



***THIRTY FOURTH
ANNUAL REPORT 1992-93***

**INDIAN INSTITUTE OF TECHNOLOGY
MADRAS**



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MADRAS**

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THE VISITOR

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President of India

THE BOARD OF GOVERNORS

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Prof N V C Swamy

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Vice-Chancellor
Anna University
Madras

Mrs Mallika Srinivasan
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Tractors & Farm Equipment Ltd.
Madras

Sri P K Kandaswamy
Chief Engineer (Retd.),
Madras Port Trust
Madras

Sri T K Srinivasan
Chairman (Retd.)
Madhya Pradesh Electricity Board

Nominees of the Senate

Prof Y V G S Murti
Prof T Gopichand
(1.1.92 to 16.9.92)

Prof T K Bose
(From 22.10.92)

Secretary

V Shanmugam, Registrar

1. REPORT BY THE DIRECTOR

Indian Institute of Technology, Madras is one among the foremost Institutes of national importance in higher technological education in India. It has been growing from strength to strength ever since it obtained its charter from the Indian Parliament in 1961 and has established itself as a premier centre for teaching, research and industrial consultancy in the country.

The activities of the Institute encompass several departments and advanced research centres in various disciplines of Engineering and Science with nearly hundred Laboratories organised on an unique pattern of functioning.

A faculty of international repute, a brilliant student community, excellent technical and supporting staff and an effective administration have all contributed to the pre-eminent status of this Institute.

In the year 1992-93, the institute continues to maintain its tempo of activities. The salient features of those activities are given below:

1. Academic Programmes:

The Institute offers a wide spectrum of programmes both at the undergraduates and post-graduates levels. At the undergraduate level, eight semester programme leading to the degree of Technology in 9 disciplines are offered. At the post-graduate level, a three semester - programme leading to the post-graduate degree of technology in 37 disciplines are offered. Research programmes leading to award of MS and Ph.D degree are also offered.

1.1 Student Intake

In the year 1992-93, 850 students were admitted. This includes, 89 Ph.D, 41 M.S., 275 M.Tech, 97 M.Sc. and 348 B.Tech students. The number of women and SC/ST students admitted were 83 and 72 respectively.

1.2 Enrolment

The enrolment of students in the Academic year 1992-93 was 2629 which includes 177 SC/ST and 256 women students. This enrolment includes 535 Ph.D, 167 M.S., 535 M.Tech, 174 M.Sc., and 1218 B.Tech students/scholars.

1.3 New Courses Introduced

The Departments review the curriculum periodically so as to make them relevant to the current needs of Engineering, Technology and Science education. During the period of report, 10 new courses were introduced/updated.

2. Faculty Development:

2.1 Faculty Position

There are 167 Professors, 66 Associate Professors, 109 Assistant Professors and 15 Lecturers totalling 357 in different departments and centres of this Institute.

2.2 Grant of Sabatical Leave

During the period under report 11 faculty members went on sabbatical leave for taking up various assignments.

2.3 Visits Abroad

60 Faculty members visited foreign countries for various academic activities.

2.4 Publications

During the period under report 877 papers were published by the faculty members of which 181 papers were in Mechanical Science, 29 papers in Electrical Science, 42 papers in Chemical Science, 73 papers in Building Science, 181 papers in Mathematical and Physical Sciences and 371 papers in other subjects.

2.5 Faculty Attending Conference/Seminar

Faculty members are keen and take effective steps for interaction with other educational institutions. During the period under report 122 faculty members participated in various conferences, seminars and symposiums conducted by other organisations/Universities.

2.6 Honours conferred on Faculty

Prof T K Bose of the Department of Aerospace Engineering was awarded Sri Om Prakash Bhasin award by the Department of Science & Technology.

Prof. D V S Murty of the Department of Chemical Engineering received the Hindustan Dorroliver (Second) Prize for the best paper titled "A simple method to quantity seaward flow of water" at the 25th Annual Convention of IWWA at Bombay.

Prof. TS. Chandra of the Department of Chemistry was awarded merit prize by association of Microbiologists of India for best poster paper presentation at 33rd Ann. Conf. at Goa.

Prof.G.V. Subba Rao of Materials Science Research Centre was elected as Fellow of the Indian National Science Academy.

Prof. H. Raman and Dr.S.Mohan of the Department of Civil Engineering received the Dorr Oliver Award for the year 1991 given by the Indian Water Works Association.

Prof. V. Radhakrishnan of the Department of Mechanical Engineering and Prof. V.S. Raju of Ocean Engineering Centre were elected as Fellows of the National Academy of Engg..

Prof. K.A. Padmanabhan of the Department of Metallurgical Engineering was elected as an Honorary Academician of the Bashkerian Academy of Sciences of the Russian Federation for his outstanding contributions in the field of Super- plasticity.

Prof. K.V.S. Rama Rao of the Department of Physics and Dr.K.M.M. Prabhu of the Department of Electrical Engineering were elected as Senior Members of the Institution of Electrical and Electronic Engineers, USA.

Dr.J.S. Mani of the Ocean Engineering Centre received the Cash Your Idea Award 1992 given by the Central Board of Irrigation and Power for his work on the Design of Y-Frame Floating Breakwater.

2.7 Short-term courses conducted

The faculty of various departments and centres of this Institute conducted 14 Short-term courses during the period under report.

2.8 Conference/Seminars/Symposia Conducted

A large number of conference, seminars, symposiums, short term courses are regularly organised at this Institute. During the period under report 30 Seminars, 3 symposium/workshop and 1 International Conference were conducted.

3. International collaboration and MOU:

The Institute with a view to promote research in science, engineering and technological education is entering into collaborative programmes with other national Universities/Institutes. During the period under report it has entered into Memoranda of Understanding (MOUs) with the following organisations:

- * University Pertanian, Malaysia
- * University of Malaya, Kuala Lumpur
- * Institut of Teknologi Mara, Malaysia

The main objectives of these MOUs are staff exchange, training & development and research collaboration.

4. Student Facilities:

4.1 Student Council

The students council, an elected body from among the student community provides an effective channel of communication among the Director, faculty and students, through dialogue and discussion on various student matters. Student council is also responsible for certain welfare measures organized on voluntary basis by the student community. The publication of Focus, campus magazine of the students is one of the activities of the students council.

4.2 Adhoc Grant for Research Scholars

To encourage the research scholars of M.S. and Ph.D programmes the Institute has been sanctioning adhoc grants for those who participate in International conference and present papers. During the period under report 8 scholars were sanctioned this grant. In the last 8 years, 51 scholars have benefitted under this scheme.

4.3 Thesis Preparation Grant

Research scholars have been sanctioned a sum of Rs.2500/- each for preparation of thesis. During the period under report 25 Ph.D scholars benefitted in this scheme.

4.4 Award of Medals

In the academic year 1992-93, 36 students obtained medals for their outstanding academic performance in various disciplines.

4.5 Scholarship

During the period under report 87 Ph.D scholars, 59 MS scholars and 212 M.Tech students were given fellowship/scholarship. Institute merit cum means scholarship was given to 14 B.Tech. students. Institute merit scholarship was given to 21 M.Sc. students. In total 297 Ph.D, 126 M.S scholars and 151 M.Tech students were granted fellowship/ scholarship. Further 36 M.Sc. students got institute merit scholarship and 62 B.Tech. students got Institute merit cum means scholarship.

4.6 Facility for SC/ST Students

During the period under report 4 B.Tech students of SC/ST community were given free messing facilities and out of pocket expenses of Rs.70/- per month, in addition to the exemption of tuition fees. With this 49 students enjoyed this facility during the period under report. Further 62 students got tuition fee exemption.

4.7 Student Welfare Fund

This is a cooperative scheme by way of subscription by every student per annum to assist needy and deserving students through loan to meet tuition fees, study tour expenses, cost of books, thesis expenses etc. During the period under report 3 students got benefitted.

4.8 Placement

The placement and training centre of the Institute contacts Medium and Large Scale Industries, National and Defence Laboratories and Universities all over the country and provides placements to the freshers, Scientists and Engineers from various discipline. During the period under report 295 students were selected by well known organisations before they actually leave the campus after completing the course. This centre has been able to achieve this almost every year.

5. Degrees Awarded:

29th Convocation was held on 31st July 1992. Dr. P. Rama Rao, Secretary, Dept. of Science & Technology, Govt. of India, delivered the Convocation Address. 690 candidates were awarded various degrees. With this the total number of candidates who were awarded degrees so far by this Institute is 16,180.

6. Industrial Consultancy & Sponsored Research Programmes:

6.1 Sponsored Projects

During the period under report 29 sponsored projects to the value of Rs.5.60 crores were obtained. As on 31.03.1993, 140 projects amounting to Rs.10.0 crores were taken up.

6.2 Consultancy

Industries from all sectors avail the expertise and facilities of this Institute through any one of the following avenues:

- * Institutional Consultancy
- * Retainer Consultancy
- * Research Based Industrial Consultancy

The value of the consultancy assignments taken up in 1992-93 was Rs.221.58 lakhs.

6.3 Retainer Consultancy

Expertise of IIT faculty is utilised by the Industries by retaining them as consultants for advice/guidance on any aspects of interest to the industries concerned for a specific duration. More than thirty faculties were retained as consultants by various industries from all over the country and availed this expertise.

6.4 Research Based Industrial Constancy

Assignments which require applied research fall under this category. Under RBIC an industry or a group of industries can jointly sponsor a project of interest to them in an area where they agree to share the know-how generated. The project duration will be for a period ranging from six months to three years. During 1992-93 more than fifteen companies entered into an agreement for pursuing projects under this programme.

6.5 Industrial Associateship Scheme

The Industrial Associateship Scheme was started in 1987 to further strengthen the linkages with the industry. At present more than three hundred industries/organisations from all over the country are members of this scheme. The institute, under this Scheme, provide access to the following facilities to their Industrial Associates :

- *Technology Appreciation Programmes (TAP),
- *Technology Requirement Programmes (TRP),
- *Library and Information Services,
- *Short term courses,
- *Get-together Programmes.

During the period under report 6 Technology Appreciation Programmes were organised.

7. Centre for Continuing Education:

The centre for continuing education has initiated a wide range of activities by utilising the resources of faculty as well as other facilities available at the Institute. During the period under report 28 teachers from various colleges were admitted in the Ph.D and M.Tech programmes under Quality Improvement Programme.

The Centre for Continuing Education during the period under report conducted 4 summer/winter schools for teachers of Engineering Institutions.

15 Ph.D. scholars and 19 M.Tech. scholars were admitted under QIP programme. So far about 200 scholars have been awarded Ph.D. degree and 300 awarded M.Tech. degree.

During the year 1992-93, 15 continuing education programmes were conducted and about 375 participants attended these programmes.

8. Hostel:

The strength of students in 12 hostels was 2010 which includes 1816 men and 194 women students.

9. Finance:

The non-plan revised estimates 1992-93 and budget estimates for 1993-94 were Rs.2,061.79 lakhs and Rs.2,728.90 lakhs respectively. The actual non-plan and plan expenditure during 1991-92 was Rs.1997.97 lakhs and Rs.309.42 lakhs respectively.

10. Library:

The Central Library has acquired 2,18,643 volumes of books, journals and periodicals as on 31.3.1993.

11. Building Programme:

During the period under report, eleven items of works were completed costing Rs. 118.95 lakhs which include 12 D type quarters, 12 Security Staff quarters, 12 Mess Staff Quarters. These buildings are now occupied for use.

2. ADMINISTRATION

2.1 General:

I.I.T. Madras is an autonomous statutory organisation functioning within the "Institutes of Technology Act, 1961", as amended by "The Institute of Technology (Amendment) Act, 1963". The five Institutes of Technology (others being at Bombay, Kanpur, Kharagpur and Delhi) are administered centrally by the Council of IITs, an apex body established by the Government of India to co-ordinate the activities of these Institutes. The Minister for Human Resource Development of the Government of India is the Chairman of the Council. The list of the members of the Council is given in Appendix 1. Each Institute of Technology has a Board of Governors responsible for its overall administration and control. The composition of the Board of Governors of this Institute is given in page i.

The Senate decides the academic policy of the Institute. It approves and controls curriculum, courses, examination and declaration of results. It appoints committees to look into specific academic matters arising from time to time. The teaching, training and research activities of various departments at the Institute are constantly under review to improve both facilities and standards. The Director of the Institute is the Chairman of the Senate. Members of the Senate are listed in Annexure II.

Financial advice to the Institute is given by the Finance Committee, whose constitution is given in Annexure II. The Buildings and Works Committee advises the Institute on matters relating to buildings and works activity. The constitution of this committee is also given in Annexure II.

In addition the Board of Academic Research, Board of Academic courses, Board of Students and Board of Industrial Consultancy and Sponsored Research are appointed by the Senate to help in the efficient administration of academic and research activities of the Institute. The composition of these Boards together with a list of other officers is also listed in Annexure II.

2.2 Staff Position:

During the year 357 Faculty, 27 Scientific Officers, 57 Officers and 164 supporting staff were in position. 88 new appointments for higher positions were made. 24 Faculty/Officers retired from their services, 6 resigned, 2 expired and 5 visiting faculty were relieved. During the period under report 29 faculty and other staff were on long leave. The details of them are given below:

Faculty/Officers appointed during the year

S.No.	Name	Designation	Date of Appointment/Selection
1.	Dr.N.G. Karanth	Professor	27.04.1992(contract)
2.	Dr.A.K.Mishra	Asst.Professor	04.05.1992
3.	Mr.S.C. Rajan	Asst.Professor	08.05.1992
4.	Mr.Varadarajan Subramaniam	Asst.Professor	08.05.1992
5.	Mr.M.Krishnamurthi	Asst.Professor	08.05.1992
6.	Mr.P.C.Majhee	Asst.Professor	08.05.1992
7.	Dr.Durgaprasad Rao	Asst.Professor	08.05.1992

S.No.	Name	Designation	Date of Appointment/Selection
8.	Mr.Mohan	Asst. Professor	08.05.1992
9.	Mr.K.S.Padiyar	Asst.Professor	08.05.1992
10.	Mr.V.N.Rajan	Asst.Professor	08.05.1992
11.	Mr.D.V.Ramalingeswara Rao	Asst.Professor	08.05.1992
12.	Dr.Archita Patnaik	Asst.Professor	11.05.1992
13.	Dr.P.Sambasiva Rao	SSO Gr.II	20.05.1992
14.	Mr.G.V.R.Chandramouli	SSO Gr.II	25.05.1992
15.	Dr.R.Ambalavanan	Lecturer	27.07.1992
16.	Dr.K.Vidyasagar	Asst.Professor(Adhoc)	19.08.1992
17.	Dr.K.Bhaskar	Lecturer (Adhoc)	02.09.1992
18.	Mr.C.R. Sekar	Asst.Librarian	11.11.1992
19.	Dr.M.Ramasubha Reddy	Visiting Faculty	01.12.1992
20.	Dr.C.Lakshmana Rao	Visiting Faculty	07.12.1992
21.	Dr.Sridhar Jagannathan	Visiting Faculty	01.01.1993
22.	Dr.E.G.Tulapurkara	Professor	24.02.1993
23.	Dr.J.Raamachandran	Professor	24.02.1993
24.	Dr.N.G. Karanth	Professor	24.02.1993
25.	Dr.C.S.Venkatachalam	Professor	24.02.1993
26.	Dr.C.Venkateseshaiah	Professor	24.02.1993
27.	Dr.Ajit Kumar Kolar	Professor	24.02.1993
28.	Dr.U.S.P. Shet	Professor	24.02.1993
29.	Dr.P.Srinivasa Rao	Professor	24.02.1993
30.	Dr.S.K.Seshadri	Professor	24.02.1993
31.	Dr.V.Damodara Das	Professor	24.02.1993
32.	Dr.V.R.K. Murthy	Professor	24.02.1993
33.	Dr.E.Rathakrishnan	Asso.Professor	24.02.1993
34.	Dr.T.Sundararajan	Asso. Professor	24.02.1993
35.	Dr.A.R.Balakrishnan	Asso.Professor	24.02.1993
36.	Dr.T. Panda	Asso.Professor	24.02.1993
37.	Dr.V.S.Ramachandra Rao	Asso. Professor	24.02.1993
38.	Dr.S.Vancheesan	Asso.Professor	24.02.1993
39.	Dr.T.K.Varadarajan	Asso.Professor	24.02.1993
40.	Dr.N.Balasubramanian	Asso.Professor	24.02.1993
41.	Dr.(Ms.)T.S.Chandra	Asso.Professor	24.02.1993
42.	Dr.T.A.Gonsalves	Asso.Professor	24.02.1993
43.	Dr.K.M.M.Prabhu	Asso.Professor	24.02.1993
44.	Dr.Bhaskar Ramamurthy	Asso.Professor	24.02.1993
45.	Dr.R.N.Anantharaman	Asso.Professor	24.02.1993
46.	Dr.S.C.Chaudhary	Asso.Professor	24.02.1993
47.	Dr.S.Srinivasan	Asso.Professor	24.02.1993
48.	Dr.L.S.Ganesh	Asso.Professor	24.02.1993
49.	Dr.C.V.Raghava Rao	Asso.Professor	24.02.1993
50.	Dr.P.V.Subrahmanyam	Asso.Professor	24.02.1993
51.	Dr.S.H.Kulkarni	Asso.Professor	24.02.1993
52.	Dr.T.Sundararajan	Asso.Professor	24.02.1993

S.No.	Name	Designation	Date of Appointment/Selection
53.	Dr.N.Sivaprasad	Asso.Professor	24.02.1993
54.	Dr.M.Singaperumal	Asso.Professor	24.02.1993
55.	Dr.V.Balabhaskaran	Asso.Professor	24.02.1993
56.	Dr.C.V.Gokulratnam	Asso.Professor	24.02.1993
57.	Dr.S.Raghavan	Asso.Professor	24.02.1993
58.	Dr.K.Prasada Rao	Asso.Professor	24.02.1993
59.	Dr.S.Ramakrishna Iyer	Asso.Professor	24.02.1993
60.	Dr.SP Subramanian	Asso.Professor	24.02.1993
61.	Dr.S.Meenakshisundaram	Asso.Professor	24.02.1993
62.	Dr.V.Ramachandran	Asso.Professor	24.02.1993
63.	Dr.B.S.V.Gopalam	Asso.Professor	24.02.1993
64.	Dr.K.Srinivasan	Asso.Professor	24.02.1993
65.	Dr.J.Majhi	Asso.Professor	24.02.1993
66.	Dr.B.Subramaniam	Asso.Professor	24.02.1993
67.	Dr.Y.Syamsundara Rao	Asso.Professor	24.02.1993
68.	Dr.Bhaskar Kannan	Asst.Professor	24.02.1993
69.	Dr.M.Ramasubba Reddy	Asst.Professor	24.02.1993
70.	Dr.D.Loganathan	Asst.Professor	24.02.1993
71.	Dr.K.Vidyasagar	Asst.Professor	24.02.1993
72.	Dr.M.V.Sangaranarayanan	Asst.Professor	24.02.1993
73.	Dr.K.Rajagopal	Asst.Professor	24.02.1993
74.	Dr.R.Ambalavanan	Asst.Professor	24.02.1993
75.	Dr.Ravi Mittal	Asst.Professor	24.02.1993
76.	Dr.D.Janaki Ram	Asst.Professor	24.02.1993
77.	Dr. (Ms.) Hema Arunachala Murthy	Asst.Professor	24.02.1993
78.	Dr.P.Sreenivasa Kumar	Asst.Professor	24.02.1993
79.	Dr.(Ms.)Nandita Dasgupta	Asst.Professor	24.02.1993
80.	Dr.Amitava Dasgupta	Asst.Professor	24.02.1993
81.	Dr.S.Jayachandran	Asst.Professor	24.02.1993
82.	Dr.S.A.Choudum	Asst.Professor	24.02.1993
83.	Dr.(Ms.)R. Usha	Asst.Professor	24.02.1993
84.	Dr.G.Venkataratnam	Asst.Professor	24.02.1993
85.	Dr.S.Rama Prabhu	Asst.Professor	24.02.1993
86.	Dr.G.Markandeyulu	Asst.Professor	24.02.1993
87.	Dr.C.Vijayan	Asst.Professor	24.02.1993
88.	Dr.V.Sankaranarayanan	Asst.Professor	24.02.1993

Faculty/Officers who have retired/resigned during the year

S.No.	Name	Designation	Date of retirement	Remarks
1.	Dr.P.Achuthan	Professor	30.4.92	Retired & re-employed upto 30.6.92
2.	Sri K.Krishnaswamy	Chief D'man	30.4.92	Retired on Superannuation
3.	Sri I.R.Nagana Goudar	Dy. Librarian	12.5.92	Resigned

S.No.	Name	Designation	Date of retirement	Remarks
4.	Dr.R.Ramji Rao	Professor	29.5.92	Retired & re-employed upto 30.6.92
5.	Sri D.S. Subramaniam	Asst.Professor	29.5.92	Retired & re-employed upto 30.6.92
6.	Sri V.K.Vidyasagar	Tech. Officer	29.5.92	Retired on Superannuation
7.	Dr.P.Kalyanasundaram	Professor	30.6.92	Retired on Superannuation
8.	Mr.Y.K.Vedantam	Superintendent	30.6.92	Retired on Superannuation
9.	Dr.A.K.Sreekanth	Professor	30.6.92	Retired on completion of tenure of re-employment
10.	Dr.D.K.Banerjee	Professor	30.6.92	Retired on completion of tenure of re-employment
11.	Dr.C.A.Sastry	Professor	30.6.92	-do-
12.	Dr.L.V.K.V.Sarma	Professor	30.6.92	-do-
13.	Dr.K.Ramananda Rao	Asso.Prof	30.6.92	-do-
14.	Dr.T.Subramanyam	Asst.Prof.	30.6.92	-do-
15.	Dr.Baldevraj	Visiting Faculty	5.7.92	On expiry of his term of appointment
16.	Mr.V.C.Alexander	Chief Sec.Officer	13.7.92	Resigned
17.	Dr.C.R.Chandrasekar	Psychiatrist	31.7.92	-do-
18.	Dr.G.Aravamudan	Professor	31.7.92	Retired on superannuation & re-employed upto 30.6.93
19.	Dr.K.G.Sundararajan	Asst.Sys.Engr.	3.8.92	Vol. retirement
20.	Dr.K.Vidyasagar	Visiting Faculty	18.8.92	On expiry of his term of appointment
21.	Dr.M.K.Achuthan	Professor	14.9.92	On expiry of re-employment
22.	Dr.P.Sambasiva Rao	SSO Gr.II	25.9.92	Resigned
23.	Dr.N.Subramanian	Professor	30.9.92	Retired on superannuation & re-employed upto 30.6.93
24.	Dr.R.Radhakrishnan	Professor	30.9.92	-do-
25.	Sri P.S.Kalyanasundaram	T.O. (SG)	30.9.92	Retired
26.	Dr.T.S.Ramanatha Ayyar	Visiting Prof.	29.10.92	Retired on superannuation
27.	Dr.(Miss)S.Asha	Jr.Med.Officer	31.10.92	Resigned
28.	Sri V.Padmaraj	SSO Gr.II	30.11.92	Resigned
29.	Dr.T.A.Ramalinga Bhat	Asst.Professor	30.11.92	On superannuation
30.	Sri N.T.Kumarasamy	T.O.	30.11.92	-do-
31.	Dr.M.Srinivasan	Professor	1.12.92	Vol. retirement
32.	Dr.M.Ramanujam	Professor	31.12.92	On Superannuation and re-employed upto 30.6.93
33.	Dr.K.N.Satyanarayana	Vist. Faculty	5.1.93	Resigned and rejoined as lectured on contract basis
34.	Prof.T.R.Chari	Visit.Faculty	29.1.93	Expiry of term of appointment
35.	Sri V..K.Vaidyanathan	Superintendent	31.1.93	On superannuation
36.	Sri K.Raman	Tech. Officer	31.3.93	-do-

S.No.	Name	Designation	Date of retirement	Remarks
37.	Dr.M.Ramasubba Reddy	Visit.Faculty	26.2.93	Relieved & joined as Asst.Prof. Retired on superannuation and reemployed upto 30.6.93 -do-
38.	Dr.K.A.Damodaran	Professor	28.2.93	
39.	Dr.B.V.A.Rao	Professor	31.3.93	

Expired

S.No.	Name	Designation	Date	Remarks
1.	Dr.T.Gopichand	Professor	16.09.92	Expired
2.	Dr.C.Chandra Prasad	Professor	17.09.92	Expired

Faculty/Officers who were on long leave

S.No.	Name	Designation	Duration	Nature of Leave
1.	Dr.C.Ramachandran	Asso.Professor	1 Year 20.4.92-19.4.93	EOL
2.	Sri M.Kathiresan	Asst.Sys.Engr.	1 Year 4.5.92-3.5.93	EOL
3.	Dr.A.Kuppurajulu	Professor	11.5.92-30.9.92 & 21.11.92-20.5.93	Sabbatical Leave
4.	Dr.V.V.Sastry	Professor	1 Year 1.6.92-30.5.93	Sabbatical Leave
5.	Dr.C.Ganapathy	Professor	1 Year 8.6.92-10.6.93	Sabbatical Leave
6.	Dr.C.Eswaran	Professor	1 Year 18.6.92-17.6.93	EOL
7.	Dr.M.Mukunda Rao	Professor	6 Months 29.6.92-3.1.93	Leave at Credit
8.	Dr.D.Ganpath Ram Sharma	Asst.Prof.	2 Years 3.7.92-2.7.94	EOL
9.	Dr.K.N.Seetharamu	Professor	6 Months 31.7.92-1.2.93	Sabbatical Leave
10.	Dr.R.Parimelalagan	Asso.Prof.	2 Years 3.8.92 -2.8.94	EOL
11.	Sri G.Jayakumar	Accountant	12.8.92-31.1.94	EOL
12.	Mr.P.Seshasayi	Manager	1.9.92-31.8.94	Leave at Credit/EOL

S.No.	Name	Designation	Duration	Nature of Leave
13.	Sri G.Palanisamy	S.S.O.Gr.II	11.9.90-4.9.92	EOL
14.	Dr.G.V. Subba Rao	Professor	2 Years 5.12.92-4.12.94	Foreign Service Terms
15.	Dr.S.Subramanian	Professor	1 Year 4.1.93-31.1.94	Sabbatical Leave
16.	Dr.P.A.Aswatha Narayana	Professor	23.2.93-21.1.94	Sabbatical Leave
17.	Dr.B.V.A.Rao	Professor	11.5.92-8.11.92	Vacation/Leave at Credit
18.	Dr.P.A.Janaki Raman	Professor	30.4.92-30.12.92	-do-
19.	Dr VM Radhakrishnan	Professor	2.1.91-30.4.92	Sab. Leave/Leave at Credit
20.	Dr MS Gopinathan	Professor	8.1.91-30.6.92	AVH Foundation Fellowship
21.	Dr.TKK Srinivasan	Professor	30.9.91-20.11.92	Sabbatical Leave
22.	Dr. V. Ramamurthi	Professor	18.9.91-31.7.93	-do-
23.	Dr. N.Parameswaran	Asst. Prof.	13.5.91-12.5.91	EOL
24.	Dr. V.N. Shukla	SDE	15.5.90-14.5.92	EOL
25.	Dr. A. Subrahmanyam	Asst. Prof.	23.8.91-22.8.92	Sab. Leave
26.	Dr. B. Subramanian	Asst. Prof.	3.6.91-2.6.92	-do-
27.	Sri G. Palanisamy	SSO II	11.9.90-10.9.92	EOL
28.	Sri S. Karmalkar	SSO II	4.11.91-3.11.92	EOL
29.	Sri G. Jothinathan	SSO II	5.2.92-4.6.92	EOL

2.3 Meetings of the Bodies:

Board of Governors

Four meetings of the Board of Governors were held on 8.5.92, 30.7.92, 30.11.92 and 24.2.93.

Finance Committee

Two meetings of the Finance Committee were held on 6.11.92 and 12.3.93.

Senate

Five meetings of the Senate were held on 21.4.92, 22.5.92, 27.7.92, 22.10.92 and 20.3.93

Board of Academic Research

Two meetings of the Board of Academic Research were held on 26.8.92 and 12.2.93.

Board of Academic Courses

Five meetings of the Board of Academic Courses were held on 3.4.92, 19.5.92, 24.8.92, 3.2.93 and 15.3.93.

Building and Works Committee

One meeting of the Building and Works Committee was held on 17.3.93.

DIRECTOR

N.V.C. SWAMY

DEANS

Academic Courses (Till 1.5.92)
(From 2.5.92)
Academic Research
Administration (Till 31.7.92)
(From 1.8.92)
Industrial Consultancy & Sponsored Research
Students

A. Kuppurajulu
C.R. Muthukrishnan
V.M. Krishna Sastri
G. Aravamudan
Y. Narayana Rao
V.S. Raju
N. Venkatrayulu

HEADS OF DEPARTMENTS

Aerospace Engineering
Applied Mechanics
Chemical Engineering
Chemistry
Civil Engineering
Computer Science & Engg.

Electrical Engineering
Humanities & Social Sciences
Mathematics
Mechanical Engineering
Metallurgical Engineering
Ocean Engineering Centre
Physics

S. Krishnan
K.M. Patil
M.S. Ananth
T.V. Ramakrishna
C.S. Krishnamoorthy
R. Nagarajan (Till 10.12.92)
(Mrs.)Kamala Krithivasan (From 11.12.92)
K. Radhakrishna Rao
Dipak Choudhury
U.N. Srivatsava
V. Radhakrishnan
K.J.L. Iyer
S. Narasimha Rao
K.V.S. Rama Rao

CENTRAL ADMINISTRATION

Registrar
Deputy Registrar
Finance & Accounts Officer
Stores & Purchase Officer
Secretary (SG) to Director
Secretary to Director
Assistant Registrar (SG)
Assistant Registrar (Audit)
Assistant Registrars

V. Shanmugam
K. Panchalan
R.Kannan
A.Thirunavukkarasu
V.V. Natarajan
G. Natarajan
G.R. Raghunatha Rao
R.N. Sankaran
K.Sekar
B. Nagaraja Rao
K.R. Raghavan
K.Ramaswamy
K.Rangarajan

Assistant Finance & Accounts Officers

S.Ramakrishnan
V.Ramamurthy
G.Sreenivasulu
R. Esakkimuthu
M.C. James
M. Manickam
A.K. Pattabiraman
V.C. Alexander
G. Selvamani

Assistant Stores & Purchase Officer (SG)
Assistant Stores & Purchase Officer
Training and Placement-cum-Public Relations Officer
Chief Security Officer (Till 13.7.92)
Security Officer

ENGINEERING UNIT

Institute Engineer
Executive Engineers
Assistant Engineer (SG)
Assistant Engineers

N. Malayalam
C. Ganesan
D. Ramanathan
M. Doorvasalu Reddy
A. Angamuthu
J.C. Jinadass
S.K. Pati
K. Ramakrishnan
A. Sardar Jhan
S. Swaminathan
P. Manickavasagam

Horticultural Superintendent (SG)

3. ACADEMIC PROGRAMMES AND AWARD OF DEGREES

3.1 Introduction

Institute offered Ph.D. Programme in 13 departments, M.S. Programmes in 10 departments, M.Tech Programme in 35 disciplines, M.Sc., programme in 3 disciplines and B.Tech programme in 9 disciplines during the year under report.

3.2 Admissions 1992-93

Students for B.Tech and M.Tech programmes were selected through JEE and GATE respectively. Selection for Ph.D., M.S. programmes was done through interview/test. For M.Sc., programme selection was done by written test and/or interview.

The number of students and scholars admitted to various courses during 1992-93 are given in Table 1.

TABLE - 1

Sl.No.	Department	B.Tech	M.Tech	M.Sc	M.S	Ph.D	Total
1.	Aerospace Engg.	24	13	-	1	4	42
2.	Applied Mechanics	-	16	-	5	7	28
3.	Chemical Engg.	45	25	-	1	11	82
4.	Chemistry	-	-	24	-	17	41
5.	Civil Engg.	46	38	-	5	8	97
6.	Computer Sci. Engg.	25	40	-	8	2	75
7.	Electrical Engg.	79	46	-	8	3	136
8.	Humanities & Soc. Sciences	-	16	-	3	6	25
9.	Mathematics	-	-	34	-	2	36
10.	Mechanical Engg.	77	58	-	5	14	154
11.	Metallurgical Engg.	31	8	-	1	6	46
12.	Naval Architecture	21	-	-	-	-	21
13.	Ocean Engg. Centre	-	8	-	4	3	15
14.	Physics	-	7	39	-	6	52
	Total	348	275	97	41	89	850

The total 850 includes the following:

Foreign National	15	QIP Scholars (Ph.D & M.Tech.)	28
Scheduled Castes	66	Sponsored Candidates (M.Tech.)	36
Scheduled Tribes	6	External Registration (MS & Ph.D)	9
Women	83	Project Staff (MS & Ph.D)	23

3.3 Students/Scholars Enrolment

The total number of students on roll in various programmes of the Institute in the academic year 1992-93 are given in Table 2.

TABLE - 2

S.No.	Department	B.Tech	M.Tech	M.Sc.	M.S.	Ph.D.	Total
1.	Aerospace Engg.	75	23	-	7	11	116
2.	Applied Mechanics	-	33	-	16	32	81
3.	Chemical Engg.	152	44	-	7	48	251
4.	Chemistry	-	-	53	-	101	154
5.	Civil Engg.	140	73	-	21	42	276
6.	Computer Sci Engg.	111	75	-	33	26	245
7.	Electrical Engg.	289	88	-	29	30	436
8.	Humanities & Soc.Science	-	36	-	7	22	65
9.	Mathematics	-	-	57	-	29	86
10.	Mechanical Engg.	289	117	-	27	80	513
11.	Metallurgical Engg.	104	19	-	7	31	161
12.	Naval Architecture	58	-	-	-	-	58
13.	Ocean Engg. Centre	-	15	-	13	25	53
14.	Physics	-	12*	64	-	58	134
	Total	1218	535	174	167	535	2629

* Solid State Tech.

The total 2629 includes the following:

Foreign Nationals	41	External Registration (MS & Ph.D)	17
Scheduled Castes	165	Project Staff (MS & Ph.D)	82
Scheduled Tribes	12	Defence (M.Tech.)	30
Women	256	CSIR(Ph.D)	36
QIP Scholars	86	Handicapped	3
Sponsored Candidates	71	Institute staff(MS & Ph.D)	36

3.4 Convocation

29th Convocation was held on 31-7-92. Dr. P. Rama Rao, Secretary, Department of Science and Technology, New Delhi, delivered the Convocation Address. 690 candidates were awarded various degrees. 457 candidates received degrees in person. The details of programme/department wise degree awarded are given in the following Table-3.

TABLE - 3

S.No.	Department	B.Tech	M.Tech	M.Sc.	M.S.	Ph.D	Total
1.	Aerospace Engg.	15	4	-	1	3	23
2.	Applied Mechanics	-	12	-	6	7	25
3.	Chemical Engg.	32	4	-	4	7	47
4.	Chemistry	-	-	18	-	6	24
5.	Civil Engg.	23	27	-	4	8	62
6.	Computer Sci Engg.	30	30	-	12	2	74
7.	Electrical Engg.	60	35	-	5	3	103
8.	Humanities & Soc. Sciences	-	25	-	6	3	34
9.	Mathematics	-	-	19	-	3	22
10.	Mechanical Engg.	61	91	-	11	16	179
11.	Metallurgical Engg.	21	5	-	3	3	32
12.	Naval Architecture	13	-	-	-	-	13
13.	Ocean Engg. Centre	-	11	-	4	6	21
14.	Physics	-	2	20	-	9	31
	Total	255	246	57	56	76	690

With this Convocation the number of degrees awarded so far by the Institute is 16,180, the details of which are as follows:

Ph.D	1462	M.Tech	5289	B.Tech	7232
M.S.	847	M.Sc.	1105	DIIT	245
B.Sc.(TA)	20				

3.5 Award of Prizes

The following are the details of award of Prizes for the students with the best academic records:

President of India Prize

B.Tech - Computer Science - M. Kannan

Governor's Prize

B.Tech - Civil Engineering - V.Kalyanaraman

Other Prizes

Master of Technology - M.Tech.

S.No.	Donor	Department	Name of Student
1.	Air India Prize	Aerospace Engineering	Roy Paulose
2.	Institute Merit Prize	Engineering Mechanics	Ritwick Roy
3.	Indira Sivasailam Merit Prize	Industrial Tribology	S Rajagopal
4.	Institute Merit Prize	Maintenance Engg. & Management	Dulipsingh Samuel Thangasamy
5.	Dr K Subbaraju Memorial Prize	Chemical Engg	U Ulaganathan
6.	Valli Anantharamkrishnan Merit Prize	Civil Engg	V R L Raju Gottumukkala
7.	CMC Prize	Computer Science	Pulavarty Badari
8.	Siemens India Ltd. Prize	Electrical Engg.	Ubale Anil Wamanrao

S.No.	Donor	Department	Name of Student
9.	K V Arunkumar Memorial Prize	Industrial Management	Harikrishna S R
10.	Coka Parthasarathy Memorial Prize	Industrial Management	Harikrishna S R
11.	Sudarshan Bhat Memorial Prize	Industrial Metallurgy	P Ragothama Rao
12.	Anantharamakrishnan Memorial Prize	Industrial Metallurgy	P Ragothama Rao
13.	Mico Bosch Prize	Mechanical Engg.	Pocha Sivasankara Reddy
14.	Prof B Sengupto Prize	Mechanical Engg.	Dhume Prasad Vaikunth Subramanya P
15.	Dr S Vaidyanathan Memorial Prize	Mechanical Engg. (Production Engg. & Machine Tools)	Subramanya P
16.	Giri Brothers Prize	Mechanical Engineering	A Roop Kumar
17.	S Anantharamakrishnan Merit Prize	Mechanical Engg.	Dhume Prasad Vaikunth
18.	American Bureau of Shipping Prize	Ocean Engg.	Anil Prasad Dash

Master of Science - M.Sc.,

1.	Dr S R Ramadas, 60th Birthday Commoreration Award	Chemistry	Prakash V R
2.	Ratna Rao, Memorial Prize	Chemistry	Prakash V R
3.	Institute Merit Prize	Mathematics	Arun Bhaskar V
4.	Prof Chilukury, Rama Sastry Memorial Prize	Physics	Gayathri N

Bachelor of Technology - B.Tech.

1.	HAL Prize	Aerospace Engineering	Venu N
2.	Prof C A Sastry Endowment Prize	Chemical Engg.	R Karthikeyan
3.	B Ravichandran Memorial Prize	Chemical Engg.	Jayarama Mallya U
4.	Reliance Heat Transfer (P) Ltd.Prize	Chemical Engg.	Jayarama Mallya U
5.	Larsen & Toubro ECC Endowment Prize	Civil Engineering	V Kalayana Raman
6.	B Ravichandran Memorial Prize	Computer Science	M Kannan
7.	Alumni Association Prize	Computer Science	M Kannan
8.	Philips (India) Prize	Electronics & Communication Engg.	Harish Viswanathan
9.	Siemens Prize	Electrical and Electronics Engg.	Manish Gupta
10.	Motorola Prize	Electrical and Electronics Engg.	Ganaptahy S
11.	Banco Foundation Prize	Mechanical Engg.	B Srihari
12.	Sivasailam Merit Prize	Mechanical Engg.	Sujatha Srinivasan
13.	Dr Dhandapani Prize	Metallurgical Engg.	T R Ramachandran
14.	American Bureau of Shipping Prize	Naval Architecture	K Chandrasekhar

Doctor of Philosophy - Ph.D

1.	Sudharshan Bhat Memorial Prize	Metallurgical Engg.	Prashant P Date, C S Ramesh
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4. DEPARTMENTS AND CENTRES

The Institute is having the following Departments and Centres:

Departments

Aerospace Engineering
Applied Mechanics
Chemical Engineering
Chemistry
Civil Engineering
Computer Science & Engineering
Electrical Engineering
Humanities and Social Sciences
Mathematics
Mechanical Engineering
Metallurgical Engineering
Ocean Engineering
Physics

Centres

Centre for Bio-Science & Bio-Technology
Regional Sophisticated Instrumentation Centre
Computer Centre
Materials Science Research Centre
Fibre Reinforced Plastics Research Centre
Centre for Industrial Consultancy & Sponsored Research
Centre Electronic Centre

The activities of these Departments and Centres during the year 1992-1993 are as follows:

4.1 Aerospace Engineering Department

4.1.1 Introduction

The Department of Aerospace Engineering was established in 1969 and has been offering Ph.D., M.S., M.Tech., and B.Tech. programmes. The major areas of teaching and research of the Department are Aerodynamics, Propulsion, and Structures.

4.1.2 Details of Faculty

Name and Qualification	Major areas of Specialisation
Professors	
T.K.Bose, Dr.Ing. (Stuttgart)	Plasma Physics, Gasdynamics, Heat Transfer and Propulsion.
K.A.Damodaran, Ph.D.(IIT M)	Design, Gasdynamics and Propulsion.
S.Krishnan, Ph.D.(IIT M) [Head]	Aircraft and Missiles Propulsion.
G.Subramanian, Ph.D.(IIT M)	Structural Analysis, Finite Element and Finite Difference Techniques, Moire Techniques.
E.G.Tulapurkara, Ph.D.(IIT M)	Aerodynamics, Aircraft Design, Performance and Stability, Turbulence.
T.K.Varadan, Ph.D. (IIT M)	Composites, Non-linear Structural Mechanics.
Associate Professors	
S.S.Gokhale, Ph.D.(Illinois)	Propulsion, Simulation, Computational Fluid Dynamics.
A.Krishnan, Ph.D. (IIT M)	Aircraft Structural Analysis and Design, Composites.
S.Santhakumar, Ph.D.(IIT M)	Aerodynamics
Assistant Professors	
K.Bhaskar, Ph.D. (IIT M)	Structural Mechanics and Elasticity, Composites
R.M.S.Gowda, Ph.D.(IIT M)	Structural Mechanics, Thermal Stress Analysis.
Job Kurian, Ph.D.(IIT M)	Exp. Gasdynamics & Systems.
S.C.Rajan, M.Tech.(IIT M)	Aerodynamics
M.Ramakrishna, Ph.D.(Arlington)	Computational Fluid dynamics

4.1.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		
	M	W	M	W	M	W	M	W	M	W	M	W	Total
Ph.D.	6	-	5	-	7	-	5	-	10	-	33	-	33
M.S.	1	2	3	-	4	-	-	-	-	-	8	2	10
M.Tech.	10	-	-	-	-	-	-	-	-	-	10	-	10
B.Tech.	24	-	20	-	14	1	13	1	-	-	71	2	73
Total	41	2	28	-	25	1	18	1	10	-	122	4	126

4.1.4 Number of Scholarship holders

Programme	Institute Scholarship	CSIR Fellowship	Others	Total
Ph.D.	9	-	1	10
M.S.	5	-	-	5
M.Tech.	5	-	5	10
Total	19	-	6	25

4.1.5 Number of Degrees Awarded

Programme	Number
Ph.D.	2
M.S.	-
M.Tech.	4
B.Tech.	13
Total	19

4.1.6 Instruments/Equipment Designed and Developed

25 mm dia Jet for testing LDA

4.1.7 New Facilities added and Major Equipment procured

3 Nos. of PC 486 added

Students computer facilities upgraded

4.1.8 Short-term Courses/Workshops/Seminars/Symposia Conferences organised

"CFD UPDATE 1992" under the auspices of ISRO - IIT(M) Space Technology Cell, September 14-18, 1992

Co-ordinators - Dr.E.G.Tulapurkara, & Dr.M.Ramakrishna
Dept.of Aerospace Engg. IIT, Madras Dr.V.Swaminathan &
Dr.V.Adhimurthy, V.S.S.C., Trivandrum.

4.1.9 Invited Lectures Delivered by the Faculty in Academic Institutions / Public Bodies

Sl. No.	Name of Faculty	Topic of the Lecture	Delivered at	Date
1.	E.G.Tulapurkara	Parallaliation of a finite volume code	Dept. of Maths IIT, Madras	Nov.'92
2.	E.G.Tulapurkara	Recent Advances in Turbulence modelling of seperated flows (Intl. Conference on Recent Advanced in Aero. Science)	I.I.Sc., Bangalore	Dec.'92
3.	M.Ramakrishna	C++ in Scientific Computing	Dept. of Maths IIT, Madras.	25-2-93
4.	M.Ramakrishna	Integral methods in Scientific Computing	Dept. of Maths Anna University (Guindy, Ms.)	4-3-93

4.1.10 Visits Abroad:

Name of Faculty	Country visited	Date	Purpose of visit
Dr.E.G.Tulapurkara	Korea	August 1992	To attend 5th Asian Congress of Fluid Mechanics
Dr.Job Kurian	Germany	Sep-Dec.92	Short Term Visit to University of Erlangen

4.1.11 Distinguished visitors to the Department

Sl. No.	Name of the Visitor and Occupation	Date of visit	Purpose of visit
1.	Dr.P.Sriram Assistant Professor Wichita State University Kansas, U.S.A.	18-6-1992	Guest Lecture
2.	Prof.K.A.V.Pandalai Director (Retd.) IIT, Madras.	7th, 8th, 14th & 15th October 1992	Guest Lecture
3.	Dr.Venkatraman Shankar Tripoli, Libya	8-1-1993	Guest Lecture
4.	Dr.S.Ravi, University of Texas at Arlington, U.S.A.	15-1-1993	Guest Lecture
5.	Dr.V.Vasant Ram Ruhr University Bochum, Germany	21-23 Jan. 1993	Discussion on Topics on Research interest & lecture

4.1.12 Sponsored Projects

Title of the Project	Period	Funding Agency	Amount Rs. in Lakhs.	Co-ordinators
Erosive Burning Studies of Solid Propellents under transonic and supersonic cross flow Mach numbers	three years	ARDB	5.98	Prof.S.Krishnan
Composite Solid Propellents Combustion Research and New Courses Development	15 months	MHRD	15.00	Prof.S.Krishnan Prof.T.K.Bose Dr.S.S.Gokhale
ComputerAided Design of Aerodynamically Heated Structure	three years	ARDB	11.85	Prof.T.K.Bose Prof.R.Palaninathan
Nozzle Flow with Secondary Injection	Two years	ISRO	4.88	Prof.T.K.Bose
Vibration Relaxation Effects in Gasdynamics	three years (*)	ISRO	3.90	Prof.T.K.Bose
Studies on Isothermal mixing of two Axisymmtric Airstreams	four years	ISRO	2.40	Prof.K.A.Damodaran
Escape frommilitary Aircraft at Very high Mach numbers (2.0M)	four years	ARDB	5.45	Prof.K.A.Damodaran
Studies on Advanced Propulsion for Aerospace Vehicles	four years (*)	DRDL	19.98	Prof.K.A.Damodaran
Studies on Supersonic Combustion	four years	ISRO	7.49	Prof.K.A.Damodaran
Moire studies using image processing techniques	three years	ARDB	6.78	Prof.G.Subramanian Dr.R.M.S.Gowda
A Higher order theory of laminated composite shells under transverse loads	four years	ARDB	3.21	Prof.T.K.Varadan

Title of the Project	Period	Funding Agency	Amount Rs. in Lakhs.	Co-ordinators
Thermal stress analysis of laminated composites with specific reference to aerospace applications	three years (*)	ARDB	5.01	Prof.T.K.Varadan Dr.K.Bhaskar
Review of Turbulence Models Applicable to Aircraft Configurations	Nine months	ADA	0.92	Dr.E.G.Tulapurkara
Flow Studies on S-blade Profiles Reversible Flow pump Turbine	one year	IRDF	0.50	Dr.E.G.Tulapurkara Dr.V.Balabaskaran Dr.P.A.Ashwatha Narayana
Computation of Supersonic turbulent base flows	two years	ISRO	4.25	Dr.E.G.Tulapurkara
Theoretical Studies in Composite Airbreathing Propulsion	two years	ISRO	4.95	Dr.S.S.Gokhale
Computer Aided Instruction for Air Breathing Propulsion	one & half years	ARDB	9.07	Dr.S.S.Gokhale Dr.H.S.Mukunda (IISc)
Aerodynamic Load Estmnt. of Helicopter Rotor in Hover and Climb and Development of Computer code	one year (*)	IRDF	0.36	Dr.M.Ramakrishna Dr.M.Balakrishnan Dr.S.C.Rajan
Development and Calibratn. preliminary experiments on a Hypersonic shock tunnel	three years	ARDB	6.45	Dr.Job Kurian Prof.A.K.Sreekanth
Studies on shock wave Propagation in Gas particle mixtures	three years	DAE	6.10	Dr.Job Kurian
Ignition studies on Solid Propellants	three years (*)	ISRO	4.70	Dr.Job Kurian Dr.K.A.Bhaskaran

Title of the Project	Period	Funding Agency	Amount Rs. in Lakhs.	Co-ordinators
Development of Self-correcting wind-tunnel technology	three years	ARDB	6.65	Dr.S.Santhakumar
Experimental Techniques for studying high velocity missile impact on concrete structure	one year (*)	IRDF	0.55	Dr.S.Santhakumar Dr.V.Paramasivam
A distributed problem solver for Navier-Stokes equations	One year (*)	IRDF	0.72	Dr.M.Ramakrishna Dr.D.Janakiraman
Study of Flow through Axisymmetric/Two Dimensional variable area Convergent/Divergent Nozzles	two years	ADA	6.23	Dr.K.A.Damodaran Dr.M.Ramakrishna

(*) Sanctioned during 1992-93

4.1.13 Major Consultancy Assignments

Title	Organisation	Amount Rs. in Lakhs.	Co-ordinator
Combustion studies of Solid Fuel Ramjet	DRDO	0.85	Prof.S.Krishnan Prof.K.A.Damodaran
Development of Computer Programmes for theoretical performance prediction of solid propellant Rocket	ISRO	1.13	Prof.S.Krishnan
Design of Low Turbulence Wind Tunnel	FCRI	0.04	Dr.E.G.Tulapurkara
Calibration of Stuttgart Type Probe	BHEL	0.49	Dr.S.Santhakumar and Dr.Job Kurian
Pitch calibration of two probes	BHEL (*)	0.47	Dr.S.Santhakumar

Design and Fabrication of 3-D traverse system	FCRI (*)	0.55	E.G.Tulapurkara
Preliminary Stress Analysis of Tyre Curing Press	L & T (*) McNeil	0.20	Dr.G.Subramanian Dr.A.Krishnan Dr.K.Bhaskar

(*) Sanctioned during 1992-93

4.1.14 Honours and Awards

Name of Faculty	Award
Prof.T.K.Bose	Sri Om Prakash Bhasin Award by the Department of Science & Technology, 1991(awarded in May '92) Elected Fellow of National Academy of Sciences, India

4.1.15 Research Publications

1. S.Savithri and T.K.Varadan, "Laminated Plates under uniformly Distributed and Concentrated Loads", J.Appl. Mech., Vol.59, March 1992, pp.211-214
2. S.Savithri and T.K.Varadan, "A Simple Higher-Order Theory for Homogeneous Plates", Mechanics Research Communications, 19(1), 65-71, 1992
3. S.A. Pillai, A.V.S.S.S.R.Sarma, G.Subramanian, and T.K.Varadan, "Computerised image processing for whole-field determination of isoclinics and isochromatics", Expt. Mech. Vol.32(1), pp.24-29, 1992
4. S.A. Pillai, A.V.S.S.S.R.Sarma, G.Subramanian and T.K.Varadan, "Detection and characterization of tight cracks using photoelastic coatings", Materials Evaluation, Vol.50(3), pp.367-372
5. K.Bhaskar and T.K. Varadan, Reissner's new mixed variational principle applied to laminated cylindrical shells", ASME Jl. of Pressure Vessel Tech., Vol.114(1), pp.24-29, 1992.
6. K.Bhaskar and T.K.Varadan, "Comments on Free vibrations of laminated rectangular plates analyzed by higher-order individual layer theory", Jl. of Sound and Vibration, Vol.154(1), pp.178-179, 1992.

7. S.Savithri and T.K.Varadan, " On various refined theories in the bending analysis of angle-ply laminates", *Jl. of Ae.S.I.*, Vol.44(2), pp.145-151, 1992
8. M.Ganapathi and T.K.Varadan, "Application of a field-consistent sheal flexible element for nonlinear dynamic analysis of laminated shells", *Finite Elements in Analysis and Design*, 1992.
9. S.Savithri and T.K.Varadan, "Nonlinear bending analysis of shear deformable plates, *Jl. Ae.S.I.* Vol.44(4), pp.361-367, 1992
10. S.Savithri and T.K.Varadan, "Large deflection analysis of laminated composite plates", *Int.J. Nonlinear Mechanics*, Vol.28, No.1, pp.1-12, 1993.
11. S.A.Pillai, A.V.S.S.S.R.Sarma, G.Subramanian and T.K.Varadan "Detection and characterization of tight cracks using photoelastic coatings", *Materials Evaluation*, Vol.50(3), pp.367-372, 1992
12. S.A.Pillai, A.V.S.S.S.R.Sarma, G.Subramanian and T.K.Varadan "Computerised image processing for whole-field determination of isoclinics and isochromatics", *Expt. Mech.* Vol.32(1), pp.24-29.
13. S.S.Gokhale, "Investigations on Multijet Nozzle Deposition for Magnesim Rich Propellants", *Proceedings of the 11th National Heat and Mass Transfer Conference*, Tata McGraw Hill, 1992.
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19. S. Krishnan and R.Jeenu, "A Surface Reaction Model for Catalyzed Composite Solid Propellants", *AIAA Jl.* Vol.30, pp.2748-2791, 1992.
20. A.Krishnan and J.V.Deshpande "Vibration of skew Laminates", *Journal of Sound and Vibration*, 153(2) 337-358, 1992

21. Manjunath P and Job Kurian "Shock interaction with a dustlayer Proceedings of 18th Int. Symp. on Shock Waves, July 1992, Sendai, Japan
22. E.G.Tulapurkara, "Recent Progress in Modelling of Turbulent Separated Flows" Proc. Int. Symp. on Advanced in Aerospace Sciences and Engineering, Bangalore, Dec.12-15, 1992, H.S.Mukunda & A.V.Krishna Murthy (Editors), Vol.I, pp.41-52, Interddline Publishing, 1993.
23. E.G. Tulapurkara, B.H.Lakshmana Gowda and Susheel Kumar Swain, "Flow in a Channel with Obstruction at the Entry - Influence of Obstruction Geometry" Proc. Fifth Asian Congress of Fluid Mechanics, August 10-14, 1992, Taejon, Korea pp.1246-1249.
24. B.H.L.Gowda, E.G.Tulapurkara and S.K.Swain, "Reverse Flow in a Channel with Obstruction at the Entry-Influence of Rectangular Geometry", Proc. of National Symposium on Experience in Fluids, IIT Kanpur 28-31, 1992, pp.113-122.
25. E.G. Tulapurkara and K.S.Kaushal, "On a New Technique for Generation of Homogeneous Shear Flows", Proc. of National Symposium on Experiments in Fluids, IIT, Kanpur, Decd.28-31,1992, pp.216-224.

4.1.16

The Department had 14 faculty members, 14 non-teaching technical and 9 non-teaching and non-technical staff.

4.2 Applied Mechanics Department

4.2.1 Introduction

The Department of **Applied Mechanics** was established in 1959, and it offers Ph.D., M.S., M.Tech. and B.Tech. programmes. The major areas of teaching and research of the Department are the following:

The research in the **Biomedical Engineering Division** is concentrated in the three main areas of Biomedical Instrumentation, Biomechanics and Biomedical Imaging and Signal processing in collaboration with hospitals and medical research institutes, in the areas of Biomechanics of Leprotic hand and foot, Rehabilitation aids, Finite element and Image processing applications in Biomechanics, Macro-micro hemo-dynamics and in Laser applications in medical diagnosis.

The faculty in the **Elasticity (Solid Mechanics) Division** are doing research in Stress analysis of plates and shells by finite element and boundary element techniques, Elasto-plastic analysis, Fracture mechanics, Fatigue, Reliability, Metal matrix composites, High temperature design and application of Image processing techniques.

The faculty in the **Fluid Mechanics Division** are doing research in Industrial aerodynamics, Automobile aerodynamics, Helicopter aerodynamics, Aerodynamics of wind turbines and Wind energy problems, Wind effects on buildings structures and bridges, Flow induced vibration, Computational fluid dynamics and Atmospheric boundary layers, Internal flow problems and Flow through conical and curved diffusers, Turbulent shear flows, Wall jets, Turbulence modelling.

The Machine Dynamics Division is engaged in research in the areas of Structural dynamics, Vibration and stress analysis using FEM techniques, Acoustics and noise control, Tribology and Maintenance engineering and Chaotic/non-linear vibrations.

4.2.2 New Courses Introduced

The following new courses were introduced during the period under report.

Course No.	Title	Structure	Faculty
AM 644	Fracture Mechanics	3 0 0 3	Prof. R.S. Alwar Dr. C. Lakshmana Rao

4.2.3 Details of Faculty

Name and Qualification

Major area of specialisation

Professors

R.S. Alwar, Ph.D (IISc)
P.A.Aswatha Narayana, Ph.D(IIT Madras)
B.V.Aswathanarayana Rao,
Dr.Ing. (Dresden)

Solid Mechanics
Fluid Mechanics
Vibration & Noise Control,
Machine Dynamics, Industrial Tribology,
Maintenance Engineering and Condition
Monitoring

N.V.Chandrasekara Swamy, Ph.D (IISc.)
N. Ganesan, Ph.D (IIT Madras)

B.H.Lakshmana Gowda, Ph.D(IIT Madras)
Megha Singh, Ph.D (Carolina)

S. Narayanan, Ph.D (IIT Kanpur)

R. Palaninathan, Ph.D (IIT Madras)

K.M. Patil, D.Sc.(Washington) [**Head**]
J. Raamachandran, Ph.D (IIT Madras)

V. Ramamurti, Ph.D (IIT Madras)

V. Ramjee, Ph.D (IISc)
B.Srinivasa Prabhu, Ph.D (IIT Madras)

P.S. Srinivasan, Dr.Es.Sc. (Poitiers)
R.S. Srinivasan, Ph.D (IISc)

Associate Professors

M. Balakrishnan, Ph.D (IIT Madras)
S. Radhakrishnan, Ph.D (IIT Madras)

Assistant Professor

P. Krishna Iyer, Ph.D (IIT Madras)
J.Lakshminarasimhan, Ph.D (IIT Madras)
M. Ramasubba Reddy, Ph.D (IISc)
S. Swarnamani, Ph.D (IIT Madras)

Lecturer

C. Sujatha, Ph.D.(IIT Madras)

Senior Scientific Officer, Gr.II

G. Thomas, M.Sc. (Madras)
Technical Officer

Mr. V. Ganesh, M.S. (Madras)

Visiting Faculty

C.Lakshmana Rao, D.Sc (MIT)

Fluid Mechanics
Vibration, Stress Analysis, Tribology, Acoustics
and Noise control

Fluid Mechanics
Lasers and ultrasound in medicine, Biofluid
mechanics, Biomedical Instrumentation

Vibration, Random Vibration, Acoustics and
Chaos

Structural Mechanics, Composite Structures
and Materials

Biomechanics, Rehabilitation Engineering
Solid Mechanics, Computer-Aided Design,
Boundary Element Method

Machine Dynamics, Vibration, Stress Analysis,
Rotor Dynamics, Computer Aided Design

Fluid Mechanics
Rotor Dynamics, Tribology, Maintenance
Engineering

Fluid Mechanics
Structural Mechanics-Stress Analysis,
Dynamics of Structures - Composite Structures

Fluid Mechanics/Low speed
Biomechanics, Rehabilitation Engineering

Solid Mechanics, Stress Analysis - Elasticity
and Plasticity

Fluid Mechanics, Incompressible
Aerodynamics, Internal flows

Neural network applications in medicine,
Biomedical Instrumentation, Medical Imaging &
Signal Processing

Instrumentation, Machine Dynamics, Tribology,
Medical Ultrasonics, Acoustics, Biomedical
Instrumentation

Machine Dynamics, Acoustics, Instrumentation,
Condition Monitoring, Fiber Optics, Vehicular
vibration

Experimental Stress Analysis

Fracture Mechanics

4.2.4 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	11	1	8	-	8	-	8	-	11	-	46	1	47
M.S.	7	-	4	-	4	-	-	1	-	-	15	1	16
M.Tech.	-	-	9	1	-	-	-	-	-	-	9	1	10
Total	18	1	21	1	12	-	8	1	11	-	70	3	73

4.2.5 Number of Scholarship/Fellowship Holders

Programme	Institute Scholarship	CSIR Fellowship	Others	Total
Ph.D.	23	-	7 (4 QIP+3 Project)	30
M.S.	15	-	1 (Project)	16
M.Tech.	8	-	7 (6 Spon.+1 QIP)	15
Total	46	-	15	61

4.2.6 Number of Degrees Awarded

Programme	Number
Ph.D.	6
M.S.	5
M.Tech.	13
Total	24

4.2.7 Instruments/Equipment Designed and Developed

1. Dynavision I - an electronic based neuromuscular trainer
2. Dynavision II - computer based neuromuscular trainer
3. Erythrocyte Deformability Meter
4. Online measurement of foot pressure by image processing technique
5. Equipment for contact pressure measurement under tyres
6. A new solid state drive (180 kW) for the Big Wind tunnel
7. Force and torque transducers

4.2.8 New Facilities Added and Major Equipment Procured

1. Ultrasonic 2D-echocardiographic system
2. Windmill test set-up
3. Curved duct flow facility
4. Dynamic Strain Data Acquisition System
5. 8 channel FM Tape recorder

4.2.9 Short-Term Courses/Workshops/Seminars/Symposia/Conferences Organised

Sl. No.	Co-ordinator(s)	Title of Course/Workshop/Seminar/Symposia/Conference	Period
1.	Dr. B.V.A. Rao Dr. S. Narayanan	National Symposium on Acoustics	12-14 Dec 1992

4.2.10 Short-Term Courses/Workshops/Seminars/Symposia/Conferences/Training Attended

Sl. No.	Name of Faculty	Title	Period/Duration
1.	Dr. Megha Singh	International Conference on Non-linear Mechanics, Gulbarga	Aug 29 to Sept. 2, 1992

4.2.11 Invited Lectures Delivered by the Faculty in Academic Institutions/Public Bodies

Sl. No.	Name of the Faculty	Topic of the	Venue	Date Lecture
1.	Dr. Megha Singh	Biophysical Aspects of Atherosclerosis	S.V. University Tirupathi	Nov 22 1992
2.	Dr.S.Radhakrishnan	Biomechanics of the foot	Govt. Institute of Rehabilitation Institution, Madras	Dec 22 1992
3.	Dr.J.Raamachandran	Photoelasticity (in Tamil) Holography (in Tamil)	AIR Madras AIR Madras	18/6/92 23.9.92

4.2.12 Visits Abroad

Sl. No.	Name of the Faculty	Country visited	Date	Purpose
1.	Dr. K.M. Patil	The Netherlands	Jun 13 - Jul 14 1992	On collaborative research project on leprotic foot
2.	Dr. Megha Singh	Germany	May-June 1992	Research related to microgravity effect on red blood cells
3.	Dr. R.S. Alwar	Germany	May-June 1992	As a consultant to BHEL
4.	Dr.P.A.Aswatha-Narayana	The Netherlands	Feb 23 1992	Sabbatical leave
5.	Dr. B.V.A. Rao	Germany	May-Oct 1992	AVH Fellowship under Re-invitation Programme
6.	Dr.V.Ramamurti	USA	Sep 18 1991	Sabbatical leave

4.2.13 Distinguished Visitors to the Department

Sl. No.	Name of the Visitor and Occupation	Date of visit	Purpose (Lecture/Discussion)
1.	Dr. K.B. Chandran Professor, Dept. of Biomedical Engineering University of Iowa, USA	10/6/92	Lecture
2.	Dr. V. Anantharaman Professor of Physiology Annamalai University Tamil Nadu	26/6/92	Lecture

Sl. No.	Name of the Visitor and Occupation	Date of visit	Purpose (Lecture/Discussion)
3.	Prof. K.R. Rajagopal Dept. of Mechanical Engg. University of Pittsburg, USA	14/8/92	Lecture
4.	Dr. P. Shanmugam Director Govt. Institute of Rehabilitation Medicine K.K. Nagar, Madras	9/10/92	Lecture
5.	Dr. V. Namasivayam Professor of Physiology Dr. ALM Institute of Basic Medical Sciences, Taramani, Madras	6/11/92	Lecture
6.	Prof. T. Yokomiza Dept. of Mechanical Engg. Kanto Gouin University Yokohama, Japan	Dec 6-8 1992	Visit-cum-Lecture
7.	Prof. V.J. Modi Dept. of Mechanical Engg. University of British Columbia, Vancouver Canada	Dec 6-8 1992	Visit-cum-Lecture
8.	Mr. R. Hamann Research associate Technische Universitat Hamburg, Germany	Nov '92 to Jan '93	INSA-DFG Programme

4.2.14 Sponsored Projects

Title	Period	Funding Agency	Amount (lakhs)	Co-ordinator(s)
1. Dev. of foot model & pressure monitoring system leprosy patients.	Three years	DST	23.4	Dr. K.M. Patil Dr. P.K. Oommen (CLTRI Chengalpattu) Dr. G.N. Malaviya (CJIL Agra) Dr. A. Huson (Limburg University The Netherlands) Dr. D.H. van Campen Eindhoven Univ.

	Title	Period	Funding Agency	Amount (lakhs)	Co-ordinator(s)
2.	Improved bio-engineering.... development	Three years	MHRD	15.0	Dr.Megha Singh, Dr.K.M.Patil & Dr.S.Radhakrishnan
3.	Maintenance Engg. with emphasis on Tribomonitoring and testing	Two Years	MHRD	10.0	Dr.B.S.Prabhu Dr.B.V.A.Rao Dr.S.Swarnamani
4.	Computer aided design in high temperature environment	Two years	BHEL	5.02	Dr. R.S. Alwar
5.	Computer aided design of aerodynamically heated structures	Three years	ARDB	11.85	Dr. R. Palaninathan Dr. T.K. Bose
6.	Development of advanced composites technology	Two years	MHRD	35.00	Dr. R. Palaninathan
7.	Generation of dynamic data for blade section of wind energy system	Three years	DNES	5.20	Dr.N.V.C.Swamy Dr.P.A.Aswatha-Narayana
8.	'Niharika Ishan' A new type of wind turbine	1 1/2 years	DNES	2.00	Dr.N.V.C.Swamy Dr.P.A.Aswatha-Narayana
9.	Numerical modelling of complex foils with heat transfer	Three years	NSF	17.39	Dr.K.N.Seetharamu Dr.P.A.Aswatha-Narayana
10.	3-D conduction code temperature distribution using FEM for GT blades	Three years	ARDB	6.75	Dr.K.N.Seetharamu Dr.P.A.Aswatha-Narayana
11.	Flow studies of 'S' blade profiles a fully reversible & flow pump turbine for a tidal plant	One year	IRDF	0.5	Dr.P.A.Aswatha-Narayana, Dr.V.Balabaskaran Dr.E.G.Tulapurkara

	Title	Period	Funding Agency	Amount (lakhs)	Co-ordinator(s)
12.	Fluid Mechanical combustion aspects of interference effects in spray combustion	Three years	ISRO	5.00	Dr.B.H.L. Gowda Dr.R.Natarajan
13.	Studies on the mixing & combustion phenomena in ramjet	Three years	ARDB	5.17	Dr.B.H.L.Gowda, Dr.R.Natarajan Mr.K.S.Padiyar
14.	Numerical prediction of two-dimensional reacting flows with application to ramjet combustion	Three years	ARDB	5.80	Dr.B.H.L.Gowda, Dr.R.Natarajan Dr.V.Ganesan
15.	Helicopter Aerodynamics in hover and climb	One year	IRDF		Dr.B.Balakrishnan, Dr.S.C.Rajan Dr.M.Ramakrishna
16.	Augmentation of Vortex formation during discharge of liquids from containers due to disturbances induced to the liquid	Three years	ICSR- ISRO	2.88	Dr. B.H.L. Gowda Dr. S.Swarnamani

4.2.15 Major Consultancy Assignments

S.No	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
1.	Structural Integrity of Gas Turbine Composites	BHEL	1.02	Dr. R.S. Alwar
2.	Seismic Analysis of LT Bus Duct for Rapp and Kaiga 1 and 2	Best and Crompton Engg. Ltd., Madras 98	0.15	Dr.B.V.A. Rao Dr.S.Narayana Dr.N.Ganesan
3.	Characteristics of Torsional Damper	Autolec Manufacturing Marketing Co. (P) Ltd. Madras 58	0.015	Dr.S.Swarnamani Dr.C.Sujatha
4.	Characteristics of Torsional Damper	Autolec Manufacturing & Marketing Co. (P) Ltd., Madras 58	0.015	Dr.S.Narayanan Dr.C.Sujatha

S.No	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinators(s)
5.	Characteristics of Torsional Damper	Autolec Manufacturing & Marketing Co. (P) Ltd., Madras 58	0.015	Dr.N.Ganesan Dr.S.Swarnamani
6.	Sound Level Study on Portable Generator.	M/s. Engifled India Ltd., Madras 96	0.03	Dr.S.Narayanan Dr.S.Swarnamani
7.	Acoustic Treatment of Conference Hall	Four Links Sales Sales (P) Ltd.	0.10	Dr. S. Narayanan Dr.S.Swarnamani Dr.A.Rama-chandraiah
8.	Characteristics of Torsional Damper	Autolec Manufacturing & Marketing Co. (P) Ltd., Madras 58	0.015	Dr.B.S.Prabhu Dr.S.Swarnamani
9.	Seismic Analysis of CTs and CVTs through Computer based FEM	Asea Brown Boveri Ltd, Bombay 400 025	0.30	Dr.B.S.Prabhu Dr.N.Ganesan
10.	Calibration Analysis Vibration/Sound Level Meter	M/s.Best and Crompton Engg. (P) Ltd., Madras 18	0.03	Dr.S.Swarnamani Dr.C.Sujatha
11.	Seismic Test on 132 KV CT	M/s. W.S.Industries (I) Ltd., Bangalore 157	0.14	Dr.B.S.Prabhu Dr.N.Ganesan Dr.S.Swarnamani
12.	Technical Advise & Calibration of Four Ball	M/s. Lucas-TVS Limited, Madras 50	0.05	Dr.B.S.Prabhu
13.	Seismic Analysis of 400 KV Circuit Breaker	M/s. Asea Brown Boveri Ltd., Vadodara	0.15	Dr.B.S.Prabhu Dr.N.Ganesan
14.	Seismic Testing of 300mm Butterfly Valve	M/s. Karnataka Electrical & Mechanical Systems (P) Ltd., Bangalore 2	0.10	Dr.B.S.Prabhu Dr.S.Narayanan Dr.S.Swarnamani

S.No	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
15.	Seismic Testing of 30 KV Metovar Surge Absorber	M/s. Oblum Electrical Industries (P) Ltd., Hyderabad	0.12	Dr.S.Narayanan Dr.S.Swarnamani Dr.C.Sujatha
16.	Seismic Analysis of Insulator	M/s. S & S Power Switchgear Ltd., Madras 116	0.28	Dr.S.Narayanan Dr.N.Ganesan
17.	Testing of Torsional Vibration Dampers for Natural Frequencies and Damping Characteristics	M/s. Autolec Manufacturing & Marketing Co. (P) Ltd., Madras 58.	0.03	Dr.B.S.Prabhu Dr.S.Swarnamani
18.	Harmonic Analysis of Transformer Voltage	M/s. Andrew Yule & Co. Ltd., Madras 96	0.04	Dr.S.Swarnamani
19.	Noise Studies on Domestic Vacuum cleaner	M/s.Facit Asia Ltd, Madras 96	0.05	Dr.S.Narayanan Dr.B.V.A.Rao Dr.S.Swarnamani
20.	Seismic Testing of 300 mm Butterfly valve	M/s. Karnataka Electrical & Mechanical Systems (P) Ltd., Bangalore 2	0.10	Dr.B.S.Prabhu Dr.S.Narayanan Dr.S.Swarnamani
21.	Noise Studies on Air Purifier	M/s.Facit Asia Ltd, Madras 96	0.03	Dr.S.Narayanan Dr.S.Swarnamani
22.	Analytical Seismic Calculations on Surge Arresters & Insulators	M/s. W.S.Industries (I) Ltd., Bangalore 157	0.30	Dr.B.S.Prabhu Dr.N.Ganesan
23.	Testing of Vibration Monitoring System	M/s. Measurement Technology Madras 17	0.02	Dr.S.Swarnamani
24.	Dynamic Parametric Analysis of D412 Batch Centrifugal Machine	M/s. K.C.P. Ltd., Madras 19	0.15	Dr.B.S.Prabhu
25.	Harmonic Analysis of Transformer Voltage	M/s. Andrew Yule & Co. Ltd., Madras 96	0.04	Dr.S.Swarnamani
26.	Noise Survey & Noise audit	M/s.I.T.C. Ltd, Bangalore 19	0.02	Dr.B.V.A.Rao Dr.A.Rama-chandriah
27.	Noise Survey & Noise audit	M/s.I.T.C. Ltd, Bangalore 19	0.02	Dr.B.V.A.Rao Dr.A.Rama-chandraiah

S.No	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
28.	Torsional Vibration Test on Viscous Dampers including Instrumentation & Recording of Data	M/s. Ashok Leyland, Madras 19	0.48	Dr.B.S.Prabhu Dr.S.Swarnamani
29.	Evaluation of Dynamic Characteristics of Panther & Zebra & Micostrain Analysis of Transmission Lines with Dampers	M/s. Rashtraudhyog (P) Ltd., Calcutta	0.24	Dr.B.V.A.Rao Dr.N.Ganesan Dr.S.Swarnamani Dr.C.Sujatha
30.	Characteristics of Torsional Damper	M/s. Autolec Manufacturing & Marketing Co. (P) Ltd., Madras 58	0.02	Dr.B.S.Prabhu Dr.S.Swarnamani
31.	Harmonic Analysis of Transformer Voltate	M/s. Andrew Yule & Co. Ltd. Madras 96	0.08	Dr.S.Swarnamani
32.	Evaluation of Dynamic Characteristics and Mircostrain Analysis of Damper	M/s. Burma Electro Corp. Jalandhar 4	0.06	Dr.B.V.A.Rao Dr.N.Ganesan Dr.S.Swarnamani Dr.C.Sujatha
33.	Dynamic Response of Submersible Vessels with Mounted equipment to [NPOL] Shock Loading & Ecaluation of vibration Mounting	M/s. Naval Physical & Oceanographic Laboratory, Cochin 2	9.8	Dr.S.Narayanan Dr.B.V.A.Rao Dr.N.Ganesan
34.	Earthquake withstand test on Surge Arresters	M/s. Oblum Electrical Industries (P) Ltd, Hyderabad	0.37	Dr.S.Narayanan Dr.B.S.Prabhu Dr.S.Swarnamani Dr.C.Sujatha
35.	Characteristics of Torsional Damper	M/s. Autolec Manufacturing & Marketing Co. (P) Ltd., Madras 58	0.03	Dr.S.Swarnamani Dr.S.Narayanan Dr.C.Sujatha
36.	Testing of Prototype AC-Brake	L&T McNeil Ltd., Madras	0.20	Dr.P.Krishna Iyer Mr.G.Thomas

4.2.16 Honours and Awards

Name of Faculty	Honours/Awards	Purpose
Dr. Megha Singh	Member	World Committee on Biomechanics

4.2.17 Books

Name of Faculty	Title	Publisher
Dr. Megha Singh (Co-Editor)	Medicine & Surgery-2000 AD Proc. II International Conf. Royal College of Physicians & Surgeons	Madras
Dr.J.Raamachandran	Thin Shells (Theory & Problems)	University Press (India) Ltd., Hyderabad
Dr. B.H.Lakshmana Gowda	A Kaleidoscopic View of Fluid Flow Phenomena	Wiley Eastern

4.2.18 Research and Publications

1. Ali Zabihi, B.S. Prabhu and S. Swarnamani, Investigation of electrical effects in roller bearings through condition monitoring techniques, Int. Conf. on Engg., Application of Mechanics (ICEAM-92), Sharif University of Technology, Tehran, Iran, 507-514, June 9-12, 1992.
2. Ali Zabihi, B.S. Prabhu and S. Swarnamani, Experimental study on roller bearings subjected to electrical field, Int. Conf. on Engineering Application of Mechanics (ICEAM-92), Sharif University of Technology, Tehran, Iran, 515-522, June 9-12, 1992.
3. Ali Zabihi, B.S. Prabhu and S. Swarnamani, Hydrodynamic journal bearings performance under the influence of different shaft voltages, Int. Conf. on Engg., Application of Mechanics (ICEAM-92), Sharif University of Technology, Tehran, Iran, 494-501, June 9-12, 1992.
4. R.S. Alwar and M.C. Narasimhan, Axisymmetric non-linear analysis of laminated orthotropic annular spherical shells, Int. Journal of Non-linear Mechanics, Pergamon Press, Vol.27, 611-622, 1992.
5. B.Arunachalam, S.Swarnamani & C.S.Prasad, Prognosis assessment through occlusal & temperomandibular sounds, National Symposium on Acoustics, IIT, Madras, Dec 13-14, 1992.
6. S.L.Carroll, H.Katayama, G.W.Henry, J.I.Ferreiro, R.Zalesak, B.Ha, C.L.Lucas, Megha Singh, P.G.Lynch and A.P.Yoganathan, Flow visualisation in anatomically accurate flow through models of the main pulmonary artery trunk, Cardiology in the young, 21,114-120, 1992.

7. J.K.Chakraborty, B.Basu and K.M.Patil, Kinematics & kinetics of lower limb during squatting on foot flat, National Conf. on Biomechanics, BM5, August 29-30, Gulbarga, 1992.
8. P. Chellapandi, S.P. Bhoje and R.S. Alwar, Identification, implementation and use of ORNL and Chaboche material models for SS 316 towards life prediction of fast breeder reactors, Proc. of Int. Conf. in Computational Engg., Hongkong, 1992.
9. D. Liepsch, Megha Singh and L. Martin, Experimental analysis of the influence of stenotic geometry on steady flow, *Biorheology* 29, 419-431, 1992
10. B.P. Gautham and N. Ganesan, Axisymmetric vibration of layered orthotropic spherical shells of variable thickness, *Computers and Structures*, Vol. 45, n5/6, 893-900, 1992.
11. B.P. Gautham and N. Ganesan, Free vibration analysis of thick spherical shells, *Computers and Structures*, Vol.45, 307-313, 1992.
12. B.H.L. Gowda and V. Sreedharan, Influence of damping on the oscillatory response of a circular cylinder due to interference effects, Proc. the Fifth Asian Congress of Fluid Mechanics, Vol. 1, 45, Taejon, Korea, 1992.
13. B.H.L. Gowda and M.M. Sitheeq, Interference effects on the wind pressure distribution on low-rise prismatic bodies exposed to higher shear velocity profile, *Indian Journal of Technology*, Vol. 30, 43-50, January, 1992.
14. B.H.L. Gowda, V. Sreedharan & S. Narayanan, Oscillatory response of a circular due to interference effects, *Aero-dynamics & Applications*, Melbourne, Australia, 1992.
15. B.H.L. Gowda and M.M. Sitheeq, Mean velocity and turbulence measurements in the wake of three-dimensional prismatic bodies, Proc. 6th National Conference on Aerodynamics, Bangalore, Sept. 1992.
16. B.H.L. Gowda, E.G. Tulapurkara and S.K. Swain, Reverse flow in a channel with obstruction at the entry-influence of rectangular geometry, Proc. National Symposium on Experiments in Fluids, Kanpur, 113-122, 1992.
17. B.H.L. Gowda and V.S.B. Durbha, Comparison of the influence of curvature on boundary layer and on the inner region of a wall jet, Proc. National Symposium on Experiments in Fluids, Kanpur, 236-244, 1992.
18. S.R. Jayaram and B.S. Prabhu, Thermal and elastic effects on the performance of tilting pad journal bearings, *Journal of Physics D: Applied Physics*, Vol.25, 373-378, 1992.
19. Kartik Venkatraman and S. Narayanan, Active control of flow induced vibration, *J. Sound and Vibration*, 160(1), 1993.
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62. S.Subramaniam and S.Narayanan, Stability of pipes conveying fluid with randomly flowing velocity, *Proc. XVIII Int. Congress of Theoretical and Applied Mechanics, Haifa, Israel*, Aug 1992.
63. H. Sujana and S. Swarnamani, Development of kidney phantom, *IEEE Ultrasonics Symposium, USA*, Oct 20-23, 1992.
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65. E.G. Tulapurkara, B.H.L. Gowda and S.K. Swain, Reverse flow in a channel with obstruction at the entry - Influence of obstruction geometry, *Proc. the Fifth Asian Congress of Fluid Mechanics, Taejon, Korea*, Vol. 2, 1246-1249, 1992.

4.3 Chemical Engineering Department

4.3.1 Introduction

The Department of Chemical Engineering was established in 1959. Now, Ph.D., M.S., M.Tech. and B.Tech. programmes are being offered.

4.3.2 Details of Faculty

Name and Qualifications

Major Area of Specialisation

Professors

M.S. Ananth, Ph.D. (Florida) [Head]

Thermodynamics, Mathematical Modelling

A. Baradarajan, Ph.D. (IIT Madras)

Bioreactors, Modelling of Bio-reaction Processes, Solid-Solid Reactions

Ch. Durgaprasada Rao, Ph.D. (Andhra)

Mathematical Modelling, Computer Process Control

M. Ramanujam, Ph.D. (IIT Madras)

Particle Technology, Mineral Processing, Environmental Engineering

C.A. Sastry, Ph.D. (Bombay)

Environmental Engineering, Bio-Chemical Engineering

N. Subramanian, Ph.D. (IIT Madras)

Polymer Processing, Rheology

Y.B.G. Varma, Ph.D. (IIT Madras)

Multiphase Systems, Process Development, Equipment Design

T. Venkatram, Ph.D. (IISc.)

Process Development, Heat Transfer, Membrane Separation, Equipment Design

Associate Professors

M. Chidambaram, Ph.D. (IIT Madras)

Nonlinear Control, Periodic Operation of Reactors

K. Krishnaiah, Ph.D. (IIT Madras)

Chemical Reactor Analysis and Design, Fluidization

N.R. Neelakantan, Ph.D. (Swansea)

Polymer Processing, Rheology

T.K. Ramanujam, Ph.D. (IIT Madras)

Environmental Engineering, Particle Technology

K.Remananda Rao,Ph.D.(IISc.)

Mass Transfer, Environmental
Engineering

D.V.Seetharamamurthy,Ph.D.(IITM)

Particle Technology, Environmental
Engineering

S.Subba Rao,Ph.D.(IIT Madras)

Mass Transfer, Computer Aided Design

R.Vedaraman,Ph.D.(IIT Madras)

Particle Technology, Mineral
Processing

Assistant Professors

A.R.Balakrishnan,Ph.D.(Waterloo)

Heat Transfer, Computer Aided Design

S.K.Rakshit,Ph.D.(IIT Delhi)

Biochemical Engineering
& Bio-technology, Downstream
Processing

P.Sesha Talpa Sai, Ph.D. (IIT M)

Chemical Reactor Analysis and
Design

S.Shankaranarayanan,Ph.D.
(Queensland)

Optimum Control of Grinding
Circuits and other Mineral
Beneficiation Process

V.Sriramachandra Rao,Ph.D.(IITM)

Internal Model Control, Adaptive
Control

T.Swaminathan,Ph.D.(IIT Kanpur)

Environmental Management,
Biotechnology, Membrane Technology

R.Subramanian,Ph.D.(IIT Madras)

Polymer Development

T.Panda,Ph.D.(IIT Delhi)

Biochemical Engineering &
Biotechnology, Protoplast fusion
Technology

Technical Officers

C.Lalitha Prasad

V.Raman

4.3.3 Participation In Seminars, Symposia, Conferences, etc.

Sl. No.	Name of Faculty	Particulars of participation in Seminars/Symposia/Short Term Course	Date
1.	Prof.Y.B.G.Varma	a) Participated in International Conference on "Fine Particle Technology" at Las Vegas, USA.	1992
		b) N.K.Prabhavathy, M.S.Ananth and Y.B.G. 'Influence of Solids on Hydrodynamics and Mass Transfer in a Reciprocating Plate Column', Annual Conference IChE.,CHEMCON'92, Manipal.	Dec.1992
		c) N.K.Prabhavathi and Y.B.G.Varma, 'Mass Transfer in a Liquid-Liquid- Solid Reciprocating Plate Column', CHISA '93, Prague.	1992
		d) T.L.Harikrishnan and Y.B.G. Varma, 'Hydrodynamics and MassTransfer in gas-Liquidand Liquid-Liquid Contacting in Reciprocating Plate Column', Fine Particle Society Conference, Las Vegas, USA.	July.1992
		e) P.Sivagnanam and Y.B.G.Varma, 'Heat Transfer in Subcooled Flow Boiling of Binary Mixtures', Conf on 'Pool and External Flow Boiling', Santa Barbara, USA.	1992
2.	Prof.M.S.Ananth	Presented an invited talk at the IUPAC international conference at New Delhi.	1992
3.	Prof.Ch.Durga- prasada Rao	Gave a talk in Computer Application in Industrial Instrumentation, ISA, Madras.	21-08-92
4.	Prof.T.Venkatram	a) Dellivered an invited lecture on "Corrosion due to Environment at Hotel Connemera in the Seminar on Corrosion organised by Indian Institute of Plant Engineers, Tamilnadu.	5-12-92
		b) Attended CHEMCON-92, Manipal.	Dec.1992.
5.	Prof.N.G.Karanth	Participated in the 33rd Annual Conferene of Association of Microbiologists of India, Goa University Delivered an invited lecture on the topic 'Engineering Challenges in Solid State Fermentation'.	6-11-1992

Sl. No.	Name of Faculty	Particulars of participation in Seminars/Symposia/Short Term Course	Date
6.	Prof.A.Baradarajan	I.I.ChE. Symp. in Manipal - 2 Papers	Dec.1992
7.	Dr.N.R.Neelakantan	IChE Congress, Manipal -Presented a paper on "Studies on Blends of Polyacetal and TPU". c.1992	
8.	Dr.T.K.Ramanujam	a) M. Velan and T.K. Ramanujam, "Gas-Liquid Mass Transfer in a Down Flow Jet Loop Reactor" ISCRE-12, Torino, Italy, V.47, No.9-11,p.2871-76	1992
		b) T.K. Ramanujam & M. Velan, "Gas Holdup and Axial Mixing in a Down flow Jet Loop Reactor with Newtonian and Non-Newtonian Fluids", First International Conference on Gas-Liquid and Gas-Liquid-Solid Reactor Engg., Columbus, Ohio, USA	13-9-1992
		c) M. Kumaraguru, T.K. Ramanujam, K.S. Balaraman & V. Ramesh, "Simulation of Phenol Removal from Refinery waste water by Liquid Membrane Process" ENVIROPRO'92, Kualalumpur, Malaysia,	28-10-1992
		d) T.K. Ramanujam, "Environmental Impact Asessement". National Seminar on Pollution control Technologies, Technologies, Bangalore.	31-1-1992
		e) K. Yagnaprasad and T. K.Ramanujam, "Liquid Circulation Velocity and Overall Gas Holdup in a Reversed Flow Jet Loop Reactor Containing Low Density Particles", CHEMCON' 92, Manipal.	19-12-1992
9.	Dr. D.V.S.Murthy	a) Participated in International Workshop and Symposium on Advances in Air Pollution Measurements Control and Diagnostics - Calcutta	Dec. 1992
		b) D.V.S.Murthy,T.Damodara Rao &C.A.Sastry, "Safeexploitationofsea coast Aquifers", Goa Seminarof IndianWater Works Association held at Panaji	Sept.1992
		c) D.V.S.Murthy,T.Damodara Rao and C.A.Sastry, "Pollution-free untapped sea coastaquifers",	

Sl. No.	Name of Faculty	Particulars of participation in Seminars/Symposia/Short Term Course	Date
		paper accepted at the International Conference & Exhibition on Environmental Protection and Control Technology, Kuala Lumpur (Malaysia)	Oct. 1992.
10.	Dr. K. Krishnaiah	K.Soundarajan & K.Krishnaiah, "Flooding aspects in turbulent contact absorber", Paper presented in CHEMCON-92, Manipal,	Dec. 1992.
11.	Dr. M. Chidambaram	"Control of fed-batch bioreactors using learning automata", Pacific Asia Biochem. Engg. Conference, Japan	June 1992
12.	Dr. T. Panda	a) Second International Symposium of International Assoc. of Agricultural Engineers. AIT., Bangkok, Thailand as invited Speaker in Post Harvest Tech. and Biotechnology session. b) CHEMCON'92 as Co-Chairman in Biochemical Engineering session I, at Manipal Inst. of Technology, Manipal, India.	Dec. 1992 1992
13.	Dr. A.R. Bala-krishnan	Workshop on Environmentally Sound Technologies for the Heating and Cooling of Buildings, Townsville, Australia.	Sept. 1992
14.	Dr. T. Swaminatha	IChE Ann. Conf. CHEMCON-92 at Manipal	Dec. 1992
15.	Dr. S.K. Rakshit	Conference on Integrated Membrane Processes IICT., Hyderabad	Feb. 1992

4.3.4 Visit of Faculty Members to other Institutions

S.No.	Name of Faculty Member	Institutions visited/purpose of visit	Duration/Date
1.	Prof. Y.B.G. Varma	Visited Dept. of Chemical & Mechanical Engineering at University of Pittsburgh, Pittsburgh, USA.	1992
2.	Prof. M.S. Ananth	Visited the Department of Chemical Engineering at IIT Kanpur at their invitation	Oct., 92
3.	Prof. Ch. Durgaprasada Rao	FUZZ Controllers ISA, Madras A Talk in Computer Application in Industrial Instrumentation	21-8-1992

S.No.	Name of Faculty Member	Institutions visited/purpose of visit	Duration/Date
4.	Prof. T. Venkatram	a) Visited CSMCRI, Bhavanagar For Selection of Scientist	1-10-1992
		b) Visited Manipal Inst. of Tech. Manipal for CHEMCON'92	Dec. 1992
5.	Prof. N.G. Karanth	Visited the Dept. of Chemical Engg. IIT Bombay upon Invitation for Interaction and delivered a seminar on "Mass and Heat Transfer Influences in Design of Solid-State Fermentation Reactors".	5-11-1992
6.	Dr. T.K. Ramanujam	Visited laboratories in the Chemical Engineering & Environmental / Civil Engg. Depts. of Ohio State Univ. Univ. of Urbana Champaign, Univ. of Southern Illinois, Carbondale, USA., for updating the latest trends in the research work in USA.	Sept.1992
7.	Dr.V.S. Ramachandra Rao	Lehrstuhl fur Elektrische Steuerung und Regelung, Ruhr - Universitat Bochum, F.R. Germany	April 1992
8.	Dr. T. Panda	Visiting Faculty to Asian Inst. of Technology, Bangkok, Thailand under Govt. of India, Secondment for the development of curriculum on Bioprocess Technology and for teaching a course in Biotechnology	Sept.,1992
9.	Dr. A.R. Balakrishnan	James Cook Univ. of North Queensland Townsville, Queensland, Australia	Sept.,1992
10.	Dr. T.S. Swaminathan	Special lectures in Bioseparation at Centre for Biotechnology, Anna University, Madras.	
11.	Dr. S.K. Rakshit	a) REC Trichy for lecture b) Indira Gandhi Centre, Kalpakkam	

4.3.5 Honours and Awards

1. Dr. D.V.S. Murthy
The paper titled "A Simple method to quantify seaward flow of water by D.V.S. Murthy, C.A. Sastry & T. Damodara Rao has been awarded the Hindustan Dorroliver (Second) prize for the best paper at 25th Annual Convention of IWWA at Bombay, 9-12, March 1993.

4.3.6 Visitors to the Department

- a) Prof. Kamath, KREC, on IIT-KREC Network programme, Sept., 1992.
- b) Prof. G. Singh, Ex. VPAA of AIT., Prof. of Agricultural Engg., AIT., Bangkok, Thailand., visited Biochemical engineering on April 1992.
- c) Prof. N.N. Prasad, Dean, Faculty of Agriculture, Annamalai University, visited in June 1992.
- d) Prof. K.B. Ramachandran, B.E.R.C., IIT Delhi
- e) Prof. Pratap Chakrabarthy, FTBE, Jadavpur Univ. Calcutta.
- f) Dr.R.S. Venkataraman, Executive Director (Technical), EIL, Nov.92

4.3.7 List of Publications

1. T.L. Harikrishnan and Y.B.G.Varma 'Analysis of Flow, Pressure drop, and Power requirement in pulsed Columns' I & EC Research 31,1352-1361 (1992).
2. T. L. Harikrishnan and Y.B.G. Varma, 'Apparent and True Longitudinal Concentration Profiles in Reciprocating Plate Columns', Biopocess Engineering, 1992
3. G.S. Venkata Ratnam and Y.B.G. Varma, 'Liquid Holdup in Gas- Liquid Cocurrent Downflow through Packed Beds', Can. J. Chem. Eng., 70, 580-585 (1992).
4. G.S. Venkata Ratnam and Y.B.G. Varma, 'Liquid Holdup in Cocurrent Gas-Liquid Downflow through Packed Beds', Ind. J. Technol., 30, 7-15 (1992).
5. G.S. Venkata Ratnam, M.S. Ananth and Y.B.G. Varma, 'A Model for the Pressure Drop in Gas-Liquid Downflow through Packed Beds', Chem. Eng. J., 51, 19-28 (1993).
6. G.S. Venkata Ratnam and Y.B.G. Varma, 'A Correlation for Interfacial Area in Cocurrent gas-liquid Downflow through Packed Beds', Bioprocess Engineering, 1992
7. P. Sivagnanam, A.R. Balakrishnan and Y.B.G. Varma, 'Forced Convection Subcooled Boiling of Binary Mixtures', Can. J. Chem. Eng., 70, 42-47 (1992).
8. P.P.Thomas and Y.B.G. Varma, 'Fluidised Bed Drying of Granular Food Materials', Powder Technol., 69, 213-222 (1992).
9. P.B.Rajendran Nair and M. Ramanujam, "Fluid Energy Grinding", Advanced Powder Technology, Vo.3, No.4, pp 273-284 (1992).
10. P.B.Rajendran Nair and M. Ramanujam, "Circular Fluid Energy Mill", Advanced Powder Technology, Vol.3, No.4, pp 285-298 (1992).
11. M.K. Sureshan, R. Vedaraman and M. Ramanujam, "Studies in Vibrationmilling of aluminium powder", Advanced Powder Technology, Vol.3, No.4, pp 299-309 (1992).
12. K.Lakshminarayanan, S. Subba Rao and Ch. Durgaprasada Rao, "Tearing and Precedence Ordering in flow sheeting", Chem. Engg. Communications, 15, 53-66 (1992).
13. S.Sundaramoorthy and Ch. Durgaprasada Rao, "Application of Process control - heuristic methods", Proceeding of Int. Seminar on Automation, Dept. of Electronics, New Delhi, Nov. 20-21, 1992.

14. Nataraj and Ch. Durgaprasada Rao, "A frequency domain simulation package for distillation", Proceedings of ACC, Chicago, June 24-26 (1992).
15. P.Padmini, S.K. Rakshit & A. Baradarajan, "Lipase catalysed hydrolysis of rice bran oil by free and immobilised system in batch stirred tank reactor", Bioprocess Engg., 1992.
16. P.Padmini, S.K. Rakshit & A. Baradarajan, "Studies on immobilisation of lipase enzyme on alumina beads for hydrolysis of rice bran oil" (1992).
17. N.Chitra & A. Baradarajan, "Transient state analysis of biochemical reactor using coimmobilized system", Accepted in Bioprocess Engg. (1992).
18. P. Salam Rajendra Babu & T. Venkatram, "Saccharification of Tapiocastarch Using Cellulose linked Gluco-amylase", Indian Chemical Engineer 34(1), 79-84 (1992)
19. Reji John, N.R. Neelakantan & N. Subramanian, EMS Nair, "New Thermoplastic Polyurethane Blend", Poly. Eng. Sci. Vol.32, 1, 20-26, 1992.
20. R.Paramasivam and R. Vedaraman, "Studies in Additive Grinding of Minerals", Advanced Powder Technology, Vol. 3, No.1, p.31- 37, 1992.
21. R. Paramasivam & R. Vedaraman, "Effects of the Physical Properties of Liquid Additives on Dry Grinding", Powder Technology, Vol.70, p. 43-50, 1992.
22. R. Paramasivam & R. Vedaraman, "Effects of Fatty Acid Additives on the Material Flow Properties of Dry Grinding", Powder Technology, 1992.
23. M. Velan & T.K. Ramanujam, "Gas-Liquid Mass Transfer in a Down Flow Jet Loop Reactor", Chemical Engineering Science, Vol 47, No.9-11, p. 2871-76 (1992).
24. M.Velan & T.K. Ramanujam, "Hydrodynamics and Mixing in a Downflow Jet Loop Reactor with a Non-Newtonian Fluid", Bioprocess Engineering, Vol7, p.193-197 (1992).
25. A.K. Sharma, C.A. Sastry and T.K. Ramanujam, "Studies on Treatment of Waste Water in a Reversed Jet Loop Reactor: Part - 1 - Hydrodynamics and residence time distribution studies", Indian J. of Environmental Protection, Vol.12, No.12, p 903- 911 (1992).
26. K. Geeta, D.V.S. Murthy & C.A. Sastry, "Studies in Colour removal by adsorption", Jl. of Instrn. Engineers, Chem. Engg. Division, Vol.73, PtCHI, p 12-15, June 1992.
27. P.Kalyanakrishnan and D.V.S. Murthy, "Studies in Chromium effluent treatment using waste tin cans", Engineering Advances, p 35-36, Aug. 1992.
28. V.V.Chaturvedi and D.V.S. Murthy, "Studies in lime mud utilization Indian", Jl. of Tech. (In press).
29. C.J. Kirubakaran, K.Krishnaiah & S.K. Seshadri, "Some studies on activated carbon production from coconut shells using fluidized bed reactor", Indian Chem. Egr. 34 (2 & 3) 141-145 (1992).
30. Sundaresan, K.R. and Ananth, M.S. "On Unsteady state Moving Boundary Problems for Non-Plane Geometries", Int.J.Engg. Sci., 30 (7), p847-859, 1992.
31. Devika, P.D., Ramachandran, T.P. and Ananth, M.S., "Enthalpy of mixing of five Binary Mixtures", Indian Journal of Technology, 30, pp612-614, 1992.
32. M. Chidambaram, "Control of bioreactors using Learning automata", Hungarian Jl. Ind. Chem. Vol 20, 273-277 (1992).
33. M. Chidambaram & G.P. Reddy, "Control of nonlinear nonminimum phasesystems with input multiplicities, Hung. Jl. Ind. Chem. Vol. 20, 301-308 (1992).

34. V.S. Ramachandra Rao, "Adaptive Tuning of a PID-Controller", Interner Baricht ESR - 9209, Institut fur Informations technik, Ruhr- Universitat Bochum, West Germany, (1992).
35. J.Anjanikumari & T. Panda, "Studies on critical analysis of factors influencing improved production of protoplasts from T.reesei mycelium", Enzyme and Microbial Technolgu. 14(3), 241-248 (1992).
36. J.Anjanikumari & T. Panda, "Critical analysis of factors influencingsphaeroplasts generation from S.cerevisiae", Bioprocess Engineering, 7, 349-355, 1992.
37. P.Sivagnanam, A.R.Balakrishnan and Y.B.G.Varma, "Forced Convection Subcooled Boiling of Binary Mixtures", Canadian Journal of Chemical Engineering, Vol.70, 42-47 (1992).
38. K.B.Radhakrishnan and A.R.Balakrishnan, "Heat Transfer Analysis of ThermalEnergy Storage Using Phase Change Materials, Heat Recovery Systems and CHP", Vol.12, 427-435 (1992).
39. M.Sadasivam and A.R.Balakrishnan, "Effectiveness - NTU Method for Design of Packed Bed Desiccant Dehumidifiers, Chemical Engineering Research and Design", Trans. I.Chem. E. (London) Part-A, Vol.70, 572-577 (1992).
40. P.Padmani, S.K.Rakshit and A.Baradarajan, "Studies on immobilization of lipase on alumina for hydrolysis of rice bran oil", Bioprocess Engineering, 1992.
41. P.Padmani, S.K.Rakshit and A.Baradarajan, "Lipase catalyzed hydrolysis of rice bran oil by free acid and immobilized enzyme system in batch stirred reactor", Bioprocess Engineering, 1992.
42. P.S.T.Sai, G.D.Surender and A.D.Damodaran, "Prediction of axial velocity profiles and solids hold up in rotary kiln.", Can. J. Chem. Eng., 70, 438-443 (1992).

4.4 Chemistry Department

4.4.1 Introduction

The Department of Chemistry was established in 1961. Now Ph.D. and M.Sc programmes are being offered. The major areas of teaching and research of the Department are:

Analytical and Radiochemistry	Catalysis
Organic Chemistry	Polymer Chemistry
Biochemistry	Chemical Kinetics
Photochemistry	Spectroscopy and
Electrochemistry	Theoretical chemistry
Inorganic Chemistry	

4.4.2. New Courses Introduced

The whole M.Sc Curriculum has been revised and the Syllabus has been updated.

4.4.3 Details of Faculty

Name and Qualification	Specialisation
Professors	
K.K.Balasubramanian, Ph.D(IIT Madras)	Organic Chemistry Synthesis, mechanisms, Photochemistry
M.S.Gopinathan, Ph.D(IIT Kanpur)	Theoretical Chemistry
C.Kalidas, Ph.D(Jadavpur)	Thermodynamics, Electro- chemistry and Fast Reaction Kinetics
V.Mahadeva Iyer, Ph.D(Madras)	Chemical Kinetics, Polymer Chemistry, Catalysis
P.T.Manoharan, Ph.D.(Columbia)	Theoretical Chemistry, Spectroscopy
R.Narayan, Ph.D.(Bombay)	Electrochemistry Photoelectrochemistry Electrochemical machining
C.N.Pillai, Ph.D(Northwestern)	Organic Chemistry Catalysis
T.V.Ramakrishna, Ph.D.(Birmingham) [Head]	Analytical and Environmental Chemistry
V.Ramakrishnan, Ph.D.(Annamalai)	Photochemistry, Theoretical Chemistry, Catalysis

M.Ramakrishna Udupa, Ph.D. (IIT Madras)	Inorganic Chemistry
D.V.Ramana, Ph.D. (IIT Madras)	Organic Chemistry, Mass Spectroscopy
R.Ramaswamy, Ph.D. (IIT Madras)	Electrochemistry, Oscillatory reactions
C.S.Swamy, Ph.D. (IISc)	Surface Chemistry, Catalysis
C.S.Venkatachalam, Ph.D. (IIT Madras)	Thermodynamics and Electrochemistry and Electroorganic reactions
B.Viswanathan, Ph.D. (IIT Madras)	Surface Science, Catalysis Solid State Chemistry, Hydrogen energy
Professors (Adjunct)	
T.K.K.Srinivasan, Ph.D. (Banaras)	Theoretical Chemistry Spectroscopy
S.Subramanian, Ph.D. (Leicester)	Theoretical Chemistry, Spectroscopy, Magnetic Resonance
Surjit Singh, Ph.D. (IIT Kanpur)	Theoretical Chemistry, Spectroscopy
Associate Professor	
N.Balasubramanian, Ph.D. (IIT Madras)	Analytical and Environmental Chemistry
(Mrs.) Chandra Sainathan, Ph.D. (IISc.)	Biochemistry
S.Vancheesan, Ph.D. (IIT Madras)	Inorganic Chemistry, Catalysis
T.K.Varadarajan, Ph.D. (IIT Madras)	Catalysis
Assistant Professors	
Archita Patnaik, Ph.D. (B.H.U)	Nuclear and Radiation Chemistry
(Mrs.) K.Lalitha, Ph.D. (Mysore)	Biochemistry
D.Loganathan, Ph.D. (IIT Bombay)	Organic Chemistry
A.K.Mishra, Ph.D. (IIT Kanpur)	Photochemistry
S.Sankararaman, Ph.D. (Victoria)	Organic Photochemistry
M.V.Sangaranarayanan, Ph.D. (IISc)	Theoretical Electrochemistry
M.S.Subramanian, Ph.D. (IIT Madras)	Analytical and Radiochemistry
M.N.Sudheendra Rao, Ph.D. (IISc)	Inorganic Chemistry
N.Sundaram, Ph.D. (IIT Madras)	Organic Chemistry, Synthesis and Mass Spectroscopy

G.Sundararajan,Ph.D(Rutgars)

Organometallic Chemistry

K.Vidyasagar,Ph.D(IISc)

Synthetic and Structural Solid
State Chemistry
Catalysis

R.P.Viswanath,Ph.D(IIT Madras)
Senior Scientific Officer Gr.I

K.D.Chandrasekaran,Ph.D.(IIT Madras)

Material Science

During the year under review the following Professors retired after superannuation:

1. Dr.G.Aravamudan 30.6.1993
2. Dr.M.Srinivasan 1.12.1992

4.4.4 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total	
	M	W	M	W	M	W	M	W	M	W	M	W
Ph.D.	14	12	10	10	16	6	10	9	17	5	67	42
M.S.	14	7	14	15	-	-	-	-	-	-	28	22
Total	28	19	24	25	16	6	10	9	17	5	95	64

4.4.5 Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	CSIR Fellowship	Others	Total
Ph.D.	63	22	24	109
M.S.	6	-	3	9
Total	69	22	27	118

4.4.6 No.of Degrees Awarded

Programme	Number
Ph.D	6
M.Sc	18

4.4.7 Instruments/Equipments Designed and developed

1. Construction of a S-band microwave bridge under process
2. Linking of several computers (PCs) to a single Laser Printer
3. The liquid helium dewar with the Mossbauer Spectrometer was brought to operation
4. A support system for single crystal EPR spectroscopy measurement using the Cryodyne Cryocooler is under progress with the help of Central Workshop
5. FT-EPR under construction

4.4.8 New facilities added and major equipment procured

Gammaray spectrometer, CTI-Cryocooler, xenon arc lamp, interference filters

4.4.9 Short term courses Workshop/Seminars/Symposia/Conferences/Training/ Attended by the Faculty in recognised Academic Institutions and Public Sectors.

S.No.	Name of Faculty	Title	Period/Duration
1	Dr.Archita Patnaik	Inter-University Consortium for Department of Atomic Energy Facilities:IGCAR Kalpakkam	1992
2	Dr.B.Viswanathan	Annual Technical meeting of the Electrochemical Society of India, Bangalore Workshop on Advances in Petroleum refining IIP Dehra Dun. 8th National Seminar on Science and Engineering of glass blowing IIT Madras. Discussion meeting on Homogeneous and Hetrogeneous Catalysis IISc Bangalore.	June 17-18,1992 Nov. 1992. Sep.21-25 1992 Jan.22-29,1993
3	Dr.S.Sankararaman	National Organic Symposium trust (NOST) Bhuvaneshwar	Jan.5-9,1993
4.	Dr.R.Narayan	National Workshop on ion sensors IGCAR Kalpakkam Chemical & Electrochemical energy sources, Summer School at IIT Madras.	Nov. 1992 June 1992

4.4.10 Invited Lectures Delivered by the Faculty in Academic Institution/Public Bodies

Sl.No.	Name of the Faculty	Topic of the Lecture	Delivered at	Date
1.	Dr.P.T.Manoharan	Exchange Interactions in dimers	DST program advisory committee Goa	March'92
		Reconstituted Hemoglobin	Univ.of W.Australia	June'92
		Biradicals	Univ.of Fribourg Switzerland	July'92
		Modulation of Heme environment in Reconstituted Hemoglobins	CLRI, Madras	1992
		Exchange interaction in Low dimensionial Dithiolene	Anna Univ. Madras	Nov.'92

Sl.No.	Name of the Faculty	Topic of the Lecture	Delivered at	Date
2.	Dr.Archita Patnaik	Planetary Gamma Ray Spectroscopy	Astronomy Club IIT M	Jan.1993
		Radiation Detection and Measurement Sun and Nuclear Energy	Childrens Club Mylapore St.Joseph School Vepery, Madras	Jan.1993
3.	Dr.A.K.Mishra	Photochemistry	Childrens Club Mylapore,Madras	Jan.1993
4.	Dr.M.N.S.Rao	Phosphiniminocyclo-thiazenes (-electron rich heterocycles)- Contributions to their synthesis structure and reactivity	Dept.of Chem. IIT Kanpur	March,93
		Contributions to the Chemistry of sulphur-nitrogen heterocycles	Dept. of Chem. Lucknow Univ.	March,93
5.	Dr.R.Narayan	National workshop on in Ion Sensors	IGCAR,Kalpakkam	June,93
		International Conference on Surface Engg.	Bangalore	Dec.,92
6.	Dr.S.Sankararaman	Photochemistry	Presidency College,Madras	
		Reaction mechanisms	Women's Christian College,Madras	
7.	Dr.B.Viswanathan	National workshop on utilisation of energy	Electrochemical solar Society of India	Jan.30-31 1992
		Annual Technical Meeting of the Electrochemical Society of India		July 17-18 1992
		8th National Seminar on Science & Engg.of glass Blowing	IIT Madras	Sep.21-25 1992
		Chemical analysis on atomic scale	Vaishnav College for women	Oct.92
		Workshop on Advances in Petroleum refining	IIP Dehradun	Nov.92
8.	Dr.K.K.Balasubramanian	International Conference on Energy, Environment and Electrochemistry	Karaikudi	1993
		Third National Organic Chemistry Science Trust Conference.	Bhubaneswar	1992
		UGC sponsored Seminar for teachers	Ethiraj college Presidency College	1992
9.	Dr.M.S.Gopinathan	INSA Local Chapter	Madras Univ. Bharathidasan Univ.	1992

4.4.11 Visits Abroad

S.No.	Name of Faculty	Country Visited	Date	Purpose
1.	Dr.C.Kalidas	Provo, Utah, USA	9-14, Aug. '92	To present a paper at International symp.on Macro-cyclic Chemistry
		Snowbird, Utah, USA	16-21, Aug '92	To present a paper at 12th IUPAC Conf. on Chemical Thermodynamics
2.	Dr.P.T.Manoharan	Australia	June 1992	Visiting Professor
		Switzerland ETH Zurich	July 19-24, '92	presented paper in a conference and Ft-EPR construction advice.
3.	Dr.G.Sundararajan	England	Summer 1992	To visit and work in the labs. of Dr. Susan Thomas
4.	Dr.T.K.Varadarajan	West Germany	11-29 Sep.92	under GTZ Indo-German Project
5.	Dr.B.Viswanathan	Budapest	July 1992	International Congress on Catalysis
		Lyon	May 1992	Indo-French Symp. on Catalysis

4.4.12 Distinguished Visitors to the Department

S.No.	Name of the Visitor and Occupation	Date of Visit	Purpose of visit Lecture/Discussion
1.	Dr.A.Rama Rao Secretary, Dept. of Science &Tech. New Delhi	31.7.92	Discussion with faculty of RSIC
2.	Dr.W.T.Robinson Dept.of Chemistry, Univ. of Canterbury, Christ Church Newzealand	25.11.92	Seminar Talk
3.	Dr.J.N.Murrel,FRS School of Chemistry and Mole- cular Sciences, Univ. of Sussex Flamer, Brighton, UK	29.10.92 to 31.10.92	Seminar Talk

S.No.	Name of the Visitor and Occupation	Date of Visit	Purpose of visit Lecture/Discussion
4.	Dr.Gopal A.Krishnan National Heart,Lung and Blood Institute,National Institute of Health, Lab.of Chemical Pharma- cology Bethesda, MD 20892, USA	31.12.92 to 8.1.1993	Seminar Talk and discussion
5.	Dr.V.V.Rampal, Adviser, Dept.of Science & Tech. New Delhi	17.2.93	Discussion
6.	Prof.Richard R.Ernst Nobel Laureat in Chem,ETH,Zurich	18.3.93	Discussion
7.	Prof.R.Mews Univ. of Bremen, Breme,Germany	2.4.93	Seminar Talk
8.	Dr.J.VanThuijl University of Leiden Leiden, Netherlands	7.1.93 to 14.1.93	Seminar Talk

4.4.13 Sponsored Projects

S.No.	Title	Period	Funding Agency	Amount in lakhs	Coordinator(s)
1.	Ion Beam Interaction on Polymers	2 yrs.	AvH Founda- tion,Germany ICSR,IIT Ms IIT Madras	8.0 0.2(seed money) 12.0	Dr.Archita Patnaik
2.	Mechanisms of reactions of aromatic hydrocarbons and 3,3-sigmatropic systems under thermal and flash pyrolytic conditions with importance to fossil fuels	3 yrs. project	Indo-US Joint	17.0	Dr.K.K.Balasubramanian Dr.Stephen E Stein (NIST)
3.	Anaerobic recycling of lignocellulosic wastes to fuels and feed stock chemicals	3 yrs.	ICAR	7.56	Dr.T.S.Chandra
4.	Ion solvation of Group IB and II B metal cryptate complexes in mixed solvents	3 yrs.	CSIR	2.0	Dr.C.Kalidas

S.No.	Title	Period	Funding Agency	Amount in lakhs	Coordinator(s)
5.	Exploratory Biotech applications of downstream processing from a high rate biomethane plant	2 yrs.	TNCST	1.2	Dr.K.Lalitha
6.	Studies on novel methanogenic isolate strain	2yrs.	DNES	5.0	Dr.K.Lalitha
7.	Spectroscopic Investigations of inter and intra molecular interactions.	2 yrs.	DST	18.0	Dr.P.T.Manoharan
8.	Construction of a FT-EPR spectrometer	3 yrs,	DST	72.0	Dr.P.T.Manoharan Dr.S.Subramanian
9.	Theoretical Studies onreactions	3 yrs.	DST	6.2	Dr.V.Ramakrishnan Dr.S.Subramanian
10.	Solvent effects on Fluorescence Quenching study	1 yr.	ICSR IIT Ms	0.5	Dr.A.K.Mishra
11.	Fundamental studies on FCC Catalysis	3 yrs.	Madras Refineries Ltd.	28.0	Prof.C.N.Pillai Prof.C.S.Swamy Prof.B.Viswanathan
12.	Preparation and catalytic reactions of metal oxides	3 yrs.	CSIR	0.9	Dr.C.N.Pillai Dr.C.S.Swamy
13.	Reductive alkylation of Aromatic Amines	4 yrs.	CSIR	0.9	Dr.C.N.Pillai
14.	Photoinduced single Electron Transfer Mediated Michael Reaction	3 yrs.	CSIR	6.2	Dr.S.Sankararaman
15.	Meathetical Polymerisation of alkynes with Gr.VI Metal carbonyls as catalysts under thermal, electrocatalytic and photolytic conditions	3 yrs.	DST	3.5	Dr.G.Sundararajan
16.	Synthesis of copolymers of HTPB and polyalkenamers by anchored metal catalysts	3 yrs.	ISRO	8.2	Dr.G.Sundararajan
17.	Preparation and investigation of Hydrogen storage alloys for catalytic hydrogenation reaction	upto May 92	CSIR	1.5	Dr.C.S.Swamy

4.4.14 Major Consultancy Assignments

S.No.	Title	Organisation	Amount in lakhs	Coordinator(s)
1.	Determination of Boron in chlorosilanes	Metkem	0.5	Dr.T.V.Ramakrishna Dr.N.Balasubramanian Dr.B.Viswanathan
2.	Analytical services of various types	several industries, R&D Labs. & academic Institutions	1.2	Dr.C.S.Swamy
3.	Retainer consultancy			Dr.K.D.Chandra- sekhar

4.4.15 Honours and Awards

S.No.	Name of the Faculty	Honours/Awards	Purpose
1.	Dr.T.S.Chandra	Merit Prize by Asson. of Microbiologists of India, 33rd Ann. Conf. at Goa	for best poster paper presentation
2.	Dr.G.Sundararajan	Visiting Fellowship	INSA/ROYALSOCIETY London

4.4.16. Research Publications

1. T.Balasubramanian and K.K.Balasubramanian, Thermal Claisen rearrangement of Arylallenylmethyl ethers. Synthesis of 4-methyl-2H-benzo-pyran and 2-(o-hydroxyaryl)-buta-1,3-dienes, 1992.
2. G.Ariamala, T.Sumathi and K.K.Balasubramanian, Photochemical studies on 3,4-epoxy-3,4-dihydro-2H-1-benzopyrans, Proc. of the Indian Academy of Sciences, 104, 753-57, 1992.
3. N.G.Ramesh and K.K.Balasubramanian, Reaction of 2,3-unsaturated aryl glycosides with Lewis acids. A convenient entry to C-aryl glycosides Tetrahedron Lett., 3061-74, 1992.
4. C.Booma and K.K.Balasubramanian, Unexpected C3-arylation of 3,4,6-tri-O-methyl-2-c-formylglycals: A simple route to 3-C-arylglycals, Tetrahedron Lett., 3049-52, 1992.
5. N.Bhuvaneshwari, K.K.Balasubramanian and C.S.Venkatachalam, Selective reduction of carbon-bromine bond in bromo epoxides, Tetrahedron Lett., 33,1499-1502, 1992.
6. T.Sumathi and K.K.Balasubramanian, A Photochemical entry to spirobenzofurans, Tetrahedron Lett., 2213-16, 1992.

7. K.C.Santhosh and K.K.Balasubramanian, Ligand coupling route to isoflavanones and isoflavones, *J.Chem.Soc., Chem. Commun.*, 224-25, 1992.
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10. B.S.M.Kumar and N.Balasubramanian, Extractive spectro- photometric determination of trace amounts of sulphur dioxide in air, 1992.
11. M.Vijayakumar and M.S.Gopinathan, Pair Correlation Energy and Successive Ionization potentials of atom He.Fn. *J.Chem.Phys.*97,6639-6643, 1992.
12. T.K.Sreekumar, G.Rajendran and C.Kalidas, Conductance behaviour of copper(II) perchlorate in water-DMSO and water- pyridine mixtures *Indian Journal of Chemistry*, 31A, 782 1992.
13. D.Vasudevan, C.S.Venkatachalam and C.Kalidas, Electro- reduction of substituted naphthyl hydrazones in DMSO, *Ber.Bunsenges Physik. Chemie.*, 96, 78, 1992.
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15. Regina Xavier and V.Mahadevan, Polymer supported palladium and platinum species as hydrogenation catalysts, *J.Polymer. Sci., Polymer Chemistry*, Vol.30, 2665-2676, 1992.
16. G.V.R.Chandramouli and P.T.Manoharan, Temperature Dependent Study of the Single crystal electronic spectrum of Octahedral Ni Ion subjected to Distortions in Weak Fields *Pramana* 39, 639, 1992.
17. Krishna Sharma, Vishnu S.Darshane, P.T.Manoharan and S.Bhaduri, Polyamino Acids and Cytochrome C Anchored Rhodium Complexes, *Proc. Indian Acad. (Chem.Sci.)* 104, 535, 1992.
18. N.Sreehari, Babu Varghese and P.T.Manoharan (Correction) *Inorg.Chem.*, 31, 716, 1992.
19. A.P.Koley, S.Purohit, L.S. Prasad, P.T. Manoharan and G.Ghosh, Studies on Gold(II) complexes with hard and soft donor ligands; Complexes with o-methylthioaniline and 1,2-diaminophenylthio)ethane, *Inorg. Chem.* 31, 305, 1992.
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26. R.Sampath and R.Narayan, Photoelectrochemical Reduction of oxygen from molten amides, J.Electroanal.Chem., 333, 273- 280, 1992.
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4.5 Civil Engineering Department

4.5.1 Introduction

The Department of Civil Engineering was established in the year 1959.

The educational objective of the Civil Engineering Department has been to train the students with emphasis in understanding the fundamental behaviour and design of civil engineering systems and components. The students thus trained could meet the challenging demands, become leaders and give appropriate direction to the engineering profession.

The degree programmes in the Department include education at the undergraduate and graduate levels. The undergraduate Civil Engineering curriculum is broad based, making a wide choice of careers possible. The course based graduate M.Tech. degree programme, on the other hand, offers specialisation in the five major areas of civil engineering: namely, Building Technology and Construction Management, Geotechnical Engineering, Hydraulic and Water Resources Engineering, Structural Engineering and Transportation Engineering. The M.Tech. degree programme prepares students to meet the advanced technology requirements of the industry. M.S. degree programme gives an exposure to the process of research, whereas the Ph.D. degree programme gives training for original research on advanced topics in the five areas of specialisation and prepares the scholars for an academic as well as research and development career.

There is extensive interaction between the faculty and industries belonging to both public and private sectors. The Department has been leading at the Institute level in the earnings through industrial consultancy projects. There is also growing emphasis on sponsored research projects and the faculty members are actively involved in several research projects funded by international collaborative scheme and national agencies.

4.5.2. New Courses Introduced

P.G.Courses

Elective Course CE 792 - Instrumentation in Civil Engineering - Prof.R.Jayaraman
Elective Course CE 734 - Irrigation System Engineering - Dr.S.Mohan.

4.5.3. Details of Faculty

Name and Qualification	Major Area of Specialisation
Professors	
H.Achyutha, Ph.D.(IIT Madras)	Structural Engineering
P.K.Aravindan, Ph.D.(IIT Madras)	Structural Engineering
K.Elango, Ph.D.(IIT Madras)	Hydraulic & Water Resources Engg.
V.Kalyanaraman, Ph.D.(Cornell)	Structural Engineering

C.S.Krishnamoorthy,Ph.D.(London)[**Head**]

N.R.Krishnaswamy,Ph.D.(London)

Nainan P.Kurian,Ph.D(IIT Madras)

V.Paramasivam,Ph.D(IIT Madras)

N.Rajagopalan,Dr.-Ing(Stuttgart)

H.Raman,Ph.D.(IIT Madras)

P.Srinivasa Rao,Dr.-Ing(Munchen)

H.Suresh Rao,Ph.D.(IIT Madras)

Visiting Professor

R.Jayaraman

Associate Professors

M.S.Mathews,Ph.D.(IIT Madras)

V.R.Rengaraju,Ph.D.(IISc Bangalore)

B.S.Thandaveswara,Ph.D.(IISc Bangalore)

Assistant Professors

R.Ambalavanan,Ph.D.(IIT Madras)

A.Boominathan,Ph.D.(USSR)

S.R.Gandhi,Ph.D.(IIT Madras)

K.Gopalakrishna,M.Tech(IIT Kanpur)

A.Mehar Prasad,Ph.D.(Rice Houston)

S.Mohan,Ph.D.(IISc Bangalore)

S.B.Pattnaik,Ph.D.(IIT Kanpur)

K.Srinivasan,Ph.D.(IIT Madras)

V.Tamizh Arasan,Ph.D.(IIT Madras)

Lecturers

S.Rajeev,M.Tech(IIT Madras)
Ph.D.(Thesis Submitted)

Structural Engineering

Geotechnical Engineering

Geotechnical Engineering

Structural Engineering

Structural Engineering

Hydraulics & Water Resources Engg.

Structural Engineering

Hydraulic & Water Resources Engg.

Hydraulics & Water Resources Engg.

Building Technology

Transportation Engineering

Hydraulic & Water Resources Engg.

Building Technology

Geotechnical Engineering

Geotechnical Engineering

Environmental Engineering

Structural Engineering

Hydraulics & Water Resources Engg.

Transportation Engineering

Hydraulics & Water Resources Engg.

Transportation Engineering

Computer Aided Engineering

A.Ramachandraiah, Ph.D.(IIT Madras)	Building Technology
K.Ramamurthy, Ph.D. (IIT Madras)	Building Technology
K.N.Satyanarayana, Ph.D.(Clemson USA)	Construction Management
Senior Scientific Officers	
K.Ananthanarayanan, M.Sc.(Engg).MBA Madras	Construction Management
M.Subbi Reddy, M.S.(IIT Madras)	Transportation Engineering
Technical Officer (SG)	
P.R.Kothandaraman	Technical Officers
	K.Bhaskaran
	M.Innaci
	V.Raman

4.5.4 Instruments/Equipment designed and developed

Prof.K.Elango: Developed a Software (Spread sheet - based) for design of server profiles.

Mr.K. Gopalakrishna: Designed the working model of an anaerobic contact filter for carrying experiments on treatment of industrial wastes for down flow and upflow feeds.

Prof.N.R.Krishnaswamy: Improved the triaxial testing apparatus for cyclic loading conditions.

Dr.A.Mehar Prasad and Prof.P.K.Aravindan: Prepared plans and layout for Structural Dynamics Laboratory building.

Prof.K.Elango, Prof.H.Suresh Rao, Dr. B.S.Thandaveswara and Dr.S.Mohan: Involved in the education modules for Indira Gandhi National Open University and ISTE on the following topics. 1. Planning, construction of management of irrigation system 2. Command area development and 3. Irrigation engineering.

Prof.V.Paramasivam and Prof.H.Achyutha: Completed establishment of new Laboratory space for Nuclear Structures Research Cell.

Dr.K.N.Satyanarayana: Involved in the development of Construction Technology Laboratory.

4.5.5 New facilities and major equipment procured

Started work on Structural Dynamics Testing facility.

4.5.6 Sponsored projects

S.No.	Title	Period	Funding Agency	Amount (Rs. in lakhs)	Coordinators
1.	Knowledge-based Expert System for civil engg. Design	3 yrs.	National Science Foundation, USA	22.00	Dr.C.S.Krishnamoorthy Dr.N.Rajagopalan Dr. V. Kalyanaraman Mr.S.Rajeev

S.No.	Title	Period	Funding Agency	Amount (Rs. in lakhs)	Coordinators
2.	Knowledge-based expert system for finite element analysis for engg. design	3 yrs.	D S T	7.18	Dr.C.S.Krishnamoorthy Dr.K.N.Seetharamu Mr.S.Rajeev
3.	Expert System in water resources management operation	3 yrs.	D S T	4.50	Dr.H.Raman Dr.S.Mohan
4.	Effectiveness of percolation ponds	3 yrs.	D S T	4.08	Dr.K.Elango Dr.S.Mohan
5.	Flood simulation and multi objective multi reservoir operation in Adyar river system	3 yrs.	C B I P	7.96	Dr.K.Elango Dr.H.Raman Dr.S.Mohan
6.	Nuclear structures research cell	3 yrs.	MHRD	15.00	Dr.H.Achyutha Dr.V.Paramasivam
7.	Stress analysis of branch connections	3 yrs.	BRNS	03.00	Dr.V.Paramasivam Dr.H.Achyutha
8.	Applications of FEM to structures and components	2 yrs.	Indo-Germen	30.00	Dr.V.Paramasivam
9.	Hydraulic routing of floods towards flood management	3 yrs.	D S T	4.57	Dr.H.Suresh Rao Dr.B.S.Thandaveswaara
10.	Creek hydrology	3 yrs.	DOD -Codaps	5.00	Dr.H.Suresh Rao Dr.B.S.Thandaveswara
11.	Analysis of layered fibre composite stiffened panels	3 yrs.	ARDB	3.60	Dr.V.Kalyanaraman
12.	Expert system based computer aided engg. of steel structures	3 yrs.	D S T	16.37	Dr.V.Kalyanaraman Mr.S.Rajeev
13.	Geosynthetics in reinforced earth embankments	3 yrs.	D S T	9.83	Dr.N.R.Krishnaswamy Dr.S.R.Gandhi Dr.A.Boominathan
14.	New Plan Scheme - Transportation Engineering	5 yrs.	MHRD	30.00	Dr.V.R.Rengaraju Dr.V.Tamizh Arasan

15.	Water resources Project management	3 yrs.	MHRD	08.50	Dr.S.Mohan Dr.H.Raman
16.	Environmental sys. analysis	1 yr.	IITM	0.36	Dr.S.Mohan Dr.M.Chidambaram
17.	Natural Hazards Mitigation	3 yrs.	Planning Commission & MHRD	1.50	Dr.A.Mehar Prasad Dr.K.Elango Dr.C.S.Krishnamoorthy
18.	CAD/CAM Programme (with Mech. Engg. Dept.)	1 yr.	MHRD	15.00	Dr.V.Radhakrishnan Dr.C.S.Krishnamoorthy

4.5.7 Major Consultancy Assignments

S.No.	Title of Assignment	Organisation	Amount (Rs. in lakhs)	Coordinators
1.	Stress Analysis of Track	CVRDE, Avadi	1.40	Dr.C.S.Krishnamoorthy Dr.K.N.Seetharamu Dr.N.Sivaprasad Dr.R.Krishnakumar
2.	Setting up CAD Facilities	ALHW Port Blair	0.60	Dr.C.S.Krishnamoorthy Mr.S.Rajeev
3.	Design of boiler supporting structures	BHEL, Trichy	8.00	Dr.P.Srinivasa Rao
4.	Design of berthing structures	Vizag Port Trust	8.00	Dr.P.Srinivasa Rao
5.	Design of natural draft cooling towers	NTPC, New Delhi	2.80	Dr.P.Srinivasa Rao
6.	Design of TV towers	All India Radio	ongoing	Dr.P.Srinivasa Rao
7.	Design of 2nd Que complex at Tirumala	TTD Board	1.75	Dr.P.Srinivasa Rao
8.	Computer aided simulation study of Thamabaraparani river system	Government of Tamilnadu	24.00	Dr.H.Raman Dr.K.Elango Dr.S.Mohan
9.	Soil investigation for domestic terminal complex Phase II at Madras Airport	International Airports Authority of India, Madras	0.95	Dr.Nainan P.Kurian Dr.N.R.Krishnaswamy Dr. T. S. Ramanatha Ayyar
10.	Soil investigation at the site of 152 HIG flats at Padi	Tamil Nadu Housing Board Madras	0.64	Dr.N.R.Krishnaswamy Dr.Nainan P.Kurian Dr. T. S. Ramanatha Ayyar

S.No.	Title of Assignment	Organisation	Amount (Rs. in lakhs)	Coordinators
11.	Foundation consultancy services for IOC Ltd. at Tondiarpet site	Indian Oil Corporation Ltd., Madras	1.96	Dr.Nainan P.Kurian Dr.N.R.Krishnaswamy Dr.A.Boominathan
12.	Geotechnical investigations for the construction of Admn. block at Madras Air Port	International Airports Authority of India, Madras	0.30	Dr.N.R.Krishnaswa Dr.Nainan P.Kurian Dr.A.Boominathan
13.	Analysis and design of water supply system for El Shidiya project	SPIC, Madras	0.85	Dr.K.Elango Dr.H.Suresh Rao Dr.S.Kumaraswamy
14.	R & D on sleeved column system Phase II	T.I. Ltd.	3.50	Dr.V.Kalyanaraman
15.	Checking the design of bridge across Zuari river in Goa	Konkan Railways Bombay	0.70	Dr.V.Kalyanaraman
16.	Salvage and erection of Buddha statue in Hyderabad	Govt. of Andhra Pradesh	1.20	Dr.V.Kalyanaraman Dr.N.R.Krishnaswamy
17.	Soil investigation for the TPTC formation of new depot at Mandaveli	Thanthai Periyar Transport Corpn. Villupuram	0.63	Dr.N.R.Krishnaswamy Dr. T. S. Ramanatha Ayyar
18.	Analysis, interpretation and Testing Minerals	Tamil Nadu Minerals Ltd.	0.23	Dr.N.R.Krishnaswamy D r P.Kalyanasundaram
19.	Field CBR test on sub-grade	International Airport Authority of India, Madras	0.25	Dr.N.R.Krishnaswamy Dr.S.R.Gandhi Dr.A.Boominathan
20.	Soil investigation analysis and recommendations of foundations in the site for the construction of NOB for RMCC, CPWD, Madras	CPWD, Madras	0.30	Dr.N.R.Krishnaswamy Dr.A.Boominathan
21.	Geotechnical investigations and recommendations of foundations	Garrison Engineer Air Force Station Tambaram	0.24	Dr.Nainan P.Kurian Dr.N.R.Krishnaswamy

S.No.	Title of Assignment	Organisation	Amount (Rs. in lakhs)	Coordinators
22.	Design of electrical coal handling systems	CEMINDIA, Calcutta	10.00	Dr.P.K.Aravindan Dr.V.S.Raju Dr.A.Mehar Prasad
23.	Treatment plants	TALCO	6.00	Dr.P.K.Aravindan Dr.V.S.Raju
24.	Graphite plant	TAMIN	18.00	Dr.P.K.Aravindan Dr.V.S.Raju
25.	Treatment plants	PCO	4.00	Dr.P.K.Aravindan Dr.V.S.Raju
26.	Evaluation and overlay design for taxiways	International Airport Authority of India, Madras	0.46	Dr.V.R.Rengaraju Dr.V.Tamizh Arasan
27.	Silencer design	DRDL, Hyderabad	1.00	Dr.M.S.Mathews Dr.A.Ramachandraiah Dr.R.Ambalavanan
28.	Design and advice on efficient treatment plants for Madurai dairy chilling centres	NDDDB, Madras	2.3	Mr.K.Gopalakrishna Dr.P.Srinivasa Rao Dr.R.Ambalavanan
29.	Design of sewerage treatment system for Korba township	Special area Development Authority, Korba, MP	0.8	Mr.K.Gopalakrishna Mr.K.Ananthanarayanan
30.	Rehabilitation and strengthening of berths at Kandla Port Trust	Kandla Port Trust	1.0	Dr.A.Mehar Prasad Dr.V.S.Raju
31.	Investigations on constructions materials and advice on suitability of their use in buildings	Telecom (Civil) Madras	0.25	Dr.R.Ambalavanan Dr.M.S.Mathews
32.	Investigations on construction materials and advice on suitability of their use in buildings	Tamilnadu Pollution Control Board, Madras	0.25	Dr.R.Ambalavanan Dr.M.S.Mathews
33.	Investigations on granite specimens and advice on quality	Gem Granites Madras	0.45	Dr.R.Ambalavanan Dr.M.S.Mathews

4.5.8 Honours & Awards

Faculty	Name of Award/Prize	Purpose	Date
H.Raman	Dorr Oliver Prize	Awarded by Indian Water Works Assn. Bombay for the Best Paper published in the IWWA Journal	Jan.'92
B.S.Thandaveswara	National Hydrology award, CBIP	Outstanding and important contribution in the field of hydrology	July 17, 1992
B.S.Thandaveswara K.Srinivasan	Union Ministry of Irrigation and Power Prize	Best paper in Jl. of Inst. of Engineers India	Feb. 13, 1992
S.Mohan	IWWA Award	2nd best paper Jl. of Inst. of Engineers India	Jan. 21, 1992
S.Mohan	CBIP certificate of merit	Best paper	Feb. 9, 1992
S.Mohan	Young Engineer Award, CBIP	For contribution in for the area of water resources engg.	1992

Election to Academic and Professional Societies

Prof.C.S.Krishnamoorthy

Fellow Institution of Structural Engineers, London
Fellow Institution of Engineers, India

Prof.H.Raman Member International Water Resources Association, USA
 President Indian Water Resources Society, Tamil Nadu Chapter
 Executive Indian Water Works Association,
 Committee Tamil Nadu Chapter
 Member

Prof.H.Suresh Member ISTE
Rao Member Indian Water Resources Society

Dr.S.R.Gandhi Member Indian Geotech. Society
 Member Institution of Engineers, India
 Member Indian Geotech.Society Madras Chapter

Dr.S.Mohan Member Institution of Engineers, India
 Member IWWA

Dr.R.Ambalavanan
 Member ISTE

4.5.9 Distinguished Visitors to the Department

Name	Affiliation	Period
Dr.L.C.Wadhara	James Cook University, Australia	29.1.93
Dr.J.M.Davis	University of Stalford	12.2.92
Dr.Ing.Schulch	Universitat Stuttgart, Germany	27.2.93
Prof.J.Eibl	University of Karlsruhe, Germany	9.3.93 to 11. 3.93

4.5.10 Visit of Faculty Members to other Institutions

Name	Institution visited	Purpose & Period
Dr.S.R.Gandhi	Technische Hochschule, Darmstadt Germany under DAAD invitation	1-12-91 to 28-2-92
Prof.H.Achyutha	Research Center (KFA) Julich, Germany	1-2-91 to 1-3-92

4.5.11 Seminars/Symposium/Conferences/Short-term Courses Organised

Faculty	Topic	Date
C.S.Krishnamoorthy S.Rajeev	STC on Knowledge based expert system for engineering design	06-11 July 1992
S.Mohan H.Raman	STC on Computer modelling of water resources	15-27 June 1992
V.Paramasivam	STC on FEM	7-19 Dec. 1992

Dr.V.R.Rengaraju	Ntl. Seminar on Advances in Transportation Systems	March 1992
Dr.R.Ambalavanan	Intl. Sem on Structural Masonry for developing countries	Dec. 1992

4.5.12 Participation In Seminars, Symposium/Conferences

Name	Title of Symposium/Seminar and Venue & Date	Nature of participation
Dr.C.S.Krishnamoorthy	Intl. Sympo. Structural Masonry for Developing Countries	Organising Chairman
Dr.B.S.Thandaveswara	One day Workshop on Coastal Estuary Models CMMACS, NAL, Bangalore	Participant
Dr.B.S.Tandaveswara	8th APRD IAHR Conference	Participant
Dr.B.S.Thandaveswara	Ntl.Symp. on Environmental hydraulics, Pune.	-do-
Dr.S.B.Pattnaik	Ntl. Sem. on Advances in Tptn. Sys: Planning and Management	Publication Secretary
	Seminar on Madras 2011 - by MMDA and TRF	
	Seminar on Strategic Tpt, Pting. for Madras Metropolitan area - by IIRT	
	Workshop on Private Participation in Tpt. projects - by IIT Bombay	

4.5.13 List of Publications

1. C.S. Krishnamoorthy, C.Srinivasa Rao and S.Rajeev, "Synthesis in engineering design", Jl. of Structural Engineering(SERC), Vol.18(4) January 1992, pp.125-132.
2. S.Rajeev. C.S.Krishnamoorthy, S.Suresh and H.Shivakumar, "Design evaluation using knowledge based techniques", Jl. of Structural Engineering (SERC), Special issue on Expert Systems for Structural Engineering Application, Vol.18(4), January 1992, pp.151-160.

3. S.Rajeev and C.S.Krishnamoorthy, "Discrete optimization of structures using genetic algorithms" *Jl. of Structural Engineering (ASCE)*, VOL>118 No.5, 1992, pp.1233-1250.
4. T.Z.Vergheese and C.S.Krishnamoorthy, "A Study of finite element and Pathematical Programming models for inelastic analysis of concrete framed structures", *Intl. Jl. of Computers and Structures*, Vol.43, No.6, 1992, pp.1007-1018.
5. G.Sathurappan, N.Rajagopalan and C.S.Krishnamoorthy, "Nonlinear finite element analysis of reinforced and prestressed concrete slabs with reinforcement (inclusive of prestressing steel) modelled as discrete integral components, *Intl. Jl. Computers and Structures*, Vol.44, No.3, 1992, pp.575-594.
6. C.S.Krishnamoorthy and S.Rajeev, "Knowledge-based systems for engineering design", *Proc. of the Joint Symp. between IIT and Siemens Germany on Systems Engineering*, April, 1992.
7. K.Ganesh Babu, G.L.V.Raja and P.Srinivasa Rao, "Concrete mix design - an appraisal of the current codal provisions", *Indian Concrete Journal*, Vol.66, No.2, Feb.1992, pp.87-95.
8. P.Srinivasa Rao, "Large scale solar power stations in India - Time for action", *Proc. of the 14th World Congress, Technical Session R3 (Renewable energy structures) IABSE*, New Delhi, 1992.
9. P.Srinivasa Rao and K.Ramanjaneyulu, "Buckling behaviour of wind loaded cooling tower shells". *Intl. Symp. on Mechanical modeling and Scientific Computing*, NAL Bangalore. 7-11 Dec. 1992.
10. R.Jagadish, H.Achyutha and P.Srinivasa Rao, "Behaviour of RC brick masonry infilled frames", *4th Intl. Seminar on Structural Masonry*, Madras, 14-17 Dec. 1992.
11. S.Mohan, H.Raman and K.Srinivasa Raju, "Multi objective analysis of a reservoir system", *Jl. of Indian Water Resources Society*, Vol.12, Oct. 1992, pp.265-270.
12. H.Raman, S.Mohan and N.C.V.Rangacharya, "Decision support system for crop planning during droughts", *Jl. of Irrigation and Drainage Engineering*, ASCE, Vol.113, No.3, April 1992, pp.229-241.
13. H.Raman, S.Mohan and M.Bhaskaran, "An expert system for water supply management", *VIII Congress IAHR, Asia Pacific Division*, Oct.1992, pp.153-157.
14. N.P.Kurian, K.S.Beena and T.S.Ramanatha Ayyar, "Settlement analysis of reinforced sand beds", *Proc. Indian Geotechnical Conference*, Calcutta, Vol.I, Dec.1992, pp.97-100.
15. N.P.Kurian, R.Srinivasan and R.S.Jeevan, "A Knowledge-based expert system for ground improvement", *Proc. Indian Geotechnical Conf.*, Calcutta, Vol.I, Dec.1992, pp.231-234.
16. K.Elango, R.Honert, C.Nagaraju Kumar and V.Suresh, "PC based management game for irrigated farming", *Microcomputers in Civil Engineering*, UK, Vol.7, No.3, Oct-Dec.1992, pp.243-256.
17. R.Naryanan, N.Indrasenan and K.Elango, "Extended boundary method for inhomogeneous and unconfined aquifers", *Engineering Analysis Water Boundary Elements*, UK., Vol.10, 1992, pp.241-247.

18. L.C.Kandasamy, E.K.James, H.Suresh Rao and K.Elango, "Mathematical modelling of mountainous river basins: A Case study in South India", Proc.Intl. Symp. on Hydrology of Mountainous Areas, Simla, May 1992, pp.375-387.
19. K.Elango and G.Sree Hari Babu, "Training simulator for reservoir flood operation", Proc. 57th Annual R & D session, Central Bd.of Irrigation and Power, Jaipur, 1992, pp.5-10.
20. V.Paramasivam, S.P.T.R.Gowda and D.Muthiah Raj, "Timoshenko beam finite element with four dof and convergence of $\alpha(h)$ ", Computers and Structures, Vol.43, 1992, pp.1187-1189.
21. H.Suresh Rao and S.Sankaranarayanan, "A discussion on paper titled "solving turbulent flows using finite elements", JI.of Hydraulic Division, ASCE, Vol.118, No.12, Dec.1992.
22. H.Suresh Rao and S.Sankaranarayanan, "Numerical method of location of free water surface and water table", IX Intl. Conf. on Computational methods in water resources, Colorado, June, 1992.
23. H.Suresh Rao and S.Sankaranarayanan, "Finite Element analysis of a transition from conduit to free surface", VIII APD-IAHR Congress, CWPRS, Pune, Oct. 1992.
24. B.S.Thandaveswara and H.Suresh Rao, "Unsteady behaviour in cooling water intake - model studies", Intl. Symp. on Hydraulic Research in Nature and Laboratory, China, Nov.1992.
25. Asimkar and H.Suresh Rao, "On-line graphics for channel routing output", Sem. on Computer application in assessment, Development and Management of Water Resources, CWRDM, 1992.
26. T.S.Sakthivel and V.Kalyanaraman, "A decision revision mechanism for blackboard systems", JI. of Structural Engineering, Vol.18, No.4, Jan 1992, pp.133-140. o:_6
27. J.Altes and H.Achyutha, "Dynamic response behaviour of the reactor building of a HTR model under aircraft impact and earthquake loading", Proc. of the 4th Intl. Conf. Finite Element, France, Apr. 1992, pp.27-38.
28. K.B.Girish, H.Achyutha and R.Radhakrishnan, "Hysteretic and dynamic characteristics of infilled frames", Proc. 4th Intl. Seminar on Structural Masonry for Developing Countries, Dec. 1992, pp.126-133.
29. R.Jagadish, H.Achyutha and P.S.Rao, "Behaviour of infilled frames with stiffened window opening", Proc. 4th Intl. Seminar on Structural Masonry for Developing Countries, pp.134-142.
30. N.R.Krishnaswamy and Suresh P.Parashar, "Effect of strain rate on uplift resistance of plate anchors with geosynthetics", Proc. Intl. Symp. on Soil improvement and pile foundations, Nanging Civil and Architectural Engineering Society, China, March 1992.
31. N.R.Krishnaswamy, N.Thomas Issac and C.N.V.Satya Narayana Reddy, "Cyclic triaxial strength of reinforced sand", Proc. Indian Geotechnical Conference, Calcutta, Dec.1992, pp.67-70.
32. N.R.Krishnaswamy, T.S.Ramanatha Ayyar, C.V.Ramalinga Raju, N.Thomas Issac and K.R.Lekha, "Model studies on fabrics as reinforcement in embankments of cohesive soil", Proc. Indian Geotechnical Conference, Calcutta, Dec. 1992, pp. 187-190.
33. S.Suresh, C.Y.Shivaji and P.K.Aravindan, "Analysis of raft foundations for towers considering soil structure interactions", Civil Engineering Constructions Review, Vol.5, April 1992, pp.39-44.

34. V.R.Rengaraju and V.Tamizh Arasan, "Modeling for air travel demand", *Jl. of Transportation Engineering. ASCE*, Vol.118, No.3, 1992, pp.371-380.
35. V.R.Rengaraju and Vinobha Sunder Singh, "Traffic characteristics at urban controlled intersections", *Ntl. Seminar on Advances in Transportation Systems: Planning and Management*, IIT Madras, March 1992.
36. B.S.Thandaveswara, "Spatially varied profile over a side weir", *Jl. of Technology*, Vol.30, 1992, pp.440-450.
37. K.Srinivasan, B.S.Thandaveswara and P.C.Naik, "Monthly stream flow data generation - A case study", *Jl. of Ind. Water Resources Society*, Vol.12, Nos.1 & 2, 1992, pp.29-38.
38. B.S.Thandaveswara, K.Srinivasan, Amarendra Babu and S.K.Ramesh, "Modelling an over developed irrigation system of South India", *Intl. Jl. of Water Resources Development*, Vol.8, No.1, 1992, pp.17-29.
39. B.S. Thandaveswara, A.Anilkumar, "Mac. cormack approach - A case study of Narmada River basin", *Intl. Conf. on Computational methods in water resources*, Colorado, 1992.
40. K.Srinivasan and B.S.Thandaveswara, "Gamma auto regressive model for annual stream flow verification and validation", *Intl. Conf. on Computational methods in water resources*, Colorado, 1992.
41. B.S.Thandaveswara, "Experimental investigation of the dambreak problem", 8th APRD IAHR Conf., Pune, 1992.
42. K.Srinivasan and B.S.Thandaveswara, "Influence of policy decision on irrigation planning and development", 8th APRD IAHR Conf., Pune, 1992.
43. D.V.Mahesh Kumar and B.S.Thandaveswara, "Dam break analysis using Mac Cromack scheme for Kali River system", *Intl. Conf. on Dam Engg.*, Malaysia, 1993.
44. K.Srinivasan and B.S.Thandaveswara, "Periodic stream flow models for reservoir planning", CWRDM workshop, Kerala, 1992.
45. M.S.Mathews, J.Sudhakumar and A.V.Thomas, "Behaviour of ferrocement roofing panels under periodic heat flow conditions", *Jl. of Ferro Cement*, No.2, April 1992.
46. M.S.Mathews, A.Ramachandraiah, J.Sudhakumar and K.E.K.Nambiar, "Thermal performance of hollow and infilled ferrocement roofing panels in typical climate", *Seminar on Energy conservation in buildings*, The Institution of Engineers", 1992.
47. K.Gopalakrishna, "Maintenance of waste water treatment units", *Proc. Conf. on Protection of fresh water bodies from pollution*, Varanasi, April 1992.
48. K.Gopalakrishna, P.Surya Raja and B.K.Bezbarua, "Algal extraction from stabilization ponds using low cost natural co-agulants - red sorella seeds", *Proc. Intl. Conf. on Environment Tarbiat Modarres*, Iran, April, 1992.
49. K.Gopalakrishna, "Ecology and environment - The prime concepts of Hindu Religion", *Conf. on Ecology and Hindu Religion*, Bangalore, March 1992.

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61. S.Mohan and P.K.Sahoo, "Stochastic simulation of droughts", Intl. Conf. on Man and Environment, Allahabad, Oct. 1992.
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68. P.Kalyanasundaram and K.Ramamurthy, "Design of elevator systems for space planning in multistorey buildings", The Institution of Engineers (India), Architectural Engg. Divn., Vol.93, No.AR1, 1992, pp.13-19.
69. T.P.Ganesan and K.Ramamurthy, "Behaviour of concrete hollow brick masonry prisms under axial compression", Jl. of Structural Engg., ASCE, Vol.118, No.7, July 1992, pp.1751-1769.
70. A.W.Hendry, T.P.Ganesan and K.Ramamurthy, "Curriculum development for structural masonry in developing countries", 4th Intl. Sem. on Structural Masonry for developing countries, Dec. 1992, pp.179-286.
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4.5.14 Other Details

Prof.C.S.Krishnamoorthy - included in the Directory of Reference India - Achievements of Men and Women Today and Tomorrow, published by Rifacimento International, New Delhi, May, 1992.

Prof.K.Elango - Member of Selection Committee for Staff Selection for REC Warangal and REC Surathkal.

Prof.V.Kalyanaraman - Member, Editorial Board, Jl. of Constructional Steel Research, UK.

Prof.H.Achyutha, Corresponding Member, Working Group of Ferrocement, Intl. Association for Shell and Space Structures, Madrid, Spain.

Prof.H.Achyutha, National Committee Member, Ferrocement Information Network (India), Tngl. Ferrocement Center, Thailand.

4.6 Computer Science & Engineering Department

4.6.1 Introduction

The Computer Centre was established in 1973. The Centre offered M.Tech, M.S and Ph.D programmes in Computer Science. The Department of Computer Science and Engineering was established in 1982. The Department offers B.Tech, M.Tech, M.S and Ph.D. The major areas of teaching and research in the Departments are:

Artificial intelligence, Expert systems, Parallel and Distributed processing, Computer Architecture, Data base systems, Data Communication, Computer Networks, Theoretical Computer Science, Automata theory, Computational complexity, Simulation and Modelling, Speech recognition and synthesis, Digital Signal processing, VLSI algorithms for parallel processing, supercomputing, Artificial neural networks, Machine translation and motion planning.

4.6.2 New Courses Introduced

The following new courses were introduced during the period under the report:

Course No.	Title	Structure	Faculty
CS 481	Computer Networks	3 1 0 4	Mr. Sukhendu Das Dr. Ravi Mittal
CS 786	Natural Language Processing	3 1 0 4	Dr.S.Raman
CS 788	Architecture & Applications of Artificial Neural Networks.	3 1 0 4	Dr.B.Yegnanarayana Mr. C.Chandra Sekhar

4.6.3 Details of Faculty

Name and Qualification

Major Area of Specialisation

Professors

R.Kalayana Krishnan, Ph.D(Yale)

Computer Architecture, Computer System Design, Microprocessors, Digital Electronic Systems, Computer Graphics, Statistical Signal Processing.

Kamala Krithivasan, Ph.D(Madras)
[Head]

Theoretical Computer Science,
Computational Geometry.

H.N.Mahabala, Ph.D(Saskatchewan)

VLSI Design, Artificial Intelligence, Expert Systems

C.R.Muthukrishnan, Ph.D(IIT, Kanpur)

Software Engineering, Computer Architecture, Distributed and Parallel Processing

R.Nagarajan, Ph.D(IIT Madras)

Operations Research, Simulation and systems Engineering, Expert Systems, Performance evaluation of Systems

B.Yegnanarayana, Ph.D(IISc)

Digital Signal Processing, Speech and Vision, Voice input/output systems, Artificial Neural Net works.

Associate Professors

C.Pandu Rangan, Ph.D(IISc)

Algorithms, Parallel and VLSI Algorithms, Graph Theory and Computational Geometry

S.V.Raghavan, Ph.D(IIT Madras)

Research and Development related to computer network and protocols with emphasis on OSI.

T.A.Gonsalves, Ph.D(Stanford)

Computer Networks, Distributed Systems, Performance Evaluation

Assistant Professors

Deepak Khemani, Ph.D(IIT Bombay)

Artificial Intelligence, Knowledge based systems

S.Raman, Ph.D(IIT Madras)

Digital System Design, Micro- processor based peripherals, Parallel processing

C.Siva Ram Murthy, Ph.D(IISc)

Parallel Computing

Hema A Murthy, Ph.D(IIT Madras)

Speech processing, Computer Graphics, Pattern Recognition

D.Janaki Ram, Ph.D(IIT Delhi)

Artificial Intelligence, Distributed Systems, CAD/CAM

Ravi Mittal, Ph.D(IIT, Delhi)

Fault Tolerant Computers, Parallel & Distributed Computing

Lecturers

C.Chandrasekhar, M.Tech (IIT Madras)

Speech Recognition, Neural Networks

G.V.Ramana Rao, M.Tech(IIT Madras)

Artificial Intelligence, Parallel Processing

G.Ravi Prakash, M.Tech (IIT Kanpur)

Intelligence

Sukhendu Das, M.Tech(IIT Delhi)

Digital System Design, Computer Vision

R.Sundar, M.Tech(IIT Madras)

Digital Electronics, Microprocessor based Design, Speech Signal Processing, Parallel Processing

Senior Scientific Officers Gr.II

N.Alwar, M.S(IIT Madras)

Microprocessor based system Design, I/O in Indian Languages, Machine Translation

B.Prabhakaran, M.S(IIT Madras)

Computer Networks, Distributed Computing

J.T.Sanjeeva Murthy, M.Tech(IIT Delhi)

Pattern Recognition, Computer Vision

4.6.4 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	4	-	4	-	6	1	5	1	5	-	24	2	26
M.S.	13	1	11	1	7	-	-	-	-	-	31	2	33
M.Tech.	39	1	31	4	-	-	-	-	-	-	70	5	75
B.Tech.	24	1	29	1	25	-	30	1	-	-	108	2	110
Total	80	3	75	6	38	1	35	2	5	-	233	11	244

4.6.5 Number of Scholarships/Fellowships holders

Programme	Institute Scholarship	Number Others	Total
Ph.D.	11	6	17
M.S.	29	4	33
M.Tech.	26	1	27
B.Tech.	16	-	16
Total	82	11	93

4.6.6 New Facilities added & Major Equipment Procured

- Two Godrej i860 Workstations, one under DOE project "Development of neural networks models for the classification of sonar targets" and the other under HRD project "Computing with artificial neural networks".
- Two Arihant AT 486 (EISA BUS) systems, one under DOE project "Development of neural network models for the classification sonar targets" and the other under HRD project "Computing with artificial neural networks".
- 9600 bps high speed line for data communication.

4.6.7 Short Term Courses/Workshops/Seminars/Symposia/Conference Organised

Faculty	Name of the course	Duration
Dr.C.R.Muthukrishnan	Objected Oriented Programming in C++,CCE Course Co-ordinator along with Dr.D.Janakiram	Dec 17-19,1992
Dr.B.Yegnanarayana	ESCA Workshop on Speech Processing University of Sheffield U.K.	April 1992
	Tutorial on Speech Technology at IIT Madras.	Dec.06-08.1992
	Workshop on Speech Technology at IIT Madras	Dec.09-11,1992
Dr.S.V.Raghavan	Networks 1992 (jointly sponsored by IFIP & CSI)	Dec. 1992
Dr.C.Pandu Rangan	Chaired a session in the International Conference FST/TCS'92 held in New Delhi.	Dec 14-16,1992
Dr.Hema A Murthy	Tutorial and Workshop on Speech Technology	Dec 06-11,1992
Dr. D.Janaki Ram	Adv. Programming in UNIX Objected Oriented Programming in C++,CCE Course Co-ordinator along with Dr D Janakiram	Jul 07-09,1992
Mr.C.Chandrasekhar	ESCA Workshop on Speech Processing University of Sheffield U.K.	Dec 06-08,1992 Dec 09-11,1992
Mr.G.V.Ramana Rao	ESCA Workshop on Speech Processing University of Sheffield U.K.	Dec 06-11,1992
Mr.N.Alwar	ESCA Workshop on Speech Processing University of Sheffield U.K.	Dec 06-11,1992

4.6.8 Invited Lecturers delivered by the Faculty in Academic Institutions/Public Bodies

Sl.No.	Faculty	Title and Venue	Date
1.	Dr.Kamala Krithivasan	Talk given at the Hindu Vaishnav College, Pattabiram (Mathematics Association)	Mar, 1993
2.	Dr.S.Raman	"Microprocessor System Design" Pondicherry Engg. College	May, 1992
		"Digital System Design Principles", S.V.University, Tirupathi	Jul, 1992
3.	Dr.T.A.Gonsalves	"CLAM Computerization of a Large Academic Library", CS&A Department Seminar, IISc., Bangalore	April, 1992
		"Design & Implementation of Low-Cost LANs", Invited talk, VORTEX 1992 Student Conference, Regional Engg. College, Tiruchi.	Aug, 1992
		"Computerization of Academic Libraries", Dept.of Christianity Seminar, University of Madras	Dec, 1992
4.	Dr.S.V.Raghavan	"Networking Technology", The Indian Scene delivered in British Council Seminar on Networking, University of Madras.	1992
		Networking delivered at Queen Mary, College, Madras	1992
		Lecture on Network Architecture-Trends and Directions, delivered at Indian Space Research Organisation, Sriharikota	1992
		OSInet-an Educational Tool, at Annamalai University	1992
		Lectures in the Appreciation Programme in Computer Networking, organised by ETDC, STQC Directorate, Department of Electronics, Govt. of India.	April, 1992
		Talk on Corporate E-Mail Networks during the Technology Appreciation Programme of Centre for Industrial Consultancy and Sponsored Research, IIT Madras.	April, 1992
		Popular talk on Electronic Mail under the auspices of IETE and CSI Madras	April, 1992

4.6.9 Visits Abroad

Sl.No.	Name of faculty	Purpose	Duration/Period
1.	Dr.Kamala Krithivasan	On invitation from MPI, Saarbrucken for furtherance on research work	2 months May-July 1992
2.	Dr.B.Yegnanarayana	U.K., Germany & Holland	April-June 1992
3.	Dr.S.V.Raghavan	Finland to present a paper at INDC 92 and also attended the IFIP TC6 meeting as Country representative at Ivalo, Finland.	Dec. 1992
		Visited University of Salford, Manchester Attended HPN 92 International Conference at Liege, Belgium	Dec. 1992
4.	Dr.C.Siva Ram Murthy	German National Res. Centre for Computer Science, Sankt Augustin, Bonn under the Indian National Science Academy International Exchange Programme	3 months Oct-Dec, 1992
5.	Mr.N.Alwar	Univ. of Bremen, Germany in connection with "Flexible Man-machine Interface".	May-July 1992

4.6.10 Sponsored Projects

S.No.	Title	Duration	Sponsor	Value in lakhs	Coordinators
1.	Algorithm for Robot Motion Planning	4 years	DAE	1.6	Dr.Kamala Krithivasan

S.No.	Title	Duration	Sponsor	Value in lakhs	Coordinators
2.	Indo-German Project on "Studies in Computational Geometry"	3 years	BMFT/MHRD	..	Dr.Kamala Krithivasan Dr.C.Pandu Rangan
3.	Studies in Parallel and Distributed AI Computers"	..	DAE	6.5	Dr.C.Pandu Rangan
4.	Telematics	1992-93	MHRD	20.00	Dr.T.A.Gonsalves/ Dr.A.Jhunhunwala/ Dr.B.Ramamurthy
5.	Indian Mathematical Algorithms	1991-94	DST	5.35	-do-
6.	Fibre Optics Railway Signalling & Communication System for Basin Bridge, Mark II	1992-93	DOE	17.00	-do-
7.	"Task Allocation in Parallel Computers"	3 years	INSA	0.60	Dr.C.Siva Ram Murthy
8.	Voice Conversion	1992-95	DST	7.89	Dr.B.Yegnanarayana Dr.Hema A.Murthy/ R.Sundar/C.Chandra Sekhar
9.	Interactive Voice Input/ Output system for a Computer	1986-93	DOE	30.02	Dr.B.Yegnanarayana/ C.Chandra Sekhar/ G.V.Ramana Rao
10.	Development of Neural Network Models for Classification of Sonar Targets	1990-94	DOE	19.63	Dr.B.Yegnanarayana/ C.Chandra Sekhar/ R.Sundar
11.	Applications of Artificial Neural Networks in Remote Sensing	3 years	ISRO	5.80	Dr.B.Yegnanarayana/ C.Chandra Sekhar/ R.Sundar

S.No.	Title	Duration	Sponsor	Value in lakhs	Coordinators
12.	Computing with Artificial Neural Networks	1 year	HRD	10.00	Dr.B.Yegnanarayana/ C.Chandra Sekhar/ Mr.R.Sundar/A.Alwar
13.	ERNET	Upto 1997	DOE	200.00	S.V.Raghavan H.N.Mahabala B.Yegnanarayana
14.	TOT of OSINET	Upto 1993	DOT	10.00	S.V.Raghavan
15.	Informatics/Information Techn.	From 1988	MHRD	35.00	Dr.C.R.Muthukrishnan
16.	CAD for VLSI for Design & ASIC	From 1986 till 9/93	DOE	64.70 FE.. 23.25	Dr.H.N.Mahabala
17.	Knowledge Based Computer Systems	-do-	DOE	71.05	Dr.H.N.Mahabala

4.6.11 Research Based Consultancy Projects

Sl. No.	Title	Duration	Sponsor	Value in lks	Coordinator(s)
1.	Fibre Optic Double Ring Telemetry System	..	IL Kota	5.5	Dr.T.A.Gonsalves /Dr.A.Jhunhunwala /Dr.B.Ramamurthy
2.	Failsafe Signal Multiplexer for Railways	..	Crompton Greaves	5.5	-do-
3.	Development of Rill Mux	..	United Telecom	2.5	-do-
4.	DSP Based PLCC System	..	WS Electronics	4.00	-do-
5.	Ethernet Driver and Monitor	..	Zenith	0.40	-do-
6.	PC-Based Ethernet Bridge	..	Multimedia	1.00	-do-
7.	Integra-SQL Based Software Development	..	Grasim	1.00	-do-
8.	Development of a Neuron-based Distributed Process	..	Alacrity Control System	15.00	-do-

4.6.12 Research Publications

1. R.Ramaseshan and B.Yegnanarayana, Image reconstruction from multiple frames of sparse data, Multidimensional systems and Signal Processing Vol.4, no.2, 1993.
2. B.Yegnanarayana and Hema A Murthy, Significance of group delay functions in spectrum estimation, IEEE Trans. on Signal Processing, vol.40, No.9, pp.2281-2289, Sept.1992.
3. P.Eswar, C.Chandra Sekhar and B.Yegnanarayana, Use of fuzzy mathematical concepts in character spotting for automatic recognition of continuous speech in Hindi, Journal on Fuzzy sets and Systems, vol.46, no.1, pp.1-9, Feb 1992.
4. B.S.Madhukumar and B.Yegnanarayana, A speaker recognition system based on intonation knowledge, proc. Discussion Meeting on Recent Advances in Signal Processing and Communications, IISc, Bangalore, pp.41-45, Jan.1993.
5. V.R.Ramachandran and B.Yegnanarayana, Co-articulation rule for a text-to-speech system for Hindi, Proc.Workshop on Speech Technology, IIT, Madras, pp.211-129, Dec.1992.
6. B.Yegnarayana, A.S. Madhukumar and V R Ramachandran, Robust features for applications in speech and speaker recognition, Proc. ESCA Workshop on Speech Processing in Adverse Conditions, Cannes Mandelieu, France, Nov. 1992.
7. A.A. Valan and B. Yegnanarayana, Directed spreading activation in multiple layers for lowerlevel feature extraction, Proc. ICCS/ISITA 1992, Singapore, pp.563-567, Nov. 1992.
8. B Yegnanarayana, H.M.Chouhan, C.Chandra Sekhar and R.P. Singh, Sonar target recognition using radial basis function networks, Proc.ICCS/ISITA'92, Singapore, pp.395-399, Nov.1992.
9. B Yegnanarayana and V R Ramachandran, Group delay processing of speech signals, Proc. ESCA workshop on Comparing Speech Signal Representation, Sheffield, England, pp.411-418, April 1992.
10. B Yegnanarayana, S Rajendran, S R Rajesh Kumar, V.R. Ramachandran and A.S. Madhukumar, knowledge sources for a text-to-speech system in Hindi, Proc. Regional Workshop on Computer Processing of Asian Languages, Indian Institute of Technology, Kanpur, pp.233-242, March 1992.
11. A Datta, R Srikant, GDS Ramkumar and Kamala Krithivasan, Fast Parallel Algorithms for the maximum empty rectangle problem, Sadhana, vol.17, Part I, March 1992, pp.221-236.
12. M Mahajan and Kamala Krithivasan, Some results on Time varying and Relativised Cellular Automata, International Journal of Computer Mathematics, 43, pp.21-28, 1992.
13. Kamala Krithivasan, M.V. Nagendra Prasad, and M.Mahajan, Forgetful L systems, in the book Lindenmayer system, Ed. by Ruzendberg and Saloma Springer Verlag, 1992, pp.419-436.
14. Kamala Krithivasan and K Induprakas, "An efficient Algorithm for Path planning among planar obstacles in three dimensions, Proc. of International conference on Intelligent Robots, pp.835-846, Bangalore, Jan. 1993.
15. R Ravi, C. Pandu Rangan, M.Marate, "An optimal Algorithm to solve All pair shortest path problem on Interval graphs", Networks Vol.22, pp.22-35, (1992).

16. K.Arvind, C.Pandu Rangan, "Connected Domination and Steiner Set Problems on Permutation Graphs", Information Processing Letters Vol.41, pp.215-220, (1992).
17. Govindan Ramesh, C.Pandu Rangan, "An $O(n \log n)$ algorithm for a maximum location problem" Discrete Applied Maths Vol.36, pp.203-205 (1992).
18. R.Ravi, C.Pandu Rangan, M.Marate, "Generalized Vertex covering in Interval Graphs", Discrete Applied Maths, Vol.39, pp.87-93 (1993).
19. V.Kamakoti, C.Pandu Rangan, M.Marate, "Generalized vertex covering Interval graphs" Discrete Applied Maths, Vol.39, pp 113-115 (1992).
20. C.S.R. Krishnan and C Siva Ram Murthy, "A Faster algorithm for sorting as Mesh-connected Computers with Multiple Broadcasting using Fewer Processors' International Journal of Computer Mathematics, Vol.47, No.3, 1992.
21. S Das, J Mukherjee and B.N. Chatterji, "Detecting occlusion from feature correspondences of multiple moving rigid objects": Proceedings of the second International Conference on Automation, Robotics and Computer Vision: Singapore, 15- 18 Sept'92.
22. S.Das, J.Mukherjee and B.N.Chatterji, "Analysis of Dynamic Stereo Images for Detecting Object Motion", Proceedings of Recent Advances in Signal Processing and Communications: Jan. 18-20, 1993, IISc, Bangalore, pp 53-58.
23. S.Sureshchandran and T.A. Gonsalves, "Performance of the Memnet Distributed Shared Memory Architecture", Proc.Conf.Information and Systems(CISS), Princeton, USA, Mar.1992.
24. V.Ramji and T.A. Gonsalves, "Distributed and Optimistic Make: Implementation and Performance", Proc. 11th IEEE Intn'l. Phoenix Conf. Comp. and Commun., Scottsdale, AZ. USA, Apr. 92.
25. A.B. Mahamuni, T.A. Gonsalves and B.Ramamurthi, "Efficient Load Information Management for Load Sharing in Distributed Systems" Proc. Networks '92 Intn'l. Conf. Computer Networks, Architecture and Applications, CSI & IFIP, Trivandrum, India, Nov.'92.
26. R.Satyanarayanan and C.R. Muthukrishnan "A Note on Raymond's Tree Based Algorithm for Distributed Mutual Exclusion", Information Processing Letters 43 (1992) 249-255 North Holland, Oct. 1992.
27. R.Satyanarayanan and C.R. Muthukrishnan, Message-efficient distributed mutual exclusion incorporating the "Least recently used fairness criterion", IEE Proceedings- E, Vol.139, No.6, Nov.92.
28. C.R. Muthukrishnan and T V Gopal, "Concurrent Programming" Encyclopedia of Computer Science and Technology - Marcel Dekker, Inc. 1992.
29. T.V. Gopal, C.R. Muthukrishnan and R.K. Subramanian, "Data Abstraction and Concurrency in Ada", Journal of Information Science and Technology, Vol.1, No.2, Jan.1992.
30. S.Jayaprakash and C.R. Muthukrishnan "An Improved Reliable Distributed Mutual Exclusion Algorithm", Singapore ICCS/ISITA '92, pp 209-213.
31. S.Raman, "The Projected Impact of Machine Translation", Akshara '92, CSI Convention, Feb'92, Bhubaneswar.

32. B.Yegnanarayana and R.Sundar, "Signal Processing Issues in Realizing Voice Input to Computer", Asia-Pacific Engineering Journal Part (A), Vol.1, No.2, 197-217, 1991.
33. G.V. Ramana Rao, "Detection of wordfinal vowels in speech using first formant energy, CPAL-2, Mar.1992, IIT Kanpur, pp.243-247.
34. G.V. Ramana Rao, "Detection of word boundaries in continuous Hindi Speech using pitch and duration, Fourth Australian Int.Conf. on Speech Science and Technology, December 1992, Brisbane, Australia.
35. B. Prabhakaran, K.Vijayananda and S.V. Raghavan, "Formal Specification of Fault Management Systems" ICCS '92, Nov.16-20, 1992, Singapore.
36. S.V. Raghavan, V.Bhargavan and Satish, "Test case Generation for Transport Protocols, INDC 92, Information Network and Data Communications, Conference held at Espoo, Finland, March 16-19, 1992.
37. S.V. Raghavan and R.Santhosh Kumar, "Performance studies and Asynchronous Communications Server for Local Area Networks", British Computer Journal, August 1992, Vol.35, pp.A369-A375.
38. Sriram and S.V. Raghavan, "Implementation of X.500 Based Directory Services in OSINET", Technical Review V9N3 1992, pp.228-238.
39. B. Prabhakaran, S.V. Raghavan, "Synchronisation Models for Multimedia Presentation with User Participation", Proceedings of First ACM Conference on Multimedia Systems, Aug. 1-6, 1993, Anaheim, California.

4.7 Electrical Engineering Department

4.7.1 Introduction

The Department of Electrical Engineering is an integral one encompassing both the areas of Electrical and Electronics Engineering and also the Centre for Systems and Devices. At present the department comprises the following laboratories :

- * Communication Systems Laboratory/DSP Lab
- * Electronic Circuits, Semiconductor Devices Laboratory
- * Amorphous Semiconductor Laboratory
- * Aeronomy, Laser, Communications Laboratory
- * Microwave Laboratory, Antenna Laboratory
- * Television Engineering Laboratory
- * Control Engineering including Guidance, Thyristor control and Robotics Laboratory
- * Electrical Machines and Drives Laboratory
- * Measurements and Instrumentation Laboratory
- * Power Systems Laboratory
- * High Voltage Engineering Laboratory
- * Power Systems Laboratory
- * Microprocessor and Digital Systems Laboratory
- * Fibre - optic Communication Laboratory

B.Tech Degree Courses are offered in the following two Streams :

1. Electrical and Electronics Engineering with emphasis on power systems, Electrical machines, control engineering and related subjects.
2. Electronics and Communication Engineering with emphasis on electronics circuits and devices, control engineering, communication systems and related subjects.

The Curriculum Development Cell in the Department of Electrical Engineering has been working on evolving an integrated undergraduate curriculum which will combine into a single curriculum what are now taught separately under the above to separate programmes. The curriculum for the above integrated programme has been finalised and this will be implemented in IIT Madras from July 1993.

M. Tech Degree in Electrical Engineering :

Four major streams of study are available at M.tech level.

Communication Systems Engineering
Energy Systems Engineering
Integrated Electronic Circuits and Systems
Control, Guidance and Instrumentation Systems

Areas of research for M.S. and Ph.D. Degree in Electrical Engineering:

Electronic Circuits, Communication Systems, Digital Techniques and Computer Technology, Electro magnetic interference and Compatibility, Antennas, Optical Communication, Image and Digital Signal Processing, Laser Communication, Microwave Engineering, Television Engineering, Semiconductor Devices, Amorphous Semiconductor Devices, Control Engineering Electrical Machines and Drives, Guidance Systems, High Voltage Engineering, Measurements and Instrumentation, Networks and Systems, Simulation of Power Electronic Systems, Power Systems, Photonics and Robotics.

4.7.2 New Courses Introduced

Course No.	Title	Structure	Faculty
EE 620	Amorphous and Polycrystalline Silicon Materials and Devices	3-0-0-3	Dr.E.Bhattacharya

4.7.3 Details of Faculty

Name and Qualification	Area of Specialisation
Professors	
M.V.Chalpathi Rao, Ph.D.(IIT Madras)	Control Theory
C.Eswaran, Ph.D(IIT, Madras)	Networks,Dig.Filters,Microprocessors
P.A. Janakiraman, Ph.D(IIT Madras)	Robotics,Control Systems, instrumentation, Image Processing
A. Jhunjhunwala, Ph.D(Maine)	Telematics
A. Kuppurajulu, Ph.D (Moscow)	Power Systems, Computer Applications
M. Mukunda Rao, Ph.D (Andhra)	Lasers, Fibre Optics
V.G.K. Murti, Ph.D (Illinois)	Networks, Instrumentation
M.S.Narasimhan, Ph.D(IIT Bombay)	Antennas, DSP
K.Narayana Bhat Ph.D (IIT Madras)	Semiconductor Fabrication
Y. Narayana Rao, Dr.Ing.(Braunschweig)	High Voltage Engineering
K.Radhakrishna Rao,Ph.D(IIT Kanpur) [Head]	VLSI, Analog and Digital IC's
J.P. Raina, D.Sc.(Louvain)	Fibre Optics, Television

K. Ramar, Ph.D(IIT, Madras)	Power Systems, Computer Applications
B. Ramaswami, Ph.D(IIT Madras)	Power Electronics, Control
P. Sankaran, Ph.D(IIT Madras)	Networks, Magnetic Materials
V.V. Sastry, Ph.D.(IIT Kharagpur)	Machines, Power electronics, Simulation
V. Seshadri, Ph.D(IIT Madras)	Control Systems
G. Sridhara Rao, Ph.D(IIT Madras)	Machines, Power electronics, Simulation
S. Srinivasan, Ph.D(IIT Madras)	Microprocessors, Computers
Vedam Subrahmanyam, Ph.D(IIT Madras)	Power electronics, Machines
V. Venkata Rao, Ph.D (Iowa)	Digital Filters, Communications
C. Venkataseshaiyah, Ph.D(IIT Madras)	High Voltage, Power Systems
S.S.Yegnanarayanan, Ph.D(IIT Madras)	Machines, Simulation
Associate Professors	
Bhaskar Ramamurthy, Ph.D(California)	Telematics, Communications
C. Dattatreyan, Ph.D. (Sheffield)	High Frequency Technology
R. Parimelalagan, Ph.D(IIT Madras)	Power electronics
K.M.M. Prabhu, Ph.D(IIT, Madras)	DSP, Image Processing
Assistant Professors	
M. Antony Reddy, Ph.D(IIT Madras)	Electronic Circuits
Enakshi Bhattacharya Ph.D (TIFR.Bombay)	Solid State devices
V. Jagadeesh Kumar, Ph.D(IIT Madras)	Measurements, Instrumentation
G.T. Manohar, M.Tech(IIT Madras)	Microprocessors, Computers, Control Systems
P. Sasidhara Rao, Ph.D(IIT Madras)	Machines
T.J.Vitto, Ph.D(IIT Madras)	Semiconductors
M. Krishnamurthy, M.Tech(IIT Madras)	Power Systems

P.C.Majhee, M.Tech(IIT Madras) Measurements, Instrumentation

Varadarajan Subrahmanyam, M.E.(IISc.) High Frequency Technology

Principle Scientific Officer

P.R. Vaya, Ph.D(IIT Madras) Semiconductor Devices

Senior Design Engineer

V.N. Shukla, M.S. Madras) Microprocessors and Computers

Ranjana Shukla, M.S.(IIT Madras) Microprocessors and Computers

P. Ramaseshagiri Rao, M.S.(IIT Madras) Semiconductor Devices

4.7.4 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total	
	M	W	M	W	M	W	M	W	M	W	M	W
Ph.D.	3	1	12	2	8	-	2	1	13	-	38	4
M.S.	13	3	7	1	5	-	3	-	1	-	29	4
M.Tech.	36	4	-	-	3	1	-	-	-	-	39	5
B.Tech.	78	2	72	5	63	-	67	3	-	-	280	10
Total	130	10	91	8	79	1	72	4	14	-	386	23

4.7.5 Number of Scholarships/Fellowship Holders

Course	Institute
Ph.D	13
M.S.	19
M.Tech	40
Total	72

4.7.6 No. of Degrees Awarded

Course	Number awarded
Ph.D	3
M.S.	5
M.Tech.	35
B.Tech.	60
Total	103

4.7.7 Instruments/Equipment Designed and Developed

Construction of a Mobile Robot is under progress.

4.7.8 New Facilities added and Major Equipment Procured

- * The VAX/VMS computer system has been upgraded from V.4.7 to V.S.4.
- * The PROMATLAB mathematical software has been upgraded to V.3.5H.
- * Siemens-PC and Vax-PC file transfer facilities have been provided.
- * A New PC Laboratory set up in ESB 119 with a large number of personal computers and terminals for Siemens Main Frame Computer is operational.
- * An amorphous silicon device fabrication facility has been set up.

4.7.9 Short term Courses/Workshops/Seminars/Symposia Conducted

Sl.No	Course title	Duration	Co-ordinator
1.	STC on DSP for ISRO		KMM Prabhu
2.	Winter School on Emerging Techniques for characterization of semiconductor materials	Jan.11-22	Dr. P.R. Vaya

4.7.10 Invited Lectures Delivered by Faculty in Academic Institution

Sl.No.	Title	Institution	Date	Faculty
1.	Multilevel Interconnects for VLSI	Natl.Semiconductors, Malakka	26-30,Oct 1992	Dr.P.R.Vaya
2.	PL Studies of MBE grown GaAs/AlGaAs Multilayer structures	Natl.University of Singapore	2-5,Nov. 1992	Dr.P.R. Vaya
3.	Optical Fibre Sensors	ICTP, Trieste, Italy	28-8-92	Dr.M.Mukunda Rao
4.	Optical Fibre Sensors	Lebedev Inst.of Physics,Moscow	28-12-92	Dr.M.Mukunda Rao
5.	Transient Analysis of Electrical Machines	BHEL, Bhopal	June '92	Dr.S.S.Yegnanarayanan
6.	Electromagnetic Fields	BHEL, Bhopal	June '92	Dr.S.S.Yegnanarayanan

4.7.11 Visits Abroad

Sl.No.	Country Visited	Date	Faculty
1.	Visited Motorola Inc. Texas (work related to DSP)	Summer 92	Dr. S. Srinivasan
2.	Foundazione UGO Bordoni, Rome, Italy	July-Dec. 1992	Dr. M. Mukunda Rao
3.	Inst. fur Rechentechnik & Robotik University of Karlsruhe, Germany	May-Nov. 1992	Dr. P.A. Janakiraman

4.7.12 Distinguished Visitors and Lectures Delivered

S.No.	Name	Affiliation	Purpose of Visit/Seminar Title
1.	Dr. Sriram (30.06.92)	Distinguished Member of Staff AT & T Bell Labs USA	Methods for Bandwidth Allocation and conges- tion Avoidance in high- speed networks.
2.	Dr.Rajiv Rama- Swami (1.7.92)	I B M, U.S.A	High-speed Optical Networks
3.	Dr.D.Subramaniam (28.5.92)	AT & T Bell Labs, U.S.A.	High-Speed networks:Proto- cols and Congestion control
4.	Dr.K.Subrahmanyam	GM, WRly(Retd.)	Railway Signalling
5.	Dr.L.L.Lai (20,21.4.92)	Director, Power & Energy Systems, City University, London	1. An Integrated EMS/ SCADA for control of Distbn Networks. 2.The Future of Information Engg. in Power Engineering. 3.Chaotic Phenomena in Power Systems 4. Effect of Harmonics on Power System Protection.
6.	Dr.Y.Narayana Rao (2.4.92)	IIT, Madras	Some Investigations in EMI
7.	Dr.S.Ashok (17.7.92)	Penn State University	Hydrogen Interaction in Silicon
8.	Dr. B.Doshi	AT&T Bell Labs, USA	Overview of High-Speed Networks
9.	Dr.K. Ghosh (10-11-8-92)	University of Iowa USA	Alignment Consideration in Package Design of Optical inter connects. Laser Machined taps on optical fibers and design- ing sensors and Signal Pro- cessors
10.	Dr.Chaitali Chakrabarti (19.8.92)	Arizona St.Univ. USA	VLSI Architectures for Real time Signal Processing Application

Sl.No.		Country Visited	Faculty
11.	Dr.S.S.Rao (20.8.92)	Villanova Univ. USA	Neural Network application in Signal Processing.
12.	V.A. Suresh (20.8.92)	Electronic Power Conditioning Inc. Oregon, USA	Variable Speed Power Generation
13.	Dr.R.S.Grandall (25.11.92)	Natl Renewable Energy Lab, Colorado USA	Amorphous Si and Photovoltaics
14.	Dr.Sonali Banerjee (26.11.92)	TIFR, BOMBAY	QW Lasers
15.	Dr.G.Roosen (7.12.92)	Inst. d'Optique Orsay, France	Photorefractives and Optical Computing
16.	Dr.D.Ostrowsky (7.12.92)	Univ. of Nice	Integrated Optics
17.	Dr.E.Giacobine (8.12.92)	Ecole Normale Superieure, Paris	Squeezed States
18.	Dr.Eric Spitz	Thomson SA, Paris	Industrial Optoelectronics
19.	Dr.(ING)Jiri Lettl	Czechoslovakia	1. Survey of Recent Trends in Power Electronics 2. Static Converter Systems 3. AC-DC PWM Converters
20.	Dr.Ing. D.Kind	President PTB Braunschweig	Current trends toward National and Intl. Metrology Systems
21.	Dr.K.Sudhakar Rao (18.2.93)	Dep.Proj.Director VSSC /Trivandrum	The PSLV Project
22.	Dr.D.Koilpillai (22.2.93)	GE Corporate R&D Schenectady USA	Equalizer performance with Diversity for US Digital Cellular Systems
23.	Dr.Vinita Vasudevan (22.2.93)	IIT, Bombay	Simulation of Radiation Effects in MOS Devices
24.	Prof.Dr.Ing.J.Holz	Univ. of Wuppertal	(1) Parameter Identification for self commissioning in vector - controlled ac - motor drive (2) Trajectory Control in Optimal Synchronous PWM
25.	Dr.M.NandaKumar	N. Carolina State University, USA	Recent Developments in Power Devices : Base-Resistance controlled Thyristor.

4.7.13 Sponsored Projects

S.No.	Title	Duration	Funding Agency	Amount in lkhs.	Co-ordinator(s)
1.	Thermal Equilibrium Studies in a - Silicon	92-93	DST	1.65	E.Bhattacharya
2.	Parallel Implementations for Signal & Image Processing	92-93	IRDF	-	S.Srinivasan & B.Yegnanarayana
3.	Educational Television Studio	92-93	MHRD	45.00	S.Srinivasan & VMK Sastry
4.	LPCVD Polycrystalline Si MOSFET Technology for 3-D Integration	5 Yrs. 88-93	DOE	49.52	K.N. Bhat
5.	Development of Bipolar and MOS Device Simulator	4 Years 93-97	DOE	21.15	K.N. Bhat
6.	Applicability of Modern Spectral Estimation algorithm to improve MTI System Performance	92-94	DRDO	12.97	K.M.M.Prabhu
7.	Development of Energy Efficient Electrical Generators and Control Systems	93-95	DOD	17.0	G.Sridhar Rao
8.	Development of Engineered version of FOC Systems	91-93	DRDO	32.20	J.P. Raina A.Jhunjunwala
9.	Development of some Optical couplers	91-93	ARDB	46.80	J.P. Raina A. Jhunjunwala
10.	Development of Compatible digital FOC Data bus for strategic air craft	91-93	ARDB	38.66	J.P. Raina A. Jhunjunwala
11.	FO System in service application	Nov.92	DOE	154.10	J.P. Raina A. Jhunjunwala

S.No.	Title	Duration	Funding Agency	Amount in lkhs.	Co-ordinator(s)
12.	Development of Optical Photonic Amplifiers		MHRD	15.00	J.P. Raina
13.	Indian Mathematical Algorithm	91-94	DST	5.35	A. Jhunjunwala Bhaskar Ramamurthy
14.	FO Railway signalling and Commn. System	92-93	DOE	17.00	A. Jhunjunwala Bhaskar Ramamurthy
15.	Investigations on NF-NF Transformations	87-93	DRDO	10.80	M.S.Narasimhan
16.	SiN-GaAs surface	91-92	DAE		P.R. Vaya K. Ponnuraju

4.7.14 Major Consultancy Assignments

S.No.	Title	Year	Sponsor	Amt.	Coordinator(s)
1.	Failsafe signal multiplexer for Railways	91-93	Crompton Greaves	5.50	A Jhunjunwala & Bhaskar Ramamurthy
2.	DSP Based PLCC System	92-93	WS Electronics	4.00	A Jhunjunwala & Bhaskar Ramamurthy
3.	Ethernet Driver and Monitor	92-93	Zenith	0.40	A Jhunjunwala & Bhaskar Ramamurthy
4.	PC-Based Ethernet Bridge	92-93	Multi-Media	1.00	A Jhunjunwala & Bhaskar Ramamurthy
5.	Integra-SQL Based Development	92-93	Grasim	1.00	A Jhunjunwala & Bhaskar Ramamurthy
6.	Intelligent Bar Code Reader	92-93	Srinidhi Farms (P) Ltd. Madras		Mrs. Ranjana
7.	PC Based Control System for CNC	92-93	Machine Tools Aids Bureau, Madras		Mrs. Ranjana
8.	Intelligent Energy Monitoring System	91-93	Alacrity Electronics Madras		VN. Shukla

4.7.15 Research/Conference Publications

1. P. Subba Raj and MVC Rao, implementable line search algorithm for unconstrained minimization without derivatives, Natl. symp on optimization Techniques and Applns Madurai, July 2-3, 1992.
2. A derivative based line search scheme national Symp on Optimization Techniques and Applns, Madurai July 2-3, 1992.
3. S.S. Yegnarayanan, C. Venkateseshiah and DVSSS Sarma, A method of predicting the maxm. possible switching on over voltages in 3-4 HT induction motors, Intl. Conf. on Elec. Robating Machanics, Bombay, Jan 1992.
4. C. Venkateseshiah, DVSSS Sarma, SS Yegnanarayanan and G. Sridhara Rao, Comparison of different methods of estimation of surge impedance of a 3- Φ HT induction motor, Ibid, Bombay, Jan 1992.
5. C. Venkateseshiah, SS Yegnanarayanan, DVSSS Sarma, Switching an over voltages in large HT induction motors, Determination by simulation and verification by field test, Seventh national power system conference, Calcutta, Dec. 19-22, 1992.
6. E. Bhattacharya, G. Ravi Kumar, P. Agarwal, Ambipolar diffusion length in amorphous Si 6th Intntl. Conf. an photovoltanc Science and Engineering, N.Delhi Feb.1992.
7. K.R. Prasad and C. Dattatreyan, Noise and Error rate performance of Raman active fiber system, Intntl. Symp. on Signals systems and Electronics, Paris, Sept. 1-4, 1992.
8. M.C. Ramesh and KN Bhat, Resistivity Model and its application for determining phosphorous diffusivity in LPCVD polycrystalline silicon, Seminar on phys. and Tech of Semiconductor, CEERI, Pilani, Sept. 21-22, 1992.
9. S. Karmalkar and KN Bhat, Analytical modeling of the channel charges in ion - implemented MOSFETS and MESFETS, Intl. Conf. on Physics and Tech. of Semiconductor Devices and IC's IIT, Madras, Feb.1992.
10. C. Basavana Goud and KN Bhat, Modeling and optimization of semi insulator passivated high-voltage field-plate devices, Intl. Symp on Power SC devices and IC's, Waseda University, Japan, May 19-21, 1992.
11. V.S. Subramanyam, KMM Prabhu, Novel phase meter using narrow pulse switched capacitor phase shifter, Electronics Letters V28, pp 589- 591, 12 March 1992.
12. KMM Prabhu and K Bhoopathy Bagan, Computer Simulation study of MTI using FFT and nonlinear processors, Intl. Conf. an ASSP, California, March 23-26, 1992.
13. B. Agarwal, KK Kamath and P.R. Vaya, PL in undoped and modulation doped GaAs/AlGaAs QW structures grown by MBE, Seminar on Phys. and Tech. of Semiconductor devices, CEERI, Pilani, Sept. 21-22, 1992.
14. K.K. Kamath and P.R. Vaya, Direct and indirect Excitation PL studies in GaAs/AlGaAs DHJ Laser Structures grown by MBE, Ibid, CEERI, Pilani, Sept. 1992.
15. V. Jayan and P.R. Vaya, investigations on S-passivated GaAs surfaces and GaAs - SiN interfaces, Ibid, CEERI, Pilani, Sept. 1992.
16. K. Radhakrishna Rao, Analog frontend for biomedical applications, Electronics and Wireless world, 1992.

17. P.A. Janakiraman & F.Wallner, Reliable prediction of ultrasonic image measurements for Robotic Applications, Tech. Rept, Inst. for Real-time Computer Systems & Robotics, Univ. of Karlsruhe, Oct 1992.
18. M. Mukunda Rao & Danaei Ahmadi, Reliability of Satellite Optical Communication due to background radiation and atmospheric turbulence, Proc. Intl. Conf. on EMC, APC-EMC-92, Sameer, Madras, Aug 24-25, 1992.
19. M. Mukunda Rao & Danaei Ahmadi Atmospheric turbulence effects on optical beam propagation for satellite laser communication, Natl. Syrup on Antennas and Propagation, Cochin University, (APSym -92), Dec. 1992
20. Prita Nair, Mridula Joshi, B.M. Sivaram, J.P. Raina, Comparison between forward and backward pumping schemes for EDFA's National Laser Symposium, I.I.T. Madras, from Feb. 17-19, 1993.
21. Prita Nair, B.M. Sivaram, J.P. Raina, Fibre lasers using all-fibre resonators - National Laser Symposium, I.I.T. Madras Feb. 17-19, 1993.
22. Mridula Joshi, Prita Nair, B M Sivaram, J.P. Raina and L. Vetrivel Gain characteristics of an Erbium doped Optical fibre amplifier, Proc. of National Symposium on Antenna & Propagation, Cochin Dec.29- 31 1992. p.no.339 to 342.
23. R. Krishna Thilakam & Ashok jhunjhunwala, The Design and Flow Control of a High Speed Integrated Packet Switched Network, Computer Networks and ISDN systems, Vol.25, 1992 pp.241-257.
24. Prita Nair, Mridula Joshi, B.M. Sivaram, J.P. Raina, Comparison between forward and backward pumping schemes for EDFA's, National Laser Symposium, I.I.T. Madras, Feb. 17-19, 1993.
25. Prita Nair, B.M. Sivaram, J.P. Raina Fibre lasers using all - fibre resonators national Laser Symposium, I.I.T. Madras, Feb. 17-19, 1993.
26. Mridula Joshi, Prita Nair, B M Sivaraman, J.P. Raina and L. Vetrivel Gain characteristics of an Erbium doped Optical fibre amplifier of National Symposium on Antenna & Propagation, Cochin Dec 29-31 1992 p.no.339 to 342.
27. Prita Nair, B.M. Sivaram, J.P. Raina. Characteristics of Fibre Raman Lasers employing 2x2 optical coupler for optical feed back Proceedings of National Symposium on Antenna & propagation, Cochin Dec 29-31. p.no.373 to 378.
28. Prita Nair, Mridula Joshi, B.M. Sivaram & J.P. Raina, EDFA Characteristics pumped both simultaneously and sequentially at different pump wavelengths and pump powers, of OE Fibres 92 session Fibre laser sources and amplifiers Boston Sept. 8-12 1992.
29. A.S. Weling, K.K. Kamath and P.R. Vaya, The effect of external excitation on the Sulphur passivation of GaAs surfaces, Thin Solid Films, 215, 179-183 (1990).

4.8 Humanities and Social Sciences Department

4.8.1 Introduction

The Department of Humanities and Social Sciences was established in 1959. Ph.D., M.S., and M.Tech. programmes are being offered. The major areas of teaching and research of the Department are :

- * Undergraduate courses in Humanities and Social Sciences.
- * M.Tech. courses in Industrial Management
- * M.S. and Ph.D. courses in Operations Research and Manufacturing Systems Management, Materials Management, Reliability Engineering, Financial Management and Business Policy & Strategy, Organisational Behaviour, Personnel Management and Industrial Relations, Applied Decision Analysis, Operations Research, Systems Analysis and Modelling, Forecasting Methods, Science and Technology Policy Studies.

German Literature, New Literature in English, Applied Economics, Applied Econometrics, Modern Indian History, Socio Economic Cultural Developments, Industrial and Social Psychology, Theoretical Linguistics, Teaching of English as a Second Language (T.E.S.L), Sociolinguistics, Generative Phonology, English for Specific Purpose (ESP) and Psycholinguistics.

4.8.2 Details of Faculty

Name and Qualification	Major area of Specialisation
Professors	
S. Ambirajan, Ph.D. (Andhra), Ph.D. (Manchester)	Economics, Economic History, Development Economics.
Dipak Chaudhuri, Ph.D. (IIT Kharagpur) [Head]	Reliability Engineering, Operations Research, Production & Materials Management, Maintenance Management.
A.V. Krishna Rao, Ph.D. (Andhra)	Effective Communication in English, Technical Reports, Indian Writing in English.
R. Rajagopalan, Ph.D. (IIT Kanpur)	Production Management, Group Technology, Science and Technology Policy, German
L.V.L.N. Sarma, Ph.D. (IISc)	Financial Management, Business Policy & Corporate Strategies.
Associate Professors	
T.T. Narendran, Ph.D. (IIT Madras)	Operations Management, Decision Support Systems, Group Technology

C. Ramachandran, Ph.D. (IIT Madras)	Modern Indian History, Labour History
R.N. Anantharaman, Ph.D. (Bangalore)	Organisation and Consumer Behaviour, Social Psychology, Psycholinguistics
S.C. Chaudhary, Ph.D. (CIEFL Hyderabad)	Theoretical Linguistics, ELT & Need Based Courses in English.
L.S. Ganesh, Ph.D. (IIT Madras)	Technology Forecasting, Multicriteria Decisions, Project Management and Applied Systems Analysis.
Assistant Professors	
(Mrs.) Elizabeth Nainan Kurian, Ph.D. (IIT, Madras)	American Fiction
(Ms) Evangeline Manickam, Ph.D. (Madras)	English, French
T.J. Kamalanabhan, Ph.D. (Madras)	Industrial Psychology, Organisational Behaviour.
V.S. Kumar, M.A. (Andhra)	English, Technical Communication
(Mrs) Malathy Duraisamy, Ph.D. (Madras)	Applied Economics/Econometrics, Labour Economics, Economics of Science and Technology.
V.R. Muraleedharan, Ph.D. (IIT Madras)	Health Economics
C. Rajendran, Ph.D. (IIT Madras)	Production Management, Scheduling, Computer Simulation.
B. Subramanian, Ph.D. (Karnataka)	German and Philosophy
D. Veeraraghavan, Ph.D. (IIT Madras)	Social and Economic History, Labour Movements.
M. Durgaprasada Rao, M.B.A. (Andhra)	Management Accounts, General Management.
S. Mohan, M.A. (Madras)	English, Science Fiction
S. Jayachandran, Ph.D. (IIT Madras)	Marketing Management
Lecturers	
G. Srinivasan, Ph.D. (IIT Madras)	Group Technology, Production Management, Operations Research.
Visiting Faculty	
(Mrs.) Birgit Schindler	German Language Teaching

4.8.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		
	M	W	M	W	M	W	M	W	M	W	M	W	Total
Ph.D.	6	1	4	3	4	1	2	2	1	-	17	7	24
M.S.	3	1	1	-	1	2	-	-	-	-	5	3	8
M.Tech.	14	1	-	-	-	-	-	-	-	-	14	1	15
Total	23	3	5	3	5	3	2	2	1	-	36	11	47

4.8.4 Number of Scholarships/Fellowships holders

Programme	Institute Scholarship	Others	Total
Ph.D.	19	1	20
M.S.	8	-	8
M.Tech.	14	1 (QIP)	15
Total	41	2	43

4.8.5 Number of Degrees Awarded

Programme	Number
Ph.D	3
M.S.	6
M.Tech.	25
Total	34

4.8.6 New Facilities added and Major Equipment procured

Modernisation of Industrial Engineering Laboratory.
Zenith Superlan System comprising a file Server and 9 Workstations.

4.8.7 Short-term Courses/Workshops/Seminars/Symposia/Conference organised

Sl.No.	Co-ordinator(s)	Title of Course/Workshop/ Seminar/Symposia/Conf.	Period
1.	Dr S.C. Chaudhary	Workshop on Spoken Communication	July,1992
2.	Dr L.S. Ganesh	"Preparing for World Class Manufacturing" - A Technology Appreciation Programme, IIT Madras.	Sep,1992

4.8.8 Short term Courses/Workshops/Seminars/Symposia/Conferences/Training attended by the Faculty in recognised Academic Institutions and Public Sectors

Sl.No	Name of Faculty	Title	Period/Duration
1.	Dr S.C. Chaudhary	"Teaching of English in Large classes", British Deputy High Commission, Madras. "Speech Technology", IIT Madras. "Towards a Model for Teaching Spoken English", IATEFL, Lille, France. "Don't blame the Mother Tongue", English Language Teachers Association of India, Dindigul.	July,1992 Aug,1992 Oct,1992 Nov,1992
2.	Dr L.V.L.N. Sarma	"Capital Market Efficiency : A Review", Econometric Society Conference.	Nov,1992
3.	Dr B. Subramaniam	Rudolf Kassener : The Physiognomic Perspective UGC Seminar on World Literature,Karnatak Univ., Dharwad.	1992
4.	Dr E.N. Kurian	"The Theme of Protest in Joseph Heller's Catch-22" Seminar on "Protest in Literature in English". IIT, Madras.	1992

Sl.No	Name of Faculty	Title	Period/Duration
5.	Dr Evangeline Manickam	"The Black Writer in the South: Tradition and Experience in Fiction" Indian Association for American Studies, 26th Annual Conference, MG University, Baroda.	1992
6.	Dr T.T. Narendran	"Bi-Criteria Model of the grouping problem in FMS" International Conference on Signals, Data and Systems, Calcutta.	Dec,1992
		"Availability assessment for a fluid catalytic cracking unit - A case study", ORSI Conference, IIM, Ahmedabad.	Dec,1992
		"Neural network models and manufacturing systems - A new synergy", ORSI Conference, IIM, Ahmedabad.	Dec,1992
		"Designing flexibility in cellular manufacturing systems", ORSI Conference, Ahmedabad.	Dec,1992
7.	Dr Dipak Chaudhuri	"Imperfect Maintenance Policies for Deteriorating Systems",	Nov,1992
		"Machine Condition Evaluation & Maintenance Decisions using Fuzzy set Theory", International Conference on Reliability, Washington.	
		"An Inspection Model for the Replacement of Critical Units Exhibiting Delay Time" Symposium on Flexible Automation, Sanfransisco.	Jul,1992

4.8.9 Invited Lectures Delivered by the Faculty in Academic /Institutions/Public Bodies

Sl. No.	Name of the Faculty	Topic of the Lecture	Delivered at	Date
1.	Dr S.C. Chaudhary	Linguistics In Language Teaching. Language Laboratory in English Language	Stella Maris College, Madras	30.8.92
			St. Christophers College of Education Madras.	30.6.92
			OEC, IIT, Madras.	1.9.92
2.	Dr B. Subramaniam	Spoken Communi- ation in Inter -disciplinary Situation. Phonology of Indian English and Teaching of Spoken English in India Teaching Literature "Zugang Zur indischen Gesinnung Gnhand indischer Mythologie"	Kendriya Vidyalaya, South Zone, Madras.	10.9.92
			Loyola College Madras	20.2.93
3.	Dr L.S. Ganesh	Project Management	TamilNadu Electricity Board, Madras	1992
		Technology Forecast- ing Systems Modeling and Analysis.	B.D.University, Trichy Annamalai University, M.K.University, Madurai Gandhigram Rural Institute.	1992

4.8.10 Sponsored Projects

Title	Period	Funding Agency	Amount (Rs in lakhs)	Co-ordinator(s)
Reliability Engineering	1989- Till date	Ministry of Human Resources Development	10.00	Dr Dipak Chaudhuri
History of Science & Technology in Madras Presidency		CSIR	1.50	Dr S.Ambirajan Dr R.Rajagopalan Dr V.R.Muraleedharan
Business of Better Writing		ISTE	0.15	Dr A.V.Krishnarao Dr S.C.Chaudhary
Women's Allocation of Time to Market & Non-Market work: Causes & Consequences.		Indian Council of Social Science Research, New Delhi	0.77	Dr Malathy Duraisamy
Identifying Personality Characteristics of Young and Budding Entrepreneurs		ICSR	0.50	Dr T.J.Kamalanabhan
Modernisation of Industrial Engineering Laboratory		MHRD	20.00	Dr T.T. Narendran

4.8.11 Major Consultancy Assignments

Title	Organisation	Amount	Co-ordinator(s)
Development of a Decision Support System for Career Management	M/S Bharat Dynamics Limited	1.414 lakhs	Dr T.T.Narendran Dr L.S. Ganesh

4.8.12 Honours and Awards

Name of Faculty	Honours/Awards
Dr B. Subramaniam	Alexander Von Humboldt Fellowship Worked with Prof. Jacob Steiner to organise an international exhibition for the Stran Hof-Museum Zurich on "Rilke und die Schweiz".
Dr L.V.L.N. Sarma	Renominated as Public Representative on the Governing Council of the Madras Stock Exchange by the Govt. of India.
Dr R. Malathy	Member, Academic Council, Mother Teresa Women's University, nominated by the Governor of T.Nadu. Served as Chief Examiner.

4.8.13 Books

Name	Title	Publisher
Dr B. Subramaniam Prof Jacob Steiner	Rilke und die Schweiz	Offizin Verlag
Kurian E.N.	A Religious Response to the Existential Dilemma in the Fiction of T.D. Salinger,	Intellectual Publishing House, New Delhi-110 002
Dr T.J.Kamalanabhan	"Readings in Behaviour Modification" - One chapter on 'Assertive Training'.	NCERT, New Delhi.

4.8.14 Research Publications

1. Dr S.C. Chaudhary "An Explanation of Simplification in Pidgeons", Indian Linguistics, Vol. 50.1-4, 1989 Issued 1992, pp.39-46.
2. Dr S.C. Chaudhary "Nippon : New Superpower" Review Article, New Quest, Vol. 91, Jan-Feb 1992, 57-64.
3. Dr S.C. Chaudhary "ESP at the Crossroads", Focus on English, Vol. 8.1, Dec 1992, 32-38.
4. Dr S.C. Chaudhary "Two Faces of Reservation", The Hindu, 2nd June, 1992, Madras.

5. Dr S.C. Chaudhary "Unplanned Growth Excessive Centralisation", The Hindu, 17th March, 1992, Madras.
6. Dr S.C. Chaudhary "Confusion in the 8th Schedule", The Times of India, Patron, Oct, 1992.
7. Dr L.V.L.N. Sarma "Architects of Modern Theory of Corporate Finance: contributions of Four Nobel Laureates in Economics to Financial Economics" , Business Spectrum(Quarterly), Vol.1, No.2, Jan-Mar 92.
8. V.R. Muraleedharan and D. Veeraraghavan, "Anti-malarial Policy in the Madras Presidency : An Overview of the Early Decade of the Twentieth Presidency", Medical History, Vol.36. No. 3, 1992.
9. V.R. Muraleedharan, "Professionalising Medical Practice in Colonial South India", Economic and Political Weekly, Vol.27, No. 4, Jan 1992.
10. Kurian,E.N. "J.D.Sahinger's Franny towards a Spiritual Frontier", Indian Journal of American Studies, Summer 1990,Vol.20,No.2,pp.33-41.
11. C. Mahendra and L.S. Ganesh; "Graphical representation of media vehicle characteristics using Chernoff faces - A subjective basis for vehicle selection", Modelling, Simulation and Control: D; Vol.6; No.2; 1993.
12. C. Mahendra and L.S. Ganesh; "Cluster Analysis of media vehicles - An objective basis for vehicle selection" Modelling, Simulation and Control: D; Vol.6; No.2; 1993..
13. Malathy, R. Women's Time Allocation to Market and Nonmarket Work: Does Education Matter? in V.N. Kothari(ed) Human Capital Theory and Human Resource Development in India, Bombay: Himalayan Publishing Co (1992).
14. S. Ramesh Kumar and T.J. Kamalanabhan "Concept of Satisfaction in Consumer Psychology" - Journal of Psychometry, Vol.6, pages 31-34, Jan, 1993.
15. K.J. Verghese, R. Ramanathan and L.S. Ganesh: "Energy Planning in a Chemical Industry: An Application of the Analytic Hierarchy Process", Energy Management, Vol.16,No.1; pp.1 to 24; 1992.
16. "Rilke und die stadt": In: "Rilke und die Schweiz", ed. Jacob Steiner, Offizin Verlag, Zurich 1992.
17. C. Rajendran and Dipak Chaudhuri "A Multi-Stage Parallel Processor Flowshop Problem with Minimum Flowtime" - European Journal of Operational Research, Vol.57, No.1, 111-122 (1992).
18. C. Rajendran and Dipak Chaudhuri "An Efficient Heuristic Approach to the Scheduling of Jobs in a Flowshop" - European Journal of Operational Research, Vol.61, No.3, 318-325 (1992).
19. C. Rajendran and Dipak Chaudhuri "Scheduling in N-Job, M- Stage Flowshop with Parallel Processors to Minimize Makespan" - International Journal of Production Economics (Formerly Engineering Costs and Production Economics), Vol.27, No.2, 137-143 (1992).
20. V. Jayabalan and Dipak Chaudhuri "An Heuristic Approach for Finite Time Maintenance Policy", International Journal of Production Economics, 27 (1992) pp 251-256.
21. C. Eswar Reddy, O.V.K. Chetty and Dipak Chaudhuri "A Petri Net based Approach for Analysing Tool Management Issues in FMS", International Journal of Production Research, Vol.30, No.6 (1992), pp 1427-1446.
22. K. Mohandas, B.V.A. Rao and Dipak Chaudhuri "Optimal Periodic Replacement for a Deteriorating Production System with Inspection and Minimal Repair", Reliability Engineering & Systems Safety, 37 (1992), pp 73-77.

23. V.Jayabalan and Dipak Chaudhuri "Optimal Maintenance - Replacement Policy under Imperfect Maintenance", Reliability Engineering & Systems Safety, Vol.32, No.2, pp 165-169, 1992.
24. V. Jayabalan and Dipak Chaudhuri "Sequential Imperfect preventive Maintenance Policies" - A Case Study, Microelectronics and Reliability, 32 (1992), No.9, pp 1223- 1229.
25. V. Jayabalan and Dipak Chaudhuri "Optimal Maintenance and Replacement Policy for a Deteriorating System with Increased Mean Down Time", Naval Research Logistics, Vol.39 (1992), pp 67-78.
26. V. Jayabalan and Dipak Chaudhuri "Cost Optimization of Maintenance Scheduling for a System with Assured Reliability" IEEE Transactions on Reliability, Vol.41, No.1, March 1992, pp 21-25.
27. K. Mohandas, B.V.A. Rao and Dipak Chaudhuri "Optimal Periodic Replacement with Inspection and Minimal Repair for a System which is Inoperable During Inspection Periods", Microelectronics and Reliability, Vol.32, No.4, 1992, pp 509-513.
28. C.Rajendran "Two-Stage Flowshop Scheduling Problem with Bi- Criteria" - Journal of Operational Research Society, Vol. 43, No. 9, 871-884 (1992).
29. Venugopal, V. and Narendran, T.T. "Cell formation in manufacturing systems through simulated annealing: An experimental evaluation". European Journal of Operational Research, Vol. 63, No. 3.
30. Mahadevan, B. and Narendran, T.T. "Determination of unit load sizes in an Automated Guided Vehicle based Material Handling System for an FMS", International Journal of Production Research, 30, No.4, 909 - 922.
31. Kochikar, V.P. and Narendran, T.T. "Modelling automated manufacturing systems using a modification of coloured Petrinets" Robotics & Computer-Integrated Manufacturing, Vol. 9, No. 3, 181-189.
32. Venugopal, V. and Narendran, T.T. "Neural network model for design retrieval in manufacturing systems" Computers in Industry, Vol. 20, No. 2, 11-23.
33. Kochikar, V.P. and Narendran, T.T. "A framework for assessing the flexibility of manufacturing systems", International Journal of Production Research, Vol.30, No.12, pp.2873-2895.
34. Venugopal, V. and Narendran, T.T. " A genetic algorithm approach to the machine-component grouping problem with multiple objectives ", Computers and Industrial Engineering., Vol.22, No.4, pp.469-480.
35. Srinivasan, G. and Narendran, T.T. 1992. "Group Technology layout using multidimensional scaling". Modelling, Simulation & Control, C, Vol.29, No.1., 55-64.
36. Venugopal, V. and Narendran, T.T. 1992. "A neural network approach for designing cellular manufacturing systems". Advances in Modelling & Analysis, C, 32, No.2, 13 - 26.
37. Kochikar, V.P. and Narendran, T.T. 1992. " A novel coloured petri net modelling approach for simulation of flexible manufacturing systems " Modelling, Measurement and Control, D, Vol. 5, No. 3, 31-42.
38. Venugopal, V. and Narendran, T.T. " Design retrieval in group technology using Hopfield neural networks" to appear in Modelling, Measurement and Control, D, Vol.6, No.2, 1-15, 1993.

4.8.15 Any Other Relevant Details

The Department had 1 Scientific Officer, 3 non-teaching technical and 8 non-teaching non-technical staff.

4.9 Mathematics Department

4.9.1 Introduction

The Department of Mathematics was established in 1959. Now Ph.D. and M.Sc. Programmes in Mathematics are offered. In addition, the Department teaches courses in Mathematics to B.Tech., M.Tech. and Ph.D. students of this Institute. The major areas of teaching and research of the department are:

1. Continuum Mechanics
2. Stochastic processes and their applications
3. Graph Theory
4. Cosmology
5. Operations Research
6. Functional Analysis
7. Mathematical modelling
8. Approximation theory
9. Application of Algebras

4.9.2 Details of Faculty

Name and Qualification

Major area of Specialisation

Professors

A Avudainayagam, Ph.D.(IIT Madras)

Fluid Mechanics, Suspension Rheology, Polar Fluids.

P Bhattacharyya, Ph.D. (London)

Complex Analysis, Theory of Splines, Lacunary Interpolation, Approximation Theory.

V.B. Johri, Ph.D.(Gorakhpur)

Theory of relativity, Brans-Dicke theory, Cosmology, the early universe, the interface of cosmology, high energy physics, Astronomy and Astro Physics, the Physical, Chemical and Biological evolution of the universe.

(Mrs) S Kalpakam, Ph.D.(IIT Madras)

Applied Probability and Stochastic Processes, Operations Research.

S N Majhi, Ph.D. (IIT Madras)

Fluid Mechanics, Bio-fluid mechanics Mathematics modelling.

P R Parthasarathy, Ph.D.(Annamalai)

Applied probability and Stochastic models, Mathematical ecology, Operations research, Statistical inference.

K R Parthasarathy, Ph.D.
(IIT Kharagpur)

Graph theory, Net-work.

H S Paul, Ph.D.(Kharagpur)

Electricity, Piezoelectricity Wave propagation, Bio-medical engineering.

U N Srivastava, Ph.D.(IIT Madras)[Head]

Applied Mathematics, Differential equations, Continuum mechanics, Singular Perturbation Problems, Boundary Layer theory, Differential inequalities, Mathematical ecology, Dynamical systems.

V Subba Rao, Ph.D.(IIT Kharagpur)

Numerical Analysis, Approximation theory, Computational fluid dynamics,

R Subramanian, Ph.D.(IIT Madras)

Applied Probability, Stochastic Processes, Operations Research.

Associate Professor

C M Purushotham, Ph.D.(IIT Kharagpur)

Hydrodynamic stability and wave propagation problems, Magnatohydrodynamics, Dust gas dynamics.

S N Venkatarangan, Ph.D.(IIT Madras)

Fluid Mechanics, Variational Methods, Dual variational principles.

S H Kulkarni, Ph.D.(IIT Bombay)

Functional analysis and Numerical analysis.

C V Raghava Rao, Ph.D.(IIT Madras)

Fluid mechanics, Numerical methods in fluid mechanics

P.V. Subramanyam, Ph.D.(IIT Madras)

Fixed point theory and applications.

Assistant Professors

S G Kamath, Ph.D. (Delhi)

Theoretical Physics, Elementary particle Physics.

Y Nagendra, Ph.D.(IIT Kharagpur)

Statistical quality control, Statistical methods and analysis, Identifying the factor(s) responsible for the poor (or good) quality items. Analysis of variance response surface analysis (to find the optimal factor combination)

A Rangan, Ph.D. (IIT Madras)

Probability theory, Stochastic Processes, Operations research Application to Biological Sciences, Nural models, Inventory controls, Ecology, Reliability.

(Mrs.) W B Vasantha, Ph.D.(Madras)

Group Theory, Ring rings, theory, Group Latticee theory, Semi groups, coding theory, Application of Algebra.

P Veeramani, Ph.D.(IIT Bombay)

Fixed point theorems and their applications to problems in Optimization and best approximation.

Senior Scientific Officer
K Swaminathan, Ph.D. (Agra)

Fluid dynamics, Ship-hydrodynamics, Mathematics problems related to naval Architecture and Ocean engineering, System simulation and development of software for control systems. Explosion generated shock waves applied to naval ships.

4.9.3 Students on roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	4	1	8	1	3	2	3	3	2	2	20	9	29
M.S.	15	14	6	16	-	-	-	-	-	-	21	30	51
Total	19	15	14	17	3	2	3	3	2	2	41	39	80

4.9.4 Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	CSIR Fellowship	Others			Total
			NBHM	PDF	QIP	
Ph.D.	20	7	1	2	1	31

4.9.5 Short term courses, Workshops, Seminars, Conferences Organised

Title	Date	Coordinator
A one day Symposium on Mathematical Methods and applications	22 Dec. 1992	Dr. S.N. Majhi

4.9.6 Lectures delivered

S.No.	Title	Venue	Date	Faculty
1.	Lectures on Probability Binomials, Exponentials and other mathematical topics to the P.G. Maths Teachers	Kendriya Vidyalaya IIT Madras	May '92	Prof. V B Johri Teaching faculty of Mathematics Department.
2.	1) Non-Singular Cosmological models with creation Mechanism	at GR International Conference at Cordoba (Argentina)	13 July'92	Lecture delivered by Prof. V B Johri Dept. of Maths
	2) On compactification of Higher Dimensional Manifolds to 4 Space-time	at II ICOMIDC International Symposium on Geometry and its Applications held at IIT Delhi	Oct'92	

S.No.	Title	Venue	Date	Faculty
3.	a) 'Graphs in Biology in Symposium on Graph of Theory, Madurai Kamaraj University Madurai,		11.9.92	Dr.KR Parthasarathy Teaching faculty Mathematics Dept. (Professor)
	b) 'Polynomial invariants and reconstruction of graphs' Seminar on Graph Theory, Annamalai Univ. Annamalai Nagar		5.1.93	-do-
	c) 'Algorithmic Applications of Graph Theory' two lectures at Karnataka University at Dharwar		26.2.93	-do-
	d) 'Applications of graph theory to other sciences' One lecture at Central University, Pondicherry		26.3.93	-do-
4.	4 lectures on 'Probability Theory' to the Postgraduate Teachers (Mathematics) during their In-service Training Course held in Kendriya Vidyalaya IIT, Madras.		May-June '92	Dr. R Subramanian Professor of Mathematics Dept.
5.	Seminar Talk on 'Fixed point Theory and Applications' at the department of Mathematics, college of Engineering, Anna University, Guindy.		26.2.93	Dr. P Veeramani Asst. Professor Mathematics Dept.
6.	Optimal Maintenance and Replacement of Deteriorating Systems with general Repair-invited lecture in National conference on Reliability Sponsored by Indian Society for Probability and Statistics at Cochin University of Science and Technology, Cochin		Dec.1991	Dr. A Rangan Asst. Prof. Dept. of Maths.
7.	A Bicriterion Optimization Scheduling Problem - Paper presented in the IASTED international conference on Reliability, Quality Control and Risk Assessment, Washington DC		Nov.1992	-do-
8.	Stochastic models of single Neurons invited lecture organised by the Dept. of Statistics and Dept. of Biophysical Science - University of Buffalo, Buffalo, New York USA		Nov.10,1992	-do-

4.9.7 Books and Monographs published:

Name of Faculty	Title	Publishers
S N Majhi and P Achuthan	Monographs on Mathematical Modelling in Science and Technology,	
S.H. Kulkarni and B V Limaye	Real functional Algebras	Marcel Dekker Inc., New York, 1992.

4.9.8 Research Publications

1. V Subba Rao and G Latha, A slope modification method for shallow rate equations, Int.J.Num.Methods in Fluids, 14, 1992, 189-196.
2. S K Srinivasan, R Subramanian and K P Kistner: Control of repair rates in cold standby systems, O.R. Spektrum, 14(1992) 129-136.
3. H S Paul and C V Raman - 'Vibration of a pyzoelectric solid cylinder of arbitrary cross section of crystal class 6' Indian Journal of Technology, Vol.30, Sept. 1992 pp.477-482.
4. H S Paul and V M Murali - Wave propagation in a cylindrical poroelastic bone with cavity' International Journal of Engineering Sequence Vol.30, Noll, pp. 1629-16- 35, 1992.
5. C V Raghavarao, 'Numerical Study of Slow vixcous flow with shear past a circular cylinder'Indian Journal Pure appl. Math, 23(5): 377-386, May 1992.
6. (i) S H Kulkarni - 'Representations of a class of real B algebra as algebras of quatednim-valued functions' Ann.Math.Soc. 116(1) (1992) 61-66
(ii) Sushma Agrawal and S H Kulkarni, 'A Spectral theorem for normal operators on a real Hilbart space'one day symposium on Mathematical Methods and Application, Dec.22, 1992, IIT Madras.
(iii)S H Kulkarni and K C Sivakumar, 'Applications of Generalized Inverses to Internal Linear Programs in Hilbert Spaces' One day Symposium on Mathematical Methods and Applications, Dec. 22, 1992, IIT Madras.
7. P R P and B K K: On the number of deaths in semi-markov compartmental system with branching particules, Math.Comp. Mod. 16 (1992)29-36.
8. P R P and B K K. on the total sojourn time of particles in semi-Markov compartmental system with branching particles. To appear in Comm. in Stat.1993.
9. P and B K K Transient solution of an M/M/I quene with balking Queueing systems, Th. and Appl. 1993.
10. P R P and V Vijayalakshmi. Transient solution of state dependent queues - a continued fraction approach To appear in Neural, Parallel and Sci. Comp. 1993
11. Some Notes on the Stochastic feature extraction of Briefly exposed visual displays, A Rangan and G Sarada (Research Scholar) J. of Psychometry, Vol.5, No.1, 1992, pp.25-33.
12. Optimal Strategies for Deteriorating Systems with changing failure distribution - A Rangan and G Sarada (Research Scholar), International J. of Management and Systems, Vol.8, No.3, 1992, pp 237-250.

13. Bicriterion Optimization in Single Machine Sequencing Problems - A Rangan and K Anandhi (M.Sc. Student), Proceedings of the IASTED International Conference at Washington DC, Nov.4-6, 1992 pp.168-171.
14. Optimal Repair Replacement Policy for a deteriorating Systems - A. Rangan and G Sarada (Research Scholar), Jour. of Maths and Phy. Sci., 1992 No. 6, pp.1-6.
15. Kamath, BRST invariance and the conical pendulum Pramana 38, 11-20(1992)
16. Kamath, Relativistic Tautochrone, J. Math. Phy. 33, 134-940 (1992)
17. Kamath, The dilatation anomaly for the non-relativistic Landan problem, Phys. Lett. A172, 99-106 (1992).
18. P V Subrahmanyam with Jessy Antony, Common fixed points and weak compatibility, Proc. of the Second International Conf. on Fixed point theory and Application, World Scientific 1992.
19. P V Subramanyan with I.C. Reilly) Some Fixed point theorems, J. Austral. Math. Soc. (Series A) 53 (1992), 304-312.
20. A note on Rolle's theorem (Mathematics Teacher, India) Vol. 26, 1990, 83-85 (Journal issued in 1992)
21. H S Paul and C V Raman, 'Vibration of a pyzo electric solid cylinder of arbitrary cross section of crystal class 6', Indian Journal issued
22. H S Paul and V M Murali - Wave propagation in a cylindrical Poroelastic bone with cavity' International Journal of Engineering Science Vol.30, Noll. pp. 1629-1635, 1992.
23. a) P Veeramani on some Fixed Point theorems on uniformly Convex Banach Spaces, J. Math. Anal. Appl. 167(1), 160-166 (1992).
b) P Veeramani on Some Fixed Point theorems for Non-continuous Mappings, Bull. Cal. Math. Soc. 85 No.1(Feb.)-1993.
24. V Vetrivel, P. Veeramani and P. Bhattacharyya, Some Extensions on Fan's Anal. and Optimiz. (13 (3 and 4) 397- 402 (1992)
25. V Vetrivel, P Veeramani and P. Bhattacharyya, On some fixed point theorems for Nonexpansive Mappings, Jour. Math. Phy. Sci. Vol. 26, No.2, 165-174 (1992)
26. W.B. Vasantha, On E-Rings, J Guizhou Inst. of Tech. Vol.20. No.1(42-44) 1992 China.
27. W.B. Vasantha, On Semigroup Rings which are Marot Rings, Revista Integracion, Vol.9 No.1 (59-62) 1992 America.
28. W.B. Vasantha, On the Ring Z_2S_3 . Mathematics Student, (Indian Mathematical Society) Vol.61, No.1-4, (246-248) 1992 (India)
29. W.B. Vasantha, A note on pre-J-group Rings, Qatar Univ. Science Journal, Vol.II 27-31 1992 Qatar.
30. W.B. Vasantha, On Strongly sub-commutative near-rings Saitama Math. Journal Vol.9, 7-8 1992. Japan.
31. W.B. Vasantha, On Null Semigroups, Maths Education Vol.26 (186-187) (1992) India.
32. W.B. Vasantha, Super Boolean Algebras, Journal of North East Normal Univ., No.4 (9-11) (1992) China

33. W.B. Vasantha, Zero Divisors in loop algebras of power associative and di-associative loops, Acta Plyechnica, vol16 No.3 (21-26) (1992) Czechoslovakia.
34. W.B. Vasantha, On Normal Elements in Loop Rings, J. of Scit of Phy. Sciences, Vol.4 No.2 (210-212) 1992, India.
35. W.B. Vasantha, On Chain Semi rings, J. of Bangladesh Academy of Sciences vol.16, No.2, (257-258) 1992, Bangladesh.
36. W.B. Vasantha, Loops over near rings, J. of Shanghai Univ. of Sci. and Tech. vol.15, No.1 (41-44) 1992, China.
37. W.B. Vasantha, On inner commutative groups, Mathematics Students (Indian Mathematical Soc.) vol61. No.1-4, (249-252) 1992, India.
38. W.B. Vasantha, On Subsemi ideal Rings, Chinese J. of Maths, Vol.7 No.1 (107-108) (1992) China.
39. W.B. Vasantha, A note on units and semi-idempotents elements in commutative group rings, Ganita, Vol.42, No.1-2, (33-34) 1991 India.
40. W.B. Vasantha, On Near Loop Rings which are marot near loop rings, Zeszyty Nal. Pol., Polia, Scientiarum Univ., Resovinsis, Vol.14, (55-58) 1992 Poland.
41. W.B. Vasantha, A note on semi-idepotents in group rings. Ultra Sci. of Phy. Sci. Vol.4 - 1 (77-78) 1992 India.
42. W.B. Vasantha, Semi group rings that are pre-boolean Rings. J. of Fuzhou. Univ. Vol.20, 1 (6-9) 1992 China.
43. W.B. Vasantha, On pre J-Group semirings, Pure Math. Manuscript Vol.8, India.
44. W.B. Vasantha, Filial Semigroups and semigroup rings Libertas Mathematics, Vol.12, (35-37) 1992 America.

4.9.9 Any Other:

Two post-doctoral fellows were in the department during the period under report.

4.10 Mechanical Engineering Department

4.10.1 Introduction

The Department of Mechanical Engineering was established in 1959. The Ph.D., M.S., M.Tech., and B.Tech. programmes are being offered. The major areas of teaching and research of the Department are:

- * Heat Transfer & Thermal Power
- * Hydro Turbo Machines
- * I.C. Engines
- * Machine Elements
- * Manufacturing Engineering
- * Mechanical Handling
- * Precision Engineering & Instrumentation
- * Refrigeration and Airconditioning
- * Thermal Turbo Machines
- * Thermodynamics and Combustion Engineering

4.10.2 New Courses Introduced

The following new courses were introduced during the period under report.

Sl.no.	Course No.	Title	Structure	Faculty
1.	ME 778	Precision Electric Drives & Actuators	3.0.0.3	Dr.D.V.R.L.Rao
2.	O Level	Engg.Graphics	Descriptive Geometry through Computer	Dr.N.Sivaprasad
3.	ME 772	Servo & Proportional Hydraulic Controls	3.0.0.3	Dr.M.Singaperumal
4.	ME 894	Hydro Static Transmissions	3.0.0.3	Dr.M.Singaperumal

New Diciplines Introduced M.Tech

1. Computer Integrated Manufacturing
2. Manufacturing Engineering

4.10.3 Details of Faculty

Name and Qualification	Major area of Specialisation
Professors	
Ajit Kumar Kolar., Ph.D.	Fluidized Bed, Combustion and Heat Transfer
Bhaskaran, K.A., Ph.D.	Combustion and Propulsion
Ganesan, V., Ph.D.	I.C.Engines
Gopalakrishnan, K.V., Ph.D.	Alternative Fuels for I.C. Engines
Gopinath, K., Ph.D.	Machine Design
Krishnaiah Chetty, O.V., Ph.D.	Manufacturing Engineering
Krishnamurthy, R., Ph.D.	Metal Cutting, Gear Tribology
Krishna Sastri, V.M., Ph.D.	Energy, Heat Transfer
Lakshminarayana, K., Ph.D.	Machine Design
Madhusudana Rao, M., Ph.D.	Mechanical Handling
Nagalingam, B., Ph.D.	Mechanical Engineering
Nagarajan, T., Ph.D.	Precision Engg. & Robotics
Natarajan, R., Ph.D.	Thermal Engineering
Parameswaran, M.A., Ph.D.	Mechanical Handling
Philip, P.K., Ph.D.	Machining, Tools, CAD/CAM
Premananda Shet, U.S., Ph.D.	Combustion Engineering
Prithvi Raj, D., Ph.D.	Turbomachines
Radha Krishna, H.C., Ph.D.	Hydroturbomachines
Radhakrishnan, V., Ph.D. [Head]	Mechanical Engineering
Raman, R., Ph.D.	Precision Engineering
Ramamohana Rao, A., Ph.D.	Machine Design
Seetharamu, K.N., Ph.D.	Heat Transfer, Fluid Flow
Shunmugam, M.S., Ph.D.	Metrology

Sriramulu, V., Ph.D.

Combustion, Solar Energy

Srinivasa Rao, P., Ph.D.

Fuels, Pollution & Engines

Srinivasa Murthy, S., Ph.D.

Refrigeration and Air-conditioning
Mechanical Engineering

Veluswami, M.A., Ph.D.

Turbomachines

Venkatrayulu, N., Ph.D.

Thermal Sciences

Venkatesh, A., Ph.D.

Heat Transfer

Venkateshan, S.P., Ph.D.

Heat Exchangers, Fluidized Beds

Vijay R. Raghavan., Ph.D.

Associate Professors

Balabaskaran, V., Ph.D.

Combustion and Propulsion

Kumaraswamy, S., Ph.D.

Hydroturbomachines

Pramod S. Mehta., Ph.D.

I.C.Engines

Singaperumal, M., Ph.D.

Fluid Power, Precision

Sivaprasad, N., Ph.D.

Finite Element Analysis
Engineering

Srinivasa, Y.G., Ph.D.

Instrumentation and Control

Assistant Professors

Gopalan, K.N., Ph.D.

Analysis Simulation & Dynamics

Govinda Mallan, K.R., Ph.D.

I.C.Engines

Govardhan, M., Ph.D.

Flow Studies in Turbomachines

Jayaprakash, V., Ph.D.

Stress Analysis

Krishnakumar, R., Ph.D.

CAD/CAM, Finite Element Computational
Machine

Krishnamurthy, S., Ph.D.

Machine Design

Kuppuswamy, G., Ph.D.

Machine Tools & Manufacturing

Mayuram, M.M., Ph.D.

Design, Surface Engineering

Mani, A., Ph.D.

Refrigeration & Air Conditioning,
Conservation, Solar Energy

Muthuveerappan, G., Ph.D.

Structural Vibration in Fluids

Narayanasamy, K., Ph.D.	Surface Topography, Manufacturing Method
Padiyar, K.S., M.Tech.	Thermodynamics
Rajan, V.N., M.S.	Energy Engineering
Ramakoteswara Rao, K., Ph.D.	Machine Design, Mechanical Handling Equipment
Ramalingeswara Rao, D.V., M.Tech.	Instrumentation and Control Engineering
Ramamoorthy, B., Ph.D.	CAI, QC, Image Processing
Ramesh Babu, N., Ph.D.	Manufacturing
Sitaram, N., Ph.D.	Thermal Turbomachines
Thyagarajan, K.V., Ph.D.	Machine Design
Vijayaraghavan, L., Ph.D.	Metal Cutting, CAD

Lecturers

Prakash M. Maiya., Ph.D. Thermal Science

Chief Design Engineer

Chennabasavan, T.S., M.Sc. Machine Design

Senior Design Engineer

Kalander Saheb, S.D., M.Tech. Design and Production

Senior Scientific Officer

Boopathy, S., M.E. Production Engineering

Senior Maintenance Engineer

Arun, A., B.E. Refrigeration Engineering

4.10.4 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	15	-	14	1	20	-	15	-	10	2	74	3	77
M.S.	11	-	9	-	8	1	7	-	13	-	48	1	49
M.Tech.	69	-	61	-	62	-	58	1	77	-	327	1	328
B.Tech.	70	-	64	-	64	-	75	2	78	2	351	4	355
Total	165	-	148	1	154	1	155	3	178	4	800	9	809

4.10.5 Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	Others	Total
Ph.D.	46	12 (QIP)	58
M.S.	31	-	31
M.Tech.	38	15 (sponsored)	53
B.Tech.	17	-	17
Total	132	27	159

4.10.6 No. of Degrees Awarded

Programme	Number
Ph.D.	16
M.S.	11
M.Tech	70 (including HAL)
B.Tech.	61
Total	158

4.10.7 Instruments/Equipment Designed and Developed

1. Designed & Developed a Small Power tiller.
2. Dev. of a Compression Testing Machine using Thermal Energy.
3. Cam and roller type continuous contact indexing mechanism with opposite direction rotation.
4. Rolling contact fatigue test rig.
5. Tooling for sintered gears.

6. Spur Gear impact measuring instrumentation.
7. Laser Doppler Anemometers.
8. A low NO₂ Swirl Burner.
9. High duty Swirl Burner.
10. Magnetic Abrasive Grinding Machine.

4.10.8 New Facilities added and Major Equipment procured

1. 24" Air Circulators
2. Weiler lathe from Germany
3. Gantry robot from Siemens Germany
4. Electromagnetic Vibrator for Chutes
5. CAD Laboratory for teaching Engg. Drawing through Computers.
6. Weiler Turning Center.
7. Deckel Machining Center.
8. Siemens Manutec Robot.
9. Laser system.

4.10.9 Short-term Courses/Workshops/Seminars/Symposia/Conferences organised

Sl. No.	Co-ordinator(s)	Title of course/Workshop/Seminar/Symposia/Conf.	Period
1.	Prof.U.S.P.Shet	Recent Advances on Comb. Science & Technology	30.11.92-11.12.92
2.	Prof.R.Natarajan	Strategies for Energy Saving in Industries	22.02.93
3.	Prof.V.Radhakrishnan Prof. V. Ganesan	Advances in Mech.Engg.	24.04.92 & 25.04.92
4.	Prof.M.A.Parameswaran Dr.N.Sivaprasad	Advances in Des.Engg.	01.03.93 & 05.03.93
5.	Prof.V.Radhakrishnan	Factories of the Future	16.10.92 & 17.10.92
6.	- do -	Education & Training for Advanced Manufacturing	01.12.92

4.10.10 Short term Courses/Workshops/Seminars/Symposia/Conferences/Training attended by the Faculty in recognised Academic Institutions and Public Sectors

Sl. No.	Name of Faculty	Title	Period/Duration
1.	Dr.S.Kumaraswamy/ Dr.V.Balabaskaran	Advances in Mech.Engg.	24.04.92 and 25.04.92
2.	Dr.S.Kumaraswamy	8th Nat.Convention of Mech.Engineers	30th & 31st Oct. & 1st Nov.1992.

Sl. No.	Name of Faculty	Title	Period/Duration
3.	Dr.S.Kumaraswamy/ Mr.S.V.Subbaramaiah	I National Symposium on Air Breathing Engines	2nd & 4th Dec. 1992
4.	Prof.V.Radhakrishnan/ Prof.M.S.Shunmugam/ Prof.P.K.Philip/ Prof.R.Krishnamurthy/ Prof.O.V.K. Chetty/ Dr.G.Kuppuswamy/ Dr.L.Vijayaraghavan/ Dr.B.Ramamoorthy/ Dr.N.Ramesh Babu	15th AIMTDR Conference Coimbatore	3rd to 5th Dec. 1992.
5.	Prof.N.Venkatrayulu	I National Conference Bangalore	2nd to 4th Dec. 1992.
6.	Prof.N.Venkatrayulu	Discussion meeting at GTRE Bangalore Presented Annual Progress Report at ARDB Panel meeting	24.02.93 25.02.93
7.	Prof.R.Natarajan	5th Asian Congress of Fluid Mechanics	10.08.92 to 14.08.92
8.	Prof.R.Natarajan	12th National Conference on IC Engines	15.09.92 to 18.09.92
9.	Prof.V.Sriramulu	- do -	- do -
10.	Prof.U.S.P.Shet	National Symposium on Acoustics	12.12.92 to 14.12.92
11.	Prof.M.A.Parameswaran	Quality through Engg.Design	13.01.93
12.	Prof.K.V.Gopalakrishnan Prof.B.Nagalingam	Advances in Mech. Engg.	24.04.92 & 25.04.92
13.	Prof.V.Ganesan & Dr.Pramod S.Mehta	12th National Con. on IC Engines	15.09.92 to 18.09.92
14.	Dr.M.M.Mayuram,	15th AIMTDR Con.	Dec.1992
15.	Prof.A.RamamohanaRao	National Conf.on Industrial Tribology	24.03.93 to 26.03.93
16.	Prof.K.A.Bhaskaran	12th National Conf. on IC Engines & Comb.	15.09.92 to 18.09.92
17.	Prof.S.Srinivasamurthy	Workshop on Environ- mentally Sound Techno- logies for Heating and and cooling Technologies in Human Settlements, Australia	28.09.92 to 02.10.92
18.	Mr.M.Fatouh & Prof.S.Srinivasamurthy	National Solar Energy Conference, N.Delhi	28.12.92 to 30.12.92
19.	Prof.A.K.Kolar Prof.S.P.Venkateshan	Indo-German Workshop on Advances in Heat Transfer	29.03.93 to 31.03.93

4.11.11 Special Lecture Delivered

Sl. No.	Name of the Faculty	Topic of the Lecture	Delivered at	Date
1.	Dr.S.Kumaraswamy	Problems in Centrifugal pumps	Aeronautical Society	30.01.93
2.	Prof.S.Srinivasa-murthy	Energy recovery from Condensors	Heat Pump's Workshop Pondicerry	17th & 18th June'92
3.	Prof.R.Natarajan	Nature & Scope of Thermal Engg.	Workshop on Advances in Mech.Engg.	24th & 25th Apl.'92
4.	Prof.K.A.Bhaskaran	Theme Lecture on Comb.& Prop.	- do -	- do -
5.	Prof.V.Sriramulu	Supersonic Comb.	- do -	- do -
6.	Prof.A.Venkatesh	Thermal Applns.of Solar Energy	- do -	- do -
7.	Prof.K.A.Bhaskaran	Current Research in High Temperature Kinetics	West Germany	16.11.92
8.	Prof.U.S.P.Shet	Swirl Comb.	Workshop on Advances in Mech.Engg.	24.04.92 & 25.04.92
9.	Dr.M.M.Mayuram	Wear Control thro' Surface coating & treatments Thermal spraying Process & Appln.	Symposium on Advances in Coatings - do -	Oct.92 - do -
10.	Prof.A.Ramamohana Rao	Failure Analysis Gear Research	S & S Switch Uni.of Berkely USA.	Aug.92 Sep.92
11.	Dr.M.A.Veluswami	Heat Exchanger Design	BHEL, Trichy	Dec.'92
12.	Prof.O.V.Krishnaiah Chetty	- do - Optimization in Design	KCP Ltd.,Ms. Brakes India, Madras	Jan.Mar. 93. Sep.92 to Mar.93
		CNC Technology	BHEL, B'lore	4th & 5th June 1992
		Computer Aided Planning	BEL, B'lore	10.06.92
		Factory of the future	IEE, Madras	16.10.92
		Two day Orientation Programme Computer Aided Process Planning Computer Aided Process Planning scheduling and Petrinets	MPC, Madras MIT, Madras BVB College,	10th & 11th May 1992

4.10.12 Visits Abroad

Sl. No.	Name of the Faculty	Country visited	Date	Purpose of visit
1.	Prof.H.C.Radhakrishna	Malaysia	10th to 25th Sep.1992	Conducting Short Term course on HTM
2.	Prof.O.V.K.Chetty	Australia Singapore	11th to 14th Aug.1992	Paper presentation To visit Institutions
3.	Prof.R.Natarajan	W.Germany	May-June	Humbolt Fellowship
4.	Prof.K.A.Bhaskaran	Germay	3 months from 13.10.92	DAAD Reinvitation
5.	Prof.A.Ramamohana Rao	6th ASME Int.Conf.on Power Transmission & Gearing (USA)	9th to 25th Sep.1992.	
6.	Prof.K.Gopinath	I World Congress of Powder Metallurgy USA	19.06.92 to 17.07.92	
7.	Prof.N.Venkatrayulu/ Dr.M.Govardhan	5th ASIAN CONGRESS of Fluid Mechanics South Korea		Paper presentation
8.	Prof.S.Srinivasamurthy	James Cook Uni. Australia & Uni. Technology, Malaysia	28.09.92 to 02.10.92	Delivered Special Lecture
		Australia	04.10.92 to 07.10.92	To deliver two invited Lectures
9.	Prof.M.Madhusudana Rao	West Germany		DAAD Reinvitation
10.	Dr.M.Singaperumal	West Germany	- do -	
11.	Prof.S.P.Venkateshan	ICCME '92 Singapore		Paper presentation
12.	Prof.K.N.Seetharamu	U.K.		Post-doctoral Research

4.10.13 Distinguished visitors to the Department (Important Dignitaries above the level of Professor)

Sl. No.	Name of the Visitor and Occupation	Date of visit	Purpose of visit (Lecture/Discussion)
1.	Dr.A.Weckenmann, Uni.of Erlangen, West.Germany	21.02.93, 2nd & 3rd March 93.	Visiting Professor
2.	Dr.Ing.Wolfgang Wiedenroth, Universitat, West Germany.	03.04.92 to 06.04.92	Visiting Professor
3.	Mr.Nirmal Joshi	17.07.92	Visited from Tribhuvan University, Katmandu
4.	Prof.Rishi Raj, City University,NY	04.08.92 to 03.09.92	Visited under TOKTEN programme.
5.	Prof.Sudhir K. Sastri Ohio State Univ. USA	11.06.92	Visiting Professor
6.	Prof.Roland Lewis Unv.College of Swansea, U.K.	26.02.93	Visited for discussion
7.	Prof.T.L.Seetharama Rao REC, Warangal, Prof.G.Kamaraj, Annamalai Univ.	23.05.92	Visited for discussion
8.	Prof.S.Sathikh, VC, Madras Uni. Prof.T.R.Jagadisan, Director,Anna Uni. Dr.R.Mahadevan, GM, India Pistons, Dr.N.S.Nagaratnam Director, CVRDE, Avadi	18.07.92	Visit and discussion
9.	Prof.Dr.Ing.Wolfgang, Wiedenroth	11.04.92	Discussions about ins- trumentation in hydraulic transportation
10.	Prof.ORAVSKY Vladmir	26th & 27th Nov.1992	Exchange programme under NSA
11.	Prof.W.Massberg Rektor, Ruhr Uni. Bochum, W.Germany	20th Nov. to 3rd Dec. 1992	Visited under Indo- German programme
12.	Dr.Heydamann,CSO, American Embassy	May 1992	To review NSF Project
13.	Dr.P.Rama Rao, Secretary, DST	July 1992	To visit & Review NSF project

4.10.14 Sponsored Projects

Title	Period	Funding Agency	Amount Rs. (in lakhs)	Co-ordinator(s)
1.Dev.of Solar operated pumpless continuous Absorption Refrigerators		DNES	12.00	Dr.S.Srinivasamurthy
2.Ignition Studies on Solid Propellents	3 yrs.	ISRO	4.495	Dr.K.A.Bhaskaran
3.Light Combat Aircraft Aircraft Mounted Accessory Gearbox	2yrs.	CVRDE	7.46	Dr.A.Rammohana Rao Dr.S.Krishnamurthy
4.Investigations on the effect of Form Errors & Surface Irregularities on the Hydraulic Lock in axial piston pumps & motors.	4.5	CSIR	4.57	Dr.K.Narayanasamy M.Singaperumal
5. RCF Testing of ball bearing Steel	2 yrs	TISCO, Jamshedpur	1.2	Dr.K.Gopinath
6. Des. of bellow making machine	2 yrs	Insap Flexible Engineers	1.15	Dr.K.Gopinath
7. Dev.ofinteractive Computer based Information & Guidance package for Educational & Employment Planning	3 yrs.	MHRD	10.0	Dr.M.S.Shunmugam Dr.V.Jayaprakash
8. Computer modelling of 2 Stroke Engines		ARDB	7.0	Dr.V.Ganesan
9. Numerical prediction of two dimensional reacting flows		ARDB	5.7	Dr.V.Ganesan
10. Tip clearance flows in Compressors	3 yrs	ARDB	5.0	Dr .N.Venkatrayulu Dr.N.Sitaram
11.Studies on Supersonic Combustion	4 yrs	ISRO	7.95	Dr.K.A.Damodaran Dr.V.Sriramulu Dr.U.S.P.Shet

Title	Period	Funding Agency	Amount Rs. (in lakhs)	Co-ordinator(s)
12.Studies on Advanced Propulsion	4 yrs	DRDO	19.9	Dr.K.A.Damodaran, Dr.V.Sriramulu
13.Des.& Dev. of Environmental chamber	2 yrs	MHRD	15.0	Dr.S.Srinivasamurthy Dr.Prakash Maiya Dr.A.Mani
14.High temperature Industrial Heat Pump Systems	5 yrs	MHRD		Dr.S.Srinivasamurthy Dr. Prakash Maiya Dr.A.Mani Dr.A.R.Balakrishnan
15.Implications of Montreal Protocol on R&AC industries in India	1 yr.	IRDF	0.50	Dr.A.R.Balakrishnan
16.Des.& Dev.of metal hydride heat pumps, heat transformers and their hybrids	4 yrs	DNES	9.56	Dr.B.Viswanathan
17.Des.& Dev.and testing of heat exchangers for Helium liquefiers	4 yrs	DST	7.50	Dr.S.P.Venkateshan
18.Dev.& Testing of industrial high temperature heat pumps	5 yrs	Planning Commission	4.60	Dr. S.P.Venkateshan & 4 Others
19.Alternatives to CFCs for Refrigeration Applications Energy, Environmental Aspects	3 yrs	Indo-German	5.00	Dr.A.R.Balakrishnan
20.Studies on the mixing & Comb. Phenomena in Ramjet Chambers	4 yrs	ARDB	4.98	Dr. R.Natarajan
21.Numerical Predictions of 2-D Reacting Flows with application to Ramjet chambers	3 yrs	ARDB	5.796	- do -

Title	Period	Funding Agency	Amount Rs. (in lakhs)	Co-ordinator(s)
22. Interference & Turbulence Effects in spray comb.	3 yrs	ISRO	7.412	- do -
23. Computer Aided Design & Manufacture of dies	3 yrs	DST	17.59	Dr.V.Radhakrishnan Dr.R.Krishnamurthy
24. Appln. of Vision System for surfaces and dimensional inspection	3 yrs	CSIR	5.4	Dr.V.Radhakrishnan Dr.B.Ramaboopathy
25. Computer Assisted Flexible Automated Assembly system	2 yrs	MHRD	15.0	Dr.V.Radhakrishnan
26. Circulating Fluidised Bed Boiler	1 yr	MHRD	1.5	Dr.A.K.Kolar
27. Development of continuous Solar Refrigerator operating with transfer tank	2 yrs	CSIR	4.2	Prof.S.Srinivasamurthy Dr.A.Mani

4.10.15 Major Consultancy Assignments

Title	Organisation	Amount
1. Failure Analysis Testing	TEXMO INDUSTRIES, Coimbatore	10,000
2. Dev. of Software for retrieval systems	BHEL, Hyd.	50,000
3. Des. dev. and proto type testing	Jay Em Exports.	30,000
4. Dev. of Twin Spindle T Slot Grinding machine	Guindy Machine Tools, Madras.	7,50,000
5. Prodn. & Quality Improvement	Susira Industries	10,000

	Title	Organisation	Amount
6.	Automation of 35 Relay	O/E/N India, Cochin	15,000
7.	General Testing of Components	Various Industries	15,000
8.	Software Dev.for Control of heat treatment systems	Fluid therm tech. Ambattur.	50,000
9.	Study of Plant & Equipment	Aurofood Ltd., Pondicherry	22,000
10.	CNC Machining of Press Tools	Fludyne Engrs. Madras.	20,000
11.	Laser Interferometer measurement	Simpson & Co., Madras.	15,000
12.	Technical Advice	Appolo Tyres Ltd., Trichur	12,000
13.	Consultancy on Fuel Oil testing	Tata Oil Mills, Madras.	10,000
14.	Analysis of Transients in Steam deaerator	BHEL, Hyderabad	1,70,000
15.	Power Engine Testing	UCAL Power Ingines	15,000
16.	Testing of Engines	Bureau of Indian Standards ICSR/43/ME/92-93	15,000
17.	Studies of flow of iron ore in chutes	NMDC, Hyderabad	35,000
18.	Analysis of Gantry Structure	Seeflex Automation Ltd., Madras	15,000
19.	FEA of connecting rod	Wheels India Ltd.	18,000
20.	Consultancy for effluent treatment plants	TALCO & PCB	45,000

	Title	Organisation	Amount
21.	Calibration of CMM with laser interferometer	TAFE, Madras	15,000
22.	Software Dev.	Fluidtherm Technology Madras	50,000
23.	Design & Dev. of Fixture and Reduction in cycle time for oil pump body	Holwart Engg.Co, Ms.	9,000
24.	Evaluation of brake friction materials	Standard Clutches, Bombay	14,000
25.	Testing of heavy duty flexible tubes under biaxial load	Insap Flexibles & Engrs.	3,000
26.	Retainer Consultant	Fluidtherm (P) Ltd., Ms.	18,000
27.	Testing of Insulation	Various Agencies	30,000
28.	Gascade testing of fan rotoblades	BHEL, Bhopal	60,000
29.	Aerodynamic testing of cooling tower fan rotor blades	Paharpur Cooling Towers Calcutta.	70,000
30.	2-D Probe Calibration	BHEL, Hyd.	50,000
31.	Assessment of Performance of a Thermal Efficiency-Improving Device for LPG Stove.	ICSR/29/ME(TCL)	9,950
32.	Energy Efficient Building design	Tata Research Dev.Centre	1,00,000
33.	Dev.of 5 MVA Super Conducting Generator	BHEL, Hyderabad	2,50,000
34.	Material Handling System for ICF	ICF Madras	25,000

	Title	Organisation	Amount
35.	Quality Improvement	Standard Packagings	12,000
36.	Analysis of Transients in a Steam Deaerator	BHEL, Hyd.	1,70,000
37.	150 TPD Pressurized Fludised Bed Gasifier	BHEL, Hyd.	12,00,000
38.	Dev. of 5MBA Cryogenic Generator	BHEL, Hyd.	2,00,000

4.10.16 Honours and Awards

	Name of Faculty	Honours/Awards	Purpose
1.	Dr.A.Ramamohana Rao Sri B.Srinivasulu	Americal Gear Mfrg. Association Award, USA	Best paper & work on Hollow tooth gears
2.	Dr. V.Radhakrishnan	Fellow of the Indian National Academy of Engineers	
3.	Dr.N.Ramesh Babu	Cash Award	Best Technical paper

4.10.17 Books

	Name of Faculty	Title	Publisher
	Dr.G.Kuppuswamy	Principles of Metal Cutting: An introduction	Orient Longman Ltd.
	Prof.R.Raman	Principles of Mechanical Measurements	Oxford and IBH Publishing Co.
	Prof.Vijay R. Raghavan	Heat Exchangers- translated from German	Hemisphere Publishing Corpn. NY, USA
	Prof.K.N.Seetharamu & Others	FEM in Heat Transfer Analysis	John Wiley & sonx U.K.

4.10.18 Research Publications

1. M. Madhusudana Rao, "Effect of air flow in the Hopper on flow of Bulk Materials through Chutes".
2. A. Ramamohana Rao, et al, "Performance Studies on treated steels as substitutes for conventional bearing materials, Wear,155, p15-25, 1992.
3. A. Ramamohana Rao, B. Srinivasulu, "Studies on the dynamic performance of a spur gear with hollow teeth, 6th ASME Int.Power Transmission Conference, Vol.1,p35-44, 1992.
4. A. Ramamohana Rao, B. Srinivasulu, "Spurgears - A new Approach to tooth design, AGMA Fall Technical meeting,Oct.92.
5. A. Ramamohana Rao, P. V. Mohan Ram, "Load distribution Analysis of journal bearings operating under mixed lubrication conditions, 6th ASME Int.Power Transmission Conference, Vol.1,p299-306, 1992.
6. S.Ramachandran, T. Nagarajan, N. Sivaprasad-"An approach for the design and dynamic analysis of Platform type robot manipulators wing FEM", Finite Elements in Analysis and Design, Vol 10, p 335-350, 1992.
7. N.Sivaprasad, Vinod Kumar, Badrinarayanan S., "Computer Aided Development of Surfaces of Transition pieces"- Computer & Structures, Vol.43, p411-418, 1992.
8. M.M. Mayuram, R. Krishnamurthy, "Some studies on AE Application in assessing tribological characteristics of plasma sprayed ceramic coatings, proc. of intl. conf. on Thermal Spraying, 1992.
9. M.M.Mayuram, "Wear control through surface coatings and treatments, thermal spraying processes and applications, symposium on advances in coatings, 1992.
10. M.A.Parameswaran, Material Handling System & Equipments, "Workshop on Advances in Mechanical Engg., 1992.
11. M.Madhusudana Rao, K.Giriprasad, Ch.Sathiah, "Effect of Air of bulk materials through Chutes Bulk Engg.USA,Vol.6,p43-51, 1992.
12. M.Madhusudana Rao,T.Ramakrishnan, Y. Venkateswara Rao, "The Slope stability of powder material bed percolated by a fluid, Advanced Powder Technology, Vol.4, No.1, 1992.
13. A. Gangadhar, M.S. Shunmugam , P.K. Philip, "Pulse Train Studies in EDM with Controlled Pulse relaxation, Int.J.M/c. Tool & Manufacturer, Vol.32,No.2, 1992.
14. P.K.Philip, M.Ramakrishnan, N.G.Nair, Design & Development of FRP Automobile Leaf Spring, Proc.15th AIMTDR Conference, p191-196, 1992.
15. V.Veerabhadra Rao, D.K.Sharma, P.K.Philip, "Object Recognition Algorithms for 2-D Non Occluded objects, Proc.15th AIMTDR Conference, p983-987, 1992.
16. G.Upendra, P.K.Philip, "Fixtures for flexible Automated Manufacturing, 15th AIMTDR Conference Dec.1992.
17. P.K.Philip, "Advanced Manufacturing Education & Training at Undergraduate and graduate levels, keynote paper at the Workshop on Advanced Manufacturing Education & Training,1992.

18. P.K.Philip, "Advanced Manufacturing Processes, Theme talk at the Seminar on "Advances in Mech.Engg., 1992.
19. N.Ramesh Babu, V.Radhakrishnan, "Performance of Evaluation of a laser dressed Al_2O_3 wheel in Wet Grinding, 15th AIMTDR Conference, p554-559, 1992.
20. K.George, N.Ramesh Babu, "Modified Algorithm for the Generation of cutter path for 3D Sculptured Surface machining, 15th AIMTDR Conference, p112-117, 1992.
21. G.Kuppuswamy, Venkata Ramesh, Role of FEM in Mfg.Engg., Proc.A.I.Seminar on Computer Applications in Material Processing p.1-12, 1992.
22. G.Kuppuswamy, A.M.Chincholkar, "Timed Petrinet method for a Robotic Handling System, 15th AIMTDR Conf.,p.471-476, 1992.
23. S.Darius Gnanaraj, R.Raman, "Experimental Studies on wear in oil impregnated Sintered Bearings, Wear, p73-81, 1992.
24. P.Bangaru Babu, T.Nagarajan, "Modelling & Simulation of Flexible Manipulators, ASME, Journal on Modelling Simulation & Control, vol.41,No.2,1992.
25. A.M.Junaid Basha, Shaik Anwar Basha, M.Singaperumal, K.Narayanasamy, "Dynamic simulation of Hydrostatic Steering System in Tracked earth moving Vehicle", Proc. VII All India Fluid Power Conf. p.31-37, 1992.
26. K.Sadashivappa, M.Singaperumal, K.Narayanasamy, "Effect of Form Errors on the Hydraulic Lock in Axial Piston Pumps and Motors, Proc. All India Fluid Power Conf., p 109-114,1992.
27. V.V.Rao, V.Madhavan, M.Karthik, K.Narayanasamy, "Profilometer using Laser Speckle Contrast in the Diffraction Plane", 15th AIMTDR Conference, 1992.
28. S.Gowri, K.Narayanasamy, R.Krishnamurthy, "Tribological Performance of Plasma Sprayed Ceramic Coating", 15th AIMTDR Conference, p 355-360, 1992.
29. D.V.Girish, M.M.Mayuram, 'Influence of Shot peening on the Surace durability of EN 24 Spur Gears performance, 15th AIMTDR Conf., 1992.
30. K.Gopinath, R.Gnanamoorthy, "Surface durability studies on Sintered Low alloy steel gears, I World P/M Congress, USA, Jan.21-26, 1993.
31. S.Nambiar, S.Natarajan, M.S.Ananth, Vijay R.Raghavan, R.Natarajan, "Second Law Analysis of Desalination process" - Indian Journal of Technology, Vol.30,p353-361, July 1992.
32. Gopinath, R, Ganesan, V., "Orthogonal arrays:an introduction and its application in optimizing under relaxation factor in a simple based algorithm, Int.Jl.of Numerical Methods in Fluids, vol.14,p665-680, 1992.
33. M.S.Nagesh, K.R.Govindamallan, K.V.Gopalakrishnan, "Experimental Investigations on Extended Expansion engine", S.A.E.International Congress, USA, Feb.1992.
34. P.Ram Reddy, K.R.Govindamallan, V.Ganesan, "Numerical & Experimental Investigation into the performance of four-stroke DI Diesel Engines, 12th National Conference on IC Engine & Comb. Sep.1992.

35. Ravichandran,M., Thangavelu,C., Ganesan,V. & Sundararajan, V."Numerical Prediction of Isothermal Flow in an Afterburner Model, Proc.of the Int.Con.on Computational Methods in Engg., Singapore,Vol.1, pp 688-693, 11-13 November 1992.
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4.11 Metallurgical Engineering Department

4.11.1 Introduction

The Department of Metallurgical Engg. was established in 1959. Now, Ph.D., M.S., M.Tech., and B.Tech. programmes are being offered. The major areas of teaching and research of the Department are:

- a. Metal Casting c. Metal Joining b. Metal Forming d. Materials Technology

4.11.2 Details of Faculty

Name and Qualification

Major areas of specialisation

Professors

K.Anantha Padmanabhan,Ph.D.(Cantab)	Metal forming (rolling, sheet metal, forging), mechanical metallurgy, superplasticity.
D.R.Gopalakrishna Achar,Ph.D.(IIT Madras)	Metal joining, (welding technology) failure analysis, corrosion, industrial metallurgy.
K.J.Lakshminarayana Iyer,Ph.D.(IIT Madras)[Head]	Material science, failure analysis, physical metallurgy.
O.Prabhakar,Ph.D.(IIT Madras)	Non-destructive testing and process modeling.
V.M.Radhakrishnan,Ph.D.(IIT Madras)	Fracture mechanics, high temperature materials, fatigue and creep.
H.Md.Roshan,Ph.D.(IIT Madras)	Metal casting (foundry technology).
S.K.Seshadri,Ph.D.(London)	Chemical metallurgy, surface technology utilisation of renewable agricultural resources.
K.Srinivasa Raghavan,Ph.D.	Materials science, physical metallurgy and electron microscopy.
S.Sundaresan,Ph.D.(IIT Madras)	Metal joining, welding metallurgy, mechanical behaviour.
R.Vasudevan,Dr.-Ing.(Aachen)	Physical metallurgy, heat treatment, X-ray diffraction and process.

Associate Professors

C.V.Gokularathnam,Ph.D.(Florida)	Physical metallurgy, X-ray diffraction, advanced ceramics, SEM & TEM.
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S.D.Pathak,Ph.D.(IIT Madras)	Materials science and technology, mechanical behaviour, material testing, metal casting.
K.Prasad Rao,Ph.D.(IIT Madras)	Metal joining, corrosion.
S.Raghavan,Ph.D.(IISc)	Physico-chemical aspects of process metallurgy, extractive metallurgy.
S.Ramakrishna Iyer,Ph.D.(IIT Madras)	Furnace technology, extraction metallurgy, hot corrosion.
P.Venugopal,Ph.D.(IIT Madras)	Metal forming, extrusion of metals and metallic powder, metal forming equipment and tool.

Assistant Professors

D.Ganapat Ram Sharma,Ph.D.(IIT Madras)	Metal casting, non- destructive testing, process modelling.
P.Kesavan Nair,Ph.D.(IIT Madras)	Physical metallurgy, X-ray diffraction.
Paramanand Singh,Ph.D.(IIT Bombay)	Powder metallurgy, ceramics and composites.
K.Swaminathan,Ph.D.(IIT Madras)	Metal forming, materials science

Lecturers

V.Sampath,Ph.D.(IISc)	Materials technology, electroslag refining.
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Senior Scientific Officers Gr II

S. Annamalai,M.S.(IIT Madras)	Metal forming
S.S.Bhattacharya,B.Tech.(IIT Madras)	Metal forming
B. Guha,Ph.D.(IIT Madras)	Mechanical testing, metal joining
G.Jothinathan, M.Tech.(IIT Madras)	Non-destructive testing ceramics
S.Kumaran,M.Sc.(Madras)	Non-ferrous extraction metallurgy, corrosion and chemical metallurgy.

Technical Officers

B. Raghunatha Rao,Ph.D.(IIT Madras)	Heat treatment, failure analysis.
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4.11.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		
	M	W	M	W	M	W	M	W	M	W	M	W	Total
Ph.D.	11	1	9	1	10	-	4	-	29	-	63	2	65
M.S.	1	-	4	-	1	-	1	-	2	-	9	-	9
B.Tech.	-	-	22	1	20	4	22	1	-	-	64	6	70
Total	12	1	35	2	31	4	27	1	31	-	136	8	144

4.11.4 Number of Scholarships/Fellowships holders

Programme	Institute Scholarship	Others	Total
Ph.D.	21	1 (SAIL)	22
M.S.	5	-	5
Total	26	1	27

4.11.5 Instrument/Equipment Designed and developed

1. A hydraulic tubular bulging device has been designed and fabricated for the evaluation of the formability characterisation of tubular blanks.
2. Hydrogen atmosphere controlled sintering set up with a programmable temperature controller upto a maximum of 1000°C.
3. Vacuum impregnation set up for inter connected porosity measurement.
4. Stainless steel Ball Mill containers for powder mixing and size reduction.
5. Die and Punch assemblies for Powder Metallurgy work.
6. A simple four point bend creep testing apparatus for brittle ceramic materials.
7. Developed a software for rapid kidney stone analysis for quick identification of deposits by x-ray.
8. A device for rapid determination of quench rates of fluids.

4.11.6 New facilities added and major equipment procured

- * Computerised potentiostat
- * Zenith LAN computer system comprising of IPCAT 386 file server and 5 nodes of PCAT 386.

4.11.7 Short term courses/ Workshops/ Seminars/ Symposia/Conferences organised

Sl. no.	Co-ordinator(s)	Title course/Workshop/Seminar Symposia/Conf.	Period
1.	H.Md. Roshan	How to implement ISO9000 in Metallurgical Industries.	29-30 Oct.
2.	S.K. Seshadri	Experimental Techniques and material evaluation in industry.	17-19 Dec.

4.11.8 Short term courses/ Workshops/ Seminars/ Symposia/ Conferences/ Training attended by the faculty in recognised Academic Institutions and Public sectors.

Sl.no	Title	Period/ duration	Name of Faculty
1.	Joint planning meeting for Indo-US workshop in welding science.	March 1993	Dr.S.Sundaresan Dr.B.Guha
2.	Science congress (Goa)	2 days Jan 93	Dr.K.A.Padmanabhan
3.	4th DAE Appreciation course on materials for nuclear Industry BARC Bombay	Nov 30th to Dec 11th 1992	Dr KJL Iyer Dr P.Kesavan Nair

4.11.9 Invited Lectures delivered by the Faculty in Academic Institutions and Public bodies.

Sl.No.	Name of the faculty	Topic of the Lecture	Delivered at	Date
1.	H.Md. Roshan	Advances in Foundry technology	Telco Jamshedpur	Sept. 1992
2.	D.R.G. Achar	Welding Technology & Inspection	Resot Center MRL Madras	23.9.92
		Introduction to Welding processes	Advani Oerlikon Ltd. Madras.	19.10.92
		Weldability & Weldability testing	-do-	24.10.92
		Metals processing	ISNT Madras	28.10.92
		Welding Metallurgy	Advani Oerlikon Ltd., Madras.	2.11.92
		Metal Joining Tech. (Key-note Address)	ABCON, Bangalore	11.12.92
		Ferrous Welding Met.	IIW, Madras	3.1.93

4.11.10 Distinguished visitors to the Department

Sl.No.	Name of the Visitors & Occupation	Date of visit	Purpose of Visit (Lecture/Discussion)
1.	Dr K.Krishna Rao Managing Director ODIN Metal Powder Ltd. Hyderabad	23.04.92	Metal Powder production by Atomization.
2.	Dr V.Rangarajan Senior Engineer R&D Lab. Inland Steel Company East Chicago, USA	29.05.92	Effects of coating properties on the formability of coated sheet steels.
3.	Prof S.K.Mannan INCO International Huntington, USA	16.10.92	Fracture toughness and High Temperature compressive strength of particulate reinforced Ni-Al based composites.
4.	Dr Thomas George Jet Propulsion Lab. Calif.Inst. of Pasadena,USA	30.11.92	Transmission Electron Microscopy of Semi-conductor Tech. material
5.	Prof K.A. Natarajan Professor, Dept. of Metallurgy, I.I.Sc. Bangalore	15.12.92	Bio Mineral Technology
6.	Prof.Peter Meadownik University of Surrey England	21.12.92	Prediction of Young's Modulus of intermetallics
7.	Mr P.Nagendra Research Scholar University of Illinois Urbana, U.S.A.	23.12.92	Adaptive Mesh Refinement for Solidification problems
8.	Dr R.Sunder Head, Structural Integrity Division National Aeronautical Lab. Bangalore	04.02.93	Short Crack Growth at Notches under Aircraft Spectrum Loading.
9.	Dr Mitchenko Visiting Scientist, UK	17.03.93	In the area of multiple crack initiation and growth at the notch root under spectrum loading.
10.	Dr V.Ramachandran Emeritus Scientist National Aeronautical Limited, Bangalore	23.3.93	The KANISHKA crash - Salvage operations and scientific investigations

4.11.11 Sponsored Projects

Sl. No.	Title	Period	Funding Agency	Amount (in lakhs)	Co-ordinator(s)
1.	Effect of US vibration on the ageing of characteristics of alloys (a) Al (b) Mg	1988-1993	ISRO	6.00	Dr.R.Vasudevan
2.	Indo-German project on Materials testing	1986-93	GTZ Germany	DM 3.2 millions	Dr.KA.Padma-nabhan
3.	Fatigue behaviour & fatigue crack growth studies on Mg & Al alloys	upto Mar. 93	ARDB	6.62	Dr.V M Radha-krishnan
4.	CAD in Metal casting face to and modeling of metallurgical microstructure	1990-93	DST	10.332	Prof.O.Prabha- kar
5.	Welding of titanium alloys	3 yrs	DST	11.98	Prof.S.Sunda- resan
6.	Thermodynamics and phase relations in system Nio-MgO-ZnO using a solid electrolyte galvanic cell	3 yrs	CSIR	1.50	Dr.S.Raghavan Dr.S.K.Seshadri
7.	Development of New contact materials	1 yr	ICSR		Dr.Paramanand- Singh Dr.K.N.Bhat
8.	Studies on plasma sprayed Ceramic coatings	3 yrs	DST	4.09	Dr.K.PrasadRao Dr.C.V.Gokula- rathnam

4.11.12 Major Consultancy Assignments

Sl.no	Title	Organisation	Amount (in lakhs)	Co-ordinator(s)
1.	Qualitative analysis of minerals	GIMPEX (PVT) Ltd.	0.141	Dr P.K.Nair Prof R.Vasudevan
2.	Residual stress analysis on crack shafts	Ashok Leyland	0.530	Dr P.K.Nair Prof R.Vasudevan
3.	Residual stress analysis on seamless tube	Kunal Engg	0.186	Dr P.K.Nair Prof R.Vasudevan
4.	Residual stress analysis on Helicopter landing grid and corrosion	L & T Mc Neil	0.156	Dr P.K.Nair Prof R.Vasudevan Prof S.K.Seshadri

Sl.no	Title	Organisation	Amount (in lakhs)	Co-ordinator(s)
5.	Qualitative analysis on Rantidine Hydrochloride	Shasun Chem.	0.12	Dr P.K.Nair Prof R.Vasudevan
6.	Failure analysis of Allen head screw	Tamil Nadu Petro, Madras	0.12	Dr B.R.Rao Prof K.J.L.Iyer
7.	Failure analysis of gears	Nagarjun Fertilizer, Kakinada	0.10	Dr B.R.Rao Prof K.J.L.Iyer
8.	Failure Analysis of steel forgings	Samalku Enterprises	0.12	Dr B.R.Rao Prof K.J.L.Iyer
9.	Corrosion of condenser tubes	Anandavikatan	0.06	Prof S.K.Seshadri
10.	Failure analysis of steel bellows	Howard Finlay Madras	0.07	Dr B.R.Rao Prof K.J.L. Iyer
11.	Failure analysis of failed Metallic, Hosur	Howard Finlay Madras	0.06	Dr B.R.Rao Prof K.J.L.Iyer
12.	Case depter analysis of Nitrided Sieving bracket mesh	Howard Finlay Madras	0.05	Dr B.R.Rao Prof K.J.L.Iyer
13.	Materials evaluation of thrust bearing	Ashok Leyland Madras	0.05	Dr B.R.Rao Prof K.J.L.Iyer
14.	Microstructural study of boiler tubes	Enmas Engg Enterprises	0.05	Dr B.R.Rao Prof K.J.L.Iyer
15.	Failure analysis of study	Tamilnadu electricity board	0.065	Dr B.R.Rao Prof K.J.L.Iyer
16.	Failure analysis of boiler tube	Tamilnadu petroproducts Ltd. Madras	0.065	Dr B.R.Rao Prof K.J.L.Iyer
17.	Study of nitrides layer	Howard Finlay Madras	0.05	Dr B.R.Rao Prof K.J.L.Iyer
18.	Surface coating for wear resistant coating	BHEL Trichy	0.437	Dr B.R.Rao Prof K.J.L.Iyer
19.	Fracture toughness of Tisten-52 steel peats by (T01)	TISCO Jamshedpur	6.0	Dr S.D.Pathak
20.	Installation of superplastic formation equipment	VSSC Trivandrum	5.0	Dr K.A.Padmanabhan
21.	The microstructural analysis of a cast iron components	Ashok Leyland Madras	0.04	Dr B.R.Rao Prof K.J.L.Iyer

4.11.13 Honours and Awards

Name of the Faculty	Honours/Awards	Purpose
K.A. Padmanabhan	G.D.Birla Award, IIM	for continuous and outstanding research work in the field of materials science and technology
K. Prasad Rao	N.M.D.Award, IIM	for research in the field of non-ferrous metallurgy
K. Swaminathan	Kamani Gold Medal, IIM	for the best paper published in Trans IIM in 1991
P. Kesavan Nair R. Vasudevan	S.P.Govnidaraj Memorial award	for best technical paper presented at the IIM welding seminar
R. Vasudevan	ISTE Award	for outstanding academic
O. Prabhakar	Material Research Society of India Medal	Contribution to the area of "Process Modeling" Medal - Rs.1000/-
H.K. Sabath	Vidya Bharathi Award	for highest marks in the degree examination in metallurgy

4.11.14 Research Publications

a. In Periodicals

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b. In conferences and Proceedings

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4.12 Ocean Engineering Centre

4.12.1 Introduction

Ocean Engineering Centre was established in 1977. Now Ph.D, M.S., M.Tech. and B.Tech. Programmes are being offered. The major areas of teaching and research of the Centre are:

- * Structural analysis, Design and Testing
- * Wave Hydrodynamics
- * Floating and Submerged Bodies
- * Marine Geotechniques
- * Materials in Ocean Environment
- * Ocean Energy
- * Naval Architecture
- * Sea bed mining
- * Underwater instrumentation

4.12.2 Details of Faculty

Name and Qualification

Major area of specialisation

Professors

S.Narasimha Rao, Ph.D(IISC)[Head]

Marine geotechnical engineering, Seabed soil characteristics under static and dynamic loads

C.Ganapathy, Ph.D(IIT Madras)

Analysis and design of offshore and ship structures

K.Muthukrishnaiah, Ph.D(IIT Madras)

Marine geotechnical engineering, Analysis and design of foundation for offshore and onshore structures

M.R.Pranesh, Ph.D(IISC)

Structural-soil-wave interaction studies, Coastline studies, Behaviour of materials in ocean environment

V.S.Raju, Dr. Ing. (Karlsruhe)

Marine geotechnical engineering, Foundation design for onshore and marine structures, Ocean energy

M.Ravindran, Ph.D.(IIT Madras)

Turbomachines, Pumps, Hydraulic turbines, Ocean energy

C.P.Vendhan, Ph.D(IIT Kanpur)

Computer aided analysis of ocean, Civil and aerospace structures, Dynamics of floating bodies and structures

Associate Professors

K.Ganesh Babu, Ph.D(IIT Madras)

Analysis and design of ocean structures, Behaviour of materials in fatigue and in ocean environment

V.G.Idichandy, Ph.D(IIT Madras)

Experimental techniques,
Instrumentation, Analysis and testing of
structural models and prototypes

R.Mahadevan, Ph.D(IISc.)

Physical oceanography, Ocean wave
hydrodynamics

K.Rajagopalan, Ph.D(IIT Madras)

Computer aided analysis, Design of
ship, underwater and offshore
structures, Reinforced and prestressed
concrete structures

R.L.Roy Choudhury, Ph.D(IIT Madras)

Ship motions and maneuvering, Ship
propulsion and resistance Design of
small crafts and fishing vessels

V.Sundar, Ph.D(IIT Madras)

Wave-structure interaction, Coastal
erosion and shore protection, Fluid
flow problems

SP.Subramanian, Ph.D(IIT Madras)

Geological oceanography, Engineering
geology

S.Meenakshisundaram, Ph.D(IIT Madras)

Measuring techniques connected with
ocean engineering studies, Wave force
studies, Ship design, Ship production
and planning

Assistant Professors

S.K.Bhattacharyya, Ph.D.(IIT Madras)

Computer aided structural analysis,
Analysis of motion of floating bodies,
Model studies)

J.S.Mani, Ph.D(IIT Madras)

Modelling of coastal engineering
problems, Hydraulic instrumentation

P.Sambandam, M.S.(IIT Madras)

Ship design, Ship structures,
Computer Applications in ship design

R.Sundaravadivelu, Ph.D(IIT Madras)

Computer aided analysis, design and
experimental studies of coastal and
offshore structures

Lecturers

Paul Mario Koola, Ph.D.(IIT Madras)

Wave energy, Hydrodynamics,
Oceanographic measurements

S.Neelamani, Ph.D(IIT Madras)

Experimental & theoretical hydro-
dynamics, Wave structure interaction,
Wave energy, Fluid Mechanics

Senior Scientific Officer-I

R.Natarajan, Ph.D.(IIT Madras)

Ship design, Ship production and
planning

Senior Scientific Officers-II

V.Ananthasubramanian, Ph.D(IIT Madras)

Naval architecture, Ship model testing

C.K.Vijayan, B.SE.(Michigan)

Marine engines and Propulsion

V.Padmaraj, M.S. (MIT, USA)

Naval Architecture (Relieved on Dec.
'92)

Visiting Faculty

Sridhar Jagannadhan, Ph.D. (USA)

Naval Architecture

4.12.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	4	-	2	-	6	3	3	1	17	1	32	5	37
M.S.	5	1	3	2	-	-	-	-	-	-	8	3	11
M.Tech.	6	1	6	-	-	-	-	-	-	-	12	1	13
B.Tech.	13	-	17	-	13	-	9	-	-	-	52	-	52
Total	28	2	28	2	19	3	12	1	17	1	104	9	113

4.12.4 Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	Others	Total
Ph.D.	16	11	27
M.S.	10	1	11
M.Tech.	4	9	13
Total	30	21	51

4.12.5 No.of Degrees Awarded

Programme	Number
Ph.D	6
M.S.	4
M.Tech	11
B.Tech	13
Total	34

4.12.6 New Facilities added and Major Equipment procured

- * 2 Personal Computers
- * 2 Force transducers upto 50 kg measurements
- * 6 Miniature Pressure Transducers
- * 1 28 Channel DC amplifier
- * 1 3 axes velocity meter (All are gifts from Germany)
- * Dyno drive powered hydrodynamic exciter
- * Wave absorber for Wave Basin

4.12.7 Short-term Courses/Workshops/Seminars/Symposia/Conference Organised

Sl.No.	Title of course/Workshop Seminar/Symposia/Conf.	Period	Coordinator(s)
1.	Org. Secretary (Publications) XIII ICSMFE Jt. Org. Secretary (Publications) XIII ICSMFE Jt. Org. Secretary (Publications) XIII ICSMFE	Jan. 94 Jan. 94 Jan. 94	Prof.V.S.Raju Prof.S.Narasimha Rao Prof.M.R.Pranesh
2.	Experiments in Ship Hydrodynamics (Continuing Education Program)	Dec. 92	Dr.V.Anantha Subramanain
3.	Foundation Problems and Remedial Measures (IGS)	Feb. 92	Prof.M.R.Pranesh
4.	Under reamed piles (BIS Codal Provisions)	Oct. 92	Prof.M.R.Pranesh
5.	Seminar on "Cost and Performance Effective Utilisation of Indian Cements in Concrete"	Apr. 92	Dr.K.Ganesh Babu
6.	Utilisation of Mineral Admixtures in Concrete	Dec.92	Dr.K.Ganesh Babu

4.12.8 Short-term Courses/Workshops/Seminars/Symposia/Conferences/Training Attended by the Faculty in recognised Academic Institutions and Public Sectors

Sl.No.	Name of Faculty	Title	Period/Duration
1.	Prof.M.R.Pranesh	IGC 92, Calcutta IGS Visakapatnam Harbour "Softclay Technology" IGS M.c. - Under-reamed piles, BIS, Codal Prov.	Feb. 93 Mar. 93 Oct. 92
2.	Dr.S.Neelamani	VIII APD-IAHR Congress, Pune	Oct. 92

4.12.9 Invited Lectures Delivered by the Faculty in Academic Institutions/Public Sectors

Sl.No.	Name of the Faculty	Topic of Lecture	Delivered at	Date
1.	Prof.S.Narasimha Rao	Behaviour of Marine Clays under cyclic loading Use of stress paths in the strength beha- viour of clays under cyclic loading Behaviour of Hamburg Marine clay Load transfer characteristics in File Foundations	Univ.of Hannover, Germany Univ.of Hannover, Germany Univ.of Hannover, Germany Univ.of Hannover, Germany	May/June '92 May/June '92 May/June '92 May/June '92
2.	Dr.V.Sundar	Coastal Wave Hydro- dynamics Coastal Erosion & Protection Wave Forces on Coastal Structures Design of Breakwater	Anna Univ. for Officers of P.W.D. Anna Univ. for Officers of P.W.D. Anna Univ. for Officers of P.W.D. Anna Univ. for Officers of P.W.D.	8-10 Feb. '93 8-10 Feb. '93 8-10 Feb. '93 8-10 Feb. '93
3.	Dr.J.S.Mani	Waves, tides and currents Port Planning and Development	P W D P W D	5.2.93 10.2.93
4.	Dr.Paul Mario Koola	Ocean Energy & Wave Energy Ocean Energy & Wave Energy Ocean Energy & Wave Energy	P W Staff Training Institute Public Works Staff Training Institute Public Works Staff Training Institute	24.11.92 8.2.93 9.2.93

4.12.10 Visits Abroad

Sl.No.	Name of Faculty	Country	Period	Purpose
1.	Prof.S.Narasimha Rao	Germany U.S.A.	May/June '92 June '92	GTZ - Advance Training Presented a paper at International Offshore and Polar Engineering Conference, San Francisco
		Singapore	Nov. '92	Presented 3 papers in Int. Conf. on Deep Foundations
2.	Dr.R.Sundaravadivelu	U.S.A.	June '92	Presented a paper at International Offshore and Polar Engineering Conference, San Francisco
3.	Prof.V.S.Raju	U.S.A.	June '92	Presented a paper at International Offshore and Polar Engineering Conference, San Francisco
4.	Dr.V.Sundar	West Germany	17.5.92- 15.6.92	In connection with Volkswagon Funded Project Invited for Research
		West Germany	16.6.92- 18.7.92	
5.	Dr.J.S.Mani	Germany	Sept.'91- Apr.'92	Studies on large scale break- water and simulation studies
6.	Dr.S.K.Bhattacharyya	Germany	Sept.'91- Apr.'92	On GTZ Programme

4.12.11 Distinguished Visitors to the Centre

Sl.No.	Name of the Visitor and Occupation	Date of Visit	Purpose of Visit (Lecture/Discussion)
1.	Dr.H.Eylers, Head of Asia Division GTZ Eschborn	24.11.92	Visit to the facilities at OEC
2.	Honourable Paul Raymond Berenger Ministry of External Affairs of Mauritius	06.04.92	Visit to the facilities at OEC
3.	Committee of Rajya Sabha	10.04.92	Visit to the facilities at OEC

4.12.12 Sponsored Projects

Title	Period	Funding Agency	Amount (in lakhs)	Coordinator(s)
Studies on the wave induced sediment Transport near Paradip Port	2 Years	Central Board of irrigation and Power, GOI	1.65	Dr. V.Sundar
Development of Numerical Models for prediction of Nearshore Phenomena	3 Years	DOD	9.07	Dr.V.Sundar Prof. V.S. Raju Dr.R.Mahadevan
Wave Forces on Inclined Cylinders	2 Years	Vokswagen Stiftung, Germany	12.00 (80,000 DM)	Prof.S.Goekcesu Dr.V.Sundar
Coastal Marine Aqua Culture	3 Years	DOD	5.00	Dr.J.S.Mani Prof.V.S.Raju
Field Measurements	3 Years	DOD	29.00	Dr.J.S.Mani Dr.S.Meenakshi-sundaram
Site specific studies & Optimisation of wave energy systems as break water	2 Years	DOD	10.00	Prof.V.S.Raju Prof.M.Ravindran Dr.S.Neelamani Dr.R.Parimelalagan
Experimental Investigation on motion behaviour of floating bodies	1989-92	DST	5.40	Dr.C.P.Vendhan Dr.V.Anantha-Subramanian Dr.S.K.Bhattacharyya
Sea trial of a 150 KW Wave Energy system off the Trivandrum Coast	1988-93	DOD	400.00	Prof.V.S.Raju Prof.M.Ravindran Paul Mario Koola
Chemical composition of Ground Water - Its Effects on foundations and Remedial Measures	6.3.91 to 4.7.92	ICSR,IIT Madras	0.50 (approx)	Dr.K.Muthukrishnaiah Dr.T.S.Ramanatha-Ayyar Dr.N.Balasubramanian

Title	Period	Funding Agency	Amount (in lakhs)	Coordinator(s)
Development of FE capability for Vibration of plated structures and shells submerged in fluids	1991-94	DAE	4.20	Dr.S.K.Bhattacharyya Prof.C.P.Vendhan
Technology cell for utilisation of Mineral Wastes in devt. of high performance cements and concretes	5 Years	MHRD	20.00	Dr.K.Ganesh Babu Prof.S.Srinivasarao
Measuring Techniques for Monitoring large structures	1 Year	IRDF, IIT Madras	Staff only	Prof.C.Ganapathy Dr.V.G.Idichandy Prof.P.K.Aravindhhan

4.12.13. Major Consultancy Assignments

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Coordinator(s)
1.	Slope stability, NLC Corp., Hyderabad	Mineral Exploration	1.10	Prof.S.Narasimha Rao
2.	Aquaculture at Nellore	Sarat Sea Foods	0.75	Prof.S.Narasimha Rao
3.	Design of seawater intake	Gopalpur Port Project	2.00	Dr.R.Sundaravadivelu Dr. V. Sundar
4.	Design of Approach Trestle	Gopalpur Port Project	4.16	Dr.R.Sundaravadivelu Dr.S.R.Gandhi
5.	Design & Development of a Longitudinal Wave Beach System for a high speed Towing Tank	Defence Research & Devpt. Organisation	2.00	Dr.V.Sundar Prof.C.Ganapathy Dr.J.S.Mani Dr.S.Meenakshisundarm
6.	Design & Development of a Transverse Wave absorber system for a high speed Towing Tank	Defence Research & Devpt. Organisation	2.00	Dr.V.Sundar Prof.C.Ganapathy Dr.J.S.Mani Dr.S.Meenakshisundaram
7.	Design of Approach Trestle	Defence Research & Devpt. Organisation	3.00	Dr.V.Sundar, Prof.C.Ganapathy Dr.J.S.Mani Dr.S.Meenakshisundaram

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Coordinator(s)
8.	Weather window for Tamilnadu Coast	Oil & Natural Gas Commission, Madras	0.12	Dr.V.Sundar Prof.C.Ganapathy
9.	Sewage disposal	Madras Corporation	0.50	Dr.J.s.Mani
10.	Jetty for EID Parry	Parry Ltd.,	1.00	Prof.V.S.Raju Dr.J.S.Mani Dr.R.Natarajan
11.	Effluent out fall studies at Uppanar river, Cuddalore	Peroxides and Uret James India Ltd.	0.40	Dr.J.S.Mani Dr.S.Meenakshisundaram
12.	Tidal predictions for R.P.L. Jetty at Hazira	Larsen and Toubro, ECC	0.24	Dr.J.S.Mani Prof.V.S.Raju
13.	Approach Road to NOIC Complex at Madras North of Cooum Mouth	Commander Works Engineers MES, Madras	0.30	Dr.K.Muthukrishnaia Prof.C.Ganapathy Dr.J.S.Mani
14.	Master plan for devpt. of an all weather port at Gopalpur (Arjipalli)	Gopalpur Port	0.20	Dr.J.S.Mani Prof.C.Ganapathy Dr.K.Ramakoteswara Rao Prof.M.A.Parameswaran
15.	Design aspects for sea water intake system at Nellore	Engineering Resource Group, Bangalore	0.12	Dr.J.S.Mani Prof.C.Ganapathy
16.	Design of an approach road connecting EDC & ODC jetties at Pawas Bay, Ratnagiri		0.55	Dr.J.S.Mani Prof.V.S.Raju
17.	Stability analysis of caisson for offshore transshipment terminal fomento, GOA	M/s.Sociadade De Fermento	2.00	Prof.V.S.Raju Dr.S.Neelamani
18.	Wave force estimation on the brestling dolphin of ethylene jetty for ethylene terminal at Ratnagiri	L & T	1.00	Dr.S.Neelamani Prof.V.S.Raju
19.	Analysis & Design of coal handling system for tuticorin for TNEB Phase I	M/s. Cem India Ltd	6.50	Prof.V.S.Raju Prof.P.K.Aravindan Dr.S.Neelamani

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Coordinator(s)
20.	Harbour crafts - evaluation, quality Control and testing	Gopalpur Port Orissa	1.50	Dr.C.Ganapathy Dr.R.Sundaravadivelu Dr.R.Natarajan Dr.V.Ananthasubramanian
21.	Simulation of explo- sion generated shock wave	NSTL	5.00	Dr.K.Swaminathan Dr.Paul Mario Koola
22.	Studies on stability of offshore pipelines	Manali Petrochemical	0.10	Prof.M.Ravindran Dr.Paul Mario Koola
23.	Retainer Consultancy	Gandhigram Trust, Gandhigram	0.36	Prof.M.Ravindran
24.	Studies on Underwater Bodies	DRDL, Hyderabad	0.10	Prof.M.Ravindran Prof.C.P.Vendhan
25.	Investigation & Advice	Indian Oil Corpn. Ltd.,	0.15	Prof.K.Muthukrishnaiah
26.	Investigation & Advice	Tamilnadu Newsprint Papers Ltd., Madras	0.15	Prof.K.Muthukrishnaiah
27.	Analysis & Advice	Richardson & Cruddas, Madras	0.10	Prof.K.Muthukrishnaiah
28.	Investigation & Advice	Regency Finance and Leasing, Madras	0.10	Prof.K.Muthukrishnaiah
29.	Training Course	Oil & Natural Gas Commission, Madras	0.25	Prof.K.Muthukrishnaiah
30.	Investigation & Advice	India Cements Ltd.,	0.10	Prof.K.Muthukrishnaiah
31.	Investigation & Advice	Saravana Constrn. Madras	0.20	Prof.K.Muthukrishnaiah
32.	Investigation & Advice	Orissa Industrial Infra- structure Devt. Corpn., Bhuvaneshwar	0.50	Prof.K.Muthukrishnaiah Prof.V.S.Raju
33.	Analysis and Advice	Tamilnadu Sports Stadia Society, Madras	0.05	Prof.K.Muthukrishnaiah
34.	Investigation, Analysis & Advice	Enkem Engineers, India	0.50	Prof.K.Muthukrishnaiah
35.	Strengthening of Hanger Sheds	Military Engineering Services, Avadi	0.40	Prof.C.Ganapathy Prof.M.R.Pranesh

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Coordinator(s)
36.	Hydrodynamic model studies and testing	DRDL	10.00	Prof.M.Ravindran Dr.V.G.Idichandy Prof.C.P.Vendhan
37.	Exptal. studies on SBM mooring system for survival conditions	ONGC, Surat	1.50	Dr.R.Sundaravadive Dr.V.G.Idichandy Prof.C.P.Vendhan
38.	Rectification of vibration in crane girder	BHEL, Trichy	0.38	Prof.C.Ganapathy Dr.V.G.Idichandy
39.	Design of Haddo Wharf	Andaman	3.00	Dr.R.Sundaravadive Prof.P.K.Aravindan Prof.V.S.Raju Dr.S.R.Gandhi
40.	Model Investigation Pilot launch	Sivam Engg., Goa	0.50	Dr.P.Sambandan Dr.R.L.Roy Choudhury
41.	Design of Self-propelled barges	Gopalpur Port Project	1.50	Prof.C.Ganapathy Dr.R.Sundarvadivelu Dr.R.Natarajan
42.	Model testing of Polymeric crafts	AMM Murugappa Chettiar Res.Centre	0.29	Prof.M.Ravindran Dr.R.Natarajan
43.	Design of Catamaran with Bails	Hari Shipping P.Ltd.	0.03	Dr.R.Natarajan

4.12.14. Honours and Awards

Name of Faculty	Honours/Awards	Purpose
Dr.J.S.Mani	Institution of Engineers	For paper on reflection characteristics(86-87)

4.12.15 Research Publications

1. Anantha Subramanian, V. "An efficient experimental technique for free floating body dynamics", Symposium on Ocean Technology, 1992, Goa.
2. Ganesh Babu, K., Raja, G.L.V. and Srinivasa Rao, P. "Concrete mix design methodology - An appraisal of the current codal provisions", The Indian Concrete Journal, Vol.66, Feb. '92, pp.87-95.

3. Ganesh Babu, K. and Malleswara Rao, P. "Damage effects on the response of a semisubmersible in regular waves", Symposium on Ocean Technology, National Institute of Oceanography, August 1992.
4. Ganesh Babu, K. and Nageswara Rao, G.S. "Fly ash concretes for marine environment", Symposium on Ocean Technology, National Institute of Oceanography, Goa, August 1992.
5. Ganesh Babu, K. and Nageswara Rao, P. and Raja, G.L.V. "Pitch and roll responses of semisubmersibles", National Seminar on Offshore Structures, Andhra University, Visakhapatnam, Feb. 1992.
6. Gopalakrishnan, T.V., Vendhan, C.P. and Raman, H. "Numerical and experimental studies on the diffraction of water waves around 3-cylinder group", International Conference on Computer modelling of seas and Coastal regions, April, 1992, Wessex Institute of Technology, Southampton, U.K.
7. Jwalamalini, R., Sundaravadivelu, R., Vendhan, C.P. and Ganapathy, C. "Stability of initially stressed plates with square openings", Marine Structures, 5, 71-84, 1992.
8. Krishnankutty, P. and Vendhan, C.P. "Computation of hydrodynamic coefficients of a tension leg platform", International Symposium on Ocean Technology, December, 1992, Goa.
9. Kurian, V.J., Dash, A.P., Idichandy, V.G. and Ganapathy, C. "Theoretical and experimental investigation on the hydrodynamic regions of a tension leg platform", Symposium on Ocean Technology, 27-29, Aug. 1992, NIO, goa.
10. Meenakshisundaram, S., Ganesh Babu, K. and Aswatha Narayana, P.A. "Probablistic model for wave forces acting on a cylinder in random waves", International Journal Publication, Ocean Engg. Vol.19, No.3, pp.259-269, 1992.
11. Meenakshisundaram, S. "Probablistic model for wave forces acting on a cylinder - considerations of the variational nature of force coefficients", International Association for Hydraulic Research, VIII Congress - Oct.20- 23, 1992, Pune, India, pp.D-1-13, Theme D: Coastal and Maritime Hydraulics.
12. Murali, K., Idichandy, V.G. "Hydrodynamic response of a semisubmersible comparison with SR 192 project, Japan", Symposium on Ocean Technology, 27-29, Aug. '92, NIO, Goa.
13. Muthukrishnaiah, K. "Light buildings on expansive clays - case studies". Proc. Seventh International Conference on Expansive Soils, Texas, USA, August '92.
14. Muthukrishnaiah, K. "Need for pile foundation for 4-storeyed building in soft clay". Proc. National Seminar on Foundation Problems and Remedial Measures, Madras, Feb. '92, 1,70-77.
15. Muthukrishnaiah, K. "Foundations in made-up soil for 3- storeyed building complex". Proc. National Seminar on Foundation Problems and Remedial Measures, Madras, Feb. '92, 78-82.
16. Sundar, V. and Sharma, S.S. "Sediment transport rate and its distribution across the surf zone off Gopalpur Port", Indian JI. of Marine Sciences, Vol.21, June '92, pp.102-106.
17. Narasimha Rao, S., Prasada Reddy, B.V. and Sakr, M.A.M. "Behaviour of defective piles in clay", Indian Geotechnical Journal, Vol.22(2), pp.69.84, April '92.

18. Narasimha Rao, S. and Prasad, Y.V.S.N. "Behaviour of a helical Anchor under vertical repetitive loading", *Marine Geotechnology*, Vol.10, pp.203-228, 1992
19. Narasimha Rao, S. and Prasad, Y.V.S.N. "Uplift capacity of plate anchors in sloped clayey ground", *Soils and Foundations*, Japanese Soc. of Soil Mechanic and Foundation engineering, Vol.32(4), pp.164-170, Dec. '92.
20. Narasimha Rao, S. and Prasad, Y.V.S.N. "Behaviour of plate anchors embedded in a two layered clayey soils", *Geotechnical Engineering, Journal of South East Asian Geotechnical Society*, Vol.23, December '92.
21. Narasimha Rao, S. and Prasad, Y.V.S.N. "Discussion on uplift behaviour of screw anchors in Sand I", *Journal of Geotechnical Engineering, American Society of Civil Engineers*, Vol.118(9), pp.1474-1478, Sept. '92.
22. Narasimha Rao, S. and Prasad, Y.V.S.N. "Estimation of uplift capacity of helical anchors in clays", *Journal of Geotechnical Engineering Division, American Society of Civil Engineers*, Vol.119(2), Feb. '93.
23. Narasimha Rao, S. and Mallikarjuna Rao, K. "Behaviour of vertical piles under static and cyclic lateral load in marine clays", *2nd International Offshore and Polar Engineering Conference, San Francisco, U.S.A.*, Vol.1, pp.475-482, June '92.
24. Narasimha Rao, S. Balarama Raju, G., Mallikarjuna Rao, K. and Rajasekaran, G. "Behaviour of pile dolphins in marine clay under lateral loading", *45th Can. Geotech Conference, Toronto*, September '92.
25. Narasimha Rao, S., Hanumantha Rao and Prasad, C.V. "Studies on stone columns in marine clays", *45th Can. Geotech. Conference, Toronto*, September '92.
26. Narasimha Rao, S. and Rajasekaran, G. (1992) "Behaviour of lime piles in a soft marine clay", *23rd Internal Conference on Deep Foundation Practice incorporating Pile Talk '92, Singapore*, pp.185-192.
27. Narasimha Rao, S. and Mallikarjuna Rao, K. (1992) "Experimental studies on flexible piles subjected to static lateral load", *2nd International Conference on Deep Foundation Practice incorporating Pile Talk '92, Singapore*, pp.171-178.
28. Narasimha Rao, S. and Prasad, Y.V.S.N. (1992) "Studies on pile anchors under vertical cyclic loading in soft marine clays", *2nd International Conference on Deep Foundation Practice incorporating Pile Talk '92, Singapore*, pp.179-184.
29. Narasimha Rao, S., Rajasekaran, G. and Prasad, C.V. (1992). "Sea-bed stabilization by Chemical Grouting", *11th International Conference on Offshore Mechanical and Arctic Engineering*, paper No. 92-833, Calgary, Canada.
30. Narasimha Rao, S., Prasad, Y.V.S.N. and Sankar, N. (1992) Influence of cyclic loading on the strength behaviour of Indian marine clays", *Proc. National Seminar on offshore structures, Visakapatnam, D9-D16, 1992*.
31. Narasimha Rao, S., Balaramaraju, G. and Satyanarayana, "Design of pile dolphin system", *National Seminar on offshore structures, Visakhapatnam, Feb. '92*.

32. Narasimha Rao, S., Madhiyan, M. and Prasad, Y.V.S.N. "Influence of bearing area on the behaviour of stone columns", Indian Geotechnical Conference, Dec. '92, pp.235- 237.
33. Neelamani, S. and Reddy, M.S. "Wave transmission and reflection characteristics of a rigid surface submerged horizontal plate", Ocean Engineering, Vol.19, No.4, pp.327- 341, 1992.
34. Neelamani, S. Thiruvankataswamy, K. and Reddy, M.S. "Performance of a partially immersed rigid vertical barrier as breakwater - a comparison of measurements with linear and Stokes second order theory", VIII APD-IAHR Congress, CWPRS, Pune, 20-23 Oct. '92.
35. Neelamani, S. and Santhanam, M. "Water particle velocities in long crested wave fields, VIII APD-AIHR Congress, CWPRS, Pune, 20-23, Oct. '92.
36. Neelamani, S. "Probability distribution of wave induced dynamic pressures on vertical cylinder", Symposium on Ocean Technology, NIO, Goa, 27-29 August '92.
37. Neelamani, S., Jayakumar, Ravindran, M., Paul Mario Koola and Raju, V.S. "Towing and seating of a wave energy caisson off Trivandrum - The technical problems and solutions", Symposium on Ocean Technology, NIO, Goa, 27-29, August '92.
38. Pranesh, M.R. "Dynamic soil-structure interaction", Theme Paper No.2, Indian Geotechnical Conference, 1992, pp.19-24.
39. Pranesh, M.R. "Foundation auditing overview", Proceedings, National Seminar on Foundation Problems and Remedial Measures, pp.1-8, Feb.21-22, 1992.
40. Pranesh, M.R. and Ayyar, T.S.R. "Under reamed piles", A Scenario, Proceedings, National Seminar on Under reamed piles, BIS Codal provisions, pp.1-8, Oct. '92.
41. Pranesh, M.R. and Johnson, A.S. "Stability analysis for submarine pipeline", Proceedings, Indian Geotechnical Conference, Vol.1, pp.341-344, 1992.
42. Raju, V.S., Jayakumar, Neelamani, S. "Concrete Caisson for a 150 KW wave energy pilot plant", Design, Construction and Installation Aspects, Second International Offshore and Polar Engineering Conference, ISOPE 92, San Francisco, California, 14-19 June, Vol.1, pp.584-591, 1992.
43. Ranga Rao, A.V. and Sundaravadivelu, R. "Nonlinear soil structure interaction of berthing structures", National Seminar on Offshore Structures, Docks and Harbours, Roorkee, Oct.16-17, 1992.
44. Sundar, V., Noethel, H and Holz, K.P. "Wave climate in a groin field", Ocean Engineering, Vol.19, No.5, Sept. '92, pp.413-426.
45. Sundar, V., Noethel, H. and Holz, K.P. "Wave kinematics in a groin field - frequency domain analysis", Coastal Engineering, 18, 1992, pp.137-152.
46. Sundaravadivelu, R., Harps, R. and Mahrenholtz, O. "Twin floating connected models in regular beam waves", Journal of Offshore Measurements and Arctic Engineers, ASME, Vol.114, No.4, pp.242-249, 1992.

47. Sundaravadivelu, R., Harps, R. and Mahrenholtz, O. "Floating connected models in regular beam waves", International Offshore and Polar Engineering Conference, San Francisco, USA, 14-19 June '92, Vol.III, pp.666-674.
48. Sundaravadivelu, R. and Rajashree S. Stanislaus, "Nonlinear soil structure Interaction analysis of laterally loaded piles", National Seminar on Offshore Structures, Docks and Harbours, Roorkee, Oct. 16-17, 1992.
49. R.Sundaravadivelu, R., Harps, R. and Mahrenholtz, O. "Twin floating connected models in regular beam waves", Journal of Offshore Measurements and Arctic Engineers, ASME, Vol.114, No.4, pp.242-249, 1992.
50. Sundaravadivelu, R. and Rajashree S. Stanislaus, "Nonlinear soil structure interaction analysis of laterally loaded piles", National Seminar on Offshore Structures, Docks and Harbours, Roorkee, Oct. 16-17, 1992.
51. Thomas C. Mathew, Vijily, B., Thomas, T.K., Sundaravadivelu, R. and Ganapathy, C. "Response of single buoy taut moored system under regular waves", Symposium on Ocean Technology, National Institute of Oceanography, Goa, 27-29, Aug. '92.

4.13 Physics Department

4.13.1 Introduction

The Department of Physics was established in 1959. Now Ph.D., M.Tech. and M.Sc., programmes are being offered. The major areas of teaching and research of the Department are:

- * Solid State Physics
- * Low Temperature Physics
- * Thin Film Physics
- * Microwave Physics
- * Magnetic Resonance and Magnetic Materials
- * Photonics and Lasers
- * Applied Optics
- * X-rays and Crystal Structure Analysis
- * Theoretical Physics (Atomic and Molecular Physics, Statistical Physics and Field Theory)

4.13.2 Details of Faculty

Name and Qualifications

Area of specialisation

Professors

Dr.V.Balakrishnan, Ph.D (Brandeis)

Theoretical and Statistical Physics

Dr.V.Damodara Das, Ph.D
(SPU, Vidyanaagar)

Thin Film Science and Technology

Dr.M.P.Kothiyal, Ph.D (IIT Madras)

Optical Instrumentation in Holography
and Speckle Phenomenon

Dr.(Mrs) Maha Seshasayee, Ph.D (RPI, NY)

X-ray Crystallography

Dr.Y.V.G.S.Murti, Ph.D (IIT Madras)

Solid State Physics, Photonics

Dr.V.R.K.Murthy, Ph.D (IIT Madras)

Microwave Physics, Dielectrics

Dr.C.K.Narayanaswamy, Ph.D (Madras)

Spectroscopy and Optics

Dr.K.V.S.Rama Rao, Ph.D (Andhra)

Magnetism and Magnetic Materials

Dr.G.Rangarajan, Ph.D (IISc)

Low Temperature Physics, Solid State
Physics

Dr.S.B.S.Sastry, Ph.D (IIT Madras)

Solid State Physics and Devices

Dr.R.S.Sirohi, Ph.D (IIT Delhi)

Modern Optics, Optical
Instrumentation,
Holography and Speckle Phenomenon

Dr.B.M.Sivaram,Ph.D(Sussex)	Laser Physics, Quantum Electronics
Dr.J.Sobhanadri,Ph.D(Andhra)	Microwave Techniques, Dielectric and Magnetic Materials
Dr.K.Viswanatha Reddy,Ph.D (IIT Madras)	Diffusion, Electromigration and Magnetism

Associate Professors

Dr.B.S.V.Gopalam,Ph.D(IIT Madras)	Physics of Semiconductor Devices
Dr.J.Majhi,Ph.D(IIT Madras)	Semiconductor Physics
Dr.V.Ramachandran,Ph.D(IIT Madras)	Solid State Physics, Lattice Dynamics
Dr.B.Subrahmanyam,Ph.D(Andhra)	Condensed Matter Physics
Dr.A.V.Narasimham,Ph.D(IIT Madras)	Theoretical Physics, Ultrasonics
Dr.Pranawa C.Deshmukh,Ph.D(Nagpur)	Atomic and Molecular Physics
Dr.S.Srinivasan,Ph.D(IIT Madras)	X-ray Crystallography, Educational Technology
Dr.K.Srinivasan,Ph.D(IIT Madras)	Electro Optics, Dielectrics
Dr.Y.Syamasundara Rao,Ph.D (IIT Madras)	Dielectrics, Instrumentation

Assistant Professors

Dr.B.S.V.S.R.Acharyulu,Ph.D (IIT Madras)	Solid State Physics, Electronics
Dr.K.Hariharan,Ph.D(IIT Madras)	Solid State Physics, Solid State Ionics
Dr.V.S.Murthy,Ph.D(IIT Madras)	Solid State Physics, Magnetic Resonance
Dr.T.S.Natarajan,Ph.D(IIT Madras)	Electronics and Instrumentation, Dielectrics
Dr.T.A.Prasada Rao,Ph.D(Andhra)	Lasers and Spectroscopy
Dr.G.Sreenivasa Murthy,Ph.D (IIT Madras)	X-ray Crystallography
Dr.A.Subrahmanyam,Ph.D(IIT Kharagpur)	Semiconductor Devices
Dr.V.Sankaranarayanan,Ph.D(IIT Madras)	Low Temperature Physics
Dr.V.Venkateswara Rao,Ph.D(IIT Madras)	Optical Instrumentation, Holography, Image Processing

Dr.(Ms.)T.M.Vimala,Ph.D(IIT Madras)

X-ray Crystallography

Dr.(Mrs) S.Lakshmi Bala,Ph.D(Madras Univ.)

Field Theory and High Energy

Chief Design Engineer

Dr.D.K.Sharma,Ph.D(IIT Madras)

Optical Instrumentation, Lens Design

Senior Scientific Officer Gr.II

Mr.K.Sarangapani,M.Sc(Madras)

Electronics and Instrumentation

4.13.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		
	M	W	M	W	M	W	M	W	M	W	M	W	Total
Ph.D.	13	2	9	2	7	1	6	6	14	6	49	17	66
M.Tech.	4	-	1	1	-	-	-	-	-	-	5	1	6
M.Sc.	24	9	15	10	-	-	-	-	-	-	39	19	58
Total	41	11	25	13	7	1	6	6	14	6	93	37	130

(Students on roll beyond 5 yrs shown in V years)

4.13.4 Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	CSIR Fellowship	Others	Total
Ph.D.	37	8	21	66
M.Tech.	2	-	-	2
M.Sc.	15	-	-	15
Total	54	8	21	83

4.13.5 No. of Degrees Awarded

Programme	Number
Ph.D	9
M.Sc	20
M.Tech	2
Total	31

4.13.6 Instrument/Equipment Designed and New Methods Developed

1. High pressure hydrogen absorption/desorption facility
2. Modification for the closer cycle helium refrigeration
3. Piezo electric measurement-designed and developed
4. Coefficient of Thermal Expansion
5. Adjustable Plunger for and measurement at Microwave Frequencies
6. Data acquisition system for real time measurement of photo conductivity
7. Developed an Erbium Doped Photonic Amplifier
8. Contact potential difference set up has been designed and fabricated for the study of clean surfaces of semiconductors
9. Voltage controlled oscillator for frequency sweeping (XR 2206)
10. Vibrating Reed technique for measuring low frequency sound velocity and attenuation in materials
11. A new method is developed to measure the electro optic constants in thin films
12. A method using lock in a amplifier is employed to determine the electrostriction coefficients in crystals
13. All Solid State devices power supply for OKK-115 Klystron was designed and developed
14. A constant voltage and a constant current power supply was designed and tested
15. Remote sensing cryogenic thermometer
16. Two square wave pulse generators (upto 20kv with 150 n sec and 1 p sec full times) have been designed and fabricated for kerr relaxation studies.
17. The specific heat cryostat has been fully automated to make specific heat measurement from 4.2 to 300 K.
18. The cryostat designed to make thermal conductivity measurement on plate type sample was also automated and is in continuous usage for measurements from 4.2 K upto 280 K. This is the first system in India to make thermal conductivity measurement over this extensive range using the plate method.
19. Digital Cryogenic Thermometer.

4.13.7 New Facilities added and Major Equipment Procured

1. Plotter (computer controlled)
2. He + Cd laser
3. Excimer Laser for 308 nm using xecl.
4. General Radio 1620.A.P. Measuring Capacitance
5. Bath type cryostat for frequency dependent conductingly and thermo electric power studies for polymer films.
6. Molecular type NMP 25 Liquid Nitrogen Plant from Koch Cryogenic System. It has a liquefying capacity of 25litres per hour and can be continuously operated without any defrosting.
7. A HELIOX helium-3 cryostat from M/s Oxford Instruments. This is a helium-3 evaporation type cryostat where a temperature down to 300 mK can be achieved by simply condensing helium-3 gas and reducing the pressure above the liquid.
8. Personal computer 386, 486 systems have been procured

4.13.8 Short-term Courses/Workshops/Seminars/Symposia Conferences organised

Sl. No.	Title of Course/Workshop/Seminars/Symposia/Conf.	Duration	Co-ordinator(s)
1.	Principle of Helium liquefaction and operation, maintenance & servicing of helium liquefier model 1410	12-10-92 to 24-10-92	Dr.G.Rangarajan Dr.V.Sankaranarayanan
2.	Seminar on Holography & Fiber Optics	Jan 11-12, 1993	Dr.R.S.Sirohi
3.	International Workshop n Fiber Optic Sensors	Mar.25-27, 1993	Dr.M.P.Kothiyal Dr.M.Mukunda Rao
4.	National Laser Symposium	Feb.17-19, 1993	Dr.B.M.Sivaram
5.	International Conference on the Physics and Technology Semiconductor Devices and Integrated Circuits	Feb. 5-6, 1993	Dr.B.S.V.Gopalam

4.13.9 Short term courses/Workshops/Seminars/Symposia/Conferences/Training attended by the Faculty in recognised Academic Institutions and Public Sectors

Sl. No.	Name of the Faculty	Title	Period/Duration
1.	Dr.V.R.K.Murthy	"New Carbon Materials"	October 6-8 1992
2.	Dr.V.V.Rao Dr.D.K.Sharma	"All India Manufacturing Technology Design and Research Conference"	Dec. 3-5, 1992
3.	Dr.B.S.V.Gopalam	"Conference on the Physics and Technology of Semiconductor Devices and Integrated Circuits"	Feb.5-7 1992
4.	Dr.B.Subrahmanyam	"3rd National Conference on Phonon Physics 1993 at Dept. of Physics Cochin Univ. Science & Technology"	Jan 20-23 1993
5.	Dr.S.Lakshmi Bala	"XDAE Symposium on High Energy Physics held at TIFR, Bombay"	Dec.22nd '92- Jan. 1st '93

4.13.10 Invited Lectures delivered by the Faculty In Academic Institutions/Public Bodies

Sl. No.	Name of the Faculty	Topic of the Lecture	Delivered at	Date
1.	Dr.K.V.S.Rama Rao	'Recent Investigations on some cubic Laves & Phase compounds of Rare earth and Transition Materials'	MRSI Annual Meeting at Thiruvananthapuram	11.2.93
2.	Dr.Y.V.G.S.Murti	'Invited Keynote Talk at the International Conference on Defects in Nonmetallic Materials'	Nordkirchen Germany.	Aug.'92
		'Disorder in Highly Ordered Systems'	Raman School of Physics Central Univ. Pondicherry.	Dec.'92
		'On the Simulation of Thermodynamic Parameters of Point Defects in Solids, National Workshop on Advances in Solid State Sciences'	Osmania Univ. Hyderabad.	Feb.15-16 1993.
		'Semiconductors and Optical Nonlinearities', International Workshop on Advanced Techniques of Characterization of Semiconductor Materials'	Dept. of Elect.Engg. IIT, Madras.	Jan.11-22 1993.
3.	Dr.V.R.K.Murthy	'Studies on Optical Nonlinearities of Fullerenes'	RRC, Kalpakkam	20th Mar. 1993.
		'Graphite intercalated compounds'	New carbon materials conference	6.10.92
4.	Dr.G.Rangarajan	'Experimental developments in High Temperature Superconductivity for Indian Physics Association'	A.C.College of Technology Madras.	Sept.'92
		'Lectures on Basic Superconductivity in Workshop on Band Structure Calculations'	Anna Univ. Madras	Nov.'92

5.	Dr.S.B.S.Sastry	'Alkali halides as device materials'	Kakathiya University Warangal	14.3.93
		'Alkali halides some applied aspects'	Bharatiyar University Coimbatore	30.3.93
6.	Dr.R.S.Sirohi	'Talbot interferometry for Optical Measurements'	Opt.Engg.Lab Riken, Japan	2.12.92
		'Speckle methods in Mech.Engg.'	Saitama Univ Japan.	4.12.92
		'Talbot interferometry'	Mech.Engg.lab Tsukuba Japan	11.12.92
7.	Dr.B.M.Sivaram	'Optical Fibre Lasers and Amplifier'	I.U.C for D.A.E Indore	13.4.92
		'Ultrafast Lasers and Application'	C.A.T. Indore School on Laser Physics	14.9.92 & 15.9.92
		'Distributed Feed back Dye Lasers'	S.E.R.C. School on Lasers & Ultrafast Optics Karnataka Univ. Dharwad.	17-18 Nov.'92
8.	Dr.B.S.V.Gopalam	'Fabrication and characterisation of Quantum well structures'	University of Science and Technology Cochin.	26.2.93
		'Photo Reflectance Spectroscopy for Alloy Semiconductors' I and II	Winter School on Emerging Techniques for Characterization of Semiconductor Materials Madras.	16.1.93 and 18.1.93
9.	Dr.J.Majhi	'Deep Level Transient Spectroscopy'	Winter School on Emerging Techniques for characterization of Semiconductor Materials, Madras.	19.1.93 & 20.1.93
10.	Dr.V.Ramachandran	'Phonons in Materials'	International workshop on solids, Anna University, Madras.	Jan.'93

Sl. No.	Name of the Faculty	Topic of the Lecture	Delivered at	Date
11.	Dr.S.Srinivasan	'X-ray diffraction as a tool for material characterisation'	Academic staff college Pondicherry Univ. Pondicherry	9.12.92
12.	Dr.V.S.Murty	'ESR Techniques and Applications'	Physics Society Ananthapur	26.2.93
		'ESR as analytical tool'	Dept. of Chemistry Ananthapur	27.2.93
		'Science for public'	Peoples science forum Ananthapur	25.2.93
		'Instrumentation as backbone of science'	National Science Day Celebration Ananthapur.	28.2.93
13.	Dr.K.Hariharan	'Materials for Solid State Ionics Devices'	Dept. of Physics Bharatiar Univ. Coimbatore.	31.3.93
14.	Dr.T.S.Natarajan	'Micro computer in control'	National Science Day celebrations at Hosur.	28.2.93

4.13.11 Visits Abroad

Sl. No.	Name of the Faculty	Country Visited	Date	Purpose of Visit
1.	Dr.R.S.Sirohi	Japan	29.11.92 to 12.12.92	Bilateral INSA-JSPS Exchange Programme
		Malaysia	15.12.92 to 3.1.93	KTP Visiting scholar
2.	Dr.J.Sobhanadri	USA	June-July 1992	Discussions at Qwestek and NIST
3.	Dr.K.V.Reddy	France	May 9 to July 8 '92	Research-Professional visit at the invitation of the University of Rennes, France.

4.	Dr.V.S.Murty	Malaysia	Aug.10-15 1992.	5th Asia pacific physics conference.
5.	Dr.T.S.Natarajan	USA, Houston	Oct.4-9 1992	To attend IEEE-Industry Application Society Meeting
6.	Dr.A.Subrahmanyam	Germany	1.9.91 to 31.09.92	Humboldt Fellowship
7.	Dr.A.Subrahmanyam	England	1.10.92 14.11.92	Visiting Scientist Loughborough Univ. of Technology,England.

4.13.12 Distinguished visitors to the Department (Important Dignitaries above the level of Professors)

Sl. No.	Name of the Visitor	Date of Visit	Purpose of Visit(Lectures/Discussion)
1.	Prof.A.Marchand, France	2-3 Jan.'93	lecture
2.	Prof.M.Ducloy Director Laser Physics Lab	11.12.92 to 13.12.92	INSA exchange visitor
3.	Prof.E.Gmelin Max-Planck Institut Stuttgart, Germany	Feb. 1993	Lecture on "Specific heat studies in Solid State Physics" & discussion on GTZ project.
4.	Prof.G.Klipping Freie University Berlin, Germany	Mar. 1993	Discussion on GTZ project

4.13.13 Sponsored Projects

	Title	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
1.	'Physico-chemical studies of graphite intercalation compounds'	92-95	CSIR	2.50	Dr.V.R.K.Murthy
2.	'Development of materials for hydrogen storage application Phase-II'	92-95	DNES	8.41	Dr.K.V.S.Rama Rao Dr.V.V.G.S.Murti

	Title	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
3.	'Synthesis of new materials & basic research in high-T _c superconductors'	92-95	PMB (DST)	45.00	Dr.G.Rangarajan Dr.U.V.V.Raju & Dr.V.Sankaranarayanan
4.	'Cryogenic studies at millikelvin temperatures'	90-92	MHRD	18.00	Dr.G.Rangarajan Dr.V.Sankaranarayanan
5.	'Indo-German project on Cryogenic Engineering'	90-93	GTZ Germany	DM 500,000	Dr.G.Rangarajan Dr.V.Sankaranarayanan
6.	'Conductor evaluation & estimation of magnetic fields of superconductivity magnets'	89-93	BHEL (Trichy)	5.00	Dr.G.Rangarajan
7.	'Fabrication of six prototype single chip -processor control for stirling cycle liquid nitrogen plant'	91-93	DST	3.50	Dr.G.Rangarajan Dr.T.S.Natarajan
8.	'Instrumentation for cold box for Helium liquefier'	89-93	DST	6.70	Dr.G.Rangarajan Dr.T.S.Natarajan
9.	'Production of News letter on High T _c Superconductors'	88-94	DST	13.00	Dr.G.V.Subba Rao Dr.G.Rangarajan Dr.U.V.V.Raju
10.	'Study of thermal & magnetic properties of ultra low temperature and in high magnetic fields'	93-96	Indo-German BMFT	6.00 DM 3 lakhs	Dr.G.Rangarajan Dr.E.Gmelin
11.	'Superconductors for microwave applications'	92-93	IRDF	0.80	Dr.G.Rangarajan Dr.G.V.Subba Rao

Title	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
12. 'Remote sensing cryogenic thermometry'	92-93	IRDF	0.60	Dr.G.Rangarajan Dr.T.S.Natarajan Mr.R.Ranganathan
13. 'Optical Instrumentation'	93-98	DAE National Laser Programme	50.00	Dr.R.S.Sirohi Dr.M.P.Kothiyal Dr.D.K.Sharma Dr.V.V.Rao
14. 'Holographic Memories and interconnects for optical computing'	93-94	MHRD	12.00	Dr.R.S.Sirohi Dr.M.P.Kothiyal
15. 'Investigations on Holo Optical elements'	92-94	ARDM	13.48	Dr.R.S.Sirohi Dr.M.P.Kothiyal Dr.D.K.Sharma Dr.V.V.Rao Dr.(Mrs)V.Sirohi
16. 'Interference & turbulence effects in Spray combustion'	93-96	ISRO IIT(M)	7.41	Dr.R.Natarajan Dr.D.K.Sharma
17. 'Training of Manpower and Dev. of in Optical Expertize Photonic Amplifying Tech.'	91-94	MHRD	10.00	Dr.B.M.Sivaram Dr.J.P.Raina
18. 'Establishment of a centre for Advanced Photonic Fibre Optic and laser Technology'	91-94	MHRD	15.0	Dr.J.P.Raina Dr.B.M.Sivaram
19. 'Studies of Transients using Microwave Absorption and Laser Flash Photolysis'	91-94	DST	24.00	Dr.J.Sobhanadri Dr.T.S.Natarajan
20. 'Fourier Transform Spectroscopy'	91-94	Indo-US	17.50	Dr.J.Sobhanadri Dr.V.R.K.Murthy
21. 'Polymer Based Technology'	92-93	IRDF		Dr.K.Hariharan Dr.Mahadeva Ayyar
22. 'Fabrication of six protohyles'	91-93	DST	3.30	Dr.G.Rangarajan Dr.T.S.Natarajan
23. 'Instrumentation for Cold Box for Helium'	89-93	DST	6.40	Dr.G.Rangarajan Dr.T.S.Natarajan
24. 'RBIC project (Fabrication of Nd:Lasers)'	92-95	Defence Labs Jodhpur	14.0	Dr.T.A.Prasada Rao

4.13.14 Major Consultancy Assignments

Sl. No.	Title	Organisation	Amount (Rs in Lakhs)	Co-ordinator(s)
1.	'Development & Supply of permanent magnetic'	S & S Power Switch Gear Madras.	2.25	Dr.K.V.S.Rama Rao
2.	'Liquid Helium Supply'	Central Leather Research Institute and Life Scan Research (P) Ltd., Madras	0.05 0.12	Dr.G.Rangarajan
3.	'Development of control for software Instrumentation	M/s Kumpulan Alex SDN,BHD Kuala Lumpur Malaysia	-	Dr.T.S.Natarajan

4.13.15 Honours and Award

Sl.no.	Name of the Faculty/Students	Honours/Awards
1.	Dr.K.V.S.Rama Rao	Materials Research Society of India Medal [MRSI]
2.	Dr.V.S.Murty	Elected as General Secretary Indian association of physics teachers.

4.13.16 Research Publications

1. S.Revathi & V.Balakrishnan, 'Diffusion of a charged particle in a magnetic field' J.Maths Phys. Sci., 26, 213 (1992).
2. G.Nicolis & V.Balakrishnan, 'Comments on the amplification of intrinsic fluctuations of chaotic dynamics' Phys. Rev. A 46, 3569 (1992).
3. S.Revathi, V.Balakrishnan & M.C.Valsakumar, 'A myopic random walk on a finite chain' pramana-J.Phys. 38, 491 (1992).
4. S.Revathi, M.C Valsakumar, V.Balakrishnan & G.H.Weiss, 'Size dependent diffusion coefficient in a myopic prandom walk on a strip'Physica A186, 210 (1992).
5. S.Revathi and V.Balakrishnan, 'Analytic calculation of the diffusion constant for random walks on strips of finite width: Dependence on size and nature of boundaries' Phys. Rev. E47, 916 (1993).
6. S.Revathi and V.Balakrishnan, 'Diffusion coefficient for random walks on strips with spatially inhomogeneous boundaries' J.Phys. A: Maths. Gen. 26, 467 (1993).

7. V.Damodara Das, 'An Introduction to the Thin Film State' COSTED Publ. p.41-46 (1992).
8. V.Damodara Das, S.Aruna and K.S.Raju, 'Electrical Resistance Variation in Se(10)Sb(10)Te(80) Ternary Semiconductor Thin Films' SPIE (USA) Publication, Vo. 1523, p.271-276, (1992), Tata-McGraw Hill.
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10. B.N.Lakhminarasappa, N.Devaraj and Y.V.G.S.Murti, Thermoluminescence of X-irradiated NaBr Crystals, "Thermoluminescence and its applications", ed. K.V.R.Murthy and T.R.Joshi, Tata McGraw Hill Pub. Co. Ltd, New Delhi (1992).
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13. R.Vijaya, Y.V.G.S.Murti and T.A.Prasada Rao, 'Nonlinear Optical Studies in iodine Solutions' J.Mod. Optics, 39 (1992) 115-120.
14. C.V.Krishnamurthy and Y.V.G.S.Murti, 'Third Order Optical Susceptibilities of Color Centres' Nonlinear Optics, 2 (1992) 337-346.
15. Radha D Banhatti and Y.V.G.S.Murti, Do Vacancy Pairs Merit A Closer Look? Proc. 'Internaional Conference on Defects in Nonmetallic Materials' (ICDIM-92, August 1992, Germany),
16. Y.V.G.S.Murti and Radha D Banhatti, The Modified Polarizable Point Ion Model - A Sound Physical Approach to Point Defect Calculations, 'International Conference on Defects in NonmetallicMaterials'(ICDIM-92, August 1992, Germany),
17. R.Vijaya, Y.V.G.S.Murti and T.A.Prasada Rao, 'Optical Phase Conjugation in Laser Dyes' Optics and Quantum Electronics, 24 (1992) 575 -586.
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29. Mridula Joshi, Prita Nair, B.M.Sivaram, J.P.Raina and L.Vetrivel, 'Gain characteristics of an Erbium doped optical fibre amplifier' National Symposium on Antennas and Propagation, 29-31 Dec. (1992) pg 340-342.
30. Mridula Joshi, A Shanti and B.M.Sivaram, 'Determination of optimum amplifier lengths for an Erbium doped optical fibre' National Symposium on Antennas and Propagation, 29-31 Dec.(1992) pg. 367-372.
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32. Shanti Ashirvatham, Mridula Joshi and B.M.Sivaram, "A study of gain slopes for an Erbium doped fibre amplifier at 1.5 micron when pumped at various wavelengths" National Symposium on Antennas and Propagation, 29-31 Dec. (1992) pg 379-383.
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- 77 a) S.K.Viswanathan and B.S.V.Gopalam, "DC and AC conductivity of a-CuInTe₂ Thin Films" P 453 - 455, 1992.
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4.13.18 (b) Conference Presentations

1. V.Damodara Das and S.Senthil Nathan, Electrical Resistance Variation of the Ternary Semiconductor Bi_{0.5}Sb_{0.5}Te₃ Polycrystalline Thin Films during Heat Treatment International Workshop on Polycrystalline Thin Films: Structural Evolution and Structure/Property Relationships, Oct. 5-9, 1992, Lake Balaton, Hungary.
2. V.Damodara Das, S.Senthil Nathan, K.S.Raju and A.Bhaskaran, Thermoelectric Power of Polycrystalline Thin Films of the Ternary Semiconductor Ga₅Se₂₀Te₇₅ as a function of Temperature and Thickness International Workshop on Polycrystalline Thin Films: Structural Evolution and Structure/Property Relationships, Oct. 5-9, 1992, Lake Balaton, Hungary.
3. V.Damodara Das, Herm A. Anand and C.Bahuleyan, Thermoelectric Power of vacuum-deposited thin films of the ternary semiconductor, 0.1% excess tellurium doped Pb_{0.5}Sn_{0.5}Te 12th International Vacuum Congress and 8th International Conference on Solid Surfaces, Oct. 12-16, 1992. The Hague, The Netherlands.

4. V.Damodara Das, S.Senthil Nathan, K.S.Raju A.Bhaskaran, Temperature and thickness dependence of electrical resistivity of thin films of the ternary semiconductor $Ga_5Se_{20}Te_{75}$ 12th International Vacuum Congress and 8th International Conference on Solid Surfaces, Oct. 12-16, 1992, The Hague, The Netherlands.
5. V.Damodara Das, R.Ramasubramaniam and C.Bahuleyan, Thermoelectric power variation with Temperature and thickness in vacuum-deposited thin films of the photovoltaic ternary semiconductor $CdSe_{0.65}Te_{0.35}$ 2nd International Conference on Semiconductor Materials, December 14-18, 1992, New Delhi.
6. V.Damodara Das, R.Ramasubramaniam and Laxmikant Damodare, Electrical resistance variation during heating-cooling cycles with temperature and thickness in vacuum-deposited thin films of photovoltaic ternary semiconductor $CdSe_{0.65}Te_{0.35}$ 2nd International Conference on Semiconductor Materials, December 14-18, 1992, New Delhi.
7. V.Damodara Das and C.Bahuleyan, Thickness dependence of conduction activation energy in $Pb_{1-x}Sn_xTe$ films 2nd International Conference on Semiconductor Materials, December 14-18, 1992, New Delhi.
8. M.Seshasayee, Molecular dynamics study of SiS_2-Li_2S glass and its transport parameters.
9. M.Seshasayee, Structural analysis of glass $AgI-Ag_2O-V_2O_5$ at the 23rd Nat. Conf. on crystallography at Jaipur, March 23-25, 1992.
10. R.Vijaya, Y.V.G.S.Murti, G.Sundara Rajan and T.A.Prasada Rao, Third Order Nonlinear Optical Response of Pure and Doped Polyphenyl Acetylene - A Wavelength Dependence Study International Conference on Frontiers in Polymer Research, New Delhi, Feb. 1992.
11. R.Vijaya, Y.V.G.S.Murti, K.R.Murali and T.A.Prasada Rao, Resonant Third Order Optical Nonlinearity in Styryl 9, International Conference in Quantum Optics -I, University of Hyderabad, January 1992.
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14. Radha D Banhatti and Y.V.G.S.Murti, Role of Interionic Potentials in the Simulation of Point Defects, Conference on Band Structure and Physical Properties, Anna University, November 1992.
15. G.Rangarajan, Narayani Senthilkumaran, N.P.Raju, E.Gmelin and R.K.Kremer, Electrical Magnetic and Thermal properties of Ternary $A_2B_2O_7$ - pyrochlores - A family of magnetic semiconductors SPIE Proceedings 1523 (1992) 226.
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30. B.M.Sivaram, J.P.Raina, Prita Nair and Mridula Joshi, "Optical fibre lasers and amplifiers" in Opto Electronics: Technologies and Applications SPIE Press, 1993.
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32. G.A.Popson, A.L.Laskar and K.V.Reddy, "Atomic Transport in Divalent Anion Doped AgBr" Ibid pp 465-469.
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34. Anjali Rastogi and K.V.Reddy, "Anodic Oxidation of InSb" Paper presented at International Conference on Surface Engineering held at Bangalore during 16-19 Dec. 1992.
35. K.V.Reddy, "Electromigration in Solids" Invited Talk given at the National Workshop on Recent Advances in Solid State Sciences held at Hyderabad during 15-16 Feb. 1993.
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42. N.Ramesh & K.Srinivasan, Determination of Third - order susceptibilities of wide band gap crystals Fifth Asia Pacific Physics Conference 10-15, Aug. (1992), Kulalumpur, Malaysia.
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45. V.S.Murty and K.Chandrasekharan, Preferential accumulation of selenium in pterocarpus santalinus National Seminar on Radiation environment and Man University of Mysore Oct. 8-9, 1992 RegeNo.16 of proceedings.
46. V.S.Murty and V.Madhurima, Recent studies on pterocarpus santalinus (Red wood) Indian Biophysics Society 18th National Symposium on Molecular and Cellular - biophysics -Jan 7-9, 1993.

47. V.S.Murty and K.Chandrasekharan, Characterization of pterocarpus santalinus wood through ESR spectroscopy V Asia pacific physics conference 10th to 15th Aug. 1992 Awana Malaysia Abstract No.6GS proceedings page 264.
48. R.Usha and T.A.Prasada Rao, "Electrooptical Kerr relaxation studies in Polymer solutions" Ninth national conference on "Atomic & molecular Physics" IX - NACAMP; BARC, Bombay, 14th to 18th Dec. 1992.
49. Janaswamy Srinivas, G.Sreenivasa Murthy, M.V.Rao, C.J.Thomas and M.N.Sudheendra Rao, Crystal structure of norbornadiene adduct of (Hexamothyleneimino) iphenylphosphinimencyclo-trilliagane - XXIV National Seminar on Crystallography 20-22 Oct. 1992 Jammu.
50. V.Vasu and A.Subrahmanyam, Photovoltaic Properties of Indium Oxide (IO)/p-InP junctions S photovoltaic Science and Engg. conference, Delhi, (Feb.92).
51. A.Subrahmanyam, Photovoltaic Properties of Reactive Thermal Evaporated Indium Oxide (IO)/Silicon junctions. Multicomponent, Multilayer Thin Films for Microelectronic Applications Oct. 92, Germany.
52. T.R.Ravindran, V.Sankaranarayanan and R.Srinivasan, Presented at the Intenational Conference on Modern Aspects of Superconductivity (ICMAS-92) held at Paris (France) from Oct. 21-22, 1992.
53. S.Lakshmi Bala, Paper presented at the X DAE symposium on high energy physics held at TIFR, Bombay, Dec.'93. Title: CHAOS IN Maxwell - Chern - Simon-Higgs Theories

4.13.18 Any other Relevant Details

1. V.Damodara Das Written one book titled "An Instrumentation to the Thin Film State"
2. A.V.Narasimham Member of the National Executive Committee of ASI Chairman of local chapter of ASI.
3. The Department also have the following distinguished faculty:
 - i) Dr.D.Srinivasan - CSIR, Emeritus Scientist
 - ii) Dr.M.V.Satyanarayana - U.G.C. Research Scientist 'A'
 - iii) Dr.V.Vasu, Dr.Mary Sukeshini and Dr.C.V.Krishnamurthy - Research Associates.

4.14 Centre for Bio-Sciences and Bio-Technology

4.14.1 Introduction

The Biosciences and Biotechnology Centre was established in 1982. The centre offers Ph.D programme.

4.14.2 Details of Faculty

Name and Qualification

Major Area of Specialisation

Professors

A. Baradarajan, Ph.D (IIT Madras)[Head]

Immobilized enzymes/Cell bioreactors, modelling and kinetics of biosystems

N.G. Karanth, Ph.D(Salford,UK)

Enzyme Engineering and Fermentation technology, bioreaction engineering, transport and reaction in bioreactors, mathematical modelling of bioreactors

Megha Singh, Ph.D (Carolina,USA)

Hemorheology, Laser applications in biology and medicine

R. Nagarajan, Ph.D (IIT Madras)

Operations research and systems engineering, computer applications in biosystems

Associate Professors

(Mrs)T.S.Chandra, Ph.D (IISc.)

Basic and applied micro biology bio transformation, fermentation of agroresidues for production of useful compounds.

T. Panda, Ph.D (IIT, Delhi)

Process development for industrial enzymes, protoplast fusion technology and bioenergy

Assistant Professors

(Mrs) K.Lalitha, Ph.D(Mysore)

Biochemistry and enzyme technology, anaerobic digestion of wastes, bio chemical studies on methanogens

S.K.Rakshit, Ph.D (IIT,Delhi)

Optimization and control of bioreactors, downstream processing including membrane applications and aqueous two phase systems

T.Swaminathan, Ph.D(IIT,Kanpur)

Environmental biotechnology, bio reactors for waste treatment, biodegradation of toxic elements and compounds

4.14.3 Visit of Faculty Members to other Institutions

S.No.	Name of Faculty	Place visited	Purpose of visit	Date
1.	Prof.N.G. Karanth	IIT Bombay	Invited Lecture	5-11-92
2.	Dr.T.Panda	AIT, Bangkok	Visiting Faculty	Sep 15- Dec 10 1992
3.	Prof.Megha Singh	Univ. of Bremen Germany	Visiting Faculty	May- June 92

4.14.4 Particulars of participation in Seminars/Symposia/Short-term Courses

S.No.	Name of Faculty	Particulars of Participation	Date
1.	Prof.N.G. Karanth	33rd Annual Conference of Association of Microbiologists of India, Goa University - Delivered an invited lecture on the topic 'Engineering Challenges in Solid State Fermentation	6-7 Nov. 1992
2.	Prof Megha Singh	3rd National Conf. of Biomechanics Gulbarga Univ., Gulbarga 5th Annual Conf. of Indian Soc. for Atherosclerosis Research, SV Medical College, Tirupati Seminar on Holography & Fibre Optics, Hotel Trident, Madras	Aug.29- Sept.2, 92 21-23 Dec. 92 11-12 Jan. 93
3.	Dr.T. Panda	CHEMCON 92, Session I Co-Chairman in Biochemical Engg. Institute of Technology, Manipal 2nd International Symposium of International Association of Agricultural Engineers, AIT, Bangkok, Thailand as invited speaker in Post Harves Tech. and Biotechnology Session	19-22 Dec. 92 7-10 Dec. 92

4.14.5 Visitors to the Centre

S.No.	Name of the visitor and Occupation	Date
1.	Dr.M.R. Bhagavan SAREC, Sweden	25-1-1993
2.	Dr.V.J. Modi University of British Columbia, Canada	Dec. 6-8 1992
3.	Dr.T. Yokomizo Kanto Gakuin University, Japan	Dec. 6-8 1992

4.14.6 Research Publications

1. J. Anjanikumari and T. Panda, Critical analysis of factors influencing sphaeroplast generation from *Saccharomyces cerevisiae*, *Bioprocess Engineering*, Vol.7, 349-355, 1992.
2. J. Anjanikumari and T. Panda, Studies on critical analysis of factors influencing improved production of protoplasts from *T.reesei* mycelium, *Enzyme and Microbial Technology*, Vol.14(3), 241-248, 1992.
3. J. Anjanikumari and T. Panda, Improved technique on reversion of mycelial protoplast of *T.reesei* into mycelia, *Bioprocess Engineering*, Vol.8(5/6), 287-294, 1993.
4. S.K. Rakshit, P.Ghosh and V.S.Bisaria, Ethanol separation by selective adsorption of water, *Bioprocess Engineering*, Vol.8, p.279-282, 1993.
5. D.Liepsch, M.Singh and LMazrtin, Experimental analysis of the influence of stenotic geometry on steady flow, *Biorheology*, 29, 419-431, 1992.
6. L.Carroll, H.Katayama, G.W.Henry, J.I.Ferreiro, R.Zalesak, B.Ha, C.L.Lucas, M.Singh, P.G.Lynch and A.P.Yoganatha, Flow visualisation in anatomically accurate flow through models of the main pulmonary artery trunk, *Cariology in Young*, 2, 114-120, 1992.
7. G.Ramachandran, K.Sampthkumar and M.Singh, Sequential analysis of the vibratory pattern of a surface by digital speckle interferometry, *J.Optics*, 21, 61-68, 1992.
8. D.Subba Rao and T.Panda, Comparative analysis of calcium gluconate and sodium gluconate techniques for the production of gluconic acid by *A.niger*, *Bioprocess Engg.*, Vo.8(5/6), 203-207, 1993.
9. P.Padmani, S.K. Rakshit and A.Baradarajan, Studies on immobilization of lipase on alumina for hydrolysis of rice bran oil, *Bioprocess Engineering*, 1992.
10. P.Padmani, S.K. Rakshit and A.Baradarajan, Lipase catalyzed hydrolysis of rice bran oil by free acid immobilized enzyme system in batch stirred reactor, *Bioprocess Engineering*, 1992.
11. J.Anjanikumari and T.Panda, Analysis of factors responsible for the regeneration to intact cells from sphaeroplasts of *S.cerevisiae*, *Bioprocess Engineering*, 1992.
12. N.Chithra and A.Baradarajan, Transient state analysis of biochemical reactor using co-immobilized system, *Bioprocess Engineering*, 1993.

4.15 Regional Sophisticated Instrumentation Centre

4.15.1 Introduction

The Regional Sophisticated Instrumentation Centre was established in 1974. Now Ph.D. programmes are being offered. The major areas of teaching and research of the Centre are:

- * Molecular Spectroscopy
- * Quantum Chemistry and Instrumentation
- * Magnetic Resonance Spectroscopy
- * Study of Biomolecules and Clusters in Solution

4.15.2 Details of Faculty

Name and Qualification

Major Areas of Specialisation

Professors

Dr.P.T. Manoharan, Ph.D. (Columbia), [Head]

Theoretical Chemistry and Magnetic Resonance spectroscopy; Bioinorganic

Dr.Surjit Singh, Ph.D. (IIT Kanpur)

Molecular Spectroscopy and General Physical Chemistry

Dr.S. Subramanian, Ph.D. (Leicester)

Magnetic Resonance Spectroscopy & Theoretical Chemistry

Dr.T.K.K. Srinivasan, Ph.D. (Banaras)

Molecular Spectroscopy

4.15.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		Total		
	M	W	M	W	M	W	M	W	M	W	Total
Ph.D.	5	1	4	-	6	2	3	-	18	3	21

4.15.4 Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	CSIR Fellowship	Others	Total
Ph.D.	12	7	5	24

4.15.5 Instruments/Equipment Designed and Developed

1. Construct of a S-band microwave bridge under process.
2. Linking of several computers (PC's) to a single Laser Printer.
3. The liquid helium dewar with the Mossbauer Spectrometer was brought to operation.
4. A support system for single crystal EPR spectroscopy measurement using the Cryodyne Cryocooler is under progress with the help of Central Workshop.
5. FT-EPR under construction.

4.15.6 New Facilities and Major Equipment procured

CTI-Cryocooler (closed cycle cryostat) installed.

4.15.7 Invited Lecture Delivered by the Faculty in Academic Institutions/Public Bodies.

Sl.No.	Name of the Faculty	Topic of the	Delivered at	Date
1.	Dr.P.T. Manoharan	a. Exchange interactions in, dimers, DST Program Advisory Committee, goa		1992
		b. Reconstituted Hemoglobin		June 1992
		c. Biradicals, University of Fribourg, Fribourg, Switzerland		July 1992
		d. Modulation of Heme environment in Reconstituted Hemoglobins, CLRI, Madras		1992
		e. Exchange Interaction in Low dimensional Dithiolene, Symposium in Anna Univ.		Nov. 1992
2.	Dr.Surjit Singh	a. Cooperativity Effects on Force Constants, Indian Institute of Petroleum, Dehradun		March 1992
		b. Abinitio Calculations on Solvations of Ion Pairs, International Meeting on Thermodynamics, L' Meridian, New Delhi		Jan. 1993
		c. O-H Force Constants for MX.H ₂ O Complex, Academy discussion meeting, IIT, Kharagpur.		Feb. 1993
		d. Applications of Raman Spectroscopy in Chemistry, University of Madras, INSA, Madras Chapter.		Feb. 1993
3.	Dr.T.K.K. Srinivasan	a. Raman Spectroscopy Phase transition		
		b. Temperature dependent Raman Spectroscopy Inst. of Physical Chemistry, University of Munich, Germany.		1992

4.15.8 Visits Abroad

Sl.No.	Name of the Faculty	Country Visited	Date of visit	Purpose
1.	Dr.P.T. Manoharan	Australia	June 1992	Visiting Professor
		Switzerland	July 19-24 1992	Presented paper in a conference & visited ETH Zurich on FT-EPR construction advice.
2.	Dr.S. Subramanian	Germany	14-05-92 to 12-07-92	Visiting Professor
3.	Dr.T.K.K. Srinivasan	Germany	27-09-91 to 20-10-92	Sabbatical

4.15.9 Distinguished Visitors to the Department (Important Dignities above the level of Professor).

Sl.No.	Name of the Visitor & Occupation	Date of visit	Purpose of visit (Lecture/ Discussion)
1.	Dr.K.D. Narayanan Institute of Organic Chemistry University of Lausanne Switzerland	12-05-1992	Seminar Talk
2.	Dr.A. Rama Rao Secretary Dept. of Science and Tech. New Delhi 110 016	31-07-1992	For Discussion with the Faculty of RSIC
3.	Dr.W.T. Robinson Department of Chemistry University of Canterbury Christ Church 1 Newzeland	25-11-1992	Seminar Talk
4.	Dr.J.N. Murrel, FRS School of Chemistry and Molecular Sciences University of Sussex Flamer, Brighton, UK	29-10-1992 to 31-10-92	Seminar Talk

Sl.No.	Name of the Visitor & Occupation	Date of visit	Purpose of visit(Lecture/ Discussion)
5.	Dr.Gopal A Krishnan Chief, Section on Drug Tissue Interaction National Heart, Lung & Blood Institute National Institute of Health, Laboratory of Chemical Pharmacology Bethesda, MD 20892, USA	31-12-1992 to 08-01-1993	For discussion with the Faculty of RSIC and Seminar Talk
6.	Dr.V.V. Rampal Adviser Dept. of Science and Tech New Delhi - 110 016	17-02-1993	For discussion with the Faculty of RSIC
7.	Prof.Richard R. Ernst Nobel Laureat in Chemistry ETH, Zuerich	18-03-1993	For discussion with the Faculty of RSIC

4.15.10 Sponsored Projects

	Title	Period	Funding Agency	Amount Rupees in Lakhs	Co-ordinator(s)
1.	Spectroscopic Investigations of inter and intra molecular interactions	1991-1993	DST	18.00	Dr.P.T. Manoharan
2.	Construction of a FT-EPR Spectrometer	1992-1995	DST	72.00	Dr.P.T. Manoharan Dr. S Subramanian
3.	Matrik Copperativity	1989-1992	DST	8.50	Dr.Surjit Singh
4.	Theoretical Studies on..... reactions	1991-1994	DST	6.20	Dr. S Subramanian Dr. V Ramakrishnan

4.15.11 Major Consultancy Assignments

Routine consultancy on Analytical and Research Spectroscopy

4.15.12 Research Publication

1. G V R Chandramouli and P T Manoharan, Temperature Dependent 2+ Study of the Single Crystal Electronic Spectrum of Octahedral Ni Ion Subjected to Distortions in Weak Fields *Pramana* 39, 639, (1992).
2. Krishna Sharma, Vishnu S Darshane, P T Manoharan and S Bhanduri, Polymino Acides and Cytochrome C Anchored Rhodium Complexes, *Proc. Indian Acad. Sci. (Chem. Sci.)* 104, 535 (1992).
3. N Sreehari, Babu Varghese and P T Manoharan (Correction) *Inorg. Chem.*, 31 716 (1992)
4. A P Koley, S Purohit, L S Prasad, P T Manoharan and G Ghosh, Studies on Gold (II) complexes with hard and soft donor ligands: Complexes with o-methylthioniline and 1,2-di(-aminophenylthio) ethane, *Inorg. Chem.* 31, 305 (1992).
5. P K Mandal, B Sinha, P T Manoharan and S Ramasesha, Theoretical Studies of the Spin States of Macrocyclic Aza- amido binuclear Copper(II) Complexes, *Chem. Phys. Lett.* 191, 448 (1992).
6. A Raghunathan, T.S. Natarajan, G Rangarajan, S Venkatachalam and P T Manoharan, Electrical Transport in some Polymetallo Phthalocyanines, *S.P.I.E.* (1992).
7. A.P. Koley, R Nirmala, L.S. Prasad, S Ghosh and P T Manoharan, Studies of Gold(II) Complexes with Hard and Soft Ligands: Part III, 1 Complexes with N-(2-pyridylmethyl)- 2mercaptoaniline, *Inorg. Chem.* 32, (1992)
8. A.P. Koley, L.S Prasad, P.T Manoharan and S Ghosh, Studies on Gold(II) Complexes with Hard and Soft Donor Ligands: Part IV, A reactivity study in Solution using ESR Spectroscopy, *Inorg. Chim. Acta* 194, 219 (1992).
9. J Shiela Annie and P T Manoharan, EPR Spin Flip Transitions in some metal Dithiolenes, *Spectrochim. Acta* 48A, 1715-1730 1992.
10. A.F. Jayaraj and Surjit Singh, Near infrared spectral studies on interactions of CH₃ groups with halide ions, *Proc. Ind. Acad.Sc. (Chem.Sc.)*, 105, 71 (1993).
11. M.C. Shivaglal and Surjit Singh, Effect of hydrogen bonding and cooperativity on Stretching force constants of formamide, *Intl.J. of Quant. Chem.*, 44, 679 (1992).
12. Surjit Singh and E. Knoezinger, O-H₂ stretching force constants in complexes of water with F⁻, Cl⁻, Li ions and LiF, LiCl ion pairs by 6-31 G ab initio, M.O. calculations, *Spectrochim Acta* 48A, 1767 (1992).
13. C.S. Gopinath and S Subramanian, Comment on "Shift of X-ray photoelectron core levels in Bi₂ Sr_{2-k} Cu₂ O₈: An explanation by Bond-valence-sum calculation", *Phys.Rev.B.* 45 7513 (1992).
14. C S Gopinath, A S Tamhane, X-ray photoelectron spectroscopic studies of the valence state of Ti in single Ti in Single- T100-layered Ti Ba_{1-k} Sr_k LaCuO₅ (0 < k < 1)
15. A Sundaresan, A K Rajarajan, M Sharon, S Subramanian, R Pinto, L C Gupta and R Vijayaraghavan, *Phys.Rev.B.* 46 6622 (1992).

16. P.S. Rao, A Kasi Viswanath and S Subramanian, EPR of dynamic Jahn-Teller distortion in Cu doped magnesuim Tutton's salt - Spectrochimica Acta 48A 1745 (1992).
17. K K Srinivasan, M Mylrajan, J B Srinivasa Rao and J Raman, Vibrational Study of $(\text{CH}_3\text{NH}_3)_2\text{ZnCl}_4$ and $(\text{CH}_3\text{NH}_3)_2\text{ZnBk}_4$, T Spectroscopy, Vol.23, 21 (1992) 7 pages.
18. T K K Srinivasan and M Mylarajan, Phase transitions in $\text{CH}_3\text{NH}_3\text{C10}_4$ and $\text{CH}_3\text{ND}_3\text{C10}_4$, Phase Transitions 38, 97 (1992) 17 pages.

4.15.13 Any other Relevant Details

The Department/Centre has 3 Scientific Officers 15 non- teaching technical and 6 non-teaching non-technical staff.

4.16 Computer Centre

4.16.1 Introduction

Computer Centre established in 1987 continues to provide the central computing facility . The Centre is equipped with SIEMENS 7580-E Mainframe, MX500 and several micro computers to support research and development in various areas.

4.6.2 Details of Faculty

Name and Qualification

Major Area of Specialisation

Professor

Muthukrishnan C.R., Ph.D, [Head]

Software Engg, Distributed and Parallel Systems, Object Oriented Systems.

Manager

Sehasayi P., M.S.
(on leave)

Semantics, Computer Systems Natural Language Processing

Senior Systems Programmer (SG)

Ramanujam M.K., Ph.D

Systems Programming, Operating Systems, Computer Networks.

Senior Systems Engineer

Dheenadayalu R., M.Sc(Engg)

Data Centre Operations, System Administration, Systems Selection.

System Engineers

Jayaprakash S., M.S

Programming Methodology, Software Metrics, Systems Programming, Fault-tolerant Distributed Systems.

Ramesh S.K., M.S

MIS, Data Management, Data Processing, Systems Programming.

Assistant Systems Engineerings

Kathiresan M., B.Tech
(on leave)

Data Base Management, Programming.

Ravikumar P., M.E.

Application Programming, Systems Programming, Networking.

Ms Vatsala, M.S

System Analysis, Application Programming, Systems Programming.

Assistant Systems Officers

Sourirajan C.S., M.Sc.

System Administration, Programming Languages, Small Computers, Application Software Development.

(Mrs) Vijayalakshmi Sirohi, Ph.D.

Software Engineering, Database Systems, Numerical Computing, Application Software.

Junior Systems Officers

Ravichandran V., M.Sc.

Application Programming, System Operations, Networking, Systems Programming.

Vijayaraghavan C.N.,
M.Sc & P.G. in Ind Maths

Computer Applications in Industry, Simulation Modelling, Operating Systems.

4.16.3 System Trainees on Roll

1990-92	1991-93
15	12

4.16.4 New Facilities/Equipments Added

1. The following equipment donated by Siemens (Germany) R&D have been added:

PC MX2	1 No
9748 Terminals	4 Nos
9783 Terminals	11 Nos

2. 25 Bit Addressing implemented thereby giving users an Address space of 16 MB from existing 8 MB.

3. A package "LAPACK" for Linear Algebra implemented in the system.

4. SIEMENS MX500 System connected to Ethernet LAN using TCP/IP protocol.

4.16.5 Short Term Course/Workshops Attended by the Staff

Mr.Vijayaraghavan C.N

Symposium on "Mathematical Methods & Applications", IIT, Madras.

4.16.6 Staff Served in Committees

Dheenadayalu, R.

Member in Committee appointed by Tamil Nadu Government for revising syllabus for Computer Science Class XI & XII

Member in Expert Committee on DST Project on "Interactive Software for Employment Education Planning.

4.16.7 Visitors

1. Mr. Holger Guenther
RWTH, Aachen Germany Talk on "Development and Operation of Parallel Programs in Hetrogeneous Environment".
2. Swami Harshananda,
R.K. Mutt, Bangalore. Visit to Computer Centre.
3. Dr. D. Swaminadhan
Member, Planning Commission Visit to Computer Centre
4. Open House Visit to Computer Centre by Representatives from Industries & Entrepreneurs.

4.16.8 Visits Abroad

Vijayaraghavan, C.N. Completed Post Graduate Course in "Industrial Mathematics" at the University of Kaiserslautern, Germany in September 1992.

4.16.9 Projects

SNo.	Title	Coordinator
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Institute Projects

1. Hospital Information System Mr. Dheenadayalu R.
2. JEE Data Processing. Mr. Dheenadayalu,
Mr. Sourirajan C.S,
Mr. Ravikumar P.
3. GATE Data Processing Mr. Jayaprakash S,
Mr. Ravichandran R.
4. Scholarship Payment System Dr. Ramanujam M.K.
5. M.Tech Admission Mr. Ramesh S.K.
6. Modification of Other Payment System Ms. Vatsala.
7. Hostel Management Payroll System, CSU Billing System Mr. Sourirajan C.S.

Consultancy Projects

1. Investigations on Holo-optical elements - Sponsored by Aeronautical Research & Development Board. Dr. (Mrs) Sirohi V.

4.16.10 Books

Name of Staff	Title	Publisher
Dheenadayalu R.	Computer Science for ICSE Class IX	Tata McGraw Hill March 93
	Computer Science for CBSE Class XI	Tata McGraw Hill Accepted.

4.16.11 Projects Drawing Support for Computer Applications

SNo.	Organisation	Dept of IIT, Madras providing consultancy	Project
1.	Integral Coach Factory, Madras.	Applied Mechanics	Design of Metre Gauge coaches.
2.	Vikram Sarabhai Space Centre, Trivandrum.	Aerospace Engg.	Development of Computer programs for rocket motor propellant design.
3.	Bharat Heavy Electricals Ltd.	Mechanical Engg.	Analysis of Transients in deerator.
4.	Andaman-Lakshadweep	Ocean Engg.	Harbour Foundation design Harbour works.
5.	University of Madras.	Direct	Labour Market Analysis
6.	Public Works Department.	Direct	Water Studies.
7.	Dept of Home Science S.V. University.	Direct	School Environment studies
8.	Centre for Water Resources Development	Direct	Modelling saline water intrusion
9.	Nuclear Power	Civil Engg.	FE analysis of raft foundation Corporation Nuclear Plant
10.	Dept of Non Conventional energy source	Applied Mech.	Generation of aero dynamic data for blade sections of wind energy systems

4.16.12 Projects by System Trainees (1992)

1. P.Annamalai & V.Swarnalatha, "Design,Development and Implementation of Mail facility for Siemens 7580-E users"
2. R.Ravikumar, "Study and application of different forecasting methods in overhauling of machine parts in a typical industry".
3. J.Jothiraj & R.Ravikumar, "Design Development and Implementation of Computerised Scholarship Payment System for IIT, Madras".
4. S.Muthuselvi & V.Sivakumar, "Video Cassette library information System, using ORACLE".
5. M.V.Neeladri Rao & Kayalvizhi, "File Transfer facility between PC and BS2000 via MX500".
6. Meera Govind, "An Accounting System for MX500".
7. Sabu Sebastian, "Computerisation of Placement of Students".
8. S.A.Kumar, "Share Investment and Equity Analysis System".

4.16.13 Research Publications

1. K.B. Lakshmanan, S. Jayaprakash and P.K. Sinha, "Properties of Control-Flow Complexity Measures", IEEE Transactions on Software Engineering, V.17, No.12, Dec.91, pp.1289-1295 (Issue was published in 1992).
2. S. Jayaprakash and C.R. Muthukrishnann, "An Improved Reliable Distributed Mutual Exclusion Algorithm", Proceedings of ICCS/ISITA'92, Singapore, Nov. 1992.
3. P.J.Masalkar and V.Sirohi. "Comparison of numerical methods for calculation of concentration profiles in ion exchange wave guide". National Symposium on Integrated optics and photonics held at SAMEER,IIT Bombay,Apl.16-18, 1992.

4.17 Materials Science Research Centre (MSRC)

4.17.1 Introduction

The MSRC was established in 1975. The major areas of teaching and research of the Department are:

(1) Ternary Superconductors (Low T_c and High T_c : Synthesis, characterization and study of T_c , H_c^2 , and other parameters - Efforts to correlate T_c with known structure-related properties - studies on improvement of T_c of copper oxides and search for non- copper oxide high T_c superconductors.

(2) Layered Transition Metal Dichalcogenides and Interca- lation compounds. Synthesis, crystal growth and characterization and measurement of physical properties including T_c ; Study of electrochemical properties including intercalation and application as battery cathode materials.

(3) Perovskite Mixed Oxides

Formulation, synthesis and characterization of new and novel rare earth containing perovskite mixed oxides - crystal growth by flux techniques - Study of electrical and magnetic properties - Search for magnetic and semi-conductor-to-metal transitions. Application in solar energy conversion.

(4) Pyrochlore Mixed Oxides

Formulation, synthesis, characterization of new and novel rare earth-transition metal pyrochlore mixed oxides - Study of their electrical and magnetic proper-ties correlations - Applications in solar energy conversion and as battery separators.

(5) Solar Energy Conversion/Storage using Semiconductors in Photoelectrochemical (PEC) Cells.

Electrolyte solar cells for solar energy conversion employing chalcogenide and pnictide semiconductor electrodes (anode and cathode)- Formulation and study of new electrolytes with known electrodes. Solar energy storage as hydrogen through photoassisted electrolysis of water employing pure and mixed (perovskite, pyrochlore, spinel and scheelite type) oxide anodes. Study of Metal-cluster compounds of the type $A_2Mo_3O_8$, $LiLnMo_3O_8$ ($Ln =$ rare earth) $GaMo_4S_8$, $ZnMo_2Re_2S_8$ and related materials for PEC conversion.

(6) Fast Ion Conductors

Fundamental studies on ion mobility and structure property correlations in fast ion conductors (oxides and chalcogenides) based on the layer- and channel type: Nasicon and Lisicon.

(7) Nuclear Waste Disposal (initiated)

Study of crystalline mixed oxide systems with a view to fix radioactive ions for nuclear waste disposal applications.

4.17.2 Details of Faculty

Name and Qualification

Major area of specialisation

Professors

K.V.S. Rama Rao, Ph.D.(Andhra)[Head]

Magnetism and Magnetic Materials

G.V.Subba Rao, Ph.D. (IIT Kanpur),
FRSC (Lond). C.Chem., FAIC (USA),
F.I.A.Sc., (Ind.), FNA (Ind.)
- Director, CECRI, Karaikudi (on lien)

Materials Science and Solid State Chemistry ..
High T_c ternary superconductors... Solar Energy Conversion and storage using PEC cells ...
R&D of new materials for nuclear waste disposal... ion conductors based Nasicon and others.

Assistant Professor

U.V.Varadaraju, Ph.D. (IISc.)

High T_c superconducting materials; High temperature oxide and phosphate based ceramics; magnetic materials.

4.17.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		
	M	W	M	W	M	W	M	W	M	W	M	W	Total
Ph.D.	1	1	-	-	1	2	2	-	-	1	4	4	8

4.17.4 Number of Scholarships/Fellowships holders

Programme	Institute Scholarship	CSIR Fellowship	Others	Total
Ph.D.	6	-	2	8

4.17.5 New Facilities added and major equipment procured

1. High Temperature Furnace with 1200° with PID Controller
2. Faraday Balance (Computerized Measurement) with temperature variation down to 100K
3. Fume Cupboard for handling toxic chemicals
4. INFRARED spectrometer for FAR-IR and MID-IR

4.17.6 Distinguished visitors to the Department

SNo.	Visitors Name	Date of Visit	Purpose of Visit
01.	Dr. S.S.Bhoga Dept.of Physics University of Nagpur Nagpur	10.04.92	To deliver Talk
02.	Dr. Y.P. Yadava Scientist, CSIR RRL, Trivandrum	05.05.92	- do -
03.	Prof.O.N.Srivasatava Dept.of Physics BHU, Varanasi.	14.05.92	- do -
04.	Prof.R.K.Singh Dept. of Physics Barkathuallah Univ. Bhopal.	- do -	- do -
05.	Prof.K.C.Patil Dept. of Inorganic Chem, and Phy.Chem,IISC, Bangalore.	28.05.92	- do -
06.	Prof.S.K.Rangarajan Director CECRI, Karaikudi.	08.06.92	- do -
07.	Prof.K.S.V.Santhanam TIFR, Bomabay.	12.06.92	- do -
08.	Dr.G.Rama Rao IICT,Hyderabad	20.07.92	- do -
09.	Dr.Jeane Ayache Lab De Phys Des Materiaux CNRS Lab,France	13th July & 15th August	- do -
10.	Dr.U.Balachandran Argonne National Lab USA	28.09.92	- do -
11.	Dr.B.V.R.Chowdari Dept. of Physics National Univ.of Singapore.	4th & 5th Nov	- do -
12.	Prof.P.Ganguly Deputy Director NCL Pune	16th & 21st Nov	- do -

SNo.	Visitors Name	Date of Visit	Purpose of Visit
13.	Dr.S.Umapathy Inorg & Phys.Chem.Dept IISc, Bangalore.	13.11.92	To deliver Talk
14.	Prof.S.Ramasesha Solid State & Structure Chem.Unit,IISc,	17.11.92	- do -
15.	Prof. Jean Rouxel Institute des materiaux des Nantes, 2 rue de Houssinlere, 44072 Nantes, CEDEX 03 France	06.12.92	- do -
16.	Dr.Herbert Pausch Germany	14.01.93	- do -
17.	Prof. G.Klipping & Prof.Schollhorn Freie University Inst.Fur.,Berlin	28.02.93	- do -
18.	Prof.E.Gmelin Max Planck Institut Fur Festkorperfor Schung, Stuttgart, Germany.	07.02.93	- do -
19.	Dr.S.Natarajan Davy Farady Research Lab, The Royal Institution of GB, London.	13.02.93	- do -
20.	Dr. M.A. Subramanian Dupont Company Wellington, USA	16.02.93	- do -
21.	Prof.Shawqi Al-Dallel Dean, College of Science University of Bahrain.	21st & 24th & 27th Feb	- do -
22.	Prof.F.J.Berry & L.E.Smart Dept. of Chemistry The open University Milton Keynes,U.K.	27.03.93	- do -

4.18 Fibre Reinforced Plastics Research Centre

4.18.1 Introduction

Fibre Reinforced Plastics (FRP) Research Centre was established in 1974 with a view to take up inter-disciplinary research and man-power training in the area of composites technology. The centre offers elective courses at MS and PhD programmes for students registered through various departments. The major areas of teaching and research of the centre are:

- * Development of Composite materials
- * Manufacturing technology of polymers, metal and ceramic matrix composites
- * Theory of composite materials
- * Analysis of composite structures
- * Composite product design
- * Testing and quality control

4.18.2 Details of Faculty

Name and Qualification

Major area of specialisation

Chief Design Engineer

N G Nair, Ph.D(IIT Kanpur)

Composites Technology, Material process development, analysis & design of products, Structural Engg.

S K Malhotra, Ph.D(IIT Madras)

Design and Development of composite products processing /testing of raw materials and products

Senior Design Engineer

BJC Babu, Ph.D(IIT Madras)

Engg. Mechanics, Design and development of FRP processing equipment structural analysis and design, dynamics of structures, experimental stress analysis

4.18.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year & above		Total		
	M	W	M	W	M	W	M	W	M	W	M	W	Total
Ph.D.	1	-	4	-	1	-	-	-	4	-	10	-	10
M.S.	-	-	1	-	-	-	1	-	-	-	2	-	2
Total	1	-	5	-	1	-	1	-	4	-	12	-	12

(All are registered through departments)

4.18.4 Number of Scholarship/Fellowship Holders

Programme	Number		Total
	Scholarship	Others	
Ph.D.	6	4	10
M.S.	1	1	2
Total	7	5	12

(All registration through department only)

4.18.5 Number of Degrees Awarded

Programme	Number
Ph.D	1

4.18.6 Short term Course/Workshop/Seminar/Symposia/Conference Organised

S.No.	Coordinator(s)	Title of course	Period
1.	Dr. N G Nair	Workshop on Fibre Reinforced Thermoset Plastics	20-5-92 to 02-6-92
		-do-	09-3-93 to 20-3-93

4.18.7 Invited Lectures delivered by the Faculty in Academic Institutions/Public Bodies

No.	Name of Faculty	Topic of Lecture	Delivered at	Date
1.	Dr.N G Nair	Fibre Reinforced Plastics	CIPET, Madras	17.11.92
		FRP and Composites	Seminar on Recent trends in plastics for Engg.& speciality held at Bangalore	30.01.93
		Recent trends in Fibre Reinforced Plastic Products	CIPET, Madras.	23.02.93
		Composite Materials Madras	AC College,	27.02.93
		Composite Materials for Mechanical Engg. Applications	Dept.of Mech. Engg.IITMs.	01.03.93
		Materials for Prosthetics and Orthotics	Rehab.Instt. KK Nagar, Ms.	30.01.93

4.18.8 Visits Abroad

S.No.	Name of Faculty	Country visited	Date	Purpose of visit
1.	Dr.S.K.Malhotra	Germany	May'92 to July'92.	DAAD Invitation

4.18.9 Distinguished Visitors to the Department

S.No.	Name of the visitor and Occupation	Date of visit	Purpose of visit (Lecture/discussion)
1.	Dr.S.R.Soni AdTech System Dayton, USA.	1.2.1993	Delivered a lecture on delamination in composites

4.18.10 Sponsored Projects

Sl.no.	Title	Period	Funding Agency	Amount	Coordinator
The following projects sanctioned in earlier years and were continued during the year.					
1.	Development of Rehab.aids in composites for paraplegics	4 yrs.	DST,New Delhi.	Rs.1.43 Lakhs	Dr.N G Nair
2.	Dev. & Evaluation of FRP splints for cerebral palsy	3 yrs.	DST, New Delhi	Rs.1.81 Lakhs	Dr.BJC Babu

4.18.11 Major Consultancy Assignments

A total of Rs.36,000/= worth design consultancy and Rs.1.50 lakhs worth testing assignments under Composite Test Facility were taken up during the year.

4.18.12 Research Publications

1. R.Krishnamurthy, G.Santhanakrishnan and S.K.Malhotra, "Machining of Polymeric Composites", Proc.of the Machining of Composite Materials Symposium, ASM/TMS Materials Week, Chicago, Illinois, USA 1-5, Nov.1992, pp.139-148.
2. Dr.G.Santhanakrishnan, R.Krishnamurthy and S.K.Malhotra, "Investigations into the machining of carbon fibre reinforced plastics with cemented carbides", JI.of Materials Processing Technology, V-30, 1992, pp.263-275.
3. S.K.Malhotra, "Design and development of Graphite fibre/epoxy tension link", Proc.of National Workshop on Newer Carbon products and their Applications", held at Bangalore 9-10th Oct.1992, pp.62-68.
4. E.M.S.Nair, P.A.S.Murthy, C.Ganapathy and N.G.Nair "Fracture Initiation in Elastic Plastic Bodies" Engineering Fracture Mechanics, Vol.42, No.2, 1992, pp.323-329.
5. P.K.Phillip, N.G.Nair and M.Ramakrishnan "Design and development of automobile leaf spring" Paper presented at the All India Machine Tool Design and Research Conference held at Coimbatore, Dec.1992.

4.18.13 Any Other Relevant Details

The Centre has one Technical Officer, six non-teaching technical and one non-teaching nontechnical staff.

4.19 Centre For Industrial Consultancy and Sponsored Research

4.19.1 Introduction

The Centre for Industrial Consultancy and Sponsored Research is responsible for providing support for the management of consultancy and sponsored research projects sanctioned to the Institute and also for promoting industrial and liaison activities of the Institute. These are:

- * Sponsored Research programmes
- * Plan schemes
- * Consultancy programmes
- * Collaborative research with foreign companies
- * Industrial associateship scheme
- * ISRO-IITM cell joint projects sponsored by ISRO
- * CODAPS Cell joint projects sponsored by Dept. of Ocean Development, Govt. of India
- * Entrepreneurship Development programmes
- * Technology transfers
- * Patents, etc.

4.19.2 Sponsored Research

Around 140 projects with a total sanction of about Rs.10 crores for a 3-year period are handled by the Centre. Out of this 29 projects of value totalling to Rs.5.60 crores were received during 1992-93 alone.

4.19.3 Plan Schemes

The Centre provides administrative support for plan schemes of Ministry of Human Resource Development sanctioned to the Institute in the emerging areas and processes of technology such as CAD-CAM, VLSI, Telematics, Fibre optic communication, Environmental engg. etc.

4.19.4 Consultancy Programmes

The consultancy programmes showed a continued growth during this year also. The total value of the approved assignments increased to Rs.221.58 lakhs in 1992-93 from Rs.204.78 lakhs in 1991-92, Research Based Industrial Consultancy activity contributing nearly 50% of the total value of the assignments. Also thirty faculty were retained as consultants by various industries. Another important activity is, taking up interdisciplinary programmes for providing consultancy to Tamil Nadu Pollution Control Board, Tamilnadu Leather Development Corporation and Tamilnadu Minerals Limited.

4.19.5 Collaborative Research Projects

The projects sanctioned in the year 1989-90 under Indo- German agreement for development of the facilities in Catalysis, Material Sciences, Electronics and Production Engineering were continued. Also projects under Indo-USSR and Indo-EEC and National Science Foundation of USA were continued.

4.19.6 Industrial Associateship Scheme

The response from the Industry towards this scheme has been highly encouraging with the membership increasing from 242 in the previous year to 309 during 1993. Six technology appreciation programmes were organised on various topics. Also Technology requirement programmes were held in the area of Fine Element materials.

Abstracts of M.Tech., M.S. and Ph.D programmes were published for the benefit of the Associates.

4.19.7 ISRO-IITM Cell Joint Projects

This is a joint research activity sponsored by the Indian Space Research Organisation where research projects of interest to ISRO are being taken. New projects were taken during the year and also short term courses were conducted in the areas of interest to ISRO. A one-day seminar was organized jointly with ISRO to identify projects of relevance to ISRO.

4.19.8 Technology Development Missions

Three Mission projects in the areas of New materials, Energy Efficient Technologies and Natural Hazards Mitigation, with financial support from the Ministry of Human Resource Development were taken up during this year.

4.20 Central Electronics Centre

4.20.1 New Courses Stated

Ninth Apprentice Training Programme of one year duration was started on 04.01.1993. 15 candidates were selected.

4.20.2 New Facilities added and Major equipment procured

	in Rs.
1. Microcontroller	9,600
2. Multioutput power supply (10 Nos.)	85,000
3. PC Board device programmer	20,000
4. Incircuit component tester	3,40,000
5. Photo plotter	2,20,000
6. 3.1/2 digit autoranging DMM (10 Nos)	50,000
7. Dot matrix printer (2 Nos.)	34,000
8. Plotter Digitizer	52,000
9. PC AT 486	86,000

4.20.3 Major Consultancy Assignments

S.No.	Title	Organisation	Amount	Co-ordinator(s)
1.	Intra-Aortic Baloon Pump	Malar Hospital	7500	M.V.Srinivasan
2.	Spark Tester	MIL India Ltd.	1500	M. Kumaravel
3.	Ind-Measurements	PS Electronics Ltd.	1500	M.Kumaravel
4.	Freq. Invertor	Protech Industries	6500	M.Kumaravel

4.20.4 Any other relevant details

The Centre has 14 Technicians, 3 Administrative and 4 Project staff.

5. CENTRAL SERVICES

5.1 Central Workshop:

The various units of Central Workshop are Carpentry and Pattern Making Fitter's and Tool maker's shop, Machine shop, Gear shop and Gear testing, Instrument shop, Electrical shop, Foundry and Heat treatment, Welding shop, Automobile repair, Electroplating shop, Design cell and Stores.

Some of the special facilities available are gear cutting, gear grinding and testing (spur and bevel gears), jig grinding, copy milling manufactures of precision scales, precision instrument repairing calibration of pressure gauges and dynamic balancing of rotors etc.

Central Workshop undertook fabrication of components, gadgets apparatus etc. required by the various Departments for research and development projects in addition to the regular training programme for the B.Tech and M.Sc. students (600 students).

For giving training in advanced machines like CNC machines, Central Workshop procured 3 CNC Lathes (Trainer) at a cost of Rs. 10,00,000/- in the year 1992.

Advanced workshop course was conducted during the Summer May - June 1992 to the B.Tech students. The following are the details of works during the period under report:

No. of Work Orders completed	:	604
No. of students trained in the Advanced Workshop Training during Summer Term Course	:	26

During the above period several works of Industrial Consultancy and Sponsored Research works were also undertaken and completed. In addition to the above Institute buses and vehicles were maintained.

The transport system of the Institute is also maintained by the Central Workshop.

5.2 Central Glass Blowing Section:

The Central Glass Blowing Section is one of the most important infrastructural facilities of the Institute since its inception in 1972. Being a central facility this section undertakes design and fabrication of sophisticated scientific glass apparatus for research and development in various departments. Besides meeting the in-house needs, this section also frequently undertakes jobs for the industry under the industrial consultancy programme.

This section has a range of modern glass working equipment largely procured from the Federal Republic of Germany as a component of the collaborative programme and these include Horizontal cum vertical lathe, Universal lathe, Forming lathe and High Vacuum Systems. It is also well equipped with a good number of sophisticated burners drilling and cutting machines, grinding and polishing equipments, and such other tools necessary for fashioning out a variety of glass apparatus and instruments. Though the services of the section are utilised by the student community and researchers of different departments, its contribution in specialised area like Cryogenic Glass Systems, high

vacuum system is quite significant in recent years. The section has adequate facilities for Quartz Working and has developed high level of expertise in this area.

Part of industrial consultancy programme this section has to its credit the following specified works:

Cryostat, Spherical, Cylindrical and Dewars (Window silvering), Luggin probe, Adibetic calorimeter, Laser housing tube with water jacket, Mercury container for voluminometer, Reaction kettles, Reactor tube, Jet electropolisher, Double walled transfer tube, Vacuum tube collector for solar energy, Quartz wares (Crucible, combustion tube, crystal growing quart sheath etc.).

The service regarding glass apparatus repair work and fabrication of precision glass instruments, sophisticated glass systems of this section is fully utilized by the departments.

This centre also procuring new tools to help in the fabrication of most sophisticated glass systems such as hydrogen absorption facilities working on volumetric and pressure reduction methods, to study the hydrogen absorption properties of metals and alloys, and bubble pump evaluation test-rig to study the volume flow rate of refrigerant and strong solution in various glass diameters for R and D of the various departments of this institute.

The Central Glass Blowing Section organised VIIIth National Seminar and Workshop on 'Science and Engineering of Glass Blowing and Machines in Glass Blowing Techniques at IIT Madras during September 21st to 25th, 1992 in collaboration with Indian Society of Scientific Glass Blower's [Regd.]. Several experts from all over India gave specialised lectures on variety of topics on glass and scientific glass blowing and quartz works. Several glass technologists presented papers in the seminar on the fabrication of specialised scientific glass and quartz apparatus. The workshop was organised with the help of experts and the specialised machinery available at the Central Glass Blowing Section. The combined workshop and seminar was represented by the scientific glass technicians sponsored by several National Institutions, Government Organization and private companies.

An exhibition of sophisticated glass and quartz apparatus was on display during the period of seminar.

5.3 Central Photographic Section:

This Section with the staff strength of five experienced technical personnel caters to the need of various departments/ centres of the Institute. It is mainly involved in Slide Preparations, Phototaking of research activities of the faculty members and research workers. It also undertakes development, enlarging and printing and helps various IC and SR activities. It covers the different Institute functions such as Convocation, Sports-meet, Seminars, Symposia, etc. Around 600 work orders were executed during the year under report.

5.4 Central Gas Supplies Unit:

The Central Gas Supplies Unit is administered by a Professor. It procures the following industrial gases and special gases from various manufacturers/suppliers and issues to various Departments/Laboratories of the Institute:

Industrial gases	Special gases
1. Oxygen	1. High Pure Argon
2. Nitrogen	2. High Pure Oxygen
3. Dissolved Acetylene	3. High Pure Nitrogen
4. Argon	4. Zero Air
5. Hydrogen	

5.5 Central Supplies Unit:

The Central Supplies Unit is administered by a Warden. It procures under the Milk Supply Scheme, the milk from the nearby villages and from T.C.M.P.F. Ltd., distributes to the student hostels, the residents of the campus and the staff of the Institute reside around the campus. Under the Provision Supply Scheme, the Unit procures the items of major consumption to hostels from the wholesale suppliers and distributes them, thus reducing the overall mess rates of hostel inmates.

5.6 Centre For Continuing Education:

The Centre for Continuing Education was established in June 1986, by merging together the different units connected with Continuing Education activities, Quality Improvement Programme and Curriculum Development work at the Institute.

Quality Improvement Programme:

Since inception, about 200 faculty members have obtained Ph.D. degrees and about 300 faculty members have obtained M.Tech. degrees under this Programme.

During 1992-93, 15 Ph.D. Scholars and 19 M.Tech. Scholars were admitted to the above programme; 44 Ph.D. Scholars and 19 M.Tech. Scholars were on rolls during 1992-93.

Under QIP, 4 Summer/Winter Schools were conducted during 1992-93, mainly for teachers of Engineering Institutions, but also involving few participants from Industry.

Beginning from this year, there has been a reorganisation of the Curriculum Development activities; instead of two exclusive Cells for Aerospace Engineering and Electrical Engineering, a more comprehensive Overall Curriculum Development Cell has now been established in order to cater to the needs of all departments.

During 1992-93, 6 proposals from faculty members for preparation of resource materials have been approved under the CD Cell Activity.

Continuing Education Programmes:

A total of 15 Continuing Education Programmes were conducted and about 375 participants attended these programmes, during 1992-93. Many industries are coming forward to make use of the expertise of the IIT Madras faculty through these programmes.

Continuing Education Project:

During 1992-93, 3 modules were completed; 61 more modules are under various stages of preparation. On the basis of the completed modules, it is intended to organize Continuing Education Programmes for working professionals.

Educational Technology Cell:

The Educational Technology Cell at IIT Madras was established in 1987 with the principal objective of producing resource materials, mainly employing the media of video, audio-visual and computer-assisted learning. A fully equipped studio has been set up for the production of these resource materials. To date, 7 video programmes have been completed, and a few more are in the pipeline.

IIT Madras Series In Science & Engineering

This series was launched a few years ago with the principal objective of making available to the students and teachers of science and engineering well-written accounts of modern developments in topics of current interest. Three books have been published till now, and a few more are under preparation.

Book-Writing Scheme

This Scheme has been initiated to encourage our faculty members to write textbooks suitable for adoption not only in our Institute but also in the other engineering colleges. Till now, about 25 books have been published by standard publishing companies.

5.7 Central Library:

The Central Library added a number of new facilities and information services during the reporting period 1992-93. The details are as follows:

I. Library Automation

Circulation: A computer based circulation system which was commissioned earlier has been provided with additional facilities to generate number of useful reports. Now complete system is available in UNIX Operating System.

Acquisition: While the MS-DOS version of acquisition system is working very satisfactorily, the work relating to UNIX version is at the completion stage and would be ready by May 93.

Serials control: Serials control system is running under DOS and would be changed to UNIX environment by May 1993.

Open Public Access Catalogue (OPAC): Data extraction from CD-ROM has been started for back log of books. A data base of periodicals holdings of Central Library is being created. About 75,000 records.

II. INFOLINE Information Retrieval Service: INFOLINE, a new online information access and retrieval service has a high speed telecommunication link to access more than 500 Industrial Databases through DIALOG Information Service in USA. The service has been found very useful. The service has been used by Industrial Associates of IIT besides IIT faculty, students and staff.

III. CD-ROM Information Retrieval Service: In addition to the already acquired CD-ROM database of OCLC, INSPEC Database is being subscribed with retrospective coverage from 1989 onwards. This new CD-ROM covers Physics, Electronics, Electrical and Computing areas. This service is open for all authorised users. Literature search can be done interactively.

IV. Expansion of Xerox copying service: Our Quick Copying Service has been augmented by providing additional copying machines in new locations. The service has been extended to include on Sundays and other Institute holidays.

V. INFODESK: A new INFODESK has been started in the Library from 1.4.92 to provide reference and reader-assistance services and serve as a main focal point of contact for the library users.

VI. Library Orientation: The Library conducts Orientation programmes for the benefit of new members, visitors etc. to familiarize themselves with the resources and services of the library.

VII. Media Resource Centre: The MRC is equipped with TV, VCR, 16 mm projector with all necessary items like screen etc. In addition to the regular screening of video cassettes available in MRC, arrangements have been made to procure video cassettes from Anna University, British Council Library, National Aeronautical Laboratory, Bangalore and other institutions. A catalogue of 16 mm motion films has been made available in MRC.

VIII. Book Bank: The Book Bank of this Central Library since its inception 13 years back has been catering to the needs of the students. The Book Bank service was augmented by way of enriching the collection both for Weaker section and General section as well increasing number of tickets that weaker section students can avail.

IX. Reorganizing Document collections: Reference Section: The Reference Section was reorganised to facilitate easy consultation and browsing of reference books.

X. Malibnet: Central Library has become a fullfledged Institutional member of the Madras Library NETwork (MALIBNET) in March 1993 with Director, IIT as Founder Member. This programme is being coordinated by INSDOC Regional Centre, Taramani, Madras 113.

XI. Computerisation Project: The computerisation project of the Central Library was completed in December 1992. The circulation system is fully operational and the Acquisition, Serials Control and OPAC are to be implemented soon.

XII. Training Programme: Central Library organised training programme on computerised modules of library activities in two spells, i.e. 6.7.92 to 15.7.92 and 16.11.92 to 30.11.92.

XIII. Library Publications

New additions to the Library (fortnightly)
Know Your Library: A Guide
Library Focus
Catalogue of Motion Films
Catalogue of Current Periodicals
Catalogue of Video cassettes

XIV. Participation In Conferences/Workshops

Sri R. Vengan, Deputy Librarian attended the following conferences/workshops during the year:

1. 58th IFLA International Conference held at New Delhi, 30 Aug. - 5 Sept. 1992.
2. 4th CDS/ISIS user group meet-cum-workshop on CDS/ISIS at NCL, Pune, 6.1.93 to 8.1.93.
3. Presented a paper titled 'Science and Technology Libraries: Librarian - the Manager', at the First Tamilnadu Library Conference 1993 held at University of Madras during 12-13 March 1993.

Sri M.Koteswara Rao, Deputy Librarian attended the following conferences/Workshops during the year.

1. 8th meeting of the Aerospace Information Panel (ARDB) held on 9th Sept. 1992 at ADA, Bangalore.

2. Seminar on DIALOG UPDATE and CD-ROM Technology organised by Informatics, held during 14-16 January 1993 at Bangalore.

XV. Invited Lectures

Sri R.Vengan, Deputy Librarian, delivered the following lectures during the year:

1. Lecture on 'CD-ROM Technology and its role as information storage media', at INFOTEK Workshop on 'Visual Communication for Education and R&D' held at IGCAR, Kalpakkam on 13th May 1992.

2. Lectures to the participants of Workshop on 'CD- ROM Technology' at INSDOC, Madras in October 1992 on the following topics:

Information Storage & Retrieval - evolution

CD-ROM TEchnology - a review

On-line v/s CD-ROM

3. An invited lecture on 'Libraries for 21st Century', at MIT Madras on 11 Nov. 1992.

4. Invited lecture on 'Advanced features of CDS/ISIS' at the Short-term Training course on CDS/ISIS by INSDOC, Madras, on 27 Nov. 1992.

XVI. Library and Information Service Statistics

The following statistics reflect the overall performance of the Libaray and Information Services during the year under report.

1. Membership:

Institute Members (Staff & Students)	4,500
Outside Members	
Individuals	133
Corporate	8
Industrial Associateship	280
Consultation Permits	1,300

2. Collection Development:

Acquisition of Publications	
Books	2,595
Theses	76
Pamphlets and Reports	175
Microfilms/Fische	8
Book-bank (General) (Total)	2,502
Book-bank (Weaker Section) (Total)	5,914
Current Periodicals by Subscriptions	426
Current Periodicals by Exchange/Gift	185
Back Volumes of Periodicals	2,840
Total Accessions at the end of March 1992 (Books & Journals)	2,18,643

3. Library and Information Services:

Circulation	
Number of Readers visited	1,44,000
Number of Volumes issued	2,52,000
Number of Volumes issued through Book Bank (General)	4,864
Number of Volumes issued through Book Bank (Weaker Section)	6,648
Overdue & other charges collected	Rs.1,61,339
Reservation for Books	
Registered	9,440
Fulfilled	9,350
Department Loans	
Department Loan	82
Permanent Loan	860

Inter-Library Loans	
Borrowed from other Libraries	13
Loaned to other Libraries	57
Literature Search	
Computer-based literature searches through DIALOG and CD-ROM databases	27
CDROM searches	350
Reprint Service	
From International Sources, i.e., British Library, Canadian Institute of Scientific Information, INSDOC, etc.	57
Translation services	2

4. Audio-Visual Service:

Number of Audio Cassettes	8
Number of Video Cassettes	21
Number of Video Programme screened	150
Number of persons attended	549
Number of Audio programme conducted	45
Number of persons attended	341

5. Reprographic Service:

Number of Xerox copies supplied	9,40,000
DTP output	12,562
Number of copies printed on Rotaprinter	5,81,740

6. Binding:

Number of Books and Journals bound (Internal)	1,204
Number of Miscellaneous Publications bound (Internal)	1,419
Number of Books & Journals Bound through external binders	2,840
Departments work	3,664

7. Visitors to the Library:

Students from Library School (about 30 students per group)	7 Groups
Other Visitors	7VIPS

6. STUDENT AMENITIES AND ACTIVITIES

6.1 Hostel:

All the students admitted to IIT, Madras are required to reside in the hostels inside the campus. There are 11 men's hostels and 1 ladies' hostel with a total of 2396 single room accommodation. During the period under report there were 1816 men and 194 women students in these hostels.

Each hostel is administered by a Warden and an Assistant Warden. The Warden is assisted by a Hostel Council consisting of student Secretaries and the Assistant Warden in day-to-day functioning of the hostel. The Hostel Management is a centrally administered body and is in overall charge of the functioning of all the Hostels and the Central Supplies Unit. There are 294 hostel employees and they are responsible to the Hostel Management through the respective Wardens of the hostels. The Chairman, Council of Wardens is the Chairman of the Hostel Management. He is assisted by an Assistant Registrar and other supporting staff.

During the period under report, the following officers were in position :

Chairman, Council of Wardens and Hostel Management	Dr.P. Aswathanarayana upto21-2-1993 Dr.P. Srinivasa Rao Professor of Mechanical Engg. from22-2-1993
Assistant Registrar	Sri K. Ramaswamy
Name of the Hostel	Warden
Alakananda	Dr.M.S. Shunmugam Professor of Mechanical Engg.
Brahmaputra	Dr.B.S.Thandaveswara Asso. Professor of Civil Engg.
Cauvery	Dr.O.Prabhakar Professor of Metallurgical Engg.
Ganga	Dr.T.T.Narendran Asso. Professor of Hum. & Soc. Sciences
Godavari	Dr.N. Sivaprasad Asso. Professor of Mechanical Engg.
Jamuna	Dr.L.S.Ganesh Asso. Professor of Hum. & Soc. Sciences

Krishna	Dr.M.Ravindran Professor of Ocean Engg.
Mandakini	Dr.V.G.Idichandy Asso. Professor of Ocean Engg.
Narmada	Dr.S.D.Pathak Asso. Professor of Metallurgical Engg.
Saraswathi	Dr.S.K.Rakshit Asst. Professor of Chemical Engg.
Sarayu	Dr.Enakshi Bhattacharya Asst. Professor of Electrical Engg.
Tapti	Dr.M.Govardhan Asst. Professor of Mechanical Engg.
C.S.U.	Dr.P.Srinivasa Rao Professor of Mechanical Engg.

6.2 Central Supplies Unit:

The Central Supplies Unit is administered by a Warden. It procures the milk under the Milk Supply Scheme from the nearby villages and from Tamilnadu Co-operative Milk Producers Federation Ltd. and distributes to the student hostels, the residents of the campus and the staff of the Institute residing around the campus. Under the Provision Supply Scheme, the Unit procures the items of major consumption from the wholesale suppliers and distributes them to the hostels, thus economizing on the mess expenditure in the hostel messes.

6.3 Medical Facilities;

Medical facilities are provided to the students in the well equipped Institute Hospital. Advises are given on a wide range of health problems to the students. The details of medical facilities available are given in the Chapter, Campus Amenities.

6.4 4(TN) Air Sqn (Tech):

The AIR WING NCC unit is functioning at IIT Madras from 16 Sept. 1965, to provide NCC Training, exclusively to the students population of the Institute. Regular IAF Officers and Airmen are posted to this unit and the strength is augmented by part-time officers and other supporting staff drawn from the Institute. NCC syllabus includes Drill, Weapon Training, Civil Defence, health/hygiene, leadership training, history of airport, principles of Flight, air armaments, Radio/Radar aids, Avionics and Instrumentation. The training is imparted by a team comprising of the Air Force elements and the Institute part time officers.

The organisation of the unit is as follows:

Officiating Officer Commanding	LT.CDR.S.Selvaraju
Associate NCC Officers	Plt Officer A. Mani
	Plt. Officer Dr. Neelamani

During the year under report 149 Cadets from the First Year B.Tech were enrolled. In addition to the regular NCC Training, the following activities were carried out:

- * Range firing practice on rifle, revolver and 12 bore gun.
- * One blood donation camp at Red Cross Society, Madras by the eligible cadets.
- * Pledging of eyes for donation by volunteer cadets.

The 4(TN) Air Sqn (TECH) NCC located within the IIT campus helps to instill a sense of discipline, comradeship, a spirit of adventure and leadership capability in the life of IIT students.

6.5 National Service Activities:

The Senate approved the inclusion of NSS, alongwith NCC and NSO, as activities open to first B.Tech students. The following are the highlights of the activities for the period 1992-93.

About 30 students were engaged in protecting the environment of our campus. They were removing unwanted plants like Prosobis and planting more benign plants like bamboo.

About 15 students were engaged in helping the school students of Taramani village. Their services were very much welcomed and appreciated by the children and their parents.

About 5 students were engaged in monitoring and controlling pollution from diesel vehicles and two-wheelers within the IIT Campus.

A camp was organised and conducted for Pranayama - Meditation by Vyakti Vikas Kendra during the period 16 to 25 February 1993. About 30 students, staff members and their families took part in the camp.

The following lectures were arranged:

- A series of lectures was held by Prof.N.V.C.Swamy, Director, I.I.T. Madras, on the subject "Life and Teaching of Swamy Vivekananda", during the first semester, July- December 1992.
- A series of lectures on "Swami Vivekananda and Upanishads" is being held by Prof.N.V.C. Swamy, Director, I.I.T. Madras, during the semester January to April 1993.
- A lecture on 'Swamy Vivekananda and National Integration', was held by Sri Harshanandaji of Ramakrishna Math at the Centre Lecture Theatre, of IIT Madras on 19-1-1993.
- Two lectures were held by Swami Paramananda on 18th and 19th February 1993.

N.S.S. students assisted in the Blood Donors camps held at Brahmputra Hostel by Voluntary Health Service on 27-2- 1993.

N.S.S. Coordinator

Prof. K V Gopalakrishnan,
Prof. of Mechanical Engineering

6.6 Student Welfare Fund:

During the year 1992-93 M/s. N Bhupathi Singh, B.Tech. Dept. of Elec.Engg., C Madhavan, M.Sc., Dept of Chemistry and B Kuberan, M.Sc., Dept of Chemistry were given loan of Rs.1000/-, Rs.3000/- and Rs.3000/- respectively.

6.7 Guidance & Counselling Unit:

- More faculty and student counsellors volunteered to work in the Unit during this year than the previous years. The unit has 60 faculty and 115 student counsellors, currently.
- A Campus Guide was prepared updating information in the form of a booklet and was made available to every fresh student of undergraduate and post-graduate programmes.
- The first year B.Tech students were distributed to various student counsellors and faculty counsellors for individual attention immediately on arrival to the campus. A deviation this

year, was that the student counsellors were chosen such that they lived in the same hostels in which their counselees also lived. This had the benefit of informal meetings of the students even during late hours, if help was needed.

- * The first year students with their parents and guardians were received by the student counsellors at Madras Central Railway station and were helped in settling down in their stay quickly in July, 1992.
- * A get-together of all the counsellors and the parents guardians was arranged to make the fresh students feel much at home.
- * Student problems were solved then and there by the counsellors by paying individual attention to the needy.
- * The Unit could identify many academically weak students and could arrange for guidance through the senior students who readily came forward to help in subjects like Mathematics, Physics, Chemistry and Engineering Drawing.
- * A few problems of emotional nature also were attended to by the unit with the help of the medical officers of the institute.
- * The unit helped the Medical Officers and the first year students to blood grouping of the first year students done.
- * A lecture to students on "ill effects of drugs" by Dr.Rajkumar, the Psychiatrist of the institute was arranged by the unit and it was well received by the students.
- * The counsellors of the unit met five times this year to exchange their views of each other for an efficient functioning.

6.8 Weaker Section & Foreign Students:

As per the GOI orders 22.5% of the seats are reserved for SC and ST students. For B.Tech. programme they are admitted through the Joint Entrance Examination with a relaxation. These students have to get only 60% of the marks obtained by the last student of the general category to get qualified for admission. 28 SC/ST students joined the B.Tech degree course during the academic year 1992-93. Students admitted against SC/ST reservation quota are given the following benefits:

1. Travelling allowance (IInd Class train fare/ordinary bus fare) from the place of residence to Madras to join the B.Tech degree course.
2. Free tuition.
3. Free lodging and free messing (basic menu) and pocket allowance of Rs.70/= p.m. irrespective of their parent's/guardian's income to the students admitted during 1990-91 and earlier years.
4. As per Govt. of India revised orders, with effect from 1st January, 1991, free lodging, free messing (basic menu) and pocket allowance of Rs.70/= p.m. was limited to the students whose parent's/guardian's income is Rs.24,000/= net per annum or below. The revised regulation is applicable to the students joined during the academic year 1991-92. Exclusive use of Weaker Section (SC/ST) Book bank. The students are issued 12 tickets in addition to the 5 tickets as issued to the general students. Against Book

Bank 12 tickets, books are issued on long term i.e. upto the end of the semester.

5. Drawing instrument (Mini-drafter) free of cost.
6. Help in getting placement. Wherever possible, industries are requested to conduct separately interview for SC/ST students and the requirements for these students are lower than that of the general category.
7. Special coachings were arranged by the Departments of Mathematics, Physics and Chemistry during semester July-Nov. 1992, and coachings were also provided by the Guidance and Counselling Unit.
8. During Counselling prior to the admission, the branch wanted by the student is readily allotted, depending upon the vacancy available.

Later, when a student finds tough in the chosen branch, he is allowed to switch over to other branches depending upon vacancies.

Preparatory Course for B.Tech

A preparatory course of one academic year was started during the year 1983-84 exclusively for SC/ST Students. Selection for this course is made from the SC/ST students who did not get admission through Joint Entrance Examination. After successfully completing the preparatory course at IIT, they will be eligible to join B.Tech degree course and they are not required to write JEE again. IIT Madras and IIT Bombay are conducting the Preparatory course for one batch in alternative years. During the academic year 1992-93, IIT Bombay conducted the Preparatory course.

M.Tech/M.Sc.

22.5% of the seats are reserved for the students of SC/ST community. At present these students are admitted through GATE examination when they obtain 2/3 of the percentile of the last student of the general category. 43 SC/ST students were admitted to M.Tech degree course during the academic year 1992- 93. In Physics Department all the SC/ST students who wrote the written test for M.Sc., admission are called for interview. The cut-off marks was 2/3 of the mark scored by the last student of the general category. The Chemistry Department and Mathematics Department conducted 2 entrance tests each. For SC/ST students the cut-off mark was 2/3 of the mark scored by the last student of the general category. One student in Physics Department and one student in Chemistry Department joined the M.Sc., programme. Students admitted against SC/ST reservation quota are given the following benefits:

1. Exclusive use of Weaker Section (SC/ST) Book bank. The students are issued 12 tickets in addition to the 5 tickets as issued to the general students. Against Book Bank 12 tickets, books are issued on long term i.e. upto the end of the semester.
2. Both Public Sector and Private Sector Industries were reminded on the obligation of recruiting SC/ST students and other special steps were taken to enhance the recruitment of this category of students
3. Scholarship as given to all students.

Foreign Students

B.Tech

During the academic year 1992-93, 15 foreign students joined the B.Tech degree course. Foreign students are also permitted to use the Weaker Section Students (SC/ST) Book Bank. 4 Book Bank tickets are issued to each student in addition to the 5 tickets issued to all students. Against Book

Bank 4 tickets, books are issued on long term i.e. upto the end of the semester. The details of nationality of the 15 foreign students are as follows:

Bangladesh	6
Sri Lankan	7
Iranian	1
Malaysia	1

General

During the year 1992-93 meetings were held on the following days.

3rd August, 1992	: Weaker Section Students (M.Tech)
5th August, 1992	: Foreign students
6th August, 1992	: Weaker Section Students (B.Tech)
28th September, 1992	: Weaker Section Students (B.Tech)
28th September, 1992	: Foreign Students
29th September, 1992	: Weaker Section Students (M.Tech)
11th January, 1993	: Weaker Section Students (B.Tech)
12th January, 1993	: Weaker Section Students (M.Tech)
13th January, 1993	: Foreign Students

Besides these meetings, many academically weaker and foreign students had meetings with Adviser to help the students to do better in the academic programmes.

Adviser

Dr. R. Raman, Professor, Mechanical Engineering Department was the Adviser, Weaker Section & Foreign Students during the period under report.

6.9 Placements of Students:

During the period under report, the placement Office was able to arrange placements for 287 students of the Institute. The branch-wise details of placement made are given below:

Branch	No. of students registered for placement	No. placed			No. got more than one job
		OC	SC/ST	Total	
I. B.Tech					
Aerospace Engineering	16	7	-	7	2
Chemical Engineering	31	13	-	13	-
Civil Engineering	29	14	-	14	-
Computer Science	31	28	-	28	10
Electrical & Electronics	30	20	1	21	4
Electronics & Commn.	41	23	3	26	7
Mechanical Engineering	65	31	3	34	4
Metallurgy	25	11	-	11	1
Naval Architecture	9	3	-	3	-
Total	277	150	7	157	28

Branch	No. of students registered for placement	No. placed			No. got more than one job
		OC	SC/ST	Total	
II M.Tech					
Aerospace Engineering	6	-	-	-	-
Applied Mechanics	9	2	1	3	-
Chemical Engineering	18	7	-	7	3
Civil Engineering	26	4	1	5	-
Computer Science	28	24	3	27	7
Electrical Engineering	31	22	5	27	5
Industrial Management	19	13	1	14	-
Industrial Metallurgy	9	2	-	2	-
Mechanical Engineering	35	13	5	18	4
Ocean Engineering	1	-	-	-	-
Solid State Technology	4	2	-	2	-
Total II	186	89	16	105	19
III. M.S.					
Civil Engineering					1
Computer Science					17
Electrical Engineering					6
Industrial Metallurgy					1
Mechanical Engineering					6
Total III					31

Besides the above, the following were also placed:

M.Sc. : Chemistry 1
 Ph.D. : Computer Science 1

Adviser, Placement and Training : Prof. M. A. Parameswaran

PublicRelation-cum-Placement and Training Officer : Sri A.K. Pattabiraman

7. FINANCIAL ASSISTANCE TO STUDENTS

Financial Assistance is extended to the meritorious students who are pursuing Engineering, Technology and Science Education in this Institute in the form of Scholarship and Fellowships. The details of Scholarship and Fellowship sanctioned to the students of different programmes during 1992-93 are as follows:

7.1 B.Tech.

The SC/ST students admitted in B.Tech. programme upto the academic year 1991-92 were sanctioned the concession of free messing plus Rs.70/- p.m. out of pocket expenses exemption from payment of tuition fees and hostel rent as per the post-matric scholarship rules. As on 31.3.93, 49 students were benefitted. The year-wise details of such students are given in Table 7.1.

The Merit-cum-means scholarship of Rs.300/- p.m. were sanctioned to the 25% of the students admitted in B.Tech. programme besides the exemption from payment of tuition fees. During the period under report 62 students got benefitted. The year-wise details of such students are given in Table 7.1.

In addition to the above the Institute sanctioned a notional prize of Rs.100/- to the top ranking 24 B.Tech. students in JEE.

Table 7. 1

Year	Merit-cum-means scholarship	Free messing (basic menu) and pocket allowance concession to SC/ST students
I	10	4
II	17	5
III	17	14
IV	18	26
Total	62	49

7.2 M.Tech.

The students who joined M.Tech. programme admitted through GATE were awarded Rs.1800/- per month scholarship. Scholarship at Rs.1000/- p.m. will be renewed, for the students who's CGPA in the first semester fall short of 6.5. During the period under report 182 fresh scholarships and 183 renewed scholarships were given, the department-wise details of which are given below:

Table 7.2

Discipline	No. of M.Tech. scholarships awarded	
	Fresh	Renewal
Applied Mechanics	7	5
Aerospace Engineering	8	9
Chemical Engineering	20	18
Civil Engineering	30	24
Computer Science and Engg	26	28
Electrical Engineering	28	32
Industrial Management	13	19
Mechanical Engineering	37	34
Metallurgy	7	9
Ocean Engineering	3	1
Solid State Technology	2	4
Total	182	183

7.3 M.Sc.

The students admitted in M.Sc. programme were sanctioned Rs.300/- p.m. merit scholarship. Exemption from payment of tuition fee were also given to certain students. During the period under report 42 students got benefitted. The department-wise details of such awards are given below:

Table 7.3

Course	Year	No. of merit scholarships awarded	No. of freships of Rs.200/- per session awarded
Chemistry	I	6	3
	II	7	4
Mathematics	I	8	4
	II	7	3
Physics	I	7	3
	II	7	3
Total		42	20

7.4 M.S.

The scholars admitted in M.S. programme through GATE or equivalent examination are given Rs.1800/- p.m. for three years. During the period under report 136 students received this fellowship. The department-wise details of the fellowship awarded and renewed are given below:

Table 7.4

Department	No. of scholarships awarded	
	Fresh	Renewal
Aerospace Engineering	1	3
Applied Mechanics	6	7
Chemical Engineering	1	4
Civil Engineering	5	11
Computer Science and Engg	13	16
Electrical Engineering	7	14
Humanities and Social Sciences	3	4
Mechanical Engineering	10	15
Metallurgical Engineering	1	5
Ocean Engineering	3	7
Total	50	86

7.5 Ph.D

The scholars who are admitted for Ph.D. full-time programme in the Engineering fields are sanctioned Rs.2400/- for the first two years and Rs.2500/- for another 3 years per month based on progress. The scholars who are admitted for Ph.D full-time in the Science fields are sanctioned Rs. 1800/- p.m. for the first two years and for another three years Rs. 2100/- p.m. If they possess M.Tech, they will get as per norms. During the period under report 319 students obtained fellowship. The department-wise details of the fellowships awarded and renewed are given below:

Table 7.5

Department	No. of scholarships awarded	
	Fresh	Renewal
Aerospace Engineering	4	6
Applied Mechanics	5	17
Chemical Engineering	11	17
Chemistry	1	54
Civil Engineering	5	19
Computer Science and Engg	3	11
Electrical Engineering	3	8
Humanities and Social Sciences	-	19
Mathematics	4	13
Mechanical Engineering	12	32
Metallurgical Engineering	9	11
Ocean Engineering	4	12
Physics	7	32
Total	68	251

8. CAMPUS AMENITIES

8.1 Engineering Unit:

The Engineering Unit of this Institute is responsible for construction of new buildings and maintenance of the campus.

During the period under report the following buildings were completed and thrown open for occupation:

S.No.	Name of Work	Amount (Rs. in Lakhs)
1.	Construction of D Type quarters Block III	36.00
2.	Construction of one block of Security Staff quarters - Block II and one block of Mess staff quarters - Block III	24.40
3.	Construction of Entrance lobby Visitors's lounge for Sarayu Hostel	2.37
4.	Construction of two wheelers sheds and car sheds in Residential zone	7.00
5.	Raising the compound wall from Bramaputra hostel to Sewage Pumping station	6.40
6.	Construction of compound wall between Cancer Institute and IIT campus	2.50
7.	Raising the compound wall and improvement works at Adyar In and Out Gates along Sardar Patel Road	8.50
8.	Construction of additional room and modification works for F type quarters - Block IV	8.80
9.	Construction of O.P. Ward for Institute Hospital	7.63
10.	Strengthening of Electrical loads at MSB, CSD and Power supply to new MSRC and Lecture hall complex	11.42
11.	Construction of IITEA Office building	3.93
	Total	118.95

The Institute had 932 quarters as on 31-03-93.

8.2 Guest House

There are two Guest Houses in the Campus viz. VIP Guest House and Taramani Guest House which are having six suites and 30 rooms respectively.

8.3 Hospital:

The Institute Hospital consisting of 36 Beds, renders medical facilities to students and staff. Hospital offers out-patient and in-patient services for Medical, Surgical, Obstetric, Gynaecological, Pediatric, ENT and Ophthalmic treatment.

The following are the Officers in the Hospital:

Dr. A. Ganesan, M.D	Chief Medical Officer
Dr. N.A. Jayavelan, M.B.B.S.	Resident Medical Officer
Dr. Lalithakumari, M.B.B.S., D.G.O	Medical Officer
Dr. S.Aruna, B.Sc., M.B.B.S.	Medical Officer
Dr. C.Sridevi, M.D., D. ch.	Medical Officer
Dr. S. Kameswaran, M.S., Ph.D., F.R.C.S.(ED), F.R.C.S. (Glax), F.R.C.S. (D.L.O.)	ENT Consultant (Part-time)
Dr. S. Devaji Rao, M.S. MNAMS, FICS	Consultant Surgeon (Part-time)
Dr. S. Rathanamala, M.B.B.S., D.O.	Eye Specialist (Part-time)
Dr. R. Rajkumar, M.D. DPM	Psychiatrist (Part-time)
Dr. Sadana Saraswathi	Junior Medical Officer
Dr. G. Suba Shree	Junior Medical Officer
Sri L. Palaniappan	Lay Secretary

Ambulance services are available at Hospital and are being used round the clock. One Medical Officer is posted for call duty and is available for all the 24 hours of a day to attend the emergency cases in the Hospital.

Laboratory tests are undertaken for Bacteriological and a few Bio-chemical investigations. Two ECG machines are available with the Hospital. Some major operations for conditions like Hernia and Peptic Ulcer were undertaken in the modernised Operation Theatre.

Immunization for children is being carried out against Polio, diphtheria, tetanus and whooping cough. Family Planning Operations were also conducted at this Hospital besides counselling.

The Statistics on the activities of the Hospital between 1-4-92 and 31-3-93 are as follows:

1. Total No.of outpatients	1,01,928
2. Total No.of inpatients	575
3. Emergencies attended	3,508
4. Dressings	16,585
5. Injections	14,988
6. Deliveries	6
7. Pathology	
Urine	4,472
Motion	3,346
Blood	5,928

8. Bio-Chemistry	Blood Sugar	3,041
	Urea	379
9. Operations	General surgery	107
	ENT operations	25
	Eye operations	28
	Minor Operations in Surgeon's room	86
Obstetric Procedures	I.U.D.	12
	ECG	558
	Vaginal Dauches	36

8.4 State Bank of India:

State Bank of India main Branch is functioning in the campus with two extension counters - one at shopping centre and the other near Narmada Hostel.

8.5 Post Office :

There is a post office in the campus opposite to State Bank of India to cater to the needs of the staff, students and residents of the campus.

8.6 Schools:

Vanavani Matriculation Higher Secondary School administered by IIT employees Educational Society is functioning in the campus besides a Central School. These schools are offering courses from L.K.G. to XII Standards.

8.7 Open Air Theatre:

The Open-Air Theatre is utilised for screening Films by Film Club during week end and for other functions of the Institute and Schools.

8.8 Student Activities Centre:

This building is utilised for indoor games of the students as well as for conduct of important functions such as Convocation etc.

8.9 Cafeteria:

There are two Canteens - namely Akshaya and Modern Cafe, in the campus to cater to the needs of staff and students.

8.10 Bus Services:

The Institute is having Omni Buses which provides transport facility to the staff, students and residents of the campus.

8.11 Campus News:

The Campus News is published every Friday highlighting the important events of the Institute.

9. FINANCE AND ACCOUNTS

The financial year of the Institute corresponds with that of Government of India i.e. 1st April to 31st March of the subsequent year. The accounts of the Institute are annually audited by the Accountant General, Tamil Nadu & Pondicherry, Madras on behalf of the Comptroller and Auditor General of India.

The Finance Committee of the Institute in its meeting held on 6.11.92 recommended the non-plan revised estimates 1992-93 and Budget Estimates 1993-94 for Rs.2061.79 lakhs and Rs.1995.00 lakhs respectively. Similarly Rs.394.93 lakhs and Rs.347.57 lakhs under Plan Revised Estimate 1992-93 and Budget Estimate Rs.1993.94 respectively were also recommended.

The general view of the revised estimates approved for 1992-93 and budget estimates 1993-94 presented to the Finance Committee is as given below:

Head	Budget Estimates for 1992-93		Revised Estimates 1992-93 as per Finance Committee	Budget Estimates 1993-94 as proposed
	as proposed	as allocated by the Board of Governors		
Non-Plan				
Recurring	2,265.11	2,019.00	2,061.79	2,714.50
Non-Recurring	55.00	10.00		14.40
Total Non-Plan	2,320.11	2,029.00	2,061.79	2,728.90
Plan				
Recurring	45.00	27.00	28.00	31.12
Non-Recurring	814.11	293.00	366.93	316.45
		+ 59.81		
Total Plan	859.11	320.00 + 59.81*	394.93	347.57
Income	314.79	315.00	286.89	314.35

* Letter of Credit established as on 31.3.92.

Audit

The audit report of the Institute are separately placed on the tables of Parliament with due certificates of the Accountant General, Tamilnadu and Pondicherry, in English and Hindi versions separately.

The accounts of the Institute for the year 1991-92 was audited by the AG between July 92 to September 1992. The audited report (English version) for the year ended 31st March 1992 was sent to Department of Education, Ministry of Human Resource Development, Government of India, on 20.4.93 for placing the same in the Parliament.

The salient features of the 1991-92 accounts are given below:

(Rs. in Lakhs)

I. Receipts:

1. Opening Balance		1282.52
2. Grant from GOI		1938.00
3. Institute Receipt:		
Fees, etc.	11.58	
Application Fees	69.51	
Income from Vehicles	6.62	
Income from Buildings	28.98	
Other receipts	206.71	
	-----	323.40
4. Recovery of Advances		38.65
5. Deposits		902.62
Total		4485.19

II. Payments:

a. Capital account:

1. Buildings and Constructions		118.63
2. Furniture, equipment and fittings	58.11	
Departments, Research Centres & Central Services	36.73	
Others	24.96	
	-----	119.80
3. Library		93.63
4. Others		59.15
Total (a)		391.21

b. Revenue Account:

1. Academic Departments/Centres:

Pay & Allowances of Tech. Staff		392.99
Pay & Allowances of Non-Teaching Staff		186.95
Department expenses		112.96
Library including staff salary		34.97
Central Workshop including staff salary & Indo-German Projects		46.64
Research Centres including staff salary (Incl. CEC pay and allowances, AC Unit pay and allowances)		33.20

Centres, Central Services working expenses		14.29
Rural Development Research Activities		6.85
Institute Scholarship		179.67
Other items		47.11
NCC, NSS and NSO: Pay & allowances & others		2.45
2. Central Administration:		
Pay & Allowances	136.54	
Hostel	67.03	
Stores Pay & Allowances	10.55	
Security & Fire fighting	5.54	
Lawns & Garden	2.45	
Service & Maintenance (Telephone, Power, Water, Furniture repair & Maintenance, Oil, Petrol, etc.)	137.70	
Medical Dispensary	26.04	
Atheletics and Gymkhana	17.45	
	-----	403.30
3. Works & Maintenance		
Pay & allowances and other expenses		170.84
4. General Expenses:		
Postage, Liveries, Stationery, Printing, etc.		38.39
Travelling		6.73
Leave salary, Reimbursement of stamp duty, Sundries, etc.		4.39
PF/Gratuity/Pension		210.09
Advances		63.73
Refund of Deposits		849.24
Total Payments (b)		2804.79
Grand Total (a + b)		3196.00
5. Closing Balance		1289.19

Total		4485.19

LIST OF MEMBERS OF COUNCIL OF IITS

Name of the Representing Organisation	Name and Address
1. Ex-officio - Chairman	The Minister-in-Charge of Technical Education in the Central Government
2. Chairman of each Institute Ex-officio	
Kharagpur	Shri Russi H.Mody Chairman B.O.G. IIT Kharagpur-721 302.
Bombay	Dr. D.V. Kapur 405, Aradhana Apartments Sector-XVIII, R.K. Puram New Delhi-110 066.
Madras	Dr. M.S. Swaminathan (Chairman, Board of Governors IIT, Madras) Chairman, M.S.Swaminathan Research Foundation 14, II Main Road, Kotturpuram, Madras-600 085.
Kanpur	Dr. Subrate Ganguly (Chairman, Board of Governors IIT, Kanpur) Executive Vice Chairman & Managing Director The Associated Cement Co. Ltd., Cement House, 121, Maharshi Karve Road Bombay-400 020.
Delhi	Dr. P.J. Kurien AB-12, Pandora Road New Delhi-110 003.
3. Director of each Institute Ex-officio	
Kharagpur	Prof. K L Chopra Director IIT, Kharagpur 721 302.
Bombay	Prof. B Nag Director IIT, Bombay 400 076.
Madras	Prof. N V C Swamy Director IIT, Madras 600 036.

	Kanpur	Prof. R C Malhotra Director IIT, Kanpur 208 016.
	Delhi	Prof. N C Nigam Director IIT, New Delhi 110 016.
4.	Chairman, University Grants Commission Ex-officio	Prof. G Rame Reddy Chairman, University Grants Commission, Bahadur Shah Zafar Marg, New Delhi 110 002
5.	Director-General, Council of Scientific Research and Industrial Research, Ex-officio	Dr. S K Joshi Director-General, CSIR Rafi Marg, New Delhi 110 001.
6.	Chairman, Indian Institute of Science, Bangalore Ex-officio	Dr. Raja Ramanna Chairman Indian Instt. of Science Bangalore 560 012.
7.	Director, Indian Instt. of Science, Bangalore Ex-officio	Prof. C.N R Rao Director Indian Institute of Science Bangalore 560 012.
8.	Three Nominees of the Central Government To represent the Ministry concerned with Education	Prof. K J Khatwani Joint Educational Adviser(T) Min. of Human Res. Dev., Dept. of Education New Delhi 110 001.
	To represent the Ministry of Finance	Shri Sudeep Banerjee Financial Adviser Min. of Human Res. Dev., New Delhi 110 001.
	To represent any other Ministry	Dr. D Swaminadhan Member (Tech & Higher Education) Planning Commission, Yojana Bhavan New Delhi 110 001.
9.	Nominee of the All India Council for Tech. Education	Shri S V Giri Education Secretary Min. of Human Res. Dev., New Delhi 110 001.
10.	Nominees of the visitor (Minimum - Three) (Maximum - Five)	Dr. M Santappa Scientific Adviser Tamilnadu Pollution Control Board 25, Dr. Radhakrishnan Salai Madras 600 004.
		Dr. A P J Abdul Kalam Scientific Adviser to the Minister of Defence

South Block
New Delhi 110 011.
Dr. Vasant Gowariker
Scientific Adviser to the
Prime Minister
2, Lodi Estate,
New Delhi 110 003.

Dr. M M Sharma
Dept. of Chemical Engg.
Univ. of Bombay
Matunga, Bombay.

Dr. Kamla Chowdhry
(Former Prof. of Management,
IIM, Ahmedabad)
Flat No.2A, 33 Prithviraj Road,
New Delhi.

11. Three Members of Parliament
(Two from Lok Sabha and
one from Rajya Sabha)

Shri Indrajit Gupta, MP
41 Western Court
New Delhi.

Shri Anandgajapathi Raju
Poosapati, MP
6, A.P. Bhavan, New Delhi.

Shri Som Pal, MP
28 Lodi Estate
New Delhi.

12. Secretary

Dr. D K Sharma
Dy. Edn. Adviser (T)
Min. of Human Res. Dev.,
Dept. of Education
New Delhi 110 001.

THE SENATE

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N.V.C. Swamy

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T. Nagarajan
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R. Narayan
K. Narayana Bhat
S. Narayanan
C. Narayana Pillai
Y. Narayana Rao
C.K. Narayanaswamy
R. Natarajan
R. Palaninathan
V. Paramasivam
M.A. Parameswaran
K.R. Parthasarathy
P.R. Parthasarathy
K.M. Patil
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M.R. Pranesh
D. Prithviraj
H.C. Radhakrishna
S. Radhakrishnan
V. Radhakrishnan
V.M. Radhakrishnan
K. Radhakrishna Rao
J.P. Raina
N. Rajagopalan
R. Rajagopalan

T.V. Ramakrishna
V. Ramakrishnan
M. Ramakrishna Udupa
A. Rama Mohana Rao
V. Ramamurti
H. Raman
R. Raman
D.V. Ramana
T.S. Ramanatha Iyer
M. Ramanujam
K. Ramar
K.V.S. Rama Rao
B. Ramaswami
R. Ramaswamy
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S. Srinivasan

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S. Subramanian
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Surendranath Majhi
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T.K. Varadan
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R. Vasudevan
Vedam Subrahmanyam
M.A. Veluswami
C.P. Vendhan
A. Venkatesh
S.P. Venkateshan
T. Venkat Ram
V. Venkat Rao
N. Venkatrayulu
Vijay R. Raghavan
B. Viswanathan
K. Viswanatha Reddy
B. Yegnanarayana
S.S. Yegnanarayanan

Three educationists from outside the Institute

(Mrs.) Rajammal P Devadas
B S Sonde
M S Valiathan

Student Representatives (Invitees)

N S Hemant Kumar
Kum Monalisa Bora
S Sundar Kumar Iyer
R Satyanarayanan

Secretary

V. Shanmugam, Registrar

Invitee (Administration)

V. Sivaramakrishnan, Professor i/c, Central Library
K. Panchalan, Deputy Registrar (Acad) (Ex-Officio)

FINANCE COMMITTEE

Chairman
Dr. M.S. Swaminathan

Shri Sudeep Banerjee
Financial Adviser
Min. of Human Res. Development
Government of India
New Delhi.

Dr. K.J. Katwani
Dy. Educational Adviser (T)
Dept. of Education
Min. of Human Res. Development
Government of India
New Delhi.

Mrs. Mallika Srinivasan
Vice-President
Tractors & Farm Equipment
35, Nungambakkam High Road
Madras.

Shri P.K. Kandaswamy
No.8, I Cross Street
Shastri Nagar
Adyar
Madras.

Prof. N.V.C. Swamy
Director

Secretary
Shri V. Shanmugam, Registrar

BUILDINGS AND WORKS COMMITTEE

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Prof. N.V.C. Swamy
Director

Members

Dr. N. Rajagopalan
Chairman Estate & Works Committee
IIT., Madras

Shri N. Malayalam
Institute Engineer

Shri C. Ganesan
Executive Engineer

Shri C. Madakannu
Chief Engineer (Buildings)
Public Works Department
Chepauk, Madras.

Shri Jose Kurian
Superintending Engineer
Central Public Works Dept.,
Shastri Bhavan, Madras.

Shri K.J. Khatwani
Director (T)
Min. of Human Res. Development
Govt. of India, New Delhi.

Secretary
Shri V. Shanmugam, Registrar

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Dr. A Kuppurajulu, Previous Dean, Acd. Courses

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Dr. Ch. Durga Prasada Rao, Chemical Engineering

Dr. C.S. Venkatachalam, Chemistry

Dr. M.S. Mathews, Civil Engineering

Dr. C. Pandurangan, Computer Science

Dr. B. Ramaswami, Electrical Engineering

Sri S. Mohan, Humanities & Social Sciences

Dr. S.H. Kulkarni, Mathematics

Dr. S. Kumaraswamy, Mechanical Engineering

Dr. S. Ramakrishna Iyer, Metallurgical Engineering

Dr. K. Rajagopalan, Ocean Engineering Centre

Dr. P.C. Deshmukh, Physics

Dr. R. Raman, Head, Foreign & Weaker Sections

Dr. M.A. Veluswami, Head, Guidance & Counselling

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Kum Monalisa Bora, Academic Affairs Secretary

Sri N.S. Hemant Kumar, Students General Secretary

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