INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY

(Declared as Deemed to be University under section 3 of the UGC Act, 1956)
Valiamala P.O., Thiruvananthapuram-695547, India

SELF STUDY REPORT

FEBRUARY 2012

Submitted to
National Assessment and Accreditation Council, Bangalore

SELF STUDY REPORT

CONTENTS

PART 1 - INSTITUTIONAL DATA

PROFILE OF THE UNIVERISTY

Institutional Data-Part-1

1. Name and address of the University: **Indian Institute of Space Science and Technology (IIST), Valiamala (P.O), Thiruvananthapuram - 695 547**

2. For communication

- **Office**

Name	*Region Code*	*Telephone No. (Direct)*	*Fax No.*	*E-mail*
Dr. K.S.Dasgupta Director	0471	2568402	2568401	ksd@iist.ac.in
Shri K. Sasikumar Registrar	0471	2568403	2568463	ksasikumar@iist.ac.in
Dr. A. Chandrasekar Steering committee co-ordinator	0471	2568503	2568406	chandra@iist.ac.in

- **Residence**

Name	*Region Code*	*Telephone No. (Direct)*	*Mobile No. E-mail*
Dr K.S. Dasgupta Director	0471	2310408	9496020001
Shri K. Sasikumar Registrar	0471	2435629	9447139968
Dr. A. Chandrasekar Steering committee co-ordinator	-	-	9446345346

3. Status of the university : **Declared as Deemed to be University under Section 3 of UGC Act, 1956**

4. Type of university : **Deemed to be university under De-novo category**

5. Date of establishment of the University:

- **Original** : **14th September 2007**
- **As a University** : **3rd July 2008**

6. Date of UGC recognition as a University:

S. No.	*Recognition*	*Date, Month & Year*
1	Under 2f	
2	Under 12 B	Applied (18th Nov. 2011)
3	3 of UGC	3rd July 2008 (No.F.9-16/2007-u.3(A))
4	Any other (specify)	

Certificate of recognition under section 3 of UGC Act is enclosed.

7. Does the University have a satellite campus? ***No***

8. Campus area in acres :

Campus	*Area in acres*
Main Campus	100 Acres
Total	**100 acres**

9. Location of the University : *Rural*

10. What is the total number of institutionsto the University? : *Nil*

11. How much is the affiliation fee? : *Not Applicable*

12. Does the University have a provision to grant autonomous status to its affiliated institutions? : *Not Applicable*

13. What is the total number of institutions affiliated to the University? : *Not Applicable*

14. Current number of academic programmes / courses offered within the university, under the following categories :

Programmes	*Numbers*
UG	**3**
PG	**2**
Ph.D	**1**
Total	**6**

15. Number of permanent and temporary members of the teaching staff at present

	Female	Male	Total
Permanent Teachers	16	49	65
Number of teachers with Ph.D.as the highest qualification	14	45	59
Number of teachers with M.Phil. as the highest qualification	1	0	1
Number of teachers with PG as the highest qualification	1	4	5
Temporary teachers	8	8	16
Number of teachers with Ph.D as the highest qualification	2	5	7
Number of teachers with M.Phil. as the highest qualification	0	0	0
Number of teachers with PG as the highest qualification	6	3	9

16. Number of students enrolled in the university for the current (2011-12) academic year according to regions and countries :

Type of student	UG	PG	PhD	Total
Students from the same State where the university is located	5	7	10	22
Students from other States of India	133	-	7	140
Grand Total	138	7	17	162

17. Unit cost of education? (in Lakhs) :

Unit cost = total annual expenditure budget (actuals) divided by the number of students enrolled.

Rs.4.43 Lakhs

Calculate cost

Unit cost calculated excluding salary component

(only revenue expenditure is considered for calculation)

Rs.3.40 Lakhs

18. Does the Institution offer a distance education programme (DEP)? : *No*

19. Number of full-time faculty employed in the DEP : ***Nil***

20. Any other general data the University would like to include Specify? :

(i) ***Full Assistanceship of Rs 49000 is given to all UG students per semester.***

(ii) ***All UG students meeting a minimum academic requirement get absorbed in ISRO/DoS centres.***

(iii) ***Substantial direct research funding is given to all faculty members including a Fast Track Research funding up to Rs 10 lakhs for newly joined faculty members.***

(iv) ***A limited number of high valued fellowship (Rs 35000 per month) and a large number of regular fellowships are given to all PhD students***

(v) ***A cash award of Rs 20000 is given to a faculty/student for publishing papers in high impact journals. All publication charges are covered for all accepted manuscripts of faculty and students.***

(vi) *Internship: A credited (3 credits) summer internship programme lasting for a period of six weeks during the summer vacation period at the end of third year is a mandatory requirement as a part of the UG curriculum. The students can do the internship either at the Institute or outside.*

(vii) *Industrial training: All UG students get an opportunity to visit and to perform few practical classes in ISRO/DoS centres and other R and D laboratories.*

(viii) *Minor Courses: A UG student at the end of IVth Semester having more than 7.0 CGPA(in a scale of 10) can opt for a three 3 credit minor course(V,VI & VII Semester) in areas other than his/her branch of study.*

(ix) *Institute Electives: All the UG students are allowed to opt for a 3 credit Institute elective in their VIIth Semester.*

(x) *Department Electives: : All the UG students are allowed to opt for a 3 credit Departmental elective in their VIIth Semester.*

(xi) *Stream Electives: At the end of the fifth semester all the UG students are allowed to choose a particular stream (among several streams in their chosen branch of study).*

Speed Post

ज्ञान–विज्ञान विमुक्तये

REGISTRAR'S OFFICE ★ IIST, THIRUVANANTHAPURAM ★ 2518 216 Govt. of India Dept. of Space

UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI-110 002

No.F. 27-1/2007 (CPP-I)

August 2008

OFFICE MEMORANDUM

Whereas the Central Government is empowered under Section 3 of the University Grants Commission (UGC) Act, 1956 to declare, on the advice of the UGC, an institution of higher learning as a deemed-to-be-university.

2. And whereas, an application was received from Department of Space for conferment of status of deemed-to-be-university under Section 3 of the UGC Act, 1956, to 'Indian Institute of Space Science and Technology' being set up at that point of time under the aegis of Indian Space Research Organisation (ISRO) near Thiruvananthapuram in the State of Kerala.

3. And whereas, the University Grants Commission have examined the said proposal and vide their communication No.F.27-1/2007 (CPP-I) dated the 2nd January, 2008 have recommended to the Ministry of Human Resource Development for conferment of status of 'deemed-to-be-university' to Indian Institute of Space Science and Technology, Thiruvananthapuram for a period of five years.

4. Now, therefore, in exercise of the powers conferred by Section 3 of the UGC Act, 1956, the Central Government, on the advice of the University Grants Commission (UGC), vide Notification No.F.9-16/2007-U.3(A) dated 3rd July, 2008 declared that Indian Institute of Space Science and Technology, Thiruvananthapuram shall be a Deemed to be University for the purposes of the aforesaid Act, subject to fulfillment of the following conditions:

(i) The functioning of the IISST as well as its performance shall be reviewed annually by the UGC through its Expert Committee. The status conferred upon the IISST will be confirmed after five years on the basis of performance reports of the Expert Review committee of the UGC and the recommendation of the Commission thereon.

(ii) The Department of Space shall finalise the Memorandum of Association (MoA) and Rules of the IISST in accordance with the model MoA/Rules prescribed by the UGC and in concurrence with the Commission. For this purpose, the Department of Space shall also take into account the variations observed by the UGC in the said MoA & rules and rectify and amend the relevant provisions in concurrence with the Commission. The IISST may, however, retain the text of the provisions proposed under Clause 20 of its Rules.

5. The declaration as made in para 4 above is subject to fulfilment of further conditions mentioned at Sr. No.5 of the endorsement to the Notification;

(S.C. Chadha)
Deputy Secretary

Copy to:-

(i) The Chairman, Indian Institute of Space Science and Technology,
(ii) The Secretary, Department of Space,
(iii) The Chairman, ISRO,
Vikram Sarabhai Space Centre, Department of Space, Government of India, Veli, Thiruvananthapuram

(i) The objectives of the Trust concerned and 'Deemed to be University' institution should confine to educational and related social and charitable activities. The IISST should not undertake or engage in any activities that are of commercial and profit making in nature.

(ii) As and when necessary, IISST shall update or revise or modify its MoA/ Rules with the approval of the UGC. Further, specific changes/ amendments, if any, suggested by the Ministry of Human Resource Development or/and the UGC shall also be carried out by the Deemed to be University institution in its MoA/ Rules with the approval of the UGC.

(iii) The accounts of the IISST shall be open to inspection/ audit by the Comptroller and Auditor General of India. There shall also be no diversion of assets of the IISST Society without prior permission of the Government of India/UGC.

(iv) The Vikram Sarabhai Space Centre, Thiruvananthapuram shall continue to support the IISST with its infrastructure facilities till the time the IIISST has a fully developed and permanent infrastructure of its own at the location near Thiruvananthapuram where such facilities are being developed by the Institute concerned.

(v) The academic programmes being offered or to be offered by IISST shall conform to the norms and standards prescribed by the relevant Statutory Councils such as the UGC and the AICTE. The IISST shall not offer/award, as the case may be any degree (s) that are not specified by the UGC. It shall also ensure that the nomenclatures of the degrees, etc. to be awarded by it are specified by the UGC under Section 22 of the UGC Act, 1956.

(vi) The IISST shall start new academic courses only as per the norms prescribed by the concerned Statutory Councils such as the UGC, AICTE, etc.

(vii) The IISST shall take all the required steps to get itself rated for valid accreditation by the National Assessment and Accreditation Council (NAAC), etc., as the case may be in terms of instructions issued by the UGC vide its circular No. F. 6-1(7)/2006 (CPP-I) dated 12th March, 2007.

(viii) The IISST shall not affiliate any teaching institutions/ colleges.

(ix) The IISST shall take immediate steps to start Postgraduate, doctoral and post doctoral programmes in emerging areas of space technology.

(x) The IISST shall not conduct any distance education programme without prior approval of UGC and Distance Education Council (DEC). The guidelines issued by both the DEC and the UGC from time to time in the matter of imparting education through distance mode have to be complied with by it.

(xi) The IISST shall not start and run any study centre/ extension centre/ off campus centre/ off shore campus without obtaining the requisite prior approval of the UGC/Government of India, as the case may be.

(xii) The IISST shall take immediate steps to comply with all the suggestions made by the UGC's Expert Visiting Committee in its inspection report submitted to the UGC, so as to bring about the recommended improvement.

(xiii) All the prescribed norms and procedures of the relevant Statutory Councils, such as UGC, AICTE, etc. and other authorities concerned in the matter of admission of students, intake capacity of students, starting of new courses/ programmes, renewal of approval to the courses, etc. will continue to be in force, and shall be adhered to by the IISST.

(xiv) In all its advertisements, public notices, communications, etc. the IISST shall distinctly mention under its nomenclature by inserting (within brackets) a line, which shall read: "*Declared as Deemed to be University' under Section 3 of the UGC Act, 1956*".

(xv) The IISST shall abide by all the norms and guidelines as laid down by the UGC and other Statutory Councils such as AICTE, etc. from time to time, as are applicable to institutions notified as 'Deemed to be Universities'.

2. The Joint Secretary, (NET) UGC, New Delhi.
3. Section Officer (Meetings Cell), UGC, New Delhi.
4. The Joint Secretary (DU), UGC, New Delhi.
5. Secretary-General, Association of Indian Universities, AIU House, 16, Kotla Marg, New Delhi-110 002
6. All Regional Offices of UGC.
7. Senior Statistical Officer, UGC, 35, Ferozshah Road, New Delhi.
8. Section Officer (FD-III Section), UGC, New Delhi.
9. Section Officer (DU Section), UGC, New Delhi.
10. All Sections in the UGC Office.
11. Guard file.

(S.C. Chadha)
Deputy Secretary

(TO BE PUBLISHED IN THE GAZETTE OF INDIA PART-I SECTION-1)

No. F.9-16/2007-U.3(A)
Government of India
Ministry of Human Resource Development
(Department of Higher Education)

Shastri Bhawan, New Delhi,
Dated the 3rd July, 2008.

NOTIFICATION

Whereas the Central Government is empowered under Section 3 of the University Grants Commission (UGC) Act, 1956 to declare, on the advice of the UGC, an institution of higher learning as a deemed-to-be-university;

2. And whereas, a proposal was received from Department of Space for conferment of status of 'Deemed-to-be-University', under Section 3 of the UGC Act, 1956, to 'Indian Institute of Space Science and Technology' being set up at that point of time under the aegis of Indian Space Research Organisation (ISRO) near Thiruvananthapuram in the State of Kerala;

3. And whereas, the University Grants Commission has examined the said proposal and vide its communication bearing No.F.27-1/2007 (CPP-I) dated the 2nd January, 2008 has recommended conferment of status of 'deemed-to-be-university' to Indian Institute of Space Science and Technology, Thiruvananthapuram for a period of five years;

4. Now, therefore, in exercise of the powers conferred by Section 3 of the UGC Act, 1956, the Central Government, on the advice of the University Grants Commission (UGC), hereby declare that Indian Institute of Space Science and Technology (IISST) Thiruvanathapuram shall be deemed to be a university, under *de novo* category, for the purposes of the aforesaid Act, provisionally for a period of five years, with immediate effect, subject to the following conditions:

(i) The functioning of the IISST as well as its performance shall be reviewed annually by the UGC through its Expert Committee. The status conferred upon the IISST will be confirmed after five years on the basis of performance report s of the Expert Review Committee of the UGC and the recommendation of the Commission thereon;

(ii) The Department of Space shall finalise the Memorandum of Association (MoA) and Rules of the IISST in accordance with the model MoA/Rules prescribed by the UGC and in concurrence with the Commission. For this purpose, the Department of Space shall also take into account the

variations observed by the UGC in the said MoA & Rules and rectify and amend the relevant provisions in concurrence with the Commission. The IISST may, however, retain the text of the provisions proposed under Clause 20 of its Rules.

5. The declaration as made in para 4 above is further subject to fulfilment of conditions mentioned at Sr. No.5 of the endorsement to this Notification.

(Sunil Kumar)
Joint Secretary to the Government of India

The Manager,
Government of India Press,
Faridabad (Haryana).

Copy forwarded to: -

1. The Secretary, University Grants Commission, Bahadurshah Zafar Marg, New Delhi - 110002

2. The Member-Secretary, All India Council for Technical Education, 7th Floor, Chanderlok Building, Janpath, New Delhi – 110001/

3. Director, Distance Education Council, Indira Gandhi National Open University, Maidan Garhi, New Delhi.

4. The Additional Secretary, Department of Space, Government of India, Antariksh Bhavan, New BEL Road, Bangalore – 560094.

5. The Chairman, Indian Institute of Space Science and Technology and the Secretary, Department of Space and Chairman, ISRO, Vikram Sarabhai Space Centre, Department of Space, Government of India, Vell, Thiruvananthapuram, Kerala - 695022. The declaration as made in para 4 of this Notification shall be further subject to fulfillment of the following conditions:-

(i) The objectives of the Trust concerned and 'Deemed-to-be-University' institution should confine to educational and related social and charitable activities. The IISST should not undertake or engage in any activities that are of commercial and profit making in nature.

(ii) As and when necessary, IISST shall update or revise or modify its MoA/Rules with the approval of the UGC. Further, specific changes/amendments, if any, suggested by the Ministry of Human Resource Development or/and the UGC shall also be carried out by the deemed-to-be-university institution in its MoA/Rules with the approval of the UGC.

(iii) The accounts of the IISST shall be open to inspection/audit by the Comptroller and Auditor General of India. There shall also be no diversion of assets of the IISST Society without prior permission of the Government of India / UGC.

(iv) The Vikram Sarabhai Space Centre, Thiruvananthapuram shall continue to support the IISST with its infrastructure facilities till the time the IISST has a fully developed and permanent infrastructure of its own at the location near Thiruvananthapuram where such facilities are being developed by the Institute concerned.

(v) The academic programmes being offered or to be offered by IISST shall conform to the norms and standards prescribed by the relevant Statutory Councils such as the UGC and the AICTE. The IISST shall not offer / award, as the case may be, any degree(s) that are not specified by the UGC. It shall also ensure that the nomenclatures of the degrees, etc. to be awarded by it are specified by the UGC under Section 22 of the UGC Act, 1956.

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(vii) The IISST shall take all the required steps to get itself rated for valid accreditation by the National Assessment and Accreditation Council (NAAC), etc., as the case may be, in terms of instructions issued by the UGC vide its circular No.F.6-1(7)/2006(CPP-I) dated the 12th March, 2007.

(viii) The IISST shall not affiliate any teaching institutions / colleges.

(ix) The IISST shall take immediate steps to start Postgraduate, doctoral and post doctoral programmes in emerging areas of space technology.

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(xi) The IISST shall not start and run any study centre / extension centre / *off-campus* centre / *off-shore* campus without obtaining the requisite prior approval of the UGC/ Government of India, as the case may be.

(xii) The IISST shall take immediate steps to comply with all the suggestions made by the UGC's Expert Visiting Committee in its inspection report.

submitted to the UGC, so as to bring about the recommended improvement.

(xiii) All the prescribed norms and procedures of the relevant Statutory Councils such as UGC, AICTE, etc. and other authorities concerned in the matter of admission of students, intake capacity of students, starting of new courses / programmes, renewal of approval to the courses, etc. will continue to be in force, and shall be adhered to by the IISST.

(xiv) In all its advertisements, public notices, communications, etc., the IISST shall distinctly mention under its nomenclature by inserting (within brackets) a line, which shall read: *"Declared as Deemed-to-be-University' under Section 3 of the UGC Act, 1956"*.

(xv) The IISST shall abide by all the norms and guidelines as laid down by the UGC and other Statutory Councils such as AICTE, etc. from time to time, as are applicable to institutions notified as 'Deemed-to-be-Universities'

6. The Principal Secretary to the Government of Kerala, Department of Higher Education, Government of Kerala, Government Secretariat, Thiruvananthapuram.

7. The Chairman, Indian Space Research Organisation (ISRO), ISRO Headquarters, Antariksh Bhavan, New BEL Road, Bangalore – 560094.

8. The Co-ordinator, Vikram Sarabhai Space Centre, Thiruvananthapuram 695022, Kerala.

9. Press Information Bureau, Shastri Bhawan, New Delhi-110001.

10. The Secretary-General, Association of Indian Universities, A.I.U. House, 16 Kotla Marg, New Delhi - 110002.

11. Director (Administration) & Web Master, Department of Higher Education, Shastri Bhawan, New Delhi with the request to issue necessary instructions to the CMIS Unit to display this notification on the website of Department of Higher Education. A soft copy of this notification is being *e-mailed* to the CMIS unit for this purpose.

12. Guard file / Notification file.

(Upamanyu Basu)
Director

CRITERION-WISE INPUTS

Criterion I: Curricular Aspects

1. Number of Programme options	:	6(UG-3, PG-2, PhD-1)
2. Number of Subjects taught in the institution	:	UG- 182, PG- 35
3. Number of overseas programmes on campus and income earned	:	Nil
4. Does the institution offer self-funded programmes? If yes, how many courses?	:	No
5. Inter / multidisciplinary programmes	:	Yes, 5 (All Minor Courses)
6. Programmes with Annual System	:	Nil
7. Programmes with Semester	:	Yes, 6 (3 UG, 2 PG and 1 Ph. D.)
8. Programmes with Trimester	:	Nil
9. Programmes with choice based credit system	:	Nil
10. Programmes with elective options	:	Yes, 6 (UG+PG + Ph.D) Ph. D. courses as decided by the doctoral committee.
11. Courses offered in modular form	:	Yes
12. Courses with ICT-enabled teaching-learning process	:	Yes, UG- 182, PG- 35
13. Courses where assessment of teachers by students has been done	: :	Yes (All Courses)
14. Programmes with faculty exchange / visiting faculty	:	Yes (Provision exists for all programmes)
15. New programmes (UG and PG) introduced during the last three years	:	Yes, 2 (M. Tech in Soft Computing and Machine Learning, 2009-2010 and M. Tech in Chemical Systems, 2010-2011)
16. Subjects in which major syllabus revision was done during the last five years	:	Yes, 1
17. Compulsory internship (UGC + other vocational programmes)	:	Yes, 1 Compulsory Internship for UG Students at the end of VI semester. In addition, UG Students do

undergo summer/winter internship.

18. Courses in emerging areas : Yes

19. Feedback obtained from employers* : Yes

20. Provision for Course evaluation : Yes (All Courses)

21. Training programmes arranged : Yes (Refer Department Profile)

22. Courses offered in modular form : Yes

23. Overseas programmes : No

24. Any other data in Curricular Aspects :

- The institute offers minor courses to UG students in areas other than the chosen branch of study.
- Summer and winter courses are offered to the students.
- Remedial classes are offered first year UG students.
- Monitoring of the course content is done by each department based on faculty and student feedbacks. These are placed before the board of studies for approval and academic council for ratification**.
- High standards are ensured while framing the syllabi of the course by inviting eminent academicians in relevant areas, with an emphasis on both concepts and applications.
- Application of ICT tools in the learning process is ensured in the curriculum and syllabi.
- Tutorials and problem solving skills are included in the course for better understanding of the concepts.

* The first batch(2007 admission) passed out of the institute in June 2011. All UG students who successfully pass out of the Institute meeting a minimum academic requirement are absorbed in DOS/ISRO centres. The Institute is initiating the efforts to get feedback of its students from the various DOS/ISRO centres. The overall feedback form various ISRO/DoS centers is indeed encouraging.

** Board of studies is chaired by head of department with a senior faculty member as the convener. In addition there are two/three external experts from other organizations. Academic council consists of Director of the insititute as chairman and has all the Deans, Registrar and Head of Departments as members. In addition five to six academic/research experts are also the members.

Criterion II:Teaching-Learning and Evaluation

1. **Number of working days during the last academic year (2010-11)** : **199**
2. **Number of teaching days during the last academic year (2010-11)** : **179**
3. **Number of positions sanctioned and filled as on date** :

	Sanctioned	*Filled*
Teaching	124	59+6*
Non-Teaching including Technical Staff	49	39

*** 59 on IIST pay roll: 6 in working arrangement from ISRO centers**

4. a. **Number of regular and permanent teachers**

		Male	Female
Sr. Professors	:	2	-
Professors	:	3	-
Adjunct Professors	:	5	1
Associate Professors	:	6	2
Assistant Professors	:	30	10
Reader	:	3	3

b. **Number of temporary teachers** :

Emeritus professor	:	3	-
Readers-Full-time	:	3	7
Visiting Faculty	:	2	1
Total	:	8	8

c. **Number of teachers** :

Same state	:	44
Other state	:	37
Other country	:	Not Applicable

5. a. **Number of qualified permanent teachers and their percentage of the total faculty strength** : **59, 100% (permanent)**
81, 100% (total)

b. **Number of faculty development programmes availed by teachers during the last five years**

Refresher	:	1
Orientation	:	Nil
Any other	:	Nil

c. **Number of faculty development programmes (Refresher courses) organized by the University through Academic Staff College of the University** : **1**

d. Number of academic development programmes (Orientation) organized by the University through the Academic Staff College	:	Nil
e. Seminars / Workshops / Symposia on Curricular Development, Teaching - learning, Assessment and others organized by the Academic Staff College	:	Nil
f. Research development programmes		
Invited / endowment lectures	:	36
tutor-ward system?	:	Yes, for the first year students
If yes, how many students are under the care of each teacher?	:	2
7. Remedial programmes offered	:	5 (For First Year)
8. Bridge courses offered	:	No
9. Is there a mechanism for	:	
a. Self appraisal of faculty	:	Yes
b. Student assessment of faculty performance	:	Yes
c. Assessment of faculty performance by experts (For the purpose of Promotion)	:	Yes
10. Do the faculty members perform additional administrative work?	:	Yes
If yes, the average number of hours spent per week by the faculty	:	2-3 hrs/week
11. Any other (Specify)	:	

Teaching Process:

- Course plans are prepared to ensure uniform coverage of syllabus. It also ensures the syllabus is covered in the stipulated time.
- Concept based animations, technical demonstrations and multimedia resources are used in the class to illustrate the concepts and practices.
- Faculty members are encouraged to develop lecture notes and presentations so that they can publish it in faculty web page as well as in printed form. This permits the faculty in innovating new approaches in teaching, presentations, and lectures.

Learning Process:

- Students are provided with adequate funding to initiate some developmental work and prepare detailed report on them.
- Students are given problems, case studies, and assignments that need the use of computer lab, internet and library facilities (ICT infrastructure).

Evaluation Process:

- Weightages for various components identified for course evaluation are decided in the

course committee meetings.

- The marks are entered in the campus management software database and also announced to the students.
- Relative grading is adopted for every course.
- Auditing of question papers is done by the department concerned.
- Question paper setting is done with an emphasis on problem solving to the extent possible. Faculty is advised to set balanced question papers suitable for the entire class.
- To have uniformity in evaluation common courses handled by more than one faculty, the examination papers are evaluated by the concerned teachers, collectively.
- The results of the UG and PG examinations are analyzed by the examination committee headed by dean academic, and consisting of representatives from all departments and then approved for release.
- The results of the UG and PG examinations are displayed in the institute website within a week of their completion.
- The students can apply for re-evaluation of their answerscripts within five working days of the result publication.

Admission Process for UG:

Institute has introduced a well organized Admission Test, namely ISAT, exclusively for those who seek admission to B.Tech. Programmes offered by IIST.

Student Profile:

Presently students from almost all states of India are studying at IIST. About 10% of them are girls.

Catering to Diverse needs:

- In the first year of all under graduate programmes, the tutorials are part of the courses offered by Aerospace, Avionics, Mathematics, Physics and Chemistry departments. In addition, tutorial components comprising a total of about 14 periods are also assigned for certain courses at the later years.
- The faculty members are helping the students not only in their learning process but also in developing their personality skills
- The talented students are given very challenging tasks/assignments and option to migrate to other branches of studies.
- The slow learners are given personal / remedial coaching by the faculty on a regular basis and are given additional assignments.

Teacher quality:

- Teacher quality is ensured through a rigorous selection procedure covering, academic credentials, proven research output, teaching strength, communication skills, and ability to excel in the profession by the academic peers.
- As a part of quality improvement, those limited faculty members, who do not have Ph.D., are allowed to register for the Ph.D. programme either at the Institute or at other institutes like IIT's.
- Deserving and qualified candidates with good academic/research records are given visiting faculty assignments. After a year of service they are considered for absorption for Assistant Professor.
- IIST follows flexible complementary promotion scheme, which does not require vacancies.

Criterion III: Research, Consultancy and Extension

1. Number and Percentage of faculty members actively involved in research guidance and projects	**:**	**66**	**81.48%**
2. Research collaborations	**:**		
National	**:**	**Yes**	
If yes, how many?	**:**	**25**	
Overseas	**:**	**Yes**	
If yes, how many?	**:**	**38**	
Consultancy earnings	**:**	**Nil**	
If yes, how much?	**:**		
3. Total Amount and Percentage of the annual budget allocated for promotion of research (Average of last five years)	**:**	**Rs. 821.16 Lakh**	
4. a. Does the faculty have research projects?	**:**	**Yes**	
If yes, how many?	**:**	**33**	
b. Provide the following details about the ongoing research projects :			
Major projects	**:**	**19 (includes 1 from MoES)**	
Minor projects	**:**	**11 (less than Rs.10 lakhs)**	
University / Projects	**:**	**1**	
Industry sponsored	**:**	**2 (ISRO sponsered)**	
Any other (specify)	**:**	**-**	
Number of Student research projects	**:**	**Each Ph. D. a research problem/project**	
5. Research publications	**:**		
International journals	**:**	**368**	
National journals-refereed papers	**:**	**34**	
University journal	**:**	**1**	
Books	**:**	**1 book and 8 chapters in different books**	
Abstracts	**:**	**40**	
Any other (specify)	**:**	**Nil**	
Mean Impact Factor of the best research journals in which publications were made (last 5 years)	**:**	**3.37**	

6. Research Awards, recognition, patents etc.	**:**	**Yes, 13 (Faculty members) 2 (Students)**
7. Presentation of high-level research papers	**:**	**Yes**
If yes, number of papers presented at		
National seminars	**:**	**20**
International seminars	**:**	**20**
Any other research activity	**:**	**Nil**
8. Number of extra curricular / co-curricular activities organized in collaboration with other agencies / NGOs (such as Rotary / Lion's etc.) on Campus	**:**	**1 An NGO named Make a Difference organizes regular classes for school children during week ends in which our students take classes**
9. Extension Centres (If any)	**:**	**Nil**
10. Number of regular extension programmes organized by NSS, NCC etc.		
Number of NCC Cadets / units	**:**	**Male - 40 : Female - 10**
Number of NSS Volunteers/units	**:**	**Nil**
11. Number of MoUs with industry / other agencies	**:**	**1(USRA)**
Internship with industry	**:**	**Yes, L & T**

12. Any other data regarding Research, Consultancy and Extension :

- **The institute provides direct research funding to faculty members based on research proposals amounting to *Rs.1521.29 lakhs*.**
- **The institute provides fast-track research projects to the tune of Rs. 10 lakhs to encourage newly joined faculty members. 10 faculty members have been funded under the above programme.**
- **The institute encourages the faculties to organize/participate in international and national conferences.**

- **The institute puts no financial limits for faculties to attain international/national conferences.**
- **All publication charges are covered for all accepted manuscripts.**
- **The institute has in place a cash award of Rs. 20000 for outstanding publication by the faculty members and students.**
- **The institute provides a limited number of high valued (ISRO-IIST) fellowship and a number of regular fellowship to all PhD students.**
- **The institute has provision for enrolling Scientist/ Engineers from ISRO/ DOS centers for their PhD in areas relevant to space science and technology as part of the human resource development programme of DOS.**
- **The institute has a Post Doctoral Fellowship(PDF) programme.**
- **Students gain valuable experience in the design of Sounding Rockets and Nano satellites.**
- **Students especially, from IITs and IISERs spent a month or two in this institute as a part of their summer internship programme.**

Criterion IV: Infrastructure and Learning Resources

1.	a. Campus area in acres	:	100 acres
	b. Built in area in Sq.meters*		12,530m^2
	*1sq.ft.=0.09290304 sq.mt.		
2.	Working hours of the Library		
	On working days	:	09.00-21.00
	On holidays	:	09.00-17.00
	During examinations	:	09.00-21.00 (all the days)
3.	Open access	:	Yes
4.	Total collection		
	a. Books	:	9218 + 4957(Book Bank)
	b. Textbooks *		
	Provided to each students	:	4957(Book Bank)
	c. Reference books	:	2409
	d. Book titles	:	3727 + 82(Book Bank)
	e. Magazines	:	17
	f. Current journals		
	Indian journals	:	29
	Foreign journals	:	19
	g. Peer reviewed journals	:	48
	h. Back volumes of journals	:	142
	i. E-resources		
	CDs/DVDs	:	467
	Databases	:	15
	Online journals	:	3427
	Audio – Visual resources	:	Yes
	j. Special collection		
	UNO Repository Centre	:	Nil
	World Bank Repository	:	Nil
	Materials acquired under special schemes (IEEE, ACM, NBHM, DST etc.)	:	ACM,Digital library, AIAA, AIP, APS,Annual Reviews, ASME, Cambridge online,IEL online (IEEE), JSTOR,Optic Infobase, Oxford Journals,Royal Society of Chemistry,Science Direct.
	Competitive examinations	:	…
	Book Bank	:	4957
	Braille materials	:	Nil
	Manuscripts	:	…
	Any other (specify)		
	Gift Books	:	224
	Cartographic Materials	:	99

5. Number of books / journals / periodicals added during the last two years and their cost :

Library Resources	The year before 2009-2010		The year before (2010-2011)	
	Number	Total cost	Number	Total cost(Rs)
Books	987	Rs. 7,39,467/-	1058	32,43,324/-
Reference Text books	19	Rs. 9,437/-	81	32,448/-
Reference Books	190	Rs. 6,32,552/-	306	18,20,836/-
Journals/Periodicals	44	Rs. 3,65,805/-	40	4,65,882/-
E-Resources	4	Rs.17,47,400/-	15	1,33,65,633/-
Any other (specify)				
Book Bank	Books were given through book grant		4957	21,00,000/-

6. Furnish the following details :

Total carpet area of the Central Library (in m^2) : 2,200m^2 (under construction)

Seating capacity of the Central Library : 32 (at presnt, expected to go up with new building)

Separate reading room facility for

Students : Yes

Staff : Yes

Number of Departmental Libraries : Nil**

*** It is possible for all faculty and students to access the library resource including e-journals from any where in the institute campus. Hence there is no separate departmental library. The reference data books, technical user manuals, are available in departmental laboratories.*

7. Is the Central Library automated? : Yes

If yes, Name the application software used : KOHA

8. Percentage of annual allocation of funds to the library out of The total budget (average of last 2 years) :10% of Revenue budget

9.	Services / facilities in the library	:	
	Circulation of books / journals	:	Yes
	Display of current events / information	:	Yes
	Bibliographic compilation	:	Yes
	Reference	:	Yes
	Reprography	:	Yes
	Computer and Printing	:	Yes
	Internet browsing	:	Yes
	Digitalization of resources	:	Yes
	Inter-library loan	:	Yes
	Uninterrupted power supply / back up	:	Yes
	Sufficient Delnet	:	
	User orientation / information literacy	:	Yes
	Any other (specify)	:	
	Binding facility		Yes
10.	Are students allowed to retain books for examinations?	:	Yes
11.	Furnish details for the following	:	
	Average number of books issued / returned per day		
	Issue	:	43
	Return	:	40
	Average number of faculty visiting the library / day	:	13
	Average number of students visiting the library / day	:	70
	Average number of users who visited / consulted per month	:	1693
	Average number of log-ins into the e-sources per month	:	2570 (Science Direct)
	Ratio of library books to number of students enrolled (Including Ph D & M Tech)	:	1:21
12.	Institutional networking through	:	
	Optical Fiber connectivity	:	Yes
	Wi-Fi connectivity	:	Yes
	Any other (specify)		
13.	Is there a Health Centre?	:	Yes
	Year of Establishment	:	2007

14. Is there Residential accommodation provided?

a) Faculty	**:**	**No***
b) Non-teaching staff	**:**	**No***

Phase two of the construction plan of the institute has made provision for faculty and non teaching staff quarters within the campus.

15. Are there Hostels for students?	**:**	**Yes (10 hostels)**
Year of Establishment	**:**	**2007**
If yes, Number of students residing in hostels	**:**	**Yes**
Male	**:**	**539**
Female	**:**	**75**

16. Is there a provision for

(a) Sports fields	**:**	**Yes, 2**
(b) Gymnasium	**:**	**Yes**
(c) Womens' rest rooms	**:**	**Yes, 10 excluding hostels**
(d) Transport	**:**	**Yes**
(e) Canteen / Cafeteria	**:**	**Yes**
Year of Establishment	**:**	**2007**
(f) Students' centre	**:**	**Yes**
Year of Establishment	**:**	**2010**
(g) Media centre	**:**	**Yes**
Year of Introduction	**:**	**2007**
(h) Telephone facility (Local / STD)	**:**	**Yes**
Year of Introduction	**:**	**2007**
(i) Generator / Electricity back up with capacity	**:**	**Yes**
Year of Introduction	**:**	**2007**

17. Is there provision for

Equipment / teaching aids	**:**	
LCD Projectors	**:**	**Yes, 9**
OHP	**:**	**Yes, 6**
Slide Projectors	**:**	**Nil**

	TV / VCP / Cable Connection	:	Yes, 12
	DVD Players	:	Yes, 1
18.	Does the institution make use of Edusat/Vsat facility	:	No
19.	Is there provision for Indoor sports facilities	:	Yes
	Year of Establishment	:	2007

20. Any other (specify)

The annual expenditure for e-journal sudsciption in the library is Rs.1.38 crores

Physical Facilities

- Campus has Wi-Fi enabled internet facility.
- Ensuring a balanced collection of learning resources with the participation of faculty and students.
- Keeping the collection in a cataloged way so as to facilitate easy retrieval of the library books / journals.
- Providing free and open access to the book collection.
- Providing computers for accessing library resources.
- Policy for liberal lending of books and resources.
- Inter Library Loan (ILL) Facility from other libraries of ISRO/DOS centres. Provision for online acess to all ISRO libraries available form the insititute.
- Provision for urgent procurement on request.
- Book bank providing at least one title per student per course.
- Communications skill development laboratory.
- Smart class rooms with multimedia support / video editing facility for content generation / content delivery.
- National Knowledge Network (NKN) connectivity to access open courseware.

Reading / reference facilities

- Showcasing new books.
- Providing library catalogue (OPAC) through intranet.
- Providing self operated user services through the OPAC.
- Self contained library portal in the intranet.
- Providing all e-journals through a single gate way through the library portal with extensive search facilities.
- Uploading list of new arrivals in the library portal.
- Organising User familiarisation programmes.

Computing facilities

- All administration and accounts are computerized.
- High performance computing cluster with three teraflop computing speed.
- Programming lab with 60 computers.

Transport facilities

- Efficient transportation facilities are provided on demand for both faculty and students.

Criterion V: Student Support and Progression

1. Student strength

Student strength enrolled 2007-08

Student Enrolment	*UG*			*PG*			*Ph.D.*		
	M	*F*	*T*	*M*	*F*	*T*	*M*	*F*	*T*
Number of students from the same state where the institution is located	3	2	5						
Number of students from other states	124	9	133						
Number of NRI students	-								
Number of overseas students	-								

Student strength enrolled 2008-09

Student Enrolment	*UG*			*PG*			*Ph.D.*		
	M	*F*	*T*	*M*	*F*	*T*	*M*	*F*	*T*
Number of students from the same state where the institution is located	8	1	9				2	0	2
Number of students from other states	124	15	139						
Number of NRI students	-								
Number of overseas students	-								

Student Strength 2009-10

Student Enrolment	*UG*			*PG*			*Ph.D.*		
	M	*F*	*T*	*M*	*F*	*T*	*M*	*F*	*T*
Number of students from the same state where the institution is located	10	4	14				3	2	5
Number of students from other states	117	20	137				9	2	11
Number of NRI students	-								
Number of overseas students	-								

Student Strength 2010-11

Student Enrolment	UG			PG			Ph.D.		
	M	F	T	M	F	T	M	F	T
Number of students from the same state where the institution is located	9	0	9	7	7	14	4	8	12
Number of students from other states	123	16	139	6	2	8	4	4	8
Number of NRI students	-								
Number of overseas students	-								

Student Strength 2011-12

Student Enrolment	UG			PG			Ph.D.		
	M	F	T	M	F	T	M	F	T
Number of students from the same state where the institution is located	4	1	5	0	4	4	2	5	7
Number of students from other states	128	5	133	3	0	3	6	1	7
Number of NRI students	-								
Number of overseas students	-								

M-Men, F-Female, T-Total

2. Dropout rate in UG and PG for the last two batches? : UG – 6/138 (2007 batch)
PG – 0 (First batch not completed)

3. Student freeships and scholarships (last Year data) : Number Amount

Support schemes(specify) : Assistanceship of Rs.49,000/- per student per semester for UG students

Endowment : Nil

Freeships : Nil

Scholarship (Government) : Full assistanceship to all students

Scholarships (Institution) : Full assistanceship to all students

Number of loan facilities : Nil

Any other student financial : Nil

4. Does the institution obtain feedback from students on their campus experience? : Yes

If yes how is this feed back analyzed by the university? : Feedback obtained by faculty mentoring of individual students

5. Major Cultural Events (Last Years' data) :

	Organized by the University			*Participated*		
	Yes	*No*	*Number*	*Yes*	*No*	*Number*
Inter-collegiate	✓		1	✓		1
Inter-university	✓		2	✓		1
National						
Any other (specify)						

6. Examination Results (during the past five years)

Programme	*UG*
% of pass	91.30% (2007-2011)
Number of first classes	124 (CGPA of 6.0 and above in scale of 10)
Number of distinctions	69 (CGPA of 7.5 and above in a scale of 10)

First batch of PG will pass out in 2012.

7. Number of students who have passed the following during the last five years :

NET : Not Applicable

SLET : Not Applicable

CAT : Not Applicable

TOEFL : Not Applicable

GRE : Not Applicable

G-MAT : Not Applicable

IAS : Not Applicable

Defence Entrance : Not Applicable

Other services : Not Applicable

Any other (specify) : Not Applicable

8. Student Counselling centre : Yes

Year of Establishment : 2007

9.	Grievance Redressal Cell	:	Grievance redressal mechanism is at place.
	Year of Establishment	:	2007
10.	Alumni Association	:	Yes
	Year of Establishment	:	2011
11.	Parent-Teacher Association	:	The academic progress of the students is duly communicated to the parents. Also in some special cases parents are called to the institute for discussions.
12.	Any other data on Student Support and Progression (specify)	:	

- A Student's Activity Board (SAB) functions under the chairmanship of the Dean, Students Activities to coordinate various student activities of the institute such as sports, library, cultural, canteen and hostel committees.
- Mentoring system for students
- The slow-learners among the first year students of the B. Tech program are provided additional learning support in the form of remedial classes outside the regular class hours and contact hours with the faculty.
- Financial and Medical assistanceship are for all students.
- Encouragement and support to students' academic and co-curricular activities.
- Students play an active role in blood donation and social service campaigns.
- Various clubs like, Voxmateria, Physics club, Maths Club, Astronomy club, Quiz club, Literary club, Movie club, Music club, etc., are also active in the institute.
- Competent doctors and necessary support are available around the clock in the campus for the benefit of the students.
- For major medical emergencies, the institute has a tie-up with a state-of-art hospital/nursing home located in the city to which a student can get admitted.
- Physical education trainer for both boys and girls are separately available.
- Sports facilities (basket ball court, volley ball court and cricket net practice) are available in the campus.
- Well-equipped multi-gymnasium is available.
- A two day intensive induction programme is given to all students during the first week of joining institute.
- A teacher will be in charge of each class. The teacher is selected by the students themselves. The teacher once a month collects feed back from the students on all academic matters. The feed backs are given to the SAB and if needed an open interaction will be held between the students and the authorities.

CriterionVI: Governance and Leadership

1. **Director of Board of University and College development / College development council. Have the following positions of the University Registrar (Academic) filled as per norms?** :

Chancellor : **Yes**

Chairman Board of Management : **Yes**

Director : **Yes**

Registrar : **Yes**

Deans : **Yes**

Finance Officer : **Yes**

2. **a. Non-teaching staff**

Permanent : **Male – 12**
Female - 8

Non technical

Temporary : **Male – 300**
Female - 107

Non teaching Technical

Permanent : **Male – 14**
Female - 5

b. Technical Assistants

Permanent : **Male – 5**
Female - 4

Temporary : **Male – 2**
Female - 6

c. Ratio of Teaching – non- teaching staff : **1 : 5.6**

3. **Number of management appointees**

Non-Teaching : **Not applicable**

4. **Number of non-teaching staff development programmes conducted** : **Nil**

5. Financial resources of the University (approximate amounts) -Last years' data :

Grant-in-aid : Rs. 7,997 lakh (actual 2010-11)

Fees : Nil

Donation : Nil

Self-funded courses : Nil

Any other (specify) : Nil

Interest on deposits + other income : Rs. 26.7 lakh

6. Finance (last two years data) :

Expenditure	Year before last 2009-10	Last year 2010-11
% spent on the salary of teaching faculty	5.67%	5.06%
% spent on the salary of non-teaching employees including contractual staff	1.48%	2.77%
% spent on books and journals	0.63%	2.41%
% spent on Building development	49.42%	53.36%
% spent on maintenance, electricity, water, sports, examinations, hostels, student amenities etc.	3.88%	4.34%
% spent on academic activities of departments, laboratories , green house, animal house etc.	2.75%	1.75%
% spent on equipment, research, teaching aids, seminars, contingency etc.	36.17%	30.31%

7.Dates of meetings of Academic and Administrative Bodies:

Management Council / Executive Council / Syndicate
Internal Admn. Bodies (mention only those of three most important bodies)
Any other (specify)

(i) Board of Management (BOM)

a) First meeting : 30.07.2007

b) Second meeting : 11.04.2008

c) Third meeting : 28.07.2008
d) Fourth meeting : 20.02.2009
e) Fifth meeting : 12.05.2009
f) Sixth meeting : 29.10.2009
g) Seventh meeting : 26.07.2010
h) Eighth meeting : 29.10.2010
i) Ninth meeting : 09.07.2011

(ii) Academic Council meeting
a) First meeting : 28.01.2009
b) Second meeting : 09.06.2010
c) Third meeting : 08.06.2011

(iii) Student Activities Board meeting
a) I meeting : 13.08.11
b) II meeting : 18.10.11
c) III meeting : 25.01.12

(iv) Finance Committee Meeting
a) First meeting : 18.03.2008
b) Second meeting : 25.09.2008
c) Third meeting : 13.10.2009
d) Fourth Meeting : 07.10.2010
e) Fifth Meeting : 24.10.2011

(v) Research Board Meeting
a) First meeting : 21.04.2008
b) Second meeting : 22.08.2010

8. Welfare Schemes for the academic community (past 5 years) : Amount
Loan facility : Yes
Medical / Group Insurance : Yes, CHS scheme as per DoS norms. Also group insurance scheme is available.
Any other (specify) : Nil

9. Is there ICT-support for the following

Office : Yes
Student Admission : Yes
Student Records : Yes
Career Counselling : Yes
Student Placements : Yes
Aptitude Testing : Yes
Examinations : Yes

10. Any other data on Governance and Leadership (specify):

- **Institute has a unique decentralized management system.**
- **Highest authority of the institute (Director) is directly accessible to any student of the institute.**
- **Entire budget operation is completely transparent. Faculty members from all levels actively contribute to the deliberations and discussions in the purchase and budget process.**
- **All departments have the freedom to decide, plan and recommend all minor alteration in the infrastructure including civil works.**
- **Inter department collaboration in research is facilitated with minimal formalities.**
- **All research activity including funding is kept under one research board.**

Criterion VII: Innovative Practices

1. **Has the university established Internal Quality Assurance Mechanisms?** : **Yes**

2. **Do students participate in the Quality Enhancement of the Institution? If yes, how?** : **Yes. They actively participate in the student activity board as well as in all it sub committees and provide valuable inputs for enhancement of quality on aspects of the institute activities.**

3. **What is the average percentage of the following students in the institutions?** : **No** **%**

SC	:	**90**	**15.41**
ST	:	**36**	**6.16**
OBC	:	**126**	**21.57**
Women	:	**61**	**10.44**
Differently-abled	:	**1**	**0.17**
Rural	:	**Not estimated**	
Tribal	:	**Not estimated**	
Any other (specify)	:	**Nil**	

4. **What is the Present average percentage of the following category of staff?** :

	Categories	*Teaching Staff*	*%*	*Non-teaching Staff*	*%*
a	**SC**	Nil		1	
b	**ST**	Nil		Nil	
c	**OBC**	8	12.3	11	22.9
d	**Women**	16	24.6	17	35.4
e	**Differently-abled**	1	1.5		
f	**Rural**	Nil			
g	**Tribal**	Nil			
h	**Any other**				

5. **What is the percentage incremental academic growth in terms of aggregate marks of the following category of students for the last two batches of students?** **:**

Average Academic marks during the admission and during pass out

Categories	*At Admission*		*On completion of the course*	
	Batch-I	*Batch-II*	*Batch-I (CGPA in scale of 10)*	*Batch-II*
a. SC	76.76%		6.87	
b. ST				
c. OBC				
d. Women	89.70%		8.27	
e. Differently-abled	-	-	-	-
f. Rural				
g. Tribal	-	-	-	-

6. **Is there a mechanism for obtaining stakeholder perception about the institution?** **: Yes**

If yes, specify **: ISRO and DoS representatives are involved in Board of Management as well as regular centre level interaction with various ISRO/DoS centres and stakeholders interest is incorporated in the academic system.**

7. **Has the institution kept a record of students shouldering social responsibilities in addition to their academic activities?** **: Yes**

If yes, specify **: Students take regular classes for school children , organized blood donation camps, collects clothes for the poor, celebrate days of importance with the marginalized and downtroden**

8. Does the institution have a mechanism for analyzing student feedback on institutional performance, to arrive at Student Satisfaction Index? (Refer to the sample Questionnaires annexed) : **Yes**

If yes, specify : **Student Representatives are active members of the institutes student activities board which provides a forum for the students to give their input and feedback on academic,sports ,technical,cultural,hostel and canteen issues.**

9. Any other (specify)

- **The institute organizes an annual outreach event named "IIST@Schools" in which about 100 students of class IX and class X from Kerala participate.**
- **The above students are exposed to the fascination of the space science and space technology.**
- **The institute has organized several events for the overall personality development of students and for moulding their outlook towards society.**
- **Examples of above such events include a minicourse on Neuro-Linguistic Programme (NLP), visit to tribal settlements in parts of Kerala, visit to orphanages and tribal schools, participation in community festivities like the Pongala.**

PROFILE OF THE DEPARTMENTS

AEROSPACE ENGINEERING

1.	Name of the Department	AEROSPACE ENGINEERING
2.	Year of Establishment	2007
3.	Courses / Programmes and subject combinations offered	B.Tech., Ph.D.
4.	Number of Teaching posts sanctioned and filled	Sanctioned posts (124) are global. Current faculty strength is 17.
5.	Number of Administrative Staff	1
6.	Number of Technical Staff	12
7.	Number of Students (Men/Women) Give details course-wise	B.Tech. 212 (198/14) & Ph.D. 14 (12/2)
8.	Ratio of Teacher to students	1:7 (Global)
9.	Ratio of Teachers to Research scholars	10:14
10.	Number of research scholars who have obtained their master's degree from other institutions	14
11.	Number of teachers in academic bodies of other Autonomous Colleges and Universities	2
12.	Latest revision of the curriculum (year)	2010
13.	Number of students passed in NET/SLET etc. (last 5 years)	Not Applicable
14.	Success Rate of students	89.8% (2007 Admission)
15.	Demand Ratio (No. of seats : No. of applications)	1:551 (Global), The entrance examination for UG is common for all the B.Tech programmes of the institute.
16.	Awards and recognition received by faculty (last 5 years)	2
17.	Faculty who have Attended Natl./Intl. Seminars (last 5 years)	7
18.	Number of national / international seminars organized (Last 5 years)	1
19.	Number of teachers engaged in consultancy and the revenue generated	Nil

20.	Number of Ongoing projects and their total outlay	6 Projects (Includes centre for excellence) Rs. 388.5 lakhs
21.	Research projects completed during last five years & their Outlay	Nil
22.	Number of inventions and patents	Nil
23.	Number of Ph.D. thesis guided during the last five years	Nil
24.	Publications by faculty (last 5 years)	22 (Journals)
25.	Average citation index and impact factor of publications	4.5 1.77
26.	Number of Books in the Departmental Library, if any	Not Applicable
27.	Number of Journals / Periodicals in the departmental library	Not Applicable
28.	Number of Computers	65
29.	Annual Budget (excluding salary)	Rs. 486.80 lakhs (BE 2012-13)

AVIONICS

1.	Name of the Department	AVIONICS
2.	Year of Establishment	2007
3.	Courses / Programmes and subject combinations offered	B.Tech., Ph.D.
4.	Number of Teaching posts sanctioned and filled	Sanctioned posts (124) are global. Current faculty strength is 16
5.	Number of Administrative Staff	2
6.	Number of Technical Staff	8
7.	Number of Students (Men/Women) Give details course-wise	B.Tech 250 (217/33) PhD 10 (5/5)
8.	Ratio of Teacher to students	1:7 (Global)
9.	Ratio of Teachers to Research scholars	11:10
10.	Number of research scholars who have obtained their master's degree from other institutions	10
11.	Number of teachers in academic bodies of other Autonomous Colleges and Universities	2
12.	Latest revision of the curriculum (year)	B.Tech - 2010
13.	Number of students passed in NET/SLET etc. (last 5 years)	Not Applicable
14.	Success Rate of students	95% (2007 Admission)
15.	Demand Ratio (No. of seats : No. of applications)	1:551 (Global), The entrance examination for UG is common for all the B.Tech programmes of the institute.
16.	Awards and recognition received by faculty (last 5 years)	3
17.	Faculty who have Attended Natl./Intl. Seminars (last 5 years)	10
18.	Number of national/ international seminars organized (Last 5 years)	4 (workshops organized)

19.	Number of teachers engaged in consultancy and the revenue generated	Nil
20.	Number of Ongoing projects and their total outlay	4 (Includes centre for excellence) Rs. 232.4 lakhs
21.	Research projects completed during last five years & their Outlay	Nil
22.	Number of inventions and patents	Nil
23.	Number of Ph.D. thesis guided during the last five years	Nil
24.	Publications by faculty (last 5 years)	45 (Journal)
25.	Average citation index and impact factor of publications	2.55 1.43
26.	Number of Books in the Departmental Library, if any	Not Applicable
27.	Number of Journals/Periodicals in the departmental library	Not Applicable
28.	Number of Computers	87
29.	Annual Budget (excluding salary)	Rs. 571.95 lakhs

CHEMISTRY

1.	Name of the Department	CHEMISTRY
2.	Year of Establishment	2007
3.	Courses / Programmes and subject combinations offered	M.Tech., Ph.D.
4.	Number of Teaching posts sanctioned and filled	Sanctioned posts (124) are global. Current faculty strength is 9
5.	Number of Administrative Staff	1
6.	Number of Technical Staff	7
7.	Number of Students (Men / Women) Give details course-wise	M.Tech 13 (7/6) PhD 9 (4/5)
8.	Ratio of Teacher to students	1:7 (Global)
9.	Ratio of Teachers to Research scholars	9:9
10.	Number of research scholars who have obtained their master's degree from other institutions	9
11.	Number of teachers in academic bodies of other Autonomous Colleges and Universities	1
12.	Latest revision of the curriculum (year)	B.Tech (I year)- 2011 M.Tech (I & II year) 2011
13.	Number of students passed in NET/SLET etc. (last 5 years)	Not Applicable
14.	Success Rate of students	Not Applicable
15.	Demand Ratio (No. of seats : No. of applications)	1:551 (Global)
16.	Awards and recognition received by faculty (last 5 years)	3
17.	Faculty who have Attended Natl./Intl. Seminars (last 5 years)	8
18.	Number of national / international seminars organized (Last 5 years)	2
19.	Number of teachers engaged in consultancy and the revenue generated	Nil
20.	Number of Ongoing projects and their total outlay	3 Ongoing Projects (Includes centre for excellence) Rs. 371.24 lakhs

21.	Research projects completed during last five years & their Outlay	Nil
22.	Number of inventions and patents	3
23.	Number of Ph.D. thesis guided during the last five years	Nil
24.	Publications by faculty (last 5 years)	101 (Journal)
25.	Average citation index and impact factor of publications	7.3 5.7
26.	Number of Books in the Departmental Library, if any	Not Applicable
27.	Number of Journals/Periodicals in the departmental library	Not Applicable
28.	Number of Computers	30
29.	Annual Budget (excluding salary)	Rs. 401 lakhs (BE 2012-13)

EARTH & SPACE SCIENCES

1.	Name of the Department	EARTH & SPACE SCIENCES
2.	Year of Establishment	2009
3.	Courses / Programmes and subject combinations offered	B. Tech., PhD.
4.	Number of Teaching posts sanctioned and filled	Sanctioned posts (124) are global. Current faculty strength is 18
5.	Number of Administrative Staff	1
6.	Number of Technical Staff	Nil
7.	Number of Students (Men/Women) Give details course-wise	B.Tech 122 (108/14) PhD. 6 (2/4)
8.	Ratio of Teacher to students	1:7 (Global)
9.	Ratio of Teachers to Research scholars	17:6
10.	Number of research scholars who have obtained their master's degree from other institutions	6
11.	Number of teachers in academic bodies of other Autonomous Colleges and Universities	2
12.	Latest revision of the curriculum (year)	2011
13.	Number of students passed in NET/SLET etc.(last 5 years)	Not Applicable
14.	Success Rate of students	86.2% (2007 Admission)
15.	Demand Ratio (No. of seats : No. of applications)	1:551 (Global), The entrance examination for UG is common for all the B.Tech programmes of the institute.
16.	Awards and recognition received by faculty (last 5 years)	1
17.	Faculty who have Attended Natl./Intl. Seminars (last 5 years)	7

18.	Number of national/ international seminars organized (Last 5 years)	5 (workshop organized)
19.	Number of teachers engaged in consultancy and the revenue generated	Nil
20.	Number of Ongoing projects and their total outlay	10 Rs.282.04 lakhs
21.	Research projects completed during last five years & their Outlay	2 Rs. 20 Lakhs
22.	Number of inventions and patents	Nil
23.	Number of Ph. D thesis guided during the last five years	Nil
24.	Publications by faculty (last 5 years)	101 (Journal)
25.	Average citation index and impact factor of publications	7.07 6.3
26.	Number of Books in the Departmental Library, if any	Not Applicable
27.	Number of Journals/Periodicals in the departmental library	Not Applicable
28.	Number of Computers	30
29.	Annual Budget (excluding salary)	Rs. 309.2 lakhs (BE 2012-2013)

HUMANITIES

1.	Name of the Department	HUMANITIES
2.	Year of Establishment	2007
3.	Courses / Programmes and subject combinations offered	PhD.
4.	Number of Teaching posts sanctioned and filled	Sanctioned posts (124) are global. Current faculty strength is 5
5.	Number of Administrative Staff	1
6.	Number of Technical Staff	1
7.	Number of Students (Men/Women) Give details course-wise	PhD. 2 (0/2)
8.	Ratio of Teacher to students	1:7 (Global)
9.	Ratio of Teachers to Research scholars	4:2
10.	Number of research scholars who have obtained their master's degree from other institutions	2
11.	Number of teachers in academic bodies of other Autonomous Colleges and Universities	2
12.	Latest revision of the curriculum (year)	2011
13.	Number of students passed in NET/SLET etc. (last 5 years)	Not Applicable
14.	Success Rate of students	Not Applicable
15.	Demand Ratio (No. of seats : No. of applications)	1:551 (Global)
16.	Awards and recognition received by faculty (last 5 years)	Nil
17.	Faculty who have Attended Natl./Intl. Seminars (last 5 years)	5
18.	Number of national/ international	1

	seminars organized (Last 5 years)	
19.	Number of teachers engaged in consultancy and the revenue generated	Nil
20.	Number of Ongoing projects and their total outlay	5 Rs. 74.86 Lakhs
21.	Research projects completed during last five years & their Outlay	1 Rs. 25,000/-
22.	Number of inventions and patents	Nil
23.	Number of Ph. D thesis guided during the last five years	Nil
24.	Publications by faculty (last 5 years)	19 (Journal)
25.	Average citation index and impact factor of publications	-
26.	Number of Books in the Departmental Library, if any	Not Applicable
27.	Number of Journals/Periodicals in the departmental library	Not Applicable
28.	Number of Computers	60
29.	Annual Budget (excluding salary)	Rs.71.50 lakhs (BE 2012-13)

MATHEMATICS

1.	Name of the Department	MATHEMATICS
2.	Year of Establishment	2007
3.	Courses / Programmes and subject combinations offered	M Tech., PhD.
4.	Number of Teaching posts sanctioned and filled	Sanctioned posts (124) are global. Current faculty strength is 9
5.	Number of Administrative Staff	1
6.	Number of Technical Staff	3
7.	Number of Students (Men/Women) Give details course-wise	M Tech 16 (9/7) PhD 3 (2/1)
8.	Ratio of Teacher to students	1:7 (Global)
9.	Ratio of Teachers to Research scholars	9:3
10.	Number of research scholars who have obtained their master's degree from other institutions	3
11.	Number of teachers in academic bodies of other Autonomous Colleges and Universities	2
12.	Latest revision of the curriculum (year)	2011
13.	Number of students passed in NET/SLET etc. (last 5 years)	Not Applicable
14.	Success Rate of students	First M Tech batch not yet come out.
15.	Demand Ratio (No. of seats : No. of applications)	1:551 (Global)
16.	Awards and recognition received by faculty (last 5 years)	1
17.	Faculty who have Attended Natl./Intl. Seminars (last 5 years)	9

18.	Number of national/ international seminars organized (Last 5 years)	6 (includes workshops)
19.	Number of teachers engaged in consultancy and the revenue generated	Nil
20.	Number of Ongoing projects and their total outlay	2 Rs. 16.12 lakhs
21.	Research projects completed during last five years & their Outlay	3 35 Lakhs
22.	Number of inventions and patents	Nil
23.	Number of Ph. D thesis guided during the last five years	Nil
24.	Publications by faculty (last 5 years)	26 (Journal)
25.	Average citation index and impact factor of publications	2.73 1.58
26.	Number of Books in the Departmental Library, if any	Not Applicable
27.	Number of Journals/Periodicals in the departmental library	Not Applicable
28.	Number of Computers	71
29.	Annual Budget (excluding salary)	Rs. 223.05 lakhs (BE 2011-12)

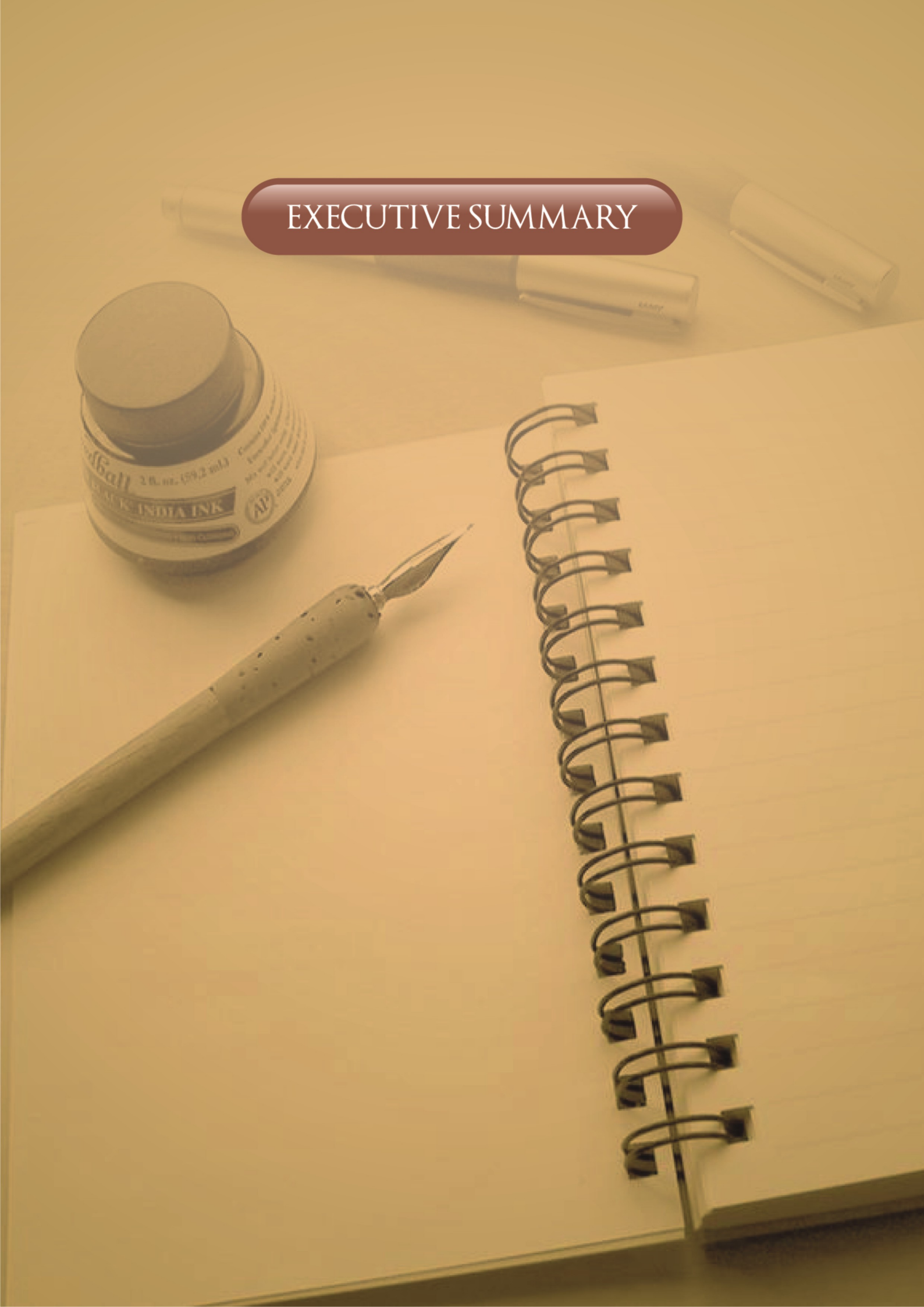
PHYSICS

1.	Name of the Department	PHYSICS
2.	Year of Establishment	2007
3.	Courses / Programmes and subject combinations offered	PhD.
4.	Number of Teaching posts sanctioned and filled	Sanctioned posts (124) are global. Current faculty strength is 8
5.	Number of Administrative Staff	2
6.	Number of Technical Staff	6
7.	Number of Students (Men/Women) Give details course-wise	PhD. 8 (5/3)
8.	Ratio of Teacher to students	1:7 (Global)
9.	Ratio of Teachers to Research scholars	7:8
10.	Number of research scholars who have obtained their master's degree from other institutions	8
11.	Number of teachers in academic bodies of other Autonomous Colleges and Universities	Nil
12.	Latest revision of the curriculum (year)	2011
13.	Number of students passed in NET/SLET etc. (last 5 years)	Not Applicable
14	Success Rate of students	Not Applicable
15.	Demand Ratio (No. of seats : No. of applications)	1:551 (Global)
16.	Awards and recognition received by faculty (last 5 years)	1
17.	Faculty who have Attended Natl./Intl. Seminars (last 5 years)	8
18.	Number of national/ international seminars	1

	organized (Last 5 years)	
19.	Number of teachers engaged in consultancy and the revenue generated	Nil
20.	Number of Ongoing projects and their total outlay	3 Rs. 175.53 Lakhs
21.	Research projects completed during last five years & their Outlay	Nil
22.	Number of inventions and patents	Nil
23.	Number of Ph.D. thesis guided during the last five years	Nil
24.	Publications by faculty (last 5 years)	54 (Journal)
25.	Average citation index and impact factor of publications	6.0 3.63
26.	Number of Books in the Departmental Library, if any	Not Applicable
27.	Number of Journals / Periodicals in the departmental library	Not Applicable
28.	Number of Computers	55
29.	Annual Budget (excluding salary)	Rs. 640.35 lakhs (BE 2012-13)

PART-II EVALUATIVE REPORT

EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

Indian Institute of Space Science and Technology (IIST), at Thiruvananthapuram is a Deemed to be University under Section 3 of the UGC Act 1956 and was formally inaugurated on 14 September 2007 by Dr. G. Madhavan Nair, the then Chairman, ISRO. The institute is the first of its kind in the country, to offer high quality education at the undergraduate, graduate, doctoral and post-doctoral programmes on areas with special focus to space sciences, space technology and space applications. IIST functions as an autonomous body under the Department of Space, Government of India. **Dean (R&D) of the institute has been conferred 'Padma Shri' by Govt. of India in 2012**.

In a little less than a year of its establishment, IIST received the recognition of **UGC as a 'Deemed to be University' under Section 3 of UGC Act, 1956.** IIST functioned from its Thumba VSSC campus from 14 September 2007 to 14 August 2010 and then moved to its own campus at Valiamala, Thiruvananthapuram from 15th August 2010. Ever since its inception, the institute has been striving to build, strengthen and maintain excellence in teaching and research. The institute has placed great emphasis in creating the right academic ambience in which teaching and research can go hand in hand and strengthen one another.

The institute recognizing the relevance of research has supported the research needs of faculty members by funding research projects directly. In addition, the Institute encourages all its faculty members to guide and supervise young scholars for the PhD programme as well as for Post-Doctoral programmes. The institute provides for a limited number of high valued (ISRO-IIST) fellowship as well as large number of regular fellowship. The Institute has a fast track research scheme wherein funding of up to Rs 10 lakhs is provided for new faculty to initiate their research. The institute provides cash incentives to its faculties and students for publishing in high impact journals. The institute also covers all publication charges of accepted manuscripts of faculty and students. Furthermore, the Institute also actively supports its faculty members to organize in house National/International Conferences, present paper in peer-reviewed journals and to participate in National/International Conferences.

The courses offered by the institute under the various UG, PG and PhD programmes in areas such as Aerospace Engineering, Avionics and Physical Science etc are extremely relevant to space studies, as well as up-to-date and need based. The academic programmes have been formulated to strengthen the fundamentals, experience the realities through practical work, and enhance the knowledge and understanding in the areas of interest. Also, the programmes so envisaged will give exposure in the emerging fields and will lead to experience knowledge synthesis. The curriculum, courses, practical, electives and the projects have been developed and continuously upgraded to meet these goals by all the departments. In addition to the regular courses, the bright UG students at IIST have a provision to voluntarily register for minor stream courses other than the chosen branch of study such as (i) Robotics, (ii) Navigation Guidance and Control, (iii) Data Processing for Earth Observation, (iv)Nano-Technology, and (v) Propulsion Systems.

The institute has a semester system in its entire UG and post graduate programmes. The students, who have enrolled in the PhD program, are expected to undergo courses such as Research Methodology and Advanced Mathematics in addition to courses stipulated by their respective Doctoral Committee.

Admissions to various UG programmes are merit based and are based on an All - India entrance examination (IIT-JEE for the first three years 2007-2009), and the institute's own admission examination (ISAT) of same standard as IIT-JEE since 2010. The admission to the PG programmes is restricted to the scientists/engineers of ISRO/DOS. The admission for PhD against open advertisement is available to the public while options for PhD admission are also possible for scientists/engineers from ISRO/DOS and in house faculty development program. The major feature of the UG and PG program in the institute is the complete absence of any form of fees payable to the institute, rendering the education **"completely free",** subject to the students securing a stipulated minimum academic requirement. However, the PhD students of the institute pay only for their accommodation and dining charges. Students also benefit from a liberal book grant provided by the institute. In order to provide for equal opportunities to all sections of society, the institute provides reservation and relaxation in the minimum qualifications together with age relaxation, wherever applicable, for SC, ST, OBC (non-creamy) candidates as well as to candidates with physical disabilities, as per the policy of the Government of India. In the last two years (2010 and 2011, since the institute started conducting its own admission test), over 80,000 candidates have competed in the All-India admission test for 156 seats in three UG disciplines. This is a testimony to the stature and the national standing of the institute.

The institute encourages adoption of modern methods of learning with the right mix of lectures, practical and tutorials in the curriculum. In addition to the conventional practical experiments, the students are also exposed and get to do real experiments at various ISRO/DoS centers. This provides an opportunity to the students of the institute to have hands on experience in real life experiments which have design links with ISRO's launch vehicle, space craft and application programme. Students also undertake summer internship program as well as their final semester project dissertations work in ISRO/DoS centers and other organizations and work on projects relevant to ISRO/DoS. Tutorials are an integral part of a majority of courses in the first year while the same is also provided for some courses in the later years. The students of the institute are encouraged to present seminars/ short presentations on a few current aspects relevant to their courses. Furthermore, the students also have a credited curricular seminar; the students choose a particular topic, do a literature survey and give a presentation. Students weak in English are given the benefit of Neuro-Lingusitic Programme (NLP) and communicative English programmes. To expose students to programming languages, soft skills training programmes are imparted after regular class hours. Furthermore, once in a week the afternoon session on Wednesdays are earmarked to carry out innovative experiments in the field of basic science/seminars in advanced topics/invited lectures from eminent academicians and researchers.

All the first year students are mentored by the faculty members of the institute. While slow learners are provided with remedial courses/additional tutorials, the failed candidates are given the option to register for summer/winter courses. The institute provides value based education through lectures on "Ethics and Values", "Tradition", "Culture" and "Social responsibility". The library in the institute boasts of an excellent collection of books and electronic journals. The online and Internet services in the library are available throughout the institute campus on a 24x7 basis. The institute's library is fully computerized in all its in-house operations, and uses the open library management software, KOHA.

The institute lays great stress on flexibility and transparency as far as the student evaluation is concerned by providing the right guidelines. Mid-term and end-term evaluations together with

class tests/class assignments are mandatory for all courses in the institute. The setting up of question papers as well as the valuation of the answer scripts is performed by the faculty member only, making the entire examination system "totally internal". Within a week of the completion of the last examination, the results are released by the Academic Office. A mechanism for student feedback which is shared with the respective faculty members is a hallmark of the institute. Examination committee meets periodically to discuss on matters related to examination and evaluation.

The institute has signed a MoU with USRA in 2010 that provides for mutual exchange of faculty and students from IIST to USRA institutes/universities. Five of the UG students of the first batch completed their project dissertation at USRA institutes/universities in 2011. The institute has initiated efforts for a similar MoU with California Institute of Technology, USA has reached an advanced stage,for which a team from CALTech visited the institute in 2010. The institute is also planning to set up MoU's with leading research/academic institutes within and outside the country.

The institute encourages its faculty members to serve in Board of Studies of other universities as well as in the editorial committee of international/national journals, help in the peer review of manuscripts submitted to journals, assist other institutes/universities in examining their PhD thesis, setting up of question paper and correcting answer-scripts of courses pertaining to other universities, as well as participating in the selection of faculty members in other institutes /universities. The institute encourages its faculty members to enroll for PhD program in the institute itself or with other institutes. The institute also provides leave to its faculty to visit other leading institutes/universities within the country (IITs and IISc) and abroad for fruitful research collaboration with research peers.

The present campus at Valiamala of around 100 acres boasts of several modern and environmentally friendly buildings which blend beautifully with the thick wooded campus located in a valley, surrounded with scenic hills with thick foliage and vegetation situated on the foot hills of Sahyadri mountains. The Phase-I of the construction activities in the institute, is presently underway where major infrastructural facilities such as academic blocks, administrative building and student hostels are being created. While two academic blocks are complete, work has commenced in two more academic blocks. While ten numbers of hostel blocks are already in use, the student's activity center, as well as the Administrative block and the library are in the advanced stage of completion. Sports facilities, faculty housing and staff quarters are being planned in Phase-2 which is likely to commence shortly. While all the four science departments are presently housed in one academic block, the remaining three departments are housed in the other academic block. The institute campus has adequate power supply from the state Electricity Board Grid and is also well backed-up by diesel gen-sets.

Within the next six to ten months all the work pertaining to Phase-I are likely to be completed providing for four completed academic blocks housing all the seven departments together with the completion of the administrative block, library and the students activity center. With this completion, the institute can boast of excellent physical infrastructure in terms of its academic, administrative and students activity buildings. The academic buildings housing the class rooms and laboratories are well maintained. Most students, except for the first year UGs, get single room accommodation in the hostel which has provision for automatic washing machines and drinking water in each wing. The present facilities for students include centralized laundry, transport and sports facilities, including a gymnasium. The students get

the benefit of spacious dining halls with modernized kitchen providing hygienic food for the hostels as well as the presence of a bank with ATM facilities inside the campus. The institute has the necessary medical facilities and infrastructure within the campus for the benefit of the students. The institute campus has a bookshop wherein the students can buy books as well as stationery items and a kiosk which provides for light snacks, tea and coffee for the students.

The library in the institute is presently housed temporarily in one of the academic blocks but is likely to move to its own building shortly. The institute is an active member of INFLIBNET consortium and presently eight INFLIBNET e-resources are currently being subscribed in the library. While the institute has purchased books for the library worth Rs.1.51 crores in the last four years, e-journals have accounted for an expenditure of Rs.2.57 crores since inception. The annual cost of e-journal subscription in the library is presently Rs.1.38 crores.

The institute campus has put in place a good ICT infrastructure and also possesses very good computing facility including a centralized computing infrastructure - High Performance cluster server having 3 Terra flop speed comprising of 32 HP Blade servers having 64 Dual Quad Processors. Furthermore, the institute also boasts a High Performance Computing Lab having several High-end Work Stations. Also the institute has provision for a **High Speed Wi-Fi enabled internet** facility for use in the academic departments and in the hostel rooms. The institute plans to setup a virtual reality lab for the students to develop/understand the 3D animation for scientific applications.

The institute under the center of Excellence plan is developing a center for advanced research in Nano Technology, virtual reality laboratory to develop/understand 3D animation for scientific applications and an advanced propulsion and laser flow diagnostics facility.

The institute provides assistantship to the tune of Rs.49,000/- per semester per student to cover the cost of tuition, establishment, hostel and dining as well as student amenities and student medical cover together with a book grant of Rs.3,000/- per semester. The above-mentioned liberal financial assistance to all students together with imparting high quality education has resulted in a situation with very few student dropouts from the institute.

The students of the institute organize a unique inter-collegiate cultural festival named "Dhanak" as well as an inter-collegiate technological festival named "Conscientia" every year, which provide a platform for the students to showcase their talents and creativity both in the cultural as well as in the technological domains.

The institute celebrates "Sports Day" wherein students and faculty members of the institute compete in several sporting events and win medals and prizes. The institute has constituted a trophy for the **"Best All-Rounder of IIST"** and is given every year to the best-all rounder student of the institute who is proficient in academics, sports as well as in cultural activities. The institute also conducts yoga classes regularly for the benefit of students. The above yoga classes are also available to all staff members of the institute.

The students of the institute can approach their faculty mentor any time and get proper counseling and guidance on any of their personal and academic matters. The institute has a separate **"Women's Cell**" to provide for counseling and guidance to women students. The institute has constituted a Student's Activities Board under the chairmanship of Dean, Students Activities of IIST, to coordinate the various students' activities of the institute. In

addition to the above student's activities board, there are also various committees formed at the institute level in specific disciplines such as sports, culture, canteen, hostel, and technical by co-opting faculty members, staff and students. The students of the institute also participate in blood donation and social service activities from time to time. The students of the institute are provided necessary medical and health care within the campus by a team of competent and dedicated medical doctors and staff. For serious and medical emergencies the students can benefit from the institute's tie-up with the state of art medical hospitals outside the campus.

Dr A.P.J Abdul Kalam, the former President of India has been serving as the Chancellor of the institute since its inception. While the institute does maintain its autonomy on academic matters, on other matters, the institute is guided and governed by a Board of Management, IIST. The Board of Management, IIST is headed by Secretary DoS/Chairman, ISRO and is ably assisted by several eminent persons as per the UGC norms.

The academic as well as administrative governance bodies are headed by Director, IIST together with the Deans and the various heads of departments and their respective faculty as well as Registrar and the administrative staff members. There exists an Academic Council, which in addition to various senior academic personnel of IIST also has several senior Professors from other IITs, and IISc, who advise and guide the institute on all academic matters. The administration of the institute has moved towards complete computerization and ICT enabled e-governance. All matters related to financial activities are also computerized in the institute.

The Finance Committee in the institute is operational and comprises of other experts from sponsoring organizations (DoS) with Registrar, of the institute acting as the Member Secretary, providing financial advice and guidance to the institute. The institute has a three-tier system of scrutiny and audit, including internal and external audit. The institute believes in putting in place practices which aid in good governance and administration, which will lead to overall growth and development of the institute. The whole structure is decentralized with independent responsibilities assigned to each unit and subunit in the organizational setup.

The written feedback by students of the institute on teaching and evaluation are collected from every class at the end of the semester. The student's feedback is used to assess teaching practices and implement changes in the course structure and classroom teaching. The institute has several student programmes for the overall academic and personality development of students. At the academic level, there are ample opportunities for students to work on scientific and engineering problems with faculty members of the institute as well as at the many centers of the ISRO and other national and international research centers and universities. The institute, through its regular series of seminars, gives the students a forum to interact with personalities from diverse disciplines. The institute also has student clubs on various subject areas like astronomy, physics, chemistry, mathematics, robotics, remote sensing etc. The physics department has been organizing every week a program where students showcase their innovations through scientific experiments and models which they have developed. For the overall personality development of students and for moulding their outlook towards society, the institute has organized several events, visit to orphanages and tribal schools, participation in community festivities like the *'Pongala'*,

The institute has strong public outreach programmes with the specific objective of enabling students to deliberate on social issues in the context of their education. As part of the course on social science and ethics, students of the institute are required to do a project on any of the tribal settlements in the State of Kerala which includes a study of their lifestyles and the challenges they face in terms of their basic needs, access to education, health care and the impact of environmental in their ways of life. The institute has started an annual educational outreach activity called IIST@Schools from 2010. Two such programmes were held in 2010 and 2011. This program brings together more than 100 students of classes 8 and 9 for a three day activity oriented workshop on science and technology. The students are selected from government, government-aided and private schools from all districts of the state with special emphasis on reaching out to village and tribal schools.

The institute is unique in terms of the specializations that it offers at the UG and graduate levels. The specializations in the B. Tech and M. Tech programmes are one of the main attractions for prospective students and their parents. Upon successful completion of their studies, the students are directly recruited as scientists into one of the many centres of ISRO/DoS. This unique opportunity of employment in the nation's space research organization and to be involved in its many ambitious projects is a highlight for students and their parents, the main stakeholders of the institute. **Unlike other Govt. funded academic institutions, where the return of investment to the society at large is indirect, the investment towards this institute results in high quality manpower educated in Space Science, Space Technology and related areas, who directly contribute to the ongoing national technology development programme.**

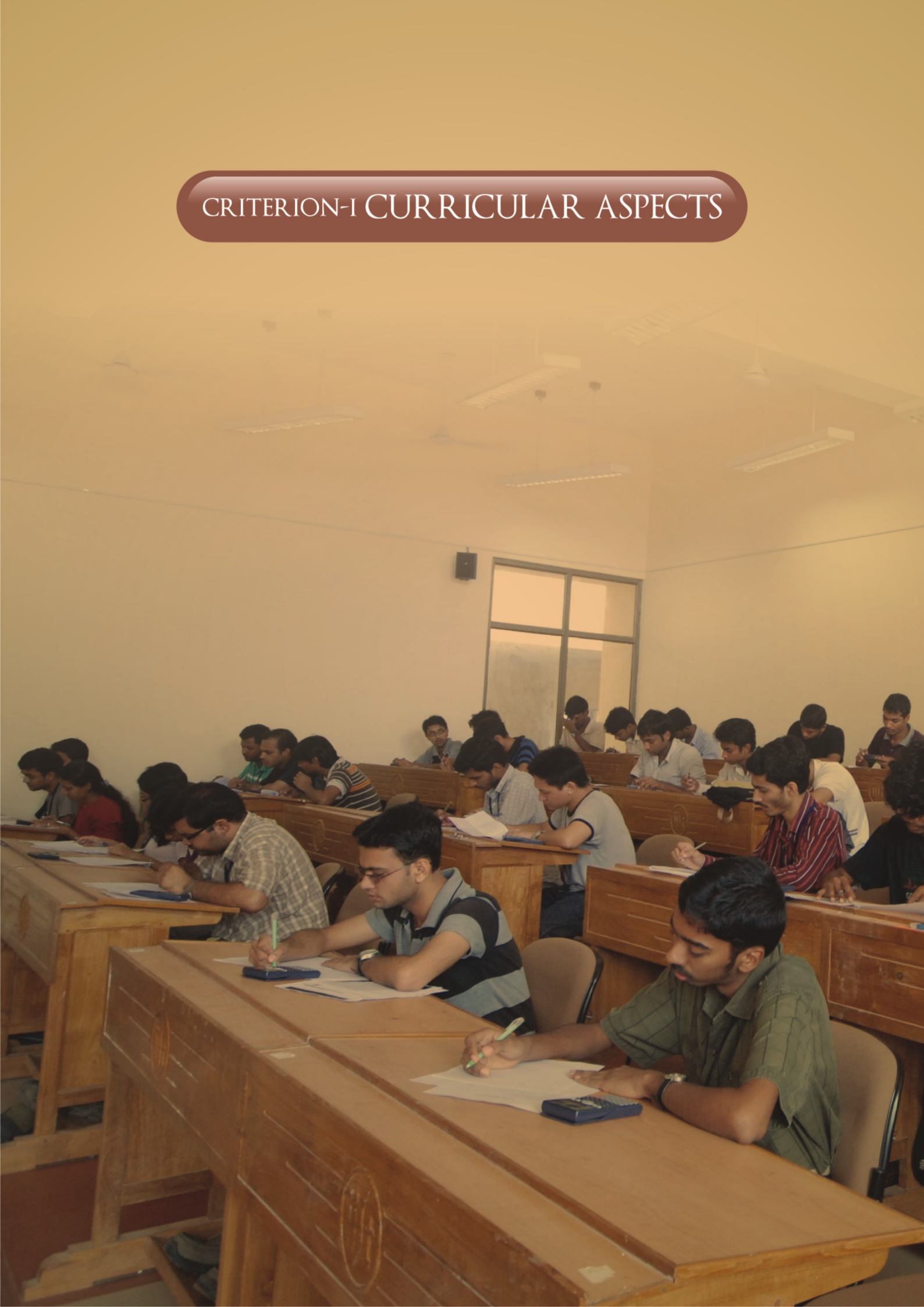
The institute has made important strides in imparting high quality education in UG and PG levels on areas of space science, and space technology. It is a matter of great satisfaction and pride to one and all that the institute continues in its onward march to attaining excellence in teaching and research. The unique nature of our academic programmes is its special attraction for all prospective students and their parents. The institute has embarked on this important journey with an institutional goal of providing ISRO/DoS with trained manpower in areas of space sciences and space technology. The positives in the last four years of its journey are the following: (i) putting in place the necessary physical infrastructure in the present permanent campus to cater to the academics in terms of academic departments, modern class rooms, laboratories as well as hostels, dining messes etc., (ii) giving a boost to library resources including procuring electronic journals and books, (iii) providing for ICT enabled learning, (iv) having recruited highly trained faculty members with excellent research credentials, (v) providing an open and transparent admission process where students compete on an All-India basis to get admitted to the programmes of the institute. The institute also promotes keenly emerging trends contributing to the national efforts of space endeavors of ISRO/DoS. The institute remains committed to maintaining the high standards in teaching and research it has set itself to, and will emerge as an outstanding academic institution in this important area of space science and space technology.

The institute is committed to completing the following tasks of its infrastructure development, (i) building faculty housing and staff quarters, (ii) constructing the remaining two academic blocks which will house the Avionics department and the Inter-disciplinary departments, (iii) building the library and the administrative blocks, (iv) constructing the student activity center, and (v) improving the sports infrastructure for the students by making available the cricket and the football grounds. In addition to infrastructure the institute has plans to offer dual

degree programmes in Aerospace Engineering, Avionics and Physical Science as well as to start new M.Tech/MS programmes in several areas such as Optical Engineering, Solid State Physics, Astronomy and Planetary Sciences, Geospatial signal processing, Propulsion, Digital Signal Processing etc. The above envisaged proposal to start new dual degree/PG programs has been cleared in principle by the Board of Management. In addition to scientists/engineers from ISRO/DoS, the institute is also keen to open up its PG programmes such as M.Tech/MS programmes to the public. The initiation of the above-mentioned new dual degree and PG programmes would require talented faculty members with strong research credentials. The institute is committed to expand its present faculty strength. Presently the number of PhD students is less in number compared to the number of faculty members in the ratio of 2:3. The above situation will change for the better as the institute plans to recruit a large number of research scholars, a move which will strengthen and expand the research activities and output of its faculty and research scholars. The institute expects that each regular faculty member will have at least one PhD scholar to pursue the individual's research ambition. **In future, the institute, true to its mission of space exploration would take off to higher realms of glory, wherein the open sky could only be the limit.**

CRITERION-WISE EVALUATIVE REPORTS

CRITERION-I CURRICULAR ASPECTS



1.1 CURRICULUM DESIGN AND DEVELOPMENT

1.1.1 State the vision and mission of the institution

Vision: ***To be a world class educational and research institution contributing significantly to space endeavors.***

Mission:

- Create a unique learning environment enriched by the challenges of the Space Programme.
- Nurture the spirit of innovation and creativity.
- Establish the centers of excellence in niche areas
- Provide ethical and value based education.
- Promote activities to address societal needs.
- Network with national and international institutions of repute

1.1.2 What are the major considerations addressed by the goals and objectives of the institution?

- Creating and enriching an environment of academic and research excellence
- Fostering national development through science and technology with a focus on space science and technologies and related areas
- Nurturing a harmonious and healthy blend of personal and professional values
- Imbibing values of social responsibility, ecological concerns and inclusiveness
- Contributing to national space endeavors

1.1.3 State the institutional goals? How the institutional goals are translated into the academic programmes, research and extension activities of the institution?

To impart knowledge and skill in the challenging field of space science and technology and related areas with an aim to emerge as an international leader as well as to actively contribute the national R&D efforts through education, research, development and manpower.

The academic programs have been formulated to strengthen the fundamentals, experience the realities through practical work, and enhance the knowledge and understanding in the areas of ***interest, give exposure in the emerging fields and to experience knowledge synthesis through*** viable real life projects. The curriculum, courses, practical, electives and the projects have been developed and continuously upgraded to meet these goals by all the departments. Innovative concepts have been incorporated in all these segments to make the academic programs rich, flexible, demanding and a dynamic learning experience. Co-curricular and extracurricular activities are planned and executed to enable the students to experience holistic development and to inculcate societal values and responsibility. Field studies and exposure covering the need, relevance, and applications of space

related activities have been included in the academic programs to sensitize the students on the relevance of their studies to the social and economical development of the country.

Research activities have already been initiated in areas that are of relevance to space science and technology covering all the academic departments. To initiate research, liberal funding has been extended to the faculty based on specific proposals that are peer reviewed and approved. Departments have now admitted research scholars for PhD work in broad areas of interest to the Institute and the faculty.

Major research facility creation in niche areas like Nano-technology, Virtual Reality, Advanced Propulsion and Laser Diagnostics are in the anvil and will act as a thrust to advanced research in these emerging interdisciplinary fields. They are to emerge as Centers of Excellence in the long run.

Masters level programs that are unique and/or having direct relevance to ISRO have been initiated by some departments and they have been offered to serving engineers/ scientists of ISRO based on a strict selection procedure.

The departments are encouraged to bring in relevant academic changes based on their experience and feedback from all the stake holders. Such ideas proposed by the faculty, students or other stake holders are debated thoroughly in the department and if found worthy, is recommended for consideration by the academic council after approval by the respective Boards of Studies. Likewise electives are recommended by the departments after careful consideration of their current as well as future relevance. *In brief, the academic programs are formulated and modified to meet the goals of the institution as well as the aspirations of the stake holders.*

1.1.4 How does the university guide its colleges to develop programmes based on their regional needs?

Not applicable, since the institute does not have any affiliated colleges.

1.1.5 Specify the steps undertaken by the institution in the curriculum development process.

As a new institute the curricula was initially developed by an expert committee consisting of eminent academicians, scientists and engineers from ISRO and practicing professionals who drew up the curricula based on the academic focus of the Institute, with due consideration for basic sciences, mathematics, humanities, general engineering, core engineering, practical, seminars and projects. This curriculum is periodically reviewed by the departments and the respective Boards of Studies. Their recommendations are discussed and approved by the Academic Council in the light of the professional needs and what is being practiced by renowned National, International institutions and professional societies. Inputs from faculty, students, employers and academic peers have all contributed to the realization of the current curricula.

1.1.6 How do the Boards of Studies ensure the currency and relevance of the programme offerings?

All academic programs are initiated by the respective academic departments. The role of faculty in this process is significant. Based on faculty interaction, the department initially makes a draft proposal on the academic program/s covering the

specific subjects as per the overall curricular design. It also prepares the syllabi for all subjects that are to be offered. The scope and syllabi of the subjects that are offered by other departments are discussed to ascertain their relevance and significance to the program together with the offering departments. This draft of the entire program is then placed before the Board of Studies.

The members of the Board of Studies comprise of academic peers in the relevant areas from renowned Institutions within the country (like IITs, IISc), senior scientists/engineers from ISRO, senior researchers from national laboratories, industry representatives and experienced faculty of the department. The Head of the Department is the chairman of the Board of Studies of that department. The Board of Studies deliberates on the draft in detail and makes suggestions and modifications wherever required, ensuring the quality and relevance of the programme. The board analyses the draft program and syllabi from different angles covering contemporary state of the art in every subject, practical relevance of the courses offered, national priorities, relevance for the user industries, research opportunities coming out such a program, career growth, relevance to the program of study and its sustainability.

1.1.7 How employability is ensured through Curriculum design and development?

IIST presently focused on the employability of its students in various centres of ISRO / DoS. The formulation of various programs, curricula and syllabi is done under the guidance of Board of Studies consisting of members from premier science and technology institutions around the country and specific inputs are taken from the employer to incorporate necessary fundamentals as well as applications, design and practice oriented courses and electives in cutting edge and interdisciplinary fields of relevance to the program. These programs are also formulated for advanced studies and research in the respective field of specialization. IIST offers a B.Tech. Program in Physical Sciences. This is a unique program offered by IIST comprising of a common set of courses covering sciences, mathematics, humanities and basic engineering. The students in the UG program can choose one of the streams of specialization offered.

B.Tech. Programme	Stream of specialization
Avionics	Control Systems Digital Electronics Communication Computers
Aerospace Engineering	Aerodynamics Manufacturing Science Structures and Design Thermal and Propulsion
Physical Sciences	Earth System Science Astrophysics and Planetary Sciences Remote Sensing Chemical Systems

Minors are offered in five specific streams by various departments. Currently these minor streams are offered:

- Robotic Systems
- Navigation, Guidance & Control
- Nano Science and Technology
- Propulsion systems
- Data processing for earth observation

1.1.8 *State the curricular design and model adopted by the University in the organization of its curricula.*

The curriculum has been designed based on the broad guidelines given by UGC/AICTE, in line with similar programs in other National and International Institutions of repute. The curriculum is designed based on credit system. In addition to this there is a provision for bright students to register for a minor stream to enhance their breadth of knowledge.

1.1.9 *How are the global trends in higher education reflected in the curriculum?*

Initial formulation of the curricula was done by experts in the field, mainly drawn from the Institutes of National Importance like IITs, and IISc. Scientists and Engineers from ISRO/DoS have provided vital inputs on current technological requirements in the area of space science and technology, and these are reflected in the courses. The curriculum and syllabi formulated takes into account the state of the art in leading international and national institutes / universities. Periodical revision of curricula and syllabi, introduction of new elective courses and PG programs are undertaken based on global trends and industry based needs. Text books and reference books are prescribed based on their international standing, current status of the contents and with the approval of the peers in the field. The state of the art laboratories are put in place to cover practical exposure to the theory being taught and to take up relevant practical studies in the fields of interest.

1.1.10 *How does the institution ensure that the curriculum bears some thrust on national development?*

The whole curriculum is focused towards developing professional competence in areas of current and future interest to the strategic sectors critical to national development. Flexibility in the curriculum permits the inclusion of electives as well as topics of importance to various branches of study / specialization so as to make them contemporary and dynamic. Most of the courses have considerable ICT content pertaining to their applications and students are given wide exposure to this both in the lecture based as well as laboratory based courses. Problem solving using advanced analytical / simulation tools are encouraged in all courses.

1.1.11 *What is the composition of the Board of Studies? Specify UG and PG representation in the BoS if there is only one BOS for both?*

Departments offering B.Tech programmes constitute Board of Studies with the Head of the Department as its Chairman. Departments offering PG programs have separate Board of Studies for such programs. Members of the board of studies include faculty members of the department, peers in the areas drawn from leading

academic institutions (IITs, IISc), practicing engineers and scientists from ISRO, R&D organizations and industries.

The institute has constituted BoS for UG in Aerospace Engineering, Avionics, Chemistry, Physical Science, Mathematics, Physics and Humanities. The institute has constituted BoS for PG in Aerospace Engineering, Avionics, Chemistry, Mathematics, Physics and Earth and Space Science.

1.1.12 *Does the institution use the UGC / AICTE guidelines for developing or restructuring the curricula?*

The institute takes note of the guidelines recommended by AICTE/UGC in the formulation of the curricula and during the curricular design these recommendations are followed.

1.1.13 *What percentage of the courses focus on experiential learning including practical and work experience? For overall development of students, what measures have been taken in the Curriculum design?*

Over 21% of the credits of the UG program focus on experimental, practical and project related work. Many theory courses are supplemented through practical demonstrations and training on software applications in those areas. Direct exposure to real life systems and experiments on them are a unique feature of IIST curriculum. This is done in collaboration with the ISRO laboratories.

Over 70% of the topics from the theory courses form part of the respective laboratory components. The curriculum has been designed to meet the requirements of future industrial needs which include ISRO/DoS. The theory and its corresponding lab are offered in the same semester in order to understand the fundamental concepts clearly. The credit is awarded for laboratory work based on the viva voce. The current evaluation scheme of the laboratory courses is given below:

Continuous evaluation,

Mini Project, Lab work & Viva-voce	-	75%
End semester examination	-	25%

1.1.14 *What are the courses aiming to promote value education or social citizenship roles?*

The following courses of the institute aim to promote value education or social citizenship role, namely,

- Introduction to Social Science and Ethics(HS221)
- Environmental Science and Engineering(CH311)

Promotion of value education is also imparted through cultural clubs, cultural events, celebrations etc.

1.1.15 *Is there a provision for computer skills to be incorporated in the curriculum for all students?*

Yes.

1.1.16 Are women's issues incorporated in the curriculum? If yes, what are the initiatives taken to introduce women related courses / topics in the curriculum?

Yes. Women's issues are incorporated in the course titled 'Introduction to social science and ethics' offered to all UG programmes. A major part of the course deals with topics on Gender and Development. Under the above topic matters related to sex, gender and problems faced by women are dealt with in detail. The course also sensitizes the students on gender related issues.

1.1.17 What programmes are developed for differentl- abled students and how the same is implemented?

The institute does not have any exclusive programme for differently-abled students.

1.1.18 What programmes are developed for distance education in the corresponding units?

The institute has initiated plans for connecting with National Knowledge Network (NKN) and is establishing a smart class room with multimedia facility.

1.2 ACADEMIC FLEXIBILITY

1.2.1 What is the range of programme options available to learners in terms of Degrees, Certificates and Diplomas? Give the cut off percentage for admission at the entry level.

Presently only degree courses are offered. While the admission to the Institute was based on the extended list of JEE for the first three years (2007 to 2009), the admission from 2010 is based on a separate national level entrance test – ISAT conducted by the Institute. There is a minimum requirement that the student should secure 70% for GEN/OBC and 60% marks for SC/ST/PD in Physics, Chemistry and Mathematics in the Class XII board examination and an aggregate of 70% for GEN/OBC and 60% marks for SC/ST/PD in Class X board examination to be eligible to write ISAT.

1.2.2 What other programmes are offered for employees / professionals in terms of training for career advancement?

Plans are afoot to offer continuing education programmes in selected topics for practicing engineers / scientists and professional training courses for employees. The PG and Ph.D. programmes in the institute are open to eligible Scientists / Engineers of ISRO/DoS, after a rigorous selection process.The Ph.D programme is also open for our own faculty.

1.2.3 Give the list of programmes offered by the University for the Colleges to choose from

Not applicable

1.2.4 What programmes are available for international students?

Not Applicable

1.2.5 Does the institution provide twinning programmes? Give details

Presently there is no such programme offered.

1.2.6 Does the institution offer any self-financing programmes in the institution? If yes, list them.

No

1.2.7 What is the procedure adopted to extend additional programmes of studies to affiliated institutions?

Not applicable

1.2.8 Does the institution follow Annual System, Semester System, Trimester System and Choice Based Credit System (CBCS)?

Yes. The Institution follows the Semester pattern.

1.2.9 Does the institution provide flexibility to pursue the programme with reference to the time frame?

Yes. A UG programme can be extended by two years over and above the stipulated period of four years. A PG program can be extended by one year over and above the stipulated period of two years.

1.2.10 Does the institution have any provision for slow and disadvantaged learners? If yes, for what courses?

Yes. These are:

- Remedial programmes are provided for the slow learners outside the regular class hours.
- Provision to complete the academic program within a longer academic span as per the academic regulations. (e.g. B.Tech. in 12 semesters; M.Tech. program in 6 semesters).
- Provision to re-register for a failed course, during normal academic semesters.
- Summer and winter courses for those with backlog subjects.
- Provision for contact courses, when the number of students re-registering for a course is very few (say one or two).

1.2.11 How does the institution identify slow and advanced learners? How are the advanced learners facilitated to meet the challenges?

The students are evaluated through Continuous Assessment, wherein the slow learners and fast learners are identified. Fast learners are encouraged to register for Minor courses which could broaden their knowledge levels in areas of their interest.

1.2.12 Does the institution provide flexibility to the students to move form one discipline to another? Give details.

Yes.There is the provision to move from one discipline (Branch) to another, based on academic performance, at the end of the 2nd semester.

1.2.13 Does the institution provide facilities for credit transfer, if the students migrate from one institution to another institution in or outside the country?

No.

1.2.14 Does the institution provide a) Core options b) Elective options c) Enrichment courses?

Yes. There are core courses and electives in each branch of study. Additionally an institute level elective (which could be opted by any student across disciplines) is provided for a more broad based learning. A unique group of courses named as Minors provide an opportunity for the students to acquire knowledge in areas other than their chosen branch of study.

1.2.15 Does the institution provide the flexibility of combining the conventional and distance mode of education for students to make use of the combination of courses they are interested in?

No.

1.3 FEEDBACK ON CURRICULUM

1.3.1 How does the University obtain feedback from?

a) Students
b) Alumni
c) Employer
d) Community
e) Academic peers
f) Industry
g) Parents

All programmes and curricula are designed and modified based on extensive feedback given by academic peers, engineers/scientists from ISRO/DoS, other research organizations and industry experts. The alumni will be included in this process as and when they become available for this exercise. We also take the parents into confidence regarding our curriculum at the time of student counseling when

parents visit the campus. These inputs are discussed at the time of curriculum review and planning. Students are encouraged to give their feedback on the curriculum and courses during discussions in the class committees and other forums.

1.3.2 How are the feedbacks used for significant changes in the curriculum?

Any feedback from the stake holders as mentioned in 1.3.1, is taken note of and is discussed in the Board of Studies. Changes formulated by the BoS are then placed before the Academic Council for final approval. This will be in addition to the academic feedback from the peers, faculty and the students.

1.3.3 Which courses had major syllabus revision during the last five years? (with change in title and content)

The following course underwent major revisions.

Department	Revision / Changes
Physics	• Modified the first semester Physics I syllabus to include more Mechanics, from a general syllabus touching on various aspects to Modern Physics with one text book as basis

1.3.4 How do the institutions give feedback to the University on curricula?

Not Applicable.

1.4. CURRICULUM UPDATE

1.4.1 Does the institution refer UGC / National / International models while updating curricula?

Yes. The curricula for the new programs were arrived at based on detailed discussion among a peer group identified specifically for the purpose. They took inputs for the curriculum from the model curriculum for an undergraduate engineering programme as prescribed by UGC/AICTE, curriculum followed by IITs and Institutes of International Standing as well as from International Professional bodies. Updating of curriculum is based on the experience gained while offering the subject, current developments in the subject, curriculum of reputed National and International Institutions and additional inputs from user organizations.

1.4.2 What are the interdisciplinary courses introduced during the last five years?

The following courses come under this category,

- Engineering Materials (Common Courses)
- Introduction to optimization (institute elective)
- Electromagnetic and Wave propagation (Avionics)
- Environmental Science and Engineering (common courses)
- Nano Sciences and Technology (minor)
- Digital Signal Processing & Image Processing (for B.Tech Physical Sciences)
- Soft computing (institute elective)
- Navigation & Control (minor)

1.4.3 How are the existing courses modified to meet the emerging needs?

Departments discuss the course plans for each course at the end of the semester and based on earlier experience by the faculty, minor changes are suggested in the course contents. This helps in speedy introduction of current topics. Such modifications are then placed before the Board of Studies and the Academic Council for their approval. Further, on a regular basis, the Board of Studies reviews the syllabus of the existing courses and incorporates changes and makes major revisions in tune with the emerging needs/trends.

Some of the approaches in this direction include:-

- Recommending latest edition of text books for courses.
- Adopting new text books that have come up in some subjects.
- Introducing new electives based on the availability of faculty and needs.
- Changing the course content to include latest technologies practiced.

1.4.4 What value added courses are introduced which would

a) Develop skills

Currently, training in the following softwares complement the regular courses offered under the curriculum: MATLAB, Labview, Discovery software, Network simulator, PSPICE, CAD/CAM, VLSI, ERDAS Imagine, ENVI, IGIS, ARC,Maple ,SCILAB,Octave,SPSS,Gaussian,Mathematica,LIECA Photogramatery suit.

b) Offer career training

The experts from different fields are generally invited to train the students in various software packages through short courses, to expose them with the latest software tools, which they can use in their lab experiments, mini projects and the final project.

c) Promote community orientation

The course titled 'Introduction to Social Science and Ethics' does include the following topics in detail to promote community well being

- Human Rights
- National Movement
- Environment
- Sociology of Health
- Family Welfare and Counseling

1.4.5 Does the institution focus on multi skill development in its programmes? If yes, illustrate.

Yes

- The institute encourages its students to participate/organize in regional/national level cultural, technical and sporting events.
- The institute awards a best all rounder trophy every year to a student excel in academic as well as co-curricular (cultural, sport, technical) activities.
- Currently, the institute holds two national level annual festivals, one cultural and another technical, which are fully organized and managed by the students.
- The institute also holds a annual sports meet for its staff and students.
- Co-curricular activities are encouraged through award of trophies/medals.

- Several technical/sport/cultural clubs are currently active and are fully supported by the institute.

1.4.6 What thrust is given to 'Information Communication Technology' in the curriculum for equipping the students for global demands?

Several courses offered under the curriculum involve extensive use of software (see 1.1.15), training for which is additionally imparted. Faculty are encouraged to make use of multimedia and other tools in delivering lectures and demonstrations. The institute has initiated plans to set up a smart class room in the institute, which will also aid in its outreach initiatives.

1.4.7 How often is the curriculum pertaining to the affiliated institutions updated and diversified?

Not applicable

1.4.8 What were the initiatives to restructure the UG courses to make them socially relevant and / or job oriented?

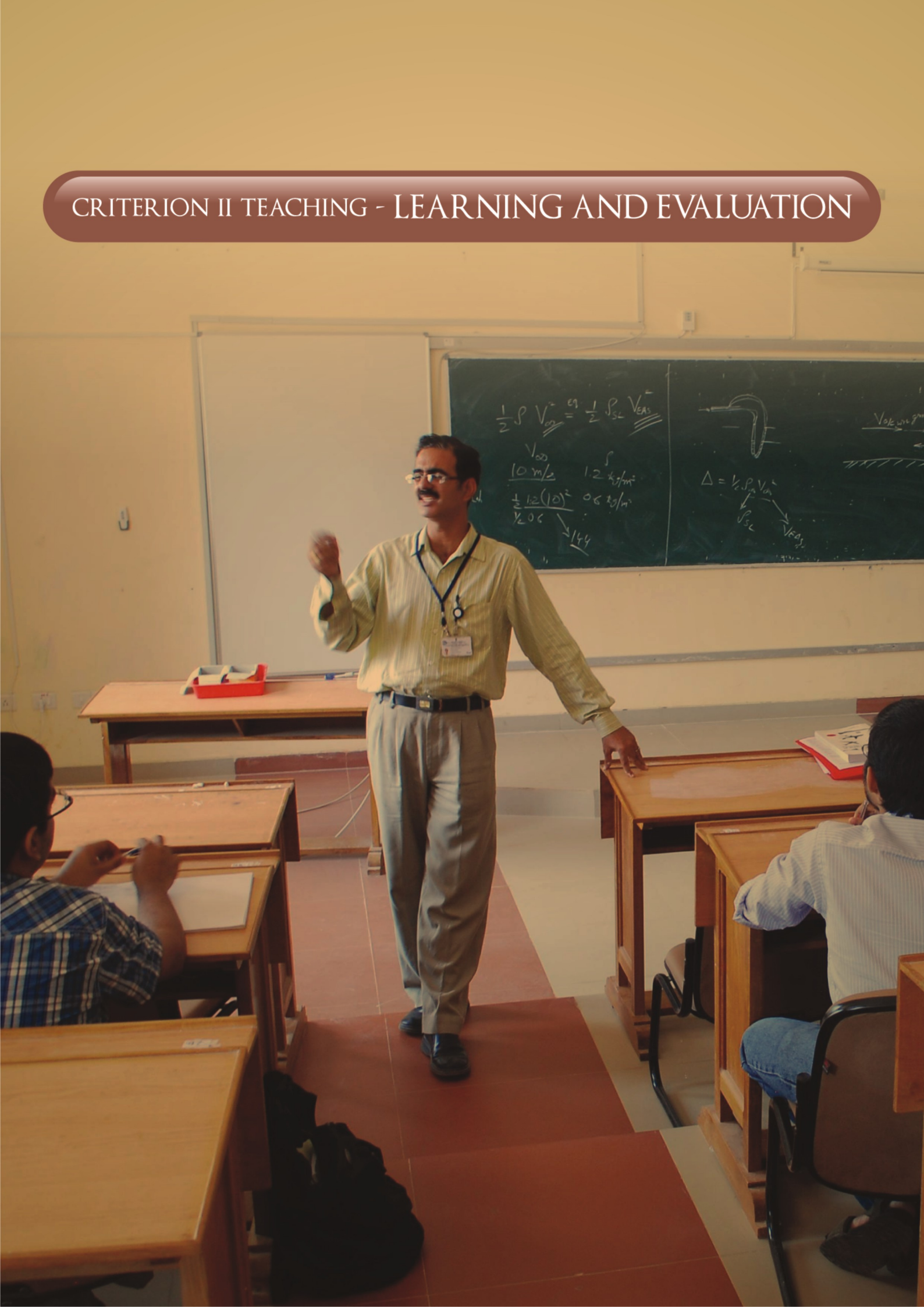
The UG courses being offered in the institute are related to Space Science and Technology and related areas, keeping in view the national objectives. The student who has successfully completed the UG programme in the designated 4 years and has secured a CGPA of 6.5 and above (out of 10) are guaranteed jobs as scientist / engineers in ISRO/DoS.

1.5 BEST PRACTICES IN CURRICULAR ASPECTS

1.5.1 What are the quality sustenance and quality enhancement measures undertaken by the institution during the last five years in curricular aspects with reference to curricular design and development / academic flexibility / feedback from stakeholders / curriculum up date?

- The institute offers minor courses to UG students in areas other than the chosen branch of study.
- Monitoring of the course content is done by each department based on faculty and student feedbacks. These are placed before the board of studies for approval and academic council for ratification**.
- High standards are ensured while framing the syllabi of the course by inviting eminent academicians in relevant areas, with an emphasis on both concepts and applications.
- Application of ICT tools in the learning process is ensured in the curriculum and syllabi.
- Tutorials and problem solving skills are included in the course for better understanding of the concepts.
- Summer and winter courses are offered to the students.
- Remedial classes are offered first year UG students.

CRITERION II TEACHING - LEARNING AND EVALUATION



2.1. ADMISSION PROCESS AND STUDENT PROFILE

2.1.1 How does the institution ensure wide publicity and transparency in the admission process?

a) **B.Tech.**: Admission to the B.Tech. Programmes was done for the first three batches viz. 2007-08, 2008-09, 2009-10 through IIT-JEE. This was given wide publicity and the response had been very encouraging. From the year 2010 onwards the admissions for the B. Tech. programs are done through a nationwide test named IIST Admission Test (ISAT). IIST has developed special software, tailor-made to ensure smooth and systematic conduct of the counseling, after giving due thought to the various processes involved in the exercise. A dedicated office under the chairmanship of a senior faculty ,maintains the administrative work for this test for the whole year with dedicated staff. All the announcements related to the test are published in all the important news papers in the country as well as on the institute website very prominently. A comprehensive IT infrastructure is mobilized to smooth and unbiased enrolment to the test. The conduct of the test is done by the direct involvement of the faculty members in making the question paper to actually going to centers and supervising the test in nationwide centers. The evaluation is done in a complete confidential manner with identity of the candidate kept confidential till the final list is made. As per Government of India rules applicable to Central Educational Institutes (CEI), candidates belonging to different categories are admitted to seats reserved for them based on a relaxed criteria. The last stage of admission process is the counseling process which is done in a unified manner in the presence of the candidate and his/her parent/guardian. The whole process is systematic and open to all the people present with the numbers and options displayed clearly on TV screens in the halls during the counseling..

b) **M.Tech.:** At present, admission to M.Tech. programmes is offered only to sponsored candidates from ISRO. Notification for this admission will be issued in advance to all ISRO centers to attract eligible candidates. Candidates apply for IIST M.Tech. programmes through their parent organization. Shortlisted candidates will be admitted through a comprehensive interviewing process.

c) **Ph.D.:** The selection of full time Ph.D. scholars is being done twice in a year based on open advertisement both in leading national dailies (English and Hindi) and on institute website as per the plans submitted by the faculty members and duly recommended by the Research Council after appropriate review process. The selection of candidates from eligible applicants is based on a written test followed by an interview. The admission to part time Ph.D. programme is offered only to scientists / engineers from ISRO and to faculty from IIST.

d) **Post Doctoral Fellowship**: IIST offers Post Doctoral Fellowship (PDF) in selected areas. The advertisement for the selection for Post Doctoral Fellowship is published both in leading national dailies (English and Hindi) and on institute website after a thorough review by the Research Council in consultation with the faculty concerned.

2.1.2 How are the students selected for admission to the following courses?

a) **B.Tech.:** All shortlisted candidates and their parents are invited for counseling. Students are given the option to choose the course they like to pursue, based on their ranking in the admission test. After exercising their option, students are admitted against the available seats based on their ranking. A waiting list is also published to replace dropouts.

b) **Ph.D.:** The Ph.D. programme is grouped into two categories viz. full-time and part-time. Applicants must have a Master's degree in the relevant area, and must have secured first class or equivalent throughout their academic career. Candidates with Master's Degree in science subjects should possess JRF conducted by CSIR/UGC to be considered for the full-time Ph.D. programme.

1. **Full-time Ph.D. Programme:** After an advertisement in all the important news papers applications are invited from eligible candidates. Those satisfying the minimum eligibility criteria are made to appear for and entrance test and interview. The successful candidates are selected.

2. **Part-time Ph.D. Programme:** Admission to the part-time Ph.D. programme is offered only to sponsored candidates from ISRO and to faculty members of IIST. Prospective candidates submit an application, duly forwarded to IIST by the respective centre of ISRO/DoS, giving details of their previous academic record, research experience, and publications, if any, along with a brief summary of the proposed research work. After a review by the IIST Research Committee headed by Dean, R&D applicant is invited to present a seminar on the broad area of proposed research before an expert committee constituted by Director, IIST. The selection of the applicant for the Ph.D. Program of the IIST is based on the recommendation of the committee and the approval of the Director, IIST.

2.1.3 What strategies are adopted to create access to?

a) **Disadvantaged community –** As per the reservation policy of Government of India applicable to Central Educational Institutions (CEI), out of a total of 156 seats in the B.Tech. programme, 15% are reserved for candidates from the Scheduled Casts, 7.5% for students from Scheduled Tribes, and 27% for Other Backward Casts belonging to the Non-Creamy Layer. Candidates belonging to these disadvantaged communities are admitted to seats reserved for them based on relaxed criteria for ranking as explained in the brochure of ISAT. Candidates belonging to SC/ST categories are required to pass the qualifying examination (Class XII) in the first appearance with an aggregate of at least 60% marks in Mathematics, Physics and Chemistry subjects, whereas for general and OBC categories it is 70%. Furthermore, the SC/ST Candidates the minimum requirement is 60% in Class X as against 70% for the others.

b) **Women –** the examination fee for ISAT exam required for female candidates is reduced to 50% of the fees to be paid by the male candidates in the case of a student seeking admission to B.Tech. courses. About 10% of the students admitted are girls as can be seen below.

The gender wise table of students admitted for the last 5 years

Academic Year	*Boys*	*Girls*	*Total*	*Status*
2007-08	127	11	138	Course completed
2008-09	132	16	148	4th Year
2009-10	127	24	151	3rd Year
2010-11	131	17	148	2nd Year
2011-12	132	6	138	1st Year
Total	***655***	***73***	***728***	

c) **Differently-abled –** As per the reservation policy of Government of India applicable to Central Educational Institutions (CEI), candidates belonging to differently-abled are given 3% horizontal reservation for B.Tech. admission. Candidates belonging to this category are required to pass the qualifying examination (Class XII) in the first appearance with an aggregate of at least 60% marks in Physics, Chemistry, and Mathematics. Furthermore, these students need to secure 60% only in the Class X examination.

d) **Economically-weaker sections of the Society –** Non-creamy layer candidates of OBC category are given 27% of reservation as per Government of India Rules.

e) **Athletes and sports persons –** At present there is no specific strategy to attract sports persons by providing relaxation in admission.

All admitted students are given free education, boarding, lodging as well as a book grant of Rs-3000 per semester and are guaranteed jobs in ISRO/DOS subject to maintaining a minimum academic standard.

2.1.4 How many applications were received and how many were granted admissions for the following courses?

The number of applications received, the number of candidates granted admission and other details in the case of B.Tech., M.Tech., and Ph. D. are given below.

a) For **B.Tech.** programme:

B.Tech. application and admission details

	IIT-JEE			*ISAT*	
	2007-08	*2008-09*	*2009-10*	*2010-11*	*2011-12*
No: of candidates registered through IIT-JEE	5475	1873	13374	-	-
No. of applications received for ISAT	-	-	-	86516	93033
No. of candidate appeared for ISAT	-	-	-	80106	80335
No: of candidates	600	829	2362		

shortlisted for counseling					
No: of candidates who attended counseling	207	245	199	1655	1839
The total number of students admitted	***138***	***148***	***151***	***148***	***138***

b) The number of candidates admitted for the **M.Tech.** programmes of IIST are 14, 8, and 7 for the academic years 2009-10, 2010-11, and 2011-12 respectively.

c) For **Ph.D.** programme:

Ph.D. application and admission details

Particulars	***2008-09***	***2009-10***	***2010-11***	***2011-12***	***2012-13***
Open category					
No. of applications received	-	4765	313	633	admission process continues
No. of applicants short listed for written test	-	334	No written test was conducted. Screening is based on a criteria set by a committee	138	
No. of candidates appeared for written test	-	234		57	
No. of candidates qualified the written test	-	44		33	
No. of candidates shortlisted for Interview	-	44	66	33	
No. of candidates appeared for Interview	-	44	38	33	
No of Candidates Selected	-	10	12	10	
No. of candidates admitted	-	10	12	10	
ISRO/IIST candidates					
No. of applications received	3	5	8	5	
No. of candidates appeared for interview	3	5	8	5	
No of Candidates Selected	3	5	8	4	
No. of candidates admitted	3	5	8	4	
Total Ph. D students in IIST	**3**	**15**	**20**	**14**	

2.2 CATERING TO DIVERSE NEEDS

2.2.1 Is there a provision for assessing student's knowledge/needs and skills before the commencement of the teaching programme?

Admitted students are given an orientation programme in the first week of their stay in the Institute. In addition to familiarization of the Institute, its academic system, laboratories and other facilities, student are also introduced to the faculty and their mentors.

As the medium of instruction is English, students who are found weak in the language are identified through a test and given special remedial courses to improve their communication skills. In the first week of admission, students who do not have programming skills are identified and special sessions are conducted for them after regular class hours.

From the current academic year, 2010-11 students are made to undergo a zero level quiz, two to three weeks after the commencement of the first semester classes. Students are categorized based on the performance in the quiz and the low performers are given additional lecture/tutorial sessions after regular class hours.

2.2.2. Does the institution provide bridge courses to the educationally-disadvantaged students?

No.

2.2.3 What programmes are offered to the students from the disadvantaged communities?

All low performers including those from the disadvantaged category are given special classes irrespective of their background.

2.2.4 What specific strategies are adopted for facilitating?

a) Advanced students – The talented students are given very challenging tasks/assignments and an option to migrate to other programmes of their interest. At the end of first year, top two performers of each batch are given an option to migrate to other B.Tech. programmes based on their requests, options, and interest.

Based on their academic performance the capable students are provided with the option to register for Minor Stream Courses that provide a wider knowledge base for them. They are given the opportunity to represent the Institute in Technical Events, Workshops, Seminars, Paper Presentation Contests etc., organized by other reputed Institutes and Societies in the country.

b) Slow learners – The slow learners are given personal / remedial coaching by the faculty on a regular basis and are given additional assignments that are worked out together with the faculty concerned. They are encouraged to meet the faculty members and check their progress and get assistance from them in academic matters. These students are encouraged to have discussion and solve problems assigned to them exclusively.

The credit system allows them to have some flexibility such as extended course duration for completion (6 years as against 4 years). Minimum credits to be acquired for getting promoted to the next semester is also relaxed as explained below.

Failed candidates are given opportunities to take up summer or winter courses and special examinations are conducted for such students. For slow learners/failed candidates, the maximum time limit allowed for successful completion of a programme is six years.

2.3 TEACHING-LEARNING PROCESS

2.3.1 How does the institution plan and organize the teaching learning evaluation schedule into the total scheme? Does the University have an academic calendar? How is it prepared?

The institution plan and organize the teaching learning evaluation schedule and brings out an Academic Calendar prepared under the guidance of Dean-Academics before the start of every Academic Year in consultation with the Institute Administration, other Deans, and Heads of the Departments. Academic programmes follow the calendar plan and the departments decide on the faculty and the courses to be offered in every semester well in advance. A department meeting is called for the allotment of courses in each semester and the allotments are made based on the consensus among the faculty.

The academic calendar gives the semester details, institute holidays, the dates of periodical tests, the last instruction day and the dates of end semester examinations, vacation, and the dates of announcements of results etc. All academic, technical, cultural and sports activities are included in the calendar. All students and faculty are given a copy of the academic calendar and the same is also posted in the institute website.

Once the courses and the faculty are identified, the faculty concerned prepares the course plan based on the approved syllabus for the course. The faculty has the freedom to cover the syllabus in the best sequence and also include any novel approaches in teaching and learning associated with the topic. Textbooks are distributed to all students through book bank. In addition to this, a book grant of ` 3,000/- is given every student per semester.

The Head of the Department constitutes a class committee for each class or a course committee for each common course offered to different branches of study as per order issued by the Director. The Head of the Department is the Chairman of these committees and the faculty members offering the courses are members. In addition to this, three student members representing the academic performance diversity are also nominated to this committee. Class committee meets at least twice in a semester. The committees discuss on the following and oversee them as detailed below:

- Evaluation details for the course, lab assignments, lab evaluation procedure.
- Proposals of mini projects/ term paper related to the course etc.
- Conduct of class tests, assignments, tutorials results and feedback on them.

The class committee also discusses and reviews the following points:

- Progress of the course and portions completed.
- Effectiveness of the Teaching and learning process.
- Student progress and performance.
- Identification of slow and advanced learners.
- Counseling strategy for the needy students.
- Recommendation on special/remedial classes.

The relative grading of the students based on their performance is done by the concerned faculty and approved by the committee excluding the student members. This is done on the basis of grade cutoff by computing minimum, maximum, average, and standard deviation for each course.

2.3.2 What are the courses which predominantly use the lecture method? Apart from classroom interactions, what are the other methods of learning experiences provided to students?

The conventional lecture method is adopted for all theory courses. However, the institute adopts modern methods of learning with a good mix of lectures, practical, and tutorial in its curriculum. Students are encouraged to give short presentations on few topics to be learned through current literature, internet, or classical books related to the subject.

In addition to the regular conventional practical experiments, students are exposed to exciting practical experiments, which have links with ISRO's launch vehicle/spacecraft and application programmes. With the objective of providing ample opportunities for students to have hands-on experience in real life experiments, a series of innovative experiments in Aerospace Engineering, Avionics, Earth and Space Sciences, Physics, and Chemistry are designed to fit the academic curriculum and carried out at ISRO Laboratories in Thiruvananthapuram.

The students also gain experience by carrying out experiments and take part in some of the activities at different centers of ISRO through their internship programmes/projects. They also have opportunities to engage in projects with faculty at IIST. In addition to regular course work, advanced learners are given interesting projects which can be completed by them during the normal semester. **Some of the student results are published in national/international conferences as can be seen below**

List of conferences attended by students

S. No	*Authors*	*Title*	*Conference*	*Date*
1	**R. K. Yadav**	Modeling of Self Similar Traffic in Wireless Networks	proceedings of International Workshop on Next Generation Wireless Networks 2011 (WoNGeN 201)	December 2011
2	**Aarathi Muppalla** and B. S. Manoj	The Impact of Communication and Terrain Characteristics on the Accuracy of Robot Formation	Proceedings of the first International Conference on Wireless Technologies for Humanitarian Relief (ACWR2011)	December 2011
3	**Saket Chawla** and B. S. Manoj	Dynamic Data Compression in Wireless Networks	Proceedings of IEEE ANTS 2011	December 2011
4	**J. Tharakan, P. Basu, D. Agarwa**l, and A. Salih	Investigations into Gas-Core Vortex Formation during Draining of Liquid from a Tank	38th National Conference on Fluid Mechanics and Fluid Power, National Institute of Technology,	December 2011

			Bhopal,	
5	**N. K. Mishra, G. Patel** and R. V. Ramanan	Development of Mission Design Process for Collision avoidance of Near earth Objects	2nd IAA Planetary Defense Conference, Bucharest, Romania	May 9-12, 2011
6	**Jyothish R. Pillai, Alex John**, and Ramanan R.V.	Design and Analysis Tool for mars atmosphere entry Missions	Proceedings of SAROD 2011, , Bangalore, India.	November 16-18, 2011
7	**Vishal kumar**, Ramanan R.V.	Impulsive Maneuver Design and Analysis for Orbital Rendezvous Missions Using Lambert Problem solution	25th National Convention of Aerospace Engineers, , BIT Mesra, Ranchi, India	November 4-5, 2011
8	**Vijith Mukundan, Golak Prasad Sahoo** and Ramanan R.V.	Optimal Moon landing Trajectory Design with Solid and Liquid Propulsion Using SQP	National conference on Space Transportation Systems, Indian national Academy of Engineering, Thiruvananthapuram, India	Decemeber 16-18,2011
9	**Maniyar Abhishek Sanjay** and Ramanan R.V.	Design Analysis of configuration and Mission of Solar sail for interplanetary Missions	National conference on Space Transportation Systems, Indian national Academy of Engineering, Thiruvananthapuram, India	Decemeber 16-18,2011

The following programmes are also effective in teaching-learning process:

- Invited lectures and Seminars by National and International experts.
- Mini Projects as part of regular laboratory experiments to enhance their learning.
- Students are encouraged to participate/ present papers in symposiums/technical fest conducted by other premier institutions.
- Research topics are given for presentation and discussion for credit Seminar.
- Internship during vacation period.
- Industrial visits and field trips.
- Student participation in various clubs, such as Astronomy Club, Mathematics Club, Robotics Club, Vox matriea (Materials Science Club), and Physics club.

2.3.3 *How is 'learning' made student-centered? Give a list of the participatory learning activities adopted by the institution, which contribute to self-management of knowledge development and skill formation?*

Learning is made student-centered by offering minor streams as well as a good number of elective courses. There are various levels of electives offered by different departments such as, stream electives, department electives, and institute electives. Students have the flexibility to choose the elective of their choice.

There are various forums for students to learn soft skills, presentation skills, debating skills and organizational skills. Additional lab hours are provided for students who need such assistance. Students are encouraged to read articles/research papers published in conferences/ Journals and present them in the classroom. The participatory learning activities adopted by the institute are:

- The credited summer internship for duration of six weeks is compulsory at the end of the third year of the programme during summer vacation. The students could do the internship at various ISRO centers or various academic and research organizations as well as at the IIST. Students have to make a presentation before submitting the internship project report.
- The Astronomy Club organized a Telescope making workshop in the year 2010.
- The International Year of Astronomy 2009 celebrations (Aparimit 09) at the IIST during 1-2 April 2009 by arranging and invited lecture by Prof. J. V. Narlikar of IUCAA, Pune.
- The Remote Sensing Club arranges for regular display of slides related to Remote Sensing in the LCD display screen. The club also organizes Lectures and Poster Events among students.
- The Physics Club in addition to organizing seminars by students encourages students to participate innovative experimental physics practical once in every week.
- The Math Club: It aims to nurture the Mathematical talents of the students of IIST. The activity of the Club is initiated by arranging a full day discussion on the foundations of Mathematics by Prof. Kumaresan, University of Hyderabad.
- Sounding Rocket and Nano-satellite Programme: Details are given in section 2.3.4.

2.3.4 *What are the modern teaching aids used in classroom instruction? What are the other student learning experiences?*

In addition to conventional teaching using the black board, limited presentations are done using Power Point and LCD projectors for the undergraduate students. The students also learn from the following experiences:

- Presentations through animations.
- Demonstration of real life systems in collaboration with ISRO labs.
- Industrial visits and field trips
- Development projects (Sounding Rocket and Satellite projects) proposed by students.

These are two students' project carried out under the guidance of IIST Faculty and the ISRO Scientists, with a view to provide knowledge and hands-on experience to the students to design, develop and build space systems and to work in teams in a project mode. The status of the projects is given below:

Sounding Rocket (VYOM) Project: The students of IIST have successfully designed a single stage sounding rocket capable of carrying the students' payload to an

altitude of 10 to 15 kilometers. The rocket motors (for VYOM) have been made at the Rocket Propellant Plant of VSSC (Vikram Sarabhai Space Centre) and successfully tested on ground. A payload has been designed to monitor the acceleration, velocity and altitude of the rocket and it is being fabricated at VSSC. CFD simulations have been carried out to verify the aerodynamic data of the rocket. The maiden flight of the rocket is planned in the current year itself.

Nano-Satellite Project: The IIST students have conceived a 3-axis stabilized nano-satellite of mass around 5 kgs. The conceptual design of the satellite has been completed and the payload and components have been identified, based on the functional requirements and availability. The nano-satellite is proposed to be launched in a polar sun synchronous orbit of about 670 kilometers altitude as a piggyback payload in PSLV (Polar Satellite Launch Vehicle) of ISRO

2.3.5 Is there a practice of having tutorial classes for the students? If yes, for what courses?

Tutorials are an integral part of some of the courses offered in the first two semesters. The subjects include Mathematics, Physics, Aerospace Engineering,Avionics and Chemistry. Tutorials are also given at higher semesters, for specific courses.

2.3.6 Is there a provision for counselors / mentors / advisors for each class or group of students for academic and personal guidance? If yes, specify.

Yes, we have an effective mentoring system. At present, IIST has 584 B.Tech. students and 81 faculty members, maintaining a healthy student-faculty ratio of about 7:1. The ratio is expected to improve further shortly due to induction of more faculty members. The mentors meet the students once in a week; remedial actions are initiated in case of any difficulties. The Institute mentoring system ensures that the students are helped by the faculty members not only in their learning process but also in developing their personality skills.

2.3.7 How is the academic progress of each student monitored by the faculty?

Faculty keeps a close watch on the academic progress of every student through performance in tutorial class and through periodical quiz/test. Attendance is compulsory and those with less than 80% attendance are not eligible to write the end-semester examination. In addition, parents of those students who have deficiency in attendance are informed about the status of attendance. The faculty judges the progress of students and takes remedial actions as and when required.

Parents are informed about the performance of their wards on a regular basis. The faculty member mentoring the students is advised to contact the parents/guardian of low performing students as and when required. In certain cases, parents are even requested to come to Institute for discussing the problems of their ward and corrective measures are taken.

2.3.8 Give details of the course by sessions of work assigned and implemented in the tutorial session:

In the first year of all under graduate programmes, the tutorials are part of the following courses. In addition, tutorial components comprising a total of about 14 periods are

also assigned for certain courses. The details of the course and number of session are given below

Details of tutorial classes for various courses

Course Code	*Course Name*	*Semester*	*Remarks*
MA111	Geometry and Calculus	1	Students are divided into six batches for conducting tutorials
PH111	Physics I	1	Students are divided into six batches for conducting tutorials
CH111	Chemistry	1	Students are divided into six batches for conducting tutorials
MA121	Linear Algebra and Differential Equations	2	Students are divided into six batches for conducting tutorials
PH121	Physics II	2	Students are divided into six batches for conducting tutorials
AE223	Kinematics and Dynamics of Mechanisms	2	One batch
AE312	Aerospace Structures I	3	One batch
AE324	Aerospace Structures II	3	One batch
AE412	Aerospace Vehicle Design	4	One batch
AV213	Signal and Systems	2	One batch
AV224	Computer Organization and OS	2	One batch
	Navigation systems and Sensors		One batch
PH211	Optics and Electromagnetic Waves		One batch
PH212	Mathematical Physics	2	One batch
CH211	Organic chemistry and polymer science	2	One batch
PH221	Modern Optics	2	One batch
CH221	Analytical and Computational Chemistry	2	One batch
PH222	Classical Mechanics	2	One batch
PH311	Quantum Mechanics	3	One batch
RS321	Pattern Recognition	3	One batch

2.3.9 How do the students and faculty keep pace with the recent developments in the subjects?

E-journals and latest books are made available in the library for the benefit of students and faculty. They also have access to the resources available in the ISRO Libraries. Internet facilities enable them to scan through the developments that happen in various areas of relevance to the subject of study. Many assignments are given that will allow the students to learn the subject independently by referring to the literature and internet. Institute conducts extramural lectures and subject specific lectures on a regular basis for the students to get a good exposure on the state of the art in different areas of specialization. They are encouraged to attend seminars and lectures given at IIST and other institutions and to present papers at national meets.

Faculty members are given all administrative and financial support to participate in international / national conferences, workshops, seminars and faculty development programmes organized by premier institutions / professional societies.

Many distinguished personalities visited IIST during last 4 years. The most prominent among them is our Chancellor**, Dr. A.P.J. Abdul Kalam**, the former President of India ,who addressed the students on 4th October, 2007. The inspiring communicator, Dr. Kalam talked to the students of IIST on a topic fittingly titled, "I Will Conquer". The presence of him was indeed a great source of motivation for the students and faculty. **Dr. G. Madhavan Nair**, former Chairman ISRO and Board of Management, IIST and **Dr. K. Radhakrishnan**, present Chairman ISRO and Board of Management, IIST also visited the Institute several times and shared their dreams and experiences with the students and faculty. The other prominent dignitaries who visited IIST and shared their knowledge and wisdom with students and faculty are

- Dr. U. R. Rao, Former Chairman, ISRO on 4th June 2008 (gave an inspiring lecture on exciting challenges in Space)
- Prof. Yashpal, Former, UGC Chairman on 11th June 2008 (gave a talk and interacted with students and faculty)
- Prof. R. Natarajan, former Director, IIT Madras and former Chairman, AICTE on 11th June 2008
- Dr. P.S. Goel, Distinguished Professor ISRO and former Sesretary,Ministry of Earth and Space Sciences.(gave a lecture on "*Excitement in Oceans*") on 3rd September 2008.
- Prof. Titus Mathews, Emeritus Professor, Dept. of Physics and Astronomy, University of Calgary, Canada, (gave lecture on "*Evolution of Universe*") on 15th October 2008.
- Wing Commander Rakesh Sharma
- Prof. Roddam Narasimha, Member, Space Commission
- Dr. Adoor Gopalakrishnan, the renowned film director
- Dr.K.Kasturi Ragan(Former Chairman ISRO,Member Planning Commision) on January 2011.

Interaction with such luminaries have immensely inspired the students and helped them widen their horizons of knowledge. Faculty members are encouraged to organize major conferences on specialized themes and to invite renowned speakers for such conference thus helping them to interact with them and share their experience and for eventual collaboration in research activities. The following national/international conferences are organized by IIST:

List of Conferences/Workshops organized by IIST

S. No	Conference	Date	Organized by	No. of Participants		
				Indian	Foreign	Total
1.	International Conference on Recent trends in Material Science and Technology (ICMST)	28-31 October 2010	IIST and Material Research Society of India (MRSI)	330	70	400
2.	International Symposium on Contemporary Trends in Optics and Optoelectronics	17-19 January 2011	IIST and Optical Society of India	250	50	300
3.	National Seminar on Frontiers in Chemistry	7-8 December 2011	Department of Chemistry, IIST	160	-	160
4.	Short Term Course On Computational Methods In Fluid Flow And Heat Transfer	12–16 July 2010	Department of Aerospace Engineering, IIST	60	0	60
5.	Self Development and Successful Communication for Young Scientist of ISRO	17-19 July2011	Department of Humanities	30	0	30

2.3.10 Are there departmental libraries for the use of faculty and students?

At present there are no separate departmental libraries in the institute. However, e-journals can be accessed from anywhere within the institute. The central library is equipped with almost all required books and periodicals.

2.3.11 On an average, how many students and faculty use the library per week?

On an average 500 students and 75 faculty members use the library every week.

2.3.12 What are the initiatives taken to make optimum utilization of INFLIBNET / DELNET facilities by the students and faculty?

Some of the e-resources available through INFLIBNET are currently being subscribed in the library. The major resources are from (i) Cambridge University Press, (ii) Royal Society of Chemistry, (iii) Oxford University Press, (iv) JSTOR (Journal Storage), (v) American Institute of Physics, (vi) American Physical Society, (vii) Annual Reviews and (viii) MathSciNet.

2.3.13 How does the library collect books and journals for all departments?

The collection of books, periodicals, and journals is developed based on need by the active participation of faculty and students. Latest catalogues of books/journals etc. are circulated to various departments, based on their area of interest. The Library software has provision for making online suggestion for books/journals within the campus. In addition, prescribed Book Indent Form is made available in the Library Portal to download for indenting new books. Suggestions from faculty are compiled and submitted for the approval of the Library Committee headed by a Senior Professor. The Library committee reviews this and recommends purchase based on its relevance to the academic activities. The Committee consists of representatives from all the Departments and also representatives from students. Hence, interest of all the departments and students are reflected in the collection presently available in the Library.

2.3.14 How does the library manage to cater the needs of teachers and students with access to books and journals and timings?

Library ensures access to materials by

- Providing open access system to the collection of documents and reading materials
- Showcasing electronic resources such as e-journals, e-database etc. through Library portal. The Library portal acts as a gate way to electronic resources. This gate way has search facilities for fast resource discovery. This helps users to access the most relevant e-resource for them on 24x7 bases.
- Organizing familiarization programmes on various library activities.

Library catalogue can be searched from anywhere in the campus through Wi-Fi enabled network. Online Public Access Catalogue (OPAC) module directs the users to appropriate resources. Library is kept open on all working days, except National holidays. The working time for week days (Monday to Friday) is 12 hours per day and that for Saturday and Sunday is 8 hours. During exam time, the Library functions 12 hours on all days.

2.4 TEACHER QUALITY

2.4.1 What is the faculty strength of the University? How many positions are filled against the sanctioned strength? How many of them are outside the State?

The sanctioned strength of faculty is	**124**
The current faculty strength is	**65 + 16**
The number of faculty from outside state is	37

2.4.2 How are the members of the faculty selected? Does the University have the required number of qualified and competent teachers to handle all the courses for all departments? If not, how does the University cope with the requirements?

The institute prescribes the minimum qualification required for appointment. Whenever requirement arises for faculty position, advertisements in English and Hindi are released in leading News Papers across the country and the same is posted on the Institute webpage time to time, giving reasonable time to apply. The candidates can also submit the application electronically at any time. The screening committee comprising the Dean, HOD and three Senior Professors, short list the eligible candidate to be called for the interview.

Short listed candidates are required to give a seminar before the day of interview. A statutory Interview Board constituted by the Director of the Institute which includes experts from various premier institutions would interview the candidates and do the selection

Yes, the Institute has presently the required number of qualified and competent faculty. As the institute activities pick up, the need for additional teachers are identified by the departments and reported to the Dean (Acad) and Director for further decision on the matter. In addition to the regular faculty there are scientists from ISRO who are on deputation to IIST and are designated as Adjunct Professors.

2.4.3 Does the University appoint substitutes/additional faculty to teach existing and new programmes? How many such appointments were made during the last year?

No, Institute has adequate faculty in all departments to teach all existing programmes.

2.4.4 What is the teacher student ratio?

Presently the Teacher Student ratio is 1: 7

2.4.5 What percentage of the teachers has Ph.D. as the highest qualification?

81.48% (66 out of 81) faculty members, including Director and Deans have Ph.D. as the highest qualification. 14 faculty members not possessing doctoral degree are registered and pursuing research in either IIST or in other premier institutions for their Ph.D.

2.4.6 What percentage of the teachers have M.Phil./M.Tech./M.S. as the highest qualification?

15 Faculty out of 81 have M.Phil./M.Tech./M.S. qualification - this amounts to 18.5%.

2.4.7 What percentage of the teachers has completed UGC, NET, and SLET exams?

Almost all faculty members in Physics, Chemistry, Mathematics, and Humanities Departments possess Ph.D. as highest qualification. 90% of them are also qualified in UGC or NET. For engineering faculty UGC, NET, and SLET are not applicable.

2.4.8 What efforts are made by the management to promote teacher development?

- Research grants for all faculty based on their proposal
- Encourages the faculty to acquire higher degree(s)
- Organization of Faculty Development Programmes in different areas and specializations
- Cash Incentives for publishing papers in high impact journals
- Attending / Presenting / Organizing national / international conferences
- The scheme of Fast-track project – Under this scheme, a research grant to the tune of 10 lakhs is provided to the newly joined faculty members

2.4.9 What are the teaching innovations made during the last five years? How are innovations rewarded?

The Institute encourages departments to innovate in the areas of teaching, learning and research. Best practices that evolve in these areas are discussed regularly in the council meetings and the IIST Faculty Committee (IFC) meetings of the institution.

Minor courses: Minor courses on various specialized topics are offered to the students to enable them to have a wider knowledge.

First year VSSC labs: A new programme is implemented to give students an exposure to what is actually being done at ISRO/DoS labs.

2.4.10 Does the institution have representation of women among the staff? If yes, what percentage?

Yes, 30% of the existing strength of faculty is women.

2.4.11 List the faculty who has been recognized for excellence in teaching during the last 5 years:

Prof Kurien Issac of Department of Aerospace Engineering has won the Best Faculty award from Mechanical Engineering Department of IIT Bombay in 2007.

2.4.12 List the faculty who has undergone staff development programmes during the last 5 years:

Staff training conducted by the university and other institutions

S. No.	*Name*	*Department*	*Designation*
1)	Rama Rao Nidamanuri	Earth & Space Sciences	Assistant Professor
2)	Pankaj Priyadarshi	Aerospace	Adjunct Professor
3)	Samir Mandal	Earth and Space Sciences	Assistant Professor
4)	Aravind Vaidyanathan	Aerospace	Assistant Professor
5)	Sam K. Zachariah	Avionics	Adjunct Professor
6)	L. Gnanappazham	Earth and Space Sciences	Assistant Professor
7)	K. Prabhakaran	Chemistry	Assistant Professor
8)	J. Mary Gladis	Chemistry	Assistant Professor
9)	Roshina Babu	Aerospace	Reader
10)	V. Poompavai	Earth and Space Sciences	Reader
11)	Sam Noble	Aerospace	Reader
12)	Sooraj V S	Aerospace	Reader
13)	Sandhya KY	Chemistry	Assistant Professor
14)	B. Sivashanmugavalli	Avionics	Reader
15)	Shine S R	Aerospace	Reader
16)	S. Chris Prema	Avionics	Reader

17)	A. Salih	Aerospace	Associate Professor
18)	P. Raveendranath	Aerospace	Adjunct Professor
19)	Rajesh J A	Avionics	Assistant Professor
20)	Rajesh VJ	Earth and Space Sciences	Assistant Professor
21)	Chakravarthy P	Aerospace	Assistant Professor
22)	E. Natarajan	Mathematics	Assistant Professor
23)	Sasikala V.	Physics	Reader
24)	Sudheesh Chethil	Physics	Assistant Professor
25)	Deepu M.	Aerospace	Assistant Professor

2.4.13 What percentage of the faculty served as resource persons in Workshops/ Seminars/ conferences during the last 5 years (average)?

About 40% of faculty members have served as served as resource persons in various workshops, seminars, and conferences. They have given more than 100 invited talks/presentations in Workshops / Seminars / conferences during the last 4 years.

2.4.14 What percentage of teaching staff participated in Workshops / Seminars / Conferences and presented papers during the last five years? (average)

More than 66.66% of the faculty participates in those programmes on an average.

2.4.15 Has the faculty been introduced and trained in the use of:

- Computers
- Internet
- Information Technology
- Audio Visual aids
- Computer Aided packages

Yes.

- All faculty members are having a PC in their office and they are also given laptops for their research and academic work.
- Dedicated Broad band connection is accessible to all the faculty.
- All class rooms have PC and Video projection facilities.
- Teachers are encouraged to use IT enabled services.
- Some of the packages available are, MATLAB, SPSS, AUTOCAD, SCILAB, CATIA,Maple,Gaussian,Mathematica etc. The institute also has a High Performance Computing Facility with all common programming languages installed.

2.4.16 Does the University have an Academic Staff College? If yes, give the details of programmes it offers.

No.

2.5. EVALUATION PROCESS AND REFORMS

2.5.1 Does the university evaluate teachers on teaching and research performance? How does the evaluation help in the improvement of Teaching and Research?

The Institute evaluates teachers on teaching performance based on the student feedback on faculty and the Annual Performance Appraisal Report (APAR) submitted by faculty. The faculty members are requested to write their self-assessments in format given in APAR. This will be reviewed and counter signed by the Head of the department. Final grading on the performance of a faculty shall be done by the Dean of Academics and the same shall confine to one of the performance scales available in the format. Once the grading is reviewed by the Director IIST, APAR will be communicated to the concerned faculty from administration to ensure fairness and transparency as envisaged in the system. Within 15 days from date of receipt of APAR by the faculty, he/she can represent against the entries in the form, if he/she disagree with it. The representation of the faculty addressing head of the administration shall be considered by the designated Appellate Authority, who shall take a decision on the matter based on the facts and materials available. The Appellate authority is a person who has not given his/her assessment at any level.

The Institute also evaluates its faculty members on research performance based on the following criteria:

- Publications and quality of journals in which papers are published
- Awards and honors received by faculty
- Self appraisal submitted by faculty
- Ph.D. / M.Tech. project guidance
- Initiative taken by faculty to take up projects funded by the Institute

2.5.2 Has the institution introduced evaluation of the teachers by the students? If yes, how is the feedback analyzed and implemented for the improvement of Teaching and Learning?

At the end of every semester feedback from students are taken and the results are statistically analyzed and given to individual faculty. Low performing teachers are advised and their progress is monitored by Head of the Department and Dean of Academics. Consistently high performing teachers are appreciated.

2.5.3 Does the institution promote self-appraisal of teachers? If yes how often?

The institution promotes self-appraisal of teachers through Annual Performance Appraisal Report (APAR) which is mandatory for all faculty members.

2.5.4 Is the appraisal by the teachers reviewed by the head of the institution and used to improve the quality of teaching?

The APAR submitted by the faculty will be first assessed by the Head of the Department and subsequently reviewed and graded by Dean (Acad) and Director. The whole process is made transparent by giving the APAR back to the faculty concerned. The faculty can counter the assessment and grading if he/she disagrees and the grievances can be redressed, if any.

2.5.5 Does the institution have an academic audit of the department? If yes, illustrate.

At the end of each semester, departments meet under the chairmanship of Head of the Department to review the academic activities of the semester. In the meeting, the relevance of various courses offered, and modifications required in the syllabus and curriculum are discussed and reviewed. Input from other departments is also taken into account for this purpose.

2.5.6 Based on the recommendations of academic audit what specific measures have been taken by the institution to improve the teaching, learning and evaluation?

The recommendations of the academic audit by the department are reviewed by Board of studies and Academic council. Corrective measures are taken as per their recommendations arrived at these meetings.

2.5.8 How does the institution monitor the performance of the students?

Students are monitored on a continuous basis in a Semester system of evaluation. Continuous evaluation during the semester has 50% weightage. This includes two announced periodical quizzes (with 15% weightage each) as scheduled in the academic calendar. Besides, class tests, tutorials, assignments, and seminars are also conducted. The weightages for these are decided at the class/course committee meetings and the students are informed about the details at the beginning of the semester. End-semester examination carries remaining 50% weight.

2.5.9 Are the evaluation methods communicated to the students at the beginning of the year? If yes how?

Yes, the details on the evaluation for a course are communicated to the students by the teacher who is handling that course, at the beginning of the semester. Newly admitted students are additionally given a common orientation programme on credit system and evaluation procedures.

2.5.10 What is the method of evaluation followed?

The evaluation methods are periodic quizzes, assignments, miniprojects, periodical tests, oral examination, and end semester examinations. All answer books of periodical quizzes and class tests are returned to the students after evaluation. After valuation of the answer books of the end-semester examinations, they are scrutinized by the faculty once again before the results are announced.

2.5.11 What is the mechanism for redressal of grievances regarding evaluation?

The Answer books of the periodical quizzes and tests are returned to the students or the students can verify them together with the faculty member. If there are any discrepancies found, corrective actions will be taken by the concerned faculty. If there are any grievances students can approach the teacher concerned, the Head of the Department / Chairmen of the class/course committee. General problems can also be brought to the class committee for discussion and remedial actions. This open procedure makes the system robust and

transparent. The answer books of end-semester examinations are made available for revaluation/verification, if necessary as per the recommendation of HOD/Dean and on request by the concerned student.

2.5.12 When are the examination results declared? Give the time frame

Examination results declared normally, within five working days after the last day of the end semester examinations.

2.5.13 Does the institution communicate to the parents regarding the evaluation outcome?

The results are made available in the Institute website, so that students as well as their parents can have access to the results. Parents of low-performing students are specifically informed the results of their wards.

2.5.14 How long has the current system of evaluation been in practice?

The current system of evaluation has been in practice since the inception of the Institute from 2007-08 academic year. Minor modifications have been incorporated in the evaluation system from time to time as per the recommendation of the Examination Committee chaired by Dean Academics.

2.5.15 Has the institution developed any evaluation reforms?

The Institute follows a continuous evaluation scheme with 50% weightage for all the batches from 2007 admissions. Initially, for the first two batches, this scheme included a mid-term examination with 30% weightage and 20% for one or more of assignments, class tests, and seminars. Latter, the mid-term examination is changed two Quizes with 15% weightage each, one before and another after the mid-term of a semester. The End-semester examination carries remaining 50% weight with no change.

2.5.16 What are the reforms made with reference to evaluation?

(Double evaluation, Open book examination, Question Bank, Moderation, Internal assessment)

In some courses, open book periodical tests, oral examinations are conducted giving importance to student's understanding on the topic. Freedom is given to teachers to design the examination pattern under broad guide lines.

2.5.17 Is evaluation procedures made transparent, if yes, how? Illustrate the different stages of evaluation till the declaration of results?

Quizzes and end-semester examinations are conducted as per academic calendar. Assignments, periodical tests, oral examinations etc. are conducted as announced by the faculty concerned based on the recommendations of course / class committees. Weights for these are decided at the course / class committee meetings and the students are informed about this at the beginning of the semester. Answer books of periodical tests and quizzes are valued and returned to students within a week. The marks are entered in the Institute Database.

Assignments/tutorials are evaluated and marks are also entered in the Database. If any student is unable to appear for the periodical quiz due to genuine reasons, one more

opportunity is given to him/her to write the periodical quiz. This is done by the teacher concerned on recommendation of Dean Academic.

The continuous assessment marks (i.e. 50% of the total) are available to the students before the commencement of end semester examinations. The answer book of the end semester examinations are valued and results are published after the class committee finalizes the results as mentioned above.

2.5.18 Does the university have continuous assessment, if yes, please specify the weightage?

The Institute follows a continuous evaluation scheme for which 50% weight is assigned. The weights are 15% for Quiz I, 15% for Quiz II, and 20% for one or more of assignments, class tests, and seminars.

2.5.19 What is the scheme / system of examination in practice for the affiliated institutions?

Institute does not have any affiliated institutions.

2.5.20 Give details of the number of question papers set, examinations conducted per semester.

The number of question papers set and examinations conducted for each course per semester on an average is given below:

Evaluation Schemes	*No. of set of Question Papers*	*No. of examinations*
Periodical Quiz I	1	1
Periodical Quiz II	1	1
Class Tests	2	2
Additional Periodical Quizzes[i]	2	2
End Semester Examination	1	1
Winter Course Examination[ii]	1	1
Summer Course Examination[iii]	1	1
Total	***9***	***9***

i. Only for students who could not write due to genuine reasons
ii. Only for first semester students who failed in the semester.
iii.Only for students having backlogs

2.5.21 Mention the number of malpractice cases reported and how they are dealt with.

- One student in the academic year 2010-11 and three students in 2011-12 are debarred from taking any examination for one semester

- One student in the academic year, 2007-08, four students in 2008-09, one in 2009-10 and five students in 2010-2011, who were found copying in examination are debarred from the examination for the particular course.
- In a rare case, two first semester students had been expelled from the institute during 2008-2009.

2.5.22 Does the university provide the photocopy of answer scripts to students? If yes, give details of the practice.

The answer books of Periodical Quizzes are returned to the students. Answer books of End-semester Examinations can be seen by the candidates, if they make a request through the Dean Academic.

2.5.23 Give details regarding the computerization of the examination system?

The whole examination system is computerized in the institute. The question papers are typeset with proper instructions using text processors such as MS Word, Latex etc. After the evaluation, the marks and grades are entered in the institute database. The result is made available in the Institute website, so that students as well as their parents can have access to it. The result is archived by academic division for future reference.

2.6. BEST PRACTICES IN TEACHING – LEARNING AND EVALUATION

2.6.1 What innovations / best practices are followed by the college with regards to teaching, learning and evaluation? With reference to admission process, student profile / catering to diverse needs / teaching-learning process / teacher quality / evaluation process and reforms or any other quality initiatives:

Teaching Process:

- Course plans are prepared to ensure uniform coverage of syllabus. It also ensures the syllabus is covered in the stipulated time.
- Concept based animations, technical demonstrations and multimedia resources are used in the class to illustrate the concepts and practices.
- Faculty members are encouraged to develop lecture notes and presentations so that they can publish it in faculty web page as well as in printed form. This permits the faculty in innovating new approaches in teaching, presentations, and lectures.

Learning Process:

- Students are provided with adequate funding to initiate some developmental work and prepare detailed report on them.
- Students are given problems, case studies, and assignments that need the use of computer lab, internet and library facilities (ICT infrastructure).

Evaluation Process:

- Weights for various components identified for course evaluation are decided in the course committee meetings.
- The marks are entered in the campus management software database and also announced to the students.

- Relative grading is adopted for every course.
- Auditing of question papers is done by the department concerned.
- Question paper setting is done with an emphasis on problem solving to the extent possible. Faculty is advised to set balanced question papers suitable for the entire class.
- To have uniformity in evaluation common courses handled by more than one faculty, the examination papers are evaluated by the concerned teachers, collectively.
- The results of the UG and PG examinations are analyzed by the examination committee headed by dean academic, and consisting of representatives from all departments and then approved for release.
- The results of the UG and PG examinations are displayed in the institute website within a week of their completion.
- The students can apply for re-evaluation of their answerscripts within five working days of the result publication.

Admission Process for UG:

Institute has introduced a well organized Admission Test, namely ISAT, exclusively for those who seek admission to B.Tech. Programmes offered by IIST.

Student Profile:

Presently students from almost all states of India are studying at IIST. About 10% of them are girls.

Catering to Diverse needs:

- In the first year of all under graduate programmes, the tutorials are part of the courses offered by Aerospace, Avionics, Mathematics, Physics and Chemistry departments. In addition, tutorial components comprising a total of about 14 periods are also assigned for certain courses at the later years.
- The faculty members are helping the students not only in their learning process but also in developing their personality skills
- The talented students are given very challenging tasks/assignments and option to migrate to other branches of studies.
- The slow learners are given personal / remedial coaching by the faculty on a regular basis and are given additional assignments.

Teacher quality:

- Teacher quality is ensured through a rigorous national/international selection procedure covering, academic credentials, proven research output, teaching strength, communication skills, and ability to excel in the profession by the academic peers.
- As a part of QIP, those limited faculty members, who do not have Ph.D., are allowed to register for the Ph.D. programme either of the Institute or of other institutes like IIT's.
- Deserving and qualified candidates with good academic/research records are given visiting faculty assignments. After a year of service they are considered for absorption for Assistant Professor.
- IIST follows flexible complementary promotion scheme, which does not require vacancies.

CRITERION III RESEARCH, CONSULTANCY AND EXTENSION

3.1 PROMOTION OF RESEARCH

3.1.1 Is there a research committee to facilitate and monitor research? If yes give details.

Yes, there are two bodies viz. IIST Research Board and IIST Research Council to monitor the research activities at IIST. The Research Board is formed to enable, promote and nurture the innovative research activity that meets the requirements and challenges of the national space and other R & D programs. The Research Board as part of its functions, (i) formulates the regulations and procedures for R & D programmes of the institute, (ii) identifies research areas and topics of interest to the institute, (iii) establishes procedures for implementing PhD and PDF programmes, (iv) ratify the constitution of doctoral committees for the PhD candidates and periodically review their research progress, (v) conduct the selection interviews for Ph.D. and PDF programmes and (v) identify and implement the procedures for completion of PhD programme.

IIST Research Council has been constituted to promote the research activities in the institute by monitoring the same on a regular basis, by providing the needed guidelines and by arranging the peer reviews wherever necessary.The IIST Research Council works out the procedures to sanction and monitor the progress of Research Projects. It also identifies the norms and procedures for selection of Ph.D. candidates, constitution of the doctoral committees and evaluation of the progress of Ph.D. candidates.

3.1.2 Is research a significant activity of the University? If yes, how does the institution promote faculty participation in research?

Yes, the Research Council receives proposals for research projects from IIST faculty members in the prescribed format and refers them to respective Peer Review Committee. Based on the evaluation reports and recommendations from the Peer Review Committees on the research projects, the research council decides on the appropriate action. The faculty members are also encouraged to supervise Ph.D. candidates with at least one Ph.D. student for each faculty. The institute equally encourages the department of Humanities to carry out research by guiding Ph.D. students. The institute covers all publication charges of accepted manuscripts of faculty and students. The institute also provides cash incentives to faculty and students for publishing papers in high impact journals. The institute provides for fast-track research projects to the tune of Rs. 10 lakhs to encourage newly joined faculty members.

The institute has initiated a Post-doctoral programme of 6 per year in various areas of Science and Technology to energize the research activities. The institute expects the post-doctoral fellows to create research laboratories of international standing, initiate research in advanced areas so that the UG/PG students can also participate and contribute.

3.1.3 What provision is made in the budget for research and development?

Around 12 % of the annual budget is for research and development.

3.1.4 *Does the university promote participation of the students in research in academic programme?*

Yes. The under graduate students have a compulsory summer internship as part of their curriculum in their programme, which is carried out either at institute or at any other research institute. The under graduate students also have a full semester project work as part of the curriculum, while the post graduate students' project dissertation encompasses the last two semesters. Five of our UG students successfully completed their final semester project work at Universities Space Research Association (USRA) Universities/Institutions in 2011, as part of our exchange programme. Our students are also actively involved in IIST Sounding Rocket Programme as well as designing payloads for the IIST Nano Satellite Programme.

3.1.5 *What are the major research facilities developed and are available to faculty and students on the campus?*

The institute has initiated efforts to set-up advanced centre of research in several areas. The list of the major facilities housed in the various departments is given below.

Department of Aerospace Engineering

- Subsonic Wind Tunnel
- Flexible Manufacturing System
- NI Data Acquisition Systems
- Thermal Power Sensors
- Turbojet Engine Test Rig
- Compressible Flow Test Rig
- Pulse/RAM Jet Test Rig
- HP XW 8600 Workstation and Software
- Ansys Academic Research
- Pressure Transducer
- Gaseous Film Cooling
- Gear Pump
- CCD Camera and Accessories
- UV Camera Lens for ICCD Camera
- High Resolution Wavemeter Analyzer and Accessories
- Calibration Light Source and Accessories
- Optical Tables and Accessories
- Optics, Optical Components and Accessories
- Components for MHz repetition rate Pulse Burst Laser
- High Speed Intensified CCD Camera
- Phase Doppler Particle Analyzer

Department of Avionics

- ADSP Processor Kit
- Digital Programmable Robot Kit
- Spectrum Analyser
- Digital Pendulum

- Agilent Modular Solar Array
- Wireless Sensor
- VDSP
- Rotational Dynamics Set up
- Active Suspension System
- Cubesat Development Setup

Department of Chemistry

- UV-Visible Spectrophotometer
- FT-IR Spectrophotometer
- Electrospinning machine
- Dip Coating Unit
- Differential Scanning Calorimeter
- Thermogravimetric analyzer
- Gel Permeation chromatography
- Deep freezer (-20°C)
- Rotating Ball Mill
- Sonicator
- Packed Bed Distillation
- Hot Stage Polarised Microscope
- Potentiostat-Galvanostat (Cyclic Voltammetry)
- Enzyme catalysis setup for conductance measurement
- Polarographic Analyser
- Polarimeter,
- Conductance cell,
- Conductance bridge
- pH meter
- Spectrophotometer
- Fumehoods, Air-oven, High Temperature Oven
- Melting point apparatus- digital,
- Manometric Gas Permeability Tester,
- Orbital Shaker
- Freeze Dryer
- Glove Box (inert atmosphere)
- Digitized Water Bath
- Wrist Action Shaker
- Ultra Sonicator
- Dynamic Mechanical Analyzer
- Lyophilizer, Centrifugal Pump Test Rig
- Tubular Heating Furnace
- Cryostat Bath
- Reynold's Apparatus

Department of Earth and Space Science

- 14-inch optical telescope
- 8-inch optical telescope
- A set of eyepieces and filters
- A power-tank for providing power to the telescopes.

- Automatic weather station (to measure WS, WD, AT, Relative Humidity, Pressure, Rainfall, soil temperature, soil moisture and Radiation) with Calibration setup
- Cloud Condensation Nuclei instrument
- Condensation particle counter instrument
- Data Logger (to log the above data)
- Microtops (for Aerosol optical depth, Precipitable water vapor, Ozone)
- Aethalometer (to measure the black carbon)
- Petrological microscope
- Various geological, geochemical and petrological software such as IGPET, PETROPLOT, TWQ, THERMOCALC
- Handheld GPS
- Differential GPS (Base station and rover)
- Spectroradiometer (300-1075 nm)
- ASD Spectroradiometer (400-2500 nm)
- Mirror Stereoscope
- Pocket Stereoscope
- Infrared emitter
- 3D glasses
- A0 colour plotter
- A0 colour scanner.

Department of Physics

- High Power Nd:YAG Laser
- Adaptive Optics Tool Kit
- Holography Set-up
- Speckle Interferometry Set-up
- Optical tables and optical components
- Z-Scan Set-up
- Spin Coating Unit
- He-Ne Lasers
- CCD Camera
- Ultra High Vacuum systems
- 5 Axis Spatial Filter
- Auto Collimator
- NIM Module
- Digital Storage Oscilloscopes
- Fiber Optic Workshop
- Spatial Light Modulators
- Fiber Laser

3.1.6 Does the university subscribe research journals for reference as per different departmental requirements?

Yes, 3427 e- journals and MathScinet (Bibliographic data base) and 44 print journals are available for reference.

3.1.7 Does the university extend recognition to national institutions that provide research training leading to research degrees?

No

3.2 RESEARCH AND PUBLICATION OUTPUT

3.2.1Give details of the ongoing minor and major projects?

The various research projects undertaken by faculty members in different departments of the institute are listed below.

S. No.	Title of the Project	Investigators	Duration	Amount (in Lakhs)	Funding agency
	Chemistry				
1.	Development and feasibility study of polymeric scaffolds for tissue culture under microgravity	Dr. Nirmala Rachel James	2009-12	19.68	DoS
2.	Development of carbon foams for high temperature thermal protection applications	Dr. K Prabhakaran Dr. K Y Sandhya	2010-13	21.56	DoS
	Physics				
3.	Investigating excited state dynamics of isolated molecular ions, hybrid molecular ions and cluster ions	Dr. Umesh R Kadhane	2010-13	138	DoS
4.	Polymer Nanocomposites for electronic and photonic applications	Dr. Honey John Dr. Pramod Gopinath	2009-13	37.53	DoS
	Mathematics				
5.	Controllability of Fuzzy Systems	Dr. Raju K. George	2010-13	2.94	DoS
6.	Dynamics and Rheology of a Dilute Suspension of Periodically Forced Spheroids in a Quiescent Fluid at Low Reynolds Number	Dr. Anil Kumar C.V	2011-14	13.18	DoS

	Earth and Space Sciences				
7.	Impact of assimilating SAPHIR and GPS-ROS data from MEGHA TROPIQUES in high resolution mesoscale model for prediction of severe weather systems over India	Dr. A Chandrasekar	2010-13	5	DoS
8.	Star formation in young Galactic clusters associated with massive stars	Dr. Sarita Vig Dr. Anandamayee Tej	2011-14	5.6	DoS
9.	Surface Layer Adjustment to Radiative Forcing (SLARF)	Dr. M V Ramana	2011-13	139.7	ISRO GBP
10	Near Simultaneous Measurements of Aerosols, Clouds and Turbulence as the Maximum Cloud Zone Moves Northward	Dr. M V Ramana	2011-14	67.38	MOES
11	Evaluation of the potential of hyperspectral remote sensing for species level classification and biophysical characterization of mangroves of Bhitarkanika National Park, Orissa	Dr. L Gnanapazham	2011-13	19.41	DoS
12	Understanding the genesis of anorthosites on Earth and the Moon: A geological and Remote Sensing approach	Dr. V. J. Rajesh	2011-2014	10.75	DoS
13	Estimation of tropical forest biophysical parameters using UV and NIR reflectance from GOSAT TANSO – CAI sensor	Dr. Rama Rao Nidamanuri co-I: Ms. A.M.Ramiya	2011-2014		JAXA/ NIES/ MoE (Japan)*

14	Multi-scale object oriented classification of satellite images	Dr. Rama Rao Nidamanuri	2012-2013	10.0	DoS
15	Multi-sensor retrieval of tropical biophysical parameters	Dr. Rama Rao Nidamanuri	2012-2014	20.0	DoS
16	Star formation in young Galactic clusters associated with massive stars	Dr. Sarita Vig (Co-I: Dr. Anandmayee Tej)	2012-2014	4.2	DoS
	Aerospace Engineering				
17.	Design of autonomous walking humanoid robot	Sam K Zachariah Dr. K Kurien Isaac	2010-14	25	DoS
18.	Numerical Simulation of Turbulent reaction flows in semi-cryogenic and tri-propellant engines	Dr. M Deepu Dr. A Salih	2009-12	10.5	DoS
19.	Development of a versatile parallel 3-D RANS solver for simulating compressible flows	Pankaj Priyadarshi	2011-13	8.0	DoS
20.	Multi-objective, multi-disciplinary design optimization of a semi-ballistic re-entry vehicle using high-fidelity heat flux estimation	Pankaj Priyadarshi	2011-13	5.0	DoS
21.	To study the effect of real gas on the aerodynamic and heat transfer coefficients of re-entry module configurations	Pankaj Priyadarshi	2011-13	10.0	DoS
	Humanities				
22.	Local Links and Impacts: The Influence of Local Institutions on Regional Development	Dr. Shaijumon C S	2010-12	5.86	DoS
23.	Developing an English language Software for IIST students	Dr. Babitha Justin	2011-13	10.5	DoS

24.	Women in New Profession- A Study of Women in the Tourism Industry	Dr. Lekshmi V Nair	2009-11	4	ICSSR
25.	Long Term Living in Institutions: A Study Of Elderly In Selected Old Age Homes Of Kerala	Dr. Lekshmi V Nair	2009-12	7	UGC
26.	Audio Visual Lab development	Department of Humanities	2011-12	47.5	IIST
27.	IIST-LPSC collaboration of electric propulsion	Department of Phyiscs	2011-	In house project in collaboration with LPSC	IIST-LPSC
	Avionics				
28.	Sam K Zachariah Dr. K Kurien	Isaac Design of autonomous walking humanoid robot	2010-14	15	DoS
29.	Dr. Basudeb Ghosh	Design and Implementation of Helmet Antenna	2012-2013	10	DoS
30.	Dr.B.S.Manoj	IIST Mesh Net: A Programmable Hybrid Wireless Mesh Network Testbed	2012-2013	7.4	DoS

* This project is restricted to utilization of JAXA data and has no funding component.

Apart from the above research projects, development of the following three Centres of Excellences has also been initiated.

S.No.	Facility	Department	Amount (in Lakhs)	Funding Agency
1.	Centre of Excellence in "Nanoscience and Technology"	Chemistry	330	DoS
2.	Centre of Excellence in "Advanced Propulsion and Laser Diagnostics Centre"	Aerospace Engineering	321	DoS
3.	Centre of Excellence in "Virtual Reality"	Avionics	200	DoS

3.2.2Does the university have research funding from the Government, Industry, NGO or International agencies? Give details.

Yes

1. Dr. Raju K George, for a project titled "Control of Systems of Partial Differential Equations', funded by Indo-French Centre for Promotion of Advanced Research (IFCPAR)
2. Dr. M V Ramana, for a project titled "Surface Layer Adjustment to Radiative Forcing", funded by ISRO-GBP
3. Dr. M V Ramana, for a project titled "Near Simultaneous Measurements of Aerosols, Clouds and Turbulence as the Maximum Cloud Zone Moves Northward", funded by MoES, Govt of India
4. Dr. Lekshmi V Nair, for a project titled "Women in New Profession- A Study of Women in the Tourism Industry", funded by ICSSR
5. Dr. Lekshmi V Nair, for a project titled "Long Term Living in Institutions: A Study Of Elderly In Selected Old Age Homes of Kerala", funded by UGC

3.2.3.Does the University have research students currently registered for PhD?

Yes

52 students have registered for Ph.D.

S. No.	Name	Dept.	Area of Research
1	**V Ashok**	AE	Hybrid Solution Methods For Near Wall Viscous Resolution In A Cartesian Mesh Frame Work
2	**Sam K Zachariah**	AV	Autonomous Walking Control Of Humanoid Biped Robot In A Novel Hybrid Dynamical System Frame Wok
3	**S R Shine**	AE	Liquid Film Cooling Optimization Studies
4	**Deepak Kumar Agarwal**	AE	Nano Fluid Heat Transfer And Spray Characteristics
5	**Remya Mol T**	CHE	Studies On Conducting Polymers And Nanocomposites With Special Emphasis On Light Matter Interaction
6	**Jalaja K**	CHE	Development Of Nanofiber Scaffiolds For Tissue Engineering And Drug Delivery Based On Natural Polymers
7	**Sanid C**	PHY	Nonlinear Dynamics
8	**Muthukumaran C K**	AE	Instabilities of mixing of a coaxial supercritical jet
9	**Ameya Anil Kesarkar**	AV	Fractional Order Control For Nonlinear Dynamic System
10	**Litesh Sulbhewar**	AE	Computationally Efficient Finite Element Formulations
11	**Richa Sharma**	PHY	New Optical Methods For Imaging Through Atmospheric Turbulence

12	**Ranajith Dey**	AV	Design And Development Of A Broad Band Conjugate Matched Feed
13	**M Sreenivasa Raju**	PHY	Studies On The Interaction Of High Power Laser With Matter
14	**Senthil Kumar**	PHY	Investigation On Adaptive Optics Technique For High Resolution Optical Systems For Earth Observation
15	**Raja J**	Maths	Justification Of Lower Dimentional Model For Thin Elastic And Piezoelectric Materials
16	**Bhaskar Dubey**	Maths	Qualitative Study Of The Basic Properties Of Control Systems Such As Controllability, Observability And Optimality Of Controls By Using The Tools Of Functional Analysis And Soft Cmputing
17	**M Vani Devi**	AV	Finding The Optimal Piolot Arrangement And Estimating The Channel Parameter For Mimo-Ofdm System
18	**Sooraj V S**	AE	Theoretical And Experimental Investigations On Ultra High Surface Finish Generation Using Fine Abrasive Impingement
19	**Kavitha M K**	CHE	Synthesis, Fabrication And Property Evaluation Of Polymer Nanocomposites For Optical Application
20	**Sarika P R**	CHE	Hydrogels For Medical Application
21	**Preeti Manjari Mishra**	PHY	Study Of Structural And Dynamic Properties Of Polycyclic Aromatic Hydrocarbon Molecules
22	**Architra K G**	AE	Numerical Simulation Of Turbulent Reacting Flows For Supercritical Combustion Applications In Liquid Rocket Engines
23	**Haripadmam P C**	PHY	Nonlinear Optical Properties Of Polymer Nanocomposites
24	**Raneesh Konnola**	CHE	Nanocomposites for structural applications
25	**Sunil Kumar P**	PHY	Multiwavelength Studies Of Galactic Star Forming Regions
26	**Arun Prasad K**	ESS	Hyperspectral Classification For Mapping Mangroues At Species Level And Biophysical Characterisation Using Hs Remote Sensing And Gis
27	**Sarah Titus**	CHE	Development of Dendrimers for Drug Delivery
28	**Dhanya M**	ESS	Satellite Data Assimilation In Mesoscale Moldelling
29	**Sajitha G**	AV	Adaptive Filtering Techniques In Digitally Controlled Dc Dc Converter
30	**Bharat Bhushan D**	ESS	Spectral Feature Reaction And Classification Of Hyperspectral Remote Sensing Data
31	**Narasimman R**	CHE	Carbon Foams for High temperature thermal protection Applications

32	**N Venkatesh**	AE	Experimental Investigation Into Regimer Of Crygenic Two Phase Flow Boiling
33	**Binu. P. Thomas**	AE	Investigations On Holographic Interferometry Techniques For Strain Measurement And (Ndt) Non-Destructive Testing
34	**Sumi Baby**	AV	New Approach For Noise Using Cmos In Mixed Signal Application
35	**B.Sivashanmugavalli**	AV	Developing Method To Improve The Transmission Capacity Of Wireless Network
36	**S.Chris Prema**	AV	Model Based Signal Processsing And Validation Using Ground Penetrating Radar
37	**Sam Noble**	AE	Wheeled Rover With Actively Articulated Suspension For Planetary Terrain
38	**Roshina Babu**	AE	Analysis And Synthesis Of A Membrane Structure For Deployable Antennas Using Biomimetics
39	**Mahima K M**	ESS	Petrogenesis Of Lunar Analogue Rocks In South India And Its Implications
40	**Harsha K V**	Maths	Information Geometry And Its Applications
41	**Treeza James**	ESS	How Is Surface Layer Adjusts To Radiative Forcing
42	**Priyanka M C,**	HUM	Gender And Science
43	**Rohith M**	PHY	To Study The Non Linear Dynamics Of Quantum Systems
44	**Lingareddy Panyala**	CHE	Inorganic Functional materials for Energy Storage Applications
45	**Mathiazhagan S**	AE	Investigations In To The Failure Of Biological Nanocomposites By Molecular Dynamics Methods
46	**Rashmi M**	HUM	Technology In Rural Kerala: A Descriptive Study Of The Use Of Technology In Rural Kerala
47	**Surya Mani Tripathi**	AE	Very Low Cycle Fatigue Analysis Of Thin Shells Due To Repeated Buckling
48	**Waghmare Rahul Gautam**	AV	Image Analysis And Computer Vision
49	**Ramesh N**	AE	Alagorithem Development For Fuel Optimum Mission Design For Lunar Soft Landing At A Special Location
50	**Muhamed Mukthar Ali**	CHE	Design and synthesis of materials for Development of Organic Solar cells
51	**Rahul Sharma**	AV	Content Based Video Retrieval
52	**A M Ramiya**	ESS	Integration Of Multispectral And Lidar Data For Land Cover Mapping And Vegetation Structural Characterization

AE-Aerospace;AV-Avionics;PHY-Physics;CHE-Chemistry;ESS-Earth and Space Science,HUM-Humanities

3.2.4.Does the University provide fellowship/scholarship to research scholars?

Yes. Rs. 35,000/- per month for the ISRO-IIST Research Fellowship and Rs. 16,000 (for NET/JRF Qualified M.Sc. and M.A. candidates) or Rs.18,000 (for M.Tech. candidates) per month for the IIST Research Fellowship.

3.2.5 Does the University have post-doctoral fellows currently working in the institute?

The institute has initiated the post-doctoral programme. The annual intake will be 6 Post-doctoral Fellows in various areas of research. The first batch is expected in the year 2012.

3.2.6 Give the highlights of the collaborative research done by the faculty.

Faculty members of the Institute are engaged in collaborative research with various institutes and universities of repute in India and abroad.

International

- Department of Earth and Atmospheric Sciences, Purdue University, USA
- Climate Research Department, Meteorological Research Institute, Nagamine, Japan
- Atmospheric Modelling and Analysis Division, US Environmental Protection Agency, USA
- Department of Astronomy, University of Wiscosin-Madison, USA
- Department of Astronomy, Pennsylvania State University, USA
- Max- Planck Institute for Radio Astronomy, Bonn, Germany
- Institute for Astronomy, Honolulu, USA
- Jet Propulsion Laboratory, Pasadena, USA
- Department of Earth Sciences, Kanazawa University, Japan
- Department of Natural Environmental Science, Kochi University, Japan
- Department of Biology and Geosciences, Shizhuoka University, Ohya, Japan
- Department of Earth and Environmental Sciences, Chonbuk National University, Korea
- Department of Earth and Environmental Sciences, Korea University, Seoul, Korea
- Hanoi University of Mining and Geology, Dong Ngac, Tu Liem, Hanoi, Vietnam
- Okayama University of Science, Okayama, Japan
- Department of Science Education, Sunchon National University, Sunchon, South Korea
- Center for Agricultural Landscape Research, Muencheberg, Germany
- University of Bonn, Bonn, Germany
- National Institute for Agro-Environmental Sciences, Tsukuba, Ibaraki, Japan
- School of Mathematical and Geospatial Sciences, RMIT University, Melbourne, Australia

- Ben-Gurion University of the Negev, Beer-Sheva, Israel
- Observatorio Astrofisico di Arcetri, Firenze, Italy
- European Southern Observatory, Munich, Germany
- National Astronomical Observatory of Japan, Tokyo, Japan
- Institute of Inorganic Methodologies and Plasmas (IMIP), Rome, Italy
- Sandia National Laboratory, USA
- Department of Computer Science, University of Colorado at Boulder, USA
- Department of Marine, Earth and Atmospheric Science (MEAS), North Carolina State University (NCSU), Raleigh, USA
- National Center for Atmospheric Research, Boulder, USA
- University of Burgundy, Dijon, France
- Department of Automatic Control & Systems Engineering, The University of Sheffield, Sheffield, U.K
- Chemical and Biomolecular Engineering Department, University of California Los Angeles, Los Angeles, USA
- Department of Material science, Federal University of Canpina Grande, Brazil
- Department of Material Science, Martin Luther University, Halle-Wittenberg, Germany
- Swedish Institute of Composites, Petea, Sweden
- Elettra Synchrotron Facility, Trieste, Italy
- IFCPAR.(Indo French)

National

- Tata Institute of Fundamental Research
- Indian Institute of Technology Madras
- Indian Institute of Technology Delhi
- Indian Institute of Technology Bombay
- Indian Institute of Technology Kanpur
- National Institute of Technology Calicut
- Institute for Plasma Research, Gandhinagar
- Physical Research Laboratory, Ahmedabad
- National Centre for Radio Astronomy, Pune
- Indian Institute of Astrophysics, Bangalore
- Inter University Centre for Astronomy and Astrophysics, Pune
- Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital
- M S Swaminathan Research Foundation, Chennai
- Centre for Earth Science, Indian Institute of Science, Bangalore
- G. N. Ramachandran Knowledge Centre for Genome Informatics, CSIR Institute for Genomics and Integrative Biology (CSIR-IGIB), Delhi
- Cochin University of Science and Technology, Cochin
- Centre for Development Studies, Thiruvananthapuram
- University of Kerala, Thiruvananthapuram
- University of Delhi, Delhi
- Mahatma Gandhi University, Kottayam
- Sree Kerala Varma College, Thrissur

- Inter University Accelerator Centre, New Delhi
- NAL,Bangalore

In addition to these faculty collaborations, there are many collaborative research done as part of Ph.D. programme with various ISRO Centres like

1. Space Application Centre (SAC), Ahmedabad
2. Vikram Sarabhai Space Centre(VSSC) , Thiruvananthapuram
3. Liquid Propulsion Systems Centre (LPSC), Thiruvananthapuram
4. Development and Education Communication Unit (DECU), Ahmedabad

3.2.7 What research awards and patents were received by the faculty during the last five years.

1. Dr.V.Adimurthy ,Dean (R&D) of the institute was conferred the **PADMA SHRI award** by the GOVt. of India January 2012.

5. Dr. K. S.Dasgupta ,Director of the institute received the ISRO "Performance Excellance Award", in2011
6. Dr. K. N. Ninan ,Emerirtus Professor, Department of Chemistry, received the ISRO "Performance Excellance Award", in2011
7. Dr.Rajesh Joseph Abraham , Department of Avionics has been selected for the "IEI Young Engineers Award 2011-2012" in Electrical Engineering discipline by the Institution of Engineers India West Bengal State Centre.
2. Prof Kurien Issac of Department of Aerospace Engineering has won Prof A Jaganmohan award for Faculty Development from Department of Mechanical Engineering, IIT Bombay in 2008.

3. Prof Kurien Issac of Department of Aerospace Engineering has won the Best Faculty award from Mechanical Engineering Department of IIT Bombay in 2007.

4. Dr. V J Rajesh of Department of Earth and Space Sciences has won the "Young Scientist Award" at the Kerala Science Congress in 2010.
5. Dr. Gomathi N of the Department of Chemistry won the best poster award for the paper "The effect of surface modification of polycarbonate using argon-oxygen plasma on platelet adhesion" in the Research Scholar Day 2009 organized by the Department of Chemical Engineering , IIT Kharagpur

6. Dr.N.Selvaganesan of Department of Avionics has received the "Best Paper Award" (Gold Medal with Citation) from Journal of Education, IETE, New Delhi (2008) for the paper titled "PC based Position-Control of Multiple Robot Arms".

7. Dr.B.S. Manoj of Department of Avionics has received the "Best Paper Award" for the paper entitled "On Optimizing Non-Asymptotic Throughput of Wireless Mesh Networks" co-authored with P. Zhou and Ramesh Rao, at the 5th Annual IEEE Consumer Communications and Networking Conference 2008 (IEEE CCNC 2008) held in Las Vegas, USA, during January 10-12, 2008.

8. Dr. K. N. Ninan, Emerirtus Professor, Department of Chemistry was selected as corresponding member by International Academy of Astronautics (IAA), 2007 .

9. Dr. K. N. Ninan , Emerirtus Professor, Department of Chemistry , was conferred Honorary Fellowship by High Energy Materials Society of India, 2009.

10. Dr. K Prabhakaran ,Department of Chemistry along with A Melkeri, N M Gokhale and S C Sharma filed a Patent, "Process for producing near net-shape ceramic components Indian Patent File No. 1312/DEL/2007.

11. Dr Umesh Kadhane , Department of Physics,received the S.N Ghosh "Young Scientist Award" in the year 2009.

Student Awards

12. **Dinesh Dhankar and Gaurav Yadav** of IIST Thiruvananthapuram secured First position under "Aerospace Young Engineer Award 2010" instituted by Mahindra Satyam for the Project: A low cost telemetry system for sounding rockets by using mobile phone transmitter (Category: **Avionics**).

13. **Kuldeep Sharma and John Vivian Prashant** of IIST Thiruvananthapuram secured Second position under "Aerospace Young Engineer Award 2010" instituted by Mahindra Satyam for the Project: The numerical simulation of a staged transverse injection behind a rearward facing step into a mach 2 stream in a confined environment (Category**: Aerodynamics**)

14. Best Poster Award for the paper on "The Effect of Surface Modification of Polycarbonate Using Argon-Oxygen Plasma on Platelet Adhesion" in the Research Scholar Day 2009 organized by the Department of Chemical Engineering, Indian Institute of Technology, Kharagpur on December 16, 2009.

3.2.8 Are there Research papers published in refereed journals periodically, by the faculty? If yes, specify.

Yes. List is given below.

3.2.9 Give the list of publications by faculty members.

a.Books

Dr. A. Chandrasekar

"Basics of Atmospheric Science" (2010**)** by A. Chandrasekar**,** PHI Learning Private Limited, New Delhi.

Book Chapters

Dr BS Girish

1. S.G. Ponnambalam, N. Jawahar and **B. S. Girish** , An Ant Colony Optimization algorithm for Flexible Job shop scheduling problem New Advanced Technologies, A. Lazinica (Ed.), INTECH Publishers, ISBN: 978-953-307-067-4, pp. 73 – 92, **2010.**

Dr. Babitha Justin

1. "Arms and the Women: A Case Study of Some Women Entrepreneurs in the Garo Hills" in Armed Conflict and Women: Consequences and Coping Mechanisms Edited by Sukhvinder Kaur Multani, The ICFAI University press, Hyderabad, 2009.
2. "Under Surveying Eyes: Ethnographical Profiling and the Construction of 'Identities'in the Colonial Writings in the Garo Hills" in the book Theory and Practice of Ethnography: Reading from the Peripheries Edited by Eswarappa Kasi and Ramesh C. Malik . IGRMS, New Delhi, 2009.
3. "Achik as Christian: Proselytism and Violence on Travel Literature, A Case Study of William Carey's The Garo Jungle Book", Protocol, Spring, 2007.
4. "Portraits Speak, The Politics of Portrait Making: Looking at Ravi Varma's Laxmi Bai", Protocol, Fall, 2007.
5. "Resistance and Conformity in the Project Colonial: A Study of Shakuntala Paintings in Ravi Varma". Dominance and Resistance in Text and Context: Probing Colonial and Post Colonial history of India, Cambridge Scholars Publishing, London

Dr.N Gomathi

6. Gomathi, N., Mishra, D., Maiti, T. K., and Neogi, S., Helium plasma treatment to improve biocompatibility and blood compatibility of polycartbonate in "Surface and interfacial aspects of cell adhesion" eds. A.Carre, K.L.Mittal, 2010, 365-373, VSP Publishers, Leiden Netherlands

Dr. Raju.K. George

7. Wrote Chapter 2 of the book "Linear Systems and Stability Analysis - Lecture Notes of Instructional Workshop on Differential equations: Theory and computation, Department of Mathematics, Indian Institute of Science, Bangalore, pp. 37-58, 2000

b. Research Papers (Journal)

Aerospace Engineering

1. **P. Chakravarthy**, Uday chakkingal and P. Venugopal,"Deformation and Temperature aided Sintering during hooker extrusion of Sintered PM Preforms of Steels" Powder Metallurgy, 54 193-201 **,2011.**
2. **S. Anup**, S.M. Sivakumar, and G. K. Suraishkumar, Influence of viscoelasticity of protein on the toughness of bone, Journal of the Mechanical Behavior of Biomedical Materials, 3(3), 260-267, **2010.**

3. **P.Chakravarthy**, Uday Chakkingal and P.Venugopal, "Use of Ring Compression Test and Plastic Poisson's Ratio in Extruding Sintered Powder Metallurgocal Preforms", Powder Metallurgy, DOI : 10.1179/1743290110Y.0000000011, **2010**.
4. **Salih, A.** and Ghosh Moulic, S., "Numerical Simulation of Buoyancy-driven Bubble Motion Using Level Set Method"**,** International Journal for Computational Methods in Engineering Science and Mechanics, 11, issue 4, 211-229, **2010**.
5. **Vaidyanathan**, A., Gustavsson, J., Segal, C, "Oxygen/Hydrogen-Planar-Laser-Induced Fluorescence Measurement and Accuracy Investigation in High-Pressure Combustion", Journal of Propulsion and Power, 25 (4), pp. 864-874, **2009**.
6. ManjuBhargavi, **P.Chakravarthy**, P.Venugopal, D.R.G.Achar, "Influence of rubbing profiles on friction welding of prestrained Aluminum to Copper" , IEEE Computer Society Digital Library doi.ieeecomputersociety.org/10.1109/ICETET. 130, page 510-514, **2009**.
7. Nair, P., Jayachandran, T., **Deepu. M**., Puranik B.P. and Bhandarkar, U.V., "Numerical Simulation of Interaction of Sonic Jet with High Speed Flow over a Blunt Body using Solution Mapped Higher Order Accurate AUSM+-UP Based Flow Solver", Journal of Applied Fluid Mechanics, Vol. 3, No. 1, pp. 15-23, **2009.**
8. **B. S. Girish** and N. Jawahar , Scheduling Job shops associated with multiple routings using Genetic and Ant Colony heuristics**,** International Journal of Production Research, Vol. 47, no. 14, pp. 3891 — 3917, **2009.**
9. S. G. Ponnambalam, N. Jawahar and **B. S. Girish,** Giffler and Thompson based Genetic Algorithms for Scheduling Job shops, Computational Intelligence in flow shop and job shop scheduling, U. K. Chakraborthy (Ed.), Springer-Verlag, Berlin/Heidelberg, SCI Vol. 230, pp229-259**, 2009.**
10. Y. Ashok kumar, **R.V Ramanan** et al., 'The Moon Impact Probe on Chandrayaan-1′, Current Science, Vol.96, No.4, 25 Feb **2009**.
11. **Salih, A**. and Ghosh Moulic, S., Sadhana, "Some Numerical Studies of Interface Advection Properties of Level Set Method",Indian Academy of Sciences, 34, Part 2, 271-298, **2009.**
12. **Sooraj V. S,** "Effect of work material properties and machining conditions on the accuracy and erosion efficiency of micro electric discharge drilling", International Journal of Abrasive Technology, **2009**.
13. **S. Anup**, S.M. Sivakumar, and G. K. Suraishkumar, Influence of relative strength of constituents on the overall strength and toughness of bone, Journal of Mechanics in Medicine and Biology, 8 (4), 527 – 539, **2008.**
14. **P. Chakravarthy**, Uday chakkingal and P. Venugopal, "Influence of Temperature on the Forming Limit Diagrams of Sintered P/M Preforms of Steel", Mat. Sci. and Engg-A . 485,395-402, **2008.**
15. **M Deepu**, Praveen Nair, and Jayachandran, T, "Numerical Simulation of Film Cooling in a Hypersonic Re-Entry Module Using Ausm+-Up Based Finite Volume Flow Solver" International Journal of Dynamics of Fluids, Vol.4, No.2, **2008.**
16. **Pankaj Priyadarshi**, Vinod Kumar, "Configuration design of a semi-ballistic re-entry module", CFD Journal, pp 391-402, Vol.16, No. 4, **2008**

17. **Pankaj Priyadarshi**, "Aerodynamic design optimization in space vehicle systems", CFD Journal, pp 403-414, Vol.16, No. 4, **2008.**
18. **K. Kurien Issac** and Sunil K. Agrawal, "An investigation into the use of springs and wing motions to minimize the power expended by a pigeon-sized mechanical bird for steady flight", Journal of Mechanical Design, Transactions of ASME, vol. 129, p. 381., **2007.**
19. **S. Anup**, S. M. Sivakumar, and G. K. Suraishkumar , Natural optima in human skull: A low-velocity impact study. International Journal of Crashworthiness, 12 (1), 17 – 20, **2007.**
20. **S. Anup**, S. M. Sivakumar, and G. K. Suraishkumar, Structural arrangement effects of mineral platelets on the nature of stress distribution in bio-composites. CMES – Computer Modeling in Engineering and Sciences, 18 (2), 145 – 153, **2007.**
21. Conley, A., **Vaidyanathan,** A., Segal, C., "Heat Fluxes Measurements for a GH2/GO2 Single-Element, Shear Injector, Journal of Spacecraft and Rockets, 44 (3), pp. 633-639, **2007**
22. **Deepu, M.,** Gokhale, S. S. and Jayaraj, S., Recent advances in experimental and numerical analysis of scramjet combustor flow fields, Journal of Aerospace Engineering; Institution of Engineers (India), Vol.88, May **2007.**

Avionics

23. **Rajesh Joseph Abraham**, D. Das & Amit Patra, "Damping Oscillations in Tie-power and Area frequencies in a Thermal Power System with SMES-TCPS combination", Journal of Electrical Systems, vol. 7, no. 1, pp. 71-80,March **2011**,.
24. **Rajesh Joseph Abraham**, D. Das & Amit Patra, "Load following in a bilateral market with local controllers", International Journal of Electrical Power & Energy Systemsvol. 33, no. 12, pp. 1648-1657 December **2011.**
25. Raghvendra Kumar Chaudhary, H. B. Baskey, K. V. Srivastava and **Animesh Biswas**, "Synthesis and Microwave Characterization of (Zr0.8Sn0.2)TiO4 Epoxy Composite and its Application in Wideband Stacked Rectangular Dielectric Resonator Antenna", Accepted for Publication in IET Microwave, Antenna and Propagation.
26. R. K. Chaudhary, V. V. Mishra, K. V. Srivastava and **A. Biswas**, "Improved Spurious Free Performance of Multi-Layer Multi-Permittivity Dielectric Resonator In Mic Environment," Progress In Electromagnetics Research (PIER) B, Vol. 30, pp. 135-156, May **2011**.
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29. **Basudeb Ghosh**, S. N. Sinha, and M. V. Kartikeyan, "Radiation From Rectangular Waveguide-Fed Fractal Apertures", IEEE Transactions on Antennas and Propagation, vol. 58, No. 6, pp. 2088-2093, Jun. **2010**.
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Journal of RF and Microwave Computer-Aided Engineering, vol. 20, No. 2, pp. 209-219, Mar. **2010**.

31. NM Mellen and **Deepak Mishra**, "Endogenous Burster Distribution in Rat Ventrolateral Medulla Overlaps Respiratory Rhythmogenic Networks", Journal of Neuroscience, 30(25):8383-8392, June 23, **2010**.
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40. **Basudeb Ghosh**, S. N. Sinha, and M. V. Kartikeyan, "Electromagnetic Transmission Through Fractal Apertures in Infinite Conducting Screen", Progress In Electromagnetic Research B, vol. 12, pp. 105-138, **2009**.
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Chemistry

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3.3 CONSULTANCY

3.3.1 List the broad areas of consultancy services provided by the Institution during the last 5 years.

Faculty members of the institute provide the following academic consultancy services.

- Member of Board of Studies of different Universities
- Question paper setters
- Journal Referee
- Ph. D. theses evaluator
- Editorial Board Members of Journals (National/International)
- Expert in Selection Committees

3.3.2.Does the institution publish the expertise available for consultancy services?

Yes. The profiles of the faculty members are published in the institute website.

3.3.3 Give details regarding the nature of consultancy services and revenue generated?

The institution does not generate funds through consultancy. However the faculty members are actively contributing towards the research related to Space Science and Technology and related fields.

3.4 EXTENSION ACTIVITIES

3.4.1. What outreach programmes are organized by the institution? How are they integrated with the academic curricula?

Apart for several outreach programs conducted time to time in various schools and institutions in the neghbourhood regular programs like IIST at school are also conducted. School children from selected schools, mainly form rural areas are hosted in the campus for two days and several science and technology popularization activities are conducted.

3.4 2 How does the university promote university-neighborhood network in which students acquire training, which contribute to sustained community development?

Various field trips are organized to neghbouring rural areas for the study of the life style, environment and the community problems by the institute faculty and students.

3.4.3 How does the institution promote the participation of the students and faculty in extension activities of NSS, NCC, YRC and other NGOs? How often and in what roles are they involved?

Since the institute is still in the building phase such associations are still under development. It is expected that in near future such activities will take shape.

3.4.4. Is there any research or extension work to ensure social justice and to empower under-privileged sections in particular, women and children?

No

3.4.5. What is the impact of extension on the community? Specify.

The institute has adopted the neighbouring village of Karipur for its extension activities. A need assessment survey has been done by the Department of Humanities. With the help of ISRO all modern communication technologies/multimedia tools will be installed at Karipur Village to cater to the technological needs of the people.

As a part of the Institute's social outreach programme, the Department of Humanities conducts classes in the neighbouring rural schools and also in other schools of Trivandrum city. As a part of NSS activities, the students of the Institute are taken to tribal areas to get a feel of the life and culture of the tribal people. Exposure visits to NGOs, palaces, museums, old age homes, and orphanages are also regularly undertaken for the students.

3.5 COLLABORATION

3.5.1 How many linkages does the institution have, for research and extension?

IIST is collaborating with

- University Space Research Association (USRA) , USA
- Universite Paul Sabaetier, Toulouse, France
- Tata Institute of Fundamental Research (TIFR), Mumbai and Bangalore
- Sri Chitra Thirunal Institute of Medical Sciences and Technology (SCTIMST), Thiruvananthapuram
- National Aeronautics Laboratory (NAL), Bangalore
- Institute for Plasma Research (IPR), Gandhinagar
- Space Application Centre (SAC), Ahmedabad,
- Vikram Sarabai Space Centre (VSSC), Thiruvananthapuram
- Liquid Propulsion Systems Centre (LPSC), Thiruvananthapuram
- DECU, Ahmedabad

It is envisaged to sign a MoU with Caltech, USA

3.5.2 List the organizations and the nature of linkages and expected outcome.

The research collaboration of the institute with SAC, VSSC, LPSC and DECU will result in awarding of Ph.D. degrees to the Scientist/Engineers of ISRO/DOS, as a part of human resource development programme of DOS. The collaboration with USRA will facilitate mutual exchange visits by faculty and students of IIST to USRA. MoU with Caltech USA is in advanced stage of progress.

3.5.3 How does the linkage promote?

1. Curriculum development

Scientists from various ISRO Centres and academicians from various IITs play an important role in framing the curriculum, as external experts of the Academic Council and Board of Studies.

2. Internship

Students do their summer and winter internships at various ISRO centres as well as other research/academic organizations. Five of our students have done their internships in 2010-11 at various Institutes/Universities in the United States of America, as part of the MoU signed between IIST and USRA.

3. On-the-job training

Although the Institute does not have provision for a formal on-the-job-training programme, faculty members of the institute have wide ranging collaborating activities with Scientists/Engineers of ISRO/DOS centres as well as with leading research/academic institutes within and outside the country.

4. Faculty exchange and development

Provision exists for faculty visits to USRA Institutes/Universities as part of the MoU signed between IIST and USRA in September 2010. The above MoU also allows faculty from USRA Institutes/Universities to visit IIST.

5. Research

Scientists/Engineers from various ISRO/DOS centres have registered for Ph.D. with the Institute. Faculty members of the institute serve as the supervisor for the above Ph.D. candidates, while the co-supervisor is from their respective ISRO/DOS centre. These collaborations will result in the awarding of Ph.D. degree to these candidates.

6. Consultancy

Some of our faculty members are in committees as honorary members to review proposals submitted to ISRO.

7. Extension

A collaborative project is undertaken with DECU to implement adoption of the neighbouring village of Karipur for extension activities. A need assessment survey has been jointly done. With the help of ISRO all modern communication technologies including multimedia tools will be installed in Karipur Village to cater to the technological needs of the people.

8. Publications

The linkages with various collaborative institutes have been in vogue for the last couple of years and hence joint publications based on the above linkages will happen in the near future.

9. Student Placement

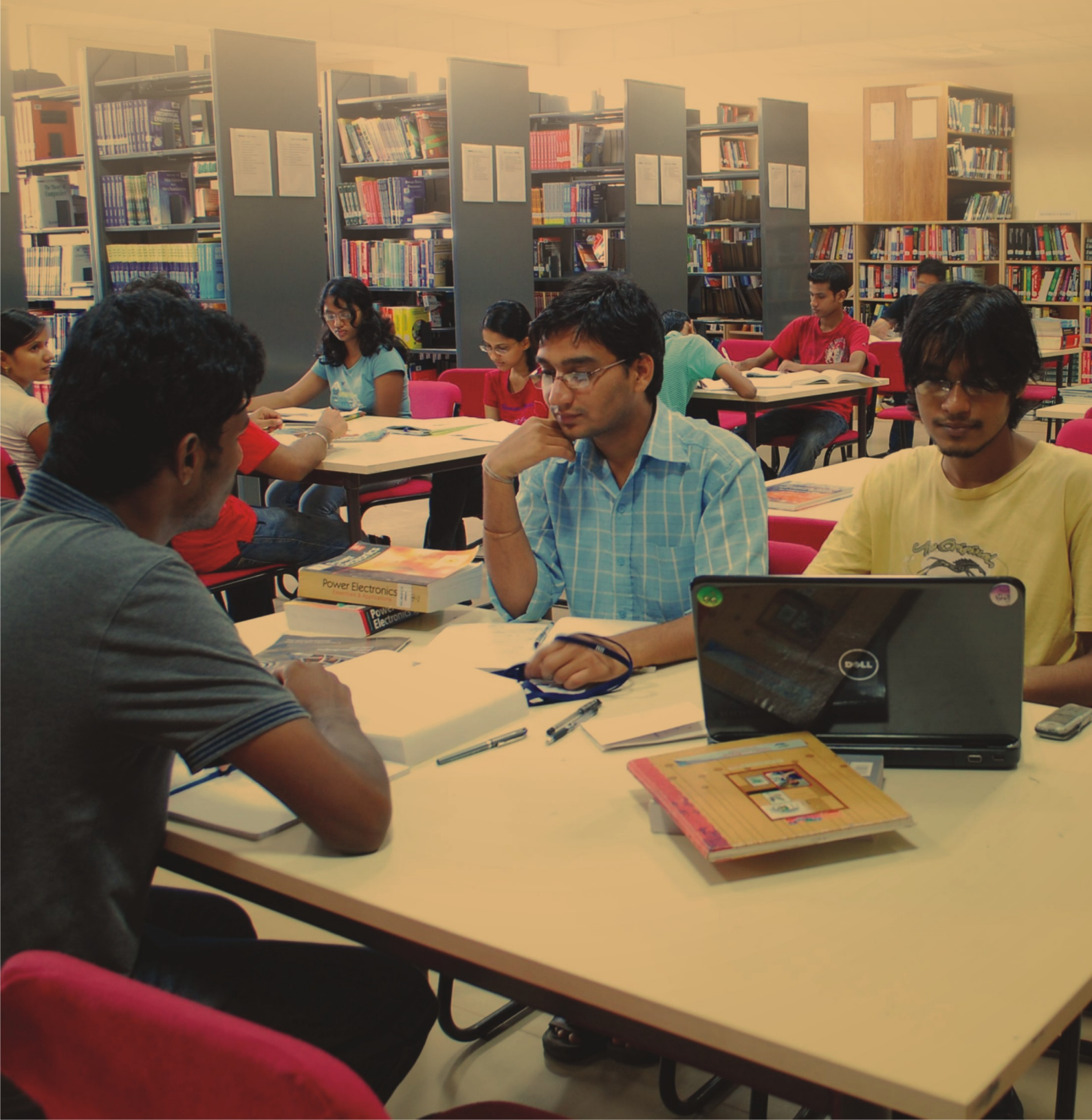
Students who satisfy a minimum academic requirement (CGPA of 6.5 in a scale of 10) and those who complete the UG programme in 4 years are absorbed as Scientists/Engineers 'SC' in various centres of ISRO/DOS. 117 students of the first batch (2007-2011) of the Institute, who satisfied the above mentioned requirement, have been absorbed in various centres of ISRO/DOS.

3.6 BEST PRACTICES IN RESEARCH, CONSULTANCY AND EXTENSION.

3.6.1 Describe the best practices in research, consultancy and extension with reference to promotion of research/publication output/consultancy and extension activities/collaborations?

- The institute provides direct research funding to faculty members based on research proposals amounting to Rs.1521.29 lakhs.
- The institute provides fast-track research projects to the tune of Rs. 10 lakhs to encourage newly joined faculty members. 10 faculty members have been funded under the above programme.
- The institute encourages the faculties to organize/participate in international and national conferences.
- The institute puts no financial limits for faculties to attain international/national conferences.
- All publication charges are covered for all accepted manuscripts.
- The institute has in place a cash award of Rs. 20000 for outstanding publication by the faculty members and students.
- The institute provides a limited number of high valued (ISRO-IIST) fellowship and a number of regular fellowship to all PhD students.
- The institute has provision for enrolling Scientist/ Engineers from ISRO/ DOS centers for their PhD in areas relevant to space science and technology as part of the human resource development programme of DOS.
- The institute has a Post Doctoral Fellowship(PDF) programme.
- Students gain valuable experience in the design of Sounding Rockets and Nano satellites.
- Students especially, from IITs and IISERs spent a month or two in this institute as a part of their summer internship programme.

CRITERION IV - INFRASTRUCTURE AND LEARNING RESOURCES



4.1 PHYSICAL FACILITIES

4.1.1 How well endowed is the university in terms of physical infrastructure? (classroom, administrative buildings, transport, water, power supply, etc., to run the academic programme) Enclose the master plan of the university campus indicating the existing building and the projected expansion in the future

The present campus has about 100 acres providing for several modern and environmentally friendly buildings which blends beautifully with the thick wooded campus located in a valley. Surrounding the valley are scenic hills with thick foliage and vegetation situated on the foot hills of Sahyadri mountains. The Phase-I of the construction activities in the institute, is nearing completion, comprising of major infrastructural facilities such as academic blocks, administrative building and student hostels. At present two academic blocks are completed and functional, while the other two academic blocks, as well as administrative block and the library are expected to be ready in a few months time. Ten hostel blocks are already completed, and the student's activity centre is under construction. Sports facilities, guest house faculty housing and staff quarters are being planned in Phase-2 which will commence shortly. However, several temporary outdoor sporting facilities, some indoor courts and a Gymnasium are available in the present hostel area. While all the four science departments are presently housed in one academic block, the remaining three departments are housed in the other academic block. The institute is well equipped with adequate physical infrastructure. At present it has sufficient class rooms, transport, water and power supply.

Details of buildings of the institute

S. No.	*Name of the Building / Facility*	*Carpet Area (m^2)*	*Status*
1	Department of Aerospace Engineering	6,258	Completed
2	Physical Sciences Block	4,921	Completed
3	Department of Avionics	4,399	Under Construction
4	Department of Inter-disciplinary activities	3,563	Under Construction
5	Administrative Block	2,575	Under Construction
6	Library	2,200	Under Construction
7	Hostel Blocks	14,200	Completed
8	Students Activity Centre	2,800	Under Construction
9	Housing for faculty and staff		Planned in Phase 2

The master plan of the campus is shown in the accompanying figure. The construction activities of phase-1 is going on, where major facilities such as academic blocks,

admistritative building and student hostels are located. Sports facilities and faculty housing are planned in phase-2.

The campus has adequate power supply from Kerala State Electricity Board's grid and is compltely backed by diesel gensets (with a backup of 3.25MW for academic area alone). The institute provides adequate transportation facilty by operating 52 light vehicles and 3 buses for faculty, staff and students. Faculty and officers are provided with light vehicles for convenient commutation from their place of residence to the campus. Institute provides transport facilty to both staff and students for all official purposes (even after regular hours). In addition to this, the institute has few trucks and fork-lift facility for better material handling.

4.1.2 What are the infrastructure facilities available for

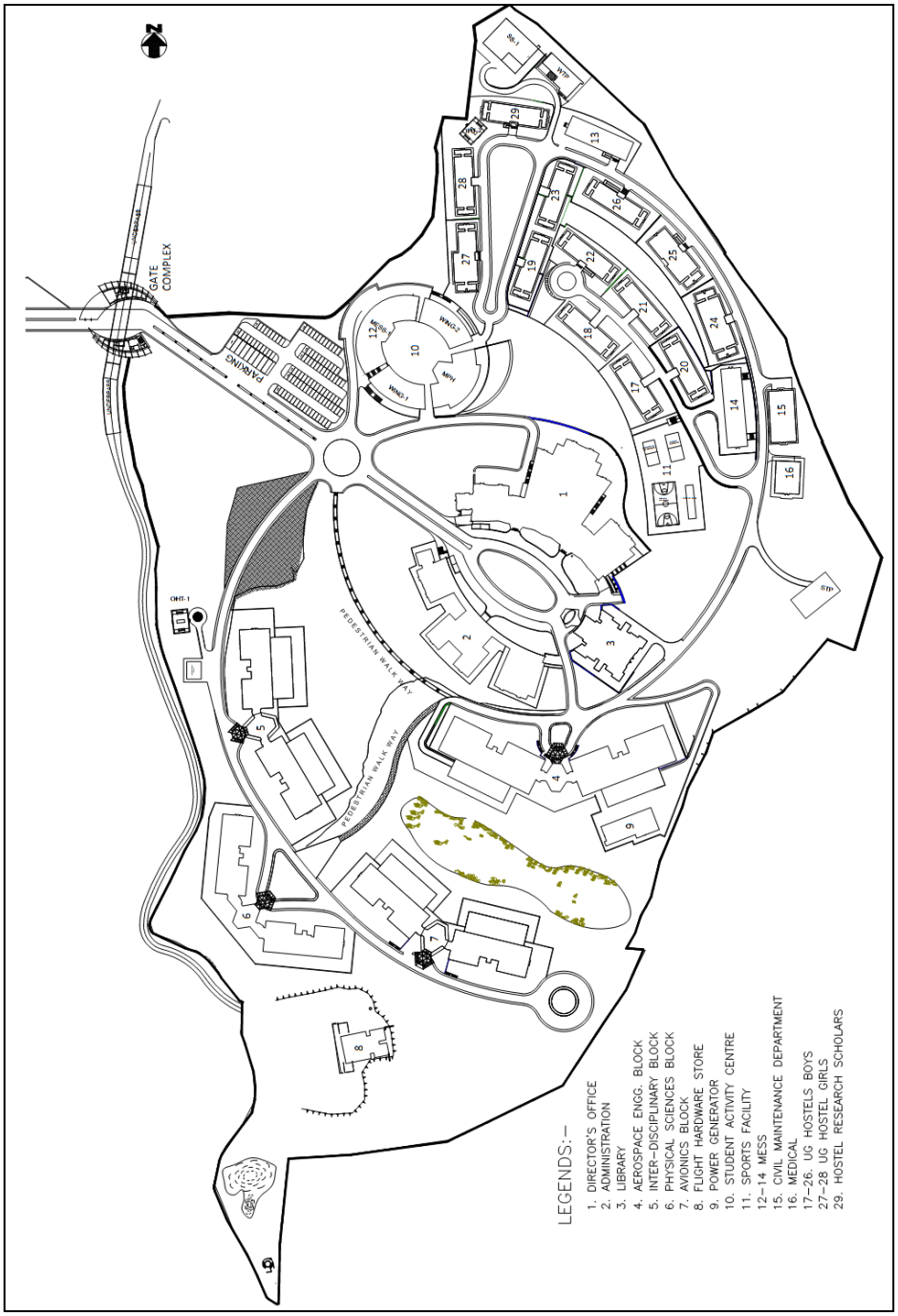
a) Academic activities:The institute has four academic buildings with 19141m^2 carpet area. These buildings have well equipped modern class rooms and laboratories together with necessary furniture and multimedia facilities. These buildings are also covered by campus wide Wi-Fi facility as well as centralised UPS.

b) Co-curricular activities:

The institute's Student Activity Centre (SAC) is in an advanced stage of completion. Students' activities such as fine arts festival "Dhanak", technical festival "Conscientia", institute day celebrations, outreach programmes (IIST@Schools) etc. will utilise this facility.

c) Sports:

The following facilities for sports and games such as basket ball court, volleyball court, cricket practising nets as well as facilities for indoor games such as Table Tennis, badminton, gymnasium are available in the campus for the benefit of students. It is planned to provide for a swimming pool and two large play grounds exclusively for cricket and foot ball during the phase-2 part of construction.


GATE COMPLEX
PARKING
PEDESTRIAN WALK WAY
PEDESTRIAN WALK WAY
OHT-1
WTP
STP
LEGENDS:–
1. DIRECTOR'S OFFICE
2. ADMINISTRATION
3. LIBRARY
4. AEROSPACE ENGG. BLOCK
5. INTER–DISCIPLINARY BLOCK
6. PHYSICAL SCIENCES BLOCK
7. AVIONICS BLOCK
8. FLIGHT HARDWARE STORE
9. POWER GENERATOR
10. STUDENT ACTIVITY CENTRE
11. SPORTS FACILITY
12–14. MESS
15. CIVIL MAINTENANCE DEPARTMENT
16. MEDICAL
17–26. UG HOSTELS BOYS
27–28 UG HOSTEL GIRLS
29. HOSTEL RESEARCH SCHOLARS

4.1.3 Has the institution augmented the infrastructure to keep pace with academic growth? If yes, specify the facilities and the amount spent during the last five years.

A total budget of Rs.278.68 crores is allocated for campus development, and a contract (on turnkey basis) has been awarded to M/s. Shapoorji Pallonji Co. Ltd. Current allocation of budget is given below:

Details of budget allocation for campus development

Year	*Budget Estimate 2012-13*	*Revised Estimate 2011-12*	*Revised Estimate 2010-11*
Budget (in Lakhs)	6,623	6,639	7,601

4.1.4 Has the institution provided facilities like common room, wash / rest room for women students and staff?

Yes. Institute does provide common rooms in all hostels, together with wash / rest room for women students and staff in hostels and academic buildings. Common rooms in hostels are equipped with recreation and entertainment facilities.

4.2. MAINTENANCE OF INFRASTRUCTURE

4.2.1 What is the budget allocation for the maintenance of infrastructure

The budget allocation for procurement is shown below:

Details of budget allocation for procurement

Item	*Budget Estimate 2012-13*	*Revised Estimate 2011-12*	*Budget Estimate 2011-12*	*Revised Estimate 2010-11*
a. Land	335			
b. Building	11,058	6,611	6,564	7,551
c. Furniture	210	2,24.5	100	300
d. Equipment	2,271	2,358.27	2,484	1,368
e. Computers	250	180	199	250
f. Transport	59	28	80	50

All figures in Rs. Lakhs

In addition to the aforementioned figures, an amount of Rs. 2 Crores has been allocated for maintenance works such as minor civil, electrical, horticulture works and equipment installations for the current financial year. The institute has recruited adequate number of trained personal under the civil and electrical maintenance engineering wings for day-to-day maintenance of essential infrastructure.

4.2.2. How is the budget optimally allocated and utilized?

Department of Space, Government of India allocates necessary budget amount for the institute based on requirements. The institute has a budget coordination cell with nominees from all departments and units. This cell ensures the proper planning and utilisation of the budget. Necessary approval of all recommendation is done by the Finance Committee of DoS. This procedure ensures the need based optimum utilisation of budget of the institute.

4.2.3. Are there staff appointed for maintenance and repair? If not, how are the infrastructure facilities, services and equipment maintained?

Institute has a civil and electrical maintenance engineering wing under the supervision of Head Civil and Maintenance Division. This group has qualified supervising engineers / technicians to provide for the maintenance / upkeep of the institute.

4.2.4 How is the infrastructure optimally used?

Besides the regular academic class and laboratory practices, the institute supports a few short term students' internship programmes during summer and winter vacations. Library timings of the institute is planned so as to maximise its utilisation. Institute facilities are also used for invited lectures, demonstrations besides class hours.

4.3 LIBRARY AS LEARNING RESOURCE

4.3.1 How does the library ensure access, use and security of materials?

The library is kept open throughout the year on all working days from 9:00 am to 9:00 pm and from 9:00 am to 5:00 pm on holidays excluding national holidays. The library is kept open from 9:00 am to 9:00 pm on all days (including holidays) around the examination period.

Library ensures access to materials by

- Providing open access system to the collection of documents
- Show casing e-resources through library portal
- Documents are issued using a bar code system and checking is done at the entrance and exit.
- Authorised access to electronic resources is ensured through the institute's network proxy setting (IP enabled access).

4.3.2 What are the facilities available in the library? (Computers, Internet, reprographic facilities etc.)

Library has computers, catalogue nodes to browse the OPAC, and Internet nodes (bandwidth of 1GBps via campus wide network) to browse electronic resources subscribed by the Library. Library has presently binding facility and a heavy duty digital copier machine for enhancing the reprographic facilities. Institute library has provision for Inter Library Loan (ILL) Facility from other libraries of ISRO centres.

4.3.3 How do the library collections cater to the needs of the users?

The collection is developed based on the user needs through active participation of faculty and students. Hence the collection is need based. The library software has the provision for making online suggestion for books / journals from anywhere inside the campus. Books are liberally issued to students. At least one book per course is provided to each student through a Book Bank facility. Books and other resources suggested by faculty of each department is reviewed the library committee.

4.3.4 How does the library ensure purchase and use of current titles, important journals and other reading materials?

Latest catalogues of books and journals are circulated among faculty members who are free to suggest books and journals based on their requirements. This ensures purchase of latest books and journals. As and when new titles are added to the Library collection, users are informed by e-mail about the new arrivals to maximise the use of library resources.

4.3.5 If the library has an archives section, to what extent is it used by the readers and researchers?

The institute is only four year old. Hence at present there is no archival section, though the institute is planning to develop one in the library. The institute does subscribe to e-archives of nearly all significant journal consortiums, making it accessible campus wide to the students and faculty.

4.3.6 How are on-line and Internet services in the library used by students and faculty? Specify the hours and frequency of use

Online and Internet services are available throughout the campus on 24×7 basis. The major e-resources include ACM Digital Library, AIAA, AIP, APS, Annual Reviews, ASME, Cambridge Online, IEL Online (IEEE), JSTOR, Optic Infobase, Oxford Journals, Royal Society of Chemistry, and Science Direct. They are widely used for both undergraduate studies and research. The institute library has its own interactive web portal through which several services are provided, such as reservations, extensions of loan and request for material to be bought.

4.3.7 Are the library services computerized? Does the institution make use of INFLIBNET/ DELNET/ IUC facilities? If yes, give details.

Yes. The library has fully computerised its in-house operations, using open library management software, KOHA.This software provides facilities for users to search any available document and reserve the same, if the same is currently on issue. In addition to other e-resources, the following eight INFLIBNET e-resources are currently being subscribed in the library:

(i) Cambridge University Press, (ii) Royal Society of Chemistry, (iii) Oxford University Press, (iv) JSTOR, (v) AIP, (vi) APS, (vii) Annual Reviews and (viii) MathSciNet

4.3.8 For how many days is the library kept open in an academic year? How many hours is the library open per day?

Library is kept open on all working days except national holidays. It is open 12 hours from Monday through Friday, and 8 hours on Saturdays and Sundays. During examinations, the library is kept open for 12 hours even during Saturdays and Sundays. Institute is actively considering a 24×7 access to the library once it is shifted to its permanent building.

4.3.9 Does the library have an advisory committee? What are its functions?

Yes. The Library Committee, headed by a senior faculty member and having members from all departments and student members, decide on policy matters, collection and development, e-resources and matters related to library services.

4.3.10 Amount of money spent for new books, journals during the last five years?

Details of budget allocation for library (Figures in Rs.)

	2007 - 2008	*2008-2009*	*2009 - 2010*	*2010-2011*	*2011 – 2012*
Books	14,14,966	46,87,706	13,81,456	50,96,608	25,46,815
Journals		3,51,767	3,65,804	4,65,882	`40,375
Electronic journals / resources			17,97,900	1,33,65,633	1,06,07,426

4.3.11 How does the library motivate students/ teachers to read existing and new arrivals?

Online Public Access Catalogue (OPAC) is deployed in the campus network on 24 × 7 basis to showcase the existing documents. The library portal displays the new arrival list. Members are informed through e-mail as and when new books are added. All e-resources are available through a single gate way with facilities for resource search. Users can also make reservations for issue of Books which are on issue, and are informed of the status by Email.

4.3.12 What are the special facilities offered by the library to the visually challenged and physically challenged person? How are they used?

At present there are no visually challenged users. However, the institute is actively considering introducing necessary facilities for the visually challenged persons in the library once it is shifted to its own premises. Library infrastructure will cater the needs of physically challenged persons in its permanent building, by providing for ramps and lifts.

4.3.13 List the infrastructure

- Computer enabled document search
- Separate reference and lending facilities
- Reprography and binding Facility

  Following facilities are being planned for the permanent library building
- Stack Facility to house 1.5 lakh books in different stacks spaces of the library with adjacent reading desks.
- Text Book Reading Facility
- Reference Facility
- Book Bank Facility
- Journal Display cum Reading Facility

- Technical Support Facility equipped with a heavy duty networked Xerox Machine and Binding Facility
- Browsing Facility to use e-resources (electronic journals, electronic books etc.).
- Discussion Rooms
- Multimedia Room to view multi-media resources
- Digital Library Facility
- Study Carrel Facility
- New Books Display cum Reading Facility
- Check out / Check in facility
- Help Desk Facility
- New Books Display Facility for Vendors

4.4 ICT AS LEARNING RESOURCES

4.4.1 How is the computer facility extended to all faculty and students?

The campus has an advanced computing facility, adequate number of terminals, a campus wide Wi-Fi network and 1GBPS high speed internet facility. Following are highlights:

Computing Facility: High Performance cluster server having 3 Terra flop speed (32 HP Blade servers having 64 Dual Quad Processor). Storage -1.20 TB SAN Storage with NAS Header. Tape Library with Backup software.

Campus Automation Servers: 8 Servers with 4CPU/Dual CPU

High Performance Computing Lab: High-end Work Stations (Quad Core Processor with 72 GB RAM , 4GB NVIDIA Graphic Card Memory and 30 inch LCD Monitor), installed with several advanced engineering and scientific software.

Programming Lab: A programming lab for UG students with 64 Desktop Computers and Digital Printers

Internet lab: An internet lab for the use of UG students with Desktop Computers and Digital Printers

In addition to these facilities

- Each department has separate computer labs
- Faculty members are provided with a laptop and a desktop
- Research scholars and staff are provided with desktops.

Internet and campus network connectivity:

BSNL is the Internet service provider for the institute and facilitates 34MBPS through the National Internet Backbone (NIB). Institute also has 1GBPS internet connectivity through the National Knowledge Network (NKN).

Institute has a Campus Wide Area Network based on a 1GBPS Backbone Network and 100/1000 MBPS Distributor Networks and 802.11 n Wireless Networks. Institute extends all its ICT resources to students and faculty through this Campus Network.

A summary of ICT accessories of the institute

S. No.	Equipment	Academics	Class Rooms	Labs	Scholars	Library	Common-Infrastructure	Service	Admin	Total
1	Desktop PC	70		264	15	10		3	25	387
2	Laptop PC	75			14	1		2	12	104
3	Work Stations	2		12						14
4	Servers						16			16
5	Server-Blades						40			40
6	Projectors	4	8					3	4	19
7	Printer									106
8	HD Printer							1		1
9	MF Printer	3							3	6
10	Colour Printer	1							4	5
11	Digital Copier	8							8	16
12	Core Network Switch						2			2
13	Distribution Network Switch						9			9
14	Access Network Switch						22	2		24
15	Wireless Network Access Point						142	72		214
16	UPS-100KVA						1			1

17	UPS-20KVA						1			1
18	UPS-10KVA			2			2	1		5
19	UPS-6KVA			4				1		5
20	UPS-2KVA			2						2
21	UPS-1KVA						20			20
22	UPS-.6KVA						20			20

4.4.2 How are the faculty facilitated to prepare computer aided teaching/ learning materials? What are the facilities available in the university for such efforts?

The faculty members make use of multimedia facilities available in all class rooms for computer aided teaching. Institute proposes to build a smart class room in each of its academic blocks. Currently one such smart class room with multimedia / video recording is under development in the Physical Sciences block. This is planned to be connected to the NKN grid for open courseware.

4.4.3 Is there a central computing facility? If yes, how favourable are its timings, access and cost to both students and faculty?

Yes. The schedule is quite favourable for students and faculty and the access is free of cost. The high performance computing facility (3 Terra Flops M/c.) is available to the students and faculty free of cost on 24 × 7 basis.

4.4.4 How are the computers and its accessories maintained in the department?

The institute has a Computer and System administration Group (CSG). This group is headed by a System Administrator and has qualified engineers / technicians to maintain the network, computers and accessories. There is a committee headed by a faculty member to oversee the computer related activities of the institute.

4.4.5 What is the output of the various departments in developing packages for their discipline?

The institute has developed its own package for online application and all aspects of the admission process for the conduct of the All India Entrance Test (IIST Admission Test-ISAT). In addition to this, all departments of the institute are in the process of developing relevant applications packages for their academic needs.

4.5 OTHER FACILITIES

4.5.1 How many students stay in the hostel? How many rooms are there in the hostel? Is the accommodation sufficient to meet the demand?

This institute is a fully residential campus and all students have to stay in the hostel. At present the institute has sufficient rooms in the hostels. The following table provides the number of hostel inmates (men and women)

Details of institute's hostel facilities

S. No.	*Hostel Name*	*No. of Students Staying*	*No. of Rooms*
1	Dhruva (H1)	116	58
2	Dhanistha (H2)	32	60
3	Chithra (H3)	54	58
4	H5**	-	58
5	H6	-	58
6	Rohini (H7)	58	58
7	H8**		58
8	H9**		58
9	Aswini (H10)	116	58
10	Ardra (H11)	116	58
11	Phalguni (H12)	51	58
12	Anuradha	0	58
13	Arundhathi (H14)*	77	58
	Total	***620***	***756***

**Women's Hostel* ***Hostels are under construction*

4.5.2 What facilities are provided in the hostel?

- Fully furnished accommodation.
- Well managed and hygienic student mess.
- Kiosk [Cafeteria]
- High Speed Wi-Fi enabled internet facility.
- Gym and Fitness Club with a full time fitness instructor.
- Laundry Facility [washing machines and Dryers installed in the Hostels along with power laundry collection points]
- 24×7 Medical Services.
- Purified Hot and Cold water dispensers.
- 24 Hrs uninterrupted Electricity and Water Supply.
- Union Bank of India with ATM facility.

- LCD Television with Satellite Connection in all the hostels.
- Newspapers
- Outdoor sports facilities including Cricket nets, Basketball, Volley Ball etc.
- Indoor Games [Carom Board, Table Tennis etc.]
- Housekeeping Services.
- Music club with all modern musical instruments.
- Transport service to the city in the weekends and holidays.
- 24×7 support of the technical team from the CMD in rectifying the issues pertaining to electricity, plumbing, sanitation etc. in the hostels.
- 24×7 Ambulance facility.

4.5.3 What are the facilities provided by the health center?

At present the institute has a well equipped FIRST-AID Medical Centre manned by four Medical Officers, four nurses and four medical attendants to cater medical aid to students, faculty members and supporting staff on all days including holidays. Individual medical reports of the students are kept in the outpatient level as well as the inpatient level. The institute has 4 observation beds and other equipments and instruments to tackle minor surgical procedures and mild medical emergencies On an average, in a month, doctors see about 396 no. of patients. M/s. Ananthapuri Hospitals and Research Institute situated in Trivandrum city has been recognized by the institute for specialized OPD consultation and it has provision to admit our students as inpatients. The institute provides Comprehensive medical coverage through a special scheme and is free of cost (extent of coverage). The institute undertakes the emergency medical treatment of the faculty and contract workers, while a thorough periodical medical checkup is mandatory for canteen boys, cooks and food handlers.

4.5.4 What are the physical and infrastructure facilities available for the sports and physical education centre?

Institute promotes the sports and physical education. Institute has separate physical education instructors for both men and women.

At present the sporting facilities available in the campus are:

- Basket ball court
- Volleyball court and beach volleyball court
- Cricket practicing nets
- Gymnasium (separate men and women)
- It is planned to provide a swimming pool and two stadia exclusively for cricket and football in the phase-2 part of construction activities.

4.5.5 How does the institution ensure participation of women in intra and inter institution sports competitions?

The institute organises competitions in various games and the spirit is maintained through inter-house competitions. The institute provides coaching sessions in various games such as basketball and volleyball. The indoor facilities include TT tables, fitness centre, and board games such as Chess and Caroms. The women students also participate actively in the annual sports meet of the institute. Students are also trained in fitness programmes. The best outgoing student is selected also based on their performance in sports activity.

4.5.6 Does the institution have a workshop / instrumentation centre? If yes, what are the physical and infrastructure facilities available in the centre?

Institute does not have a centralised workshop / instrumentation centre at present. However, Institute has a central workshop well equipped with all conventional and CNC machine tools which is being used by the UG students across all disciplines. Most of the instruments currently are under Annual Maintenance Contract (AMC). This is being coordinated by the respective departments. In the long run, depending up on the need, the institute may setup a centralised instrumentation centre to carry out above mentioned activities.

4.6 BEST PRACTICES IN THE DEVELOPMENT OF INFRASTRUCTURE AND LEARNING RESOURCES

4.6.1. Describe the best practices for the development of infrastructure and learning resource adopted by the college with reference to physical facilities and its maintenance / library as a learning resource / ICT as learning resource and other facilities to create learning ambience?

Annual expenditure for e-journal subscription in the library is Rs1.38 crores.

Physical Facilities

- Campus has Wi-Fi enabled internet facility.
- Ensuring a balanced collection of learning resources with the participation of faculty and students.
- Keeping the collection in a cataloged way so as to facilitate easy retrieval of the library books / journals.
- Providing free and open access to the book collection.
- Providing computers for searching Library catalogue.
- Providing computers for accessing electronic resources.
- Policy for liberal lending of books and resources.
- Inter Library Loan (ILL) Facility from other libraries of ISRO/DOS centres. Provision for online acess to all ISRO libraries available form the insititute.
- Provision for urgent procurement on request.
- Book bank providing at least one title per student per course.
- Communications skill development laboratory.
- Smart class rooms with multimedia support / video editing facility for content generation / content delivery.
- National Knowledge Network (NKN) connectivity to access open courseware.

Reading / reference facilities

- Showcasing new books.
- Providing library catalogue (OPAC) through intranet.
- Providing self operated user services through the OPAC.
- Self contained library portal in the intranet.

- Providing all e-journals through a single gate way through the library portal with extensive search facilities.
- Uploading list of new arrivals in the library portal.
- Organising User familiarisation programmes.

Computing facilities

- All administration and accounts are computerized.
- High performance computing cluster with three teraflop computing speed.
- Programming lab with 60 computers.

Transport facilities

Efficient transportation facilities are provided on demand for both faculty and studen

CRITERION V-STUDENT SUPPORT AND PROGRESSION

5.1. STUDENT PROGRESSION

5.1.1 What is the student strength of the institution for the current academic year? Give the data gender-wise, state-wise and nationality-wise, along with analysis and comments?

Student Enrolment	UG			PG			M.Phil.			Ph.D.			Diploma / Certificate			Self - Funded		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
Number of students from the same state where the institution is located	32	6	38	7	11	18				12	15	27						
Number of students from other states	491	55	546	9	2	11				18	7	25						
Number of NRI students																		
Number of overseas students																		

5.1.2 Details of last two batch of students and their profile (SC/ST, OBC, BC, General etc.) prefixing the Socio-economic profiles also.

2010-11

Name of the course	Students enrolled -2010										Grand Total
	GEN		SC		ST		OBC		Total		
	M	F	M	F	M	F	M	F	M	F	
B.Tech Aerospace	25	1	9	0	4	0	13	0	51	1	52
B.Tech Avionics	28	10	9	0	1	0	11	2	49	12	61
B.Tech Physical Science	27	2	3	2	0	0	1	0	31	4	35
Total	**80**	**13**	**21**	**2**	**5**	**0**	**25**	**2**	**131**	**17**	**148**
Grand Total	**93**		**23**		**5**		**27**		**148**		

2011-12

Name of the course	Students enrolled -2011										Grand Total
	GEN		SC		ST		OBC		Total		
	M	F	M	F	M	F	M	F	M	F	
B.Tech Aerospace	34	0	9	0	4	0	12	0	59	0	59
B.Tech Avionics	34	2	9	0	3	1	7	2	53	5	58
B.Tech Physical Science	12	1	5	0	3	0	0	0	20	1	21
Total	**80**	**3**	**23**	**0**	**10**	**1**	**19**	**2**	**132**	**6**	**138**
Grand Total	**83**		**23**		**11**		**21**		**138**		

5.1.3 What percentage of the students on an average progress to further studies? Give details for the last five years

Not Applicable.

5.1.4 What is the dropout rate for the different years after admission?

Details of dropout among B.Tech students

Admission Year	*Dropout in 2008*	*Dropout in 2009*	*Dropout in 2010*	*Dropout in 2011*	*Total*
2007	-	3	2	1	6
2008	-	-	2	-	2
2009	-	-	-	-	-
2010	-	-	2	1	3
2011	-	-	-	-	-
Total	***-***	***3***	***6***	***2***	***11***

There is no dropout of students from M.Tech

5.1.5 What proportions of the graduating students have been employed for the last three years? Provide placement record for the last three years.

126 students completed B.Tech in 2011. 117 were absorbed in various ISRO/DoS centres; placement details are given below.

Centre	*Aerospace*	*Avionics*	*Physical Science*	*Total*
ISAC	15	24	10	49
LPSC	9			9
SCL	2	4		6
SDSC	2	3		5
VSSC/IISU	13	10		23
ADRIN		2		2
ISTRAC		3		3
MCF		3		3
SAC		5	4	9
IIRS			1	1
PRL			3	3
NRSC			4	4
Total	***41***	***54***	***22***	***117***

5.1.6 How many students appeared / qualified in UGC – CSIR –NET, SLET, IAS. GATE / CAT / GRE / Tofel / GMAT / Centarl / State services, etc. through Competitive Examinations (last two years).

Not Aplicable

5.2. STUDENT SUPPORT

5.2.1 Does the institution publish its updated prospectus and handbooks annually? If yes, what are the information contents disseminated to students?

Yes. The institute brings out an annual hand book which has the following information:

Student admission rules,
Disciplinary rules,
Award of Assistanceship rules,
Medical scheme for students,
Evaluation of performance,
Guidelines for candidates appearing for the end semester examination,
Anti ragging measures as mandated by UGC, etc.

5.2.2 Does the Institution provide financial aid to students? If yes, specify the type and number of scholarships /free- ships given to the students last year?

Undergraduate Programme

Every student pursuing UG programme meeting certain minimum academic requirement (GPA of 6.0 in a scale of 10) are given assistanceship to the tune Rs.49,000/- per semester covering.

i.	Statutory Semester Fees	: Rs. 20,000/-
ii.	Student Amenity Fees	: Rs. 4,000/-
iii.	Hostel Charges including dining	: Rs. 12,000/-
iv.	Establishment Charges	: Rs. 8,000/-
v.	Medical Coverage to Students	: Rs. 2,000/-
vi.	Book Grant	: Rs. 3,000/-

A student not securing a GPA of 6.0 in a given semester will pay Rs.22,000/- towards Hostel Charges including dining, Establishment charges and Medical cover.

Postgraduate and PhD Programmes

No assistanceship towards accommodation and dining is provided to students in PG and Ph.D. programmes. However, the fee towards tuition, establishment and medical cover are completely covered by the institute.

There are three categories of Ph.D. fellowships in the institute receiving different assistanceships, namely:

- ISRO-IIST Fellowship : Rs. 35,000/- per month(maximum of 5 per year)
- IIST Fellowship
  - (a) For candidates in Science and Humanities with Masters degree in Science or Arts as their qualifying degree: Rs.16,000/- per month and enhancement to Rs. 18,000/- per month after two years.
  - (b) For candidate in Science and Engineering with Masters degree in Engineering / Technology as their qualifying degree: Rs.18,000/- per month and enhancement to Rs. 20,000/- per month after two years.
- ISRO/DoS Sponsored Candidates: Nil

5.2.3 What types of support services are available to overseas students?

Not Applicable

5.2.4 What support services are available to SC/ST students?

Reservation according to the Govt. of India rules (15% for SC and 7.5% for ST) is followed for admission to institute, based on relaxed criteria. All students including SC/ST students get financial assistance upto Rs. 49,000/- every semester. The slow-learners among the first year students (which may consist some of the students from the SC/ST) of the B.Tech. programme are provided additional learning support in the form of remedial classes outside the regular class hours and contact hours with the faculty.

5.2.5 What are the supports services made available to differently-abled students?

3% of the seats are reserved for differently-abled students, as per Govt. of India rules. All the hostels of the institute are equipped with disabled access ramps located adjacent to steps. The institute is planning to make disabled access facilities in all the academic blocks.

5.2.6 Does the institution offer placement and counseling services to students?

Yes. The students of the institute who successfully complete the UG program in four years and secure a CGPA of 6.5 in a scale of 10 are absorbed in various ISRO/DOS centers as Scientists / Engineers SC. Placement counseling is organized for passing out students with participation of Directors from various ISRO/DOS centers. The placement is carried out considering the students preference, performance and availability at respective centers.

5.2.7 Is there a counseling service for women students?

Yes. Women cell is giving separate counseling for women students.

5.2.8 Does the faculty participate in academic and personal counselling? If yes, how many have participated last year?

Yes. Institute has a 'mentoring system' for counseling for all first year students. All faculty members are involved in the mentoring system. Each student can approach their concerned faculty mentor any time, personally or over phone, and get guidance on their personal and academic issues.

5.2.9 Has the employment cell encouraged students to be self-employed during the last five years?

Institute is initiating a placement cell for those who are not meeting the minimum requirements for getting selected to the ISRO/DOS centers.

5.2.10 Does the institution have an alumni association? If yes, what are its activities?

The institute is yet to have an active alumni association since the first batch passed out only seven months back. However, the institute is initiating measures to form an alumni association shortly.

5.2.11 List the names of top 10 most renowned Alumni of the University along with their designation?

Almost all of our students are placed in various ISRO/DOS centers.

5.2.12 Are the alumni contributing to the development of the institution? If yes, Please specify how?

The alumni have been associating in the development of the institute by assisting the final year projects of the students, satellite and launch vehicle projects etc. Their contribution to the institute is expected to be expand in the coming years.

5.2.13 Does the institution have a grievance redressal cell? If yes, what are the functions?

Yes. A committee under the chairmanship of the Registrar, IIST, addresses all grievances from the students. Director, IIST is the highest appellate authority for grievance redressal. A Student Activities Board (SAB) has been formed under the chairmanship of Dean, Student's Activities, to monitor and recommend suitable measures for the general students' welfare with proper mechanism to obtain student feedback on all relevant matters. The institute provides for suggestion box as part of the redressal mechanism. As far as grievances on academic results are concerned, the students can apply for re-evaluation of their answer scripts within a specified period from the date of publication of results.

5.2.14 List the number of grievances redressed during the last two years.

The institute has not encountered any major grievances from students till date. Minor issues arising from time to time are resolved through the above mentioned mechanism, and other channels such as mentorships.

5.2.15 Is there a provision for welfare schemes for students? If yes, specify.

Yes. The welfare scheme for students include,

- Complete medical coverage,
- Complete assistanceship for studies including tuition, boarding and lodging.

5.2.16 What were the specific measures initiated by the institution to enhance the quality of education with reference to student support and progression?

i. Internship/project program in various research institutions and laboratories in India and abroad
ii. Opportunity for interacting with reputed scientists
iii. Weekly invited lectures named 'Wednesday lectures' on various topics
iv. Neuro linguistic programmes for the students

v. Opportunities for students to work with reputed scientists in various ISRO/DOS laboratories
vi. Several social outreach opportunities.

5.2.17 Is there a cell to prevent Sexual Harassment? How effective is the cell?

Yes. Issues of sexual harassment come under the purview of Women's Cell of the institute, constituted as per the directives of the Government of India. Any issue of sexual harassment reported to the women's cell is promptly addressed and resolved.

5.2.18 What are the efforts to provide legal literacy to women?

The IIST Women's Cell was legally constituted as per Vishakha Guidelines in the year 2008. The cell comprises of a chairperson, who is an IIST faculty and six members. The members include three faculty members, administrative officer, lady student representative and a member from a reputed NGO. The chairperson of the Women's cell processes a degree in law and provides assistance to women in need of legal help.

Women's Cell has organized a seminar on "Women's Rights are Human Rights by Smt. Aleyemma Vijayan, Director, Sakhi Women's Resource Centre, Thiruvananthapuram on 22nd April 2009 for the students, faculty and staff of IIST.

5.3. STUDENT ACTIVITIES

5.3.1 What are the incentives given to students who are proficient in sports?

i. Every year institute encourages sporting activities through awards for best female and male sports person.
ii. Every year an all-rounder award is given to a student proficient in academic, sports as well as cultural activities.
iii. Encourages and supports the participation of students in regional and national sports meets.
iv. Two Physical education teachers (1 male and 1 female) have been appointed for proper coaching guidance
v. Training programmes by outside experts for proper directions
vi. Institute conducts an Annual Sports Day.
vii. The institute bears the cost of procuring and maintaining all sports goods and facilities for the students

Sports facilities in IIST

The second phase of the campus is under construction. A full-fledged sports utility complex is coming adjacent to the campus with all modern facilities in sports. The following table shows the available infrastructure at present for sports in IIST.

Name of the Sport	*Available infrastructure*	*Alternate arrangement*	*Future plan*
Cricket	Cricket pitch, Team coaching, All cricket equipments available	Agreement with VSSC Central School, Mancha Technical school and GV Raja Sports school for using grounds	Full fledged cricket ground

Basketball	Full fledged open basket ball court in IIST. Team coaching and equipments		Indoor basketball court
Football	Team coaching and equipments	Agreement with VSSC Central School, Mancha Technical school and GV Raja Sports school for using grounds	Full fledged football ground
Badminton	equipments for badminton		Indoor badminton court
Volleyball	Volleyball court, Team coaching, equipments		Indoor volleyball court
Table Tennis	Equipments, Team coaching		Professional coaching and dedicated court
Athletics (various events)	Coaching for various athletics events, equipments	GV Raja Sports School	Full fledged athletics track
Physical fitness	Multi Gym, Training		Full fledged most modern multi gymnasium.

5.3.2 Give details of the participation of the students in sports and the outcome, at the state, regional national and international levels, during the last five years.

Inter-collegiate events

The institute team is participating various inter collegiate tournaments organized by different institutes. The list of events that IIST team had participated is given below.

Date	*Event*	*Result*
11th January 2012	All India Inter Collegiate Volleyball tournament in College of Engineering, Pune, Maharashtra	Semifinal
11th January 2012	All India Inter Collegiate Cricket tournament in College of Engineering, Pune, Maharashtra	Third Round
11th January 2012	All India Inter Collegiate Sevens Football tournament in College of Engineering, Pune, Maharashtra	Third Round
7th March 2011	Inter collegiate Basket ball tournament in Mohandas College of Engineering,	Third Round

	Trivandrum	
28th February 2011	Inter collegiate Basket ball tournament in PA Aziz college of Engineering and Technology, Trivandrum	Second round
23rd February 2011	Inter collegiate Basket ball tournament in Marian Engineering College	Semi finalist
16th February 2011	Inter collegiate Basket ball tournament in TKM Engineering College, Kollam	Second round
22nd January 2011	All India Inter Collegiate Cricket tournament in College of Engineering, Pune, Maharashtra	Second Round
22nd January 2011	All India Inter Collegiate Badminton tournament in College of Engineering, Pune, Maharashtra	Second round
22nd January 2011	All India Inter Collegiate Basketball tournament in College of Engineering, Pune, Maharashtra	Semi Final
4th October 2010	Inter collegiate Basketball tournament in Mar Ivanious College, Trivandrum	Second round

5.3.3 How does the institution collect feedback from students for improving the support services?

All services including sports, library, hostel and canteen services are managed by committees consisting of faculty members, managers of the relevant services and student members. Student representatives also form part of the Students Activities Board, which includes the members from sports, cultural, and canteen and hostel committees. The students thus have a say in all decisions regarding services in the institute.

5.3.4 Does the institution collect feedback from employers? If yes how is the feedback used? Illustrate the outcome.

As of now ISRO/DOS remains the sole employer of students passing out from the UG programme. The institute has an active participation of ISRO/DOS in designing its academic curriculum. Several ISRO/DOS scientists also serve as members of various Boards of Studies in the institute.

5.3.5 Furnish information regarding the participation of students in extracurricular activities and recreational activities?

i. Every year students organize the intercollegiate cultural fest named Dhanak and technical fest named Conscientia.
ii. About 60% students participate in Annual Sports Meet.
iii. Yoga classes are being organized regularly by the institute for the students
iv. Several festivals are celebrated with fun and fervor in the institute.

v. Several students also participate in sports meets, technical and cultural festivals organized in other institutions in India.

5.4. BEST PRACTICES IN STUDENT SUPPORT AND PROGRESSION

5.4.1 Describe the Best practices in student support and progression practiced by the college in terms of student progression / student support / activities.

- A student's activity board functions under the chairmanship of the Dean, Students Affairs to coordinate various student activities of the institute such as sports, library, cultural, canteen and hostel committees.
- Mentoring system for students
- The slow-learners among the first year students of the B. Tech program are provided additional learning support in the form of remedial classes outside the regular class hours and contact hours with the faculty.
- Financial and Medical assistanceship are for all students.
- Encouragement and support to students' academic and co-curricular activities.
- Students play an active role in blood donation and social service campaigns.
- Various clubs like, Voxmateria, Physics club, Astronomy club, Quiz club, Literary club, Movie club, Music club, etc., are also active in the institute.
- Competent doctors and necessary support are available around the clock in the campus for the benefit of the students.
- For major medical emergencies, the institute has a tie-up with a state-of-art hospital/nursing home located in the city to which a student can get admitted.
- Physical education trainer for both boys and girls are separately available.
- Sports facilities (basket ball court, volley ball court and cricket net practice) are available in the campus.
- Well-equipped multi-gymnasium is available

CRITERION VI-GOVERNANCE AND LEADERSHIP

6.1 INSTITUTIONAL VISION AND LEADERSHIP

6.1.1 Does the mission statement define the institution's distinctive characteristics in terms of addressing the needs of the society, the students it seeks to serve, institution's traditions and value orientations, vision for the future etc.?

Yes. The mission statement of the institute does define its distinctive characteristics in terms as indicated above

- To create a world class educational institute of excellence having an unique aim of integrating under graduate/post graduate programmes in space science, space technology and space applications relevant to national R&D goals.
- The institute is open to all persons of whatever race, religion, creed, caste, class and geographical area of the country. No test or condition is imposed regarding religious belief or occupation in admitting or appointing members, students, teachers, workers etc.
- No capitation fee is charged in any form for admission.

6.1.2. What are the goals and objectives of the institution? How are they made known to the various stakeholders?

- The institute's long term goal is to become a world class educational and research institution contributing significantly to the Space and National R & D endeavors.
- Creation of an enriching environment of academic and research excellence aimed at fostering holistic development through science and technology, with a focus on space science & technology.
- To impart knowledge and skill in the challenging field of space science and technology and related fields with an aim to emerge as an international leader as well as to actively support the national needs through, education, research, development and manpower.
- The Institute has the unique mandate of encouraging and equipping brilliant youngsters from all parts of the country to take up a career as Scientist/Engineer in ISRO/DoS.
- The goals and objectives are widely publicized through the institute website and by displaying the same in prominent places inside the institute. Furthermore, the goals and objectives of the institute are also communicated to the prospective students and parents during admission.

6.1.3 Does the institution have a mission statement and goals reflecting quality? If yes, give details.

Yes. The Mission Statement is as follows:

- Create a unique learning environment enriched by the challenges of the Space Programme and related fields.
- Nurture the spirit of innovation and creativity.
- Establish Centres of Excellence in niche areas.
- Provide ethical and value based education.
- Promote activities to address societal needs.
- Network with national and international institutions of repute.

Creation of a unique learning environment of academic and research excellence having a focus on space science and technology and related fields with a harmonious and healthy blend of personal and professional values, social responsibility, ecological concerns and inclusiveness.

Establish "Centers of Advanced Research" in niche areas like (i) Virtual Reality, (ii) Advanced Propulsion & Laser diagnostics and (iii) Nanoscience & Technology which will cater to the national R&D needs.

6.1.4 What measures has the institution taken to translate quality to its various administrative and academic units?

The following measures are put in place by the institute for its faculty members to enhance their professional competence and consequent quality.

- Provision to direct research funding to the faculty by the institute.
- Provision for a Fast Track Research project to the tune of Rs.10 lakhs for new faculty members.
- Full coverage of journal publication charges of any accepted manuscript of the faculty.
- A cash award of Rs.20,000/- for the faculty for publishing in high impact journals.
- Sabbatical leave to participate in research / academic activities both Nationally and Internationally and study leave to pursue higher studies.
- Financial Support for participating / presenting / organizing International & National Conferences / Seminars in India & abroad.
- Organization of Faculty Development Programs in different areas and specializations.
- In-service training.
- Quality of teaching in the departments is enhanced through student feedback system.
- Access to 3475 journals, and 13863 books.
- The institute encourages its faculty members to write books and lecture notes for the benefit of the students and the fellow faculty members.
- The IQAC monitors the overall activities in the institute to sustain and enhance quality.

As far as the non-teaching administrative staff is concerned, they are all well experienced and their selection / promotion is through critical review / assessments as per UGC norms.

6.1.5 What are the leadership functions of the Head of the Institution? How is the leadership system established in the university?

The Director is the Head of the Institution and is responsible for the academic and administrative governance of the institute. He is the Principal Executive Officer of the Institute and shall exercise general supervision and control over the affairs of the institute and is mainly responsible for implementation of the decisions of all the authorities of the Institute. The Director is the Ex-officio Chairman of, the Academic Council, the Finance Committee, the Planning & Monitoring Board and the Selection Committee. Director ensures that Regulations and Rules of the Institute are duly observed and implemented; and, he/she has all the necessary powers in this regard.

All powers relating to the proper maintenance and discipline of the Institute are vested with the Director. The Planning & Monitoring Board is the principal Planning Body of

the Institute and is responsible for the monitoring of the development programmes of the Institute. The Planning & Monitoring Board would advise the Board of Management and the Academic Council on any matter which it considers necessary for the fulfillment of the objectives of Institute. The recommendations of the Planning & Monitoring Board is placed before the Board of Management for consideration and approval. Proposals relating to the academic matters may be processed through the Academic Council.

The Director is ably helped by the Registrar, three Deans, and IQAC coordinator. The Registrar is appointed by the Board of Management and is directly responsible to the Director and works under his direction. The Registrar is the ex-officio Secretary of the Board of Management, the Academic Council and the Planning and Monitoring Committee. The duties of the Registrar are

(i)to be the custodian of the records and the funds and such other property of the Institute,(ii) to conduct the official correspondence on behalf of the authorities of the Institute,(iii) to issue notices convening meetings of the authorities of the Institute and all Committees and sub-Committees appointed by any of these authorities, (iv) to maintain the minutes of the meetings of all the authorities of the Institute and of all the Committees and sub-committees appointed by any of these authorities, (v) to make arrangements for and supervise the examinations conducted by the Institute, (vi) to represent the Institute in suits or proceedings by or against the Institute, sign powers of attorney and perform pleadings or depute his/her representatives for this purpose, (vi) to enter into agreement, sign documents and authenticate record on behalf of the Institute, (vii) to make arrangements to safeguard and maintain the buildings, gardens, office, canteen, cars and other vehicles, laboratories, libraries, reading rooms, equipment and other properties of the Institute, (viii) to perform such other duties as may be specified in the Rules or as may be assigned by the Board of Management or the Director from time to time.

The institute presently has three Deans namely, Dean (Academic), Dean (Research & Development) and Dean (Student Activities) who report directly to the Director.

The Dean (Academic) assists the Director with the Heads of Departments and the faculty members of the institute on all academic matters. All Heads of Departments directly report to Dean (Academics). As custodian of all academic matters, the Dean (Academic) interacts closely with the Academic Council and the respective Board of Studies on all aspects of curriculum change by taking suitable suggestions/inputs from the faculty members and the Heads of Departments. The Dean (Academics) also advises the Director on the need for initiating new UG/PG programmes in the institute. The Dean (Academics) plays a very important role in faculty selection by helping with the short listing of the candidates to be called for interview and playing a critical role in the faculty selection committee.

The Academic Council is the principal academic body of the Institute and has the control over as well as the responsibility for the maintenance of standards of teaching, research and training, approval of syllabus, coordination of research activities, examinations and tests within the Institute and exercises such powers and perform such other duties and functions as may be prescribed or conferred upon it by the Rules of the institute. The Academic Council is chaired by the Director and consists of the Deans, HODs, Registrar, together with a few eminent persons from academic/scientific organizations as per UGC norms.

The functions of the Academic Council comprise of

i. To exercise general supervision over the academic work of the Institute and to give direction regarding methods of instruction, evaluation, and improvements in academic standards.

ii. To promote research within the Institute, acquire reports on such researches from time to time.
iii. To prescribe courses of study leading to degrees and diplomas of the Institute.
iv. To make arrangements for the conduct of examinations in conformity with the Bye-Laws.
v. To appoint examiners, moderators, tabulators and such other personnel for different examinations.
vi. To maintain proper standards of the examinations.
vii. To recognize diplomas and degrees of universities and other Institutions and to determine equivalence with the academic degrees of the Institute.
viii. To suggest measures for departmental co-ordination.
ix. To make recommendations to the Board of Management on:
    a) Measures for improvement of standards of teaching research and training.
    b) Institution of Fellowships, Travel Fellowships, Scholarships, Medals, Prizes etc.
    c) To recommend to the Board of Management, the establishment or abolition of departments/ centres.
    d) To frame rules covering the academic functioning of the Institute, admissions, examinations, award of fellowships and studentships, free-ships, concessions, attendance, discipline, residence etc.
x. To appoint sub-committees to advise on such specific matters as may be referred to it by the Board of Management.
xi. To consider the recommendations of the sub-committees and to take such action as the circumstances of each case may require;
xii. To take periodical review of the activities of the Departments/Centres and to take appropriate action with a view to maintaining and improving standards of instruction;
xiii. To recommend institution of teaching posts (Professors, Associate Professors and Assistant Professors) to the Board of Management.

The Dean (Research & Development) is entrusted with the critical task of assisting the Director on all matters related to research and development. The Dean (R&D) is a vital member of the Research Board which consists of members from reputed academic and research organizations including ISRO/DOS.

The Dean (Student Activities) assists the Director with Heads of Departments and the faculty members on all matters related to student activities. The Dean (Student Activities) is the person who is the "face of the institute" as far as the students are concerned.

The Dean (Student Activities) heads the Student Activity Board (SAB), consisting of the Registrar, all heads of the departments, Chairmen of various institute committees and student representatives from all batches and branches. The student representatives provide feedback and suggestions on all aspects concerning student issues on campus (curricular and co-curricular). Under the SAB the following committees exist, such as the Sports committee, Technical Committee, Cultural Committee, Hostel and Canteen committee. Each of these committees has student representatives. The Dean (SA) together with Registrar and a HOD comprise the Disciplinary committee of the institute which oversees all issues of student indiscipline.

The Director of the institute heads the Finance Committee, also consisting of a person nominated by the Society / Trust, two nominees of the BOM of which one will be member of BOM, nominee of the Govt. of India and the Finance officer of the institute who will be its secretary. Currently the Dy. Registrar (Finance) holds the additional responsibility of Finance Officer.

Functions of the Finance Committee include : i) to consider the annual accounts and financial estimates of the Institute and submit them to the Board of Management for approval, ii) to consider and recommend the annual budget and revised estimates to the Board of Management, iii) to fix limits of the total recurring expenditure and the total non-recurring expenditure of the year based on the income and resources of the Institute (No expenditure other than that provided in the budget is incurred by the Institute without the approval of the Finance Committee).

The Finance Officer is appointed by the Board of Management and works under the direction of the Director and is responsible to the Board of Management through the Director. He is responsible for the preparation of annual budget, estimates and statements of account for submission to the finance Committee and the Board of Management. He is responsible for the management of funds and investments of the institution, subject to the approval of the Board of Management.

Each department has a head (HOD) who is responsible for the academic and administrative functions of the department. The HOD reports to Dean (Academics) and to the Director.

i. There is a Head of the Department for each of the Departments in the Institute who is appointed by the Director from amongst the Professors of the Department.
ii. The HOD is responsible for the day to day functioning of the department, including all the laboratories under the department.
iii. The HOD together with the faculty provide the input requirements for laboratory development and upkeep to the Purchase Committee of the institute.
iv. Any modifications to the existing infrastructure, including civil works, to the respective departments is carried out by the institute upon the request of the HOD.
v. The HOD also chairs the BoS and Doctoral Committees of the students registered under the department. Leadership system is ensured in the institute by assigning responsibilities in a decentralized manner.

6.1.6 Is the faculty involved in decision-making? If yes, how?

Yes. IIST has a Faculty committee, called the IFC comprising of all the faculty members of the institute which periodically meets and discusses all issues related to teaching, research & development. Inputs of the faculty members are provided to the authorities through the IFC forum, which form part of the decision making process.

Apart from IFC there are other committees at the institute level (Research committee, ISAT (entrance Exam of IIST) committee, Exam Committee, Purchase committee, Library Committee and Disciplinary Committee) where faculty contribute to the decision making. In many of the non-statutory bodies and committees, faculty members get good representation and participate in the decision making.

6.2 ORGANIZATIONAL ARRANGEMENTS

6.2.1 Give the organizational structure and the details of the statutory bodies?

Organizational Structure is as follows:

- Board of Management
- Academic Council
- Planning & Monitoring Board
- Finance Committee

- Board of Studies
- Institute Council
- Research Board
- Research Council
- Institute Faculty Committee
- Purchase Committee
- Student Activities Board
- Technical Committee, Sports Committee, Cultural Committee , Hostel and Canteen Committee
- Library Committee, Examination Committee

The Board of Management, IIST is chaired by Secretary, DOS and is ably assisted by several eminent persons including Director, IIST. The Board of Management is a compact and homogenous body empowered to promptly take and implement well considered decisions and to effectively handle crisis situations.

The Board of Management is the principal organ of Management and principal executive body of the institution and has the following powers, namely:

(i) To establish and advice of the Academic Council, Divisions and Departments for the academic work and functions of the Institute and to allocate areas of study, teaching and research.

(ii) To create teaching and academic posts, to determine the number, cadres and qualifications thereof as approved by Government of India/ University Grants Commission (hereinafter referred to as Commission), and statutory bodies concerned and the emoluments of such posts in consultation with the Finance Committee

(iii) To appoint such Professors, Associate Professors, Assistant Professors and other academic staff as may be necessary on the recommendation of the selection Committee.

(iv) To lay down the duties and conditions of service of the Professors, Associate Professors and Assistant Professors and other academic staff of the Institute, in consultation with the Academic Council and subject to government rules and regulations on the subject.

(v) To provide for appointment of Visiting fellows and Visiting Professors.

(vi) To create administrative, ministerial and other necessary posts in terms of the cadres laid down and to make appointment thereof in consultation with the Finance Committee and with the approval of competent government authorities.

(vii) To regulate and enforce discipline among the employees of the Institute and to take appropriate disciplinary action, wherever necessary.

(viii) To entertain and adjudicate upon and, if thought fit, to redress the grievances of any of the employees and students of the Institute.

(ix) To approve the award of Degrees, Post Graduate Degrees, Post Graduate Diplomas and Doctor of Philosophy based on the results of examinations and tests and to confer, grant or award such Certificates and other academic titles and distinctions.

(x) To institute Fellowships, including Travel Fellowships, Scholarships, Studentships, Medals and Prizes in accordance with the Rules to be framed for the purpose;

(xi) To appoint such committees for such purpose and with such powers as the Board of Management may think fit and to co-opt such persons on these Committees as it thinks fit.

The Academic Council of the institute is chaired by Director, IIST and comprises of Registrar and senior persons from academic/research organisation. The Academic Council

also has several senior Professors from IITs, and IISc who advise and guide the institute on all academic matters.

The Board of Research is chaired by Director, IIST, and consists of the Dean R&D, senior faculty members from the institute and academic peers from reputed academic / research organizations including ISRO/DoS.

The Planning & Monitoring Board is headed by Director, IIST and comprises of Registrar and a few eminent members from IIST, ISRO/DoS as well as other organizations. The planning committee works towards both long and short term plans of the Institute and provides suitable plan inputs to the Board of Management.

The institute has a Finance Committee as per the UGC norms. The above finance committee with Finance Officer as the Member Secretary, provides financial advice and guidance to the institute.

The Board of Studies is headed by the Heads of the individual Departments and includes the members of the department, external domain experts from eminent academic and research institutes as well as from various ISRO centres. The BoS has the primary task of designing the curriculum of the study. The BoS ensures that the curriculum meets the desired bench-marks of the National / International standards.

The Institute's Council is chaired by Director, IIST and comprises of all the three Deans, Registrar, Emeritus professors, all HOD's, all professors and Dy. Registrar (Admin). The Institute's council periodically meets and takes care of the decisions related to the day to day functioning of the institute.

Dean (R&D) oversees the R&D program of the institute.

Dean (Student Activities) deals with student issues and activities

Dean (Academic) oversees the academic activities of the institute.

Registrar oversees all Adminstrative Activities of the institute.

While Deputy Registrar (Finance) assists the Registrar on financial matters, Deputy Registrar (Academics) helps Dean (Academics) on academic matters.

The Student Activity Board consists of Registrar, faculty and student members and is chaired by Dean (Student Activities)

The Women Cell to takes care of women issues

6.2.2 Give details of the meetings held, the decisions made, regarding finance, infrastructure, faculty, academic research, extension, linkages and examinations held during the last year.

Infrastructure Decisions made last year (2011)

It was decided to expedite construction of academic blocks D1 and D3, library, administrative blocks, hostels and student convention center.

Finance Decisions made last year (2011)

The BoM approved the revised budget estimate of 2011 in its ninth meeting held on 9th July 2011.

The BoM resolved for registration under the New Pension Scheme for its employees also in the above meeting.

The BoM also approved revision of remuneration for ISRO/DoS employees taking full course at the institute, as well as remuneration for visiting faculty and experts invited for academic and other committee meetings in the above meeting.

Faculty Decisions made last year (2011)

The Board approved the proposal for allowing distinguished faculty members of premier academic institutions to spend their sabbatical in IIST

Academic & Research Decisions made last year (2011)

The winter and summer courses for students will be restricted only to the first year. For other students an examination during the summer vacation will be conducted preceded by contact classes for a duration of 10 hours. The earlier restriction on the number of supplementary examinations a student can appear in is now removed.

The students completing the first year UG were expected to secure a minimum of 29 credits without which they cannot continue their UG programme. The BoM in the last meeting has given an option for the students to continue despite not securing the minimum credits. However, such students will have to pay the applicable semester fee for the first year and repeat the first year courses. And hence, they become ineligible for absorption in ISRO/DoS.

125 students of the institute completed their UG programme requirements in 2011. The BoM approved the proposal for award of B.Tech. degrees to the above students.

The BoM has approved in principle the proposal to start new MS/M.Tech. programmes in some specialized areas, namely "Optical Engineering", "Geospatial Signal Processing and Navigation", "Astronomy & Astrophysics", "Digital Signal Processing", "Aerospace Propulsion" and "Solid State Physics" in addition to existing MTech programmes in "Soft Computing & Machine Learning" and "Chemical Systems".

Modalities for implementation of Dual Degree programmes in Aerospace, Avionics and Physical Science were considered in the last BoM and are being worked out.

Extension Decisions made last year (2011)

The institute decided to celebrate its annual outreach program IIST @ Schools in February 2011.

Linkages / Collaborations Decisions made last year (2011)

An MoU was signed by the institute with Universities of Space Research Association (USRA) in 2010 to provide for mutual exchange of faculty, students to USRA universities/institutes. As a part of this MoU five UG students of 2007 batch visited USRA universities/institutions in 2011. There is a proposal to have a collaboration with CalTech, USA for which a team from CalTech visited the institute in 2010.

Examinations Decisions made last year (2011)

The Institute decided to conduct IIST's All India Admission Test (ISAT) in 2011 and the same was successfully conducted in April 16, 2011. It was conducted in 23 centers all over India. Around 1 lakh students applied for writing the exam and about ~85000 students wrote the ISAT exam in 2011.

6.2.3 How frequently are the meetings of the different statutory bodies held? What are the major outcomes?

The Board of Management meeting is typically held twice in a year. The Academic Council meets as often as may be necessary but not less than two times during an academic year. The Finance Committee meets at least twice a year to examine the accounts and to scrutinize the proposals for expenditure. The Research Board meets twice in a year while the

IIST council meets six times in a year. The Board of Studies meets based on the academic needs but not less than once in two years.

The major outcomes of the BoM meetings that are already implemented or under progress are:

Board of Management Decisions:
(Academic Year 2011-12)

The BoM approved the revised budget estimate of 2011 in its ninth meeting held on 9th July 2011.

The BoM resolved for registration under the New Pension Scheme for its employees also in the above meeting.

The BoM also approved revision of remuneration for ISRO/DoS employees taking full course at the institute, as well as remuneration for visiting faculty and experts invited for academic and other committee meetings in the above meeting.

The Board approved the proposal for allowing distinguished faculty members of premier academic institutions to spend their sabbatical in IIST

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The Modaliies for implementation of Dual Degree programmes in Aerospace, Avionics and Physical Science were considered in the last BoM and are being worked out.

BoM Decision (Academic year 2010-2011)

The BoM has approved in principle the enhancement of retirement age to 65 years to faculty members of the institute and this matter is being pursued by DoS for further ratification from the department concerned.

The BoM approved establishment of centers of excellence at IIST.

The BoM approved the proposals in principle on establishing Research Chairs at the institute.

The BoM approved the amendments to the bye-laws on recruitment of faculty members of the institute.

The BoM approved the initiation of Post Doctoral programmes at the institute.

BOM decision (Academic year 2007-2010)

The BoM approved the inclusion of IIST Council as one of the authorities of the institute.

The BoM approved the conversion of Integrated M.Sc. in Applied Science to B.Tech. in Physical Sciences.

The BoM approved the revision of curriculum and syllabus of B.Tech. (Physical Sciences)

The BoM approved the norms for absorption to ISRO/DoS for those students of the institute who have successfully completed their UG program.

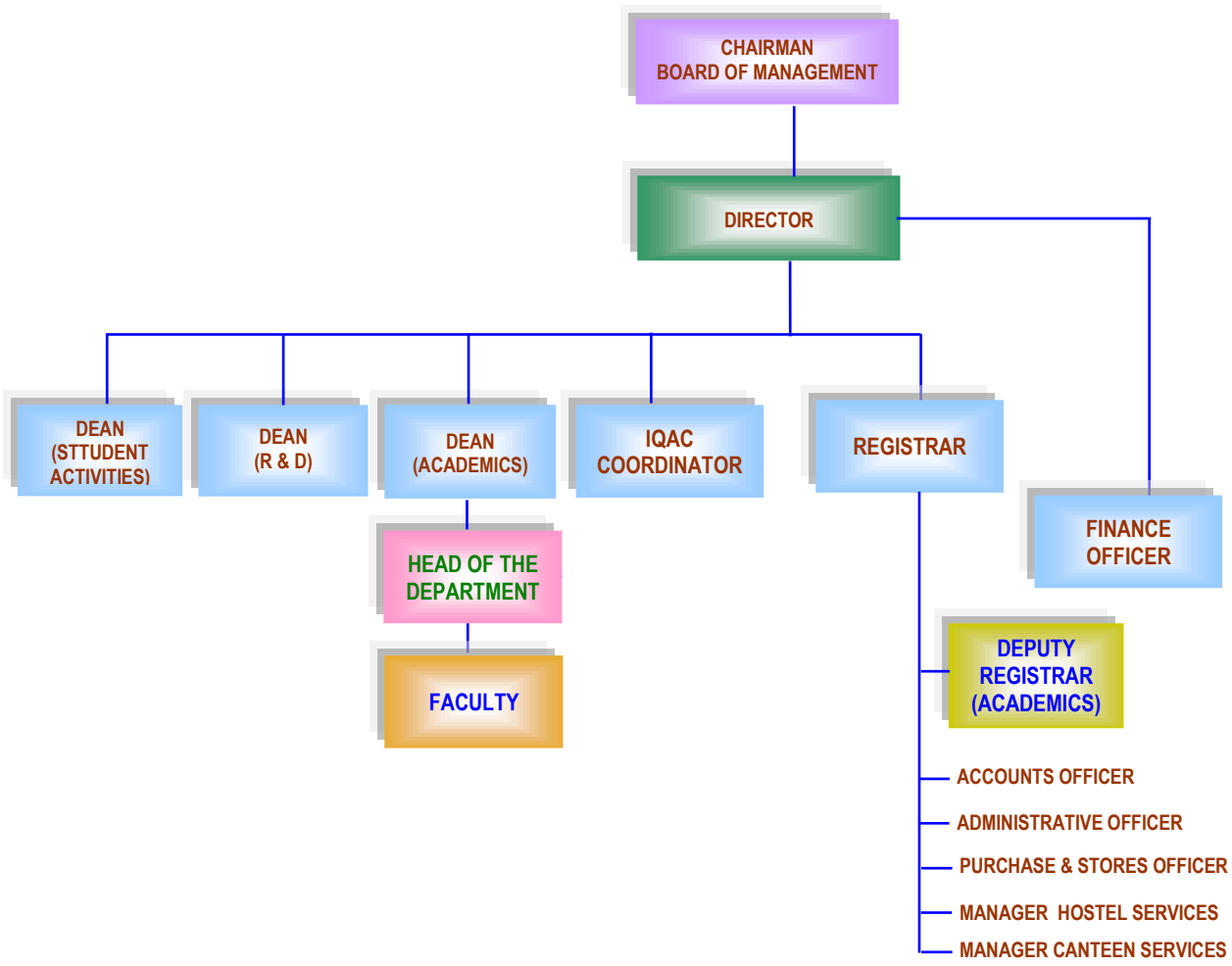
The BoM approved PRIS to the staff members of the institute.

6.2.4 What percentage of the management council's resolutions are implemented during the last year?

All the council resolutions are implemented in total.

6.2.5 How is the administration decentralized? Illustrate the organization chart.

All the Deans, Registrar, IQAC Coordinator, Finance Officer report to the Director. Whereas all faculty report to Head of the department and later report to Dean (Academics). Deputy Registrar (Academics), Accounts Officer, Administrative Officer, Purchase and Stores Officer, Manager Hostel Services and Manager Canteen Services report to Registrar.



6.2.6 Does the institution have an effective internal coordination monitoring mechanism? If yes, specify.

Yes.

Currently, the Institute Council takes care of the internal coordination monitoring mechanism among the faculty and the administration.

The IQAC has been established with MQAC for the effective internal coordination monitoring mechanism.

6.2.7 How many times does the management meet the staff in an academic year? What are the major issues discussed?

On an average the Management meets the staff for about 6 to 8 times in an academic year. The major issues discussed in such meetings are the following:

- Academic matters including examinations
- Research funding
- Conference participation/visits within and outside the country
- Administrative Matters

a) What are the norms to extend affiliation to a new institution?

Not applicable

b) What are the procedures for conferring permanent affiliation to a college?

Not applicable

6.2.8 Does the university have a College Development Council (CDC) or Board of College and University Development (BCUD)? If yes, give the details of its structure and functions.

Not applicable

6.2.9 How does the university promote 'autonomous status' to the affiliated institutions?

Not applicable

6.3. STRATEGY DEVELOPMENT AND DEPLOYMENT

6.3.1 Does the institution have a perspective plan for institutional development?

Yes.

The Institute strives to be a world class educational and research institution contributing significantly to the Space and national R &D endeavors. It encourages research in all areas related to space science and technology and other related areas. The Institute already has PG and Ph.D. programmes and also has initiated PDF programme. The Institute continuously strives to improve its UG programme by creating a conducive teaching and learning environment so that it meets the requirements of students and other stakeholders. The institute has initiated plans for starting of dual degree programs as well as new PG programs. The institute is also planning to open up the PG programmes to the common pool outside of ISRO/DoS.

➢ **Quality of Students**

The quality of UG students is ensured since the students are selected on the basis of a national level entrance examination in which more than 600 students compete for one seat at the institute. Furthermore, there are strict eligibility requirements for students to meet in

terms of their academic performances in Class X and Class XII boards to write the above-mentioned national level entrance examination. The students of the institute also organize and actively participate in national level annual technical events held at the institute and showcase their creative and innovative talents. The students of the institute also have the opportunity to undertake their summer internships / final semester project dissertation in any one of the ISRO/DoS centers. Unlike other institutes, the students who join the institute are assured of a job in any of the ISRO/DoS centers and hence get an opportunity to contribute to the national space programmes. The proposal for students to undertake minor courses in areas other than their chosen branch of study is one that ensures student quality in terms of providing them greater exposure to other important areas.

- **Academic Plans**

The Institute is presently offering two Post Graduate programmes (M.Tech in Soft Computing & Machine Learning and M.Tech in Chemical Systems) that are unique and having direct relevance to Space Science and Technology and related areas. They are being presently offered to serving Engineers/ Scientists of ISRO/DoS based on a strict selection procedure.

In addition to the existing M.Tech programmes in "Soft Computing & Machine Learning" and "Chemical Systems" the institute is actively considering the starting ***of new M.S/M.Tech programmes in areas like "Optical Engineering", "Geospatial Signal Processing and Navigation", "Astronomy & Astrophysics", "Digital Signal Processing", Aerospace Propulsion and Solid state physics, to be initiated in the next academic year 2012-2013.***

The institute is working on modalities to start Dual Degree programmes in Aerospace, Avionics and Physical Science, which is expected to commence in the next academic year 2012-2013.

The departments are encouraged to suggest/propose any relevant academic changes based on their experience and feedback from all stake holders. Such ideas proposed by the faculty, students or other stake holders are debated thoroughly in the department and if found worthy, are recommended for consideration by the academic council. Likewise electives are recommended by the departments after careful consideration of their current as well as future relevance.

The department also periodically proposes the withdrawal of electives that have limited interest or relevance, from the experience gained to the respective BoS. In brief the Academic Programmes are formulated and modified to meet the goals of the institution as well as the aspirations of the stake holders. This is done under the overall supervision of the Board of Studies of the respective departments.

The proposal for allowing distinguished faculty members of premier academic institutions to spend their sabbatical in IIST (Interim Sabbatical) has been approved by the Board of Management.

- **Research & Development**

Research activities have already been initiated in areas that are of relevance to Space Science and Technology and other related areas covering all the academic departments. To initiate research, liberal funding has been extended to the faculty based on specific proposals that are peer reviewed and approved. The institute has initiated a Fast Track Research project proposal which will provide funding to the tune of ` 10 lakhs for a new faculty member who does not have research scholars or research projects. The institute covers the publication

charges of all accepted manuscripts of its faculty and students. The institute also provides cash incentive to faculty and students who publish papers in high impact journals.

The institute started its Ph.D. programs under ISRO-IIST fellowship and IIST fellowship along with postdoctoral programs for encouraging research in advanced areas of space science and technology and other areas. Individual Departments have selected PhD scholars having NET/GATE qualifications, as per UGC norms through competitive exams/ interviews. Fifty two students have presently enrolled for their Ph.D. programme in the institute. These include 10 scientists/engineers from ISRO/DoS, 10 Reader (on contract) faculty members from the institute, 11 students who have availed themselves of the high-valued ISRO-IIST fellowship and 21 students who have obtained the regular IIST fellowships.

The major research facility creation in areas like Nanoscience & Technology, Virtual reality and Advanced Propulsion & Laser Diagnostics are on the anvil which will provide a thrust to advanced research in these emerging interdisciplinary fields. These major research facilities are to emerge as Centers of Excellence in the near future. The concerned departments have initiated work in establishing the centers.

Apart from the joint guidance option of collaboration of the institute faculty with the scientists/engineers from ISRO/DoS centers in which a scientist/engineer from ISRO/DoS center has registered for his/her Ph.D., the institute also has ongoing collaborative research programmes with ISRO/DoS centers.

The students get the opportunity to undertake their summer internship/final semester project in various ISRO/DoS centers. The students of the institute are involved in designing Nano Satellite and Rocket Sounding projects; both these activities come outside their normal curricular requirements. Five of the UG students of the institute undertook their final semester project dissertation in USRA universities/institutes in 2011 as part of the MoU which the institute signed with USRA in 2010. The institute has plans to initiate a similar MoU with CalTech., USA in the near future. The other MoU with USRA and the proposed MoU with CalTech will also provide for faculty exchange between the institute and USRA universities/institutes as well.

Infrastructure-New Campus of IIST

IIST started functioning from its new campus at Valiamala from Aug 15, 2010. Presently two academic blocks (D4 and D2) wherein all the academic activities are housed, and ten hostel blocks have been completed. Except for the first year students, all others are provided single occupancy accommodation in hostels. The construction work of the institute's Library and Students Activity Centre are in the advanced stages while the work is in progress in the administrative block and in the two remaining academic blocks (D1 and D3). Overall, civil works are progressing well.

How are the various constituencies involved in the process of planning?

The Planning and Monitoring Board is the principal Planning Body of the Institute and is responsible for the monitoring of the development programmes of the Institute. The Director is the Chairman of the Planning and Monitoring Board and Registrar is its Secretary. It has seven internal members and three outside eminent experts, including one nominee of the UGC. The Planning and Monitoring Board advises the Board of Management and the Academic Council on any matter which it considers necessary for the fulfillment of the objectives of Institute. The recommendation of the Planning and Monitoring Board is placed before the Board of Management for consideration and approval. Plan proposals relating to

the academic matters may be routed to the Board of Management through the Academic Council.

6.3.2 Does the institution follow an academic calendar? How effectively is it prepared?

Yes. The calendar is designed for two semesters every year before the commencement of the academic year and is displayed in the website of the institute. It includes dates specified for the Quiz (internal tests), cultural/Technological festivals, annual sports meet and holidays, besides the End Semester Examinations, winter/summer courses and their Supplementary Examinations. The calendar also delineates the beginning and end of the academic session together with the winter and summer vacation period for students and academic staff.

6.3.3 During the last five years, specify how many plan proposals were initiated /implemented? Give details.

- **Quality of Students**

The decision to go in for our own national entrance examination for admissions to the UG program in the year 2010 was one of the important plan proposals which ensured quality of students. Prior to 2010 the admissions to the UG programme was made on the basis of the IIT JEE extended list, an examination which is known for its transparency and its standard.

The proposal that only students of the institute who complete their UG programme in the stipulated four years and secure a minimum CGPA of 6.5 (in a scale of 10) are eligible for ISRO/DoS absorption has ensured that only quality students can secure jobs with ISRO/DoS centers and contribute directly to national space programme.

The proposal to sign an MOU with USRA in 2010 resulted in five of the UG students of the institute undertaking their final semester project dissertation in USRA universities/institutes in 2011. The institute is actively pursuing plans to initiate a similar MoU with CalTech., USA.

The proposal for students to undertake minor courses in areas other than their chosen branch of study is one that ensures student quality in terms of providing them greater exposure to other important areas.

- **Academic Plans**

The proposal of the institute to initiate new post graduate MS/M.Tech programmes in areas like “Optical Engineering”, “Geospatial Signal Processing and Navigation”, “Astronomy & Astrophysics”, “Digital Signal Processing”, Aerospace Propulsion and Solid state physics are in consideration and will significantly increase the number of the postgraduate programmes of the institute.

The proposal of the institute to initiate a new dual degree program in Aerospace Engineering, Avioinics and Physical Science will provide for some of the academically oriented among our B.Tech students to seamlessly complete a PG program, the latter providing for a longer and rigorous project component. The advantage of a dual degree is that student his /her can seamlessly move to a Ph.D. programme.

The proposal of the institute for allowing distinguished faculty members of premier academic institutions to spend their sabbatical in our institute would provide our students and faculty an unique first hand opportunity to interact closely with eminent academicians from premier institutions.

➢ **Research & Development Plans**

The proposal of the institute to initiate a limited number of high valued fellowships (Rs.35,000/- per month) and a large number of regular fellowships (Rs.18,000/- or Rs.16,000/-) have given the right impetus to the research environment of the institute.

The proposal of the institute to initiate a postdoctoral programme will greatly enhance the research output of the institute.

The proposal of the institute to directly fund the research needs of faculty, including the fast track research funding proposal will provide for the new faculty financial support and encouragement to pursue research.

The proposal of the institute to provide cash awards for faculty and students who publish papers in high impact journals and the proposal of the institute to provide for full publication charges of any accepted manuscript of its faculty and students will give a fillip to the journal publication output of the institute and motivate the faculty and students to pursue advanced quality research.

The proposal to establish centers for advanced research areas like Nanoscience & technology, Virtual reality, Advanced Propulsion & Laser Diagnostics have provided faculty members working in these frontier areas access to state of art equipments which will provide the right thrust for these advanced research centers to emerge as Centers of Excellence in the near future.

➢ **Infrastructure-New Campus of IIST**

The proposal to move the institute from its temporary premises to a permanent campus in 2010 has made it fully residential for the students. The proposal of the institute to build faculty and staff quarters within the campus will ensure that the institute becomes completely residential in its fullest sense. The proposal of the institute to construct a new library building (with six floors) will provide for ample space for students and faculty to utilize the library resources more meaningfully.

6.3.4 What are the mechanisms evolved by the university to meet the developmental needs of the affiliated institutions?

Not Applicable

6.3.5 How often is the functioning of the affiliated institutions inspected and supervised? When was the exercise done last? Give details

Not Applicable

6.3.6 Has the University conducted an academic audit of its affiliated colleges? If yes, give details.

Not Applicable

6.4. HUMAN RESOURCE MANAGEMENT

6.4.1 How are the staff recruited? Illustrate the process.

Teaching as well as non-teaching staff are recruited through open advertisement in National dailies (English/Hindi) and the same is published on the institute website.

Applications received against advertisement are scrutinized at the Administrative, Departmental and the Institute level.

Shortlisted candidates (for faculty positions) are expected to present a seminar on their research work before a committee and then they are interviewed by the duly constituted selection committee at the institute. The selection committee is headed by the Director and consists of external domain experts together with Dean (Academics) and the concerned Head of the Department.

Reservation of posts as applicable under the DoS are adhered to for recruitment of non-teaching/non-teaching staff of the institute.

6.4.2 How does the University assess the need for staff recruitment?

The institute gets the necessary inputs for additional faculty requirements from the faculty and HoD of the respective department who convey their faculty needs to the Dean (Academic) who in turns conveys the same to the Director. The need for additional faculty arises due to the following reason, (i) initiation of new academic programmes, (ii) a situation wherein there exists a compulsory core course that needs to be taught but the department does not have a trained faculty in that area, and (iii) a situation where a faculty member has left the institute and there are no suitable faculty who can teach the course taught by the faculty who has left. The recruitment of the faculty is based on the needs and requirements of the department.

In the case of non-teaching staff the recruitment is dependent on the laboratory needs and secretarial needs of the department.

6.4.3 What percentage of faculty are recruited from other institutions, other states and other countries? Give details

Only Indian nationals are recruited in the institute for both academic and non-academic positions. While the percentage of faculty recruited from other states is 46%, the remaining are accounted by faculty within the state.

6.4.4 What is the ratio of teachers to non-teaching staff?

The current ratio of teachers* to non- teaching staff is 81: 39

** Including Adjunct Professors*

6.4.5 Does the institution have a 'self–appraisal method' to evaluate the performance of the faculty in teaching, research and extension programmes? How far has it motivated the teachers?

Yes.The institution has an Annual Performance and Appraisal Report (APAR) to evaluate the performance of the faculty in teaching, research and extension programmes and this exercise is done once in a year. The reporting officer for the APAR is the HOD concerned. The reviewing officer for the APAR is the Dean (Academics) and the countersigning officer is the Director. Any faculty member wishing to know his/her performance evaluation can have access to the assessments (APAR) made by his/her superiors. The standard procedures of the DoS are followed by the institute for internal reviews / assessments. The above-said measures contribute greatly in maintaining the motivation levels of the faculty members.

6.4.6 Does the institution appraise the performance of the teaching staff? If yes, specify.

Yes. Every semester student feedback is taken for each course and for each teacher and the above inputs from the students are collected and processed. After the processing of

the student feedback, the evaluative reports based on the student inputs are given to the concerned faculty member through the HOD for their own betterment.

6.4.7 Does the institution appraise the performance of the non- teaching staff? If yes, specify.

Yes. The APAR is reviewed by the immediate officer and then recommended by the Registrar and approved by the Director and given back to the non-teaching staff.

6.4.8 Has there been any study conducted during the last five years by the university / government or by any other external agencies on the functioning of any aspect of academic and administrative management? If yes, give the details of the reports.

Yes. The UGC has reviewed the functioning of the institute in September 2009. A high level team from UGC visited the institute in September 2009 and spent two days interacting with the authorities (Director, Registrar, and Deans), faculty, non-academic staff, students of the institute. Recently in January 2012 another high level team from UGC visited the institute and had interaction with all sections of the institute for two days.

6.4.9 Has the institution conducted any programme for skill upgradation and training of the non-teaching staff based on the performance appraisal? Give details.

Yes. In-house training has been arranged by DOS for non-teaching and non-technical staff. The institute also encourages its non-teaching staff to undergo skill upgradation programmes conducted by other organizations.

Details of the training/skill upgradation programmes attended by non-teaching staff is given below.

S. No.	*Name*	*Designation*	*Name of the Training Programme*	*Duration & Place*	*Conducted by*
1	Smt. Bindya K.R	Administrative Officer	Residential Training programme for the Liaison Officers on Reservation Policy of the Govt. of India for SCs/STs/OBCs	25.05.2009 to 27.05.2009 Bhuvaneswar	Institute of Public Administration, Bangalore
			Residential Management Development Programme	26.09.2010 to 01.10.2010	DoS
			Orientation course in Records Management	14.02.2011 to 18.02. 2011	National Archives of India, New

					Delhi
			Right to Information Act	28.10.2011 Trivandrum	Corporate Relations
2	Shri. M B Subash Chandran	Purchase & Stores Officer	Technical Workshop on Purchase management	22.10.2009 to 24.10.2009 New Delhi	Institute of Socio Economic Research Action(ISERA)
3	Shri S Ramanathan	Administrative Officer	Residential Management Development Programme	26.09.2010 to 01.10.2010	DoS
4	Shri. Mohan Sukumar	Computer System Administrator	HiPC -2010 International conference on High performance Computing (HPC)	19.12.2010 to 22.12.2010 Goa	IEEE
5.	Shri. V Sennaraj	Dy. Registrar, Academics	Executive Training Programme for Sr. Executives of Administrative areas	26.09.2011 to 30.09.2011	DoS
6	Shri. Hari Prasad	Dy. Registrar, Finance	Executive Training Programme for Sr. Executives of Administrative areas	21.11.2011 to 25.11.2011	DoS

6.4.10 Does the institution conduct staff development programme for the teaching staff & non-teaching staff? Illustrate.

Yes. In 2010, Academic Staff College of India, Hyderabad conducted a 3 day training program under quality improvement for teaching faculty. For details refer part II Criteria II 2.4.12.

6.4.11 How are teaching staff encouraged to use the computers, Internet, audio-visual aids, computer aided packages etc.?

All faculty members of the institute are provided with Desktop and Laptop computers and have access to the internet. The institute has provision for Wi-Fi connectivity in its campus. Most classrooms are equipped with multi-media facility and faculty can utilize them during lecture hours. Some of the departments have procured projectors which are used by their faculty for class room teaching. The institute provides software packages for the benefit of its faculty members and students.

Computer Lab and Engineering Software: A computer lab with about 30 computers have been set up and various important engineering software packages relevant for Aerospace / Mechanical engineering discipline such as Autodesk inventor, Catia, Hyperwork's Hypermesh, Autocad, Scilab, etc. have been installed in these computers.

6.5. FINANCIAL MANAGEMENT AND RESOURCE MOBILIZATION

6.5.1 Provide income / expenditure statement for the last financial year? (Provide the same to the peer team during the on site visit)

Supporting documents are attached

6.5.2 Is the operating budget of the institution adequate to cover the day-to-day expenses? If not, how it is managed?

Yes.

6.5.3 Is the maintenance budget of the institution adequate with reference to its infrastructure and learning resources?

Yes. Budget summary of the institute is given below.

BUDGET SUMMARY for RE 2010-11 & BE 2011-2012

(Rs. in Lakhs)

S. No.	*Items*	*Actuals 2009-2010*	*Exp upto 30-09-2010*	*Budget Estimates 2010-11*	*Revised Estimates 2010-11*	*Budget Estimates 2011-12*
A) CAPITAL EXPENDITURE						
I	Infrastructure Development	2732.19	1655.57	7812.00	7601.00	11138.00
ii	Institute Facilities	1500.93	568.59	3408.00	1995.00	2168.00
iii	Centre of Excellence	0.00	0.00	0.00	67.00	716.00
	Sub Total	***4233.12***	***2224.16***	***11220.00***	***9663.00***	***14022.00***
B) REVENUE EXPENDITURE						
I	Salary	341.09	272.06	410.00	516.00	975.00
ii	Administrative Expense	649.37	412.73	1450.00	1268.00	1510.00
iii	Academic Expenses	10.54	2.93	15.00	40.00	75.00
iv	Student Activities	16.02	9.50	60.00	20.00	35.00
V	Research & Development	9.18	27.47	180.00	110.00	331.00
vi	Auxillary Services	246.64	181.29	815.00	370.00	590.00
	Sub Total	***1272.84***	***905.98***	***2930.00***	***2324.00***	***3516.00***
	TOTAL	***5505.96***	***3130.14***	***14150.00***	***11987.00***	***17538.00***

C) INCOME						
I	Other Income	38.75	7.39	10.00	10.00	10.00
ii	Surplus in Assistanceship	0.00	0.00	140.00	250.00	250.00
	Sub Total	**38.75**	**7.39**	**150.00**	**260.00**	**260.00**
D) GRANT IN AID FROM DOS						
i	Requirement for Current Year	5467.21	3122.75	14000.00	11727.00	17278.00
ii	Unspent Grant in Aid-Non-Recurring				(4071.66)	(7278.00)
iii	Unspent Grant in Aid - Recurring				(1155.34)	0.00
	TOTAL	***5467.21***	***3122.75***	***14000.00***	***6500.00***	***10000.00***

6.5.4 Have the accounts been audited regularly? What are the major audit objections and how are they complied with?

Yes the institute has a three tier audit structure providing for both internal and external Central audit. There have been no major audit objections.

6.5.5 Does the institution have a mechanism for internal and external audit? Give details.

Yes. Internal audit is being done from the Department of Space & the External Statutory audit is carried out by qualified Chartered Accountants.

6.5.6 What are the current tuition and other fees?

The tuition and others fees totaling ` 49,000/- per semester per student of the institute is supported by the Department of Space, Govt. of India as an Assistanceship package.

6.5.7 How often is the fee revised?

Not Aplicable.

6.5.8 What is the quantum of resources mobilized through donations? (other than block grants) Give details.

The institute gets funds directly from the Department of Space, Government of India and does not solicit any donations for resource mobilization.

6.6 BEST PRACTICES IN GOVERNANCE AND LEADERSHIP

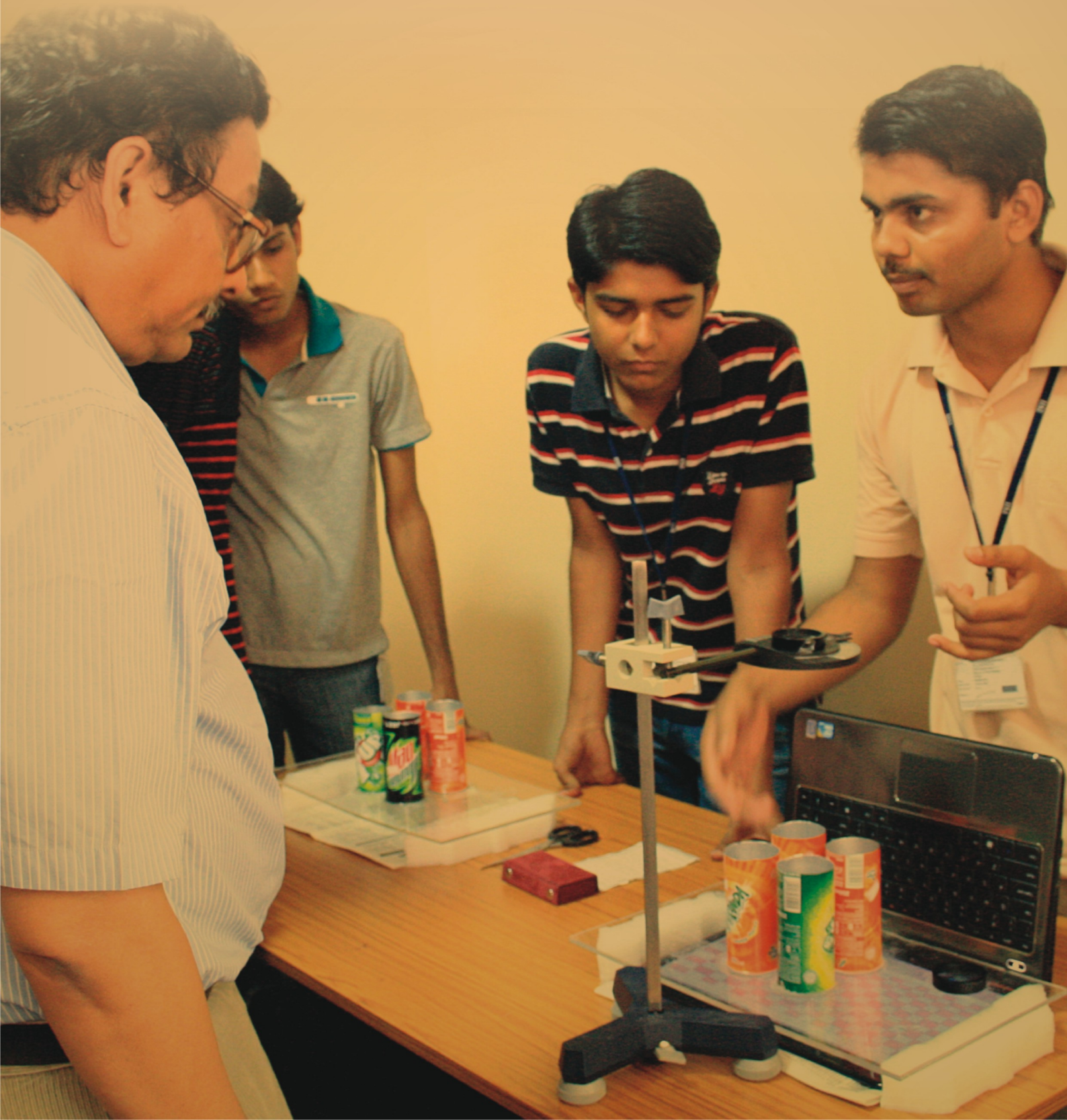
6.6.1. Describe best practices in Governance and Leadership adopted by the college in terms of institutional vision and leadership / organizational arrangements / strategies development / deployment human resource management / financial management and resource mobilization

- Institute has a unique decentralized management system.
- Highest authority of the institute (Director) is directly accessible to any student of the institute.
- Entire budget operation is completely transparent.

- Faculty members from all levels actively contribute to the deliberations and discussions in the purchase and budget process.
- All departments have the freedom to decide, plan and recommend all minor alteration in the infrastructure including civil works.
- Inter department collaboration in research is facilitated with minimal formalities.

All research activity including funding is kept under one umbrella.

CRITERION VII INNOVATIVE PRACTICES



7.1 INTERNAL QUALITY ASSURANCE SYSTEM

7.1.1 What mechanisms have been developed by the institution for quality assurance within the existing academic and administrative system?

Selection of students for the B.Tech. program is done based on a nation-wide entrance examination which ensures an intake of only meritorious students. A continuous assessment procedure in the form of quizzes, class tests, assignments, projects and final exam is in place to ensure quality of learning. The Academic Council is the highest body which reviews all aspects of academics For each graduate program, the institute has constituted a Board of Studies with members from other academic institutions and research organizations. At the institute level, there is an examination committee headed by Dean (Academics) with members which include the heads of the various departments.

Overseeing the research activities of the institute is the Research Board consisting of senior faculty members of IIST, senior scientists of ISRO, and experts from other leading academic institutions. For the doctoral program, there is a Research Committee headed by Dean (R & D) which is responsible for admission and progress evaluation of Ph. D. students. The prospective students are selected based on a written test followed by an interview. For students applying for the Ph. D. program in all science streams, NET-JRF eligibility is mandatory. In addition, the institute also has made provision for faculty of IIST and nominees from ISRO/DoS to register for the Ph. D. program subsequent to their selection based on an interview. The initial year of the Ph.D. program is dedicated to course work which includes a combination of mandatory courses common to all and specific courses recommended by the Research Council.

The Faculty are selected based on merit with importance given to their research and teaching record. While a doctoral degree is mandatory, adequate post-doctoral experience is given due weightage in selection of the faculty. There is a mechanism in place for teacher evaluation involving written feedback from students. These feedback forms are used to assess teaching practices and implement changes in the course structure and classroom teaching. The student feedback is taken into account in the Annual Performance Report of the faculty.

In addition to the above, the institute has constituted an Internal Quality Assurance Cell (IQAC) which ensures that best practices on all aspects of academic and administrative systems are followed.

7.1.2 What are the functions carried out by the above mechanisms in the quality enhancement of the institution?

The Board of Studies (BoS) formulates and critically evaluates the course contents of all undergraduate and post-graduate programs. Approval from the BoS is mandatory for proposing changes to the curriculum as well as introduction of new courses to the existing curriculum. The recommendations of the BoS are placed before the Academic Council for its approval. The final ratification of any revision / amendment is obtained from the Board of Management.

The Research Board formulates the regulations and procedures for research and development programs of the institute. It is responsible for identifying research areas and topics of relevance and establishes procedures for implementing them in the institute. The Research Committee is constituted with all relevant internal functionaries to review the

research activity on a regular basis (once per semester) and give feedback to the Research Board.

Separate committees are constituted for the shortlisting and selection of each faculty. The selection committee is made up of a core committee consisting of the Director, Dean (Academics), and other members from ISRO and other organizations. In addition to the core committee respective Head of the Department and at least two experts from eminent outside academic institutions or research organizations participate in the selection process. The faculty selection procedure includes a research seminar followed by an interview.

The faculty are assessed for their teaching abilities by students through a written feedback which is consolidated and reviewed by Director, Dean (Academics) and the respective Head of the Department.

7.1.3 What role is played by students in assuring quality of education imparted by the institution?

There exists a Student Advisory Board headed by Dean (Student Activities) with faculty members and student representatives from all programmes. The student members of this board are invited to meetings involving discussions on curricular and co-curricular activities at the institute. Written feedbacks on teaching and evaluation are collected from every class at the end of the semester. These feedback forms are used to assess teaching practices and implement changes in the course structure and classroom teaching.

7.1.4 What initiatives have been taken up by the institution to promote best practices in the institution? How does the institution ensure that the best practices have been internalized?

The IQAC and the Research Board encourages departments to innovate in the areas of teaching, learning and research. The best practices that evolve in these areas are discussed regularly in the council meetings and the staff meetings (IFC) of the institution. The institute encourages research activities of faculty by supporting their research needs through direct funding and expects all the faculty members to avail the research funding. The research contributions of the faculty are given significant weightage in their career growth. The institute also provides research fellowships to all Ph.D. students through a large number of regular and a limited number of high-value ISRO fellowships (5 per year). The institute has also initiated post-doctoral programs to strengthen research activities and enhance research output. A cash incentive is instituted to encourage faculty members, students and post-doctoral scholars to publish in high impact peer-reviewed journals. All publication charges for accepted manuscripts are covered by the institute. The Faculty members are encouraged to organize and participate in international and national workshops and symposiums. They are also allowed extended visits to other institutions in India and abroad for initiating and furthering research collaborations. The institute has signed a MoU with Universities Space Research Association (USRA, USA) in 2010 that provides for mutual exchange of faculty and student visits for research activities. Also, a MoU between IIST and CalTech is in advanced stage of process.

7.1.5 In which way has the institution added value to students' quality enhancement?

The institute has several programs for the overall academic and personality development of students. At the academic level, there is an ample opportunity for students to work on scientific and engineering problems with faculty at the institute as well as at the different centres of ISRO and other national and international research centres and universities. The institute, through its regular series of seminars, gives its students a forum to interact with personalities from different disciplines. The institute also has student clubs in astronomy, physics, chemistry, mathematics, remote sensing and robotics. In addition to regular activities, the club also conducts special events on occasions like the International Year of Astronomy, Year of Chemistry etc. The Department of Physics has been organizing a weekly programme where students showcase scientific experiments and models which they have developed.

For the overall personality development of students and for moulding their outlook towards society, the institute has organized a minicourse on Neuro-Linguistic Programme (NLP), visit to tribal settlements in parts of Kerala, visit to orphanages and tribal schools and participation in community festivities like the *Pongala*.

7.2 INCLUSIVE PRACTICES

7.2.1 What practices have been taken up by the institution to provide access to students from the following sections of the society?

a) Socially-backward
b) Economically-weaker and
c) Differently-abled

As per the Government of India rules candidates belonging to the above categories are admitted to seats reserved for them based on relaxed criteria. Of the total number of seats in the B. Tech program, 15% are reserved for students from the Scheduled Castes, 7.5% for students from Scheduled Tribes, 3% for differently-abled students and 27% for Other Backward Castes belonging to the Non-Creamy Category.

7.2.2 What efforts have been made by the institution to recruit staff from the disadvantaged communities? Specify?

a) Teaching
b) Non-teaching

Recruitment of teaching staff is exclusively done on a merit basis with no discrimination made in terms of gender, religion or regional identities. There is no consideration for reservation of any kind.

For the non-teaching staff, the institute follows the norms as per the Government of India rules on reservations, applicable to the Central Educational Institutions (CEI).

For house keeping staff preference for contract employment is given to persons in the immediate neighbourhood.

7.2.3 *What special efforts are made to achieve gender balance amongst students and staff?*

The institute is committed to ensure equal opportunity in all aspects of admission and employment. Hence no discrimination is made on the basis of gender. The policies followed in the admission of students are as per the Government of India rules on reservations, applicable to the Central Educational Institutions (CEI).

7.2.4 *Has the institution done a gender audit and/or any gender-related sensitizing courses for the staff/ students? Give details.*

The record of the gender ratio amongst its teaching, non-teaching staff and students are maintained and are as follows.

Students (as of 30.10.2011):

Year	Male	Female
B.Tech. 2007	116	10
Current B.Tech	523	61
M.Tech.	16	13
Ph.D.	30	22

Staff (as of 30.10.2011):

Category	Male	Female
Academic Staff	58	23
Non-academic Staff (Permanent)	26	13
Non-academic Staff (Contract)	302	113

The institute has thus far not held any gender-related sensitizing courses for its staff or its students.

7.2.5 *What intervention strategies have been adopted by the institution to promote overall development of the students from rural/ tribal background?*

The institute does not have any intervention strategy for development of students from rural/tribal background.However,from the 2011-12 academic year, the institute started the practice of offering remedial programs in Physics, Chemistry, Mathematics, Aerospace Engineering and Avionics courses in the first year of the B.Tech. curriculum. These are students who are identified in the beginning of the semester as requiring special attention. The identification is done on the basis of a written quiz within two weeks of the commencement of the first and second semesters. In addition, a two credit regular course on Communicative skills in English is compulsory to all students in the first year of their B.Tech. program.

Workshops are also conducted, with resource people invited from outside the institute, for developing the soft skills of students.

7.2.6 Does the institution have a mechanism to record the incremental academic growth of the students admitted from the disadvantaged sections?

The institute does not feel the need to have an exclusive policy for the disadvantaged sections as they are selected through a highly competitive nation-wide common entrance examination. However, the slow-learners among the first year students (which may consist of some of the disadvantaged sections) of the B. Tech program are provided additional learning support in the form of remedial classes outside the regular class hours and contact hours with the faculty. The progresses of the students who avail these remedial courses are continuously monitored by the examination committee headed by Dean (Academics). The parents/guardians of the slow-learners are duly informed of their progress in academics on a regular basis.

7.3 STAKEHOLDERS RELATIONSHIPS

7.3.1 How does the institution involve all its stakeholders in planning, implementing and evaluating the academic programmes?

The stakeholders of the institute are primarily students (including alumni), parents / guardians and the prospective employers. All students who successfully complete the B.Tech. program within the stipulated period of four years and maintain a minimum CGPA of 6.5 (in a scale of 10) are offered employment as Scientists / Engineers in one of the many centres of ISRO/DoS. The students have the benefit of undergoing their summer internship and /or project dissertation at any of the ISRO/DoS centres. Some of the senior scientists of ISRO/DoS are members of the various committees including the Board of Management, Board of Studies, Research Board, Academic Council, Finance Committee etc.

The Student Advisory Board with members from the student community acts as a forum for students to give their feedbacks on the curriculum, the course structure, research opportunities and teaching practices. Students are also part of the IQAC.

The institute at present does not have a formal Parents Association. However, it is mandatory for students to bring their parents / guardian at the time of admission. Parents are encouraged to get in touch with the faculty members to learn about their ward's academic progress. Parents of students with an academic backlog are periodically informed about their ward's academic performance, and are also requested to visit the institute to be briefed on the same.

7.3.2 How does the institution develop new programmes to create an overall climate conducive to learning?

The institute has several novel programmes (R & D projects / research program) to extend learning and teaching beyond the regular classroom and lab set ups. Examples of these programmes include (a) design and control of sounding rockets (b) design of nano satellites and associated payloads (c) setting up of a satellite receiver system and collection of data (d) regular field trips as part of geology and remote sensing courses (e) visit to

observatory facilities in India as part of the astronomy program (f) visit to banks and financial centres for understanding their functioning and also for interaction with its experts as part of the economics course. The institute is in the process of setting up an innovation centre to support student initiatives. The institute has been running minor programs in several topics to expose students to areas which are outside of their regular course programme. The Internal Quality Assurance Cell (IQAC) ensures that best practices are followed in all aspects of academics.

The institute has signed a MoU with Universities Space Research Association (USRA, USA) in 2010 that provides for mutual exchange of faculty and student visits for research activities. Under this, understanding three students of the B.Tech. programme did their final year project in 2011 at Lunar & Planetary Institute (Texas, USA) and two more students at the University of Texas, Arlington (USA).

7.3.3 What are the key factors that attract students and stakeholders resulting in stakeholder satisfaction?

The institute is unique, keeping in line with its vision and mission, that it offers specializations at the undergraduate and post-graduate levels. These specializations are in specific areas of space science, space technology and its broad range of applications. The specializations in the B.Tech. programmes are one of the main attractions for the prospective students and their parents. Upon successful completion of their studies and satisfying a minimum academic requirement, the students are directly recruited into one of the centres of ISRO/DoS. This unique opportunity for a career in ISRO/DoS with prospects for actively getting involved in its many ambitious projects is a highlight for students and their parents.

All the students are provided financial assistance to cover tuition, establishment, hostel, dinning, student amenity, medical and book grant (of Rs.3,000/-) for every semester. The students are given the opportunity to do their internship/project at various ISRO Centres.

7.3.4 How does the institution elicit the cooperation from all stakeholders to ensure overall development of the students considering the curricular and co-curricular activities, research, community orientation the personal / spiritual development of the students?

ISRO/DoS recruit as Scientists/Engineers those students who have successfully completed their B.Tech. programme from IIST within the stipulated four years securing a CGPA of not less than 6.5 (in a scale of 10). The eligible students undergo an extensive counselling session conducted by senior representatives from the ISRO/DoS centres prior to the recruitment. Students of the institute have the option to undergo their summer internships and final semester projects at the various ISRO/DoS centres.

The Student Advisory Board has student representatives from all branches of the B.Tech. program. The student members of this board are invited to meetings involving discussions on curricular and co-curricular activities at the institute. Students are also part of certain key committees like the library committee, hostel committee, technical committee etc. Students have been organizing an inter-collegiate annual technical festival (*Consentia*), an annual cultural festival (*Dhanak*) and an annual sports event with support from the institute.

7.3.5 How does the University anticipate public concerns with current and future programme offerings and operations?

There is a realization among the public of a strong disconnect between the pedagogical approaches for teaching science in schools and the practice of science as a research discipline. As a first step towards addressing the above concern among the public, the institute has started several educational outreach programs at the school level. An annual outreach program of this nature is the IIST@Schools, started in 2010, which has had large participation from middle school students from across the state. In addition to this effort several initiatives from the faculty and students have been taken up for promoting space science and technology among the larger public.

7.3.6 How does the institution promote social responsibilities and citizenship roles among the students? Does it have any exclusive program for the same?

The institute has public outreach programmes with the specific objective of enabling students to think about social issues in the context of their education. As part of the course on social science and ethics, students are required to do a project on any of the tribal settlements in the state which includes a study of their lifestyles and the challenges they face in terms of their basic needs, access to education, health care and the impact of environmental problems in their ways of life. Some of our students work on projects relevant to the social sciences. The institute has taken steps to adopt the nearby Karipoor village with the objective of providing technological solutions to the problems faced by the community. In this connection there is an on-going effort to map the natural resources and infrastructure of the above village.

7.3.7 What are the institutional efforts to bring in community-orientation in its activities?

The institute has an annual educational outreach activity called IIST@Schools. This program brings together more than 100 students of classes VIII and IX for a three day activity oriented workshop on science and technology. The students are selected from government, government-aided and private schools from all districts of the state with special emphasis on reaching out to village and tribal schools. In future, the student participants of IIST@Schools will be exclusively drawn from tribal schools, with preference given for schools from the neighbouring panchayats of the institute.

7.3.8 How does the institution actively support and strengthen the neighbourhood communities? How does the University identify community needs and determine areas of emphasis for organizational involvement and support? How do the faculty and students contribute in these activities?

The institute has started outreach programs carried out on a continuous basis focused at nearby villages. The outreach programs are primarily focused on supporting the educational needs of the schools in the neighbourhood. In this connection, the faculty of IIST have conducted astronomy classes for middle schools students of the Government Tribal Higher Secondary School at Meenangal. In addition, a two day intensive summer programme on Communicative English was also organized for the students of this school. Students from the neighbouring schools were invited to participate in the annual IIST@Schools educational outreach event.

7.3.9. Describe how the institution determines student satisfaction, relative to academic benchmarks? Does the institution update the approach in view of the current and future educational needs and challenges?

To ensure student satisfaction in academics, the institute follows the practice of collecting written feedbacks from students on the courses they take. The feedback forms give students the opportunity to comment on specific aspects of teaching and learning as well as the course evaluation methods. These feedbacks are used to assess teaching practices and implement changes in the course structure. The undergraduate program has in its curriculum structure electives at the stream level, at the department level and at the institute level. The electives ensure that the students have the option to choose the courses they want to study in their area of specialization as well as outside of their chosen stream.

The students are also involved in several decision making committees through their representation in the Student Advisory Board. The student members of this board are invited to meetings involving discussions on curricular and co-curricular activities of the institute. Students are also part of certain key committees like the library committee, hostel committee, technical committee etc. The student inputs are considered while bringing changes to the academic and administrative undertakings of the institute.

7.3.10. How does the institution build relationships, to attract and retain students', to enhance students, performance and to meet their expectations of learning?

The undergraduate and post-graduate programs of the institute have several unique features which are an attraction for prospective students. The specializations offered are in specific areas of space science, space technology and its broad range of applications. During the course of their study, the students have the opportunity for doing short term and long term projects at any of the ISRO/DoS centres as well as at universities abroad through the institutes exchange programme with USRA. Also, upon successful completion of their studies and satisfying a minimum academic requirement, the students are directly recruited into one of the centres of ISRO/DoS. All of these play an important role in attracting motivated students to the institute.

In the course of their program of study, there is a continuous assessment procedure in place in the form of quizzes, class tests, assignments, projects and final exam. This continuous performance feedback ensures that the students are aware of their progress and provides the scope for improving their performance. From the 2011-2012 academic year, the institute has initiated the practice of offering remedial programs for first year students of the B. Tech curriculum. These remedial courses are for slow-learners among students who are identified in the beginning of the semester as requiring special attention. Their progress is monitored by the examination committee headed by Dean (Academics). Such additional learning supports ensure improvement in the overall performance of students and their continuing progress in the program.

7.3.11. What is the institution's complaint management process? How does the institution ensure that these complaints are resolved and promptly and effectively? How are complaints aggregated and analyzed for use in the improvement of the organization, and for better stakeholder-relationship and satisfaction?

The institute has made several forums available for students to express their opinions and concerns. The Student Advisory Board with members from the student community acts as a forum for students to give their feedbacks on the curriculum, the course structure, research opportunities and teaching practices. Students are also part of the IQAC and certain key committees like library committee, hostel committee, technical committee etc. Suggestion/Complaint boxes are displayed in various academic blocks and student hostels for students to submit their grievances or complaints and their anonymity is maintained. These complaints are promptly reviewed and necessary action is taken by a committee chaired by the Director with members including the Deans, the Registrar, Heads of Departments, and senior faculty members. The institute also has a Women's Cell for addressing concerns of women.

EVALUATIVE REPORTS OF THE DEPARTMENTS

DEPARTMENT OF AEROSPACE ENGINEERING

DEPARTMENT OF AEROSPACE ENGINEERING

Aerospace Engineering deals with design and development of aircrafts, launch vehicles, and spacecrafts. Aerospace Engineering is the discipline which is closest to what is popularly known as "Rocket Science". The department offers B.Tech. and Ph.D. programmes and is in the process of formulating new M.Tech. programme.

1. Faculty profile, adequacy and competency of faculty

Faculty profile: The department has a total of 17 well qualified and experienced faculty as given below

Profile of the faculty of Department of Aerospace Engineering

Name of the Teacher	*Designation*	*Highest Qualification*	*Area of Specialization*	*Experience (years)*	
				Teaching	*Industry / R&D*
Prof. K. Kurien Issac	Senior Professor & Head of Dept.	Ph.D.	Design, Kinematics, Robotics	23	-
Dr. A. Salih	Associate Professor	Ph.D.	Computational Fluid Dynamics	20	2
Dr. M. Deepu	Asst. Professor	Ph.D.	Thermal Sciences	11	-
Dr. V. Aravind	Asst. Professor	Ph.D.	Experimental Combustion	2	-
Dr. S. Anup	Asst. Professor	Ph.D.	Fracture Mechanics	16	-
Dr. P. Chakravarthy	Asst. Professor	Ph.D.	Mechanical Metallurgy	2	1
Dr. B. S. Girish	Asst. Professor	Ph.D.	Industrial Engineering	8	-
Mr. S. R. Shine	Reader	M.Tech.	Thermal Engineering	11	6
Mr. C. R. Bijudas	Reader*	M.Tech.	Aerospace Structures	11	4
Ms. Roshina Babu	Reader ¤	M.Tech.	Structures	3	-
Mr. Sam Noble	Reader ¤	M.Tech.	Computer Aided Design	4	-
Mr. K. Jayakumar	Reader ¤	M.E.	Manufacturing Engineering	5	-
Mr. V. S. Sooraj	Reader ¤	M.Tech.	Manufacturing Technology	5	-

Dr. R. V. Ramanan	Adjunct Professor§	Ph.D.	Spaceflight Dynamics	2	26
Mr. Pankaj Priyadarshi	Adjunct Professor§	M.E.	Aerodynamics	2	19
Dr. P. Raveendranath	Adjunct Professor§	Ph.D.	Aerospace structures	2	20
Prof. V. RadhaKrishnan	Professor Emeritus	Ph.D.	Manufacturing Processes& Metrology	48	-

§ On deputation from Vikram Sarabhai Space Centre, Thiruvananthapuram

* On deputation for higher studies (to IIT Bombay)

¤ On contract basis

Adequacy: The current faculty strength is adequate with the ratio of teacher to students being 1:7 globally. In addition to faculty department have adequate supporting staffs for laboratories are given below

Competency: Competence in teaching is high on the average

The number of teaching and non-teaching staff of the department

	Male	*Female*	*Total*
No. of faculty with Ph.D. as the highest qualification	10	0	10
No. of faculty with M.E/M.Tech. as the highest qualification	6	1	7
No. of Part-time teachers	0	0	0
No. of administrative staff	0	1	1
No. of technical staff	12	0	12

2. Student profile according to programmes of study, gender, region etc .

At present there are 212 B.Tech. students out of which 14 (6.60%) are girls and 198 (93.40%) are boys. Also, 14 (6.60%) students are from home state (Kerala) while remaining 198 (93.40%) students are from 19 different states.

3. Changes made in the courses or programmes during the past five years and the contribution of the faculty to those changes

The initial curriculum was proposed by an expert committee chaired by the former director of IIT Madras Prof. R. Natarajan. Since then the curriculum and syllabus has evolved by incorporating suitable modifications more in the form of fine tuning by taking inputs from faculty, experts of board of studies and students.

4. Trend in the success rate and dropout rate of students during the last five years.

The success rate of the students who joined in the year 2007 was 89.80%. Only two students had to leave the programme due to below-par performance, one from the 2007 batch and the other from the 2008 batch.

5. *Learning resources of the department like library, computers, laboratories and other such resources*

Department library: - It is possible for all faculty and students to access the library resource including e-journals from anywhere in the institute campus. Hence there is no separate departmental library. The reference data books, technical user manuals, are available in departmental laboratories.

Computer Lab and Engineering Software: A computer lab with 30 computers have been set up and many software packages relevant for Aerospace/Mechanical engineering discipline such as Autodesk inventor, Catia, Hyperwork's Hypermesh, Autocad, Scilab, FEAST, PARAS3D, CFD++, FLUENT, ANSYS, etc. have been installed.

Instructional Labs: Currently the department have eleven instructional laboratories, and a workshop. The names of the labs and the total cost of equipment installed so far are given below.

- Manufacturing Process Lab and Workshop (₹187 Lakhs)
- Metrology & Computer Aided Inspection Lab (₹ 60 Lakhs)
- Thermal Engineering & Propulsion Lab (₹ 105 Lakhs)
- Strength of Materials Lab (₹ 38Lakhs)
- Aerospace Structures Lab (₹18 Lakhs)
- Fluid Mechanics Lab (₹ 5.0 Lakhs)
- Heat Transfer Lab (₹ 40 Lakhs)
- Aerodynamics Lab (₹ 50 Lakhs)
- Flight Mechanics Lab (₹ 2 Lakhs)
- Modelling & Analysis Lab (₹51 Lakhs)
- Physical Metallurgy Lab (₹ 50 Lakhs)

List of costly equipment in these labs are given below. These equipments are useful for both Undergraduate and research

Advanced machineries and equipments for research purposes in academic labs

S. No.	*Item*	*Cost (₹ in lakhs)*
1	Measuring Machines and Comparators	9.98
2	Rotating beam fatigue testing machine: Test speed: 3000 rpm	5.07
3	Two-stage rotary compressor	6.50
4	Test setup for fundamental studies of diffusion flame	7.00
5	Static and stability analyzing apparatus	17.94
6	Seam and spot resistance welding setups	5.00
7	Surface Grinding Machine	8.00
8	Cylindrical Grinding Machine with Internal Grinding attachment	17.00
9	Liquid fuel combustor test rig	5.24

10	Table top CNC milling machine with 6 station automatic tool changer	32.11
11	Jet engine test rig	33.00
12	Pulse jet/Ram jet test rig	27.60
13	Universal milling machine with accessories	11
14	EDM Die Sinking Machine	15.00
15	Flight demonstration wind tunnel	8.44
16	Hydraulic (static) Universal Testing Machine	8.92
17	Nozzle flow apparatus	8.94
18	Air flow modular bench	9.64
19	Creep and Rupture Testing Machine and accessories	21

6. Enhancement of the learning resources during the past five years

Department of Aerospace Engineering encourages faculty to develop learning resources in the form of lecture notes, handouts, lab manuals, models, etc. Visits are arranged to ISRO Labs to enable students to experience working of real life systems.

7. Modern Teaching methods in practice other than the lecture method

The institute has provision for multi-media facilities in most of the class rooms. Smart class room with multi-media support/video editing facility for content generation/content delivery is initiated.

8. Participation of teachers in academic and personal counselling of students

The Institute has in place a Student Activity Board which is headed by the Dean, Student Activities, and consists of faculty and student representatives. All the first year students in the institute are mentored by the faculty. The students meet their mentors regularly and discuss their personal and academic problems. These faculty members take maximum effort to rectify the problems. Any problem beyond their control is brought to the notice of the authority concerned. A department level interaction with the students is organized prior to their choosing the stream specialization. Counseling is provided to the students prior to their undertaking summer internship and the final year thesis project.

9. Details of faculty development programmes and teachers who benefited during the past five years.

10 faculty members of the department have participated in the faculty development workshop organized by Administrative Staff College, Hyderabad in 2010.

10. Participation of teachers in academic activities other than teaching and research

A short term course on “Computational methods in fluid flow and heat transfer” was organized by Dr. A Salih, Dr. G Rajesh and Dr. Deepu M.

The department of Aerospace engineering encourages faculty to attend short term courses and workshops attended by faculty during the last four years is given below.

The short term courses and workshops attended by faculty during the last four years

Name of the faculty	Details of the programme
Dr. S. Anup	1. Smart materials, July 2009, Government Engineering college Bartonhill sponsored By Director of Technical Education, Kerala 2. Research orientation programme on numerical simulation July 2009, Government Engineering college Barton hill sponsored AICTE. 3. Research orientation programme on numerical simulation, July 2009, GECBH, Thiruvananthapuram
Dr.R.V.Ramanan	A workshop on "Threat to Earth from Asteroids and comets" was organized on 28th November 2010 in IIST
Dr. Deepu M.	1. "CFD in Combustion" Programme 'AD', Hyderabad, November 13-16, 2007, under the auspices of Combustion Institute (Indian Section). 2. "Optimization Techniques in Engineering", January 8-20, 2007. NSS College of Engineering, Palakkad. 3. "Advanced Embedded Systems", February 13-25, 2007. NSS College of Engineering, Palakkad. 4. "Recent Trends in Engineering Practices", December 11-22, 2006, NSS College of Engineering, Palakkad. 5. "State of Art Technologies in I.C. Engines", May 29 to June 2, 2006, IIT Madras. 6. "Embedded Systems", March 13-25, 2007. NSS College of Engineering, Palakkad.
Dr. Girish B S	1. Operational research applications in Engineering and management organized by Anna University, Trichy. 2. Advanced Tools and Techniques for Research in Engineering problems by NIT Trichy. 3. Operational research and information technology in supply chain management by Thiagarajar College of Engineering Madurai.
Mr.K.Jayakumar	1. Recent Trends in Machining, at Amrita University, Coimbatore (25-8 to 26-8- 2011.) sponsored by ISRO & DRDO. 2. Soft computing using MATLAB organised by AICTE at Kongu Engineering College, Erode (8-1-2011 to 29-1-2011). 3. Measurements during Metal Cutting (1 day) organized by Karunya University, Covai (13 sep-2008). 4. Electron Microscopy (3 Days) sponsored by TEQIP at NIT, Trichy (6-8 Sep 2008). 5. Micro/Nano-scale Phenomena (14 days) organised by MHRD & AICTE at NIT, Calicut (6-19 July 2008). 6. Introduction to Research (2 days) TEQIP at NIT, Calicut (24-25 Jan 2008).

Mr. Sam Noble	1. Numerical Methods for non-linear finite element computations organised by P.A. Aziz College of Engineering and Technology, Karakulam, Trivandrum (9th to 20th February 2009). 2. Effective teaching and learning methodology organised by P.A. Aziz College of Engineering, Karakulam, Trivandrum, 21st to 25th July 2008.
Mr. Shine S.R.	Cryocoolers: Theory, Design and Practice organised by IIT Bombay (19-22 February 2008)

11. Collaborations with other departments and institutions at the national and international level and their outcome during the past five years.

Associations with others are as follows.

- Institute has a student exchange programme with Universities Space Research Association (USRA). One of the students of Aerospace Engineering has done final semester project work at University of Texas, Arlington, USA.
- Faculty members of the department are involved in technical reviews of ISRO projects. This would lead to projects on some critical issues, and close collaboration with associated teams in ISRO.
- For setting up of advanced laboratory facilities, expertise of scientists of ISRO and other institutions were made use of.

12. If research is a significant activity, the thrust areas of the department

- Thermal and Propulsion
- Structures
- Aerodynamics and Space flight dynamics
- Manufacturing
- Advanced Propulsion and Laser Diagnostics and High Speed Flow

13. Details of the ongoing projects and projects completed during the last five years.

There are five ongoing projects in the department funded by Department of Space. For details refer response to criteria III 3.2.1

14. 'Programmes by research' offered by the university.

Department of Aerospace Engineering offers Ph.D. for external candidates, ISRO scientists and IIST faculty. 14 scholars are currently registered for Ph.D. in Aerospace Engineering, IIST. For details refer criteria III 3.2.3

15. Publications of the faculty, for the past five years. Details regarding citation index and impact factor analysis.

The complete list of publications is given in criteria III 3.2.9. The average citation of our journal papers of the last five years is 1.6, while the average impact factor 1.77. Citation details of publications of faculty of Department of Aerospace Engineering are given below.

Citation details of Publications of faculty of Department of Aerospace Engineering

S. No.	Name of the Faculty Member	No. of Citations	The most cited article
1	Dr. K. Kurien Issac	12	K. Kurien Issac and Sunil K. Agrawal, "An investigation into the use of springs and wing motions to minimize the power expended by a pigeon-sized mechanical bird for steady flight", Journal of Mechanical Design, Transactions of ASME, vol. 129, p. 381., 2007.
2.	Dr. B. S. Girish	12	B. S. Girish and N. Jawahar , Scheduling Job shops associated with multiple routings using Genetic and Ant Colony heuristics, International Journal of Production Research, Vol. 47, no. 14, pp. 3891 — 3917, 2009.
3.	Mr. Sooraj V. S.	5	Sooraj V. S, "Effect of work material properties and machining conditions on the accuracy and erosion efficiency of micro electric discharge drilling", International Journal of Abrasive Technology, 2009.
4.	Dr. A. Salih	5	A Level Set Formulation for the Numerical Simulation of Impact of Surge Fronts,Ind.Academy.of Sci.,31,697-707,2006
5.	Dr. Aravind V.	4	Conley, A., Vaidyanathan, A., Segal, C., "Heat Fluxes Measurements for a GH2/GO2 Single-Element, Shear Injector, Journal of Spacecraft and Rockets, 44 (3), pp. 633-639, 2007.
6.	Dr. Deepu M.	3	Deepu, M., Gokhale, S. S. and Jayaraj, S., Recent advances in experimental and numerical analysis of scramjet combustor flow fields, Journal of Aerospace Engineering; Institution of Engineers (India), Vol.88, May 2007.
7.	Dr. R. Venkatta Ramanan	1	Precise lunar gravity assist transfers to Geo-stationary Orbits,AIAA Journal of Guidance ,Control&Dynamics,29,pp 500-502,2006
8.	Mr. Pankaj Priyadarshi	1	Pankaj Priyadarshi, "Aerodynamic design optimization in space vehicle systems", CFD Journal, pp 403-414, Vol.16, No. 4, 2008.
9.	Dr. P. Chakravarthy	1	P. Chakravarthy, Uday chakkingal and P. Venugopal, "Influence of Temperature on the Forming Limit Diagrams of Sintered P/M

			Preforms of Steel", Mat. Sci. and Engg-A . 485,395-402, 2008.
10.	Dr. S. Anup	1	S. Anup, S. M. Sivakumar, and G. K. Suraishkumar, Structural arrangement effects of mineral platelets on the nature of stress distribution in bio-composites. CMES – Computer Modeling in Engineering and Sciences, 18 (2), 145 – 153, 2007.

The impact factor details of the various publications are summarized below.

Impact factor of Publications of faculty of Department of Aerospace Engineering

Faculty Member	*Title of the Journals*	*Journal's Impact factor*
Dr. S. Anup	International Journal of Crashworthiness	0.62
	Computer Modeling in Engineering and Sciences	4.3
	Journal of Mechanics in Medicine and Biology	0.12
	Journal of the Mechanical Behavior of Biomedical Materials	3.1
Dr. Deepu M.	International Journal of Computational Methods	1.167
	Journal of Applied Fluid Mechanics	0.61
	Defense Science Journal	0.304
Dr. P. Chakravarthy	Powder Metallurgy	0.783
	Material Science and Engineering	2.31
Dr. B. S. Girish	International Journal of Production Research	1.033
Mr. Sooraj V. S.	International Journal of Advanced Manufacturing Technology	1.068

16. Participation of the department in the extension activities of the university.

A few of the faculty members have been involved in science popularization and outreach activities in various schools in the district. In addition, the faculty members have also participated in the Institute's annual outreach programme, IIST@schools.

17. Method of continuous student assessment

The evaluation methods are periodic quizzes, assignments, periodical tests, oral examination, and end semester examinations. Students are monitored on a continuous basis in a Semester system of evaluation. Continuous evaluation during the semester has 50% weight. This includes two announced periodical quizzes (with 15% weight each) as scheduled in the

academic calendar. Besides, class tests, tutorials and assignments carrying 20% weight are also given. End-semester examination carries remaining 50% weight. The details on the evaluation for a course are communicated to the students by the teacher who is handling that course, at the beginning of the semester. All answer books of periodical quizzes and class tests are returned to the students after evaluation. The answer books of the end-semester examinations are scrutinized by the faculty once again before the results are announced.

18. Placement record of the past students and the contribution of the department to the student placements

44 students graduated from our department of which 41were absorbed in various ISRO/DoS. Details are given below.

Placement record-2007Admission

Centre	*No. Of students*
VSSC, Thiruvananthapuram	9
LPSC, Thiruvananthapuram	9
IISU, Thiruvananthapuram	4
SDSC, Shriharikotta	2
ISAC, Bangalore	15
Semi Conductor Lab, Chandigarh	2
Total	41

19. Significant achievements of the department or faculty or students during the past five years

- **Kuldeep Sharma and John Vivian Prashant** of IIST Thiruvananthapuram secured Second position under "Aerospace Young Engineer Award 2010" instituted by Mahindra Satyam for the Project: The numerical simulation of a staged transverse injection behind a rearward facing step into a mach 2 stream in a confined environment (Category**: Aerodynamics**)
- **Nitin Kumar Mishra** of Aerospace Engineering submitted a paper on "Development of Mission Design Process for Collision avoidance of Near earth Objects" which was accepted and duly presented IAA Planetary Defense Conference, Bucharest, Romania, May 2011.

20. Participation of the department in COSIP/COHSSIP/ SAP CAS /DSA/ DRS/ FIST etc.

Not applicable

21. Plan of action of the department for the next five years

i. *Programmes*: Department of Aerospace Engineering plans to start Dual Degree, M.Tech. and M.S. programmes in Aerospace Engineering, under the different specializations

ii. *Research*: The department's research labs are being setup and research topics which are relevant to aerospace discipline are offered in Ph.D. programme.

iii. *Collaborations*: Collaboration with ISRO and other R&D organization and academic institution will expand.

iv. *Instructional labs*: The existing eleven instructional labs of the department will be strengthened with additional experiments.

v. *Teaching aids and supportive materials*:-Faculty of this department develop their teaching resources on a continual basis.

22. Any other highlights.

Department encourages the students to learn though experimentation right from the beginning of their professional course. In this regard an assembly disassembly laboratory has been setup for first year students, wherein students are given parts of various machines to assemble and make them workable. Faculty of the department encourages the student to take up small course projects and task based assignments for enhancing their knowledge.

Academic laboratories of this department are equipped with modern and advanced equipments for enhanced learning. Most of the advanced machineries have computer aided analysis support that helps the student to get acquainted with respective ICT resources. Advanced facilities in laboratories are attracting many students to do their internship and project work in our facilities.

Department has an excellent manufacturing facility to cater the needs of the entire institute. An advanced flow diagnostics and high speed flow laboratory are under development shall enhance research facilities of the department.

Students from the department of Aerospace Engineering is actively involved in the sounding rocket project and aeromodelling activities of the institute.

DEPARTMENT OF AVIONICS

DEPARTMENT OF AVIONICS

1.Faculty profile, adequacy and competency of faculty.

Name of the faculty	*Designation*	*Highest Qualification*	*Specialization*	*Exp yrs*
Dr. Thomas Kurian	Professor & Head	Ph.D.	Digital Electronics and Control	36
Dr. Animesh Biswas	Visiting Professor	Ph.D.	RF and Microwave	26
Dr.B.S.Manoj	Asso. Professor	Ph.D.	Computer Networks	9
Dr. N.Selvaganesan	Asst. Professor	Ph.D.	System Identification and Control	11
Dr. Rajesh Joseph Abraham	Asst. Professor	Ph.D.	Power systems Control	7
Dr. Deepak Mishra	Asst. Professor	Ph.D.	Soft Computing	5
Dr. J.Sheeba Rani	Asst. Professor	Ph.D.	Digital Image Processing	11
Dr. Priyadarshnam	Asst. Professor	Ph.D.	Control and Electrical Networks	2
Dr.R. Lakshmi Narayanan	Asst. Professor	Ph.D.	Communication Engineering	2
Dr. Basudeb Ghosh	Asst. Professor	Ph.D.	RF & Microwave Engineering	3
Mrs. M.Vanidevi	Reader	M.E.	Communication Engineering	8
Mrs. S.Chris Prema	Reader *	M.E.	Communication Engineering	9
Ms.B.Sivashanmugavalli	Reader*	M.E.	Communication Engineering	7
Mrs. Sumi Baby	Reader*	M.E.	VLSI	5
Dr. Vikraman Nair	Emeritus Professor	Ph.D.	Computer Science	39
Shri. Sam Zachariah	Adjunct Professor **	M.Tech.	Control Systems	23

* on contract basis; ** Deputed from VSSC

The number of teaching and non-teaching staff of the department

	Male	*Female*	*Total*
No. of teachers with Ph.D. as the highest qualification	10	1	11
No. of teachers with M.E.,/ M.Tech., as the highest qualification	1	4	5
No. of administrative staff	1	1	2
No. of technical staff	2	6	8

2. Student profile according to programmes of study, gender, region etc

At present there are 250 B.Tech. students out of which 33 (13.20%) are girls and 217(86.80%) are boys. Also, 16 (6.4%) students are from home state (Kerala) while remaining 234 (93.6%) students are from 19 different states.

3. Changes made in the courses or programmes during the past five years and the contribution of the faculty to those changes

The overall curriculum of Avionics was initially framed by expert members from IIT's / IISc /ISRO centers which was chaired by Prof. Natarajan, Former Chairman, AICTE. The following courses underwent minor revisions.

- A control system component was included in Control and guidance course.
- A new course 'Electromagnetic & Wave Propagation' was introduced as a prerequisite to RF & Microwave Engineering course.
- Differential Amplifier, Instrumental amplifiers, Integrated circuits and Filter design was introduced in Analog Electronic Circuits.
- The addition experiments like multistage amplifiers and stage tuned amplifiers were included in Analog electronics lab.
- Advanced topics 'Design of FPGA, Complex CMOS design' were introduced in Digital electronics and FPGA design.
- In place of 8085, 8086, ATMEL and PIC microcontroller were incorporated in Microprocessors and Microcontrollers course.
- Measurement of Gain and Noise figure was introduced in RF and microwave lab.
- LAN, WAN, MAN, Ethernet was introduced with existing content of the course Computer networks.
- Introduction to conducted EMI and power filters was included in Power Electronics.
- Synthetic aperture radar and MST radar was included in Radar systems.
- Sensor fusion was introduced in Navigation systems and sensors.
- "Smart Sensors & MEMS" were introduced in the revised syllabus of "Measurements & Instrumentation".

4. Trend in the success rate and dropout rate of students during the last five years

The success rate of the students who joined in the year 2007 was 95%. Due to below-par performance two students were dropped in 2007 and one student was dropped in 2008.

5. Learning resources of the department like library, computers, laboratories and other such resources

- **Library:** All the library resources such as books, journals and periodicals are catered to by the central library of the institute which is accessible by all faculty, staff and students. The department maintains handbooks and manuals in its labs.
- **Computer and software related** – In general 16 computers for a batch of 30 are available in each laboratory. The following software used by Avionics department in various labs:
  - MATLAB, Labview, Mentor Graphics IC Design Tool , Synopsis IC Design Tool, Microwave Office, PSPICE, Vector Field, Emulators, Discovery Software, Network Simulator V-2
- **Instructional Labs:** They are listed as follows along with the major laboratory equipments.

S. No	*Name of the Laboratory*	*Major Equipments*
1	Basic Electrical and Electronics Engineering	Electrical Power Frames which comprises i) DC motor and Generator ii) Single Phase and Three phase Induction machine iii) Single phase and three phase transformers iv) Power Meters • Variable frequency Induction machine • Vector Field magnetic analysis • GWINSTEK SFG 1013,3MHz Function generator • Fluke 170 TRUE RMS digital multimeter
2	Analog Electronic Circuit	• GwInstekAnalog oscilloscope 100MHz • Tektronix Arbitrary function generator 100MHz • Tektronix Arbitrary function generator 25MHz • GwInstek DC Power supply,3channels • DSO • Gwinstek Linear IC Tester • Weller Soldering station
3	VLSI and E-CAD	• Xilinx XUP VIRTEX-II PRO Digilent FPGA Boards • Xilinx XUP VIRTEX-V DigilentPRO FPGA Boards • Altera DE1 FPGA Board(Donated) • ADC/DAC Interface Card

		• 5 Mega Pixel Digital Camera Package • Video Decoder Card • Tektronix 136 channel Logic Analyser • Xilinx 13.2 • Questasim 6.5C • Modelsim • Synopsis IC Design Tool • Cadence IC Design Tools • Calibre Parasitic Extraction Tools • ORCAD 16.1
4	Digital Electronics	• Digital trainer kit • Mechatronics Linear analog and digital IC tester
5	Microprocessor and Microcontroller	• 8085, 8051, 8086 • 8051 Microcontroller Trainer kit • 8085, 86 Microprocessor Trainer kit • PIC Microcontroller (PIC 16F 877) ESA-SARAYU-PIC-03 • MPLAB ICD3 Debugger • MSP430 F5438 Micro controller (Texas Instruments) • MSP 430-USB- Debugger Interface • PIC16/18 PIC DEM2 Plus Demo Board • PIC PROG POD-5 • MPLAB ICD2 In-circuit Debugger • DEV KIT 8000 OMAP 3000 Evaluation Kit • MPLAB IDE V8.36
6	RF and Micro Wave Communication	• Klystron setup • Gun diode setup • Spectrum Analyzer 9KHz-18GHz(Rohde &Schwarz) • Spectrum Analyzer 9KHz-3GHz(Rohde &Schwarz) • Vector network analyzer(9KHz-3GHz) • Vector signal generator 9KHz-3.2GHz • Signal analyzer(9KHz -3.6GHz) • Signal generator (9KHz-3.2GHz) • RF Transceiver kit • AVR Software
7	Digital Signal Processing	• TMS 320 C 6713 DSP starter kit(DSK) module

		Spectrum Digital • TMS 320 F2812 DSK Spectrum Digital (TMS 320C6455 DSK Spectrum Digital • ADSP-21369-Kit • Image Daughter card for DSK • CCD Camera Module • Multichannel audio daughter card • Host port Interface daughter card • Arbitrary Function generator (Tektronix –AFG 3102)Dual Channel 1GS/s 100MHz • Tektronix TDS 2014C. Four channel 100MHz, 2GS/s • IC Tester GWINSTEK • Code Composer Studio
8	Digital Communication	• WICOMM-T • Tektronix-MSO3014,100MHz, 4+16 channel
9	Control and Guidance	• Inverted Pendulum • Twin Rotor MIMO Systems • DC/AC Servo Positioning • Magnetic Levitation Systems • Active mass suspension control • Digital Storage Oscilloscopes • Rover • Matlab Simulink • LEGO elecro-mechanical
10	Instrumentation and Measurement	• Labview based LVDT, Temperature sensors and strain gauges • Dspace card • Level and Flow Process • Pressure Process control • Dead weight tester • PC based Temperature calibrator • Transducer Kit with following Sensors i) Light Sensors ii) Temperature sensors iii) Electro mechanical systems
11	Computer Networks	• Network Simulator V-2
12	Power Electronics	• Feed Back Thyristor Principles and Motor Control Trainer Kit(230/400V 50Hz)

		• Agilent Technologies Solar Array Simulator • Weller Soldering Station (60w, 220/240V 50/60Hz) • Tektronix AFG 3022B Dual channel 250MHz • Tektronix TPS2014 100MHz DSO • Orcad 16.1 • MATLAB 2009a
13	Navigation Systems and Sensors	• 3 DOF Gyro • Rate Gyro • Scan Gyro • Accelerometer • DTG Accelerometer test station

7. Enhancement of the learning resources during the past five years

Department encourages faculty to develop learning resources in the form of lecture notes, handouts, lab manuals, models, etc.

- **Library** - In the area of learning resources IIST has procured number of text as well as reference books in addition to book bank source. Institute have also provides online access to leading international journals like IEEE, Elsevier, Science Direct, etc as source for research.
- **ISRO experiments** – A few interesting experiments were conducted at ISRO laboratories by Scientist/Engineer of various ISRO units to enable the students (Semester I to IV) to explore the real time problems associated with launch vehicle applications and are as follows:
  - Active filter
  - DC-DC Converters
  - Electromechanical Servo Control System
  - Onboard Computers for Launch Vehicles
  - Linear Variable Differential Transformer Signal Conditional Circuits
  - Measurement of Electrical parameters of an Operational Amplifier
  - Design and Testing of an Onboard Signal Conditioning Package
  - Stepper Motor Based Actuator & Drive Circuit

7. Modern Teaching methods in practice other than the lecture method

The institute has provision for multi-media facilities in most of the class rooms. Smart class room with multi-media support/video editing facility for content generation/content delivery is initiated.

8. Participation of teachers in academic and personal counseling of students

The Institute has in place a Student Activity Board which is headed by the Dean, Student Activities, and consists of faculty and student representatives. All the first year students in the institute are mentored by the faculty. The students meet their mentors regularly and discuss their personal and academic problems. These faculty members take maximum

effort to rectify the problems. Any problem beyond their control is brought to the notice of the authority concerned. A department level interaction with the students is organized prior to their choosing the stream specialization. Counseling is provided to the students prior to their undertaking summer internship and the final year thesis project.

9. Details of faculty development programmes and teachers who benefited during the past five years

5 faculty members of the department have participated in the faculty development workshop organized by Administrative Staff College, Hyderabad in 2010.

10. Participation of teachers in academic activities other than teaching and research.

Workshop and Training Organised

S. No	*Workshop*	*Convener*	*Duration*
1	Workshop on Digital Signal Processing using Matlab - for scientist and engineers in ISRO centres	Dr.Thomas Kurian, Dr. J.Sheeba Rani & Mrs. M.Vanidevi	June 2009
2	Short term course in "Control System Design – CSD2010"	Dr.Thomas Kurian Dr.N.Selvaganesan	August 3-5, 2010
3	A Short-Term Course in "Soft and Evolutionary Computing"	Dr Deepak Mishra	December 19-21, 2011
4	Basics of Signals and Systems and adaptive filtering technique	Dr. J.Sheeba Rani & Mrs. M.Vanidevi	January 2010
5.	VHDL Simulation Tool and Parasitic Extraction Tool (Training on Questa)	Dr. J.Sheeba Rani	23rd & 24th December 2009
6.	VHDL Simulation Tool and Parasitic Extraction Tool (Training on Calibre)	Dr. J.Sheeba Rani	29th & 30th December 2009
7.	Synopsys IC Design tools(In-house Training)	Dr. J.Sheeba Rani	25 Jan 2009 to 3rd Feb 2009
8.	FPGA Design using System Generator (In-house Training)	Dr. J.Sheeba Rani	: 28th to 31st March 2011
9.	Advanced FPGA Architecture and Design flow (In-house Training)	Dr. J.Sheeba Rani	12th to 20th Dec 2011

Workshop Attended

Sl. No	Title of Short term courses / Workshop	Name of the Faculty	Duration
1	Satellite Technology :Trends and future perspectives, SAC, Ahmedabad	S.Chris Prema	12/1/2011
2	Aerospace and Defense Symposia, Agilent technologies, Bangalore.	S.Chris Prema & M.Vanidevi	24/06/2011
3	Latest Trends in Telecom 2009, BSNL, Trivandrum	S.Chris Prema	11/12/2009
4	Management technology for educational practices, Bangalore	N.Selvaganesan	29/07/2009 & 30/07/2009
5	Short term course on Microwave, IIT, Kharagpur,	B.Sivashanmugavalli	Jan 2010 (one week)
6	INCEMIC (Workshop on Electromagnetics)", SAMEER, Bangalore	B.Sivashanmugavalli	Nov 2010 (one week)
7	Wireless kit demonstration workshop, IIT Chennai	M.Vanidevi	June, 2011 (Two weeks)
8	Chandrayan data analysis, PRL, Ahmedabad	M.Vanidevi	Jan 12th 2011 (Two weeks)
9	Chandrayan data analysis, PRL, Ahmedabad	J.Sheeba Rani	Jan 12th 2011 (Two weeks)
10	GARUDA-NKN Partners meet 2011, Bangalore	B. S. Manoj	15-16 July 2011

- The faculty members of the department also participate as reviewers/editors of international journals/experts in committees.
- Some of the faculty chaired a session / delivered a key note address in the International/National conference which was organized by different institution/ industries across the country.

11. Collaborations with other departments and institutions at the national and international level and their outcome during the past five years.

Associations with others are as follows.

- Institute has a student exchange programme with Universities Space Research Association (USRA). One of the students of Avionics has done final semester project work at University of Texas, Arlington, USA.
- Faculty members of the department are involved in technical reviews of ISRO projects. This would lead to projects on some critical issues, and close collaboration with associated teams in ISRO.

- For setting up of advanced laboratory facilities, expertise from ISRO scientists and other institutions were utilised.

12. If research is a significant activity, the thrust areas of the department

- Robotics and computer vision
- Fault Tolerant systems
- Adaptive Control systems
- Virtual Instrumentation and Smart Systems
- Power converters
- Smart sensors and networking
- Low noise CMOS design
- Antenna design
- Signal processing and validation for ground penetration radar
- MIMO OFDM Communication systems

13. Details of the ongoing projects and projects completed during the last five years.

- Four projects are presently ongoing for details refer Part-II criteria III 3.2.1

- Centre of excellence in "Virtual Reality - VR"
  - ✓To build a virtual reality capability which allows IIST to utilize and demonstrate its research strengths in areas of computer visualization and 3D imaging, creating 'cave' with near real environments for terrestrial and interplanetary missions
    Phase I (2010 -2012)
  - ✓Creation of virtual reality environment and Immersion to develop VR in the following area: Phase II (2012 -2014)
    - ✓ Space exploration (lunar surface)
    - ✓ Launch vehicle simulation
    - ✓ Tele-presence applications to space

14. 'Programmes by research' offered by the university

10 students are presently undergoing Ph.D programme for details refer to Part-II Criteria III-3.2.3

15. Publications of the faculty, for the past five years. Details regarding citation index and impact factor analysis

The complete list of publications is given in criteria III 3.2.9. The average citation of our journal papers of the last five years is 2.55, while the average impact factor 1.43. Citation details of publications of faculty of Department of Aerospace Engineering are given below.

Conference/ Seminars attended by the faculty members (Last five years)

1. V. N. Mishra, R. K. Chaudhary, K. V. Srivastava and A. Biswas, "Compact Two Pole Bandpass Filter Implemented Using Via-free Composite Right/Left Handed Transmission Line with Radial Stubs" accepted for presentation in 41th European Microwave Conference (EuMC), 9 Oct. -14 Oct., 2011, in Manchester Central, Manchester, United Kingdom (UK).
2. R. K. Chaudhary, G. K. Singh, K. V. Srivastava and A. Biswas "Coaxial Fed Half-Split Multilayer Cylindrical Dielectric Resonator Antenna for Wideband

Applications" accepted for presentation in 41th European Microwave Conference (EuMC), 9 Oct. -14 Oct., 2011, in Manchester Central, Manchester, United Kingdom (UK).

3. Varish Diddi, Kumar Vaibhav Srivastava and Animesh Biswas, "Design of Low Power LNA for GPS Application" has been accepted for publication in 2011 International Conference on Circuits, System and Simulation (ICCSS 2011) May 28-29, 2011 in Bangkok, Thailand
4. Saumen Mondal, Kumar Vaibhav Srivastava and Animesh Biswas "A 600MHz, 6th Order, Highly Linear Gm-C Bandpass Filter Design" has been accepted for publication in IEEE Asia Pacific Conference on Circuits and Systems (APCCS 2010), 6 - 9 December 2010, Hilton Kuala Lumpur and Le Meridien Kuala Lumpur, Malaysia.
5. Raghvendra Kumar Chaudhary, Kumar Vaibhav Srivastava and Animesh Biswas "Four Element Multilayer Cylindrical Dielectric Resonator Antenna Excited by a Coaxial Probe for Wideband Applications" has been accepted for publication in National Conference on Communications (NCC 2011), 28 - 30 January 2010, IISc Bangalore, India.
6. Varish Diddi, Kumar Vaibhav Srivastava and Animesh Biswas "A 6 mW Low Noise Amplifier for 3.1-10.6 GHz UWB Application" has been accepted for publication in National Conference on Communications (NCC 2011), 28 - 30 January 2010, IISc Bangalore, India.
7. Ankur Prasad, Mausumi Roy, Animesh Biswas and Danielle George, "Application of Genetic Algorithm to Multi-objective Optimization in LNA Design," has been accepted in Asia Pasific Microwave Conference, Yokohame, Japan, 7-10 December 2010.
8. G. Naga Satish, K. V. Srivastava, A. Biswas and D. Kettle, "Band-pass Filter using Symmetrical Left-Handed Transmission Line Zeroth-Order Resonators," • Proceedings of 5th German Microwave Conference (GeMiC) 2010, Berlin, Germany in March 2010.
9. Raghvendra Kumar Chaudhary, K. V. Srivastava, Vishwa V. Mishra and Animesh Biswas, "Multilayer Multi-Permittivity Dielectric Resonator: A new approach for improved spurious free window," 40th European Microwave Conference 2010 Paris, pp. 1194-1197, Sept 2010.
10. Raghvendra Kumar Chaudhary, Kumar Vaibhav Srivastava and Animesh Biswas "An Investigation on Three Element Multilayer Cylindrical Dielectric Resonator Antenna Excited by a Coaxial Probe for Wideband Applications", in IEEE Asia-Pacific Conference on Applied Electromagnetics (APACE 2010), Port Dickson, Malaysia. Nov. 2010.
11. Viveka Nand Mishra, Raghvendra Kumar Chaudhary, Kumar Vaibhav Srivastava and Animesh Biswas "Compact Two Pole Bandpass Filter Using Symmetrical Composite Right/Left Handed Transmission Line with Vias" in IEEE Asia-Pacific Conference on Applied Electromagnetics (APACE 2010), Port Dickson, Malaysia. Nov. 2010.
12. Akhilesh Mohan, Animesh Biswas, D. Kettle and A. Gibson, "Bandstop Filter Using Hybrid EBG Structure," 39th European Microwave Conference, Rome, Italy, Sept.2009.
13. G. Naga Satish, K. V. Srivastava, A. Biswas and D. Kettle, "A Via-Free Left Handed Transmission Line with Radial Stubs," • Proceedings of Asia Pacific Microwave Conference-2009, Singapore, December 2009.

14. Akhilesh Mohan, Surinder Singh and Animesh Biswas, " Design Procedure for Quadruple Band BandPass Microwave Filters", Proceedings of Asia Pacific Microwave Conference 2008, Hong-Kong, December, 2008.
15. V. Madhusudana Rao, Akhilesh Mohan and Animesh Biswas, "Realization of Dual Bandpass Filters with Metamaterials in Three Coupled Finlines" Proceedings of Asia Pacific Microwave Conference 2008, Hong-Kong, December, 2008.
16. Basudeb Ghosh, D. H. Yang, J. C. Cheng, and Jeffrey S. Fu, "Bandpass Characteristics of Substrate Integrated Waveguide Loaded With Hilbert Curve Fractal Slot," Proc. IEEE International Workshop on Electromagnetics (iWEM), Taipei, Taiwan, Aug. 2011.
17. D. H. Yang, Basudeb Ghosh, Jeffrey S. Fu, H. Msheikh, and N. C. Karmakar "Band rejection controlled amplitude modulated non-uniform electromagnetic bandgap structure," Proc. IEEE International Workshop on Electromagnetics (iWEM), Taipei, Taiwan, Aug. 2011.
18. D. H. Yang, Jeffrey S. Fu, J. C. Cheng, and Basudeb Ghosh, "Band rejection design for Chebyshev modulated dumbbell DGS bandpass filter", Proc. of 4th International NanoElectronics Conference, Taiwan, June, 2011.
19. Basudeb Ghosh, S. N. Sinha, and M. V. Kartikeyan, "Fractal Apertures in Waveguides and Conducting Screen", TENCON 2008, Hyderabad, India, November 18-21, 2008.
20. A. Verma, C. Verma, B. R. Tamma, and B. S. Manoj, "New Link Addition Strategies for Multi-Gateway Small World Wireless Mesh Networks," Proceedings of IEEE ANTS 2010, December 2010**.**
21. J. Daftari, B. R. Tamma, B. S. Manoj, and Ramesh Rao, "On Capturing Spatio-temporal Factors in Cognitive Network Channel Selection," Proceedings of IEEE ANTS 2010, December 2010.
22. Yao Liu, B. R. Tamma, B. S. Manoj, and Ramesh Rao, "On Cognitive Network Channel Selection and the Impact on Transport Layer Performance," Proceedings of IEEE Globecom 2010, December 2010.
23. G. Quer, S. N. H. Meenakshisundaram, B. R. Tamma, B. S. Manoj, Ramesh Rao, and M. Zorzi, Proceedings of IEEE Globecom 2010, December 2010.
24. B. Balaji, B. R. Tamma, B. S. Manoj, "Cognitive Network Adaptation using Bayesian Networks," Proceedings of IEEE Globecom 2010, December 2010.
25. G. Quer, S. N. H. Meenakshisundaram, B. R. Tamma, B. S. Manoj, Ramesh Rao, and M. Zorzi, "A Novel Power Saving Strategy for Greening IEEE 802.11 based Wireless Networks," "Cognitive Network Inference through Bayesian Network Analysis," Proceedings of IEEE Milcom 2010, October-November 2010**.**
26. Yao Liu, B. R. Tamma, B. S. Manoj, and Ramesh Rao, "Traffic Prediction for Cognitive Networking in Multi-Channel Wireless Networks," Proceedings of IEEE INFOCOM-2010 Workshop on Cognitive Wireless Communications and Networking 2010, April 2010.
27. "J. Daftari, B. R. Tamma, B. S. Manoj, and Ramesh Rao, "A Cognitive Access Point using Bayesian Networks IEEE Globecom 2010 Demonstrations, Miami, Florida, December 2010.
28. B. R. Tamma, B. S. Manoj, and Ramesh Rao, "CogAP: An Autonomous Cognitive Access Point for Wi-Fi Hotspots," IEEE INFOCOM 2010 Demonstrations, San Diego, March 2010.

29. Chavali Krishna Bharadwaj & Rajesh Joseph Abraham, "Suppressing Oscillations in Tie power and Area Frequency in a Hydrothermal Power System with Capacitive Energy Storage", Proc. of the International Conference on System Dynamics and Control, Manipal, Aug. 19 – 22, 2010.
30. N.Selvaganesan, Rajeev Ranjan, Gaurav Bholotia and Sunil Kumar, "Realtime T-S Fuzzy Identification for Twin Rotor MIMO System", Int. conf. on SYMOPA , PP 5-10, 2010.
31. N.Selvaganesan, Rajeev Ranjan, Gaurav Bholotia and Sunil Kumar, "Realtime T-S Fuzzy Identification for Twin Rotor MIMO System", Int. conf. on SYMOPA 2010, PP 5-10.
32. Herman, J. Sheeba Rani,J. Devaraj,D., ""Face Recognition using Generalized Pseudo Zernike Moment", Proceedings of 2009 Annual India IEEE Conference INDICON 2009, Ahmedabad, India.
33. B. R. Tamma, B. S. Manoj, and Ramesh Rao, "An Autonomous Cognitive Access Point for Wi-Fi Hotspots," in Proceedings of IEEE Globecom 2009, November-December 2009.
34. "A Learning Framework for Autonomic Control of Wi-Fi Hotspots," B. R. Tamma, B. S. Manoj, and Ramesh Rao, Proceedings of Learning for Networks 2009 as part of ACM SIGMETRICS/Performance 2009, June 2009.
35. N. Baldo, B. R. Tamma, B. S. Manoj, and Ramesh Rao, "A Neural Network based Cognitive Controller for Dynamic Channel Selection," Proceedings of IEEE ICC 2009, June 2009.
36. B. R. Tamma, N. Baldo, B. S. Manoj, and Ramesh Rao, "Multi-Channel Wireless Traffic Sensing and Characterization for Cognitive Networking," in Proceedings of IEEE ICC 2009, June 2009.
37. Rajesh Joseph Abraham, D. Das & Amit Patra, "Bilateral Load Following in a Restructured Power system with Local Controllers", Proc. of the 7th Asian Control Conference (ASCC 2009), Hong Kong, August 27-29, 2009.
38. D. Raja, N. Muraly, V. Vijayavelan and N. Selvaganesan ,"A 24-Pulse AC-DC Converter for Improving Power Quality using Fork Connected Transformer", Proceedings of the Int Conf. on Control, Automation, Communication and Energy Conservation –, pp 753-761. 2009.
39. T. Vinopraba, N.Sivakumaran, N.Selvaganesan and S.Narayanan, "Stabilization Using Fractional-Order PID alpha Controllers for First Order Time Delay System", IEEE-ACT, pp 725-728, 2009.
40. S.Narayanan, N.Sivakumaran, T.Vinopraba and N.Selvaganesan, "IMC based PID controller design for gas turbine plant", Int. conf. on MS pp 386-390. '09
41. D. Raja, N. Muraly, V. Vijayavelan and N. Selvaganesan,"A 24-Pulse AC-DC Converter for Improving Power Quality using Fork Connected Transformer",. Proceedings of the Int Conf. on Control, Automation, Communication and Energy Conservation – 2009, pp 753-761.
42. T. Vinopraba, N.Sivakumaran, N.Selvaganesan and S.Narayanan, "Stabilization Using Fractional-Order PID alpha Controllers for First Order Time Delay System",. IEEE-ACT2009, pp 725-728.
43. S.Narayanan, N.Sivakumaran, T.Vinopraba and N.Selvaganesan,"IMC based PID controller design for gas turbine plant", Int. conf. on MS '09 pp 386-390.

44. B. R. Tamma, B. S. Manoj, and Ramesh Rao,"Time-Based Sampling Strategies for Multi-channel Wireless Traffic Characterization in Tactical Cognitive Networks," Proceedings of IEEE MILCOM 2008, November 2008.
45. A. Bhorkar, B. S. Manoj, B. D. Rao, and Ramesh Rao,"Selection Diversity based MAC Protocol for MIMO Ad hoc Wireless Networks," Proceedings of IEEE Globecom 2008, November-December 2008.
46. B. R. Tamma, B. S. Manoj, and Ramesh Rao,"On the Accuracy of Sampling Schemes for Wireless Network Characterization," Proceedings of IEEE WCNC 2008, March-April 2008.
47. B. S. Manoj, P. Nuggehalli, and Ramesh Rao,"On the Use of Information Sharing in Wireless Networks," Proceedings of IEEE CCNC 2008, pp. 776780, January 2008.
48. P. Zhou, B. S. Manoj, and Ramesh Rao,"On Optimizing Non-Asymptotic Throughput of Wireless Mesh Networks",Proceedings of IEEE CCNC 2008, pp. 343-347, January 2008.
49. Rajesh Joseph Abraham, D. Das & Amit Patra,"Improving AGC of a Thermal Power System with SMES-TCPS combination", Proc. of the 8th International Power Engineering Conference (IPEC 2007), Singapore, Dec.03 – 06, 2007.
50. N.Selvaganesan S.Renganathan, N.Arunkumar and Dennis Thomas,"Model Reduction for Interval Systems", TIMA, NIT, Trichy, pp 237-240, 2007.
51. N.Selvaganesan and S.Sandosh Kumar, "Dahlin's Control of PWM Inverter for Series Active Power Filter" pp 469-474, Int. conf. on RACE 2007.
52. S.Srinivasan, P.Kanagasabapathy, and N.Selvaganesan, "Neural Network based Parameter Identification and Fault Diagnosis for a Deaerator", Int. Conf. on Control, Instrumentation and Mechatronics Engineering, Malaysia, pp. 812-819, 2007.
53. S.Srinivasan, P.Kanagasabapathy, N.Selvaganesan,"Neural Based Parameter Identification and Fault Diagnosis in a Three-Tank System", IEEE- ICCIMA '07, pp 169-173.
54. N.Selvaganesan and R.Saraswathy Ramya,"Fuzzy Modeling of Permanent Magnet Synchronous Generator", ESCT ,NIT, Calicut, pp 178-183, 2007.
55. N.Selvaganesan and G.Divya Charline ,"Fuzzy logic Controller for High Performance Coupled-Inductor DC-DC Converter", ESCT , NIT, Calicut, 253-257, 2007.
56. N.Selvaganesan S.Renganathan, N.Arunkumar and Dennis Thomas,"Model Reduction for Interval Systems", TIMA 2007, NIT, Trichy, pp 237-240.
57. N.Selvaganesan and S.Sandosh Kumar,"Dahlin's Control of PWM Inverter for Series Active Power Filter" Int. conf. on RACE 2007, pp 469-474.
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59. S.Srinivasan,P.Kanagasabapathy,N.Selvaganesan,"Neural Based Parameter Identification and Fault Diagnosis in a Three-Tank System", IEEE- ICCIMA '07, pp 169-173.
60. N.Selvaganesan and R.Saraswathy Ramya , "Fuzzy Modeling of Permanent Magnet Synchronous Generator", NIT, Calicut, pp 178-183, ESCT 2007.
61. Sheeba Rani, J. Devaraj, D. Sukanesh, R., "A Novel feature extraction technique for Face Recognition system", Proceedings of the International Conference on Computational Intelligence and Multimedia Applications, IEEE Computer Society, Mepco Schelink Engg College, Sivakasi, Vol II, pp. 431-435. Dec 2007.

62. N.Selvaganesan and G.Divya Charline , "Fuzzy logic Controller for High Performance Coupled-Inductor DC-DC Converter", NIT, Calicut, 253-257, ESCT 2007.

Citation Index

S. No	*Name of the Faculty member*	*Total no of article published*	*No of citation*	*The most cited article*
1	Dr. Thomas Kurian	6	14	"Investigation of the solar wind Moon interaction onboard Chandrayaan-1 mission with the SARA experiment" Current Science vol.96. No.4, 25, Feb 2009. **(14 Citations)**
2	Dr. B. S. Manoj	10	33	CogNet: A Cognitive Complete Knowledge Networking System," in IEEE Wireless Communications Magazine, December 2008. **(17 Citations)**
3	Dr.N.Selvaganesan	20	8	"Mixed Method of Model Reduction for Uncertain Systems", Serbian Journal of Electrical Engineering,Vol.4, No.1, pp 1-12, 2007. **(3 Citations)**
4	Dr. Rajesh Joseph Abraham	10	18	"Automatic Generation Control of an Interconnected Hydrothermal Power System considering Superconducting Magnetic Energy Storage", International Journal of Electrical Power & Energy Systems, vol. 29, no. 8, October 2007, pp. 571 – 579. **(15 Citations)**
5	Dr.Deepak Mishra	7	19	"Time-series prediction with single integrate-and-fire neuron". Appl. Soft Comput., Vol. 7, No. 3, pp. 739-745, 2007. **(8 Citations)**
6	Dr. J. Sheeba Rani	6	10	"A Novel feature extraction technique for Face Recognition system", Proceedings of the International Conference on Computational Intelligence and Multimedia Applications, IEEE Computer Society, Mepco Schelink Engg College, Sivakasi, Vol II, pp. 431-435. Dec 2007. **(4 Citations)**
8.	Dr. Basudeb Ghosh	8	10	"Investigations on Fractal Frequency Selective Diaphragms in Rectangular Waveguide", International Journal of RF and Microwave Computer-Aided

				Engineering, vol. 20, No. 2, pp. 209-219, Mar. 2010 **(5 Citation).**

Name of the faculty member	***Title of the Journal in which research article is published***	***Impact factor of the Journal***
Dr. Thomas Kurian	Current Science	0.897
Dr. Animesh Biswas	IET Microwave, Antenna and Propagation Progress In Electromagnetics Research (PIER) B International Journal Microwave and Optical Technology Letter	0.682 3.763 0.656
Dr. B. S. Manoj	IEEE Wireless Communications Magazine Computer Networks, Elsevier IEEE Communication Letters EURASIP Journal on Wireless Communications and Networking Journal of Parallel and Distributed Computing ACM Wireless Networks Computer Communications Communications of the ACM	2.45 1.69 1.059 0.732 1.065 0.958 0.958
Dr.N.Selvaganesan	Iranian Journal of Fuzzy Systems Journal of Electrical – ELEKTRIKA	0.5 0.15
Dr. Rajesh Joseph Abraham	IET Generation, Transmission & Distribution International Journal of Electrical Power & Energy Systems European Transactions on Electrical Power Journal of Electrical System	0.951 2.073 0.371 4.88
Dr.Deepak Mishra	Journal of Neuroscience Appl. Soft Computing ACS Industrial & Engineering Chemistry Research	2.262 2.084 2.072
Dr. H. Priyadarshan	Linear Algebra and its Applications, Elsevier	1.005
Dr. Basudeb Ghosh	IEEE Transaction on Antennas and Propagation Progress in Electromagnetic	2.011 3.763

	Research (PIER) B	3.763
	Progress in Electromagnetic Research (PIER) C	0.475
	Int. Journal of RF and Microwave Computer Aided Engineering	

16. Participation of the department in the extension activities of the university.

A few of the faculty members have been involved in science popularization and outreach activities in various schools in the district. In addition, the faculty members have also participated in the Institute's annual outreach programme, IIST@schools.

17. Method of continuous student assessment

The evaluation methods are periodic quizzes, assignments, periodical tests, oral examination, and end semester examinations. Students are monitored on a continuous basis in a Semester system of evaluation. Continuous evaluation during the semester has 50% weight. This includes two announced periodical quizzes (with 15% weight each) as scheduled in the academic calendar. Besides, class tests, tutorials and assignments carrying 20% weight are also given. End-semester examination carries remaining 50% weight. The details on the evaluation for a course are communicated to the students by the teacher who is handling that course, at the beginning of the semester. All answer books of periodical quizzes and class tests are returned to the students after evaluation. The answer books of the end-semester examinations are scrutinized by the faculty once again before the results are announced.

18. Placement record of the past students and the contribution of the department to the student placements

57 students graduated from our department of which 54 were absorbed in various ISRO/DoS. Details are given below

Name of the ISRO Center	*No. of Students(2011)*
ADRIN, Hyderabad	2
ISAC, Bangalore	24
ISTRAC, Bangalore	3
MCF, Bhopal	3
SAC, Ahmedabad	5
SCL, Chandigarh	4
SDSC, Shriharikotta	3
VSSC/IISU, Thiruvananthapuram	10

19. Significant achievements of the department or faculty or students during the past five years

- Centre of excellence in Virtual Reality Laboratory (2010-2014)
- Students are actively doing the following real time projects apart from their regular courses.
  - Student satellite project
  - Sounding Rocket Project
  - Unmanned Arial vehicle systems
  - Sky liner
  - I on wheels

Student Awards

15. **Dinesh Dhankar and Gaurav Yadav** of IIST Thiruvananthapuram secured First position under "Aerospace Young Engineer Award 2010" instituted by Mahindra Satyam for the Project: A low cost telemetry system for sounding rockets by using mobile phone transmitter (Category: **Avionics**).

Some of our students did their internship under the guidance of faculty and published few papers in the IEEE conferences which are as follows:

- **Rajeev Ranjan, Gaurav Bholotia and Sunil Kumar**, N.Selvaganesan, "Realtime T-S Fuzzy Identification for Twin Rotor MIMO System", IEEE-Conf. on SYMOPA 2010, PP 5-10.
- **Aarathi Muppalla** and B. S. Manoj, "The Impact of Communication and Terrain Characteristics on the Accuracy of Robot Formation," accepted for publication in the Proceedings of the first International Conference on Wireless Technologies for Humanitarian Relief (ACWR2011), December 2011.
- **Saket Chawla** and B. S. Manoj, "Dynamic Data Compression in Wireless Networks," accepted for publication in the Proceedings of IEEE ANTS 2011, December 2011.
- **Rajnish Kumar Yadav**, "Modeling of Self Similar Traffic in Wireless Networks," accepted for publication in the proceedings of International Workshop on Next Generation Wireless Networks 2011 (WoNGeN 2011), December 2011.

20. Participation of the department in COSIP/COHSSIP/ SAP CAS /DSA/ DRS/ FIST etc.

Not applicable

21. Plan of action of the department for the next five years

- **Programmes:** Department of Avionics will be starting M.S/M.Tech programme under different specializations.
  - Control Engineering
  - Digital Signal Preciessing
  - RF and Microwave Engineering

The Board of Management has in principle approved introduction of these post-graduate programmes.

- A dual degree program in Avionics is being planned which will be offered shortly.

- **Center of excellence:** Virtual reality lab – is the thrust area to advanced research in the emerging interdisciplinary fields. They are to emerge as Centers of Excellence in the long run.
- **Nano-Satellite:** Students and faculty members of the Department are actively involved in the nano- satellite project which is planned for 2012.
- **Robotics Lab:** Planning to establish a Robotics research laboratory
- **Training and continuing education of faculty and staff**: Department plans to organize many continuing education programs in collaboration with other institutions of national importance and research organizations. Also faculty and staff of the department also will be deputed for continuing education programmes to upgrade their skills.

22. Any other highlights

- The total budget utilized by the department in terms of PG/research labs as well as sponsored funded projects under DoS amount to ` 1444.51 Lakhs.

- Ratio of research scholars to teachers (eligible to guide research students) 11:10

- Ratio of research papers published during the last 5 years at international and national levels to number of teachers :2.8:1 (45 papers; 16 faculty)

DEPARTMENT OF CHEMISTRY

DEPARTMENT OF CHEMISTRY

1. Faculty profile, adequacy and competency of faculty.

The present faculty strength of the department is adequate for handling the B.Tech. and M.Tech. courses offered by the department.

Name of the teacher	Designation	Highest Qual.	Specialization	Experience (years)
Dr. Kuruvilla Joseph	Professor and Head	Ph.D.	Polymers & Composites	18
Dr. Nirmala R James	Associate Professor	Ph.D.	Polymer Chemistry, Biomaterials	11
Dr. Honey John	Assistant Professor	Ph.D.	Polymer Technology Conducting polymers	13
Dr. K Prabhakaran	Assistant Professor	Ph.D.	Ceramics & Inorganic Materials	12
Dr. K Y Sandhya	Assistant Professor	Ph.D.	Organic and Polymeric Materials	10
Dr. N Gomathi	Assistant Professor	Ph.D.	Chemical Engineering, Surface Engineering	7
Dr.K.G.Sreejalekshmi	Assistant Professor	Ph.D.	Organic Synthesis, Combinatorial Chemistry	6
Dr. J Mary Gladis	Assistant Professor	Ph.D.	Inorganic Functional Materials	6
Dr. K N Ninan	Emeritus Professor	Ph.D.	Polymers, Propellants & Special Chemicals	45

Teaching and non-teaching staff of the department

	Male	Female	Total
No. of teachers with Ph. D. as the highest qualification	3	6	9
No. of teachers with M.Phil as the highest qualification	-	-	-
No. of administrative staff	1	0	1
No. of technical staff	3	4	7
No. of Class IV staff	-	-	-

2. Student profile according to programmes of study, gender, region etc

At present there are 13 M.Tech. students out of which 6 (46.15%) are girls and 7 (53.85%) are boys. Also, 8 (61.53%) students are from home state (Kerala) while remaining 5 (38.47%) students are from different states.

3. Changes made in the courses or programmes during the past five years and the contribution of the faculty to those changes

(i) Chemistry courses for first year B.Tech. (common courses) were first framed by an expert committee chaired by Prof. C.G. Ramachandran, Former Dean & Head of Chemistry Department, Kerala University.

(ii) The syllabus of M.Tech programme was initially finalized by an expert committee comprised of experts from ISRO, IIT, IISc and the faculty members of Chemistry Department and chaired by Shri. M.C. Dathan, Director of Sathish Dhavan Space Center (SDSC), SHAR.

(iii) The syllabus for Minor Course in Nanoscience & Technology was formulated in 2009.

4. ***Trend in the success rate and drop out rate of students during the last five years***

No student has passed out of the programmes offered by Chemistry Department yet. Also there is no drop out of students from the department.

5. Learning resources of the department like library, computers, laboratories and other such resources

The central library of the institute has 13863 books, 3475 journals (including e-journals, 14 Magazines, 142 Back Volumes and 15 online resources. The central library has 1375 pure chemistry and chemistry related books which are accessible to all students, staff and faculty members of the institute. The central added 513 chemistry and related books in 2011. Out of 3475 journals, 384 are chemistry and related journals. The department maintains handbooks and manuals in its labs.

Chemistry Department has the following labs:

(i) General Chemistry Lab
(ii) Chemical Engineering Lab
(iii) Organic Lab
(iv) Inorganic Lab
(v) Material Characterization Lab
(vi) Polymer Processing Lab
(vii) Polymer Technology Lab
(viii) Physical Chemistry Lab
(ix) Nanoscience Lab

The labs cater to B.Tech, M.Tech and Ph.D. students of the department as well as the institute. Some high-end equipment, come under centralized/ interdisciplinary facilities which is accessible to all the departments.

Centre for Advanced Research in Nanoscience & Technology

Chemistry Department is in the process of establishing a Central Facility named "Centre for Advanced Research in Nanoscience & Technology" which will address

the national challenges in the areas of Nanoscience & technology. The goal of the Center is to bring all facilities required for synthesis, process and characterization of Nanomaterials under one roof to promote advanced research in Nanoscience & technology as well as to have international collaborations.

Nanoscience & technology is the study of manipulating matter on an atomic and molecular scale and deals with developing materials, devices of nanoscale which find applications in electronics, advanced materials, energy production, energy conversion. Future Space science & technology and other developments are heavily dependent on devices based on intelligent materials like shape memory materials, light sensitive materials etc., Structural materials, green and clean energy, solar energy conversion, energy storage materials etc. Nanotechnology can immensely help scientist address the future challenges.

The Center for advanced research aims to support research areas of national significance including space science & technology related areas. These areas include nanomaterials with advanced properties, artificial bio-mimetic systems which can act as sensors, nanophotonics and nanoelectronics to develop the novel and unique properties necessary for the precise control of electronic and photonic properties of materials and to promote nanoresearch as an attempt to increase our understanding of the underlying mechanisms of mechanical behavior of nanoscale materials and structures. The following facilities will be available in the Nanoscience & Technology Lab.

(i) X-Ray Diffractometer (XRD)
(ii) Atomic Force Microscope (AFM)
(iii) Glove Box (Multi-Hazard)
(iv) Electro Spinning Machine (high-end model)
(v) Particle Size Analyser (Nano)
(vi) Scanning Electron Microscope (SEM)
(vii) Transmission Electron Microscope (TEM)
(viii) Plasma Reactor

Department is currently in the process of acquiring XRD, AFM, Glove Box, Particle Size Analyzer and Electro spinning machine. SEM, Plasma Reactor and TEM is planned to be procured in two years time.

Computers: Each faculty member is provided with a desktop and a laptop computer. In addition, there are 2 desktop computers in the department and 5/10 dedicated desktop computers in the lab. Each Ph.D. Students are provided with a desktop computer with internet facility for their research purpose.

Software: Chemistry department has procured Gaussian software programme and two other software programmes which are used to teach and conduct practicals for chemistry courses. Gaussian software is used to teach computational chemistry for the B.Tech physical sciences (chemical system) students and used to conduct simulation experiments in chemistry.

6. Enhancement of the learning resources during the past five years

(i) Each year, all books that are used as text books and references for course work are purchased by the institute library on the basis of request by students and faculty (requests for these purchases can be submitted online). A library committee headed by the head of the department meets once a month to approve such requests and initiate measures for the purchase. The central library has 1375 pure chemistry and

chemistry related books which are accessible to all. The central library added 513 chemistry and related books in 2011. Out of 3475 journals, 384 are chemistry and related journals. The department maintains handbooks and manuals in its labs.

(ii) Electronic journals are also subscribed on the basis of requests from faculty. A journal committee headed by the Dean, Academic, meets at least once a semester to review and approve such requests.

(iii) Students get a yearly book grant of Rs. 6000/- (Rs. 3000/- per semester) for purchase of books approved by faculty.

(iv) Laboratory manuals have been made and provided to the students for enabling them to understand the theory and procedure of the prescribed experiments in the various lab sessions.

(v) Visits to various National Institutes, Industries and ISRO centers have been conducted each year for the students to kindle their interest in research as well to give them a real world experience.

(vi) Department also organizes National and International conferences and seminars to promote the interaction of scientists and research scholars from all over India and internationally. This will help promote collaborations and open up opportunities and help the students of the institute to get a better outlook of the research world.

(vii) Faculty attend conferences, seminars, workshops, present papers and give invited talks regularly

7. Modern Teaching methods in practice other than the lecture method

The institute has provision for multi-media facilities in most of the class rooms. Smart class room with multi-media support/video editing facility for content generation/content delivery is initiated.

8. Participation of teachers in academic and personal counselling of students

The Institute has in place a Student Activity Board which is headed by the Dean, Student Activities, and consists of faculty and student representatives. All the first year students in the institute are mentored by the faculty. The students meet their mentors regularly and discuss their personal and academic problems. These faculty members take maximum effort to rectify the problems. Any problem beyond their control is brought to the notice of the authority concerned. A department level interaction with the students is organized prior to their choosing the stream specialization. Counseling is provided to the students prior to their undertaking summer internship and the final year thesis project.

9. Details of faculty development programmes and teachers who benefited during the past five years.

3 faculty members of the department have participated in the faculty development workshop organized by Administrative Staff College, Hyderabad in 2010.

10. Participation of teachers in academic activities other than teaching and research.

- Faculty are members of various committees like Cultural Committee, Sports Council, Faculty Committee, Library Committee, Research Council, Web Committee, Exam Committee, IIST@Schools etc. and are involved in the day to day and establishment activities of IIST.

- Organized a four day international conference on Recent Trends in Materials, Science & Technology (ICMST 2010).
- A two day national seminar was organised on Frontiers in Chemistry in 2011 to celebrate the International Year of Chemistry (IYC 2011)
- Faculty members give Keynote addresses, Invited talks and lectures in conferences, Seminars conducted by other institutes and colleges (detail is given elsewhere).
- The faculty members of the department also participate as reviewers / editors of international journals/experts in committees.

Dr. Kuruvilla Joseph acts as a Member of Board of studies for the PG programme in Nanoscience & Technology of Kerala University; He is also a Senate Member, Syndicate member and Academic council member of M.G. University, Kerala.

Invited Lectures/Conferences/Seminars/Worshops for the past Five years:

Dr. Kuruvila Joseph

(1) Invited lecture on "Bio-nanocomposites Based on Agricultural Fibers" at the International Conference on Food and Agriculture Applications of Nanotechnologies (NANOGRI-2010) in Sao Pedro, Brazil during June 20-25, 2010 organized by the Food and agricultural Organization (FAO) of the United Nations in collaboration with Brazilian Coordination for graduate Education (CAPES) and Brazilian corporation for Research in Agriculture (EMBRAPA)..

(2) Invited lecture on "New generation composites" on January 28, 2011 at the International Conference on Functional polymers organized by NIT, Calicut.

(3) Invited lecture on "High performance composites" during the National science day celebration on February 28, 2011 organized by the centre for nanoscience and nanotechnology at Mahatma Gandhi University, kottayam.

(4) Keynote address on "Nanotechnolgy for space applications" at Amrita Vishwa Vidyapeetham Unuiversity, Kollam in connection with the National Science day celebrations on March 7, 2011

(5) Invited lecture in the national seminar on Development of chemistry through ages organized by the department of chemistry, NIT, Calicut on August 4-6, 2011.

(6) Invited lecture in the national conference organized by Bihop Kurialacherry College for Women, Amalagiri, Kottayam on "Emerging Trends in Nanotechnology" on 30th September 2011.

(7) Plenary Speaker, International Conference on Nanotechnology for Agricultural Applications(Nano-agri 2010), SaoPedro, Brazil

(8) Plenary Speaker, on "Role of Natural fiber composites as future materials" at Dept of Mechanical Engineering, Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada, March 11-12, 2010.

(9) Invited lecture on "Dynamic, Mechanical & Thermal Properties of Cotton/PP Commingled Composite Systems" at International Conference on Advances in Polymer Technology, February 26-27, 2010.

(10) Plenary Speaker, on "Introduction to polymer nanocomposites" at Holy Cross College, Tirunelveli on February19, 2010.

(11) Invited lecture on "Novel techniques for the processing of in situ microfibrillar composites from polymer blends" at the International conference on polymer processing, ICPPC-2010, January 15-17, at Mahatma Gandhi University, Kerala.

(12) Plenary Speaker, on "Nanomaterials in space applications" at the national staff development programme on December 22 at NIT, Surathkal, Gujarat.

(13) Invited lecture on "High performance rubber nanocomposites" in the International conference on nanostructured materials and nanocomposites ICNM-2009 on April 6-8, 2009, Kottayam, Kerala.

(14) Invited lecture on the "Recent Trends in Material Science", organized by the Department of Physics, University of Calicut on 27th March, 2009

(15) Invited lecture on "Nanofabrication techniques" at the NANO-09 national seminar organized by S.N College, Chengannur on 17-18th March 2009.

(16) Invited lecture on "Recent advances in polymer based micro and nanocomposites" in the international conference on innovative technologies, ICIT -09 on June 18-19, 2009, PDM College of Engineering, Haryana.

(17) Chaired a session at the International conference on polymer processing, ICPPC-2010, January 15-17, at Mahatma Gandhi University, Kerala.

(18) Chaired a session in the International conference on nanostructured materials and nanocomposites ICNM-2009 on April 6-8, 2009, Kottayam, Kerala.

(19) Chaired a session in the International conference on innovative technologies, ICIT -09, on June 18-19, 2009, PDM College of Engineering, Haryana.

(20) Plenary Speaker, on "Polymer-Polymer in-situ micro fibrillar composites" at the MRSI Annual Technical Meeting held on June 29, 2009 at NIIST, Trivandrum.

(21) Plenary Speaker, "Effective utilization of green materials as an alternative to waste recycling" at the National conference on advanced materials , NCAM -2009 organised by PSN college of Engineering, Tirunelveli.

(22) Invited lecture "Physical and mechanical properties of high performance rubber annocomposites" at the National conference on advanced materials , NCAM -2009 organised by PSN college of Engineering, Tirunelveli on August 25-27, 2009.

(23) Plenary speaker on "Effect of draw ratio on the morphology and dynamic rheology of microfibrillar composites based on PP and PET" at the International conference on blends and composites, ICBC 2008, September 22-24, 2008, Kottayam, Kerala.

(24) Delivered a key note speech on the occasion of the inauguration of the Science Aptitude Developer Programme (SADP) at ST BERCHMANS COLLEGE, Changanacherry on 16thAugust, 2008.

(25) Invited lecture on "Nanocomposites in space technology" at IHRD, September 2008, Mallapally.

(26) Plenary speaker, 4th international conference on Science and Technology of Composites Materials, COMAT 2007, at the Federal University of Rio De Janeiro, Rio De Janeiro , Brazil, during December 9-12, 2007.

(27) Plenary speaker, International conference on Natural polymers, bio polymers, Blends and Gels: Macro to Nano Scales ICNP 2007, November 19-21, 2007, Kottayam , Kerala Plenary speaker international conference on Polymer Processing ICPP 2007, at the Beijing University of Chemical Technology, Beijing, China, during May 18-20, 2007.

Dr. Honey John

(1) Honey John Emerging Trends and Vistas in Polymer Science Invited Lecture in National Seminar February 14th 2008 Govt. Attingal College, Trivandrum

(2) Honey John Refresher course for college teachers Invited Lecture in Refresher course25th February 2008 Maharajas Govt. College, Ernakulum

(3) Honey John Quantum Chemistry and Nanotechniques Invited Lecture in National Seminar20th November 2009 Maliyankara, Aluva

(4) Honey John Emerging Trends in Material Chemistry Invited Lecture in National Seminar 19th February 2010. Holy Cross College, Nagercoil. Honey John Challenges in Nanoscience and Technology-CNT2011 Invited Lecture in National Seminar29th July 2011 St. Theresa's College, Ernakulam

Dr. Nirmala James

(1) Introduction to principles of intellectual property rights: special emphasis on the issue of patentability in the current scenario Nirmala R James. National Symposium on Current Trends in the Development of Herbal Drugs & Annual Conference of Indian Association of Biomedical Scientists, held at Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram in November, 2006.

(2) Polymers in Tissue Engineering" National Conference on Emerging Trends in Chemistry for Medical Applications held at Nesamony Memorial Christian College, Marthandam, March, 2010.

(3) Green Materials in Medical Applications Seminar on "Green and Sustainable Chemistry" organized by Dept. of Chemsitry, St. Cyril's College, Adoor, in October, 2011.

Dr. K.N. Ninan

(1) K.N. Ninan, "Materials for Indian Space Programmes – Current trends and future directions", National Conference on Smart Electroceramics, Thrissur (March 2007)

(2) K.N. Ninan, "Thermal analysis of advanced materials for space applications", Thermans – 2008 (February 2008).

(3) K.N. Ninan, "Chemical Propellants in Space Endeavours" International Conference on Advanced Materials, ICAM – 2008 (February 2008).

(4) K.N. Ninan, "Self – reliance in Chemical and Materials for Indian Space Programmes – Current Trends and Future Directions", National Workshop on Self Reliance in Aerospace Technology SRAT -08 (March 2008)

(5) K.N. Ninan, "High Energy Materials in Indian Space Endevours", Plenary Lecture 7th International High Energy Materials Conference, HEMCE, 2009, Pune (December 2009).

(6) K.N. Ninan, "Lessons Learned from Solid Propulsion Systems of ISRO Launch Vehicles", Workshop on "Lessons Learned from ISRO Space Systems", Bangalore, August, 2011.

Dr.Gomathi, N.

(1) Gomathi, N. (2011). "Plasma Surface Modification for Biomedical Applications" Talk delivered at Institute of Physics, Bhubaneswar on May-11, 2011.

(2) Gomathi N (2011) "Blood Compatibility through Plasma Surface Modification" Talk delivered at PSNA College of Engineering and Technology, Dindigul on June-10, 2011.

(3) Gomathi, N. and Neogi, S. (2009). The Effect of Surface Modification of Polycarbonate Using Argon-Oxygen Plasma on Platelet Adhesion. Poster presented at the Research Scholar Day 2009 organized by the Department of Chemical Engineering, Indian Institute of Technology, Kharagpur on December 16, 2009.

(4) Gomathi, N., Mishra, D., Maiti, T. K., and Neogi, S., (2009). Enhancing the Bio and Blood Compatibility of Polycarbonate by Helium Plasma Treatment. Paper presented at the Workshop on "Process Engineering Applications of Plasma Technologies" (PEAPT-2009) held at IISc, Bangalore, India on August 14, 2009.

(5) Gomathi, N. and Neogi, S. (2009) *Improving bio and blood compatibility of polymers using plasma*, National workshop on plasma technology for biomedical application, Organized at IIT, Kharagpur, India on March, 27, 2009.

(6) Gomathi, N., Sureshkumar, A. and Neogi, S. (2009). Surface modification of Polycarbonate by argon plasma treatment for biomedical applications. Paper presented at the International Conference on Hi-Tech Materials (ICHTM-09) organized at IIT, Kharagpur, India during February, 11-13, 2009.

(7) Gomathi, N. and Neogi, S., (2008). *Role of plasma in biomedical applications*, presented in Symposium on Nano-Bioengineering and Family Welfare, Organized at IIT, Kharagpur, jointly organized by Ministry of health and family welfare and Damodar valley corporation on December, 2, 2008.

(8) Gomathi, N., Sureshkumar, A., and Neogi, S. (2007). Surface modification of Polypropylene by RF plasma for biomedical applications. Paper presented at the Indian Chemical Engineering Congress (CHEMCON-2007) held at Kolkata during December 27 – 30, 2007.

Dr. Nirmala

(1) Dr. Nirmala attented a National Conference on "Chemical and Biological Waste treatment Processes for Green Environment, June 2010 organized by Indian Institute of Chemical Engineers and Kerala state Pollution control Board.

Dr. Prahakaran

(1) Dr. Prahakaran attented a one day seminar conducted by NIIST, Trivandrum in 2010.

Dr.Sandhya K.Y

(1) Poster Presentation Sandhya K.Y., Remya, Prabha D. Nair "A biodegradable in situ injectable hydrogel based on chitosan and oxidized hyaluronic acid for tissue engineering applications" Materials Research Society, Boston, USA, Nov 30–Dec 4 2009.

(2) Dr. Sandhya attended a one day seminar conducted by NIIST, Trivandrum in 2010.

Dr. Sreeja Lekshmi

(1) Dr. Sreeja Lekshmi attented a Two - day Joint Academies Lecture Workshop on Analytical Chemistry and Environmental Sciences at Mar Ivanios College, Thiruvananthapuram during 11th and 12th of December 2008

(2) Dr. Sreeja Lekshmi attented a Three-day workshop on Computational Chemistry at IIITM-k, Technopark, Thiruvananthapuram during March 2009.Dr. Sreeja Lekshmi attented a Materials Research Society of India, Trivandrum Chapter, Annual Day Celebrations, held at IIST during July 2010. Topic: Dendrimers as engineered materials for prospective bionano devices.

(3) Dr. Sreeja Lekshmi attented a Materials Research Society of India, Trivandrum Chapter, Annual Day Celebrations, held at Achutha Menon Centre Auditorium, SCTIMST, Trivandrum on May 15th 2007. Topic: *Solid phase combinatorial protocols for anticancerous heterocycles and their analogs.*

11. Collaboration with other departments and institutions at the national and international level and their outcome during the past five years

Refer Part II 3.2.6

12. If research is a significant activity, the thrust areas of the department.

Thrust areas are listed below.

(i) Polymers for specialty applications

- High Temperature Resistant materials
- Conducting polymers
- Organic Solar Cells

(ii) Ceramics /Inorganic Functional Materials

- High temperature materials
- Sensors

(iii) Biomaterials

- Polymeric Scaffolds for Tissue Engineering

(iv) Combinatorial Synthesis and drug discovery

- Dendrimers for Drug Delivery

(v) Nanocomposites

- Polymer Nanocomposites for photonic applications
- Nanocomposites for structural applications

(vi) Surface Engineering

- Surface modification

13. Details of the ongoing projects and projects completed during the last five years.

There are three ongoing projects funded by DoS. For more details refer criteria III 3.2.1

14. 'Programmes by research' offered by the university.

9 students are undergoing PhD programme in the department. For more details refer criteria III 3.2.3

15. Publications of the faculty, for the past five years. Details regarding citation index and impact factor analysis.

The complete list of publications is given in criteria III 3.2.9. The average citation of our journal papers of the last five years is 7.3, while the average impact

factor 5.7. Citation and impact factor details of publications of faculty are given below.

Citation Index:

S. No.	*Name of the Faculty Member*	*Total No. of Articles Published*	*Total No. of Citations*	*The most cited article*
1	Prof. Kuruvilla Joseph	88	1779	Effect of chemical treatment on the tensile properties of short sisal fiber-reinforced polyethylene composites Polymer, 1996 **(272 citations)**
2	Dr. K. N. Ninan	155	2300	New approximation for the p (x) function in the evaluation of non-isothermal kinetic data MP Madhusudanan K Krishnan, KN Ninan - Thermochimica Acta, 1986 – Elsevier (**125 citations**)
3	Dr. Nirmala James	14	152	**Nirmala R. James** and A.Jayakrishnan, Surface thiocyanation of poly(vinyl chloride) and its effect on bacterial adhesion *Biomaterials* **24**: 2205 (2003) **(32 citations)**
4	Dr. Prabhakaran	51	450	K. Prabhakaran and C. Pavithran "Gelcasting of alumina using urea-formaldehyde I. Preparation of concentrated aqueous slurries by particle treatment with hydrolysed aluminium" Ceram.Int. 26(2000)63-66. **(32 citations)**
5	Dr. Honey John	19	66	K. Lakshmi, Honey John, Rani Joseph, K.E. George, K.T. Mathew "Microwave absorption, reflection and EMI shielding of PU–PANI composite" 57, 2009, 371–375, Acta Materialia **(22 citations)**
6	Dr. Sandhya K.Y.	13	345	Sandhya Y. K., Pillai C. K. S. and Tsutsumi N. (2004) Stable Polymers for Nonlinear Optics: A Review based on Azobenzene Systems. Progress in Polymer Science, 29, 45-74. Citation Index 247; Impact Factor 12.81 **(251 citations)**
7	Dr. Gomathi	07	29	Gomathi, N., Sureshkumar, A., and Neogi, S., (2008). RF plasma treated polymers for biomedical applications. *Current Science*. 94 (11) 1478-1486. **(19 Citations)**

8	Dr. Sreeja Lekshmi	7	46	*Sreejalekshmi, K.G.*, Krishnan, K.A., Anirudhan, T.S. Adsorption of Pb(II) and Pb(II)-citric acid on sawdust activated carbon: Kinetic and equilibrium isotherm studies *Journal of Hazardous Materials*, 2009, 161 (2-3), pp. 1506-1513**.** **(23 Citations)**
9	Dr. Mary Gladis	34	850	Ion imprinted polymer (IIP) particles: Synthesis, Characterisation and dysprosium ion uptake properties suitable for analytical applications. V.M. Biju and J. Mary Gladis, T. Prasada Rao; *Anal. Chim. Acta* 478 (2003) 43-51. (**76 citations)**

Impact Factor:

Name of the Faculty Member	***Title of the Journals in which Research Articles are Published***	***Impact factor of the journal***
Prof. Kuruvilla Joseph	Comp Sci Tech	2.856
	Compos Interface	0.573
	Compos Part A-Appl S	2.338
	Eur Polym J	2.517
	Int J Polym Mater	0.458
	J Appl Polym Sci	1.24
	J Compos Mater	0.968
	J Elastom Plast	0.51
	J Mater Sci	1.855
	J Membrane Sci	3.673
	J Phys Chem B	3.603
	J Polym Res	1.186
	J Reinf Plast Comp	0.823
	J Thermoplast Compos	0.865
	Mater Lett	2.117
	Plast Rubber Compos	0.374
	Polimeros	0.436
	Polym Composite	0.998
	Polym Degrad Stabil	2.594
	Polym Polym Compos	0.558
	Polymer	3.828
	Polym-Plast Technol	0.557
	Rubber Chem Technol	0.799
	J Polym Environ	1.507

Dr. Nirmala James	Biomaterials	7.88
	Polymer	3.83
	Macromol. Chemistry and physics	2.44
	Polymer International	2.06
	J of Applied chemistry	1.24
	Int. J of Polymeric Materials	0.458
Dr.Prabhakaran	Carbon	4.89
	J of European Ceramic Society	2.26
	Journal of Ceramic Society (JACS)	2.17
	Material Research Bulletin	2.15
	Ceramic International	1.42
	J of Material Science	1.855
	Materials Chemistry & Physics	2.46
	Bulletin in Material Science	0.95
	Advanced in applied Ceramics	0.49
	Ferroelectric Letters	0.54
	Inter. J of applied Ceramic Technology	1.28
Dr. Sandhya	Progress in Polymer Science	12.81
	Cancer Letters	8.23
	Clinical Cancer Research	4.36
	J Polymer Sciene Polymer Chemistry	3.89
	Nanotechnology	3.64
	J of molecular endocrinology	3.28
	Carbohydrate Polymers	3.68
	Macromol. Chemistry and physics	2.44
	J Polymer Science Polymer Physics	2.4
	J of Applied chemistry	1.24
Dr. Honey John	Bull. Mater. Sci.,	1.185
	Acta Materialia	3.781
	Microwave and Optical Tech. Letters	0.656
	Int Journal of Polymeric Materials	0.458
	Polymer Composites	0.998
	Microwave Technology Letters	0.656
	Rubber, plastics, composites,	1.00
	Journal of Applied polymer science,	1.24
	Journal of European ceramic society	2.574
Dr. Gomathi	J of Adhesion Science and Technology	1.175
	Applied Surface Science	1.616
	Journal of Applied Polymer Science	1.203
	Current Science.	0.782
Dr. Sreeja Lekshmi	Bioresource Technology,	4.365
	Journal of Biomedical Mater. Research	3.044
	Phosphorus, S and Si & Rel. Elements	0.621
	Desalination	1.851
	Journal of Hazardous Materials	3.723

	Indian J of Chemistry - Sec B Org and Medicinal	0.562
	Chemistry	2.618
	Tetrahedron Letters	4.925
	British Journal of Pharmacology	
Dr. Mary Gladis	Reviews in Anal. Chem.	0.688
	Anal. Bio anal. Chem.	3.48
	Anal. Sci.	1.526
	Talanta	3.29
	Atomic spectroscopy	1.197
	Anal. Chim. Acta	3.757
	Anal. lett..	1.314
	Radiochim Acta	1.459
	Trends in Anal.Chem.	6.546
	Micro Chimica Acta	2.648
	Radiochim Acta	1.459
	J. Mol. Recognit.	2.776
	Radiochim. Acta ,	1.459
	J. of Radioanal. Nucl. Chem.	0.631
	Crit.Rev. Anal.Chem.	2.621
	Environ. Sci, Tech.	4.63
	Chemia Analit.,	0.702
	Electroanalysis,	2.63
	Sensors & Actuators B: Chemical	3.083

16. *Participation of the department in the extension activities of the university.*

A few of the faculty members have been involved in science popularization and outreach activities in various schools in the district. In addition, the faculty members have also participated in the Institute's annual outreach programme, IIST@schools.

17. *Method of continuous student assessment*

The evaluation methods are periodic quizzes, assignments, periodical tests, oral examination, and end semester examinations. Students are monitored on a continuous basis in a Semester system of evaluation. Continuous evaluation during the semester has 50% weight. This includes two announced periodical quizzes (with 15% weight each) as scheduled in the academic calendar. Besides, class tests, tutorials and assignments carrying 20% weight are also given. End-semester examination carries remaining 50% weight. The details on the evaluation for a course are communicated to the students by the teacher who is handling that course, at the beginning of the semester. All answer books of periodical quizzes and class tests are returned to the students after evaluation. The answer books of the end-semester examinations are scrutinized by the faculty once again before the results are announced.

18. *Placement record of the past students and the contribution of the department to the students placements*

Not Applicable

19. *Significant achievements of the department or faculty or students during the past five years.*

- Centre for Advanced Research in Nanoscience & Technology is a laboratory facility with a budget of Rs. 700 lakhs. The goal of the center is to address the national challenges in R & D in Nanoscience & Technology.
- Organized a four day International Conference on Recent Trends in Materials Science & Technology) (ICMST 2010) at IIST in October 2010
- Organized a two day National Seminar in the Frontiers of Chemistry (NSFC) at IIST in December 2011
- Three patents have been submitted by faculty.
- Dr. K.N. Ninan, Emeritus Professor was selected as corresponding member by International Academy of Astronautics (IAA), received Honorary Fellowship, conferred by High Energy Materials Society of India, 2009 and was awarded ISRO Performance Excellence Award, 2011.

20. *Participation of the department in COSIP/ COHSSIP/ SAP/ CAS/ DSA/ DRS/ FIST/ etc.*

Not Applicable

21. *Plan of action of the department for the next five years*

(1) Postgraduate Programme:

The Department of Chemistry will be starting MS programmes in "Material Science" and "Polymer & Composites" and an integrated Ph.D. Programme and a dual degree programme.

(2) Instructional / Research Lab

The Instructional Labs of the Department are all well equipped with all the standard experimental facilities and in addition it has various experimental set up of international standards which will enable the students to learn chemistry in an interesting way. The labs are all built in par with standard research laboratories of the country when it comes to the safety measures.

The department has a well equipped Material characterization lab with all the modern equipments necessary for characterization of polymers and other materials. The department is procuring Laminar Flow Hood, CO_2 Incubator, Freeze Dryer, Surface area Analyzer, Impedance Analyzer, High Performance Liquid Chromatography, Planetary Ball Mill, Inductively Coupled Plasma Analyzer, Phase Contrast Microscope and High Temperature Sintering Furnace which will enable the lab to characterize and develop biomaterials for tissue engineering purpose and perform research on ceramic materials etc. The lab also has facilities like High efficient Fume Hoods, Digitized Water Bath, Wrist Action Shaker, Ultra Sonicator, etc. The department plans to buy an IV (current-Voltage) measurement set up and solar simulator which will facilitate the work of organic solar cells which. All these facilities combined enable the material characterization lab for advanced research in polymers, specialty polymers and other materials and competes with top National Institute's Material Characterization lab.

(3) Research

The department plans to elaborate its research activities to advanced areas in Nanoscience & Technology and apply nanotechnology to address the challenges in current research areas.

(4) Center of Advanced Research in Nanoscience & Technology

Establish the center into a full-fledged laboratory that can address the challenges in Nanoscience & Technology as well as challenges of Space Science & Technology related areas.

(5) Organize National and International Conferences

Department plans to conduct more conferences and seminars in the future.

22. Any other highlights.

- The total budget utilized by the department in terms of UG/PG/research labs as well as sponsored funded projects under DoS amount to Rs. 577 Lakhs.
- Ratio of research scholars to teachers : 1:1
- Ratio of research papers published during the last 5 years at international and national levels to number of teachers: 11.2:1 (101 papers: 9 faculty)

DEPARTMENT OF EARTH AND SPACE SCIENCES

DEPARTMENT OF EARTH AND SPACE SCIENCES

1. Faculty profile, adequacy and competency of faculty

The present faculty strength of the department is adequate to handle the introductory and specialized courses offered by the department under the three specializations **(Astronomy & Planetary Sciences, Earth System Science, and Remote Sensing)** in the B.Tech. Physical Sciences programme.

Name	*Designation*	*Highest Qualification*	*Specialization*	*Experience in years*
Prof.A. Chandrasekar	Senior Professor and Head	Ph.D.	Numerical Modeling of Atmosphere	23
Dr. N. Padmanabhan	Adjunct Professor	Ph.D.	Mathematical modeling; Digital Image Processing; Satellite Data Processing	24
Dr. Radhika Ramachandran	Adjunct Professor	Ph.D	Numeric Modeling of the Atmosphere	27
Dr. Anandmayee Tej	Associate Professor	Ph.D.	Star Formation and Stellar Evolution	11
Dr. M. V. Ramana	Associate Professor	Ph.D.	Atmospheric Science	11
Dr. Anand Narayanan	Assistant Professor	Ph.D.	Intergalactic medium	3
Dr. L. Gnanappazham	Assistant Professor	Ph.D.	Remote sensing and GIS technologies	16
Dr. Gorthi R. K. S. S. Manyam	Assistant Professor	Ph.D.	Image Processing	3
Dr. Jagadheep D.	Assistant Professor	Ph.D.	Star formation; astrophysical masers	4
Dr. Rajesh V. J.	Assistant Professor	Ph.D.	Planetary Geosciences, Petrology and Minerology	7
Dr. Rama Rao Nidamanuri	Assistant Professor	Ph.D.	Hyper-Spectral image processing, Remote Sensing	7
Dr. Samir Mandal	Assistant Professor	Ph.D.	Accretion Physics	5

Dr. Sarita Vig	Assistant Professor	Ph.D.	Star formation; Galactic Structure	5
Dr. Saroj K. Mishra	Assistant Professor	Ph.D.	Numerical modeling of the global atmosphere	3
Dr. L Reshmi	Assistant Professor	Ph.D.	Gamma Ray Bursts, Radiation processes in astrophysical contexts, Relativistic sources	6
Dr. Poompavai V.	Reader	Ph.D.	Microwave Remote Sensing	2
Ms. Ramiya A. M.	Reader	M.S.	Digital Image Processing	2
Dr. Sumitra S. Nair	Visiting Faculty	Ph.D.	Machine learning	4

The number of teaching and non-teaching staff of the department

Name	*Male*	*Female*	*Total*
No. of teachers with PhD as highest qualification	**10**	**7**	**17**
No of teachers with M.S. as highest qualification	**-**	**1**	**1**
No. of administrative staff	**-**	**1**	**1**

2. Student profile according to programmes of study, gender, region, etc.

At present, there are 122 students enrolled in the Physical Sciences B.Tech programme, of which 14 are girls (11.47%) while boys account for 88.53%. 7 (5.70%) of students are from home state while 94.30% are from 19 different state.

3. Changes made in the courses or programmes during the past five years and the contribution of faculty to those changes.

The curriculum of B.Tech Physical Sciences was initially framed by an expert committee and chaired by Dr. George Joseph(Former Director, SAC). The curriculum and syllabus has evolved over the years by incorporating suitable changes to cater to the emerging needs of science and technology. The contributions of the faculty towards creation/modification of course syllabi are listed below:

- Dr. V.J. Rajesh made the syllabus for the elective course “Planetary Geosciences” in 2011.
- Dr. V.J. Rajesh made the syllabus for the elective course “Solid Earth and its Dynamics” in 2010.

- Prof. A. Chandrasekar made the syllabus for the minor course "Introduction to Weather and Forecasting" in 2010.
- Dr. Padmanabhan designed the syllabus for the course on "Satellite Date Processing", a minor course in 2011.
- Dr. M.V. Ramana designed the syllabus for the course "Climate and Climate Change".
- Dr. R.R. Nidamanuri made the syllabus for the elective course "Hyperspectral Image Analysis".
- Dr. R.R. Nidamanuri made the syllabus for the elective course "LIDAR Remote Sensing".
- Dr. R.R. Nidamanuri made the syllabus for the elective course "Advanced Digital Image Processing".
- Dr. V. Poompavai designed the course contents of the elective course "Microwave Remote Sensing" in 2010.
- Dr. V. Poompavai designed the course contents of the elective course "Cartography and Navigation" in 2010.
- Prof. A. Chandrasekar modified the course "Earth System Science" to enhance the atmospheric and oceanic content of the above course in 2010.
- Prof. A. Chandrasekar modified the elective "Numerical Weather Prediction and Modelling" to enhance the modelling aspects.
- Dr. V.J. Rajesh modified the course "Earth System Science" to enhance the solid earth sciences content of the above course in 2010.
- Dr. R.R. Nidamanuri modified the course "Quantitative Remote Sensing" to reflect the current understanding of the subject.
- Dr. R.R. Nidamanuri modified the course "Digital Image Processing" to reflect the current understanding of the subject.

4. Trend in the success rate and dropout rate of students during the last five years.

Success rate of 2007 B.Tech Physical Sciences students is 86.20%. 4 students have dropped out in 2007 batch.

5. Learning resources of the department like library, computers, laboratories and other such resources.

Library: All the library resources such as books, journals and periodicals are catered to by the central library of the institute which is accessible by all faculty, staff and students. The department maintains handbooks and manuals in its labs.

Astronomy Lab: Currently, the astronomy lab has the following equipment:

- 14-inch optical telescope
- 8-inch optical telescope
- A set of eyepieces and filters
- A power-tank for providing power to the telescopes.

In addition, there are hand-held spectrographs (15 Nos.), celestial sphere (2 Nos.), multi-media resources (9 DVD sets containing science documentaries) which are primarily used as teaching aids. The lab is in the process of acquiring an SBig CCD camera, SBig low-resolution spectrograph and a solar telescope. Moreover, the 14-inch telescope is housed in an observatory with a dome structure at the roof the department.

Total equipment cost: Rs. 31.85 Lakhs

Atmospheric Science Lab: The Atmospheric Science Lab has the following equipment:

- Automatic weather station (to measure WS, WD, AT, Relative Humidity, Pressure, Rainfall, soil temperature, soil moisture and Radiation) with Calibration setup
- Cloud Condensation Nuclei instrument
- Condensation particle counter instrument
- Data Logger (to log the above data)
- Microtops (for Aerosol optical depth, Precipitable water vapor, Ozone)
- Aethalometer (to measure the black carbon)

The lab is currently acquiring particle counters to measure the pollution level and UPS systems to connect the above instruments.

Total cost of instruments: Rs.127.5 Lakhs

Geology Lab: The geology lab has a Petrological microscope which is used to analyze and identify rocks and minerals in thin sections. The lab is also currently in the process of acquiring an Electron Probe Micro-Analyzer (EPMA) for the study of mineral chemistry and for the dating of terrestrial and extra-terrestrial rock samples and meteorites. A good collection of minerals, rocks and fossils are available to teach students about the megascopic identification of rocks and minerals. Various geological, geochemical and petrological software such as IGPET, PETROPLOT, TWQ, THERMOCALC, etc. are available to model the genesis of igneous and metamorphic rocks.

Cost of existing equipment:Rs.12.5 Lakhs.

Remote Sensing Lab: The lab hosts the following hardware equipment:

- Handheld GPS
- Differential GPS (Base station and rover)
- Spectroradiometer (300-1075 nm)
- ASD Spectroradiometer (400-2500 nm)
- Mirror Stereoscope
- Pocket Stereoscope
- Infrared emitter
- 3D glasses
- A0 colour plotter
- A0 colour scanner.

Imagery from the following satellites is available:

1. Resourcesat – AwiFS, PAN, LISS 4
2. Cartosat – PAN (stereo)
3. Oceansat – OCM
4. IRS-1A
5. IRS-1C
6. Envisat – ASAR (Microwave).

A total of 87 images/scenes from the satellites listed above (data volume is about 100 GB) are available for analysis.

The following software packages (10 floating licenses per software package) are available for analyzing the data:

- ERDAS Imagine 2011
- ENVI 4.8 + IDL 7.0
- ArcGIS 10

- IGIS 1.1 (Integrated GIS and Image Processing Software)
- Leica Photogrammetry Suite LPS 2010
- ADRIN Detailed Analysis System

The total cost of equipment, imagery and data analysis software is Rs.112.7 Lakhs. (Individual break up: Hardware – Rs.73 Lakhs data – Rs.8.7 Lakhs; Software – Rs. 31.4 Lakhs)

Computers: Each faculty member is provided with a desktop and a laptop computer. In addition, there are 25 desktop computers and 5 high-end work stations for use by students and faculty.

6. Enhancement of the learning resources during the past five years

(i) Each year, all books that are used as text books and references for course work are purchased by the institute's library on the basis of request by students and faculty (requests for these purchases can be submitted online).

(ii) Electronic journals are also subscribed on the basis of requests from faculty. A journal committee headed by the Dean, Academic, meets at least once a semester to review and approve such requests.

(iii) Students get a yearly book grant of Rs.6,000/- (Rs.3,000/- per semester) for purchase of books approved by faculty.

(iv) Laboratory manuals have been made and provided to the students for enabling them to understand the theory and procedure of the prescribed experiments in the various lab sessions.

(v) Field trips were organized for the students in Geology, Astronomy, and Remote Sensing streams in order to supplement their understanding of the content learnt in lectures.

7. Modern teaching methods in practice other than the lecture method

The institute has provision for multi-media facilities in most of the class rooms. Smart class room with multi-media support/video editing facility for content generation/content delivery is initiated.

8. Participation of teachers in academic and personal counseling of students

The Institute has in place a Student Activity Board which is headed by the Dean, Student Activities, and consists of faculty and student representatives. All the first year students in the institute are mentored by the faculty. The students meet their mentors regularly and discuss their personal and academic problems. These faculty members take maximum effort to rectify the problems. Any problem beyond their control is brought to the notice of the authority concerned. A department level interaction with the students is organized prior to their choosing the stream specialization. Counseling is provided to the students prior to their undertaking summer internship and the final year thesis project.

9. Details of faculty development programmes and teachers who benefited during the past five years.

4 faculty members from the department have participated in the faculty development workshop organized by the Administrative Staff College, Hyderabad in 2010.

10. Participation of teachers in academic activities other than teaching and research.

Teachers actively take part in the deliberations of various committees of the institute like, Technical Committee, Sports Council, Library Council, Web-Committee, Examination Committee, Time table Council, etc. Apart from these in-house activities, teachers also attend conferences and workshops regularly. The following workshops were organized:

S. No	*Convener*	*Name of the Workshop*	*Duration*
1	Dr. A Chandrasekar	Earth System Science	November 2009
2	Dr. A Tej	Telescope making workshops	February 2010
3	Dr. A Tej	Telescope making workshops	February 2011
4	Dr. A Chandrasekar	IIST-USRA workshop	August 31-September 2, 2010
5.	Dr. Anand Narayanan and other Astronomy Faculty	Multi-wavelength astronomy with ASTROSAT	January 9-12, 2012

The faculty members of the department also participate as reviewers / editors of international journals / experts in committees. Prof. A. Chandrasekar is a member of the Board of Studies of Cochin University of Science and Technology, Cochin and SASTRA University, Tanjore. Dr. Poompavai is a member of the Board of Studies in the M.Tech (GIS) programme of Bharathidasan University, Tiruchirapalli.

The following gives the list of conferences/seminars/workshops attended by ESS faculty.

1. J. D. Pandian, T. Troost, F. Wyrowski, J. P. Williams, F. Schuller, & K. M. Menten, “Fragmentation of Cold Atlasgal Dust Clumps”, American Astronomical Society Meeting 217, 2011.

2. Poompavai V,Doorbeen – Telescope making workshop, Indian Institute of Space Science and Technology, Thiruvananthapuram, February 1-6,2011

3. Poompavai V, National Seminar on Spatial Strategies for Sustainable Management, ,Department of Environmental Management, Bharathidasan University, Tiruchirappalli, February 14-16, 2011

4. Poompavai V, Workshop on Biologically Inspired Computing – WBIC 2011, Organized by Department of Mathematics, IIST, Thiruvananthapuram, July 4-7,2011.

5. Equivalent Resolutions of Dynamical Cores in CAM – Established in Terms of Precipitation,US Department of Energy’s Climate Modeling Principal Investigators’

Annual Meeting.Washington DC, USA, S. K. Mishra, Mark Taylor, Henry Tufo, Ram Nair, Joseph Tribbia, Peter Lauritzen, September-2011.

6. M. A. Taylor, J. Edwards, K.J. Evans, P. H. Lauritzen, A.A. Mirin, S. K. Mishra, R. Neale, J.J. Tribbia, P. H. Worley, The Spectral Element Dynamical Core in the Community Earth System Model Version1.US Department of Energy's Climate Modeling Principal Investigators' Annual Meeting.Washington DC, USA, September-2011.

7. M. A. Taylor, J. Edwards, K. Evans, O. Guba, P. H. Lauritzen, M. Levy, S. K. Mishra, Pat Worley, Petascale Performance of the Community Earth System Model,Scientific Discovery through Advanced Computing (SciDAC) Annual Conference Denver, Colorado, July-2011.

8. S. K. Mishra, M. A. Taylor, Henry Tufo, Ram Nair, Joe Tribbia, Jose Garcia, Rich Neale, Cecile Hannay, Preliminary Results from CAM5/HOMME,CESM Annual Meeting, Breckenridge, Colorado, June-2011.

9. M. A. Taylor, J. Edwards, O. Guba, P. H. Lauritzen, M. Levy, S. K. Mishra, A., CAM-SE: The HOMME dynamical core, CESM Annual Meeting,Breckenridge, Colorado, St-Cyr. June-2011.

10. S. K. Mishra, M. A. Taylor, R. D. Nair, H. M. Tufo. J. J. Tribbia, K. Evans, J. Edwards, P. H.Lauritzen, J. Garcia, CAM4/HOMME AMIP Results, CESM-Atmosphere Model Working Group (AMWG) Meeting. Boulder, Colorado, USA, February-2011.

11. J. D. Pandian, E. Momjian, Y. Xu, K. M. Menten, & P. F. Goldsmith, "6.7 GHz Methanol Masers: Signposts of Rapidly Accreting Massive Stars", Great Barriers in High-Mass Star Formation, 2010.

12. Poompavai V, Indian Small Satellite Systems Conference (ISSSC-1), ISRO Satellite Centre, Bengaluru, April 28, 2010

13. Poompavai V National Conference for ISRO Women Employees on the occasion of International Women's Day, "Education as Empowering tool for Women", Satish Dhawan Space Centre(SDSC), SHAR, Andhra Pradesh, ,March 8, 2010.

14. S. Indira Rani, Radhika Ramachandran and D. Bala Subrahamanyam 'Development of Convection on 1 May 2005 over the Rocket launching Site of India' , (AOGS, Hyderabad, 2010).

15. D. Bala Subrahamanyam, Radhika Ramachandran, S. Indira Rani, S. Sijikumar, T. J. Anurose and Ashish Kumar Ghosh 'Location Specific Weather Predictions for Sriharikota (13.72°N, 80.22°E) through Numerical Atmospheric Models during Satellite Launch Campaigns', National Space Science Symposium, 2010.

16. S. Indira Rani, Radhika Ramachandran, D. Bala Subrahamanyam, S. Sijikumar, Sandhya K. Nair and P.K. Kunhikrishnan 'Analysis of propagation of Convection along the West coast of India' National Space Science Symposium, 2010.

17. Rajesh V. J "Probable Precambrian oceanic remnants in the Palghat-Cauvery Suture Zone, southern India" ,Oral presentation titled in the 7th Annual Meeting of Asia Oceania Geosciences Society (AOGS), Hyderabad, India, (July 5-9, 2010).

18. Rajesh V. J "Recent Advances and Future Directions in Science and Technology" Participated in the seminar on organized by Indian JSPS Alumni Association (IJAA) sponsored by Japan Society for the Promotion of Science (JSPS), Japan and supported by The Embassy of Japan, India (May 10-11, 2010).

19. M. A. Taylor, J. Edwards, K. Evans, P. H. Lauritzen, S. K. Mishra, Global Climate Modeling: The Spectral Element Dynamical Core in the Community Climate System Model, Energy Security and Climate Change Seminar, University of Texas, El Paso, USA, December-2010.

20. M. A. Taylor, K. Evans, S. K. Mishra, J. Edwards, P. H. Lauritzen. Global Atmospheric Modeling with Regional Resolution Earth System Prediction Capability Workshop, Earth System Research Laboratory, Boulder, Colorado, USA, September-2010.

21. M. A. Taylor, J. Edwards, K. Evans, P. H. Lauritzen, S. K. Mishra, CCSM with the HOMME Cubed-Sphere Atmospheric Dynamical Core,US Department of Energy's Scientific Discovery through Advanced Computing, Annual Meeting. A. St-Cyr.Chattanooga, Tennessee, USA, July-2010.

22. M. A. Taylor, J. Edwards, K. Evans, A. Fournier, O. Guba, P. H. Lauritzen, S. K. Mishra, A petascale-ready version of the CCSM for high resolution global simulations. Global High Resoloution Modeling Workshop, A. St-Cyr, Colorado State University, Fort Collins, Colorado, USA, June-2010..

23. T. Craig, many others, S. K. Mishra, CCSM4 – Toward 100k Processors,Global Arrays Tecnical Meeting, and many others,Pacific Northwest National Laboratory, Richland, Washington, USA, May-2010.

24. S. K. Mishra, M. A. Taylor, R. D. Nair, H. M. Tufo, P. H. Lauritzen, J. J. Tribbia, Performance of the HOMME dynamical core in NCAR-CAM4, US Department of Energy's Climate Change Modeling Program, Science Team Meeting, Washington DC, USA, March-2010.

25. M. A. Taylor, J. Edwards, K. Evans, P. H. Lauritzen, S. K. Mishra, J. J. Tribbia, CAM4 with HOMME Dynamical Core: 1 degree and 1/8 Degree Simulation and Scalability Results,US Department of Energy's Climate Change Modeling Program, Science Team Meeting, Washington DC, USA, March-2010.

26. M. A. Taylor, J. Edwards, K. Evans, P. H. Lauritzen, S. K. Mishra, J. J. Tribbia, AMIP Simulations from CCSM4 with HOMME Dynamical Core.US Department of Energy's Climate Change Modeling Program, Science Team Meeting , Washington DC, USA, March-2010.

27. M. A. Taylor, J. Edwards, K. Evans, P. H. Lauritzen, S. K. Mishra, A. AMIP Simulations with HOMME, CCSM-Atmosphere Model Working Group Meeting. St.Cyr, Boulder, Colorado, USA, February-2010.

28. J. D. Pandian, E. Momjian, Y. Xu, K. M. Menten, & P. F. Goldsmith, "Spectral Energy Distributions of 6.7 GHz Methanol Masers", Millimeter and SUbmillimeter Astronomy at High Angular Resolution, 2009.

29. J. D. Pandian, E. Momjian, Y. Xu, K. M. Menten, & P. F. Goldsmith, "Spectral Energy Distributions of 6.7 GHz Methanol Masers", American Astronomical Society Meeting 215, 2009.

30. D. Bala Subrahamanyam and Radhika Ramachandran "Nowcasting at Sriharikota through ARPS Model Simulations for predictions of Thunderstorms during PSLV-C11 (Chandrayaan-1) Mission",. Indo-Russian Workshop on Climate Change (INDORUSCC-09), Cochin, October 08-09, 2009.

31. Rajesh V. J "Alaskan-type Ultramafic Rocks in Neoproterozoic Palghat Cauvery Suture Zone in southern India: Implications on Petrogenesis and Tectonic Setting, in the 6th International symposium on Gondwana to Asia, Hanoi, Vietnam (October 2-6, 2009)

32. Rajesh V. J "Petrogenesis and Tectonic Setting of Alaskan-type Ultramafic Rocks in Neoproterozoic Palghat Cauvery Suture Zone in southern India"., 6th Annual General Meeting of Asia Oceania Geosciences Society, Singapore (11 – 15 August, 2009)

33. Rajesh V. J "Genesis of Volatile-rich High-Mg Olivine Cumulates with Low Ni and Cr in Achankovil Shear Zone, South India", Japan Geoscience Union Meeting 2009, Chiba, Japan (16-21 May, 2009)

34. Nidamanuri, R.R. and Zbell B On the transferability of vegetation spectral library, presented in 33rd International Symposium on Remote Sensing of Environment, May 3 – 7, 2009, Stresa, Italy, (2009).

35. Gnanappazham. L. and V. Selvam, Multi-temporal remote sensing data in monitoring the mangroves of Pichavaram in the National Seminar on Hyperspectral Remote sensing data on Natural Resource Management, 2008. Annamalai University, 13-15 February, 2008

36. G. R. K. S. Subrahmanyam, A. N. Rajagopalan, R. Aravind, and R. Gerhard, "Edge-preserving unscented Kalman filter for speckle reduction",. International conference on pattern recognition (ICPR 2008).

37. J. D. Pandian, E. Momjian & P. F. Goldsmith, "Probing Galactic Structure using 6.7 GHz Methanol Masers", American Astronomical Society Meeting 211, 2008.

38. S. Indira Rani, Radhika Ramachandran, D. Bala Subrahamanyam and P.K. Kunhikrishnan "HRM simulation of Mountain wave genesis and Propagation over the Western Ghats of Indian Sub-continent" ,: Third International HRM Workshop, Hanoi, Vietnam, 24-28 November 2008 (Invited Lecture)

39. D. Bala Subrahamanyam, Radhika Ramachandran, S. Indira Rani and P.K. Kunhikrishnan "Numerical simulations of Meteorological fields over Sriharikota during Satellite Launch Campaigns through High-resolution Regional Model (HRM): An Overview"" Third International HRM Workshop, Hanoi, Vietnam, 24-28 November 2008 (Invited Lecture)

40. Indira Rani, Radhika Ramachandran and D. Bala Subrahamanyam and P.K. Kunhikrishnan Numerical Simulation of Mountain Waves Over Western Ghats, National Space Science Symposium, Radio Astronomical Centre, Ootty, February 2008.

41. S. Indira Rani, Radhika Ramachandran and D. Bala Subrahamanyam and P.K. Kunhikrishnan Numerical Simulation of Thunderstorm over a tropical station along the west coast of Indian Subcontinent- A case Study, National Space Science Symposium, Radio Astronomical Centre, Ootty, February 2008.

42. S. Indira Rani, D. Bala Subrahamanyam, Radhika Ramachandran and P.K. Kunhikrishnan Statistiacal Evaluation of High Resolution Regional Model (HRM)-Bias and its incorporation in near-real time simulations: A step towards improvements in atmospheric predictability, National Space Science Symposium, Radio Astronomical Centre, Ootty, February 2008.

43. D. Bala Subrahamanyam, S. Indira Rani, Radhika Ramachandran and P.K. Kunhikrishnan How realistic are the high values of sensible heat flux over the Korean Strait. Is it a direct impact of Tushima Warm Current?. National Space Science Symposium, Radio Astronomical Centre, Ootty, February 2008.

44. D. Bala Subrahamanyam, S. Indira Rani, Radhika Ramachandran and P.K. Kunhikrishnan Can nudging of vertical profiles of meteorological parameters improve performance of mesoscale atmospheric model? National Space Science Symposium, Radio Astronomical Centre, Ootty, February 2008.

45. D. Bala Subrahamanyam, S. Indira Rani, Radhika Ramachandran and P.K. Kunhikrishnan Estimation of Air-Sea Interface fluxes from Oceanic Buoys: How realistic are the unusually high values of sensible heat fluxes over the warm oceanic current region? National Seminar on Emerging Trends in Space and Aviation Meteorology (SAM08), 2008.

46. Radhika Ramachandran, D. Bala Subrahamanyam, S. Indira Rani and P.K. Kunhikrishnan Statistical skill analysis of High resolution Regional Model (HRM) during PSLV-C7 and PSLV-C8 Launch campaigns. A step towards improvements in Model simulated forecasts. National Seminar on Emerging Trends in Space and Aviation Meteorology (SAM08), 2008

47. Radhika Ramachandran "An Overview of High-resolution Regional Model (HRM) Simulations during PSLV-C7 and PSLV-C8 Launch Campaigns", National Seminar on Emerging Trends in Space and Aviation Meteorology (SAM08), New Delhi, February 18 – 19, 2008. (Invited)

48. Rajesh V. J , "Petrogenesis of Ultrapotassic Melts and Implications for Extensional Tectonics in Achankovil Shear Zone, South India" in 5th International symposium on Gondwana to Asia, Yonsei University, Seoul, South Korea, (October 31-November 2, 2008)

49. Rajesh V. J "Petrology of Ultramafic Rock in Palghat Cauvery Suture Zone, Southern India: Implications on Origin and Tectonic Evolution" in 5th International symposium on Gondwana to Asia, Yonsei University, Seoul, South Korea, (October 31-November 2, 2008)

50. Rajesh V. J , "Genesis of unusual high-Mg low-Ni dunites in Achankovil Shear Zone, South India" in AGU Chapman Conference on Shallow Mantle Composition & Dynamics 5th International Orogenic Lherzolite Conference Mount Shasta Resort, Mount Shasta, California, USA, (September, 22-26, 2008)

51. Rajesh V. J , "Petrogenesis of an Unusual Ultramafic-ultrapotassic Intrusive Complex in a Late Proterozoic Ductile Shear Zone in Southern Granulite Terrain, South India" in Open Research Center of Okayama University of Science International Symposium on Material Science and History of Earth and Sister Planets, Okayama, Japan, (March 14-16, 2008)

52. S. K. Mishra, An Introduction to Climate Modeling and Scientific Computation,SOA University (invited talk). Bhubaneswar, Orissa, India, August-2009.

53. M. A. Taylor, J. Edwards, K. Evans, P. H. Lauritzen, S. K. Mishra, A. Ct-Syr,Santa Fe, Achieving Regional Resolution in the CCSM, Simulating the Spatial-Temporal Patterns of Anthropogenic Climate Change: A Workshop in the Bridging Disciplines, Bridging Scale Series. New Mexico, USA, July-2009.

54. M. A. Taylor, J. Edwards, K. Evans, P. H. Lauritzen, S. K. Mishra, A. Ct-Syr,Breckenridge, CCSM-HOMME update, CCSM Annual Meeting, Colorado, USA. June-2009.

55. S. K. Mishra, M. A. Taylor, J. Edwards, K. Evans, P. H. Lauritzen,, A. St.Cyr.,Breckenridge, Performance of the HOMME Dynamical Core in the Simulation of Rainfall with NCAR- CAM3.5: Real-Planet Study, CCSM Annual Meeting, Colorado, USA. June-2009.

56. S. K. Mishra, The Impact of Changes in Time Step and Convective Parameterization on the Simulation of Tropical Climate in NCAR CAM3 GCM, Indian Institute of Science, Bangalore, India, Sept-2009.

57. S. K. Mishra, The Impact of Changes in Temporal Resolution and Convective Parameterization on the Simulation of Tropical Climate in NCAR CAM3 GCM, National Center for Atmospheric Research, Boulder, Colorado, USA, April-2009.

58. S. K. Mishra, The Impact of Changes in Time Step Size and Cumulus Parameters on the Simulation of Tropical Climate in NCAR CAM3 GCM, Indian Institute of Science, Bangalore, India, Dec-2008.

59. S. K. Mishra,Sensitivity of the Rainfall Simulation in NCAR-CAM3.0 to Various ModelComponents.National Center for Atmospheric Research (invited talk), Boulder, Colorado, USA, May-2008.

60. Gnanappazham.L, Comparison of IKONOS multispectral data and merged data of Cartosat and IRS LISS III for mapping mangrove vegetation of Pichavaram wetland, east coast of South India. International Symposium of Remote Sensing of Environment. Session PS 3.6, Costa Rica. (Poster Presentation of Marine Ecosystem on June 26. 2007).

61. G. R. K. S. Subrahmanyam, A. N. Rajagopalan and R. Aravind "Unscented Kalman filter for film-grain noise removal", , IEEE International Conference on Image Processing(ICIP 2007).

62. J. D. Pandian, E. Momjian & P. F. Goldsmith, "Probing Galactic Structure using 6.7 GHz Methanol Masers", Massive Star Formation: Observations confront theory, 2007.

63. J. D. Pandian, P. F. Goldsmith & A. A. Deshpande, "The Arecibo methanol Maser Galactic Plane Survey", IAU Symposium 242: "Astrophysical masers and their Environments", 2007.

64. Subrahamanyam, D. B., S. Indira Rani, Radhika Ramachandran and P. K. Kunhikrishnan "Can Nudging of Vertical Profiles of Meteorological Parameters Improve Performance of a Mesoscale Atmospheric Model TROPMET – 2007, Advances in Meteorology and their Applications, Bhopal, 17 – 19 December 2007.

65. Subrahamanyam, D. B., Radhika Ramachandran, S. Indira Rani and P. K. Kunhikrishnan "An Overview of High-resolution Regional Model (HRM) Simulations of Meteorological Fields during PSLV-C7 and PSLV-C8 Launch Campaigns", TROPMET – 2007, Advances in Meteorology and their Applications, Bhopal, 17 – 19 December 2007.

66. Rani, S. I., Subrahamanyam, D. B., Radhika Ramachandran and P. K. Kunhikrishnan "Statistical Evaluation of High-resolution Regional Model (HRM) Bias and its incorporation in Near Real-time Simulations: A Step towards improvements in atmospheric predictability", TROPMET –2007, Advances in Meteorology and their Applications, Bhopal, 17 – 19 December 2007

67. Rajesh V. J "Petrogenesis and Geological Significance of Ultramafic Rocks in Singok area within the Honseong Belt, Gyeonggi Massif, South Korea" ,in the Annual conference of Korea Society of Economic and Environmental Geology at Kyeongju, South Korea (April 25-27, 2007)

68. The Impact of Convective Relaxation Time Scale on the Simulation of Seasonal Migration of ITCZ, MJO, and Kelvin waves in CAM3.0,Celebrating the Monsoon, IISc, Bangalore, India, July-2007.

11. Collaboration with other departments and institutions at the national and international level and their outcome during the past five years.

The institute has signed a Memorandum of Understanding with the Universities Space Research Association (USRA), USA, in September 2010, which provides for mutual exchange of faculty and students of the institute with USRA institute/universities. Three of our 2007 B.Tech. Physical Science students carried out their final semester project dissertations with Lunar and Planetary Institute, Houston (USA) in 2011. Refer for more collaborative details part II criteria III 3.2.6 for details.

12. If research is a significant activity, the thrust area of the department

(a) Astronomy & Planetary Sciences:

- Star Formation
- Astrophysical masers
- Physics of Accretion around compact objects
- Observations of Inter-Galactic medium
- Gamma Ray Bursts

(b) Atmospheric Science

- Monsoon Climate Studies
- Climate Modelling
- Mesoscale Modelling
- Data Assimilation
- Aerosols and Climate Change
- Radiation and Climate Change
- Atmospheric Boundary Layer
- Unmanned Aircraft Vehicle (UAV) as a research platform
- Miniaturized instrumentation

(c) Geology

- Planetary Geology (Earth, Mars, and Moon)
- Minerology and Petrology

(d) Remote Sensing

- Hyperspectral Remote Sensing
- Microwave Remote Sensing
- Pattern Recognition
- Geographical Information Systems
- Satellite Data Processing
- Image Processing
- Machine Learning

13. Details of the ongoing projects and projects completed during the last five years.

10 projects are ongoing while 2 projects have been completed. For more details of the ongoing projects refer Part II criteria III 3.2.1.

Projects completed in the last five years:

S. No.	*Sponsoring Agency*	*Principal and Co-Investigators*	*Title of the Major Research Project*	*Total Grant*	*Exact Period of Operation*
1	SAC ISRO	Prof. A. Chandrasekar	Assimilation of Oceansat-2 scatterometer in mesoscale model	Rs.12 Lakhs	2008-2011
2	IIST	PI: Dr. Anandmayee Tej	Multiwavelength studies of Galactic star formation regions	Rs.8 Lakhs	2009-2011

14. "Programmes by research" offered by the university

6 students are pursuing PhD from department. For details refer Part II criteria III 3.2.3.

15. Publications of the faculty, for the past five years. Details regarding citation index and impact factor analysis

For list of jurnal publication refer part II criteria III 3.2.9. The average citation of journal papers of the last five years is 8.07, while the average impact factor 6.39. Citation and impact factor details of publications of faculty are given below.

Citation Index:

Sl. No.	***Name of the Faculty Member***	***Total No. of Articles Published***	***No. of Citations***	***The most cited article***
1	Prof. A. Chandrasekar	42	96	Impact of localized sea surface temperature anomalies over the equatorial Indian Ocean on the Indian summer monsoon, Chandrasekar, A. and Kitoh, A., 1998, Journal of Meteorological Society of Japan,76, No. 6, 841-853. **(39 citations)**
2	Dr. N. Padmanabhan	22	54	Effect of Latent heat release on mountain waves in sheared mean flow **(2 citations)**
3	Dr. Radhika Ramachandran	40	198	Study on thermal internal boundary layer structure over Thumba, India, Ann. Geophys., 11, 52, 1993. **(29 citations)**
4	Dr. Anandmayee Tej	11	128	Optical and near-IR spectra of O-rich Mira variables: A comparison between models and observations, Tej, A., Lançon, A., Scholz, M., Wood, P. R. , 2003, Astronomy & Astrophysics, vol. 412, pp. 481 **(27 citations)**
5	Dr. M. V. Ramana	8	406	Warming trends in Asia amplified by brown cloud solar absorption, ***Nature, 2007*** **(206 citations)**

6	Dr. Anand Narayanan	12	103	A Survey of Weak Mg II Absorbers at 0.4 < z < 2.4 **(16 citations)**
7	Dr. L. Gnanappazham	4	45	Selvam, V., Ravichandran, K. K., Gnanappazham L. and Navamuniyammal, M. 2003. Assessment of community-based restoration of Pichavaram mangrove wetland using remote sensing data. Current Science 85: 6, 794-798. **(24 citations)**
8	Dr. Gorthi R.K.S.S. Manyam	4	13	A recursive filter for despeckling of SAR images, G.R.K.S.Subrahmanyam, A.N.Rajagopalan and R. Aravind, 2007, *IEEE Trans. Image Processing*, vol. 17, no. 10, pp. 1969-1974 **(6 citations)**
9	Dr. Jagadheep D.	15	204	First Results from the Arecibo Galactic H I Survey: The Disk/Halo Interface Region in the Outer Galaxy, S.Stanimirovic, M.Putman, C.Heiles, J.E.G.Peek, P.F.Goldsmith, B-C.Koo, M.Krco, J-J.Lee, J.Mock, E.Muller, J.D.Pandian, A.Parsons, Y.Tang, D.Werthimer, 2006, *Astrophysical Journal*, vol. 653, pp. 1210. **(42 citations)**
10	Dr. Rajesh V. J.	14	121	Phanerozoic high-pressure eclogite and intermediate pressure granulite facies metamorphism in the Gyeonggi Massif, South Korea: implications for the eastward extension of the Dabie-Sulu continental collision zone. **(43 citations)**
11	Dr. R.R.Nidamanuri	18	89	Development of cultivar based crop spectral library and classification of crop cultivars using hyperspectral data, Precision Agriculture, 8, 173-185. **(15 citations)**
12	Dr. Samir Mandal	18	100	The spectral properties of shocked two-component accretion flows in the presence of synchrotron emission, S.K. Chakrabarti & S. Mandal, 2006, *Astrophysical Journal Letters*, vol. 642, pp. 9 **(31 citations)**

13	Dr. Sarita Vig	13	98	A near infrared study of the NGC7538 star forming region, D. K. Ojha, M. Tamura, Y.Nakajima, M.Fukagawa, K.Sugitani, C.Nagashima, T.Nagayama, T.Nagata, S.Sato, S.Vig, S.K.Ghosh, A.J.Pickles, M.Momose, K.Ogura., 2004, *Astrophysical Journal*, 616, 1042. **(31 citations)**
14	Dr. Saroj K. Mishra	10	13	The Impact of Time Step on the Intensity of ITCZ in Aquaplanet GCM, S.K.Mishra, J.Srinivasan, and R.S.Nanjundiah, 2008, *Monthly Weather Review*, vol. 136, pp. 4077-4091. **(6 citations)**
15	Dr. L Resmi	6	63	A. J. van der Horst, A. Kamble, L. Resmi, R. A. M. J. Wijers et al. Detailed study of the GRB 030329 radio afterglow deep into the non-relativistic phase. A&A, 2008, 480, 35 **(25 citations)**
16	Dr. Sumitra S. Nair	4	7	The Application of Machine Learning Algorithms to the analysis of Electromyographic patterns from Arthritic patients; S. Nair, R. French, D. Laroche and E. Thomas.., 2010, *IEEE Transactions on Neural Systems & Rehabilitation Engineering*, Vol 18, No. 2, pp-174 – 184 **(3 citations)**

Impact Factor:

Name of the Faculty Member	*Title of the Journals in which Research Articles are Published*	*Impact factor of the journal*
Prof. A. Chandrasekar	Global and Planetary Change	3.27
	Atmospheric Environment	3.14
	Boundary Layer Meteorology	2.22
	Journal of Applied Meteorology & Climatology	1.89
	Natural Hazards	1.22
	International Journal of Engineering Sciences	1.19
	Journal of Meteorological Society of Japan	1.10
	International Journal of Remote Sensing	1.09
	Pure and Applied Geophysics	0.94
	Meteorology and Atmospheric Physics	0.87
	Proceedings of Indian Academy of Sciences (Earth & Planetary Sciences)	0.82
	Current Science	0.78
	Archives of Mechanics	0.47
	Atmosfera	0.44
Dr. N. Padmanabhan	International Journal of Remote Sensing	1.18

Dr. Radhika Ramachandran	Boundary Layer Meteorology	2.22
	Atmospheric Research	1.81
	Annales Geophysicae	1.65
	Natural Hazards	1.22
	Open Ocean Engineering Journal	1.00
	Ocean Science Journal	0.35
Dr. Anandmayee Tej	Monthly Notices of the Royal Astronomical Society	5.02
	Astronomy & Astrophysics	4.26
Dr. M. V. Ramana	Nature	36.10
	Nature Geoscience	10.39
	Proceedings of the National Academy of Sciences	9.77
	Atmospheric Chemistry and Physics	5.31
	Journal of Geophysical Research	3.30
	Quarterly Journal of the Royal Meteorological Society	2.98
Dr. Anand Narayanan	Astrophysical Journal	6.41
	Astronomical Journal	5.02
Dr. L Gnanappazham	Wetland Eology and Management	1.0
	Geocarto International	0.6
	Current Science	0.5
Dr. Gorthi R.K.S.S. Manyam	IEEE Trans. Image Processing	2.92
	Journal of Optical Society of America	1.94
	IEEE Signal Processing Letters	1.17
	IEEE Multimedia Magazine	1.07
Dr. Jagadheep D.	Astrophysical Journal Letters	7.90
	Astrophysical Journal	6.41
	Astronomy & Astrophysics	4.26
	IEEE Microwave Magazine	1.49
Dr. Rajesh V. J.	Gondwana Research	5.50
	Lithos	3.64
	Journal of Geology	2.24
	Island Arc	1.40
Dr. R.R.Nidamanuri	ISPRS Journal of Photogrammetry and Remote Sensing	2.88
	Progress in Physical Geography	2.28
	Precision Agriculture	1.68
	The Journal of Agricultural Science	1.48
	Biosystems Engineering	1.46
	Journal of Environmental Studies and Sciences	1.20
	International Journal of Remote Sensing	1.18
	IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing	1.14
	GIscience and Remote Sensing	1.00
	International Journal of Ecology and Environmental Studies and Sciences	0.90
		0.60

Dr. Samir Mandal	Astrophysical Journal Letters	7.90
	Experimental Astronomy	2.14
	Astrophysics & Space Science	1.43
	Bulletin of the Astronomical Society of India	0.31
Dr. Sarita Vig	Astrophysical Journal	7.90
	Monthly Notices of the Royal Astronomical Society	5.25
	Astronomical Journal	5.02
	Astronomy and Astrophysics	4.26
	International Journal of Mass Spectroscopy	2.27
Dr. Saroj K. Mishra	Journal of Climate	4.3
	Climate Dynamics	4.0
	Monthly Weather Review	2.3
	Atmospheric Research	1.7
	Annales Geophysicae	1.6
	Theoretical and Applied Climatology	1.6
	Atmospheric Research Letters	1.4
	Meteorology and Atmospheric Physics	0.9
Dr. L. Resmi	Astrophysical Journal Letters	7.90
	Monthly Notices of the Royal Astronomical Society	5.25
	Astronomy and Astrophysics	4.26
Dr. Poompavai V.	International Journal of Applied Remote Sensing	1.0
Dr. Sumitra S. Nair	SMALL	6.17
	Environmental Science & Technology	4.83
	IEEE Transactions on Neural Systems & Rehabilitation Engineering	2.40
	IET Control Theory and Applications	1.28

16. Participation of the department in the extension activities of the university

A few of the faculty members have been involved in science popularization and outreach activities in various schools in the district. In addition, the faculty members have also participated in the Institute's annual outreach programme, IIST@schools.

17. Method of continuous student assessment

The evaluation methods are periodic quizzes, assignments, periodical tests, oral examination, and end semester examinations. Students are monitored on a continuous basis in a Semester system of evaluation. Continuous evaluation during the semester has 50% weight. This includes two announced periodical quizzes (with 15% weight each) as scheduled in the academic calendar. Besides, class tests, tutorials and assignments carrying 20% weight are also given. End-semester examination carries remaining 50% weight. The details on the evaluation for a course are communicated to the students by the teacher who is handling that course, at the beginning of the semester. All answer books of periodical quizzes and class tests are returned to the students after evaluation. The answer books of the end-semester

examinations are scrutinized by the faculty once again before the results are announced.

18. Placement record of the past students and the contribution of the department to the student placements

All the students who complete their UG degree programme in 4 years with a minimum CGPA of 6.5 on a scale of 10 are placed in any one centre of ISRO/DoS. 25 students graduated from our department of which 22 were absorbed in various ISRO/DoS. Details are given below

Sl No	*Centre*	*No. of students*
1	ISAC	10
2	SAC	4
3	NRSC	4
4	PRL	3
5	IIRS	1

19. Significant achievements of the department or faculty or students during the past five years

In chronological order:

- **M. V. Ramana** has published a paper in *Nature* in 2007, a journal with a very high impact factor. The paper has since received over 200 citations.
- **Prof. A. Chandrasekar** has written a book titled "Basics of Atmospheric Science", published by Prentice Hall in 2010.
- **V. J. Rajesh** was awarded the young scientist award in the 2011 Kerala Science Congress meeting for his research contributions.
- Three of our undergraduate students were selected to undergo their final semester project dissertation at Lunar and Planetary Institute, Houston, USA in 2011.
- **Rama Rao and Bharath Bhusan,** presented a paper "Multiple classifier systems for hyperspectral image classification" which won the Best Poster Award at the "National Symposium on Empowering Rural India through Space Technology" organized by the Indian Society of Remote Sensing, November 8 -11, 2011, Bhopal.
- **R. R. Nidamanuri and A. M. Ramiya** was selected by the Japan Space Agency (JAXA) through international competitive bidding in 2011, for a research proposal titled"Estimation of tropical forest biophysical parameters using near UV and NIR reflectance from GOSAT TANSO – CAI sensor".

20. Participation of the department in COSIP / COHSSIP / SAP CAS / DSA / DRS / FIST. Etc

Not Applicable

21. Plan of action of the department for the next five years

Postgraduate Program

The Department of Earth and Space Sciences will be starting a M.S. programme in Astronomy and an M.Tech programme in Geospatial Signal Processing and Navigation in

2012. Furthermore the department also plans a dual degree programme in Physical Sciences with specialization in (i) Astronomy and (ii) Geospatial Signal Processing and Navigation in 2012. The department is planning to introduce similar PG programmes in Earth System Science.

Instructional / Research Lab

1. The 14-inch telescope in the Astronomy lab will be housed in an observatory with a dome facility at the roof of the department. In addition, a radio astronomy facility is being planned at the IIST observing station in Ponmudi.
2. The Atmospheric Sciences group has initiated setting up a Climate Observatory at Ponmudi. The observatory will eventually feature a full suite of instruments to measure atmospheric boundary layer parameters, aeorosol, and cloud physics measurements.
3. The Atmospheric Sciences group is planning to set up a data analysis facility for climate research.
4. The Geology group will be setting up a Petrology lab to analyze terrestrial and extra-terrestrial geological samples. To this effect, an Electron Probe Micro-Analyzer (EPMA) has been indented. This equipment will be purchased for the study of mineral chemistry and for the dating of terrestrial and extra-terrestrial rock samples and meteorites. In addition, the inventory of rock samples and minerals collected from various field works will be expanded.
5. A SAR image processing facility is being planned in the Remote Sensing Lab for academic purposes.
6. The department has plans to put in place a near real time satellite data acquisition and associated pre-processing facility.

Research

1. In addition to the individual thrust areas such as (i) star formation, (ii) intergalactic medium, and (iii) compact objects, the Astronomy group plans to join national and international projects like the Thirty Meter Telescope (TMT), and the South African Large Telescope (SALT). The group is already involved with the ASTROSAT project. In addition, the faculty members plan to make full use of new/upgraded telescope facilities such as the Expanded Very Large Array (EVLA) and the Atacama Large Millimeter Array (ALMA).
2. The Atmospheric Science group has plans to utilize the data obtained from MEGHA TROPIQUES satellite to (i) understand the convection processes associated with the Indian monsoon. (ii) to assimilate the MEGHA TROPIQUES observations in mesoscale models. (iii) To study the cloud physics related processes using MEGHA TROPIQUES data. Based on the above understanding, the group plans to improve the simulation and prediction of the Indian monsoon.

   The proposed projects (as listed under Item No. 13(3, 4)) directly addresses a major research objective "to improve the predictive understanding of the radiative forcing of the climate system by aerosols and by chemically-active greenhouse gases." Moreover, the largest uncertainty in understanding the climate is relating the effects of aerosols on cloud formation and subsequent indirect radiative forcing and precipitation processes. Cloud condensation nuclei (CCN) are linked to radiative forcing, precipitation, and cloud structure; yet, their role in climate feedback remains largely unknown. It is this liaison that the Ponmudi Climate observatory (in conjunction with vertical profiling platforms) will serve the purpose of improving our

understanding of aerosol-cloud interactions and their subsequent effect on climate through modification of cloud radiative properties and the hydrological cycle; a central issue in the debate concerning the impact of humans on twenty-first century climate change.

3. The Geology group is planning to develop an active research base in Planetary Geoscience studies at the institute. The faculty has started collaboration with SAC, Ahmadabad and PRL, Ahmadabad on future Planetary Science exploration programmes such as PLANEX and Chandrayaan-2. The group has started working on identifying and studying terrestrial sites that are lunar and Martian analogues. Geological fieldwork will be carried out at these sites in addition to mock *in-situ* experiments for the proposed space planetary missions.

4. The Remote Sensing group plans to carry out research in (i) SAR image processing for retrieval of geophysical parameters, (ii) Geospatial technologies for coastal zone management with special emphasis on integration of Optical, Hyperspectral and LIDAR data, (iii) Development of image classification algorithms, (iv) Image fusion techniques for biophysical characterization, and (v) Near real time data acquisition of satellite data and pre-processing.

It is hoped that centers for advanced study in each of the above mentioned specialization would be initiated to further expand the research activities of the faculty and research scholars.

22. ANY OTHER HIGHLIGHTS

(i) The total budget utilized by the department in terms of PG/research labs as well as sponsored funded projects under DoS amount to Rs. 477.15 Lakhs.

(ii) The institute directly provides funds for the research needs of the faculty. However, very recently, the institute has started allowing faculty members to procure funds from external funding agencies involving national experiments/campaigns. Dr. M. V. Ramana has obtained Rs. 67 Lakhs funding from the Ministry of Earth Sciences (MOES), Govt. of India in 2011.

(iii) A dual degree B. Tech./M. S. program is being planned which will be offered shortly.

- Ratio of research scholars to teachers (eligible to guide research students) **0.35:1**
  Ratio of research papers published during the last 5 years at international and national levels to number of teachers **5.6:1 (101 papers; 18 faculty)**

DEPARTMENT OF HUMANITIES

DEPARTMENT OF HUMANITIES

1. *Faculty profile, adequacy and competency of faculty.*

(Faculty profiles attached)

Name of the Teacher	*Designation*	*Highest Qual.*	*Specialisation*	*Exp yrs*
Dr. Babitha Justin	Reader	PhD	English language and literature – Gender studies	10
Mrs. Gigy J Alex	Reader	MPhil	English language and literature – Black American and Native American literature	8
Dr. Lekshmi Nair	Assistant Professor	PhD	Sociology - Gerontology	9
Dr. Ravi V	Assistant Professor	PhD	Management – logistic and supply chain management and technology management	11
Dr. Shaijumon C S	Reader	PhD.	Economics – Development economics	11

The number of teaching and non-teaching staff of the department

	Male	*Female*	*Total*
No. of teachers with Ph.D. as the highest qualification	2	2	4
No. of teachers with M.Phil. as the highest qualification	-	1	1
No. of administrative staff	-	1	1
No. of technical staff	-	1	1

2. *Student Profile according to programmes of study, gender, region etc.*

Not Applicable

3. *Changes made in the courses or programmes during the last five years and the contribution of the faculty to those changes.*

a. Courses were newly introduced and syllabus framed accordingly.
b. New electives were introduced namely: Introduction to Macro economics (2011), Visual communication (2010) and Science fiction (2010).
c. Study visits formed part of the curriculum.
d. Induction program given to all first semester students.
e. Audio visual lab proposed for a better interaction through virtual class room.

The following faculties were respomsible for the revision of the following courses.

1. Dr. Babitha Justin – Communication Skills and Visual Communication
2. Ms. Gigy J Alex – Communication Skills and Science Fiction
3. Dr. Lekshmi V Nair – Introduction to Social Science and Ethics

4. Dr. Ravi V - Principles of Management
5. Dr. Shaijumon – Introduction to Economics and Introduction to Macro Economics

4. Trend in the success rate and dropout rate of students during the last five years.

Not Applicable

5. Learning resources of the departments like library, computers, laboratories and other such resources.

a. E-library of JSTOR
b. Language lab with most modern facilities
c. Books and Reading materials and CDs maintained by each faculty.
d. Latest Journals displayed in the Faculty room.
e. Each faculty is provided with a desktop computer, laptop and a printer
f. One Photostat machine and scanner is available in the department
g. Video camera, headphones, sound system etc. are available in the department.

Facilities Available

The department has a well equipped language lab with forty computers and one server. Clarity language lab software and Orell language lab software have been purchased for the efficient and optimum use of the lab. In order to enhance the multi media feedback system in the process of learning and teaching Sony Handycam is also put into use. Reprographic facility is also available in the department. For research and statistical analysis E-Views statistical software has been procured. Total cost of all the equipments purchased by the department in the last five years is Rs28/-, 18,000.

6. Enhancement of the learning resources during the past five years.

- Added about 342 books on various disciplines of humanities in the main library
- Established a language lab with most modern facilities.
- The dept. is in the process of establishing a most modern audio visual lab.
- Notes for the students printed and supplied.
- A collection of videos depicting social reality.
-

7. Modern Teaching methods in practice other than the lecture method.

The institute has provision for multi-media facilities in most of the class rooms. Smart class room with multi-media support/video editing facility for content generation/content delivery is initiated. The department has a unique tradition of using field interactive learning, which is strengthened with ethnographic visual essays and video ethnography as pedagogical tools. Video analysis, Group Discussion, Seminars presentations, Discussion on newspaper reports, and writing project proposals etc are used in addition to lecture method. Institution visits and invited lectures of specific topics on all disciplines of humanities.

8. Participation of teachers in academic and personal counselling of students.

The Institute has in place a Student Activity Board which is headed by the Dean, Student Activities, and consists of faculty and student representatives. All the first year students in the institute are mentored by the faculty. The students meet their mentors regularly and discuss their personal and academic problems. These faculty members take maximum effort to rectify the problems. Any problem beyond their control is brought to the notice of the authority concerned. A department level interaction with the students is organized prior to their choosing the stream specialization. Counseling is provided to the students prior to their undertaking summer internship and the final year thesis project.

9. Details of faculty development programmes and teachers who benefited during the past five years.

Dr. Lekshmi V Nair attented the orientation programme organized by the ASC in March 2010. Dr. Shaijumon attended the course on 'Statistical software for data analysis' conducted by Norma School, Thiruvananthapuram, 26-30 July 2010.

10. Participation of teachers in academic activities other than teaching and research.

- Participation in seminars, conferences, workshops by all 5 faculties at State, National and International levels.
- Three teachers of the dept provided consultancy to various agencies including State Government Departments, NGOs, other academic institutions etc
- Involvement in curricula development of the Dept by all teachers
- Two faculty members are members or IIST Humanities Board of Studies
- Four faculty members serve as the resource person in several educational institutions.
- Three faculty members have major research projects
- Faculty are convenors of various committees of the institute
- Faculty are convenors of various councils such as publication, students activity board, sports, culture and committees formed in the institute as part of celebrations, seminars and institute day.

S. No.	*Organizer of the Conference / Workshop*	*Period of the Conference / Workshop etc.*	*Title of the Conference / Workshop etc.*	*No. of Participants*		*Total budget for the Conference / Workshop*	*Sponsored By*
				From Abroad	*From India*		
1.	Dr Babitha Justin	17th to 18th 2011	Self Development and Successful Communication		30	8lacs	IIST

11. Collaboration with other departments and institutions at the national and international level and their outcome during the past five years.

- United States Education Foundation in India (USEFI)
- UGC, ICSSR
- Kerala State Planning Board
- IIT Delhi, IIT Bombay, IIT Madras
- University of Kerala
- MS Swaminathan Research Foundation
- University of Delhi
- Kerala Varma College, Trichur
- EFLU, Hyderabad
- MG University
- Institute of Social and Economic change (ISEC)
- DECU (Development and Education Communication Unit) ISRO
- Center for Gerontological Studies, Trivandrum
- Centre for Development Studies
- Indian Social Institute, Bangalore

12. If research is a significant activity, the thrust areas of the department.

The major areas of thrust are:

Economics

- Technology and Economic development
- Agricultural development of India
- Neo liberal reforms, globalization issues
- Macro Economics
- Indo American Trade relations

English

- Black American and Native American Literature
- Science Fiction
- English Language Teaching & Learning
- Travel Writing
- Gender studies
- Visual Communication and ELT
- Culture Studies

Management

- Logistics Management, Supply chain management and Technology management
- New Product development

Sociology

- Tourism and its socio-cultural impact
- Science and Technology
- Social Surveys
- Problems of marginalized communities like women, fishermen, slum dwellers etc.
- Elderly

13. Details of the ongoing projects and projects completed during the past five years.

2 projects are completed while 5 projects are ongoing. For details refer part II criteria III 3.2.1

14. ' Programmes by research' offered by the university

2 students are undergoing Ph.D. programme. Refer part II criteria III 3.2.3

15. Publications of the faculty, for the past five years. Details regarding citation index and impact factor analysis.

For list of journal publication Refer part II criteria III 3.2.9

16. Participation of the department in the extension activities.

- The department has adopted the neighbouring village of Karipur for its extension activities. A need assessment survey has been done. With the help of ISRO all modern technologies will be installed to cater to the technological needs of the people.
- The faculty take classes regularly in the neighbouring rural schools and also in other schools of Trivandrum city.
- IIST@Schools is a regular program of the department. This Workshop was intended for students of the VIII and IX Std. The objectives of the proposed workshop were to bridge the perceptible gap between the pursuit of science and the fulfilment of societal needs and aspirations and to motivate and inspire the participants to look at science as way of life and to acquaint them with the achievements and challenges of the Indian Space Programme.
- Every year the students are taken to tribal areas to get an idea about the life and culture of the tribal people.
- Exposure visits to NGOs, palaces, museums, old age homes, and orphanages are also regularly undertaken.
- Students and faculty are regularly interacting with local people and conducting surveys and project works.
- Inter-departmental collaboration on project works and research.
- Giving talks and lectures to various institutions

17. Method of continuous student assessment.

The evaluation methods are periodic quizzes, assignments, periodical tests, oral examination, and end semester examinations. Students are monitored on a continuous basis in a Semester system of evaluation. Continuous evaluation during the semester has 50% weight. This includes two announced periodical quizzes (with 15% weight each) as scheduled in the academic calendar. Besides, class tests, tutorials and assignments carrying 20% weight are also given. End-semester examination carries remaining 50% weight. The details on the evaluation for a course are communicated to the students by the teacher who is handling that course, at the beginning of the semester. All answer books of periodical quizzes and class tests are returned to the students after evaluation. The answer books of the end-semester examinations are scrutinized by the faculty once again before the results are announced.

18. Placement record of the past students and the contribution of the Department to the students placements

Not Applicable

19. Significant achievements of the Department or faculty or students during the past five years.

- IIST@Schools and NSS are two important contributions of the department
- The department has a unique tradition of using field interactive learning, which is strengthened with ethnographic visual essays and video ethnography as pedagogical tools
- The department also organized a National Workshop on Self Development and Successful Communication- Ignite for the young ISRO scientists.
- Department faculty members have presented papers in International conference in India and abroad.
- The department also organized a National Workshop on Self Development and Successful Communication- Ignite for the young ISRO scientists.
- All first semester students are given a two day intensive induction program on joining IIST
- Neuro Linguistic Programme for four consecutive batches to develop their communication skills and enhance the holistic development of an individual.
- Communication skills workshops conducted every year by well-known experts in the communicative English field.
- The third semester students are given a one day workshop on social analysis.
- About 110 project reports prepared by students in various topics related to technology and economic development

20. Participation of the department in COSIP / COHSSIP / SAP / CAS / DSA / DRS / FIST / etc.

Not Applicable

21. Plan of action of the Department for the next five years.

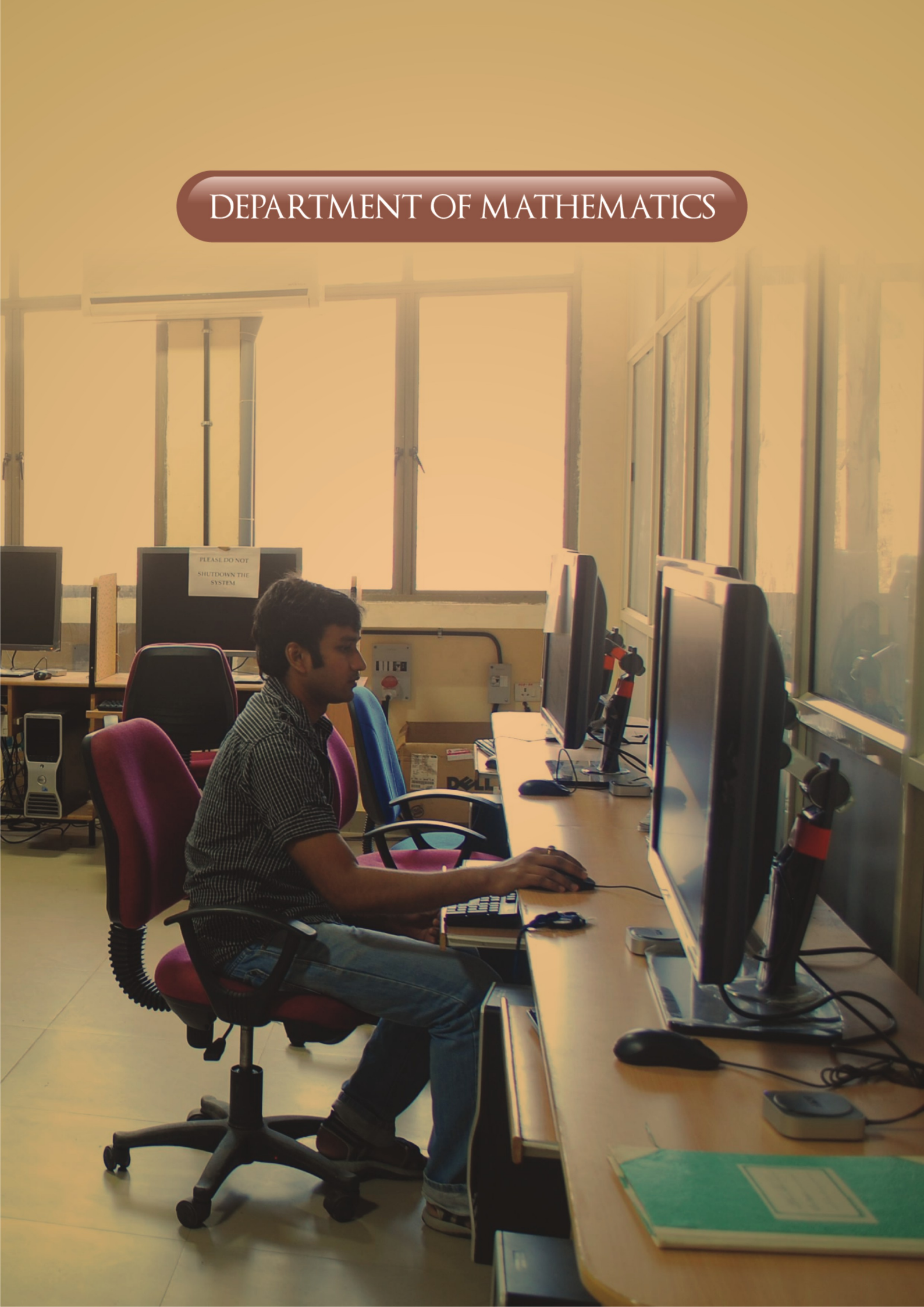
- The importance of humanities in engineering curriculum is being increasingly realised. Accordingly the department has introduced relevant electives and minor courses like, macroeconomics, visual communication, science fiction, social science and ethics etc. it will be our endeavour to continuously refine these courses and introduce newer ones
- An active research program in different specialisation of the department will be encouraged.
- More content development for IIST students
- Content generation for ISRO activities and common public.
- The department will bring out a strategic plan for the next five years
- A nationwide study on the socio economic status of the marginalised will be undertaken
- More lectures by experts from outside and workshops will be conducted for the students
- Since the humanities department include, economics, management, literature and sociology, social outreach program will be a major focus of this dept. Accordingly the department will try to play a major role in making tools derived from space technology like, telemedicine, tele-education, etc. available to rural areas and the department can also play a role in evaluating the importance of space and technology on the society

- Projects taken up for content development in English Language and communications to enhance and improve the communicative aspects of different kinds of learners of EFL. These content modules are to be used in future tele-educational programmes of DECU.
- Planning to build a well equipped audiovisual lab.
- One national or International seminar per year
- Planning to start a centre for Space Economics.

22. Any other highlights.

- The total budget utilized by the department in terms of PG/research labs as well as sponsored funded projects under DoS amount to Rs.71.50 Lakhs
- Ratio of research scholars to teachers (eligible to guide research students): 2:5
- Ratio of Journal research papers published duringthe last 5 years at international and national levels to number of teachers: 3.8:1 (19 Journal Publications,5 faculty)
- Department organizes special lectures regularly
- Department Coordinates the institute Quiz club and Literary Club
- Department has unique extension activities like, village adoption program, social rvice programs, IIST@Schools programs, collaboration with other institutions etc.

DEPARTMENT OF MATHEMATICS



DEPARTMENT OF MATHEMATICS

1. Faculty profile, adequacy and competency of faculty..

S. No.	Name	Designation	Highest Qualification	Specialisation	Experience (in years)	
					Teaching	Research
1.	Raju K. George	Professor and Head	Ph.D.	Functional Analysis, Mathematical Control Theory, Softcomputing	20	25
2.	C.V. Anilkumar	Assoc. Professor	Ph.D.	Suspension Rheology Time Series Analysis	15	19
3.	N. Sabu	Assoc. Professor	Ph.D.	Partial Differential Equations	5 ½	16
4.	K.S. Subrahmanian Moosath	Assoc. Professor	Ph.D.	Differential Geometry and Applications	17	21
5.	T.G. Deepak	Asst. Professor	Ph.D.	Stochastic Modelling & Analysis	13	14 ½
6.	E. Natarajan	Asst. Professor	Ph.D.	Computational Fluid Dynamics,	3	5
7.	Kaushik Mukherjee	Asst. Professor	Ph.D.	Numerical Analysis	1 ½	6
8.	Sarvesh Kumar	Asst. Professor	Ph.D.	Finite Element methods	3 ½	7
9.	Prosenjit Das	Visiting Faculty (Full time)	Ph.D.	Commutative Algebra	1 ½	5

The number of teaching and non-teaching staff of the department

	Male	Female	Total
No. of teachers with Ph.D. as the highest qualification	9	0	9
No. of administrative staff	0	1	1
No. of technical staff	1	2	3

2. Student profile according to programmes of study, gender, region etc.

Out of 16 M.Tech students 7 (43.75%) are female while remaining (9) 46.25% are male. Also 11 (68.75%) students are from home state while remaining (5) 31.25% are from outside states.

3. Changes made in the courses or programmes during the past five years and the contribution of faculty to those changes

Based on the experience on the courses in Mathematics offered for the under graduate programmes, the syllabus for the courses was revised twice during the period 2007-09. In 2010, the entire syllabus has been restructured by the faculty members of the department after deliberations with eminent academicians working in premier institutions like IIT and IISc as a part of BoS. In 2011, a similar exercise has been done for the M.Tech. programme in **Soft Computing and Machine Learning**, offered by the Department.

4. Trend in the success rate and dropout rate of students during the last five years M. Tech and Ph.D. programmes:

No student has passed out yet. Also there are no student drop out.

5. Learning resources of the Department like library, computers, laboratories and other such resources.

Library:

- Learning resources available in the Central Library are given below:

Number of books and journals

	Library (print)	*Book bank (print)*	*Online*	*Total*
Number of books in Mathematical sciences	1242	927	-	2169
Journals in Mathematical sciences	4	-	175	179*

* The department has access also to the bibliographic database, **MathSciNet** and SIAM Journals

Computer:

- The Department has a programming lab, well equipped with software like MATLAB, SCILAB, TISEAN, MATHEMATICA and MAPLE, which enable the students to implement the methods and algorithms that they have been taught in class rooms, especially in connection with courses like numerical methods, modelling and simulation etc.
- The faculty members are encouraged to develop learning resources in the form of lecture notes, handouts, lab manuals etc
- The other details of learning resources are listed below
- Computers in Programming lab: **60**

- Work stations : **10**

6. Enhancement of the learning resources during the past five years.

(i) Each year, all books that are used as text books and references for course work are purchased by the institute's library on the basis of request by students and faculty (requests for these purchases can be submitted online).

(ii) Electronic journals are also subscribed on the basis of requests from faculty. A journal committee headed by the Dean, Academic, meets at least once a semester to review and approve such requests.

(iii) Students get a yearly book grant of `6,000/- (` 3,000/- per semester) for purchase of books approved by faculty.

(iv) Laboratory manuals have been made and provided to the students for enabling them to understand the theory and procedure of the prescribed experiments in the various lab sessions.

7. Modern Teaching methods in practice other than the lecture method

The institute has provision for multi-media facilities in most of the class rooms. Smart class room with multi-media support/video editing facility for content generation/content delivery is initiated.

Maths Club: The students who are interested in Mathematical Sciences have formed a Maths Club under the guidance of the Department. It aims to nurture the Mathematical talents and make an avenue for learning and practicing Mathematics. The club plans to give opportunities to students for presenting topics of their interest and arranging lectures/workshops for more exposure to Mathematical applications. The activity of the Club is initiated by arranging a full day discussion on the foundations of Mathematics by Prof. Kumaresan, University of Hyderabad

Instructional workshop: The department has conducted Instructional workshops in C-programming, MATLAB familiarization, Networking etc.

Programming Labs were made interesting with modern software like MATLAB, SCILAB, Maple, Octave etc.

8. Participation of teachers in academic and personal counselling of students.

The Institute has in place a Student Activity Board which is headed by the Dean, Student Activities, and consists of faculty and student representatives. All the first year students in the institute are mentored by the faculty. The students meet their mentors regularly and discuss their personal and academic problems. These faculty members take maximum effort to rectify the problems. Any problem beyond their control is brought to the notice of the authority concerned. A department level interaction with the students is organized prior to their choosing the stream specialization. Counseling is provided to the students prior to their undertaking summer internship and the final year thesis project.

9. Details of faculty development programmes and teachers who benefited during the past five years.

One faculty members of the department have participated in the faculty development workshop organized by Administrative Staff College, Hyderabad in 2010.

10. Participation of teachers in academic activities other than teaching and research.

Teachers actively take part in the deliberations of various committees of the institute like, Technical Committee, Sports Council, Library Council, Web-Committee, Examination Committee, Time table Council, etc. Apart from these in-house activities, teachers also attend conferences and workshops regularly.

Prof. Raju K George

- Member of **Indian Mathematical Society**
- Member of **Indian Science Congress**
- Member of **Gujarat Ganit Mandal**

Dr. Anil Kumar CV

- Member, Board of Examiners for M.Phil, M.Tech and M.Sc**, University of Kerala**.

Dr. K.S. Subrahmanian Moosath

- Member, Board of studies, **Calicut University**
- Adjunct faculty, **IISER, Thiruvanathapuram**
- Member, board of examiners for Ph. D, M.Phil and M.Sc, **University of Calicut**
- Member, board of examiners for M.Phil, and M.Sc, **University of Kerala**.

Dr. T. G. Deepak

- Member, board of examiners for PhD and M.Sc, **Cochin University of Science and Technology**

Dr. Prosenjit Das

- Member, board of examiners for M.Sc, University of Burdwan
- Member, Curriculum board, B.Sc Mathematics (Hons.), University of Burdwan

Details of workshops / Invited talks arranged by the department

S. No.	*Title of the Conference / Workshop*	*Name(s) of Resource Persons*	*Date*
1	Tomography and Reconstruction via boundary Measurement	Prof. A.K. Nanadakumaran, Dept. of Mathematics, **IISc, Bangalore**	1 December 2007
2	Homogenization and Applica tions to Control Problems in Perforated Domain	Prof. A.K. Nanadakumaran, Dept. of Mathematics, **IISc, Bangalore**	1 December 2007
3	Special Talks on Basics of MATLAB Program-ming	Prof. Raju K George, **IIST**	2008
4	Workshop on Computer Networking, Apache Server and MySQL	Amit Shah, Som Sahni, Bharat S. Ratanpal	6-9 January 2009
5	Mathematical Theory of	Prof. Ovidiu Carja, **AI.I.Cuza**	9 April 2009

	Controllability	**University, Romania**	
6	IIST MATHS CLUB	Prof. Kumaresan, Dept. of Mathematics and Statistics, **Central University, Hyderabad.**	16 March 2009
7	Workshop on MathLab and Simulink	Dept. of Mathematics, **IIST**	7-9 July 2009
8	Summer course on C /C++Programming	Dept. of Mathematics, **IIST**	22 July - 7 August 2009.
9	Seminar on From Fourier Transform to Wavelets	Prof. V.D. Pathak, **M.S University of Baroda**	8 April 2010
10	A Special Software training program on MAPLE-13 – A Powerful Symbolic Calculation Software	Mr. Venkatesulu, **Bangalore**	12 April 2010
11	A special lecture on Fractals and its Applications	Prof. Vinod Kumar P.B, **Rajagiri College of Engineering and Technology, Cochin**	8 March 2011
12	Stochastic Modeling and Repairable Systems	Prof. K. Muralidharan, Dept. of Statistics, **M.S University of Baroda**	16 March 2011
13	Kernel Methods for Machine Learning	Prof. Chiranjib Bhattachariya, CSA**, IISc, Bangalore**	12 May 2011
14	Workshop on "Biologically Inspired Computing" (WBIC-2011)	Prof. N. Sundararajan, School of Electrical & Electronic Engineering, **Nanyang Technological University**, Singapore	4-7 July 2011
15	Use of Mathematica in Education and Research	Dr. Anshu Manik, Sonali DeSouza, Wolfram Research	16 September 2011
16	Mathematical Modeling of Satellite Data Processing	Dr. N. Padmanabhan**, IIST**	5 October 2011
17	Introduction to Maple	Mr. Venkatesulu. R, Lanika Solutions Private Limited,	13 October 2011
18	A series of lectures on Research Methodology	Prof. RVG Menon, Former Principal, **Govt. Engineering Colleges, Kerala**	3-5 October 2011
19	A series of lectures on History of Science and Technology & Science	Prof. C.G. Ramachandran Nair,Former Professor	11-14 October 2011

	Fiction	**University of Kerala**	
20	A series of lectures on Kinematics, Dynamics and Control of Robot Manipulators	Prof. N. Sukavanam, Dept. of Mathematics**, IIT Roorkee**	21-23 November 2011
21	Differential Geometry and Applications	Prof. M. Sitaramayya, Department of Mathematics Central University, Hyderabad	15 December 2011

List of faculty members who attended / presented papers in national / international conferences / workshops (last 5 years)

S. No.		***Title of the Conference / Workshop***	***Period of the Conference***	***Organizer***
1			**Dr.Raju.K.George**	
	(i)	5th International Conference on Dynamic systems and Applications	May30-June 2, 2007	Morehouse College Atlanta,Georgia,USA
	(ii)	Dynamical Systems described by Differential Equations,75th annual conference (Platinum Jubilee), of the Indian Mathematicians	Dec 27-30,2009	Kalasalingam University,Anand Nagar
	(iii)	Finite Dimensional Controllability Theory	Sep 07-11,2009	Indian Institute of Science,Bangalore
	(iv)	Basics of Matlab	July 07-10,2009	IIST,Thiruvananthapuram
	(v)	Solvability of System of Equations Ax=b by using Generalized Inverse	Nov 6th,2008	D.B College,Sasthamcotta
	(vi)	Theory of Control – A functional Analytic Approach	Sep 25-27,2008	D.B. Pampa College, Parumala,Thiruvalla

2	**Dr. Anil Kumar CV**			
	(i)	5th International Conference, SERC School	May, 2007	SERC School, Pala
3	**Dr. K. S. Subrahmanian Moosath**			
	(ii)	On Existence of Standard Momentum maps	2007	IIT Madras
	(iv)	National Symposium on Geometry	19, 20 January, 2007	University of Mumbai, India
	(v)	Workshop on Dynamical Systems	22-10-2007 to 3-11-2007	IISc Bangalore
	(vi)	National Workshop on Partial Differential Equations	2008	University of Calicut
	(vii)	ICM-2010 Satellite conference on "Geometry, Topology and Dynamics in Negative Curvature"	2nd to 7th August 2010	TIFR Bangalore
	(viii)	ICM-2010 Satellite conference on "Integrable Systems and Geometry"	12th to 17th August 2010	Central University Pondicherry
4	**Dr. T G. Deepak**			
	(i)	Instructional Workshop on Bioinformatics, Stochastic Calculus and Finance & Control of network queues	3-8 January 2005	CUSAT, Kochi
	(ii)	All India refresher course on Probability, Stochastic processes and applications	September 26th to October 7, 2005	Indian Academy of Sciences Bangalore
	(iii)	International conference on Statistics, Probability and related areas	2-5 January, 2007	CUSAT, Kochi

	(iv)	Sixth International Conference on Matrix Analytic Methods in Stochastic Models (MAM6)	11-14 June, 2008	Chinese Academy of Sciences and Dalhousie University, Canada, Beijing
	(v)	Stochastic processes	19-22 December, 2008	Amrita Viswa Vidyapeetham, Kollam
	(vi)	International symposium on Probability Theory and Stochastic Processes	6-9 February, 2009	CUSAT, Kochi
5	**Dr. E. Natarajan**			
	(i)	Recent Advances in Computational fluid dynamics ICM Satellite event	IIT Guwahati	August 2010
	(ii)	Multi-Scale Analysis and Homogenization	IISC,Bangalore	June 2010
	(iii)	International conference on recent advances in mathematics and applications	University of Burdwan, Kolkata	Jan 2010
	(iv)	Optimizing Performance of Parallel programs on Emerging Multi-core Processors and GPU's	Indian Institute of Technology, Madras	June 2009
	(v)	Instructional School on modern PDE Theory and Computations	Institute of Technology Bombay	May 2007
	(vi)	Convection Workshop	Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore	March 2005
6	**Dr. Sarvesh Kumar**			
	(i)	International conference on scientific computing and its applications	Banff, Canada	
	(ii)	Sixth international congress in industrial and applied mathematics	Switzerland	
	(iii)	Summer school on Topics in Nonlinear PDEs	Coimmbra, Portugal	
	(iv)	International Conference on `Recent Trends in Computational PDEs'	IIT Bombay	

7	**Dr. Kaushik Mukherjee**			
	(i)	Training Programme on Theoretical and Numerical Aspects of Ordinary Differen tial Equations (TPODE-05)	IIT Guwahati	December 15-24, 2005
	(ii)	Indo-German Workshop on Automatic Differentiation, Optimal Control and Adaptivity with Applications (ADOCAA-06)	IIT Bombay	November 11-17, 2006
	(iii)	Workshop on Computational Partial Differential Equations (ICCPDE-08)	IIT Bombay	December 7-9, 2008
	(iv)	QIP Short Term Course on Mathematical Methods, Modelling and Optimal Control	IIT Guwahati	June 2-6, 2009
	(v)	International Workshop on Multi-scale Analysis and Homogenization (vi) Conferences on 52nd congress of Indian Society of Theoretical and Applied Mechanics (ISTAM)(An International Meet)	IISc Bangalore	June 28-July 10, 2010
	(vi)	Conferences on 52nd congress of Indian Society of Theoretical and Applied Mechanics (ISTAM)	B.N.M. Institute of Technology,Bangalore	December 14-17, 2007
	(vii)	International Conference on Recent Trends in Computational Partial Differential Equations (ICCPDE-08)	IIT Bombay	December 10-13, 2008
8	**Dr. Prosenjit Das**			
	(i)	International conference on “Affine Algebraic Geometry”	TIFR	22–28 December 2008
	(ii)	CAAG-2009	IIT Madras	6-10 July 2009
	(iii)	ICM-2010	Hyderabad	19-27 Aug 2010
	(iv)	ICM 2010 Satellite Conference on “Mathematics in Ancient Times”	Kerala School of Mathematics	29 Aug-01 Sept 2010
	(v)	National Seminar on Mathematics and Applications-2011	The University of Burdwan	24-25 Feb 2011
	(vi)	AIS in Differential and algebraic topology	ISI, Kolkata	5-31 Dec 2005
	(vii)	AIS in Comm. algebra and alg.	IIT Bombay	4-30 July 2005

		geometry		
	(viii)	International School and Workshop. Polynomial Automorphisms and Related Topics	Institute of Mathematics, Hanoi, Vietnam	October 9-20, 2006
	(ix)	Workshop in Comm. Algebra & Alg. Geometry	IIT Madras	10-23 June 2007
	(x)	Indo-GermanWorkshop on Computational Commutative Algebra	IISER Pune	13-31 Dec 2011

11. Collaborations with other departments and institutions at the national and international level and their outcome during the past five years.

Research Projects with national/international collaborations

S. No.	***Name of faculty at IIST***	***Name and address of the collaborators***	***Title***	***Period***	***Funding agency***
International level					
1	Raju K George	1. Jean-Pierre Raymond, Universite Paul Sabaetier, France 2. Mythily Ramaswamy TIFR, Bangalore	Control of Systems of Partial Differential Equations	2008-2011	IFCPAR (Indo-French Centre for the Promotion of Advanced Research)
National level					
2	Anil Kumar CV	Dr. Ramamohan T.R, NAL, Bangalore	Dynamics and Rheology of a Dilute Suspension of Periodically Forced Spheroids in a Quiescent Fluid at Low Reynolds Number	2011-2014	IIST

12. If research is a significant activity, the thrust areas of the department.

The thrust areas of research are

- Functional Analysis
- Mathematical Control Theory
- Computational Fluid Dynamics
- Suspension Rheology and Chaos
- Time Series Analysis
- Partial Differential Equations
- Differential Geometry and Applications
- Stochastic Modeling & Analysis

- Finite Element Method
- Numerical Analysis
- Commutative Algebra
- Soft-Computing and Machine Learning

13. Details of the ongoing projects and projects completed during the last five years.

While 3 projects are completed, 3 projects are ongoing. For details of ongoing projects refer part II criteria III 3.2.1

Name of PI	*Title*	*Duration*	*Amount sanctioned*	*Funding Agency*
Dr.Anil Kumar.C.V	Analysis of the fluctuations of Dst index	2006-2009	Rs.4 Lakhs	UGC (Research Award)
Dr.Anil Kumar.C.V	Modelling and analysis of the time series of total electron content by varying locations at low latitudes	2006-2009	Rs.6 Lakhs	KSCSET, Govt. of Kerala
Dr.R.K.George	Control of Partial Differential Equation	2007-2010	Rs.25 Lakhs	IFCPAR

IFCPAR-Indo French Centre for Promoting Advanced Research

14. Programmes by research' offered by the Department

3 students are undergoing PhD programme. For details refer part II criteria III 3.2.3

15. Publications of the faculty, for the past five years. Details regarding citation index and impact factor analysis.

Refer part II criteria III 3.2.9 for journal publication list. The average citation of our journal papers of the last five years is 2.73, while the average impact factor 1.58. Citation and impact factor details of publications of faculty are given below.

Details of publications, its citation and average Impact Factor of the journals

S. No.	***Name of the faculty***	***Total number of publications***	***Total number of citations***	***The most cited article***
1	Prof. Raju .K .George	40	105	A note on Controllability of Impulsive Systems, **J. Math. Anal. Appls**. 241, 276-283(2000) **38** citations
2	Dr. C.V. Anil Kumar	15	38	Analysis of the fluctuations of the total electron content (TEC) measured at Goose Bay using tools of nonlinear method**, J.Geo. Phys. Res,** Vol. 109 A02308, doi: 10.1029/2002JA009768, (2004) -

				12 citations
3	Dr. N. Sabu	13	28	Two-dimensional approximation of eigenvalue problem for flexural shells, **Chinese Annals of Maths,** 21 B, 1-16 (2000)- **6** citations
4	Dr. T.G. Deepak	15	56	An M/G/1 Retrial Queue with non-persistent customers and orbital search, **Stoch. Anal. Appls,** 23, 975-997 (2005) - **10** citations
5	Dr. E. Natarajan	5	24	Natural convection flows in a trapezoidal enclosure with uniform and nonuniform heated bottom wall, **Int. J. heat and mass tran**., 51, (2008), 747-756-- **20** citations
6	Dr. Kaushik Mukherjee	5	10	An efficient numerical scheme for singularly perturbed parabolic problems with interior layers, **Neural, Parallel, and Scientific Computations**, 16:405--418 (2008)- **4** citations
7	Dr. Sarvesh Kumar	6	9	Finite Volume Element Method for Second Order Hyperbolic Equations, **Int. J Num. Anal. Modeling,** Vol. 5 (2008), 132-151- **6** citations

List of journals (with impact factor) in which publications are made

	Name of the Journal	***Impact factor2010***
Prof. Raju K. George	Journal of Franklin Institute	**1.492**
	Journal of Mathematical Analysis and Applications	**1.174**
	Meditaranean Journal of Mathematics	**0.645**
	Numerical Functional Analysis and Optimization	**0.687**
	Systems and Control Letters	**1.412**
	Nonlinear Analysis, Theory, Methods and Application	**1.279**
Dr. Anil Kumar C.V	Rheologica Acta	**2.382**
	Physics Letters A	**1.963**
	Sadhana	**0.279**
	Int. J. Bifurcation and Chaos	**0.814**

	J. Geophys. Res.	**3.303**
	J. Non-Newtonian Fluid. Mech	**1.572**
Dr. N.Sabu	Asy. Anal	**0.845**
	Chinese Annals of Maths	**0.452**
	J. Elasticity	**1.160**
	Math. Mech of Solids	**1.296**
Dr. Deepak T.G	Computers & Operations Research	**1.769**
	TOP	**0.756**
	Neural, Parallel and Scientific Computations	**0.497**
	Stochastic Analysis and Applications	**0.419**
	Annals of Operations Research	**0.675**
	Non linear Analysis-Theory, Methods & Applications	**1.279**
Dr. E. Natarajan	International Journal of heat and mass transfer	**1.898**
	Industrial and engineering chemistry research	**2.071**
	Numerical heat transfer Part B	**1.029**
Dr. K. Sarvesh Kumar	International Journal of Numerical Analysis and Modeling	**0.670**
	Numerical Methods for Partial Differential Equation	**1.427**
Dr. Kaushik Mukherjee	Computing	**0.959**
	Numerical Algorithms	**0.784**
Dr. Prosenjith Das	Communications in Algebra	**0.369**

16. Participation of the department in the extension activities of the university.

A few of the faculty members have been involved in science popularization and outreach activities in various schools in the district. In addition, the faculty members have also participated in the Institute's annual outreach programme, IIST@schools.

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17. Method of continuous student assessment.

The evaluation methods are periodic quizzes, assignments, periodical tests, oral examination, and end semester examinations. Students are monitored on a continuous basis in a Semester system of evaluation. Continuous evaluation during the semester has 50% weight. This includes two announced periodical quizzes (with 15% weight each) as scheduled in the academic calendar. Besides, class tests, tutorials and assignments carrying 20% weight are also given. End-semester examination carries remaining 50% weight. The details on the evaluation for a course are communicated to the students by the teacher who is handling that course, at the beginning of the semester. All answer books of periodical quizzes and class tests are returned to the students after evaluation. The answer books of the end-semester examinations are scrutinized by the faculty once again before the results are announced.

18. Placement record of the past students and the contribution of the department to the student placements.

Not Applicable

19. Significant achievements of the department or faculty or students during the past five years.

- Prof. Raju.K. George: Wrote Chapter 2 of the book "Linear Systems and Stability Analysis - Lecture Notes of Instructional Workshop on Differential equations: Theory and computation, Department of Mathematics, Indian Institute of Science, Bangalore, pp. 37-58, 2000
- Prof. Raju.K. George wrote Chapter 3 of the book "Neural Networks, Lecture Notes on Scientific Computing - Theory and practices", edited by M C Joshi, G B Pant University of Agricul. And technol., Pantnagar, 2006 (publisher name)
- Dr. Raju K George is the Chairman and Dr. Anil Kumar CV is a member of the IIST Web and computer Committee.
- Dr. Raju K George established a Data centre having a cluster of 64 Quad core servers with 3 Terra flop speed computational capability and 20 TB storage facilities.

20. Participation of the department in COSIP/COHSSIP/ SAP CAS /DSA/ DRS/ FIST etc.

Not applicable

21. Plan of action of the department for the next five years.

Programmes under active consideration:

- Integrated Ph.D. programme in Mathematics
- Two year M.Sc. Applied Mathematics Programme

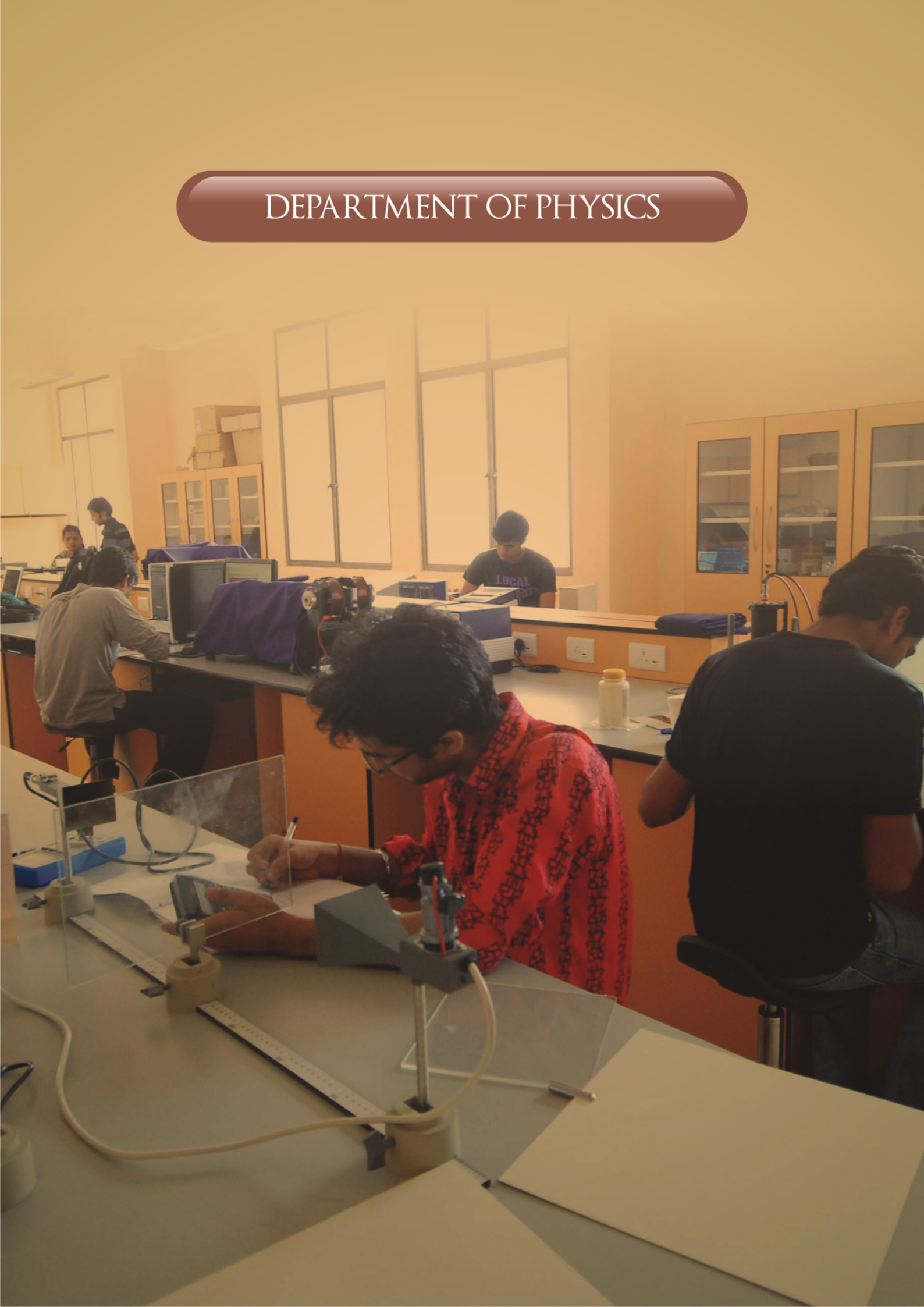
Strategic Plans:

- National Workshop once in a year
- National Conference once in two years
- International Conference once in three years

22. Any other highlights.

- The faculty members substantially contribute to the effective functioning of many committees constituted by the Director, IIST. All the faculty members of the Department are working as Chairman/Coordinator/members in at least one functional bodies of the Institute.

DEPARTMENT OF PHYSICS



DEPARTMENT OF PHYSICS

1. Faculty profile, adequacy and competency of faculty.

Name of faculty	Designation	Highest Qualification	Specialization	Experience (years)
Dr.C.S.Narayanamurthy	Professor and Head	Ph.D.	Applied Optics	23
Dr. S Murugesh	Assistant Professor	Ph.D.	Theoretical Physics	9
Dr. Sudheesh Chethil	Assistant Professor	Ph.D.	Theoretical Physics	5
Dr. Umesh R Kadhane	Assistant Professor	Ph.D.	Atomic and Molecular Physics	5
Dr. Pramod Gopinath	Assistant Professor	Ph.D.	Laser Plasma Spectroscopy, Nonlinear Optics	10
Dr. Rakesh Kumar Singh	Assistant Professor	Ph.D.	Applied Optics	2
Dr. Naveen Surendran	Assistant Professor	Ph.D.	Theoretical Physics	6
Ms. Sasikala V	Reader*	M.Sc.	Electronics	7

*On Contract

The number of teaching and non-teaching staff of the department

	Male	Female	Total
No. of teachers with Ph.D. as the highest qualification	7	1	8
No. of teachers with M.Sc. as the highest qualification	-	1	1
No. of administrative staff	1	1	2
No. of technical staff	1	5	6

2. Student profile according to programmes of study, gender, region, etc.

Not Applicable

3. Changes made in the courses or programmes during the past five years and the contribution of faculty to those changes.

The department offers two theory and two laboratory courses to the entire undergraduate students during the first two semesters. It also offers seven theory courses and four laboratory courses to the B. Tech. Physical Sciences students spread over from third to sixth semesters. The syllabi of these courses are reviewed regularly by the Board of Studies for Physics and are finally approved by the academic council. Any change needed in the curriculum is suggested by the faculty members to the Board of Studies.

Modified the first semester Physics I syllabus to include more Mechanics, from a general syllabus touching on various aspects to Modern Physics with one text book as basis

4. Trend in the success rate and dropout rate of students during the last five years.

Not Applicable

5. Learning resources of the department like library, computers, laboratories and other such resources.

The Institute Library takes care of the reference and text book requirement of the faculty members and students. It has 1544 books related to Physics area in reference and circulation sections. An additional 998 text books in Physics are kept in the Book Bank to be issued to students every semester to cater to their text book needs.

Instructional laboratories

- **Computational Physics Lab**

A computer lab with 25 computers has been set up with many software packages like Mathlab, C, C++, etc. This lab is utilized for the Computational Physics Laboratory Course for the B.Tech. Physical Sciences programme and by the research students.

The major experimental set-ups available in each of the other instructional labs are:

General Physics Lab (Rs.65 lakhs)

- Modulus of Elasticity
- Torsional vibrations and torsional modulus
- Surface tension by ring method(Du Nouy method)
- Projectile motion
- Moment of Inertia and angular accelearation
- Variable 'g' pendulum
- Mechanical Equivalent of heat
- Earth's Magnetic field
- Magnetic field of single coils/ Biot's-savart's law
- Coulomb potential and coulomb field of metal spheres
- Magnetic moment in the magnetic field
- Characteristics of solar cell
- Inductance of solenoid
- Electric field potential in the plate capacitor
- Dielectric constant of different materials
- Universal Gravitational constant
- Driven damped harmonic oscillator
- Black body radiaton
- Mechanical waves
- Ratio of specific heats
- Coulomb's law
- Faraday's law
- Charge of an electron

Optics Lab (Rs.100 Lakhs)

- Nd:YAG Laser
- Geometrical Optics Comprehensive Kit
- Standard Laser Kit
- Michelson Interferometer
- Holography Kit
- Speckle Interferometry Kit
- Optical Fiber Characterization and Communication Kit
- Advanced Optical Fiber Lab System
- Faraday Effect Apparatus
- Brewster Angle Apparatus
- Malus Law Apparatus
- Newton's Ring Apparatus
- Diffraction Apparatus
- Fabry-Perot Etalon
- Liquid Lens Apparatus
- Prism and Grating Spectroscope
- Analog Oscilloscope
- Function Generators
- Fourier Optics Set-up
- Photo-electric Effect Set-up
- Speed of Light Set-up

Modern Physics Lab Rs. (75 Lakhs)

- Frustrated Total Internal Reflection
- Magnetostriction with Michelson Interferometer
- Specific Charge of Electron e/m
- Fine Structure, One and two electron Spectra
- Blamer Series/Determination of Rydberg's Constant
- Atomic Spectra of two electron System He, Hg
- Electron Spin Resonance
- Absorption of Gamma and Beta Rays
- X-Ray Fluorescence & Mosleys Law with Multichannel Analyser
- Zeeman effect
- He-Ne Laser (Green and Yellow)
- Digital Oscilloscope
- Function Generator
- Turbo Pump, Rotary Pump & Accessories
- NIM Module

6. Enhancement of the learning resources during the past five years

- Each year, all books that are used as text books and references for course work are purchased by the institute's library on the basis of request by students and faculty (requests for these purchases can be submitted online).

- Electronic journals are also subscribed on the basis of requests from faculty. A journal committee headed by the Dean, Academic, meets at least once a semester to review and approve such requests.
- Students get a yearly book grant of **Rs.**6,000/- (**Rs.**3,000/- per semester) for purchase of books approved by faculty.
- Laboratory manuals have been made and provided to the students for enabling them to understand the theory and procedure of the prescribed experiments in the various lab sessions.

7. Modern teaching methods in practice other than the lecture method.

The institute has provision for multi-media facilities in most of the class rooms. Smart class room with multi-media support/video editing facility for content generation/content delivery is initiated.

8. Participation of teachers in academic and personal counseling of students

The Institute has in place a Student Activity Board which is headed by the Dean, Student Activities, and consists of faculty and student representatives. All the first year students in the institute are mentored by the faculty. The students meet their mentors regularly and discuss their personal and academic problems. These faculty members take maximum effort to rectify the problems. Any problem beyond their control is brought to the notice of the authority concerned. Counseling is provided to the students prior to their undertaking summer internship and the final year thesis project.

9. Details of faculty development programmes and teachers who benefited during the past five years.

2 faculty members of the department have participated in the faculty development workshop organized by Administrative Staff College, Hyderabad in 2010.

10. Participation of teachers in academic activities other than teaching and research.

Teachers actively take part in the deliberations of various committees of the institute like, Technical Committee, Sports Council, Library Council, Web-Committee, Examination Committee, Time table Council, etc. Apart from these in-house activities, some of the faculty members also serve as Member, Board of Examiners, of various universities.

The department has also organized the XXXV Optical Society of India (OSI) Symposium as an International Conference on `*Contemporary trends in optics and optoelectronics'* during January 17- 19, 2011 at IIST Trivandrum.

The conferences/workshops/seminars attended by the faculty members are listed below.

Name of Faculty	*Name of the Seminar/ Conference/ Symposia/Workshop attended/given talks*	*Name of the Sponsoring Agency*	*Place and Date*
Dr. C S Narayanamurthy	XXXIII OSI Symposium	Optical Society of India	University of Tezpur, Tezpur 2007

	21st Congress of INTERNATIONAL COMMISSION FOR OPTICS	IIST Trivandrum	Convention Center, Sydney, Australia July, 04-08, 2008
	XXXIV OSI Symposium	Optical Society of India	CSIO, Chandigarh 2009
	Fringe 2009	IIST, Trivandrum	Universitat Stuttgart, Germany Sept 14-17, 2009
Dr. S Murugesh	International Conference on Frontiers of Nonlinear and Complex Systems	Hong Kong Baptist University	Hong Kong May 24-26, 2006
	Fifth National Conference on Nonlinear Systems and Dynamics	DST, India	Kolkata March 5-7, 2009
	National Seminar on Quantum Cryptology	College of Engineering, Perumon	November 20, 2009
Dr. C Sudheesh	7th Asian International Seminar on Atomic and Molecular Physics	IIT Madras	December 2006
	Symposium on Quantum Information	JNU, Delhi	March 16-18, 2007
	IV National Conference on Nonlinear Systems and Dynamics	Physical Research Laboratory, Ahmadabad,	January 2008
	Topical Conference on Atomic and Molecular Physics	Sardar-Patel University, Vallabh Vidyanagar	January 2008
	Workshop on *Basic Level Parallel Computing*	CDAC- Pune	Physical Research Laboratory, Ahmadabad, February 19-22, 2008
Dr. Umesh R Kadhane	XX ISIAC 2007 (International symposium on ion atom collisions)		Crete, Greece August 2007

Dr. Umesh R Kadhane	Conference on Electro Static Devices, ESD 2009,		Aarhus, DENMARK, June 2009
	DAE-BRNS Symposium on Atomic Molecular and Optical Physics (SAMOP)		Inter University Accelerator Centre, (IUAC) New Delhi, 10th to 13th February 2009.
	Atomic, Molecular and Optical physics SERC school		PRL, Ahmadabad, during April-May 2009
	Topical Conference 2010		*RRCAT, Indore*
	International Workshop on Merged-Beam Experiments		Tokyo Metropolitan University, Tokyo, Japan, August 25th and 26th 2010.
	National Workshop on Optoelectronics and Optical Communication (NWOOC-2011		Kerala University, Trivandrum, January 5th and 6th 2011
Dr. Pramod Gopinath	Indo-UK Workshop	City University, UK and CUSAT	CUSAT, Cochin Aug 29-31, 2006
	Workshop on National Fusion Program-ITER and Beyond	DAE, PSSI	IPR, Gandhinagar Nov 8-10, 2006
	Annual Photonics Workshop on Ultrafast Processes and Applications	ISP, CUSAT	Cochin Feb 26-28, 2008
	Annual Photonics Workshop on Nanophotonics	ISP, CUSAT	Cochin Feb 26-28, 2009
	National conference on Electric Propulsion System	ISRO	LPSC, Bangalore 23-24, Feb, 2011
Dr. Rakesh Kumar Singh	ICONTOP 2011, Kolkata University	JSPS(Japan) and IIST	Kolkata, India, 7 -9 Dec. 2011

Dr. Rakesh Kumar Singh	Optical Metology (SPIE)	JSPS, Japan	Munich , Germany 23-26th May,2011
	Digital Holography and 3D Imaging (OSA)	JSPS, Japan	Tokyo, Japan, May 9-11th 2011
	XXXV Optical Society of India, IIST	JSPS, Japan	Thiruvananthpuram, India, 17-19th January 2011
	Photonics 2010	JSPS, Japan	IIT Guwahati, India, 11-15th December, 2010
	Optics Photonics Japan	JSPS, Japan	Tokyo, Japan, 8-10th November 2010
	Japanese Society of Applied Physics (JSAP)	JSPS, Japan	Nagasaki, Japan, 14-17th September 2010
	SPIE Annual Meeting	JSPS, Japan	San Diego, USA,1-5th August 2010
	7th International Conference on Optics-Photonics Design & Fabrication (ODF 10),	JSPS, Japan	Yokohama, Japan, 19-21st April, 2010
	The University of Electro-Communication/Tokyo University of Agriculture and Technology		Tokyo, Japan, 5th December 2009
	Optics and Photonics Japan	JSPS, Japan	Nigata, Japan, 24-27 Nov. 2009
	XXXIII Optical society of India Symposium	Council of Scientific and Industrial Research (CSIR)	Tezpur, India, 18-20th December, 2007
	XXXII Optical society of India Symposium	CSIR	Vadodra, India, 1-3rd March, 2007
Dr. Naveen Surendran	Korrelationstage 2011		Dresden, February 2011
	Strong Correlations in Material and Atom traps		Trieste, August 2008
	Highly Frustratred Magnets and Strongly Correlated Systems		July 2007

11. Collaboration with other departments and institutions at the national and international level and their outcome during the past five years.

Refer for details part-II Criteria –III 3.2.6

12. If research is a significant activity, the thrust area of the department

(i) Applied Optics
(ii) Laser Plasma Spectroscopy
(iii) Nonlinear Optics
(iv) Nonlinear Dynamics
(v) Atomic and Molecular Physics

13. Details of the ongoing projects and projects completed during the last five years.

Two ongoing projects for details refer Part-II Criteria –III 3.2.1

14. "Programmes by research" offered by the university

8 students are undergoing Ph.d Programm for details refer Part-II Criteria –III 3.2.3

15. Publications of the faculty, for the past five years. Details regarding citation index and impact factor analysis

Refer part II criteria III 3.2.9 for journal publication list. The average citation of our journal papers of the last five years is 6.0, while the average impact factor 3.63. Citation and impact factor details of publications of faculty are given below.

Citation Index:

S. No.	*Name of the Faculty Member*	*Total No. of Articles Published*	*No. of Citations*	*The most cited article*
1.	C.S.Narayanamurthy	32	98	Diffusivity studies of transparent liquid solution by use of digital holographic interferometery, Appl.Optics(OSA, USA), Vol.45, No.5, 904-909 (2006), (**Citations: 14**)
2.	S. Murugesh	10	24	New connections between moving curves and soliton equations, S Murugesh, R Balakrishnan Physics Letters A 290 (1-2), 81-87 (**Citations: 8**)
3.	Sudheesh Chethil	9	51	Manifestations of wave packet revivals in the moments of observables, C. Sudheesh, S. Lakshmibala, V Balakrishnan, 2004, Phys. Lett. A, Volume 329, Issues 1-2, Pages 14-21. (**Citations: 13**)
4.	Umesh R. Kadhane	42	345	Interference effect in electron emission in heavy ion collisions with H_2, by comparing the

				measured electron spectrum from atomic hydrogen. D. Misra, **U. Kadhane**, Y.P. Singh, L.C. Tribedi, P.D. Fainstein and P. Richard, **Phys. Rev. Lett. 92**, 153201 (2004). (C**itations: 90**)
5.	Pramod Gopinath	10	94	Time resolved study of CN band emission from plasma generated by laser irradiation of graphite, S S Harilal, Riju C Issac, C V Bindhu, Pramod Gopinath, V P N Nampoori, and C P G Vallabhan, Spectrochimica Acta Part A **53**, 1527-1536 (1997) (**Citations: 29)**
6.	Rakesh Kumar Singh	16	88	Effect of astigmatism on the diffraction of a vortex carrying beam with Gaussian background, J. Opt. A: Pure Appl. Opt. 9, No. 5 (2007) 543 (**Citations: 14)**
7.	Naveen Surendran	7	57	Exactly solvable Kitaev model in three dimensions, Saptarshi Mandal and Naveen Surendran, 2009, Physical Review B, 79, 024426. (**Citations: 20**)

Impact Factor:

Name of the Faculty Member	*Title of the Journals in which Research Articles are Published*	*Impact factor of the journal*
Prof. C S Narayanamurthy	Journal Of Optical Society of America `A'	1.903
	Optics Communications (Elsevier)	1.556
	Applied Optics (OSA, USA)	1.703
	Journal Of Pure and Applied Optics	1.702
	Optics and lasers in Engineering (Elsevier)	1.606
	Review of Scientific instruments (AIP, USA)	1.598
	Optics and lasers Technology (Elsevier)	1.266
	Optical Engineering(SPIE, USA)	0.882
	Optik (Germany)	0.501
	Pramana(Journal Of Physics, India)	0.561
	American Journal Of Physics(AIP, USA)	0.881
	Europian Journal Of Physics(IOP, U.K)	0.757
	Indian Journal Of Pure and Applied Physics	0.511
S. Murugesh	Physics Letters A	1.995
	European Physical Journal B	1.446
	Theoretical and Mathematical Physics	0.748
	Journal of Mathematical Physics	1.210

	Physica D	1.857
	Quarterly Journal of Mechanics & Applied Mathematics	0.945 1.729
	Chaos Solitons and Fractals	2.133
Sudheesh Chethil	Phys. Rev. A	2.866
	Europhys. Lett.	2.753
	Phys. Lett. A	1.963
	J. Phys. B: Atomic, Molecular & Optical Physics	1.902
	J. Opt. B: Quantum Semiclass. Opt.	1.662
Umesh R. Kadhane	Physical Review Letters	7.33
	Journal of the American Society for Mass Spectrometry	3.83
	J. phys chem B	3.6
	Phys Chem Chem Phys	3.45
	ChemPhysChem	3.34
	Tetrahedron	3.01
	J. Chem. Phys.	2.92
	Physical Review A	2.87
	J. Phys. Chem. A	2.73
	Physical Review E	2.35
	Chemical Physics Letters	2.29
	J. Photochem. Photobio.	2.24
	International J. Mass Spectrometry	2.00
	Nuclear Physics A	1.99
	J. Physics B	1.9
	Review of Scientific Instruments	1.6
	Radiation Physics Chemistry	1.13
	Nuclear Instrumentation Methods B	1.04
Pramod Gopinath	Applied Physics Letters	3.820
	Journal of Optical Society of America B	2.095
	Synthetic Metals	1.871
	Applied Surface Sciences	1.793
	Applied Physics A	1.760
	Spectrochimica Acta Part A	1.770
	Journal of Nonlinear Optical Physics & Materials	0.553
Rakesh Kumar Singh	Opt. Express	3.749
	Opt. Laser Technology	1.266
	Optics Communications	1.474
	Optics and Laser Engineering	1.567
	J. Optical Society of America A	1.933
	J. Optics A: Pure Applied Optics	1.662
	Optik	0.454
Naveen Surendran	Physical Review B	3.772
	EPL	2.753

16. Participation of the department in the extension activities of the university

A few of the faculty members have been involved in science popularization and outreach activities in various schools in the district. In addition, the faculty members have also participated in the Institute's annual outreach programme, IIST@schools.

17. Method of continuous student assessment

The evaluation methods are periodic quizzes, assignments, periodical tests, oral examination, and end semester examinations. Students are monitored on a continuous basis in a Semester system of evaluation. Continuous evaluation during the semester has 50% weight. This includes two announced periodical quizzes (with 15% weight each) as scheduled in the academic calendar. Besides, class tests, tutorials and assignments carrying 20% weight are also given. End-semester examination carries remaining 50% weight. The details on the evaluation for a course are communicated to the students by the teacher who is handling that course, at the beginning of the semester. All answer books of periodical quizzes and class tests are returned to the students after evaluation. The answer books of the end-semester examinations are scrutinized by the faculty once again before the results are announced.

18. Placement record of the past students and the contribution of the department to the student placements.

Not Applicable

19. Significant achievements of the department or faculty or students during the past five years.

Dr Umesh Kadhane got the S.N Ghosh young scientist award in the year 2009.

20. Participation of the department in COSIP/COHSSIP/SAP CAS / DSA / DRS / FIST. Etc

Not Applicable

21. Plan of action of the department for the next five years

Postgraduate Program

a. The Department of Physics is planning to start M.Tech. degree course in Optical Engineering, which is already approved by UGC, from July 2012. The required laboratory facilities in areas of Laser Technology, Applied Optics and Adaptive Optics for the M.Tech. programme are being developed.

b. The Department is also planning to offer a dual degree programme in Solid State Physics.

Research

1. The Applied and Adaptive optics group will be actively carrying out research work in Adaptive optics especially to develop adaptive optics sensors, detectors and new techniques involving coherence and polarization holography for imaging through atmospheric turbulence.
2. The laser and photonics research group is aiming at developing novel materials using polymer nanocomposites for nonlinear optical and electronic applications in

collaboration with Department of Chemistry and also to set-up state of the art laser plasma diagnostic facility.

3. The atomic and molecular physics team is actively involved in developing recoil ion momentum spectrometer with mass spectroscopy. The program involves theoretical as well experimental study of several complex and hybrid molecules which could possibly have applications in space and medical science. The program also involves development of multipole ion traps for molecules as well as form atomic ions. The later part will be used for development of Quantum Logic clock (also known as single ion clock) for extremely high precision timing.
4. The theoretical physics group is working on nonlinear dynamics and quantum optics and they aim at developing new techniques for quantum computation and quantum information in next five years.