Crafts
 - Costumes & props
- > Community living
- > Social Work
- > Voluntary work
- > Grama Seva (Annual Village Service)
- > Prasadam Distribution

The philosophy of service at SSSIHL is based on the concept that divinity pervades all of humanity, and hence when you serve others, you are serving the Divine. Students learn to serve without expecting anything in return, other than the deep inner satisfaction of giving joy to others.

The compulsory residential system, where students live in dormitory-styled accommodation with other students from totally different backgrounds (for a minimum of two years and up to five or more years), provides an excellent foundation for the service dimension.

For information on hostel life and the concept of Self Reliance at SSSIHL, see page 20.

INTELLECTUAL DIMENSION

- > Academic studies
- > Research
- > Workshops & Conferences
- > Colloquia
- > Symposia
- > Talks and Discussions during Assembly
- > Awareness Class
- > Moral Class
- > Study Circles
- > Summer Course in Indian Culture & Spirituality

The university provides five-year integrated programmes combining undergraduate and postgraduate studies. Students receive their bachelor's degree after three years, and those who choose to pursue their master's degree are awarded one at the end of five years of study. This helps teachers to orient their teaching in a manner that inspires young students to get much more out of their chosen field of study than a conventional undergraduate programme.

In line with the vision of the Revered Founder Chancellor, all research at the university leads to societal benefit. Thus, the topics for doctoral research across all departments are chosen with great diligence, leading to directed basic research or translational research.

OUTCOMES

It is the hope of the Revered Founder Chancellor that alumni of SSSIHL lead a life of sacrifice and conduct themselves as befits a member of the Sri Sathya Sai Institute of Higher Learning.

One often asks the valid question that with so much effort and emphasis on integral education at SSSIHL, what *real* impact has it had on the daily lives of its alumni? The SSSIHL alumni impact survey in 2010 highlighted the following:

Professionally Sound

SSSIHL alumni are employed in a wide range of industries: Banking, Finance, Insurance, Consulting, Manufacturing, IT, Education, Research, Health care and Telecommunications. Over 50% of them are in middle management or above in various corporations and organizations across the world.

Socially Responsible

Almost 80% of all alumni are voluntarily involved in some service activity or community development programme on a regular basis, many of them in leadership positions. They are also known to take time out and support relief efforts - in times of natural disasters, for example.

Spiritually Aware

A majority of alumni say that love of and faith in God, positive thinking, contentment, forbearance, love for fellow beings, discrimination, patience and adaptability were among the main qualities they acquired while at the university. They expressed that the lessons learnt at SSSIHL permeated all aspects of their lives and in turn touched all those with whom they came in contact.

Residential Character

HOSTEL

The compulsory residential system is an essential ingredient for Sri Sathya Sai Values-based Integral Education to achieve its stated outcomes. This is where the concept of the modern *Gurukula* really comes to the fore. In fact, Bhagawan Baba Himself designed the entire system and its activities, right down to the daily routine of students! It is being implemented exactly as per His vision.

For a detailed overview of hostel life at SSSIHL, see page 20.

DAILY ROUTINE

All students stay in the hostel located in the campus. The daily routine at the Hostel is designed to keep students engaged in constructive and productive activities—academic and extracurricular—throughout the day.

The day typically starts at 5:00 a.m. with a couple of hours spent in prayer, exercise and other vocational pursuits (such as practice sessions for music, band, traditional Indian instrumental music and the likes). Classes commence at 9:00 a.m.

After college ends at around 4:00 p.m., students move to the *Mandir/Prayer*

hall for participation in congregational chanting (*veda*), devotional singing (*bhajans*) and other spiritual activities. These also include talks by eminent speakers on a variety of spiritual topics. Post dinner, students usually spend time on their studies.

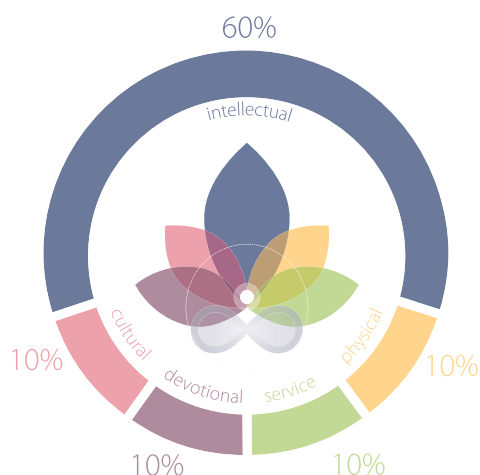
TIME ON DIMENSIONS

There are extended periods during each semester when a significant amount of time is devoted to a particular dimension of Sri Sathya Sai Integral Education. The following pages will highlight some of these activities and their dimensions. Examples include:

- > Festivals (**Cultural & Devotional**)
- > Cultural presentations (**Cultural & Devotional**)
- > Summer Course in Indian Culture & Spirituality (**Intellectual, Cultural & Devotional**)
- > Annual Sports & Cultural Meet (**Physical & Cultural**)
- > *Grama Seva* & Community Service (**Service**)

The diagram below depicts the broad distribution of time students spend on different dimensions of Sri Sathya Sai Values-based Integral Education during the year.

AVERAGE TIME SPENT ANNUALLY ON DIMENSIONS OF INTEGRAL EDUCATION



49

106



1 in 3 teachers are residential

(Stay with students in the hostel)

RESIDENTIAL TEACHERS

Residential teachers voluntarily stay with students in the hostel. They choose this responsibility in addition to their academic and administrative workload. Like students, they also share rooms with typically three or more teachers in a single room.

They perform three fundamental tasks:

- > Ensure the all-round welfare of students
- > Discharge specific duties for the upkeep of the hostel daily routine and general discipline
- > Facilitate the smooth functioning of the hostel Self Reliance departments (see page 20 for details)

MENTORING

Unlike other universities, where access to teachers is restricted to designated office hours, at SSSIHL the environment is such that students can approach teachers at various times during the day and can freely discuss both academic issues and personal matters with them—ranging from spirituality to family issues back home—in confidence.

As facilitators and mentors, teachers set an example by following the Sri Sathya Sai Values-based Integral Education as laid out by the Revered Founder Chancellor.



Multi-faith Festivals

The Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba always highlighted the essence and unity of all religions. Hence, at SSSIHL, the celebration of festivals from all major religions every year helps build a unique awareness in the mind and heart of each Sai student.

It is a significant part of the integral education model, and every student is involved in one way or another in the celebration of these festivals.

In 2013/14, some of the festivals celebrated include:

- > Eid-al-Fitr
- > Independence Day
- > Sri Krishna Janamashtami (cow procession)
- > Ganesh Chaturthi
- > Ganesh Immersion
- > Christmas
- > Ugadi
- > Sri Ramanavami

UNIVERSITY BRASS BANDS

The story of the university brass bands, highlights the dedication, effort and graceful manner behind all integral education activities.

In the formative years, Sri Sathya Sai Baba spent a considerable amount of His time to initiate the brass bands and sent celebrated trumpeters like Maynard Ferguson and other instrumentalists to teach students how to play these instruments.

With the hard work and effort that goes into the practice sessions around the year, it is no surprise that the university today has two of the most versatile and complete brass bands. It has instruments such as the Sousaphone, Trombone, the French Horn, the Baritone Sax, and other latest percussion and wind instruments. The senior students teach their juniors as they gain expertise in their own instruments.



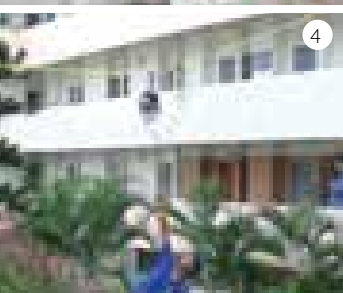
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2



3



4



5



6



7



1 Republic Day
2 Eid-al-Fitr drama
3 Avatar declaration day
4 Krishna Janmashtami pot breaking
5 Ganesh Chaturthi immersion
6 Christmas Day orchestra
7 Maha Shivaratri card offering
8 Ganesh Chaturthi procession
9 Krishna Janmashtami cow procession
10 Global Akhanda Bhajan prasadam
11 Laksharchana



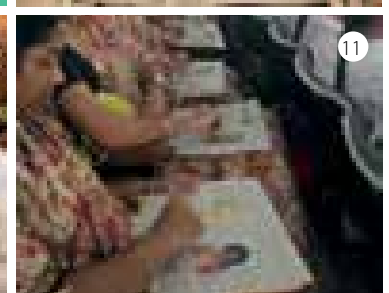
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9



10



11



Cultural Presentations & Gratitude Programmes

Bhagawan Sri Sathya Sai Baba says:

The end of culture is perfection.

Throughout the academic year, at each campus of SSSIHL, students participate in a host of cultural activities. Examples of these include:

- > Music, devotional singing, dance, drama, quiz, panel discussion and elocution
- > Competitions in veda chanting, stotram recitation, teachings of the Bhagavad Gita (to promote among students a deep understanding and appreciation of India's rich and ancient culture and spiritual heritage)
- > Painting, sketching/drawing, card-making, bookmark-making and preparation of useful articles out of waste

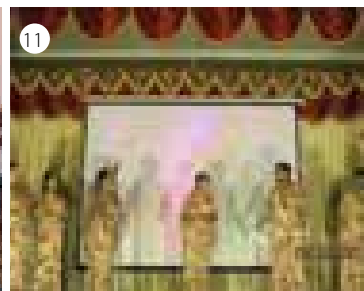
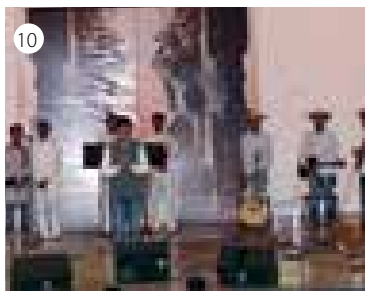
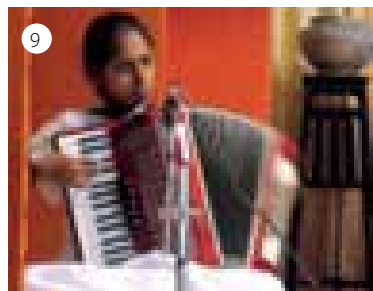
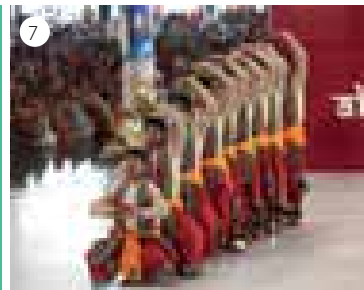
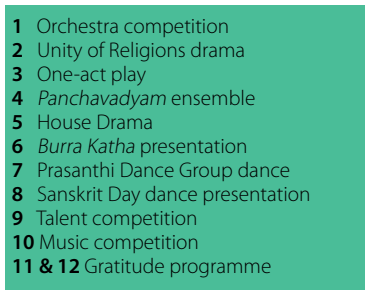
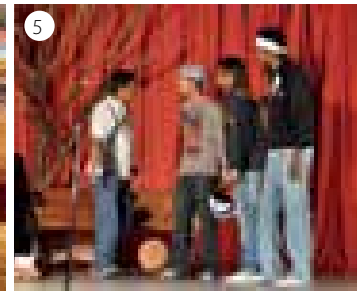
Participation by students is dependent on a student's level of skill or interest. With so many cultural activities throughout the year, everyone gets a chance to get involved.

For example, during dramas and the preparation leading to dramas, a number of students are involved in music, sets, lighting, costumes, makeup, etc. - all of which hone their team-building and leadership skills in organizing such functions.

Students are also encouraged to come forward and speak in front of the university community on topics ranging from science to metaphysics, thus giving them an appropriate platform to develop their public speaking skills and to refine their thought process.

GRATITUDE PROGRAMMES

Each year, graduating students express their love and gratitude to the Revered Founder Chancellor for lovingly moulding them into worthy citizens and better human beings through speeches, skits, dance and musical presentations in the Divine presence.



- 1 Orchestra competition
- 2 Unity of Religions drama
- 3 One-act play
- 4 Panchavadyam ensemble
- 5 House Drama
- 6 Burra Katha presentation
- 7 Prasnathi Dance Group dance
- 8 Sanskrit Day dance presentation
- 9 Talent competition
- 10 Music competition
- 11 & 12 Gratitude programme



Hostel Life & Self Reliance

The philosophy of hostel life is based on the approach of community living wherein each one lives for the other and all live together for a common higher cause.

Students hailing from different states of India, diverse cultures and varied economic and financial backgrounds live in dormitory-styled accommodation with 10-14 students staying together in a room. The pan-Indian character of the university comes alive in the hostel. The hostel buildings are also aesthetically pleasing, thus creating a noble ambience for students to live in.

As a result, the hostel is a miniature model of the world outside with people of different habits, temperaments, lifestyles, language and outlook staying together and working. This develops the qualities of understanding, adjustment, sharing and caring amongst the students. It nurtures virtues like adaptability, tolerance and sacrifice; developing students into noble and responsible citizens.

The ambience in the hostel is suffused with both discipline and loving care. All doctoral research scholars and one

of every three teaching faculty reside with the students in the hostel. The relationship between the students and teachers is very cordial and warm, and the teachers pay personal attention to the problems of each and every student. The teachers are chosen with extreme care to play an important role in this process. Many of them are alumni of the Institute, dedicated and well versed in integral education. They serve as facilitators and are available at all times for mentoring the students on personal and academic matters.

Personal cleanliness, punctuality and regularity, general behaviour, personal etiquette and room cleanliness- these are the major components of the discipline that is followed at SSSIHL hostels.

SELF RELIANCE

A major portion of the functioning of the hostel is taken care of by the students and resident staff members. The guiding principles of the hostel are a simple life coupled with self reliance. Students do their work with least dependence on external agencies. To inculcate the dignity of labour and respect for work, most functions and

departments of the hostel are run by students under the able guidance of resident faculty.

The self reliance departments include:

- > Electricals
- > Plumbing (water supply)
- > Audiovisual
- > General store
- > Dispensary
- > Dietary services
- > Hostel Mess
- > Arts & Crafts
- > Costumes & props

These self reliance activities enable students to become self-confident and independent. They also contribute to leadership and entrepreneurial development. To maintain continuity and effective succession planning, senior students train the junior students in all aspects of each self reliance department before graduating.





Community Service

On their own volition, students and teachers of the university work with local communities around the campuses. Example of these from 2013/14 include:

RIVER CLEANUP 1

Prasanthi Nilayam & Brindavan Campus

The sacred Chitravati river in Prasanthi Nilayam has a litter problem today.

A river cleanup program initiated in September 2013 by employees and alumni of Sai institutions (including SSSIHL students) has gained momentum and scores of people on Sundays (including local youth), pick up litter, bag it and place it in newly created garbage cans along the river front. They also helped plant about 50 flowering trees and level the riverbed and surrounding areas.

LET THERE BE LIGHT 2

Brindavan Campus

Students visited homes of village folk without electricity in the nearby Tarabahalli village to install solar bottle bulbs - an ecologically sustainable and free-of-cost source of interior light to rooms in simple dwellings with a thin roof using plastic bottles filled with

water plus a little bleach (to inhibit algal growth), fitted through the roof.

During daytime, the water inside the bottle refracts sunlight, delivering as much light as a 40- to 60-watt incandescent bulb to the interior. The 'bulb' can last up to 5 years.

Other activities included building and installing smokeless *chulas* (firewood saving stoves for healthy indoor coking) in villagers' homes and taking part in *Narayan Seva* activities.

ADOPTING A LEPER COLONY 3

Anantapur Campus

The campus warden, with the help of students and alumni, has adopted a leper colony since 1986.

Aptly named *Love Stream*, the project has helped transform the lives of 25 socially marginalized families through dedicated love and care.

The colony that consisted of 10-12 huts in 1986 now has 20 neat little houses. The creatively raised capital has funded water pumps, stationery items, food supplies and even 50 trees so that they can sell their own fruits and earn an income. As a result, almost every family now has its own bank account.

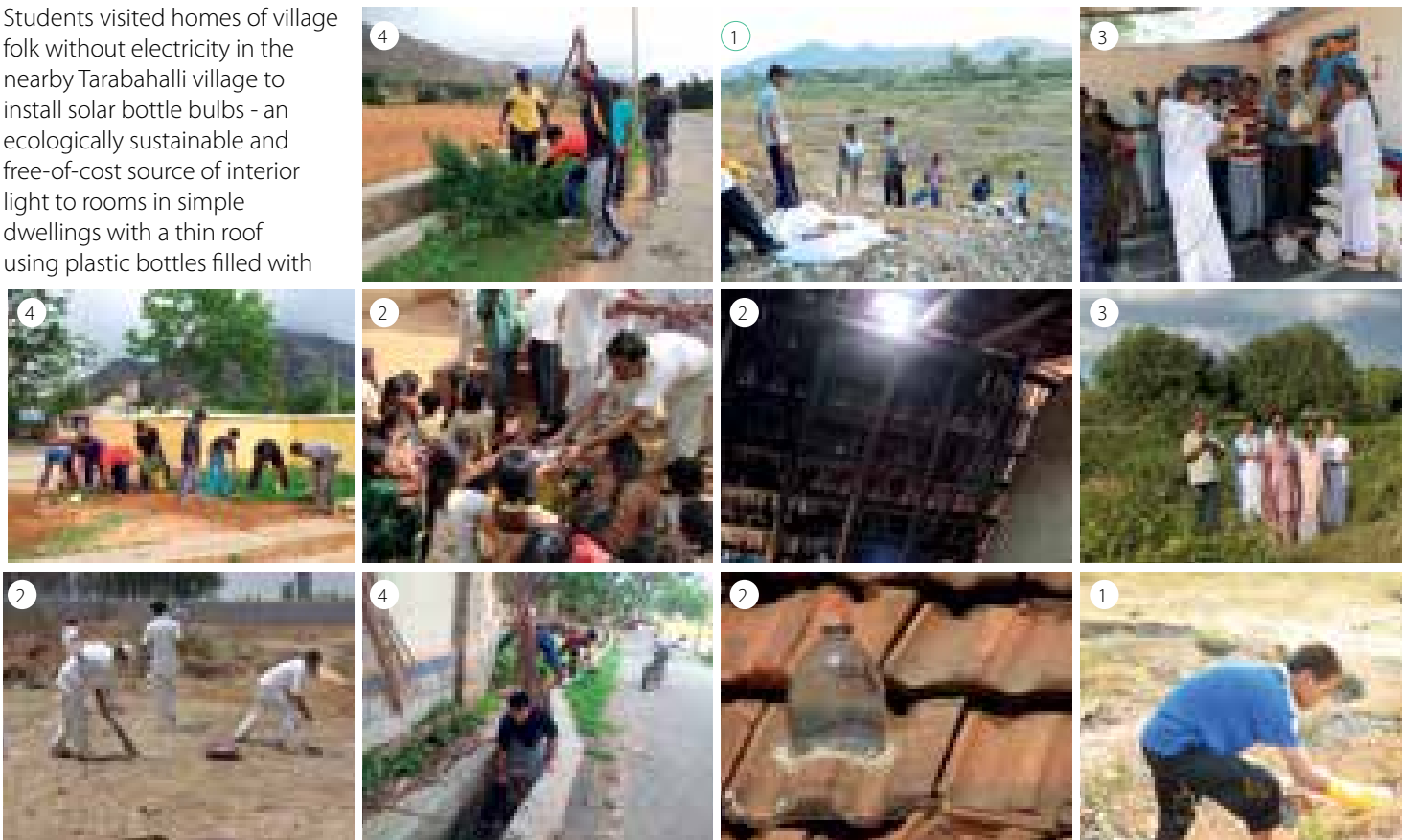
Practicing human values, bhajan singing, educating them in various ways - these are some of the issues that the warden and students have taken the time to help the lepers with.

The long-term objective is to make the families self-sufficient in every way.

SERVING VILLAGERS' NEEDS 4

Muddenahalli Campus

Students and teachers have taken up activities such as village cleaning after liaising regularly with the *panchayats* of surrounding villages, in an effort to better serve the needs of villagers.





Summer Course in Indian Culture & Spirituality

The **Special Annual Events** comprise five marquee events at SSSIHL which cover all the five dimensions of Sri Sathya Sai Integral Education. A tremendous amount of hard work and effort is put into them every year.

We will cover them briefly in the following pages.

The Summer Course in Indian Culture & Spirituality serves as an induction programme to all students and teachers of the university with an objective to expose students of the university to the rich cultural and spiritual heritage of *Bharath*. It orients students into Bhagawan Baba's educational philosophy and gives them deep, first hand insights into how they can directly benefit from this unique institution.

morning, afternoon and evening sessions.

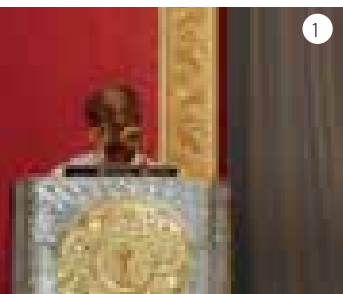
The morning sessions consist of talks by teachers and research scholars of the university. Typically, they entail key insights and lessons from the ancient Indian scriptures, spiritual personalities and concepts. The sessions also feature a short video show on Bhagawan Sri Sathya Sai Baba.

In the afternoons, students and teachers from all four campuses have breakout sessions where they discuss teachings and lessons from Bhagawan Baba's discourses. Key moral messages from these are creatively presented on the final day before the valediction.

The evening sessions on the first two days of the event consist of a music programme by students of individual campuses, along with veda chanting and bhajans in the Sai Kulwant Hall.

FORMAT

Each day is typically split into the

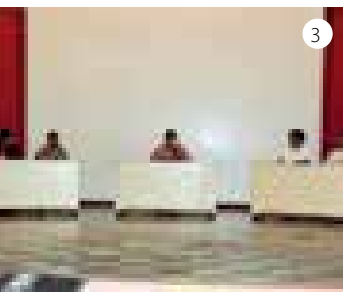


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- 1 Vice-Chancellor's inaugural address
- 2 Bhajan Antakshari
- 3 Alumni panel discussion
- 4 & 5 Quiz
- 6 Music presentation
- 7 Veda chanting
- 8 & 9 Global presentations based on study circle



3



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9



SUMMER COURSE 2013

Theme for Study Circle:

Mastery of the mind

(Based on the 1990 Summer Course discourses by Bhagawan Baba)

Day 1 – Saturday, 8 June 2013

- > Welcome Note & Inaugural Address
- > Two talks on Lessons from the Ramayana and Mahabharata for Modern Society
- > Darshan Video of Bhagawan
- > Bhajan *Antakshari*
- > Study Circle
- > Veda and Talks by students
- > Music Programme by Muddenahalli Campus

Day 2 – Sunday, 9 June 2013

- > Panel discussion on Ideal Sai Students and their Role in Society
- > Short video film - The Message of the Avatar
- > Talk on Lessons from the *Bhagavatam* for Modern Society
- > Quiz on the 'The lives of all Avatars' as narrated by Bhagawan Sri Sathya Sai Baba
- > Study Circle
- > Veda and Talks by Students
- > Music Programme by Anantapur Campus

Day 3 – Monday, 10 June 2013

- > Situational analysis exercise
- > Darshan Video of Bhagawan
- > Global presentations on the collective learning of the key

moral and life lessons from Swami's discourses deliberated upon during the study circle sessions

- > Valedictory Session

Parayanam Sessions

Sharing of experiences with Bhagawan Baba by senior teachers and alumni of SSSIHL with students of respective campuses take place in the evenings after dinner.





Sri Sathya Sai Grama Seva (Village Service)

For over 1300 young university students (and their teachers), nine days of their academic year is spent in the service of 3,00,000 village folk from over 150 villages. This includes distribution of food, clothes and other items, along with devotional singing, thus converting the food into *prasadam*.

The university students, research scholars and teachers largely manage the entire project—the planning, resourcing, organizing and implementation—from start to finish. See the opposite page for details.

IMPACT OF GRAMA SEVA

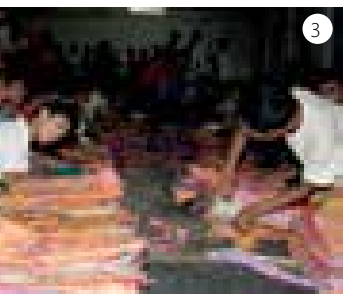
The Revered Founder Chancellor, when initiating this project in the year 2000, stressed that the greatest beneficiaries of this are not the villagers, but the students. What impact does *Grama Seva* have on students and villagers?

ON STUDENTS

- > It inspires students to live their lives along a higher ideal.
- > It sensitizes them to the problems of our society, to rural life and needs of the lesser privileged sections of the community.
- > It trains students to work in teams and groups under constraints of time and resources.
- > It enables the students to appreciate the joy associated with service.

ON VILLAGE FOLK

- > It kindles hope in their hearts, reinforcing their faith in the truth that God will take care of them.
- > The *prasadam* distributed after *nagar sankirtan* and bhajans is symbolic of Bhagawan Baba's Divine love, compassion and grace, and of His assurance of protection.
- > They receive food and clothes at the physical level, but hope and faith at the mental level and bliss at the spiritual level.



- 1 Preparation - Ladoos
- 2 Preparation - Rice
- 3 Packing - clothes
- 4 & 5 Packing - Food packets
- 6 Loading food crates into trucks
- 7 Circumambulating the Mandir
- 8 Loading refreshments
- 9 Leaving for villages
- 10 Unloading at the village
- 11 Sanctifying the village with prayers
- 12 Serving each person at their doorstep



PLANNING



Procurement of clothes for distribution

Recce

A month in advance, a team of staff and research scholars survey 150 villages in 3 mandals.

They check for:

- Condition of roads
- Accessibility levels for various vehicles post the rains
- Demographics
- Transportation & Logistics Requirements

1 month in advance

PREPARATION



Kitchen: responsible for preparing food for 33,000 people everyday, including:

Rice: This involves four steps: Cooking the rice, making the tamarind mix, cooling the rice and then the mixing process. *Sevadals* and volunteers assist in this process.

Ladoo: A few weeks in advance, women *sevadals* & volunteers make around 3,00,000 *laddos*.

PACKING



Ladoo packing

Students pack the *laddos* in small paper bags to prevent breakage.

Rice packing

Starting at 2:00 a.m., for all the nine days, women students and staff pack rice into packets of around 350g each.

Clothes packing

Sarees and *dhotis* are bundled for convenient handling and distribution.

LOGISTICS



Logistics

Depending on the number of people each vehicle will serve that particular day, the logistics team decides the amount of food to be loaded per vehicle.

Loading

Starting at 5:00 a.m., students load these crates of food and clothes into the vehicles as per the lists prepared.

Vehicle Maintenance & Logistics

Students take care of the maintenance and fuel requirements of the vehicles going for distribution, including food and other needs of the drivers

SERVING



Students are organised into teams of 30 members with a teacher in-charge of each team.

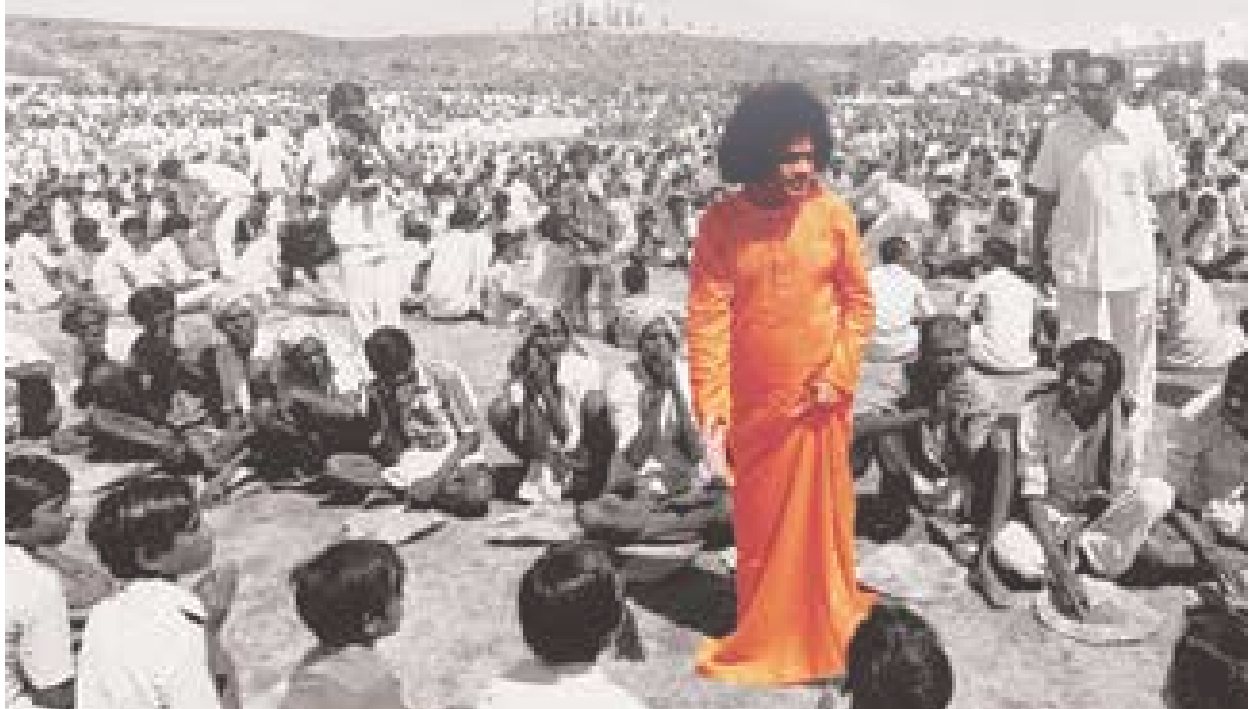
Serving

After prayerfully circumambulating the *Mandir*, students go to their respective vehicles and head to the villages. After sanctifying the atmosphere with bhajans, they serve the *prasadam* at every doorstep as a token of Bhagawan's love.

The students too partake of the same *prasadam* as lunch.

EVERY DAY FOR ALL NINE DAYS

Manava Seva is Madhava Seva
Sri Sathya Sai Baba



GRAMA SEVA 2013

153

Villages Served

300,000

People served

285,250

Food packets distributed

46,885

Sarees distributed

44,255

Dhotis distributed

ALL STUDENTS AND
STAFF PARTICIPATE



Dasara Celebrations & Prasanthi Vidwan Mahasabha

VEDA PURUSHA SAPTAHA JNANA YAGNA

Since the early sixties, the festival of Dasara in Prasanthi Nilayam has been closely associated with the Veda Purusha Saptaha Jnana Yagna- a week-long worship conducted in the Divine



Presence for the welfare of the whole world. The *Yagnam* commences on the fourth day of Dasara and concludes with the Poonahuti – the final oblation that is offered on Vijayadasami, the tenth day.

The most important component this worship is the *Rudra Yagam* where the oblations are made in the *Yagna Kunda* to Lord Shiva while chanting hymns from the *Sri Rudram*. In addition to this, other rituals like *Surya Namaskara*, worship of *Devi*, *Sahasralinga Archana*, *Srimad Bhagavatha Parayana*, *Ramayana Parayana* and the *Devi Mahatmyam* are simultaneously performed.



The students of Sri Sathya Sai Institute of Higher Learning take active part in the *Yagnam* by chanting the vedas, reading the scriptures and performing other parts of the worship along with the learned pundits.

PRASANTHI VIDWAN MAHASABHA

The evening programmes during the seven days of the *Yagnam* are held in Sai Kulwant Hall, under the auspices of the Prasanthi Vidwan Mahasabha, where many speakers—primarily students and functionaries of Bhagawan's institutions—address the gathering on topics concerning spirituality and philosophy, Bhagawan's teachings and experiences of devotees.



Topics Covered:
Prasanthi Vidwan Mahasabha

- > Glory of Bhagawan's Mission
- > Path of Service
- > Steps to Happiness
- > Thy will be Done
- > Attuning to God
- > Pathway to Sai Sannidhi
- > Glory of Divine Mother
- > Glory of Bhagawan's Love



Convocation

XXXII CONVOCATION

The Annual Convocation of the Sri Sathya Sai Institute of Higher Learning (SSSIHL) was held in the Divine presence at the Sai Kulwant Hall, Prasanthi Nilayam on 22 November 2013. The evening programme began with a ceremony to give away the Sai Krishna Awards for Excellence in Research (for further details, see page 53) just before the Convocation drama.

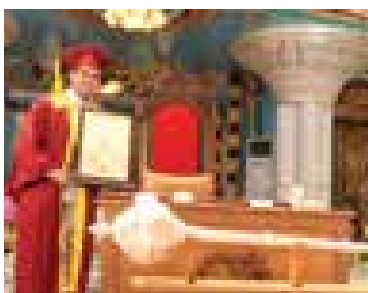
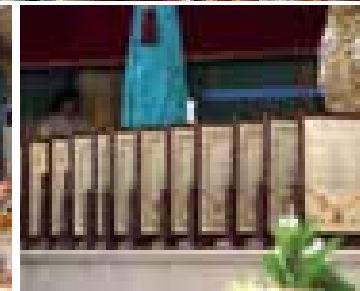
This year, the ceremonial procession entered Sai Kulwant Hall at 10.00 a.m. It included the chief guest, Sri Sam Pitroda, Former Advisor to the Prime Minister on Public Information Infrastructure and Innovations; Honourable Chancellor of SSSIHL, Honourable Justice M N Venkatachaliah, Former Chief Justice of India; Prof. J Shashidhara Prasad, Vice-Chancellor; former Vice-Chancellors of the university; members of the Board of Trustees; members of the Board

of Management and the Academic Council. The procession was led by the university brass band followed by two students carrying the University Standards on either side of the Registrar, who carried the ceremonial mace.

The Vice-Chancellor sought the blessings of the Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba. The Registrar, Dr. Naren Ramji then formally welcomed the chief guest by garlanding him. The proceedings of the convocation began with chanting of Vedic hymns by a group of students. The Vice-Chancellor then prayed to the Revered Founder

I hereby solemnly declare and promise that, if admitted to the degree for which I have been duly recommended, I will in my daily life and conversation, and in thought, word and deed, conduct myself as befits a member of the Sri Sathya Sai Institute of Higher Learning; that I will to the utmost of my capacity and opportunity, support the cause of sound learning, humanity, morality and spirituality; and that as far as lies in me, I shall uphold and advance the social and indeed all round welfare of my countrymen and fellowmen.

CONVOCATION PLEDGE, SSSIHL



Chancellor, Bhagawan Sri Sathya Sai Baba to declare the Convocation open. The convocation was declared open in Bhagawan's voice.

Sri G S Srirangarajan, Controller of Examinations, SSSIHL presented the graduands of the year to the Honourable Chancellor, Justice M N Venkatachaliah for admitting them to their respective degrees. The Vice-Chancellor then administered the convocation pledge to the graduands.

This year, 391 students attended the convocation to receive their degrees. Twenty-four students were awarded

gold medals and five research scholars were awarded doctoral degrees.

This was followed by convocation addresses by The Honourable Chancellor, Vice-Chancellor and the Chief Guest, after which the Revered Founder Chancellor delivered His benedictory address.

In His benedictory address, Bhagawan Baba described a man of knowledge as the one who understands the five aspects of education, i.e. what is education, what type of education should be acquired, what is the standard/yardstick of education, what is the type of education to uplift humanity and what is the use of present day education. He emphasized that character and culture are essential for students, which can be achieved through practical knowledge and not by superficial knowledge. He stressed that practical knowledge can be acquired by educate, i.e. by bringing

forth the divinity immanent in man. This educate has to be used for social welfare.

The Divine Benediction was followed by the national anthem and aarati, marking the end of the 32nd Annual Convocation ceremony.

CONVOCATION DRAMA

A drama presented by students of SSSIHL on the occasion of the 32nd Annual Convocation, entitled *Sai Kathamrutham- Stepping Stone to God* was a fitting finale to the day.

The drama conveyed that to establish a connection with God, one has to first detach oneself from the world. One must then cultivate a persevering faith in God and lastly, one must take up but a single step towards Him and God will take a hundred steps closer to the devotee, leading to the merging of man with God.



GOLD MEDAL AWARDEES 2013/14

Dinesh Majeti

Distinction in M.Tech. in Computer Science

K N Kartheek

Distinction in M.Tech. in Applied Optics

Chintakayala Krishna Das

Distinction in M.B.A.

Rashmi Ranjan Jena

Distinction in M.B.A. in Finance

Goturu Sai Sudheer

Distinction in M.Sc. in Mathematics

Sanathana K V

Distinction in M.Sc. in Physics

Sai Shiv Narayan

Distinction in M.Sc. in Nanoscience & Nanotechnology

Vernekar Dnyanesh Vinayak

Distinction in M.Sc. in Chemistry

Ranjan Devkota

Distinction in M.Sc. in Biosciences

Akash Krishnan

Distinction in M.A. in Economics

Srimalla Srikanth

Distinction in B.Sc. (Hons.) in Mathematics

Ramakrishnan A R

Distinction in B.Com. (Hons.)

Rajesh Siwakoti

Distinction in B.A. (Hons.) in Economics

R Divya

Distinction in B.Ed.

Sunandini C Haldipur

Distinction in M.A. in English Language & Literature

Balabadruni Shantipriya

Distinction in M.Sc. in Food Science and Nutrition

Varkekar Namrata Jagdeo

Distinction in M.Sc. in Food Technology

V M M Saipavitra

Distinction in B.Sc. (Hons.) in Physics

K R Sai Kiran

Distinction in B.Sc. (Hons.) in Chemistry

A B Aishwarya

Distinction in B.Sc. (Hons.) in Biosciences

Channa Sripadmavalli

Distinction in B.Sc. in Home Science

Latika Kalyan

Distinction in B.A.

Akriti Pradhan

Distinction in M.Phil. in Food Science and Technology (Sciences)

Manisha Thakuri

Distinction in M.Phil. in English Language & Literature (Humanities)

PH.D. AWARDEES 2013/14

Sri A Sunil

Doctor of Philosophy in Chemistry

Fluorometric and Photometric Methods for Determination of Transition Metals in Trace Levels

Sri Vennel Raj

Doctor of Philosophy in Biosciences

Studies in Biodiversity of *Aegle marmelos* (Linn.) Correa Using Morphological Traits and Molecular Markers

Sri V N S Malleswar D Kota

Doctor of Philosophy in Biosciences

Pila globosa (Indian Apple Snail) a Sentinel Organism to Monitor Climatic Stress in the Ecosystem: Mechanisms of Adaptation

Devi Sudheer Kumar Chunduri

Doctor of Philosophy in Computer Science

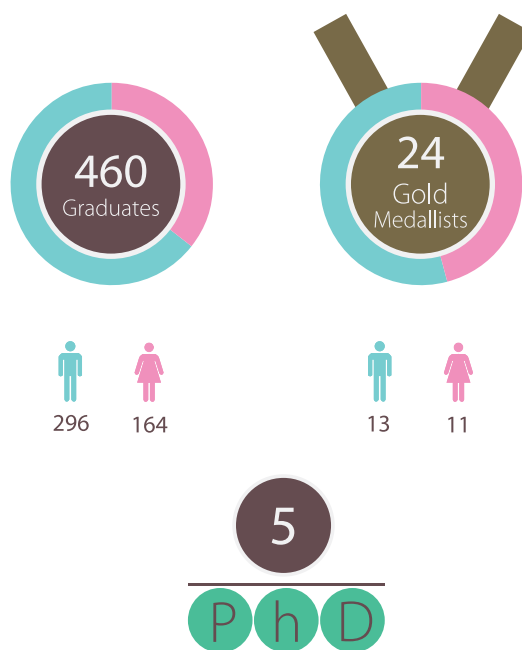
Topology and Routing Aware Mapping on Parallel Processors

Sri D Hanumantha Rao Naidu

Doctor of Philosophy in Computer Science

Context-Based Speech Enhancement

GRADUATES 2013/14





Sports & Cultural Meet

We, the children of Sai, swear that, we shall take part in the Annual Sports & Games of Sri Sathya Sai Institutions, in fair competition; respecting and abiding by the rules which govern them and with a desire to participate in the true spirit of sportsmanship, for the honour of our country, the glory of sport and our beloved Mother Sai.

SPORTS MEET OATH, SRI SATHYA SAI EDUCATIONAL INSTITUTIONS

The preparations begin a month in advance of the grand display at the Sri Sathya Sai Hill View Stadium on 11 January every year. The performance routines are perfected, the skills are honed, the band and march past practice attains perfection, the props are finished, and final touches to each presentation are made.

This culmination of the enormous effort by students, their coaches and teachers is not in their personal glory, but in the deep sense of satisfaction that they make the Revered Founder Chancellor happy and proud.

The grand display of physical items on 11 January is followed by cultural programmes in Sai Kulwant Hall. Each campus of the university performs a drama or musical presentation. This five-day Sports & Cultural Meet culminates with the Prize Distribution ceremony for sports and cultural events.



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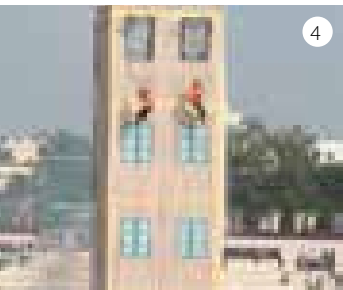


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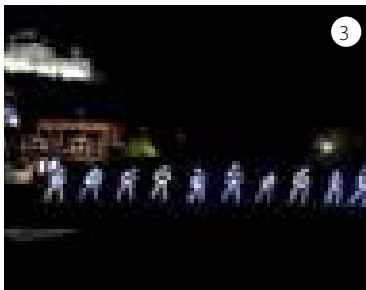


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- 1 Welcoming Sai
- 2 Anantapur Campus presentation
- 3 Prasanthi Nilayam Campus
- 4 Brindavan Campus presentation
- 6 Prasanthi Nilayam Campus
- 7 University Brass Band
- 8 Muddenahalli Campus presentation



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SPORTS & CULTURAL MEET 2014

The Sports & Cultural Meet was held over five days from 11 to 15 January 2014 at Prasanthi Nilayam.

CAMPUS PRESENTATIONS

Prasanthi Nilayam Campus

SPORTS

- > Transcenders Ropes and Rings: Gravitons
- > Giant Wheel: Wheel Wizards
- > Trampoline Trampsters
- > LED: Let Everybody Dance

CULTURAL

- > Drama titled Jaya, based on selected episodes from the Mahabharata.

Anantapur Campus

SPORTS

- > Russian Folk Dance
- > Display on Bikes
- > Mystic Whites

CULTURAL

- > Drama based on the Chinna Kathas told by Bhagawan Baba on various occasions in His Discourses. The drama was an exhibition of skilled puppetry.

Brindavan Campus

SPORTS

- > Celestial Rhythms
- > Master Strokes
- > Disaster Management

CULTURAL

- > A musical drama based on the life of Saint Thyagaraja highlighting the beauty of devotion to God through *kirthanam* (music).

Muddenahalli Campus

SPORTS

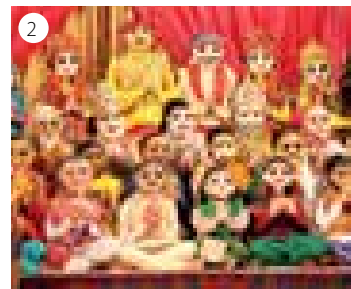
- > Bicycle Formations and Stunts, Art in Motion

Prasanthi Nilayam. The order of the day was as follows:

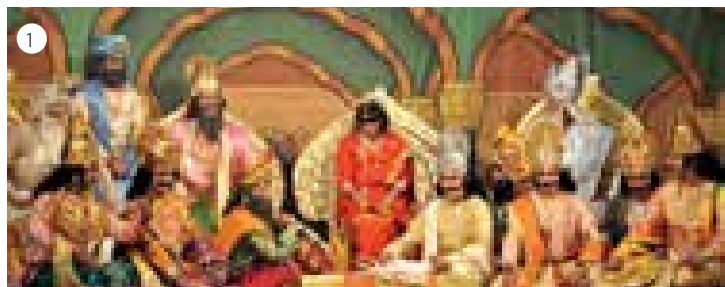
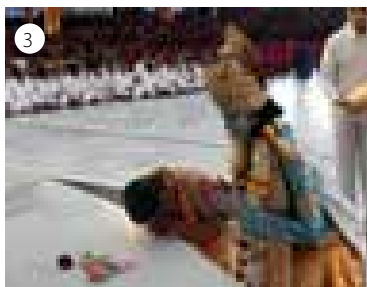
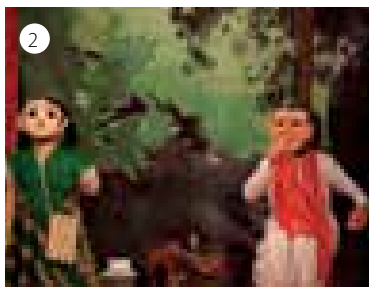
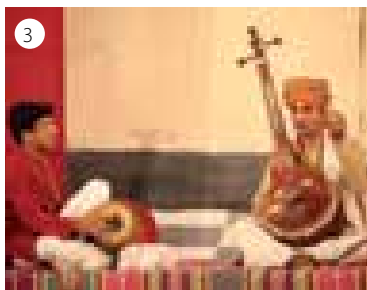
- > Grand procession comprising the university brass band, veda chanting students and a flag-bearing squad
- > Introductory speeches and talks by students
- > Awarding of the Founder Chancellor's trophies to all the Sai educational institutions
- > List of winners presented to Bhagawan
- > Championship trophies awarded
- > Divine Message & aarati

PRIZE DISTRIBUTION CEREMONY

The Prize Distribution Ceremony of the Sports and Cultural Meet was held on the auspicious day of Makarasankranti, 14 January 2014 in Sai Kulwant Hall,



- 1 Prasanthi Nilayam Campus drama on selected episodes from the Mahabharata
- 2 Anantapur Campus puppet drama on Chinna Kathas told by Bhagawan Baba
- 3 Brindavan Campus musical drama on the life of Saint Thyagaraja



Athletics Champions 2013/14

Pratima Barrailly	Postgraduate <i>Anantapur Campus</i>
Apoorva Awasthi	Undergraduate <i>Anantapur Campus</i>
Gunaranjan K S	Postgraduate <i>Prasanthi Nilayam Campus</i>
Anirudh Pavithran	Undergraduate <i>Prasanthi Nilayam Campus</i>
Menon Sai Aditya Anilkumar	Undergraduate <i>Brindavan Campus</i>
Sudheendra N R	<i>Muddenahalli Campus</i>

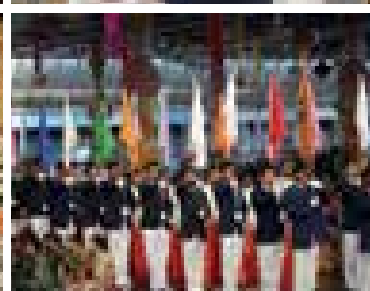
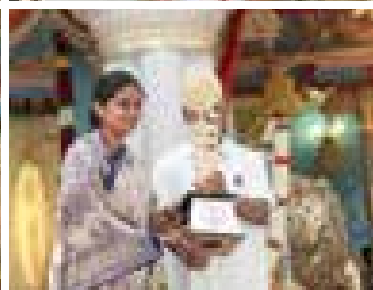
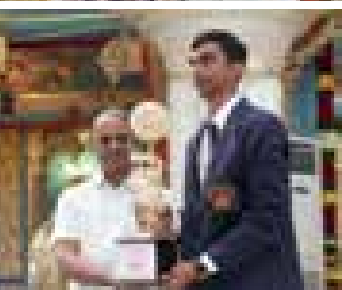
Cultural Champions 2013/14

Sharanya Gopalakrishnan	Postgraduate <i>Anantapur Campus</i>
Priya Gurumoorthy	Undergraduate <i>Anantapur Campus</i>
Aditya Moktan Tamang	Postgraduate <i>Prasanthi Nilayam Campus</i>
Devjeet Auddy	Undergraduate <i>Prasanthi Nilayam Campus</i>
Satya Prakash Mohanty	Postgraduate <i>Brindavan Campus</i>
Sai Sankar Sarangi	<i>Muddenahalli Campus</i>

Fine Arts Champions 2013/14

Ashasmita Subhadarshine Mishra	Postgraduate <i>Anantapur Campus</i>
Gayathri S	Undergraduate <i>Anantapur Campus</i>

Champions with their trophies



Prize Distribution Ceremony



Awareness Course, Moral Class & Prayer Talks

Bhagawan Sri Sathya Sai Baba set up the curriculum in a manner that helped students develop broad-mindedness and compassion. He said:

Education must broaden the heart; it must expand one's love. Fortitude and equanimity belong to the Reality in man. One must reveal this fact in every act.

To help achieve this, along with their academic courses, students are exposed to the following Intellectual Dimension activities:

AWARENESS COURSE

The Awareness Courses are designed for both undergraduate and postgraduate programmes, and aim at cultivating a broad view of the human condition in students. This holistic view includes the contributions of all cultures. It reveals the unity of all great world religions and provides an understanding of their underlying spirituality. It fosters a yearning in students to alleviate human misery and distress.

The course content helps trigger self-reflection and enquiry in students. It sensitises them to the concerns of society and gets them to think about practical solutions to these problems.

At the undergraduate level, classes cover topics such as:

- > Philosophy of Education
- > Unity of Religions and Faiths
- > Ethos and Values and their Relevance in the Current Milieu
- > Life and its Quest
- > Study of Indian Classics Such as Ramayana and Bhagavatam.

A lot of the course content is from Sai literature- books written by Bhagawan Baba Himself, such as the *Vahinis*.

For postgraduate students, the focus is on introducing students to the practical aspects of spirituality, enabling them to apply the spiritual principles from the ancient scriptures to the problems of modern society.

THURSDAY MORAL CLASS

At each campus, Thursday mornings begin with an hour of inspiring and ennobling talks by eminent speakers stressing on their personal spiritual experiences, messages from sacred scriptures and other elevated and socially relevant themes (such as patriotism, societal service, professional values, Indian culture and heritage and the like). It is also used to highlight students' talents in music, dramatics, elocution, debates, quizzes, etc.

2013/14 topics included:

Experiences with Bhagawan Baba, classical music competition, mono acting, drama on Vivekananda, skits, Swami, Values and Cricket: Interview with Sri V V S Laxman, etc.

PRAYER TALKS

Every morning before classes commence at the college, all students and teachers gather for the morning assembly. Prayers/veda chanting and a few minutes of silent sitting are typically followed by a talk by students, faculty members or invited guests on topics related to morals and values.

2013/14 topics included:

- > The Power of Giving
- > When the Mind is without Fear
- > Power of *Namasmarana*
- > Patience is all the Strength Man Needs
- > Swami's Love as a Father
- > Power of Prayers
- > Duty of a Sai Student
- > Service: Solutions for Social Problems
- > Motivation
- > The Rama Principle
- > Devotion & Friendship

Moral Class in progress





The real sign of an educated person is his attitude of sameness towards all. He sees in society the manifestation of divinity. Every student should observe the three principles of equality, unity and cooperation. Education has to aim at ensuring peace and stability in each country by continuous precept and practice of the basic unity.

Bhagawan Sri Sathya Sai Baba
Revered Founder Chancellor

ACADEMICS

2013/14



2



Academics Overview

HOLISTIC EDUCATION

At SSSIHL, academics and co-curricular activities go hand-in-hand. So much so, that each graduand's degree certificate has two final grades - one for cumulative academic performance, and the other for cumulative performance in Integral items (activities in the sports, culture, service and devotional dimensions.)

This holistic evaluation system at the university is designed to foster unity, teamwork and a spirit of sacrifice amongst both faculty members and students. Students are consistently provided with opportunities to develop their potential for leadership, teamwork, ethical and moral behaviour. A disciplined routine (both academic and residential), which the teachers themselves follow, sets a precedent for students to emulate.

INNOVATIVE EVALUATION SYSTEM

The examination system constitutes the continuous internal evaluation (CIE) which spreads across the entire semester and End of semester Examination (ESE) which is conducted at the conclusion of a semester.

CIE enables graded learning as students are evaluated on a monthly basis through tests/assignments/case studies, etc. It therefore ensures that students have a sound conceptual understanding of the subject. They also promote discipline and punctuality.

This continuous feedback from the CIE assists students in improving their academic performance. It also allows teachers to take timely action in helping students improve/maintain their academic performance.

SMALLER CLASS SIZE

With less than 9 pupils per class on average, the student-to-teacher ratio at SSSIHL is amongst the best in India.

This means that teachers give more individual attention to students and have more time to work one-on-one with them.

Since teachers have fewer students to monitor, they tend to spend less time on classroom management issues, such as discipline.

A lower student-to-teacher also encourages greater student participation in class. In smaller groups,

students feel more accountable and comfortable participating in class discussions- and this greater degree of accountability leads to better grades and higher levels of achievement.

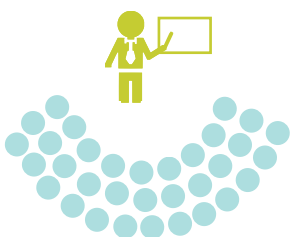
As a result, SSSIHL students have consistently performed very well- both in internal and external/national tests and examinations. See page 41 for further details.

EXCELLENT FACILITIES

The university provides students with high quality infrastructure to maximise their learning experience and excel at their academics and research.

Laboratories house modern, sophisticated instruments and resources, and the classrooms have computer-aided teaching equipment. Each campus also has video conferencing facilities. Libraries across campuses stock over 1,60,000 volumes and the computer centres boast high speed broadband internet connectivity. The student-to-computer ratio is 2.6 students per computer, with the actual usage always being one student per computer.

STUDENT-TEACHER RATIO 2013/14



33:1

National Average*



8.5:1

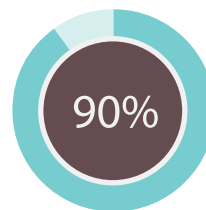
SSSIHL 2013/14

The above reflects full-time Faculty

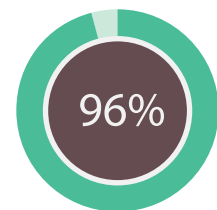
155

1321

EXAMINATION PASS PERCENTAGE



Undergraduate
Programmes 2013/14



Postgraduate & Professional
Programmes 2013/14

*Source: UGC Report, Strategies and Schemes during Eleventh Plan Period(2007-2012) for Universities and Colleges, 2011

Admissions

OPEN ADMISSIONS POLICY

SSSIHL has a merit-based, open admissions policy which provides an equal and fair chance for all suitable candidates to secure admission. It also implements the Government of India's reservation policy to all students from the Scheduled Castes (SCs), and the Scheduled Tribes (STs) for all programmes of study.

SSSIHL provides education free of cost for all programmes of study.

NEW PROGRAMMES

Two new programmes were introduced during the academic year 2013/14:

- > M.Tech. in Nuclear Medicine
Duration: 2 years
Department: Physics
- > Master of Education (M.Ed.)
Duration: 1 year
Department: Education

INCREASE IN APPLICATIONS

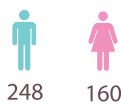
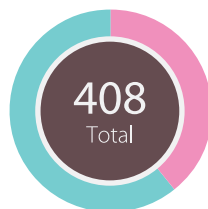
Admissions for the academic year commencing in June 2013 saw a record number of applications.

Undergraduate applications were up 52% from 1063 to 1611. Postgraduate and professional applications increased 39% year-on-year from 392 to 545.

These numbers represent eligible applicants who met the minimum requirements for admissions. The actual number of applicants was much higher.

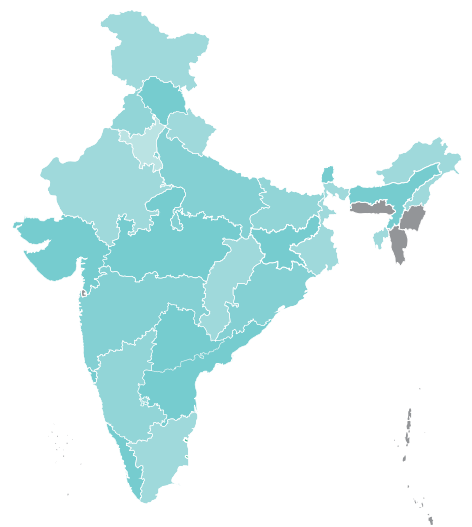
ACCEPTANCE RATES

As a result, the acceptance rates in 2013/14 were less than 20% for all programmes.

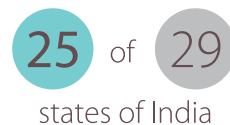


STUDENT DIVERSITY

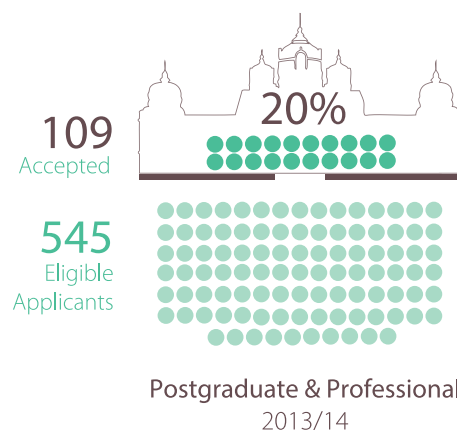
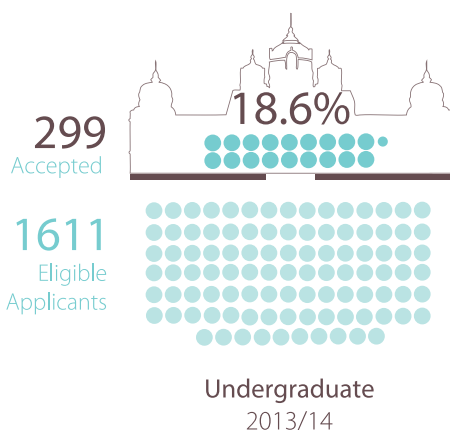
Students admitted to SSSIHL come from all parts of the country. This is a conscious effort made by university as this diversity contributes to a rich and stimulating learning environment that brings out the best in students.



SSSIHL students represent

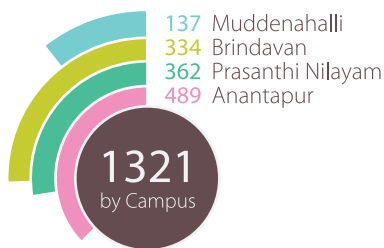


ACCEPTANCE RATES 2013/14



Student & Staff Profiles

STUDENT PROFILE 2013/14



RECENT TRENDS

The student strength has steadily increased from 1159 in 2010 to 1321 in 2013. Although this represents a 14% increase in three years, the student-teacher ratio has improved from 10:1 to 8.5:1 during the same period.

NEW FACULTY

The university continues to attract high quality teachers. In 2013/14, nine new faculty members joined the SSSIHL family. This brought the total number

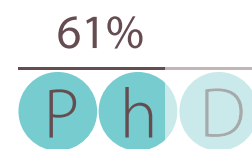
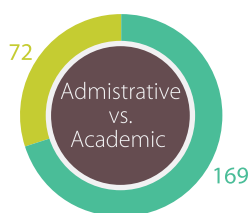
of teachers to 155, of which 61% have a Ph.D. Additionally, 24 teachers are currently pursuing a Ph.D.

New faculty members welcomed in 2013/14 were:

- > Sri Radhakrishnan Nair, Professor, Dept. of Management Studies
- > Dr. (Ms.) Chaitanya Mulakayala, Asst. Professor, Dept of Biosciences
- > Dr. (Ms.) Tapasya Anand, Asst. Professor, Dept of Home Science
- > Miss Akanksha Aggarwal, Asst. Professor, Dept. of Management Studies

- > Sri S Sai Manohar, Asst. Professor, Dept of Management Studies
- > Sri L K Prasad Rayaprolu, Asst. Professor, Dept of Management Studies
- > Sri P Bhargaw, Asst. Professor, Dept of Commerce
- > Dr. Krishna Chaitanya V, Asst. Professor, Dept. of Physics
- > Dr. (Mrs.) Pallavi Krishnamoorthi, Teaching Assistant, Dept. of Physics
- > Mrs. Vedavathi Aluri, Teaching Assistant, Dept. of Physics

STAFF PROFILE 2013/14



- 25 Professor
- 33 Associate Professor
- 81 Asst. Professor
- 16 Others

94/155 teachers have Ph.Ds. (additionally, 24 teachers are currently pursuing a Ph.D.)

Visiting & Guest Faculty

Inspired by the unique philosophy and vision of the Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba, eminent academicians and senior corporate executives volunteer to visit the university on an on-going basis to share their knowledge and experience

with students and faculty. They add a unique perspective to the courses taught and provide students exposure to wider academic and real world scenarios. Quite a few taught syllabi spanning an entire semester.

During the academic year 2013/14, 162 Visiting & Guest Faculty visited our campuses. Given below is a partial list of the institutions and organizations they came from.

162
Visiting
Faculty

Mathematics & Computer Science 21	Indian Institute of Technology, Kanpur	Siemens
	Microsoft	Old Dominion University
	Cornell University	Arizona State University
	Indian Institute of Technology, Chennai	University of New Haven
	University of Cincinnati	SAP Labs
Physics 27	EMC Data Storage Systems	Indian Statistical Institute
	Indian Institute of Technology, Chennai	University of Massachusetts
	Lucent Technologies	University of Western Ontario
	AT&T Bell Labs	Carleton University
	GE Global Research	Defence Research and Development Laboratory
Chemistry 8	Indian Institute of Astrophysics	Bank of America
	Bayer Health Care	Analog Devices India Pvt Ltd., (ADI)
	National Institute of Science and Technology	New Jersey Institute of Technology
Biosciences 8	Kansas State University	Indian Institute of Technology, Kanpur
	University of Canterbury	Bayer Health Care
Management Studies 38	Baylor College of Medicine	University of Illinois College of Medicine
	University of Allahabad	University of Colorado Health Sciences Centre
	University of Maryland (Baltimore)	University of Wollongong
	University of Sussex	Case Western Reserve University
Commerce 53	National Dairy Development Board (NDDB)	University of Sonthampson
	Deloitte	TVS Motor Company Ltd.
	IBM Global Business Services	Barclays Capital
	Kotak Mahindra Bank Ltd.	Nokia India Pvt. Ltd.
	Toyota Kirloskar Motors Ltd.	IDFC (Infrastructure Development Finance Company)
Economics 7	TCS (Tata Consultancy Services)	Birla SunLife Asset Management Co.
	Delloit Haskins and Sells	Myrian Capital
	Siemens	Mahindra Insurance Brokers
English Lang. & Literature	Ashok Leyland	Future Generali India Insurance Company
	Memorial University	Delhi School of Economics
	California State University	DRDO
	The Economic Times	

Student Activities & Achievements

BEST ALL-ROUND STUDENT AWARD

The Best All-Round Student Award recognises a final year student who excels in all five dimensions of the Sri Sathya Sai System of Values-based Integral Education - Intellectual, Cultural, Physical, Devotional and Service.

The award recognises one student from each of the four campuses of the university who secures an 'O' grade (Distinction) or above in academics and who also consistently excels in all co-curricular activities that include sports and games, cultural activities, self reliance, service activities, spiritual activities; and who exemplifies the high standard of conduct and behaviour expected of a student of the Sri Sathya Sai Institute of Higher Learning.

FELLOWSHIP

PHYSICS

K V Sanathana

M.Sc. in Physics (specialization in Photonics) graduate was awarded the prestigious Marie-Curie Fellowship to pursue Doctoral research at Instituto Italiano di Tecnologia (IIT), Genova, Italy, Oct 2013.

ACTIVITIES

PHYSICS

All final year M.Tech. (Applied Optics) students

Attended the IEEE ANTS (Advanced Networks and Telecommunication Systems) Conference, SRM University, Chennai, 15-18 Dec 2013. They presented two demonstration experiments indigenously set-up by them, which was accepted by the peer review committee of the conference to be exhibited during the 4-day International conference.

FIELD TRIPS

MATHEMATICS & COMPUTER SCIENCE AND PHYSICS

I M.Tech in Computer Science (Dept. of Mathematics & Computer Science) students and I M.Tech in Optoelectronics & Communications (Dept. of Physics) students, along with select faculty went on an annual four-day visit to Bangalore from 16-19 April 2014 to interact with technical experts at various organizations and companies who assisted them in choosing their final year projects in relevant areas. Organizations visited included: TVS

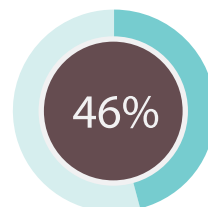
Motors, SAP Labs, Honeywell Aerospace Division, CISCO, Sri Sathya Sai Institute of Higher Medical Sciences (SSSIHMS), Whitefield, Bangalore, Akshaya Patra Foundation, Laboratory for Electro Optics Systems (LEOS), Tejas Networks and Honeywell Technology Solutions Lab (HTSL).

MANAGEMENT STUDIES

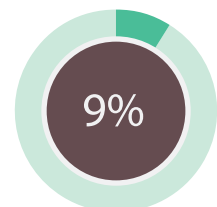
II M.B.A. and M.B.A. in Finance students visited a few industrial organizations in Bangalore from 16-20 April 2014 in an effort to help them connect the dots from the classroom to the workplace. These visits involved detailed plant tours followed by interaction with company management. Organizations included: TAFE, TVS Motor Company, Sundaram Fasteners, Harita seatings, Yuken India and Akshaya Patra Foundation.



PERFORMANCE IN NATIONAL EXAMS



GATE/JEST 2013/14



CSIR-UGC/NET 2013/14

This data pertains to final year postgraduate students who are eligible to write these tests

GATE: Graduate Aptitude Test in Engineering
JEST: Joint Entrance Screening Test

CSIR: Council of Scientific & Industrial Research
UGC: University Grants Commission
NET: National Eligibility Test

PERFORMANCE IN NATIONAL EXAMS

A high percentage of SSSIHL postgraduate students qualify in national exams such as the GATE/ JEST or the CSIR-UGC NET. The list of qualifying students in 2013/14 is included here.

***CSIR** (Council of Scientific & Industrial Research) | **JRF** (Junior Research Fellowship)

***NET** (National Eligibility Test) | **LS** (Lectureship)

****GATE** (Graduate Aptitude Test in Engineering)

All the above ranks are national (All India Rank)

*****AP-SLET** (Andhra Pradesh State Level Eligibility Test in Education)

Total No. of Exam Takers:

CSIR JRF/NET: **120,546**

GATE: **307,007**

CSIR JRF/NET* RANK

GATE** RANK

MATHEMATICS & COMPUTER SCIENCE

Srinivas K	79	32
Pinak Panigrahi		1207
BNSK Chaitanya		1666
Sai Prasanna		3837
Sai Sameer		3380
B Guru Swaroop		3890
Rohit Dhandhaniya		4341
Pediredla Appala Naidu		7810

PHYSICS

Sadhu Pavan Prasanth	37 (JRF)	22
Vinod Kumar Reddy		31
Abhishek H	122 (LS)	42
Lachit Saikia		48
Vinay Hegde		65
Ashish K Dora		275
Vibhav Bharadwaj	86 (LS)	409
Bipin Sharma		82
Aditya Kurdekar		157
Prateek Bhojanne		353

CHEMISTRY

N S P Chakravarthy		600
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BIOSCIENCES

Aiyer Kartik Satyanarayan		1710
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HOME SCIENCE

Kritika	UGC- NET* LS	
Yamini Iyer	UGC- NET* LS DRDO Research Fellowship	
Lakshmi Iyer	UGC- NET* LS	

EDUCATION

Hari Priya V	NET*	
R Divya	AP-SLET***	

ENGLISH LANGUAGE & LITERATURE

Ms. Lalitha Sarma	UGC NET* (eligibility for Asst. Professor)	
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Projects & Dissertations

Mathematics & Computer Science 22	M.Tech. in Computer Science and M.Sc.in Mathematics Key Areas: Computer Vision, Image/Video Processing & Machine Learning, Data Mining, Differential Equations, Computer Networks, High Performance Computing
Physics 46	III B.Sc. (Hons.) in Physics, M.Sc. in Physics, M.Sc. in Nanoscience and Nanotechnology and M.Tech. in Optoelectronics & Communications Key Areas: Electronics, Micro Processors, Nuclear Physics, Optics, Nano Science, Classical Physics, Optical Image Processing, Non-linear Optics, Biophotonics, Photovoltaics, Optical Networks, Plasmonics, Digital Image Processing, Fiber Optics, DWDM, LTE
Chemistry 11	M.Sc. in Chemistry, M.Tech. in Analytical Methods and Chemical Instrumentation Key Areas: Plasmonic Sensors, Electrochemical sensors, Environmental Monitoring, Photonics, Bioactive molecules, Bio-processing, Molecular modelling & Drug design
Biosciences 7	M.Sc. in Biosciences Key Areas: Microbial Electrochemical Systems, Systems Biology of Diseases, Environmental Biology
Home Science 7	M.Sc. in Food Technology and M.Sc. in Food Nutrition Key Areas: Novel Food Processing Technologies, Nutraceuticals , Biopreservation, Designer Foods
Management Studies 43	M.B.A. and M.B.A. in Finance Key Areas: Analytics in Business, Business and Internet, Business Ethics, Business Strategy, Consumer Behaviour, Entrepreneurship, Financial Markets, Financial Planning, Financial Strategies, Green Business, Insurance, International Business, Management of Not-for-profit organisations, Organisation Development, Organisational Behaviour, Stakeholder Management
Commerce 20	Master of Financial Management (M.F.M.) Key Areas: Bank Management, International Financial Reporting Standards (IFRS), Security Analysis and Portfolio Management, Financial Management and Analysis, Insurance, Financial Markets Analysis
Economics 7	M.A. in Economics Key Areas: Macroeconomic Modelling, Development Economics, Financial Econometrics
Education 9	Master of Education (M.Ed.) Main Theme: Values-based Education Key Areas: Importance of Educare – Sri Sathya Sai Philosophy of Education, Integration of Values through School Subjects, Peace Education – Ceiling on Desires, Importance of Women Education, Role of Dharma in Shaping Personality, Fundamental Duties – Its implications
English Lang. & Literature 2	M.A. in English Language & Literature Key Areas: Exploring the Phoneme-Grapheme Link: The Clue to Spelling and Pronunciation, The 'Becket Theme' Re-invented: A Comparative Study of Eliot's Murder in the Cathedral, Fry's Curtmantle, and Anouilh's Becket

Faculty Activities & Achievements

ANNUAL FACULTY WORKSHOP

28-29 May 2013

Prior to the start of each academic year, all academic staff and doctoral research scholars of the university come together for a two-day workshop. The workshop encourages everyone to participate and share ideas, experiences and best practices with respect to the process of character building, which is the cornerstone of the distinctive Sri Sathya Sai Values-based Integral Education.

The core objective of the workshop is to deliberate on the domains of the system of Values-based Integral Education of the university—its components, its critical success factors, the role of teachers and the like—as envisioned by the Founder Chancellor, Bhagawan Sri Sathya Sai Baba.

This year, the major focus of the workshop was on Bhagawan Baba's guidelines for teachers/doctoal research scholars and a session on how to keep students focused on Bhagawan Baba.

FACULTY ACTIVITIES & ACHIEVEMENTS

MATHEMATICS & COMPUTER SCIENCE

Sri Ajith Padyana

- > Delivered an Invited Talk on Big Data and Cloud Computing, NIT, Warangal, ABCD-2014, Mar 2014.
- > Delivered an Invited Talk on Memory Performance Optimization in GPUs in Hyderabad Central University. HyPack 2013, Oct 2013.

Dr. Pallav Kumar Baruah

- > Attended Precision Medicine Congress, London on 19-20 May 2014. (organized by Global Engage Ltd.).

- > Delivered an Invited Talks on GPUs: an enabling force for Real Time Computing at National Centre for Supercomputing Applications, University of Illinois, Urbana-Champagne, USA, 28 Mar 2014.
- > Delivered Invited Talks on 'MPI Collective Calls on Xeon Phi' and 'Dynamic Data Management and Communication Optimization in a Multi GPU Environment' in National Workshop on Hybrid Computing-Coprocessors & Accelerators, Power-aware Computing & Performance of Application Kernels (hyPACK 2013), 16 Oct 2013, jointly organized by CDAC and CMSD University of Hyderabad, Gouchibowli Campus, Hyderabad.
- > Member of Technical Program committee for the following Conferences:
 - > Third International Workshop on Recent Advances in Medical Informatics (RAMI-2014), Delhi, INDIA, 24-27 Sep 2014.
 - > International Conference on Networks & Soft Computing, IEEE Computer Intelligence Society, IEEE Hyderabad Section, Vignan University.
 - > ICACCI 2014 – IEEE 3rd International Conference on Advances in Computing, Communications and Informatics, Delhi, 24-27 Sep 2014
 - > ICCS 2014, International Conference of Computational Science, Cairns, Australia, 10-12 Jun 2014
 - > ICACCI 2013 – IEEE 2nd International Conference on Advances in Computing, Communications and Informatics, Mysore, 22-25 Aug 2013.
 - > ICCS 2013, International Conference of Computational Science, Barcelona, Spain, 5-7 Jun 2013.
- > Reviewer of the following Journals:
- > Mathematical Reviews:
- > Mathematical Archives - American

Mathematical Society, Journal of Applied Mathematics and Computing (Springer Publication), Journal of Super Computing (Springer Publication).

Dr. S Balasubramanian

- > Invited to present a talk on Machine Learning for Refresher Course on Computer Science, Goa Academic College, 28 Jan 2014.

Dr. S Balasubramanian and Dr. R Raghunatha Sarma

- > Poster Presentation – Improvised Eigen Vector Selection for Spectral Clustering in Image Segmentation. National conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG-2013), Jodhpur, Rajasthan, 18-21 Dec 2013.

PHYSICS

Dr. Krishna Chaitanya V

- > Presented an Invited Talk at a workshop on Non-linear Optics and Materials, at the DST-SERC School, SSN College of Engineering, Chennai, 3-21 Feb 2014.
- > Delivered an Invited Talk at Recent Advances in Optical Sciences (RAOS), University of Hyderabad, Hyderabad, 26-27 Apr 2014.

Dr. V Sai Muthukumar

- > Received Best Paper Award at the International Conference on Advanced Nanomaterials and Emerging Engineering Technologies (ICANMEET), 2013 for a paper on Enhanced optical limiting of solubilized carbon nanotubes decorated with Pt/Pd nanoparticles, Satyabhama University, Chennai, 24-26 July 2013.

Dr. Gowrishankar R

- > Guest lecturer for Fiber Optics and Optical Fiber Communications in the ECE, Bearys Institute of

Technology, Mangalore, 27-29 Sep 2013.

Dr. (Miss) Deepa Seetharaman

- > Presented a talk on Nuclear Structure Studies at the Awareness Workshop on Research Opportunities using the Facilities at VECC, DAE, Kolkata (organized with UGC-DAE Consortium for Scientific Research and Variable Energy Cyclotron Centre (VECC), Kolkata), SSSIHL, Prasanthi Nilayam, Andhra Pradesh, 28-29 Jun 2013.
- > Selected to participate in the 6th Science Conclave, a congregation of Nobel Laureates and INSPIRE Internship Program, conducted at IIT, Allahabad, 8-16 Dec 2013 and gave a report of the proceedings at the Science Colloquium, SSSIHL, 21 Dec 2013.

Dr. (Miss) Deepa Seetharaman, Dr. R Gowrishankar and Dr. K Vijay Sai

- > Selected to participate in the Workshop on Evaluation of Nuclear Structure and Decay Data, Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, 22-26 Mar 2014. Of the total of twenty participants selected for the workshop across various countries, eight were from India, of which three were from SSSIHL. A data evaluation team has been formed by these three faculty members in collaboration with VECC, Kolkata for Nuclear Data Evaluation.

CHEMISTRY

Dr. R Sai Sathish

- > Winner of the Sai Krishna Award for Excellence in Research in Sciences (2012/13), SSSIHL, Prasanthi Nilayam, 22 Nov 2013.
- > Delivered an Invited Talk at Recent Advances in Optical Sciences (RAOS), University of Hyderabad, Hyderabad, 26-27 Apr 2014.
- > Dr. R Sai Sathish, a DBT-Ramalingaswami Fellow attended

the DBT-Ramalingaswami Fellows conclave, National Centre for Cell Science (NCCS), Pune, Sep 2013 and his research work was greatly appreciated by peers. Senior experts also acknowledged the high-end and contemporary research work being carried out at SSSIHL.

Dr. S Prathap Chandran

- > Awarded the INSPIRE Faculty Award (Research Grant) a sum of ₹35 lakhs over a five-year period for research in the area of Colloids (synthesis, surface modification and assembly in to long-range structures or colloidal molecules) and colloid-LC composites.

BIOSCIENCES

Dr. B S Vijayakumar

- > Delivered a talk on Fungal Technology in the National Conference on Fungi in Centre for Marine Biotechnology, Annamalai University, Chidambaram, 27-28 Feb 2014.

Sri Sai Murali R S

- > Received the best oral presentation award – First Prize, for the paper entitled Variation in vasicine content of *Adhatoda vasica* Nees as a function of ecomorphometric parameters from the topo-geographically distinct regions of South Eastern Malabar area of Western Ghats of India at the *National Conference on Conservation, Characterization and Cultivation of Medicinal Plants for Sustainable Utilization and Community Welfare*, Pondicherry, 23-25 Feb 2014.

HOME SCIENCE

Prof. (Mrs.) Rashmi Kapoor

- > Talk delivered on Management of Lifestyle Diseases in a workshop entitled Nutraceuticals for Disease Management, DFRL, Mysore, 25-28 Sep 2013.

MANAGEMENT STUDIES

Prof. A Sudhir Bhaskar

- > Invited to give a talk on Diagnostics, Motivation and Leadership topics at the week-long Management Development Programme, Managerial Effectiveness, for Middle and Senior level Managers of M/s JSW Steel Ltd." organised by Sona School of Management, Salem, Dec 2013.

Dr. Sayee Manohar K

- > Chaired Conference Sessions during the 2nd National Conference on Business Challenges and Opportunities for Transformation Excellence, organized by Vysya Institute of Management Studies, Salem, 26 Feb 2014.

COMMERCE

Dr. (Miss) Ch Radhakumari

- > Chaired the inaugural session for the International Conference on Finance, Banking and Insurance (ICFBI 2013), Melbourne, Australia, 16-17 Dec 2013.

Dr. (Miss) N Niranjana

- > Spoke on the Role of Women in Society, JSS College of Arts & Commerce, Mysore, 10 Apr 2014.

Dr. (Miss) T R Rajeswari

- > Invited as chief guest and resource person and delivered a talk on 'Educare for Life' at the UGC-sponsored National Seminar on Values oriented Education - Status and Direction, Sri Sathya Sai College, Bhopal, 24-25 Oct 2013.

Dr. N Siva Kumar

- > Delivered a talk on 'Gandhian Economics' to the Postgraduate students of Media Studies at the University of San Francisco, USA, 29 Apr 2014.

ECONOMICS

Dr. R Prabhakar Rao

- > Winner of the Sai Krishna Award for Excellence in Research in Management, Commerce, Economics and Education (2012/13), SSSIHL, Prasanthi Nilayam, 22 Nov 2013.

Sri G Raghavender Raju

- > Invited by the Vivekananda Degree College, Vempalli, Kadapa to deliver a set of lectures to their undergraduate students on National Income, Trade Cycles and International Trade Theories, 27-29 Jan 2014.
- > Invited as Resource Person to chair two sessions for the two-day National Level workshop on 'Econometrics with Computer Applications – III', Chhatrapati Shahu Institute of Business Education & Research, Shivaji University, Kolhapur, 26-27 Feb 2014.
- > Invited by the Dept. of Economics, Shivaji University, Kolhapur, to deliver a lecture to their faculty and students on Econometrics Applications, 27 Feb 2014.

EDUCATION

Prof. (Miss) Madhu Kapani

- > Invited as a Resource person and delivered talks on Excellence in Education, Fostering Creativity and Guidance and Counseling at a School Leadership Workshop, Institute of Sathya Sai Education (India), Hyderabad, 23-27 Oct 2013.
- > Invited as an expert for M.Ed. course material preparation, Dr. B R Ambedkar Open University, 10 Dec 2013.
- > Attended the 4th Convention of Sathya Sai Schools (India) as member of the National Council of Sri Sathya Sai Schools, India. Acted as Panel member for the theme 'Developing School Leadership for

Excellence' held at Sri Sathya Sai Vidya Vihar, Indore, 7-9 Feb 2014.

- > Appointed editor and panel of lesson writers for the M.Ed. degree programme by Centre for Distance Education, Acharya Nagarjuna University, Apr 2014.
- > Invited as Resource Person to the International Seminar on 'Alternatives in School System and Teacher Education' organised by the Dept. of Education, University of Allahabad in collaboration with Indian Association of Teacher Educators and National Institute of Open Schooling (NIOS), 8-9 Mar 2014. Chaired a session on Research in Alternative Schooling and Teacher Education: Issues and priorities, and delivered a special talk on 'Sri Sathya Sai System of Integral Education'.
- > Reviewer for Rayat Bahra Journal of Education.

ENGLISH LANGUAGE & LITERATURE

Prof. (Miss) Rajeshwari C Patel

- > Winner of the Sai Krishna Award for Excellence in Research in Language and Philosophy (2012/13), SSSIHL, Prasanthi Nilayam, 22 Nov 2013.

SANSKRIT LANGUAGE

Dr. N Venkatesha Rao

- > Invited as a resource person to speak on the topic Gita Bhasya and Gita Tatparya: A comparative analysis, at the *Poorna Prajna Samshodha Samsthan*, Bangalore, 19-23 Apr 2014.

Academic Workshops & Conferences

MATHEMATICS & COMPUTER SCIENCE

Systems Software

24 Jul 2013

A hands-on workshop organized by SSSIHL alumni for B.C.A. students.

Areas included: Learning assemblers, compilers and linkers, thus helping students improve their programming and Java skills.

Distributed Parallel Programming on a cluster using Map Reduce and Hadoop

30 Nov and 14 Dec 2013

The workshop helped participants get started with implementing algorithms that need to work on large data sets. Such algorithms typically need to be distributed, parallel and capable of being deployed on a large cluster built using commodity hardware. The best solution available



today for such algorithms is the Hadoop framework originally developed by Yahoo. The workshop was designed around hands-on labs. The labs focused on implementing basic algorithms for a set of problems and the problems can be extended in its scope for student research projects.

External Experts / Invited guests from:

Impetus Infotech India Pvt. Ltd.
HP India Software Operations

PHYSICS

Research Opportunities using the Facilities at Variable Energy Cyclotron Centre (VECC), DAE, Kolkata

28-29 Jun 2013

The Variable Energy Cyclotron Centre (VECC) at Kolkata, has been the seat for accelerator based research in the country for over three decades now. The room temperature cyclotron built at VECC has undergone extensive modernization and has been delivering light ion beams in the energy domain of 7-15 MeV/nucleon. Heavy ion beams in the similar energy domain is scheduled to be available soon. Further, the upcoming Superconducting Cyclotron facility is soon expected to deliver energetic ion beams in the Fermi energy domain (up to ~ 60 MeV/nucleon). In addition, an ECR based low energy highly charged intense (~ 30 - 40 μ A) ion beam facility (10-300 keV) is also operational. These ion beams cater to a variety of research in basic and applied sciences.

Several experimental facilities centered around these major ion beam facilities have been developed by the in-house VECC research groups. The efficient utilization of such advanced facilities requires collaboration between the in-house groups and the user community.

The workshop facilitated the use of the facilities available at VECC, for multidisciplinary research, by research communities in universities, colleges and institutes. It was intended for research scholars and faculty members



from universities and academic institutions - to help solve research problems using these facilities. It has addressed the possible research problems and methodology that can be pursued for the use of such facilities. Topics covered during the workshop comprised of invited and contributory presentations on Nuclear Physics; Nuclear Detectors and Instrumentation; Material Science, Radiation Biology and Chemistry.

External Experts / Invited guests from:

VECC | Homi Bhabha National Institute | UGC DAE CSR

Web Technologies

27 Jul 2013

A workshop aimed at making the participants familiar with current and emerging web-based technologies. The prominent innovations in various fields of modern technology are those which represent progressive developments within a field for competitive advantage. A thorough overview of web browsers was given. The use of HTML Editor and Writing Code with the Text Editor along with the rules of HTML were demonstrated and hands on training was given to all the participants.

Recent Trends in Networking Technologies

17 Aug 2013

External Experts / Invited guests from:

Indian Institute of Technology (IIT), Madras
CISCO
BSNL
Qualcom

Faculty Development Program on Quantum Mechanics

28 Feb-1Mar 2014

Quantum mechanics (QM) is a most difficult subject to learn and also to teach. In other areas of physics such as classical mechanics or electrodynamics, one can start with well laid-out postulates and principles, since the foundations of these subjects are well established. This is not the case with QM. We have a one-semester course on QM at the undergraduate level. At the postgraduate level, we have QM spread over two semesters. A workshop on the teaching methodology of QM at the undergraduate level was organized for the benefit of all faculty members. The level of mathematics needed for QM is little more abstract than that required for other areas. Hence the workshop stressed on concepts like vectors that need to be 'upgraded' to 'elements belonging to a linear space. Familiarity with delta function and Fourier series and integrals were also highlighted. The concept of probability amplitude (which can even be a complex number) was also elaborated in detail.

CHEMISTRY

Integrated Chemistry Conference – ICCON 2013

14-15 Dec 2013

The primary objective of this conference was to expose postgraduate students and research scholars of the department to an integrated approach in understanding and solving scientific problems with practical insights. The conference covered the frontier fields of Surface Chemistry, Coordination Chemistry, Biochemistry, Computational Chemistry, Environmental Chemistry, Nano Biotechnology and Spectroscopy.

External Experts / Invited guests from:

VECC
Homi Bhabha National Institute
UGC DAE CSR
Indian Institute of Science
Raman Research Institute
Sri Krishnadevaraya University
Indian Institute of Science Education & Research (IISER)
Tata Chemicals Ltd.
National Institute of Pharmaceutical Education and Research (NIPER)
Syngene International Ltd.
Geological Survey of India



BIOSCIENCES

Hands-on Training in Immunology and Developmental Biology

1-2 Mar 2014

A hands-on training that helped equip postgraduate students with advanced techniques in immunology and developmental biology.

MANAGEMENT STUDIES

Business Analytics & Big Data

23-24 Aug 2013

The advent of data analytics has given businesses additional value and flexibility to view their relationships and patterns through data captured in a variety of forms - including text, images, and digital sensors.

Big Data is changing our view of the value of information. It is also providing a hint at what's next: the ability to expertly contextualize and analyze oceans of data. In computer science circles, this approach is known as Cognitive Computing. It is the underlying technology that allows a search engine such as Google to anticipate what you mean by the question you ask and adjust their rules and results on the fly. The commercialization of cognitive computing will require a new digital ecosystem. Companies like Google, Apple and Facebook are already using cognitive computing behind the scenes in services like Siri (an intelligent personal assistant available on Apple's mobile devices that helps you get things done just by asking).

The combination of big data and advanced analytics offers companies countless opportunities across the value chain. In portfolio strategy and product development, for example, companies can get a more detailed understanding of consumer needs and attitudes and more precisely identify consumer segments, thus improving their ability to target the highest-value opportunities. They can measure the return on investment (ROI) for marketing spend across both traditional and newer marketing vehicles (such as social media), allowing them to shift marketing dollars to the most effective channels.

External Experts / Invited guests from:

Rural Shores India | Wipro Technologies | Hansa CE Equity
SKS Microfinance | Nanobi Analytics | Hewlett-Packard
Chrysler India

Women Executives & Managers – Opportunities & Challenges

14 Dec 2013

A workshop that brought together experts from academia and industry from various fields to engage in a deliberation on the state of play of women executives, their role in the workspace, the challenges & opportunities, etc.

External Experts / Invited guests from:

Airworks | Nmore | ING Vysya | MMC Infotech
Sai Seva Business Solutions



Man Management – A Management Development Program

15-16 Feb 2014

A thematic, two-day Management Development Programme that focused on individual and team development, and transformation. Experts from industry elaborated on topics ranging from empowering people to customer and cost focus, from managing results to handling difficult situations.

External Experts / Invited guests from:

HCL Technologies | Tata Consultancy Services
Valcon Management Consultants | Symrise Pvt. Ltd.
Virtusa India Pvt. Ltd. | InSAI Consultants
Times Centre for Learning Ltd.

Indian Ethos & Values: Man Management Based on Discourses of Bhagawan Baba

22 Mar 2014

A half-day orientation for students, research scholars and faculty to the message and guidelines of Bhagawan Sri Sathya Sai Baba with reference to Man Management – a collection of His Divine Discourses on the same subject. It included a panel discussion led by SSSIHL alumni, based on a video presentation of Baba speaking on Indian ethos and values, and their significance in management.

External Experts / Invited guests from:

TCS | Famy Care Ltd. | SSSIHL alumni

COMMERCE

Trends in Financial Services

17 Aug 2013

A symposium focused on the emerging trends in Insurance, Mutual Funds, Banking and Financial Services. The latest trends, along with their ethical implications were discussed.

External Experts / Invited guests from:

Future Generali Insurance Co.

Birla Sun Life Asset Management Co.

Airworks | L&T Financial Holdings | Barclays Bank

Ethics and the Challenges of Business

22 Feb 2014

The symposium discussed ethical challenges faced by executives in Industry. The sub-themes included Ethics and Financial Services, Ethics and Business Strategy and Ethics and Business Operations.

External Experts / Invited guests from:

Grant Thornton India Ltd. | State Bank of India (SBI)

Insurance Regulatory and Development Authority (IRDA)

UBS | Barclays Bank | HDFC | Arvind Brands

ECONOMICS

Indian Economy: Perspectives and Challenges

21-22 Feb 2014

A two-day national conference that discussed perspectives on the Indian economy with the sub-themes of Agriculture, Industry and Services, Trade and Balance of Payments, Economic Growth and Development, Fiscal and Monetary Policies, Financial Markets, Rural Uplift and Inclusive Growth, Ethical Perspectives, etc.

External Experts / Invited guests from:

Delhi School of Economics | Indian Institute of Technology (IIT), Mumbai | GITAM University | Andhra University



Indira Gandhi Institute of Development Research (IGIDR)
National University of Educational Planning & Administration (NUEPA) | Jadavpur University | Acharya N G Ranga Agricultural University | Indian Institute of Technology, Kanpur

EDUCATION

Imbibing Teaching Abilities/Skills and their Components

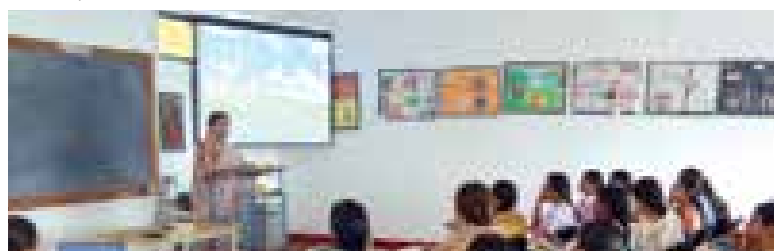
4-9 July 2013

A workshop that helped young faculty members to improve their teaching abilities and skills. It also helped them understand better the evaluation system at SSSIHL. The themes discussed were preparation and planning of lessons by keeping the educational objectives in view; integrating values through different teaching subjects; and the feedback and evaluation of Viva-voce and Practicals.

Models of Teaching

5 Sep 2013

A workshop conducted by a senior expert from Vasanta College of Education, Varanasi for all staff and students of the department.



Creation is a marvel. It defies description. It exhibits what is not real and conceals what is. Confronted with the Universe, so difficult to decide whether true or false, some have concluded it is real, some have declared it unreal, and some have described it as a mixture of the real and the illusory. The problem has been the subject of endless debate and controversy. Right education should aim at discovering the basic truth, which will lay at rest this uncertainty.

Bhagawan Sri Sathya Sai Baba
Revered Founder Chancellor



RESEARCH

2013/14



3



Research Overview

RESEARCH GROWTH

The research output at the university has seen a significant rise in the past few years. The number of doctoral research scholars has seen a 53% increase in three years from fifty-one in 2011 to seventy-eight in 2014. Research Scholars represent almost 8% of the current student population at SSSIHL, a figure far above the national average. New research collaborations in the Sciences between the university and external institutions like the FDA (USA), as well as collaborations on multiple research projects with the Sri Sathya Sai Institute of Higher Medical Sciences (SSSIHMS) are testimonial to the rise in the quality of research at the university.

Grants for ongoing research projects across departments total upwards of ₹956 lakhs, of which ₹447 lakhs is from projects sanctioned in 2013/14.

BENEFIT TO SOCIETY

In line with the vision of the Revered Founder Chancellor, all research at SSSIHL ultimately leads to societal benefit. Thus, the topics for doctoral research across all departments are chosen with great diligence.

This extends to the research projects chosen by researchers in each department, so that all the research done leads to translational research or directed basic research.

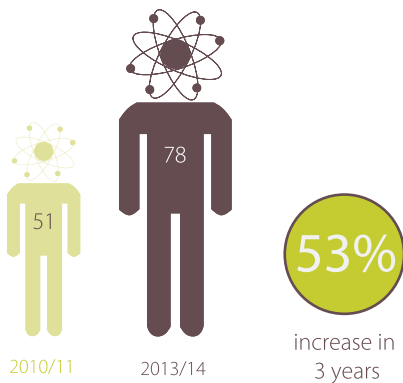
projects that will benefit society.

This has led to interdisciplinary collaborations of SSSIHL with SSSIHMS and external agencies in areas such as the rapid detection of endemic diseases, diabetic retinopathy, development of a cost effective multi-modal microscope, regenerative medicine and tissue engineering, etc.

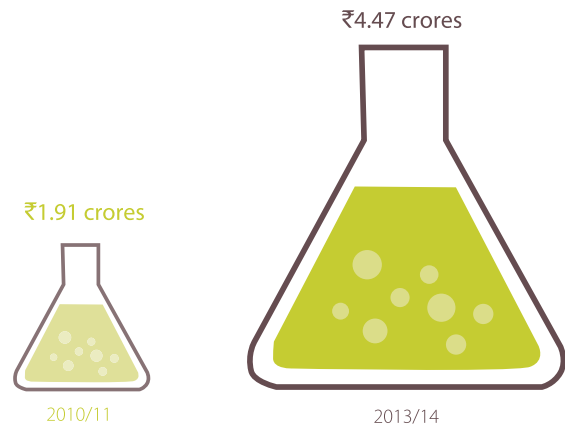
INTERDISCIPLINARY APPROACH

The university has taken many steps in the past few years in bringing the various disciplines at the university and SSSIHMS together to discuss issues from various perspectives and identify

DOCTORAL RESEARCH SCHOLARS



RESEARCH GRANTS



Interdisciplinary Science Colloquium

The Interdisciplinary Science Colloquium—conducted every Saturday afternoon—provides an opportunity for doctoral research scholars, teaching faculty and visiting experts to share their research experiences with one another. All the science departments (across campuses) of the university participate, using the video conference facility.

As a result, the colloquium has helped break down the barriers between the various science disciplines and directed the university's research thrust towards the merging of traditionally distinct scientific disciplines and creating new opportunities.

TOPICS OF SCIENCE COLLOQUIUM 2013/14

- > Bioanalysis Using Tetrakis (4-sulphonatophenyl) Porphyrin
- > The joy of doing Basic Research
- > Material considerations underlying Power Plant (Thermal/ Nuclear) Design and Operation
- > Nanodielectronics for energy storage applications - Role of Interface
- > Time Frequency transforms for Radar Image Enhancement
- > Statistics, Science and Society
- > Nutrigenomics and Nutrigenetics: An Emerging Paradigm in Molecular Nutrition
- > Aptamers: Revolutionising Diagnostics and Therapy
- > Avascular Necrosis of Femoral Head: Molecular Genetics and Biophysical Characterization
- > Impedance Analysis of Dielectric Nanoparticles Enabled Via a Self-assembled Monolayer
- > Chitosan Biopolymer: Antimicrobial Activity and Postharvest Applications
- > On Water
- > Functional implications of SNPs in Spliceosomal Network: A Structural Systems Biology Approach
- > Are we Eating Food or the Food is Eating Us? A Brief Review of Good Fat Vs Bad Fat.
- > Saponins as Nutraceutical Agents
- > Chitosan Biopolymer: Antimicrobial Activity and Post Harvest Applications
- > Stability of Nanoparticles: From the Perspective of Drug Formulations
- > Targeting Cancer with Resveratrol Analogues
- > Development of Small Organ Imaging Gamma Camera
- > Life and Works of Sir C V Raman
- > Methods for Extraction of Phytochemicals: A Journey from Plant to Bioactive Compounds
- > New Insights on Emission and Chemistry of Voccs from High Time Resolution *in-situ* Measurements in the Himalayan Foothills
- > Sharing of Experiences during the Sixth Science Conclave: A Congregation of Nobel Laureates, Indian Institute of Information Technology, Allahabad, Uttar Pradesh, 8-14 Dec 2013
- > Opto-fluidics: A New River of Light
- > Single Frame Image Super-Resolution Using Exemplar Based Approaches
- > Comparative Study on the Production of Low-Cost Cellulolytic Enzyme System from Groundnut Shell (GNS) with the use of Solid State and Submerged Liquid Fermentation Techniques
- > Methods for Extraction of Phytochemicals: A Journey from Plant to Bioactive Compounds
- > Plasmonic and Electrochemical Applications of Gold Nanoparticles
- > How to be Safe on the Internet?
- > Introduction to Femtosecond Laser-based Fabrication Technology: Micro Fluidic Devices and Applications
- > Generation of Novel Andrographolide and Ethionamide Analogues of Pharmaceutical Promise.
- > Understanding the Immune System – How it Works
- > Introduction to Mathematical Modelling
- > 100 years of X-Ray Diffraction

Sai Krishna Award for Excellence in Research

The Sai Krishna Award for Research and Teaching has been instituted to honour the top researchers and teachers of SSSIHL each year. The awards alternate between top researchers and top teachers every year. The winners in the three categories are selected based on evaluation of the research work of the applicants by external experts. The winners for 2013/14 were:

- > Excellence in Research in Sciences: Dr. Sai Sathish, Asst. Professor, Dept. of Chemistry, SSSIHL
- > Excellence in Research in Management, Commerce, Economics and Education: Dr. R Prabhakar Rao, Associate Professor and Head, Dept. of Economics, SSSIHL
- > Excellence in Research in Languages and Philosophy: Prof. (Miss) Rajeshwari C Patel, Professor and Head, Dept. of English Language & Literature, SSSIHL








Doctoral Research Scholars Activities & Achievements

		Activity / Achievement
Mathematics & Computer Science	Sri Sai Hareesh A	> Reviewer for Journal of Visual Communication and Image Representation, Elsevier.
		> Received Travel Grant from Microsoft Research Bangalore for presenting the paper in IEEE International Winter Conference on Applications of Computer Vision, (WACV 2014), Steamboat Springs, Colorado, USA, 24-27 Mar 2014.
		> Received the Best Poster Award in the Section of Mathematical Sciences including Statistics at 101 st Indian Science Congress (ISCA), Jammu, Feb 2014.
Physics	Sri Pradyumna Mulpur	> Received the Young Scientist Award, 2 nd Prize in the Category of Physics (2013/14) for his paper, Graphene as a Smart Spacer Material on Engineered Thin Film Hybrids for the Amplification of Surface Plasmon Coupled Emission Towards Sensing, conferred by the KV Rao Scientific Society (a prestigious non-profit organization that promotes science in numerous ways), Birla Science Centre, Hyderabad, 31 May 2014.
		> Received a Certificate of Completion with Distinction for a 9-week online course entitled, Nanotechnology: The Basics, authorized by Rice University, Texas, 3 Feb 2014.
	Sri Murali Ravi	> Selected to attend a UGC DAE-CSR Summer School on Detector simulations using GEANT 4, Kolkata, 15-30 Jun 2014.
Biosciences	Sri K N Naresh	> Received Second Prize for the Oral Presentation at the International Conference on Biotechnology and Bioinformatics (ICBB) 2014, International Centre for Stem Cells, Cancer and Biotechnology (ICSCCB), Pune, Maharashtra, 1-2 Feb 2014, for the paper 'Enhancement of Phenoloxidase Activity of Molluscan Hemocyanin by SDS: a Study Using Enzyme Kinetics and Molecular Dynamics'.
Management Studies	Dr. Shashank Shah (Post-Doc Fellow)	<ul style="list-style-type: none"> > Invited as Resource Faculty at the four-day Executive Development Programme jointly organised by Harvard University's South Asia Institute (SAI) in collaboration with the World Bank and the Dept. of Public Enterprises, Government of India on the theme Non-State Players in Human Development: Achieving India's Goals, Mumbai, 3-6 Feb 2014. > Co-authored book with Prof. V E Ramamoorthy entitled 'Soulful Corporations: A Values-based Perspective on Corporate Social Responsibility', released at a special function by Dr. Indu Shahani, Member, University Grants Commission; and Former Sheriff of Mumbai, 31 Oct 2013. Dr. Shashank Shah addressed the gathering on the theme entitled 'Emerging Role of Corporations in Society'. > Reviewer, Journal of Human Values, Indian Institute of Management, Calcutta, Sage Publications, for the academic year 2013/14. > International Advisory and Editorial Board Member, Journal of Values-based Leadership, Valparaiso University, USA, for the academic year 2013/14.



Research Grants & Projects

	Granting Agency	Project
Mathematics & Computer Science 	DRDO ER & IP, Delhi, India	Near-Real-Time Super Resolution of Aerial Video (Visual and IR) Sequences for Defence Applications
	Zentron Labs Bangalore	Diabetic Retinopathy Screening Tool
	DRDO (ER and IPR)	Real-Time Motion Compensation, Image Enhancement, and Feature Extraction of Moving Targets in ISAR
	ISRO-RESPOND	Elliptic Curve Cryptography
	NBHM/DAE	Qualitative Study of Coupled Ordinary Differential Equations
	DRDO	An Ensemble of Image Segmentation Algorithms for Medical and Aerial Images
Physics 	UGC	UGC Basic Science Research (BSR) project
	DST	FIST (Fund for Improvement of Science & Teaching Infrastructure)
	DST	Postgraduate Teaching Programme – M.Sc. in Nanoscience and Nanotechnology
	DAE-BRNS	Modification of a Planar Gamma Camera and its Upgradation for Supporting Education, Training and Research in Medical Imaging
	VGST, DST, Govt. Karnataka	Research-based Reforms in Physics Instruction: Classroom and Laboratory
	DST	Design and Development of Multi-modal Optical Microscope Using Fourier Optical Image Processing
Chemistry 	DRDO	Real Time Motion Compensation, Image Enhancement and Feature Extraction of Moving Targets in ISAR
	DAE-BRNS	Studies on Semiconductor-metal Nano Composites as High Performance Thermoelectric Materials
	DST Faculty Award	INSPIRE - Regiospecific Functionalisation of Anisotropic Nanoparticles and Implications Towards Generation of Plasmonic Metal Nanoclusters
	DBT	Development and Validation of an Indigenous Assay for Lp-PLA2 for Early Detection of Heart Disease in Young Indians
	DBT	Application of Plasmonic Technologies and Microbes-fortified Biosorbents for Efficient Integrated Bioprocessing
Biosciences 	DST	Application of Plasmonic Technologies and Microbes-fortified Biosorbents for a Low-cost Integrated Approach to Water Treatment
	UGC	Start up grant - Modulation of TNF Alpha and Homocysteube-induced Inflammation by HDAC and Hsp90 Inhibitors
	UGC	SAP DRS LEVEL II - Special Assistance Programme: Plant Cell, Tissue Culture and its Applications. Immunogenetics
	DST-SERB	Evaluation and Characterization of ESBL Producing Pathogenic Gram Negative Enterobacteriaceae
Home Science 	UGC	Food and Nutraceutical Application of Aloe Vera Gel

Research Scholars

POST-DOCTORAL

	Dr. S Prathap Chandran	Colloids and colloid-LC composites
Chemistry	Dr. A Sunil	Novel Chemical Methods for Metal Responsive Fluorescent Sensing, Corrosion Inhibition and Bio-medical Applications
	Dr. Sasidhar Siddabattuni	Organic - Inorganic Nanocomposites; Interfacial Chemistry; Polymers
Management Studies	Dr. Shashank Shah	Leadership Perceptions on Business Management and Stakeholder Welfare: A Qualitative Study of Corporate India

DOCTORAL

	Sri Srikanth Khanna	Image Processing
	Sri N Uday Kiran	Microlocal Analysis of Operators with Multiple Characteristics
	Sri D Hanumantha R Naidu	Context-based Speech Enhancement
Mathematics & Computer Science (DMACS)	Sri B V K Bharadwaj	Ordinary Differential Equations and Differential Analysis
	Sri. Ajith Padyana	High Performance Computing
	Sri Srinath M S	Cryptography
	Sri Sai Hareesh A	Real-Time Video Super-Resolution
	Sri Sai Shyam	Digital Watermarking
	Sri Lalit Srikanth C	Spectral Clustering Techniques with Application to Image Segmentation
	Sri Muralikrishna Molli	Nanomaterials for Thermoelectric Applications
	Sri Benoy Anand	Non-linear Optical Properties of Nanostructured Materials
	Sri Suresh Penamati	Radar Signal Processing
	Sri Sai Kiran Aditha	Nanomaterials for Photovoltaic Applications
	Sri Sandeep Patnaik	Pharmaceutical Nanotechnology
Physics	Sri L A Avinash Chunduri	Nano Medicine
	Sri Pradyumna Mulpur	Plasmonics, Photonics & Nanomaterial Sensors
	Mrs. C Prathibha	Novel Nano Materials for Deflouridation Studies
	Sri Murali Ravi	Nuclear Medicine Instrumentation
	Sri Sumukh Nandan R	Optofluidic Resonators
	Dr. V Sivasubramaniyan	Nuclear Medicine
	Sri Ramakrishna Motamarri	Natural Products
	Sri Sai Giridhar S	Clinical Biochemistry
	Sri Abilash Gangula	Early Detection of Heart Disease in Young Indians
	Sri K M Ganesh	Ground Water Quality Assessment and Defloridation
Chemistry	Sri K Naga Sai Visweswar	Biosynthesis and Applications of Bacterial Cyclic Glucans
	Sri R S Sai Siddhardha	Electro-catalysis, Electrochemical Sensors, Energy Devices, Nanocatalysis
	Sri Sai Giridhar S Kandanur	Synthetic Organic and Medicinal Chemistry
	Sri Manne Anupam Kumar	Electrochemical Sensing of Biological & Chemical Molecules using Graphene Based Nanocomposites
	Sri Pradeep Kumar Badiya	Bioprocessing and Solid State Fermentation
	Sri S Venkatesh	Plasmonics, Nanophotonics
	Sri Vennel Raj	Studies in Biodiversity of <i>Aegle marmelos</i> (Linn.) Corea Morphological Traits and Molecular Markers
Biosciences	Sri V N S Malleswara D Kota	Studies on the Stress Related Adaptability in an Amphibious Snail (Indian Apple Snail)
	Sri K N Naresh	Protein Structure and Function

Biosciences	Sri A S Vishwanathan	Microbial Biotechnology
	Sri Robin Sharma	Antioxidant Capacity of Endophytic Fungi from Medicinal Plants
	Sri Sai Murali R S	Plant Biotechnology and Phytochemistry
	Sri Aswath Narayanan S	Disease Biology of Bone
	Sri P Sujith Kumar	Glaucoma - Disease Biology
	Sri Prasanth Ghanta	Plant Biotechnology
	Sri Sai Krishna S B	Biomarkers in Rheumatoid Arthritis
	Miss Isha Sai	Bioactive Compounds of Mushrooms
	Sri Mukul Anand	Plant Biotechnology
	Mrs. Niranjana Mahalingam	Molecular Microbiology
	Mrs. Bhavani M	Molecular Microbiology
Miss B Anusha	Bioactive Principles and Medicinal Properties of Spices	
Home Science	Miss Pushkala R	Functional Foods and Nutraceuticals, Postharvest Technology
	Miss Rajeshwari C U	Phytochemicals and Therapeutic Potential of Spices
	Miss Iyer Shobha R	Phytochemicals and Therapeutic Potential of Spices
Management Studies	Sri G S Srirangarajan	Spirit at Work in Business Organizations in India
	Sri Amey Deshpande	Corporate Strategy
	Sri S Sai Manohar	A Study of Innovation Culture of Leading Innovative Organizations
	Sri B Chandrasekhar	A Study on Microsavings and Saving Behaviour of the Poor: Hurdles and Opportunities
	Sri Bhabani Shankar Padhy	Social Entrepreneurship
	Sri V N Prakash Sharma	Corporate Governance and Firm Performance
Sri Jhaveri Aman Sunil Priti	Organizational Strategies for Inclusive Growth	
Commerce	Miss U Suma	Top Women Executives in India: An Exploratory and Descriptive Study
	Sri C Srinivas Yadav	Study of Health Insurance in India with Special Reference to Standalone Health Insurance Companies
	Sri G Ragahvender Raju	An Analysis of India's External Sector Under the New Economic Policy Regime
	Sri Rajabushan J Nayak	Public Debt
	Sri Siva Kiran Gupta K	Analysis & Modelling of Capital Markets & Economic Growth of Emerging Economies (esp. BRICS)
Sri Gopakumar K U	Food Inflation in India: A Policy Oriented Analysis	
English Language & Literature	Miss Dibba Bhargavi	Modern British Novel
	Miss Maitali Verma	Modern and Post-Modern Poetry
	Miss Divya Goyal	Modern European Drama
	Sri Prashant Luthra	A Study of Selected Novels of R K Narayan
	Miss Lalitha Sarma R	Feminism and Gender Studies
Sri Siddhartha R	Witness Literature	
M.PHIL.		
DMACS	Sri Ivaturi Aditya	Mathematical Ecology
	Sri Gannavarapu K Prasad	Synthetic Organic Chemistry (Supramolecular Chemistry)
Chemistry	Sri Chelli Sai Manohar	Molecular Modelling and Drug Design
	Sri Thota Sai Manohar	Chaperone Biology
Biosciences	Sri Girish T N	Ecological Genetics
	Kum. Nelli Vani Sri	Anton Chekhov: A Critical Study of Four Select Plays
Eng. Lang. & Literature	Kum. Sunandini C Haldipur	Fyodor Dostoevsky and the Psychological Delineation of Character: A Study of Three Select Novels

Research Focus Areas

Department of Mathematics & Computer Science



COMPUTER VISION, IMAGE/VIDEO PROCESSING AND MACHINE LEARNING

Computer Vision is to enable the machines to see and interpret the real-world scenes imitating human perception and understanding and then to act upon derived understanding. Image and Video Processing is the area where captured images and videos are processed to enhance its quality, to segment regions of interest, to extract useful features and to perform detailed analysis in offline and real-time modes to enable higher level tasks in Computer Vision. Machine Learning area is a sub-field of computer science in which the machines are enabled with the ability to learn from data, an important tool for building intelligent machines that can improve the quality of our lives.

RESEARCH SUMMARY

- > Over two decades, the Department of Mathematics and Computer Science (DMACS), has pioneered work on Image Processing, Computer Vision and Machine Learning domains of research. Healthcare and Defence have been the two major focus areas on which the department had gained considerable expertise. DRDO awarded ₹22.00 lakhs for Aerial Image Mosaicing project, followed by ₹41.4 lakhs for Image Segmentation for Defence and Medical Applications, and recently, DRDO has also awarded ₹48.76 lakhs for Near-real time Super Resolution of IR and Visual Video Sequences.
- > DMACS has acquired skills in the areas of image pre-processing, image denoising, image restoration, image enhancement, image super resolution, image segmentation, image inpainting, image mosaicing, image feature extraction, image descriptors, image classification, and image analysis. Similarly, DMACS has also acquired skills in the area of video pre-processing, video 2D/3D motion estimation, video stabilization, video super resolution, object detection, recognition, and tracking in video sequences.
- > DMACS has applied this capability to screen patients with Diabetic Retinopathy and also Children with Acute Lymphoblastic Leukemia. Currently, a research project to provide an online tool for screening Diabetic Retinopathy patients is being pursued to assist doctors/clinicians. Work is underway to identify best-of-breed algorithms for breast

cancer detection.

- > DMACS has to its credit a number of publications in reputed international journals, international and national conferences and book chapters.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Image Segmentation for Defence and Medical Applications for DRDO
- > Near Real-time Video Super Resolution of Visual and IR Sequences for DRDO for aerial surveillance

Collaborations

- > DRDO ER & IP Delhi and ADE Aerial Image Exploitation Centre
- > Sri Sathya Sai Institute of Higher Medical Sciences (SSSIHMS) at Whitefield and Prasanthigram
- > A number of eye research institutes such as Sankara Nethralaya, Agarwal Eye Hospital, Narayana Nethralaya, and SSSIHMS
- > Zentron labs, Bangalore

Other Activities

- > We have also embarked on a health-informatics project on data pertaining to patients having Rheumatoid Heart Disease using machine learning, data mining and natural language processing.



CRYPTOGRAPHY

Cryptography is a field that focuses on providing safe, and secure communications and exchange of sensitive information between parties. It attempts to develop systems that will make the time to decode the encrypted messages unimaginably large to thwart all possible attacks.

RESEARCH SUMMARY

- > Over the last five years, DMACS has pioneered work on Encryption using Chaotic Dynamical Systems such as Lorentz attractors, Elliptic Curve Cryptography and Number Theoretic Encryption Techniques.
- > DMACS has acquired reasonable skills in the areas of image encryption, multi-linear maps, digital signatures and non-commutative algebraic cryptography. It has also acquired detailed mathematical background for conducting research in use of elliptic curves in cryptography.
- > Currently DMACS is being supported under the ISRO/RESPOND scheme for research work on Elliptic Curve Cryptography.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > ISRO/RESPOND Project on Elliptic Curve Cryptography

Collaborations

- > Advanced Data Research Institute (ADRIN), Dept. of Space, Hyderabad
- > IIT, Bangalore, Dr. Vijay Patankar

Other Activities

- > The department has also worked on Digital Watermarking to increase the payload capability. It has also researched the possibility of using heterogeneous watermarks such as audio file in an image file.

HIGH PERFORMANCE COMPUTING (HPC)

HPC is a branch of computer science that concentrates on developing supercomputers and software to run on supercomputers. A main area of this discipline is developing parallel processing algorithms and software programs that can be divided into little pieces so that each piece can be executed simultaneously by separate processors. Finding solutions to the challenges in designing supercomputers and large-scale computer clusters to solve advanced computation problems forms part of the core research area of HPC. HPC has the capacity to handle and analyze massive amounts of data at very high speeds. Tasks that can take months using normal computers can be done in days or even minutes. It can be used to model and solve highly complex problems across a range of high-value sectors.



RESEARCH SUMMARY

- > Over the last ten years, DMACS has acquired satisfactory skills in understanding the super-scalar architectures, high performance computing-related bottlenecks, parallel algorithms, and has enhanced skill sets in CUDA programming and research.
- > DMACS has been recognized by NVIDIA as their recognized teaching and research centres in CUDA programming. They have signed a Professor-in-Partnership Program with DMACS providing adequate support in terms of GPGPU hardware. DMACS has been receiving latest versions of GPGPU for research and teaching as part of the CTC CUDA Teaching Centre and CRC CUDA Research Centre.
- > A doctoral research work has been completed in the area of "Topology and Routing Aware Mapping on Parallel Processors". Another doctoral research work is in progress and it focuses on finding solutions to the problem of I/O bottleneck in HPC applications.
- > DMACS has also been active in Hadoop/Spark platform and is in the process of building an 8 node Hadoop cluster.

- > DMACS has established an 8-node cluster to study various architectures and to support scientific computing across all departments.
- > A number of publications by students of DMACS have won prizes and awards in the International Conference on High Performance Computing being held every year in India.

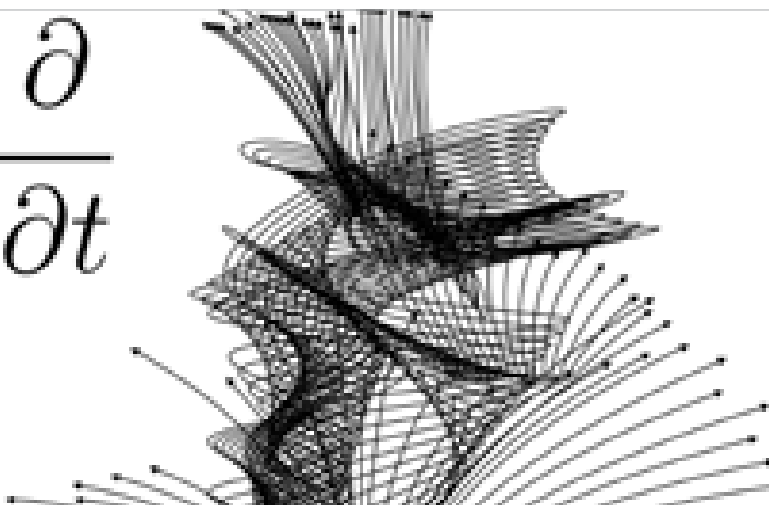
MAJOR RESEARCH ACTIVITIES 2013/14

Collaborations

- > Prof. Ashok Srinivasan, University of Florida, USA
- > Prof. Sadayappan, Ohio State University, USA

Other Activities

- > A number of papers showcasing the performance enhancement of applications when they are parallelized have been published



DIFFERENTIAL EQUATIONS

- > Differential Equations is a branch of Analysis which uses analytic or numerical methods to address questions on existence, uniqueness and stability of solutions.
- > Singular Interface Problems are problems with a differential equation defined on a domain with singularity that can be viewed as 'holes' or 'gaps' in the domain. The conditions imposed usually indicate the interaction of the boundaries of the singularities.
- > Fractional Calculus or the non-integer order calculus is an extension of traditional calculus. With the flexibility of a non-integer order derivative, fractional calculus has been found to be useful in describing the dynamical behaviour of materials and processes over vast time and frequency scales with very concise and computable models.
- > Pseudo-differential Operators are generalization of differential equations using tools of Fourier analysis. These operators due to their geometric and algebraic treatment played a major role in the understanding theoretical questions of Partial Differential Equations.

RESEARCH SUMMARY

- > Singular Interface Problems: Over the last two decades, DMACS has established the area of Singular Interface Problems with both analytic and numerical studies of general n^{th} -order non-linear singular interface problems. Two doctoral research works have been completed in these areas. Further research work is being undertaken in the context of boundary value problems. A proposal to DST to further this research work has been submitted for consideration.
- > Fractional Calculus and Applications to Image Processing: Fractional Differentiation, Fractional Order Derivative and its applications in signal and image processing is now assuming importance for the international scientific community. The present work in DMACS aims to contribute to the area of image processing by studying the filters, transforms and other conventional techniques and their fractional or rather generalized counterparts. A doctoral research is in progress in this area.
- > Pseudo-Differential Operators: A doctoral research work is being carried out on the development and extension of tools required for the local and global well-posedness problems of hyperbolic operators using the pseudo-differential calculus. The main aim of this work is a complete resolution of the Ivrii-Petkov conjecture and to extend the theory of pseudo-differential operators of type S .
- > Mathematical Modelling: In Ecological and Epidemic modelling, the department has worked on the provision of additional food as a tool for biological control of predator-prey systems. The preliminary study of neglected tropical diseases is in progress.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Under SSSIHL with University of Torino: Theory of Pseudo-Differential operators of type S and Global well-posedness of strictly hyperbolic operators
- > Analytical and numerical studies of general n^{th} order non-linear singular interface problems on time scales submitted to DST

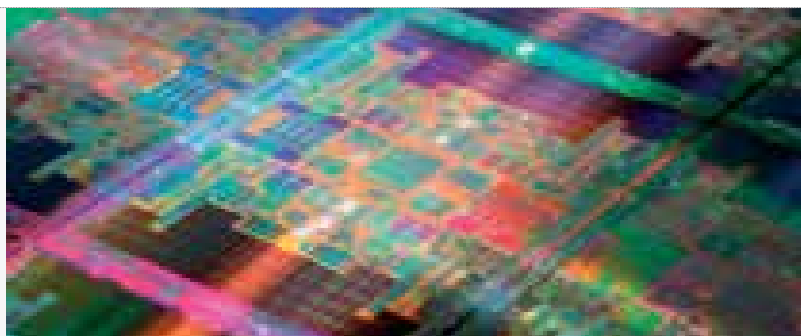
Collaborations

- > Dr. Sandro Coriasco, Dr. Marco Cappiallo and Prof. Luigi Rodino, University of Torino, Italy
- > Prof. P D N Srinivas, Head, Dept. of Mathematics, Andhra University

Department of Physics

PHOTONICS

The generation, emission, modulation, transmission, amplification and detection of light are studied under the science of photonics, covering all technical aspects over the entire spectrum of electromagnetic radiations. The science is closely related to classical and modern optics giving the scope to study practical application of optics like optical fiber communications, optoelectronics, microscopy, astronomy and so on.



RESEARCH SUMMARY

- > Research work in photonics is being undertaken in the sub areas of non-linear optics, nanophotonics, biophotonics, fiber optics and photonic sensors. Non-linear optical properties of varied materials including novel nano materials are being studied using high power pulsed Nd:YAG laser and associated systems. The department has an automated Z-scan setup for such studies. Non-linear effects in fibers, surface Plasmon resonance studies, switching and power limiting properties of Bacteriorhodopsin, design and construction of multi-modal microscope, nanomaterial synthesis by laser ablation, multi-parameter sensing using optofluidic ring resonators and fiber gyroscope sensors are the various research activities carried out in this area.

- > Design and characterization of optofluidic resonator geometries for biomedical sensing applications funded by UGC-DAE-CSR, Kalpakkam Node

Collaborations

- > UGC DAE CSR – Kalpakkam Node; Dr. B K Panigrahi, Indira Gandhi Centre for Atomic Research, Kalpakkam
- > Dr. Sai Siva G, Dept. of Instrumentation & Applied Physics, Indian Institute of Science, Bangalore
- > Prof. A M Rao, Clemson University, USA
- > Dr. Shivakiran Bhaktha B N, Indian Institute of Technology, Kharagpur
- > Dr. V Lakshminarayana, Dr. Reji Philip, Raman Research Institute, Bangalore
- > Photonics lab, Indian Institute of Astrophysics, Koramangala, Bangalore

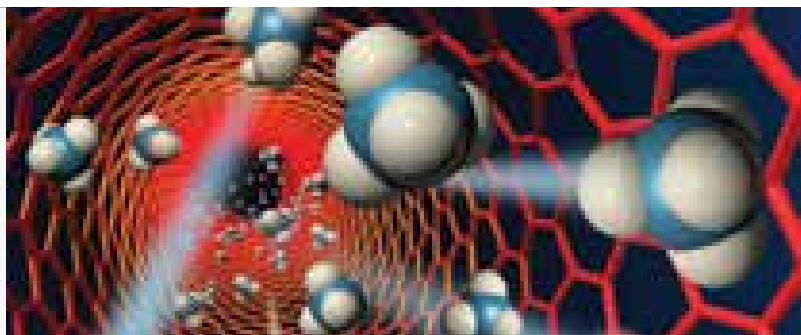
MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects sanctioned

- > Design and Development of Multimodal Optical Microscope using Fourier Optical Image Processing funded by DST

NANOSCIENCE AND NANOTECHNOLOGY

Nanoscience and Nanotechnology deals with the study and control of matter at atomic and molecular scale. This highly interdisciplinary and versatile field brings together scientists and engineers from applied physics, materials science, chemistry, biology, medicine and so on to produce, characterize and effectively use materials of such low dimensions for variety of applications, ranging from energy production and drug delivery to cosmetics and clothing.



RESEARCH SUMMARY

- > Research activity in Nanoscience has now grown as a full-fledged thrust area of research of the department. The work done in this area can be broadly divided into energy and healthcare applications. Research is being carried out to study novel nanomaterials and nanocomposites for efficient thermoelectric power generation, synthesis of nanomaterials for water purification and fluoride removal, new materials for efficient photovoltaic applications,

Pharmaceutical Nanotechnology – Nano formulations for Improved Therapeutic Efficacy, Fluorescent Nanomaterials for Biomedical applications and nanomaterials for sensing applications.

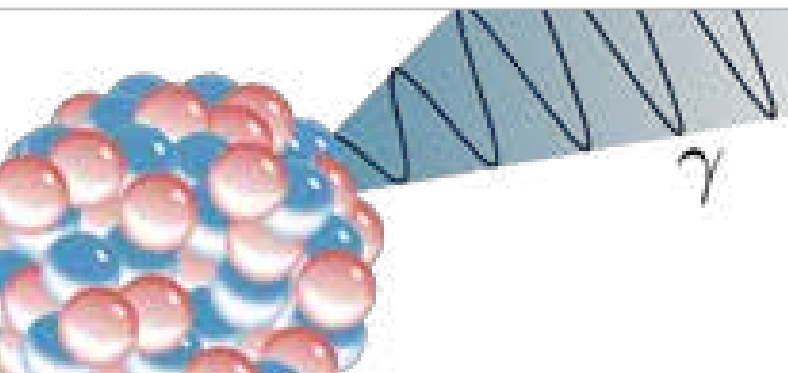
MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Studies on Metal-Semiconductor nanocomposites as high performance thermoelectric materials, funded by DAE-BRNS
- > Studies on thermoelectric performance of nanostructured Bismuth Telluride and Lead Telluride Nanocomposites grown via novel solvothermal nanoplateing technique, funded by UGC-DAE-CSR Kalpakkam Node

Collaborations

- > UGC-DAE-CSR Kalpakkam Node; Dr. B K Panigrahi, Indira Gandhi Centre for Atomic Research, Kalpakkam
- > Dr. Sai Siva G, Dept. of Instrumentation & Applied Physics, Indian Institute of Science, Bangalore
- > Prof. A M Rao, Clemson University, USA
- > Prof. S Mitra, New Jersey Institute of Technology, USA
- > SSSIHMS, Prasanthigram
- > Raman Research Institute, Bangalore



NUCLEAR SPECTROSCOPY

The field of science dedicated to the study and understanding of the atomic nuclei is called Nuclear Physics. It is concerned with the nucleus of the atom and the interaction of different nuclei. Nuclear Spectroscopy is a branch of Nuclear Physics that is concerned with the study of the discrete spectrum of nuclear states. Research in Nuclear Physics reaches out to various applications like nuclear power production, nuclear medicine, nuclear magnetic resonance imaging, geology and archaeology.

RESEARCH SUMMARY

- > Low energy nuclear spectroscopy research facility was established in the department in early 1990's. With the available research facilities, electron-gamma spectroscopy studies on level structures of odd-odd deformed nuclei of interest are carried out. Conversion electron studies, singles and co-incidence gamma studies and X-ray spectra studies are carried out off-line using liquid nitrogen cooled, HPGe and Si(Li) detectors coupled to PC based multi-channel analyzers. Indigenously built mini-orange electron transporter coupled to Si(Li) detectors are often used for conversion electron studies. Theoretical studies and model based predictions of isomers and levels structures in odd-odd deformed nuclei are also being undertaken.

MAJOR RESEARCH ACTIVITIES 2013/14

Collaborations

- > BARC, Mumbai
- > VECC, Kolkata
- > NNDC, BNL, USA
- > GSI, Germany

Other Activities

- > Evaluation of Nuclear Structure and Decay Data for mass chain $A=215$, $A=219$ and $A=227$
- > Three faculty members attended workshop on Evaluation of Nuclear Structure and Decay Data, Abdus Salam International Centre for Theoretical Physics, Italy
- > Atomic Mass evaluation – in collaboration with GSI, Germany
- > Organized awareness workshop of the Nuclear Physics research facilities in India in collaboration with VECC and UGC-DAE-CSR at SSSIHL, Prasanthi Nilayam, Jun 2013

SIGNAL PROCESSING

Signals can be of different kinds, such as sound, electromagnetic radiation, electrocardiograms, telecommunication, images and sensor readings that carry information. Signal processing is the enabling technology for the generation, transformation, extraction, and interpretation of information carried by these signals. The origin of these signals is varied, right from a human vocal cord to the signals sent by radars and satellites.



RESEARCH SUMMARY

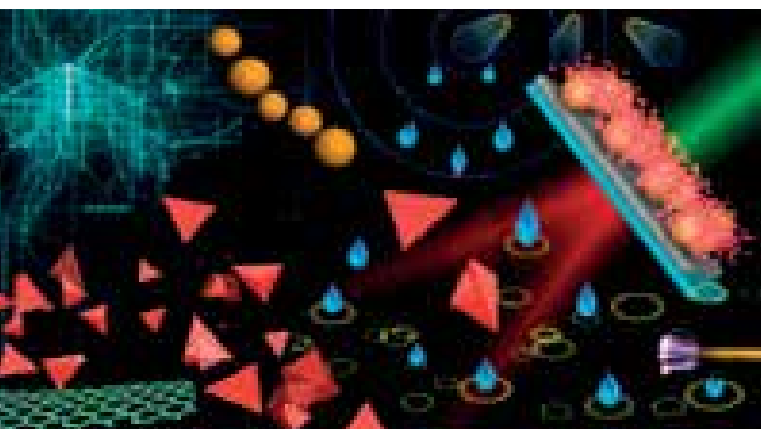
- > Inverse Synthetic Aperture Radar (ISAR) imaging is an effective way to acquire high resolution images of targets of interest at long range. It is an irreplaceable tool in the task of Non-Cooperative Target recognition (NCTR) of both aircraft and ships. Therefore, effective ISAR imaging will facilitate improved target detection and target identification strategies for NCTR. Experimental results have shown that ISAR image of a target can be distorted severely as a result of a time-varying and perturbing rotational motion possessed by the target. In many of the measured ISAR images from moving targets—such as those from in-flight aircraft or manoeuvring ship—the distortion can be quite severe. The department's research work will add insight into the distortion mechanisms that affect the ISAR images of a target in motion. For ISAR to realize the operational goal of NCTR, methods are being

developed to compensate for the quadratic and higher order terms in the Doppler motion. Furthermore, novel algorithms such as adaptive S-method, Hermite S-method, and adaptive local polynomial Fourier transform are being developed to compensate for the quadratic and higher order motions to improve performances of the Fourier transform and the standard S-method in radar imaging.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Real time Image enhancement and feature extraction of moving targets in ISAR



SENSORS & NANOTECHNOLOGY

Observation has always been the key component in scientific discoveries and advancements. In the previous century, discoveries were limited to the micro scale on account of the non-availability of electron microscopy and other tools to explore smaller dimensions. The modern era has seen nano-world applications embrace man's life in different forms, starting from mobile phone technology to cancer treatment. In this context, sensors help us in observing the changes of a particular parameter of a system. In other words, sensors translate the message from science to a common language. In this broad framework, we intend to explore the possibilities of next generation sensors.

Research Sub-Focus Areas

- > Plasmonic Sensors
- > Biosensors
- > Electrochemical Sensors
- > Environmental Monitoring
- > Photonics
- > Enhanced Energy Storage Devices

PLASMONIC SENSORS

- > The ongoing research in the department is in the broad field of template assisted nanoparticle assembly. Research is directed towards the well-defined assembly of nanoparticle clusters with control over the aggregation number and aggregate structure. This is being done in order to exploit the interesting optical properties that metal nanoparticle clusters exhibit like plasmonic enhancements and hybridized resonances as predicted by theory and other experiments. The use of such nanoclusters in the development of plasmonic nanosensors based on surface plasmon resonance and surface plasmon-coupled emission is envisaged. Currently, the department working on applications related to biomedical diagnostics and point-of-care devices. A new 'Plasmonics Lab' has been established to augment future research in nanoplasmonic applications.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Regiospecific functionalization of anisotropic nanoparticles and implications towards generation of plasmonic metal nanoclusters
- > Application of plasmonic technologies and microbes-fortified biosorbents for a low-cost integrated approach to water treatment

Collaborations

- > Dr. Indira Hewlett, CBER/FDA, USA
- > Prof. Govind Rao, University of Maryland Baltimore County
- > Prof. Appa Rao, Clemson University
- > Dr. Shivakiran Bhaktha BN, Indian Institute of Technology, Kharagpur
- > Dr. Dinesh Jagadeesan, National Chemical Laboratory, Pune

BIOSENSORS

- > Despite significant advances in medical and surgical therapies, morbidity and mortality due to coronary artery disease (CAD) remains high. In India, the burden of CAD is particularly severe, as the disease occurs 1-2 decades earlier and has a 2-4 fold increased mortality rate compared to more European and North American populations. Early onset of CAD (< age 45 years) is particularly common within the Indian population and carries considerable morbidity and economic costs. Lipoprotein associated phospholipase A2 (Lp-PLA2, a pro inflammatory marker) is a potent pro-inflammatory mediator which plays an important role in the development of coronary atherosclerosis. Lp-PLA2 has significant potential to become an important marker for the early onset of atherosclerosis in Indians. The department's hypothesis is that the elevated levels of Lp-PLA2 are associated with the early onset CAD in Asian Indians and that evaluating Lp-PLA2 levels will add incremental value to contemporary CAD risk assessment, particularly for the early onset of the disease. This work is in its final phase and the results are being communicated to international peer reviewed journals and conferences.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Development and validation of an indigenous assay for Lp-PLA2 for early detection of heart disease in young Indians

Collaborations

- > Dr. Vijayalakshmi V, National Institute of Nutrition, Hyderabad
- > Dr. Srikanth Sola, SSSIHMS, Whitefield, Bangalore
- > Dr. Carani B Sanjeevi, Karolinska Institute, Sweden

ELECTROCHEMICAL SENSORS

- > Nanomaterials are widely used in the design and fabrication of sensors because of their facile synthesis, sensitivity, specificity and multiplexing capability. They also exhibit excellent conducting behaviour that makes them potential candidates for electrochemical detection and fuel cell application. Electrochemical deposition of nanoparticles is the predominant synthetic approach apart from various

other routes such as pulsed laser ablation and bottom up solution synthesis. In the recent past, the department has synthesized Gold, Platinum and Palladium nanoparticles over graphene and carbon nanotube frameworks. These materials exhibit enhanced electrochemical behaviour in terms of electrocatalysis of alcohols and selective determination of the neurotransmitter dopamine. The department is also working towards the development of a rapid, low-cost electrochemical assay for quantification of HIV p24 levels in clinical specimens by sensitive detection of the HIV p-24 antigen.

MAJOR RESEARCH ACTIVITIES 2013/14

Collaborations

- > Prof. Lakshminarayanan, Raman Research Institute, Bangalore
- > Prof. S Mitra, New Jersey Institute of Technology, USA

ENVIRONMENTAL MONITORING

- > Analytical sampling and upcoming laboratory analyses of biological and chemical analytes of interest are the gold standard for environmental and biological monitoring. However, unabated demand for more data and faster acquisition at lower cost, size, and power continue to drive research in all major classes of biological and chemical sensors in environmental monitoring applications. Unlike many sensor arenas, where a dominant technology has taken hold for decades, the best choice for chemical and biological environmental monitoring remains unclear. As a result, research continues across a broad range of sensor classes to find footholds in application-specific tasks.

MAJOR RESEARCH ACTIVITIES 2013/14

Collaborations

- > Dr. J S Bhargav, Geological Survey of India, Hyderabad
- > Prof. Ram Prabhu, Indian Institute of Technology Madras, Chennai

PHOTONICS

- > The development of NLO molecules has attracted the spotlight of modern research in view of their impending applications in photonic technologies. Chalcones, a class of organic materials, are attractive for their large second harmonic generation (SHG) efficiencies. The research focuses on the synthesis, characterization, SHG and third order non-linear properties of chalcone and bis-chalcone derivatives for varied photonic applications.

ENHANCED ENERGY STORAGE DEVICES

- > Self-assembled monolayers (SAMs) on metal oxide nanoparticles like titania (TiO₂) aids in the reduction of surface conductivity of nanoparticles and allows reliable dielectric characterization like dielectric permittivity determination of nanoparticles. Impedance characterization results using slurry methodology in host liquid, butoxyethanol (BOE) illustrates the differences in the electrical resistances of nanoTiO₂ with and without SAMs. Various organophosphates (MDDP – monododecyl phosphate; PP – phenyl phosphate; NP – Naphthyl phosphate) are employed for obtaining SAMs on nanoTiO₂. The SAM treated nanoparticles will be dispersed in polymer matrix for designing high energy density polymer nanocomposite dielectrics.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Develop Interfacial Chemistry Based Structure-Property Relationship in Nanodielectric Composites for Enhanced Energy Storage Applications



Research Sub-Focus Areas

- > Bioactive molecules
- > Biocomposite based tissue engineering
- > Bioprocessing
- > Molecular modelling & Drug design

BIOACTIVE MOLECULES

- > Extensive utilization of definite fossil fuels and associated environmental problems, such as air, land and water pollution and global warming, has paved the way for research and development on renewable fuels. The department's current research has been focused on the replacement of the non-renewable fossil fuels such as gasoline and diesel, with biofuels and bio-based products. Towards this direction, the research on biofuels production has been governed by the choice of microbes, substrate and the technique, that play an important role in the biological conversion of lignocellulosic biomass (LCBs). An innovative and first of its kind study has focused towards enriched cellulolytic enzyme production using a combination of endophytic, epiphytic, micro and macro fungal cultures. A novel optical quantification technique to measure fungal growth on agar plates has also been developed. A new Molecular Bioprocessing Lab has been established to boost future research in integrated bioprocessing and bio-based materials.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Application of plasmonic technologies and microbes-fortified biosorbents for efficient integrated bioprocessing

Collaborations

- > Dr. Praveen V Vadlani, Kansas State University, USA

BIOCOMPOSITE BASED TISSUE ENGINEERING

- > Polymeric scaffolds using biopolymers have been synthesized by the department for tissue engineering applications. We have synthesized cross-linked homogeneous blends by employing Alginate (Alg) and Chitosan (CS) (6:1). The scaffolds are being investigated for use in chondrocyte cell culture.

BIO-INSPIRED APPLICATIONS

The dawn and progress of human civilization across ages was deeply inspired by the interplay of living systems in nature. In particular, the role that biomolecules played in the evolution of various organisms with increasing complexities is something that needs to be studied and applied for a sustainable world. Our concentrated and integrated focus is to study at a fundamental level, the generation of these biomolecules via living systems and understand the mechanisms using modelling and structured design and find applications in health, chemical, fuels and polymer industries.

Effect of chondrocyte cell culture on the biopolymers with and without curcumin is also under investigation.

BIOPROCESSING

- > Many of the modern drugs being used at present are derived from natural sources. Identification of bioactive molecules from natural sources involve the steps of extraction, separation, purification, evaluation of their medicinal efficacy and structural characterization. The search for new drugs, especially from natural sources such as plants, algae, fungi and also semi-synthetic ones are being explored.

MAJOR RESEARCH ACTIVITIES 2013/14

Collaborations

- > Dr. Nanduri Srinivas, National Institute of Pharmaceutical Education and Research, Hyderabad
- > Dr. Meera Pandey, Indian Institute of Horticultural Research, Bangalore

MOLECULAR MODELLING & DRUG DESIGN

RESEARCH SUMMARY

- > The increased potential of advanced computational technology helps the development of drug design. Exploiting the quantized fundamental parameterization of atomic/molecular properties, this modern area of research has optimized the economy of time, effort and resources. The department's research effectively and innovatively explores this tool unto *in silico* drug design of various synthetic and semi-synthetic analogs of medicinal extracts. Further, this tool is also used to understand the thermodynamics and kinetics of various reactions therein.

MAJOR RESEARCH ACTIVITIES 2013/14

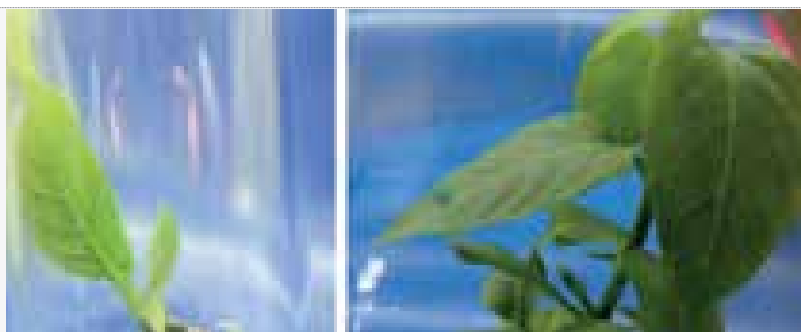
Collaborations

- > Dr. Sreedhara R Voleti, INDRAS Pvt. Ltd., Hyderabad
- > Dr. Ramesh Sistla, Syngene International Ltd, Bangalore

Department of Biosciences

PLANT BIOTECHNOLOGY AND PHYTOCHEMISTRY

Medicinal and aromatic plants have been used since time immemorial as panacea for a plethora of illnesses. Given the vulnerability of many of these plants to over-exploitation by the industry, the establishment of tissue culture protocols for these plants is urgently needed. The characterization of their major phytochemical constituents from tissue cultures and natural samples provide insights on their anti oxidant, anti microbial and cytotoxic properties for effective therapeutic regimens.



RESEARCH SUMMARY

- > *Adhatoda vasica* Nees (Malabar Nut) is a perennial shrub of the Indian subcontinent that is routinely used in codified and non-codified systems of medicine. Based on the inputs on the efficacy of drugs from *Adhatoda vasica* in traditional medicine, the department has:

Pioneered the development of *in vitro* tissue culture methods for propagation of this plant under laboratory conditions
Made an attempt to define the morphological markers that reflect metabolite content
Nominated potential binding partners for the alkaloids using *in silico* methods
Acquired insights on the binding modes of the alkaloids using

spectroscopic, thermodynamic and functional methods
The current body of work is directed towards characterizing all the major alkaloids from *Adhatoda vasica* and studying their functional aspects.

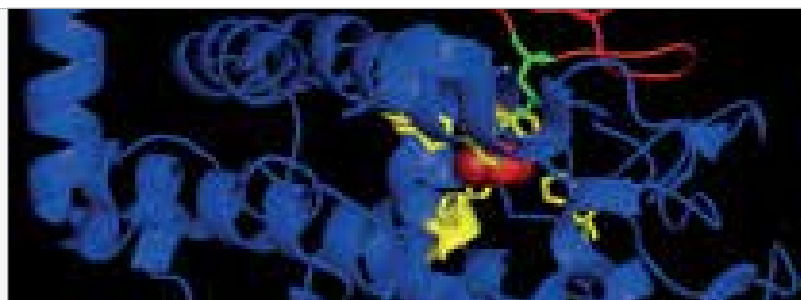
MAJOR RESEARCH ACTIVITIES 2013/14

Collaborations

- > Dr. Arun Sreekumar, Dept. of Molecular and Cellular Biology, Baylor College of Medicine, Houston, Texas, USA

PROTEIN STRUCTURE AND FUNCTION

Proteins are extremely tiny molecular machines of sub-nano dimensions that occur in myriad shapes and sizes in a typical living organism. They are the workhorses which carry out numerous biological functions within the organism. Understanding their intricate structure and highly specific function constitutes an intriguing area of research.



RESEARCH SUMMARY

- > Structural and functional aspects of proteins are studied using hemocyanin purified from endemic snails as a model protein. Hemocyanins—through their various levels of structural organization—exhibit one of the largest protein assemblies found in nature. Ease of purification from the source and its availability in large quantities make hemocyanin a tangible model for study. Apart from the study of its structure using various biochemical and biophysical techniques, the research is focused on activation and enhancement of phenoloxidase-like enzyme activity in hemocyanins which are well known only as oxygen carrier proteins. This is attempted by exposing the protein to certain chemical agents which might bring about subtle structural modifications that are responsible to elicit enzyme activity in the protein. Phenoloxidase-like function of hemocyanins is studied *in vitro* using enzyme kinetics and the structural modifications underlying the

elicitation of the activity is studied *in silico* using molecular dynamics simulations.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

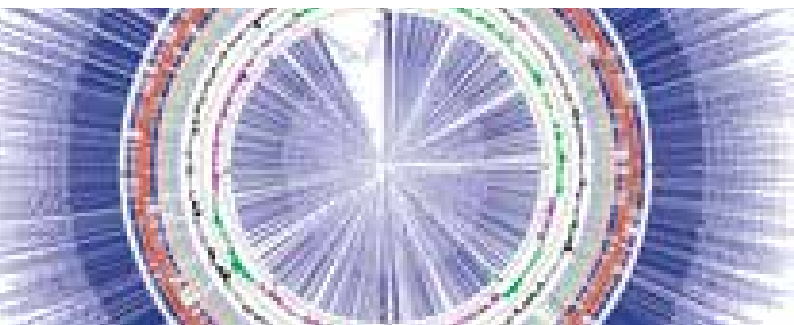
- > Doctoral thesis work to study the structure, function and biotechnological application of hemocyanin purified from endemic snails is nearing completion.

Collaborations

- > Dr. J S Bhargav , Geological Survey of India, Hyderabad
- > Prof. Ram Prabhu, Indian Institute of Technology Madras, Chennai

Other activities

- > A hemocyanin-based prototypic first generation sensor to detect phenols in aqueous solutions has been developed.



MOLECULAR MICROBIOLOGY

Prevention and treatment of increasingly prevalent multidrug resistant bacterial infections is dependent on the availability of effective antibiotics. There is an urgent need to understand molecular mechanisms by which human pathogenic bacteria are evolving to attain multidrug resistance. This would greatly enhance the current knowledge of their ability to adapt to, invade and thrive in human tissues.

RESEARCH SUMMARY

- > The focus of research in Molecular Microbiology is on how human pathogenic bacteria evolve to attain multi-drug resistance. The department's expertise includes bacteriological analysis, antibiotic susceptibility testing and molecular epidemiology. New testing methods pioneered here include tests for susceptibility *in vitro*, PCR diagnostics, bacterial gene sequencing and whole genome sequencing of select bacterial pathogens.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

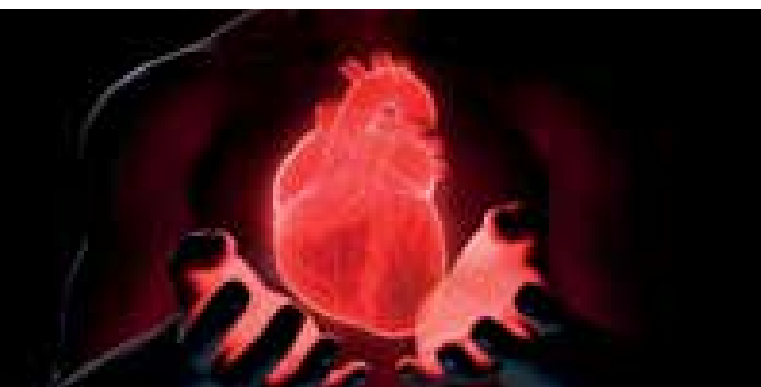
- > Evaluation of clinically isolated Enterobacteriaceae producing

Extended Spectrum β -Lactamases (ESBL).

- > Evaluation of clinically isolated *Pseudomonas* producing VIM and IMP Metallo- β -Lactamases

Collaborations

- > Dept. of Microbiology, Sri Sathya Sai Institute of Higher Medical Sciences, Prasanthigram
- > Prof. V Nagaraja, Dept. of Microbiology and Cell Biology, Indian Institute of Sciences, Bangalore
- > Dr. S Shivakumara Swamy, Faculty Scientist, Institute of Bioinformatics and Applied Biotechnology, Bangalore



REGENERATIVE MEDICINE AND TISSUE ENGINEERING

Regenerative Medicine and Tissue engineering is one of the frontier areas of research that aims to *in vitro* synthesize tissue equivalents of bone, heart muscle, nerve, cartilage, blood vessels and other organs for repair or replacement of damaged tissue through disease or trauma. This transdisciplinary research area encompasses principles from chemical, physical, biological, nano materials science and mechanical engineering. It brings together basic scientists and clinicians onto a single platform to develop bench to bedside solutions.

RESEARCH SUMMARY

- > Autologous Chondrocyte Implantation (ACI) - comprises of a series of procedures. First, a cartilage sample is harvested arthroscopically from a non-weight bearing area of the affected knee joint. The chondrocyte cells extracted from the harvested cartilage are cultured for four to six weeks to expand the cell population (by a factor of about 50). Then, in a second open surgical procedure, the cultured chondrocytes are implanted into areas denuded of cartilage by disease or injury. Each damaged area is carefully debrided and covered with a periosteal tissue flap, beneath which the autologous chondrocytes are injected. In a modification of the treatment, extracted chondrocytes are cultured within a collagen matrix, which is then implanted (matrix-guided ACI). The implantation is followed by a specific rehabilitation protocol following the procedure.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Role of Autologous Chondrocyte Implantation in Chondral Defects of Knee Joint.

Collaborations

- > Dept. of Orthopaedics, Sri Sathya Sai Institute of Higher Medical Sciences, Prasanthigram, India

Other Activities

- > Technical support from Prof. Anders Lindahl and Prof. Lars Peterson, Sahlgrenska University, Hospital, Gothenburg, Sweden

SYSTEMS BIOLOGY OF DISEASES

Homocysteine is a toxic, non-essential amino acid that is an unavoidable intermediate in many synthetic reactions of cells. It is a common risk factor in many diseases such as eye, cancer, bone, cardiovascular and neurodegenerative diseases. The focus is to explore unifying mechanisms for homocysteine induced diseases.



RESEARCH SUMMARY

The department is primarily interested in understanding the mechanism by which homocysteine (also cytokines, hypoxia and adenosine deaminase) causes inflammation, leading to manifestation of disease and the role of chaperones and HDACs in modulating inflammation. It employs multidisciplinary and multifaceted approaches like genomic, metabolomic, bioinformatic/systems biology, clinical, biophysical, biochemical, molecular biology, cell culture techniques, animal models and patient samples to answer specific questions in an effort to understand the mechanisms of diseases.

Analyses have provided evidence for the lead role of homocysteine in promoting inflammation. It has been elucidated that purinergic signalling is one of the components of inflammation. Genomic tools are being used to elucidate the functional implications of SNPs. Yeast knock-out model expressing human genes or their variants will be employed to understand role of SNPs. Mice models of disease are being used to understand multiple sclerosis.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > A homocysteine network behind human diseases - Unifying mechanisms, emerging therapeutic targets:
 - > Bone Disease: Avascular Necrosis of Femoral Head,

CANCER BIOLOGY

In silico tools provide ample scope for understanding mechanisms of drug-receptor interactions and enzyme activity. The research presently focuses on investigating these interactions with specific reference to ovarian and prostate cancer.

RESEARCH SUMMARY

- > Ovarian cancer is the fifth most common cancer. It accounts for 5% of all cancer deaths in women. An attempt is being made to identify the key signaling pathways leading to the development of ovarian cancer and metastasis. Following identification of the most significant signal transduction pathway, a couple of proteins/enzymes involved in that pathway will be shortlisted. *In silico* tools would then be used to study the interaction of these proteins with specific drugs being used to treat ovarian cancer.
- > Prostate cancer is the second leading cause of cancer death in adult men. Prostate is an androgen dependent organ which needs testosterone or its active form dihydrotestosterone for growth. Androgen binds to its receptor to transduce the signal in normal cells. However, in prostate cancer, the

Rheumatoid Arthritis

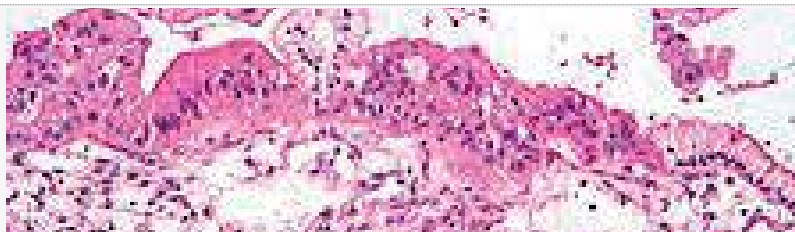
- > Eye Disease: Glaucoma
- > Neurodegenerative Diseases: Multiple Sclerosis
- > Cancer: Glioma
- > Mechanisms of ATP secretion and the role of ATP activated P2 receptors in inflammation: Implications for Multiple Sclerosis.
- > HDAC inhibitors inhibit inflammation by interfering with purinergic signaling.

Collaborations

- > Dr. Arun Sreekumar, Baylor College of Medicine, USA
- > Dr. Prakash Khanchandani, Sri Sathya Sai Institute of Higher Medical Sciences, Prasanthigram
- > Prof. Lakshminarayanan, Raman Research Institute, Bangalore.
- > Prof. Seshagiri, Indian Institute of Science, Bangalore
- > Dr. Arun Roy, Raman Research Institute, Bangalore
- > Dr. Vijayalakshmi Venkatesan, National Institute of Nutrition, Hyderabad
- > Dr. V R Rao, Dept. of Anthropology, University of Delhi

Other Activities

- > Developing a diagnostic kit for homocysteine.
- > Developing diagnostic kits using Q-PCR (multiplexing) conjugated to a nanoparticle based fluorescent-quencher system.



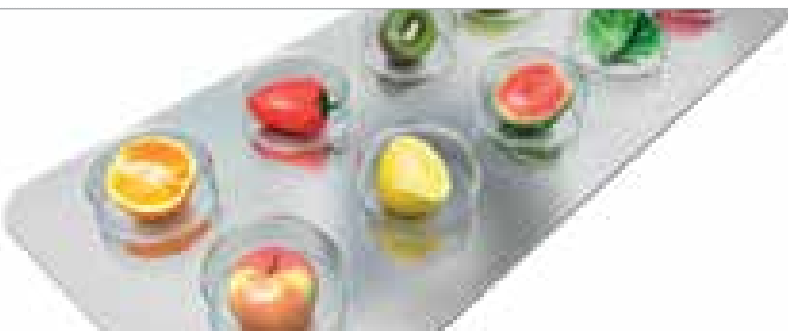
prostate gland becomes androgen independent and grows even in the absence of androgen. The interaction between the androgen receptor and flutamide (a drug used widely in treatment of prostate cancer) is being investigated using *in silico* techniques.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects (Dissertation Projects)

- > A comprehensive study of ovarian cancer and mechanism of drug therapy - A bioinformatics study.
- > A comprehensive study of prostate cancer and mechanism of drug therapy - A bioinformatics study

Department of Home Science



NUTRACEUTICALS

Nutraceuticals are a diverse product category that provides health benefits in addition to its basic nutritional value. The term is applied to a range of including: isolated nutrients, dietary supplements and herbal products, specific diets and processed foods such as cereals, soups and beverages.

RESEARCH SUMMARY

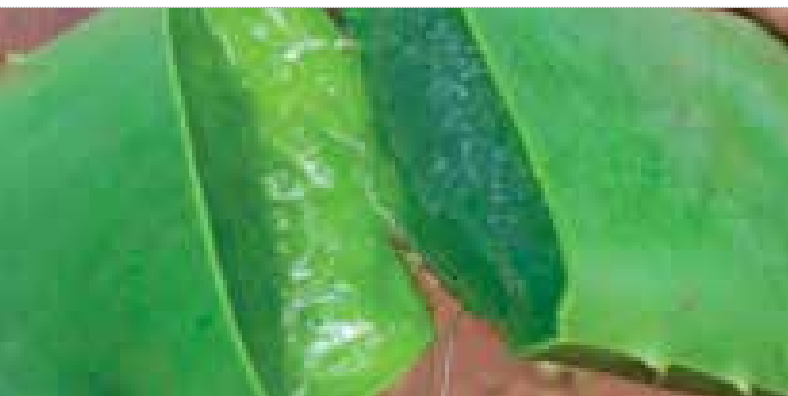
- > The research in the area is being directed towards screening of a variety of conventional and unconventional foods for a wide spectrum of phytochemicals viz., total polyphenols, flavonoids, terpenoids, alkaloids, ergosterols, anthocyanins, phenolic acids, fiber components, glycosides, tannins, vitamin C, β -Carotene and saponins. The identified foods as well as its isolates are tested for their bioefficacy as antidiabetic, anti-oxidant, anti-microbial, anti-cancer, anti-hypertensive and anti-inflammatory agents using *in vitro* models. In the current year, bioactive component screening as well as *in vitro* therapeutic assessment was undertaken for certain beans such as *Phaseolus lunatus*, *Glycine max*, *Macrotyloma*

uniflorum; banana varieties, *Aloe vera* gel, *Piper cubeba* *Trachyspermum ammi* and flax seeds.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Nutraceutical potential of selected banana varieties
- > Nutritional and nutraceutical profile of selected beans and their sprouts
- > Functional and nutraceutical quality of developed tomato and papaya based instant dry mix formulation
- > Influence of thermal treatments on the nutraceutical properties of kapok buds (*Piper cubeba*)



BIOPRESERVATION

Biopreservation technologies involve the use of natural compounds and methods to preserve and extend the shelf life of perishable foods. Edible coating is emerging as an eco-friendly biopreservation technology particularly for extending shelf life of horticultural produce. Edible films are thin layers of material which can be consumed and provide a barrier to moisture, oxygen and solute movement.

RESEARCH SUMMARY

- > Natural biopolymer from *Aloe vera* gel is being explored as a novel edible coating. The study has investigated and identified *Aloe vera* edible coating as a simple low-cost environmentally friendly postharvest technology for reducing postharvest losses in whole fruits and vegetables. *Aloe gel* powder coating was identified as a cost effective non-chemical biopreservative with multiple benefits for extending shelf life and enhancing the health potential of fresh cut vegetables. The gel coating also enhances the nutritional and therapeutic properties of the product. The developed

technology would be explored for shelf life extension of other fruits and vegetables.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Food and nutraceutical application of *Aloe vera* gel.

DESIGNER FOODS

Designer foods are normal foods fortified with health promoting ingredients. Food ingredients used to formulate designer foods are those which are known to modulate human health and cure or prevent diseases. These foods can be produced by either adding, removing, concentrating or modifying one or more components of a food, or by modifying their bioavailability.



RESEARCH SUMMARY

- > The research work in this area covers the development of a wide variety of therapeutic foods for clinical application in diseases such as diabetes, cancer, anemia, obesity, hyperlipidemia and liver disorders. Emphasis is provided for the development of convenience foods which are designed using pre-preparation processing and require minimum preparation by the consumer. The work in the current year was directed for formulation of probiotic enriched flax seed based products - legume-based cauliflower and garden cress enriched soup powders, bean sprouts enriched wheat based instant *khichdi* mix, *Aloe vera* enriched papaya spread, *Aloe*

gel enriched tomato chutney mix, *Aloe* gel enriched tomato-based fruit beverages and soya bean enriched pizza bases.

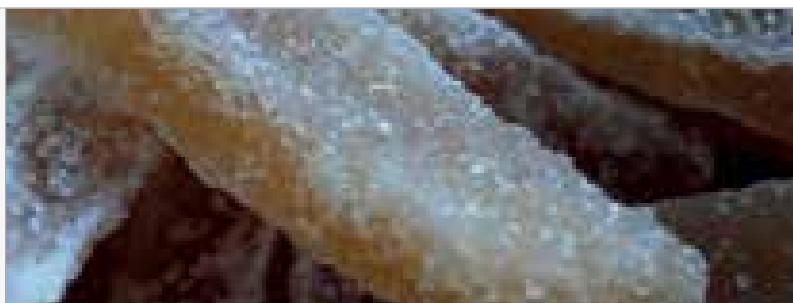
MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > Quality characteristics of wheat-pulse flours and their utilization in baked food formulation.
- > Formulation, development and popularization of dehydrated products.
- > Nutraceutical potential of flaxseed (*Linum usitatissimum*) and flaxseed based probiotic enriched product

NOVEL FOOD PROCESSING TECHNOLOGIES

Novel food processing technologies improve the quality and process efficiencies of the food chain. The aim of developing novel processing techniques is to improve microbial safety and nutritional quality, to improve physical-chemical properties of foods by minimizing the process intensities, to reduce energy requirements, to reduce waste load and to increase production and process efficiency.



RESEARCH SUMMARY

- > The work centres around low-cost dehydration technology – osmo-air dehydration. The technology involves the removal of water by immersing fruits or vegetables in a concentrated salt or sugar solution. The process has several advantages, including quality improvement in terms of colour, flavour, texture, energy efficiency, reduction in packaging and distribution cost, elimination of chemical treatment, enhanced product stability and retention of nutrients during storage. The technology is being exploited on a variety of fruits like pineapples, bananas, blueberries, pears, apples, mangoes, apricots, berries, plums, cherries and vegetables such as onions, carrots, tomatoes, potatoes, *agar* gel and pumpkins. In the current year, the technology was used to investigate the quality and stability of Sapodilla (*Manilkara zapota*) flakes.

MAJOR RESEARCH ACTIVITIES 2013/14

Research Projects

- > A study on the effect of osmo-air dehydration treatments on quality and stability of Sapodilla (*Manilkara zapota*) flakes.

Department of Management Studies



LEADERSHIP, SPIRITUALITY AND ORGANIZATION CULTURE

Leadership in emerging nations will tend to be different from that of the west as it gets rooted more in the cultural and ethnic context of each nation. Besides, innovation which flourishes within the constraints of developing nations, will not only be path-breaking but will also further the trend of indigenous solutions in organizational thought and managerial activities. This trend offers exciting paradigms for research.

RESEARCH AREAS 2013/14

INNOVATION IN ORGANIZATIONS

Innovation has been widely regarded as a powerful tool for stimulating economic growth and changing the quality of human life. The important objectives of the study on innovative companies were to: investigate the influence of organization culture on innovation, to identify common innovation culture characteristics of successful innovative companies and to identify the unique attributes and practices of innovative organizations.

This doctoral research investigated the role of innovation culture in bringing out innovations in India and abroad. Six parameters were identified to study the innovation culture of organizations. These were: Organization Climate, Leadership, Core Values, Customer Focus, Creativity and Envisioning the Future. Based on their innovation capabilities, the companies were grouped into three categories: product, process and business model innovation organizations. Fifteen organizations that have consistently ranked among the top 20 companies on global innovation survey studies were selected for the study. The study revealed common practices widely shared and practiced by these organizations, which helped them to emerge as leaders in their industries.

SPIRIT AT WORK IN BUSINESS ORGANIZATIONS IN INDIA

There are several factors that have led to the need to manifest Spirit at Work. The foremost among them is a sense of insecurity in people: both economic and job insecurity arising on account of post globalization trends such as business re-engineering, downsizing, outsourcing and off-shoring, cut throat competition, etc. The resulting work environment is a high stress work space with focus on short-term financial gains. The thirst for manifesting Spirit at Work that is being felt across organizations on one hand and the lack of recognition of the same as part of mainstream management literature on the other; establishes the need and importance for the current study.

The objective of this doctoral research is to develop a better understanding of Spirit at Work through an individual-centric

approach, as a function of individual values/attitude coupled with an organization-centric approach, as a function of organizational culture and corporate philosophy. The study aims to evaluate the performance of Spirit at Work in business organizations and compare with expectations that executives have about the same. It proposes to develop an enriched description of Spirit at Work using the Karma Yoga model framework.

WOMEN EXECUTIVES IN INDIA

The status and role of Indian women in society, organizations, and in homes is undergoing change because of the influence of globalization.

This doctoral research focuses on two areas – work life balance and gender bias. It endeavours to know the ways in which women executives actually manage their work life balance issues and it seeks to identify the organizational and social factors which help them to achieve work life balance. In terms of gender bias, it seeks to examine the prevalence of subtle biases, which were identified in the scoping studies. It also studies the structure and agency dynamics of women executives in the area of work life balance and gender bias. Further, it examines how women executives who have a greater agency, negotiate their structural constraints, and how these actions contribute to social production. It is found that there are enduring structures in Indian society which resist change, and are unquestioningly absorbed by women executives. The study thus provides insights into work life balance and gender bias faced by women executives in particular, and in a general sense it describes the correlation between structure and agency of women executives in a developing, globalized context.

BUSINESS & SOCIETY ECOSYSTEM

Business as a catalytic part of the social ecosystem has great relevance in the present times of globalization and high interconnectivity. The need to integrate and include various sections of society into main stream has become the imperative of progress. As a consequence, the relationship of business with society in terms of stakeholders, green procedures, social entrepreneurship or financial inclusion through microfinancing becomes important. An exploration of the symbiotic relationship between business and society has been the focus of a number of doctoral research studies at the department.



RESEARCH AREAS 2013/14

STAKEHOLDER MANAGEMENT

This doctoral research focused on Stakeholders Management practices at the industry and firm levels. For the industry-level study, the Banking and Financial Services Industry (BFSI) in India was identified. This included public, private and foreign banks as well as financial services companies in India. Demographic, economic, technological and political changes in contemporary India carved a very important role for this industry, which is closely linked with the future growth story of India. The Tata Group of companies were selected for the firm-level study. Rich qualitative and anecdotal data gained in the course of interactions with 38 senior and highly experienced executives from diverse Tata Group companies contributed immensely to the study and provided a valuable addition to the existing body of knowledge.

SOCIAL ENTREPRENEURSHIP

The evolution of Social Entrepreneurship in the past few decades has captured the imagination and attention of the academia and the industry as well. Due to the apparent dichotomy that exists between the twin goals of profitability and social mission, the novelty of the concept itself merits a closer examination in terms of leadership along with its interesting socio-economic impact.

This doctoral research strives to accomplish a holistic understanding of Social Entrepreneurship at a conceptual level, gaining insights into social entrepreneurs, various stakeholders and the environment that becomes their operational canvas. The proposed conceptual model for social entrepreneurial development elaborates the three stage development of a social entrepreneurial leadership as Initiation, Implementation and Expansion. The third stage of Expansion tends to facilitate a Social Entrepreneurial Ecosystem that comprises different stakeholders, who are mutually interdependent, and who as an organism bring stability and authenticity to both the financial and social goals.

GREEN SUPPLY CHAIN MANAGEMENT

The pace of industrial development in the last two decades has led to tremendous technological innovation and globalization. This growth has however negatively impacted the environment.

Businesses recognized that sustainability is possible only by adopting green practices within their own companies. They started to realize that the benefits derived by them will be more significant and meaningful when green initiatives are spread to their partners - upstream and downstream, rather than in isolation. This led to the emergence of the Green supply chain concept- using environmental friendly practices in a traditional supply chain setup. Literature shows that the research done to date has focused mainly on South-East Asian nations, especially China, Philippines and Thailand. India is set to play a key role in world economy in years to come. Hence, the role of Indian industries needs to be researched in the area of Green Supply Chain.

The three potential areas which have been identified for this doctoral research include:

- > Awareness among Indian consumers about green practices
- > Maturity among Indian industries to practice green methods
- > Policies and decision making abilities of the Indian Government to drive the country into the green path

MICROFINANCE IN INDIA

Amidst growing awareness and realization that the world's poor are excluded from formal financial systems, Microfinance— amongst many other initiatives—has come in to bridge this wide gap. Although Microfinance refers to the entire range of financial services such as savings, money transfers, insurance and production and investment credit; in most of these cases, the focus has been on Microcredit, i.e., the extension of very small, frequent loans to a large number of poor clients. Other aspects of financial inclusion like savings, insurance etc., are largely unattended.

This doctoral research focuses on this aspect of Microfinance, and the extent to which it has taken root in the Indian context of financial inclusion. It attempts to understand the saving patterns of the Indian poor and the preferences and features that they look for in a saving instrument. It also studies the hurdles which are to be removed to act as facilitators to regular savings. In the Indian context, the heterogeneity of people's poverty levels, the varying natures of employment and incomes, family situations, the availability of financial services (or the lack of it), creates a platform for region-specific exploratory studies to understand the neglected pillar of Microsavings.

Department of Commerce



VALUES IN COMMERCE AND MANAGEMENT

The research area deals with understanding and analyzing the importance of human values and ethical principles in various aspects of commerce and management.

The work done in this area includes theoretical and empirical studies on Values-centred Leadership, Corporate Governance and the impact of ethical values on economic development.

This is an ongoing research area of the department with regular research publications. Apart from research publications in International Journals, the department organized a Workshop on 'Ethics and Challenges of Business' in February 2014 involving well-known experts from Industry.

MUTUAL FUNDS

Mutual funds are dynamic financial institutions that play a crucial role in an economy by mobilising savings and investing them in capital markets. As a result, they establish links between savings and the capital markets.

The doctoral research undertaken in this area attempts to evaluate the performance of UTI and ICICI Prudential mutual funds during the pre-recession, recession; and post-recession periods (spanning 2001-2013) by application of different risk and return measures. The research further analyses investor perception based performance of mutual funds relating to the current status of performance and the problems faced.

FINANCIAL MANAGEMENT AND SERVICES

Financial Management and Services focus on advisory and administrative functions in financial enterprises. They cover areas of Economics, Business Law, Consulting and various areas of Corporate Finance.

Several postgraduate dissertations have been completed in this area of research. Work has been done on IFRS, Bank management, Capital structure analysis and Working Capital management.

FINANCIAL INCLUSION

Financial inclusion is the process of ensuring access to appropriate financial products and services needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost. It has become one of the most critical aspects in the context of inclusive growth and development.

This is an ongoing research area of the department with periodical publications related to different areas of financial inclusion. The strategies adopted by various banks in reaching out to the rural citizens in villages, changes in the customers' perceptions relating to opening of no-frill accounts over different time intervals, and technology acceptance levels of rural citizens are some of the areas covered under the research.

FINANCIAL MARKETS AND PORTFOLIO MANAGEMENT

Financial Markets deal with different markets like Capital Markets, Foreign Exchange Markets and Markets for derivative instruments. Portfolio Management deals with analysis of Financial securities and investments.

Several postgraduate dissertations have their focus on Portfolio optimization, Value at Risk, Derivatives and Capital Market efficiency.

INSURANCE

Research studies in Insurance involve understanding various nuances of Insurance including health insurance.

Doctoral research is being undertaken in the area of Health Insurance. Postgraduate dissertations have been done in the areas of FDI and Innovation in the insurance sector.



Department of Economics

MACROECONOMIC POLICY MODELLING

The macroeconomic model specifies the statistical relationship of economic phenomenon under study, in order to capture complex and dynamic interrelationships among the various economic variables. It provides a suitable analytical vehicle for analyzing contemporary issues like tackling inflation, growth prospects in the medium to long term, trade and capital flows, impact of monetary, fiscal and exchange rate policies.



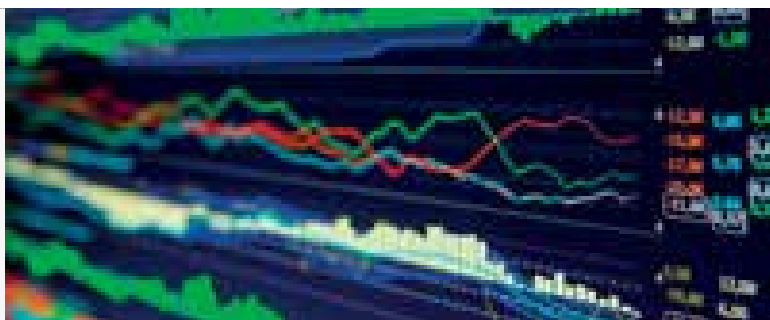
MAJOR RESEARCH ACTIVITIES 2013/14

- > Two faculty members and one research scholar are pursuing their Ph.D. in this area on the topics modelling India's external sector, Public debt management and modelling India's Food inflation. One research paper was published in a

refereed international journal and two research papers have been published in refereed national journals. Three M.A. in Economics dissertations have been done in this area. About six research papers have been presented in various national conferences.

FINANCIAL ECONOMETRICS

Financial Econometric modelling is the mathematical and statistical representation of the behaviour of financial variables in explaining/influencing economic growth. The thrust is to analyze the financial system which includes financial markets, institutions and financial services in relation to the long run growth of the economy.



MAJOR RESEARCH ACTIVITIES 2013/14

- > One faculty member is pursuing his doctoral research in the area of Financial Economics with an emphasis on Analysis and Modelling of Capital Markets and Economic Growth in Emerging Economies. One theoretical econometric

research paper was published in a refereed international journal and four research papers were published in refereed national journals. Two topics in this area were selected for M.A. in Economics dissertations during the academic year. Five research papers were presented in various national conferences.

DEVELOPMENT ECONOMICS

Development economics focuses on how to promote economic growth in an economy by improving the conditions in the areas of health, education, infrastructure, etc. The emphasis is on analyzing the growth of various sectors of the economy such as agriculture, industry, services and trade, in promoting economic development.



MAJOR RESEARCH ACTIVITIES 2013/14

- > About four research papers were published in this thrust area of research during the last academic year. Two M.A. in Economics students have done their dissertations in the areas of growth of the agriculture sector in India and the Development of the Education Sector over the last four decades.

Collaborations

- > Prof. B C Sutradhar, Memorial University of Newfoundland, Canada
- > Dr. Vandana Jowheer, University of Mauritius, Mauritius
- > Prof. Madhusudhan Mohanty, California State University, USA

Department of English Language & Literature

MAJOR RESEARCH AREAS

Indian Writing in English, European Literature, Women's Studies, Modern and Post-Modern British Literature, Witness Literature

A STUDY OF SHIFT IN PERSPECTIVE IN THE SELECT NOVELS OF IRIS MURDOCH

The concept of 'purpose' is studied both according to Eastern and Western philosophy, and applied in the analysis of select novels of Iris Murdoch, a modern British writer and philosopher. The project identifies and traces the journey of life from apparent purposelessness to the realisation of the latent meaning in life. It makes a sincere effort to highlight 'purpose' in absurdity and therefore fragmentation, which are the predominant characteristics of the Modern and Postmodern psyche.

'INTER- AND INTRA- PERSONAL UNITIES' IN 'POETRY AS A PROCESS': A STUDY OF SELECT MODERN AND POST-MODERN POETS

The project studies two kinds of unities – intra- and inter-personal – in the triad of poet, critic and reader, effected by 'poetry as a process'. Keeping in view the 'aesthetic wisdom' and the capacity of poetry to uplift humanity, a theoretical model has been conceived, named the dual unities in a deuce-ace model (d-u-d model). This model highlights the metaphysical function of poetry. It assays a study of how a definitive Unity can be achieved through poetry. This model attempts to highlight the problem of the divided psyche in the contemporary world, and the remedy for its unification through the poetic process. The d-u-d model is studied and explained in the light of relevant post-modern critical, philosophical and psychological theories. The project focuses on a selection of Modern and Postmodern poets in the light of this model, with a detailed analysis of two Postmodern poets, Philip Larkin and Ted Hughes.

criticism, are psychoanalysis, structuralism, deconstruction and identity studies. The research aims to explore the inevitability of spiritual growth as a necessary and primary step towards 'emancipation' of the feminine self to confront newer frontiers of identity, ripping apart the various masks of conventional role-playing.



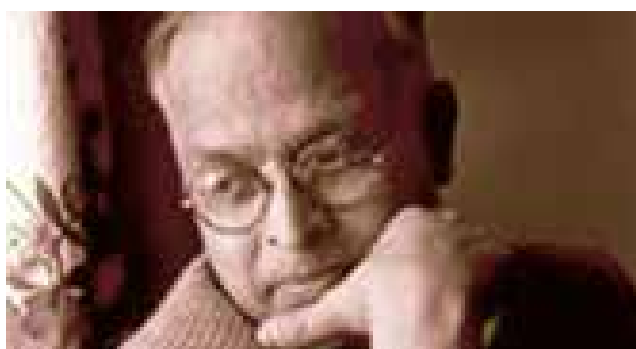
EUROPEAN DRAMA: HENRIK IBSEN

This project studies the broad area of European Drama, with specific reference to the works of the nineteenth-century Norwegian dramatist, Henrik Ibsen. It attempts to define his oeuvre as a continual and complex growth of the self through the evolution of his heroes, and seeks to relate his works to the philosophical ideas of Heidegger and Nietzsche, critical concepts in literary theory like phenomenology, postmodernism, etc. It also reflects on the Eastern and Western views on the concepts like awareness, realisation, dignity, the metaphysical self, suffering, hope, etc., and relates the same with the characters, motifs and symbols used in Ibsen's plays. The research project studies Ibsen's plays, both from the point of view of the ideas they embody, and the technical innovations he introduced in the theatre.



FEMINISM AND GENDER STUDIES

The project is envisioned as an intensive study of femininity and Woman's identity using select plays of Shakespeare as medium for discussion. It is an extension of similar work done in the genre of Fiction in the postgraduate and M.Phil. programmes. The study is both thematic and critical in its approach. The major themes under focus are patriarchal subjugation, feminine subjectivity, androgyny, and scrutiny of myths employed in the plot. The various critical schools that find place in this research, apart from feminist literary



INDIAN WRITING IN ENGLISH: R K NARAYAN

This project is a study of the comic/ ironic vision of R K Narayan. The work stands on the assumption that all literature embodies or contains values in some form or the other, even when the writer is not consciously didactic. Therefore, an attempt is being made to look for a moral message that can be culled out of the ironic vision of Narayan. Hence, the research work focuses on thematic and character/ situation study that may, perhaps, highlight the values that could be garnered from a close examination of select novels of R K Narayan.

Research Publications 2013/14

DEPT. OF MATHEMATICS & COMPUTER SCIENCE

JOURNAL PAPERS

- > Sai Hareesh A and Chandrasekaran V (May 2014) Exemplar-based Color Image inpainting: A Fractional Gradient Function Approach. *Pattern Analysis and Applications*, 17(2), 389-399.
- > Padyana A, Baruah P K, Devi Sudheer K and Srinivasan A (2014) Reducing the Disk IO Bandwidth Bottleneck through Fast Floating Point Compression using Accelerators. *IJACR-International Journal of Advanced Computer Research*, 4(14), 134-144.
- > Vamsi D K K, Dwarakanath K N V S D, Aditya I, and Baruah P K (2014) Existential and Uniqueness Results for Initial Value Problems associated with Non-linear Singular Interface Problems on Time Scales using Fixed Point Theorems. *International Journal of Mathematical Trends and Technology (IJMTT)*, 5, 7-35.
- > Nageshwara Rao V, Sai Hareesh A and Srinath M S (26-31 Jan 2014) Set Difference and Symmetric Difference of Fuzzy Sets. In *FSTA 2014: 12th International Conference On Fuzzy Sets Theory And Applications*, Liptovský Ján, Slovak Republic, FSTA.
- > Tripathi R and Sai Hareesh A (3-7 Feb 2014) Application of Technique using T-Norm and T-Co-Norm with Reference to the Disease Diarrhoea. *101st Indian Science Congress (ISCA)*, Jammu, India.

CONFERENCE PAPERS

- > Sai Hareesh A and Chandrasekaran V (24-27 Mar 2014) Color Child: A Robust and Computationally Efficient Color Image Local Descriptor. *IEEE International Winter conference on Applications of Computer Vision, WACV 2014*, Steamboat Springs, Colorado, USA.
- > Satyanvesh D, Kali Uday B, Padyana A and Baruah P K (24-27 Mar 2014) Adaptive Gen Codex: A Novel algorithm for compressing DNA sequences on Multi core and Graphical Processing Units. *GTC 2014: GPU Technology Conference*, San Jose, USA.
- > Sai Prasanna A N, Iyer Chandrasekhar, Naidu H R and Baruah P K (24-27 Mar 2014) Real-time codebook-based speech enhancement now possible with nVIDIA GPUs. *GTC 2014: GPU Technology Conference*, San Jose, CA, USA.
- > Sai Hemanth S V, Sarma B and Baruah P K (24-27 Mar 2014) GPU Accelerated PrefixSpan Algorithm For Sequential Pattern Mining. In *GTC 2014: GPU Technology Conference*, San Jose, USA.
- > Kanchiraju S, Panigrahi P, Srinivasan A and Baruah P K (24-27 Mar 2014) Performance Prediction Model For Applications on GPUs. *GTC 2014: GPU Technology Conference*, San Jose, USA.
- > Uday Kiran N and Nagaraj B R (2013) A note on a class of Fuchsian operators. *Journal of Pseudo-Differential Operators and Applications*, 4(4), 479-493.
- > Sampath Kumar N V S S P and Baruah P K (Oct 2013) Communication Optimization for Multi GPU Implementation of Smith-Waterman Algorithm. *International Journal of Computer Applications (0975-8887)*, 80(12), Oct 2013. (Digital

Library URL: <http://www.ijcaonline.org/archives/volume80/number12/13910-1121>, ISBN: 973-93-80878-32-4), 1-7.

- > Kali Uday B, Satyanvesh D and Baruah P K (Jun 2013) GenSeek: A Novel Parallel Multiple Pattern Recognition Algorithm for DNA Sequences. *Advances in Intelligent Systems and Computing*, 1001-1006. (Print ISBN: 978-81-322-1664-3, Online: ISBN978-81-322-1665-0).
- > Vamsi D K K, Dwarakanath K N V S D, Aditya I and Baruah P K (2013) Existential and Uniqueness Results for Initial Value Problems associated with nth Non-linear Singular Interface Problems on Time Scales using Fixed Point Theorems. *Advances in Fixed Point Theory*, 3(4), 608-628.
- > Sai Hareesh A and Akella P (2013) Relation between neutral element and annihilator in absorption equation. *Fuzzy Sets and Systems, Elsevier*, 228 (Special issue on AGOP 2011 and EUSFLAT/LFA 2011), 145-151.
- > Tripathi R K, Raich V V and Sai Hareesh A (2013) The Determinant of an Interval valued fuzzy matrix with respect to t-norm and t-conorm. *International Journal of Fuzzy Mathematics and Systems. Research India Publications*, 3(2), 109-112.
- > Sai Hareesh A and Chandrasekaran V (19 -21 Dec 2013) Child: A Robust Computationally-efficient Histogram-based Image Local Descriptor. *IEEE National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG)*, Jodhpur, India.
- > Sai Hareesh A, Srikanth L and Chandrasekaran V (9 -11 Dec 2013) Hybrid Method for Image Super-Resolution Using Steering Kernel Regression and Example-based Approaches. *IEEE International Conference in Image Information Processing (ICIIP)*, Shimla, India.
- > Krishna G, Goturu S, Sai Hareesh A, Chandrasekaran V and Baruah P K (18-21 Dec 2013) A Fast and Robust Image Local Descriptor For Texture Classification. *20th Annual International Conference on High Performance Computing (HiPC 2013): Student Research Symposium*, Bangalore.
- > Karthik P, Kumar A, Sai Hareesh A, Chandrasekaran V and Baruah P K (18-21 Dec 2013) Image Inpainting Using a Combination of Feature Descriptors: A Heterogeneous Parallel Computing Approach. *20th Annual International Conference on High Performance Computing (HiPC 2013): Student Research Symposium*, Bangalore.
- > Suresh P, Thayaparan T, Siva Sankara Sai S, Sridharan K S and Venkataramanaiah K (12-14 Dec 2013) Gabor-Wigner Transform for Micro Doppler Analysis. *International Radar Symposium IRSI-13*, Bangalore. Published in the Proceedings.
- > Satyanvesh D, Kali Uday B and Baruah P K (21-22 Sep 2013) GenAlign - A High Performance Implementation for Aligning the Compressed DNA sequences. *15th International Conference on Advanced Computing Technologies (ICTACT-2013)*, Rajampet, Andhra Pradesh. IEEE Explore.
- > Kali Uday B, Satyanvesh D and Baruah P K (12-14 Jun 2013) GenSeek: A Novel Parallel Multiple Pattern Recognition Algorithm for DNA Sequences. *International Conference on Advanced Computing, Networking, and Informatics (ICACNI 2013)*, Raipur, Chhattisgarh, India. Springer Publications.

- > Sairam V, Sarma R, Balasubramanian S and Sai Hareesh A (9-11 Dec 2013) A Unified Framework for Geometry and Exemplar Based Image Inpainting. *IEEE Second International Conference on Image Information Processing (ICIIP -2013)*, Jaypee University of Information Technology Waknaghat, Shimla, Himachal Pradesh, India, 511-515.
- > Sai Hemanth S V, Sharma B and Baruah P K (18-21 Dec 2013) CUDAPrefixSpan - GPU-Accelerated Sequential Pattern Mining. *SRS-IEEE International Conference On High Performance Computing*, Bangalore.
- > Dhandhanian R K, Prakash A, Balasubramanian S, Sarma R and Baruah P K (18-21 Dec 2013) A Computationally Efficient Approach for Spectral clustering with eigenvector selection. *IEEE International Conference On High Performance Computing (SRS)*, Bangalore.
- > Iyer C G, Sai Prasanna A, Naidu H R and Baruah P K (18-21 Dec 2013) Cloud-based Real-Time Speech Enhancement for Mobile Communication. *IEEE International Conference on High Performance Computing (SRS)*, Bangalore.
- > Kanchiraju S, Panigrahi P and Baruah P K (18-21 Dec 2013) Efficient Intra-MIC Broadcast. *IEEE International Conference On High Performance Computing (SRS)*, Bangalore, India.
- > Nangireddi P, Golakoti S and Baruah P K (18-21 Dec 2013) Parallel Informative Feature Selection for Object Recognition via Sparse PCA. *IEEE International Conference On High Performance Computing (SRS)*, Bangalore, India.
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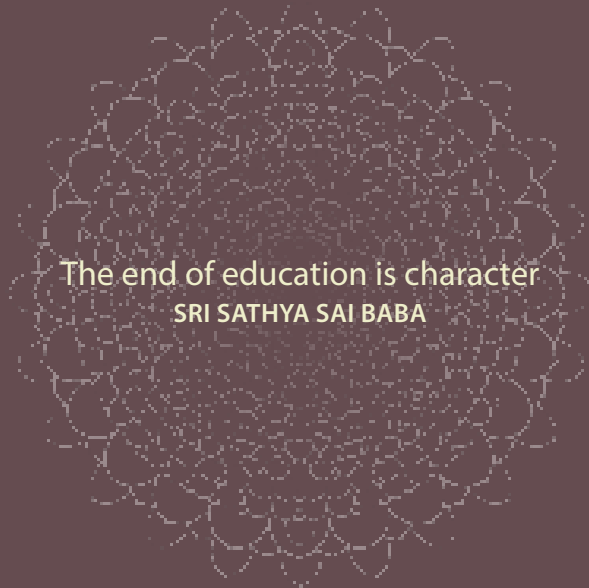
Be like the star which never wavers from the crescent but is fixed in steady faith.

When the sun is over your head there will be no shadow; so too when faith is steady in your heart, it should not cast any shadow of doubt.

Do not talk ill of others; talk only of the good in them; all are good; if you see bad in them, it is because there is bad in you; if you do not like someone, do not mix with him.

Grace is the sunlight which will ripen the fruit; Sadhana is the sap which rises from earth. Both are needed by the tree in order that it may yield fruit.

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