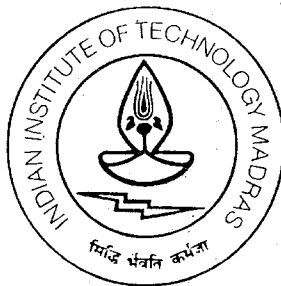


**THIRTY SEVENTH  
ANNUAL REPORT**

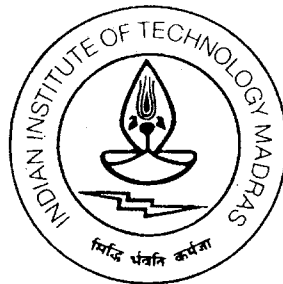
**1995 - 96**



**INDIAN INSTITUTE OF TECHNOLOGY  
MADRAS**

# THIRTY SEVENTH ANNUAL REPORT

1995 - 96



INDIAN INSTITUTE OF TECHNOLOGY  
MADRAS

## THE VISITOR

Dr. Shanker Dayal Sharma  
President of India

## THE BOARD OF GOVERNORS

### Chairman

Dr.M.S.Swaminathan

### Director of the Institute

R.Natarajan

## Members

### Nominees of State Governments

(Mrs.) A.Vanajakshi  
Secretary to Government  
Higher Education Dept.,  
Andhra Pradesh

P.V.Bhandary  
Director of Tech. & Mining  
Education  
Govt. of Karnataka

K.Sivaraman  
Director of Tech. Education  
Govt. of Kerala

S.Varadarajan  
Director of Tech. Education  
Tamilnadu

### Nominees of the IIT Council

A.P.J. Abdul Kalam  
Scientific Adviser to the  
Defence Minister  
New Delhi

Manthosh Sondhi  
Chairman  
Ashok Leyland Ltd.  
New Delhi

A.C.Muthiah  
Vice-Chairman & President  
SPIC Ltd., Madras

Raghupati Singhania  
Director  
J.K.Organisation  
New Delhi

## Nominees of the Senate

U.N. Srivastava

V.M. Krishna Sastri

## Secretary

Registrar

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## 1. DIRECTOR'S REPORT

IIT Madras is a leading national and international Institute dedicated to the advancement, dissemination and application of knowledge in physical sciences, engineering and technology through education, research and services. Its renowned faculty constantly keep pace with latest technological developments.

Our academic staff bring a variety of skills, knowledge and experience to their teaching and research. A special feature of this Institute is the extensive world-wide experience of the teaching staff in the practical applications of their knowledge, training and skills.

The missions and goals of the Institute, other than teaching and continuing education programmes, are

- an industry liaison programme which associates industrial units on annual membership basis
- a direct research programme on cost reimbursement basis
- a consortium approach which is supported by groups of companies having common research interests and
- consultancy on an individual basis directly involving faculty members.

### Academic Programmes :

The Institute offers a wide range of taught courses, higher degrees by research and continuing professional development programmes.

<b>Students Intake 1995-96</b>	
Ph.D.	74
M.S.	89
M.Tech.	273
M.Sc.	75
B.Tech.	340
<b>Total</b>	<b>851</b>

<b>Degrees Awarded 1995-96</b>	
Ph.D.	95
M.S.	57
M.Tech.	251
M.Sc.	63
B.Tech.	324
<b>Total</b>	<b>790</b>

Introduction of new courses as well as revision of existing course contents continued during this year.

During 1995-96, the entire curriculum and course contents of M.Tech. - Engineering Mechanics, M.Tech. - Civil Engineering with Structural Engineering specialisation, M.Sc. Physics and Physics courses of the B.Tech. programme were changed. Chemical Engineering Department merged 4 streams of their M.Tech. programme and offered a single stream of M.Tech. Chemical Engineering.

At the 32nd Convocation held on 28th July 1995, 790 candidates were awarded various degrees. With this, the total number of candidates who have been awarded degrees by this Institute has risen to 18,474.

**Students on Roll 1995-96**

Ph.D.	471
M.S.	228
M.Tech.	588
M.Sc.	150
B.Tech.	1400
<b>Total</b>	<b>2837</b>

**Papers Published 1995-96**

Mech. Sci.	353
Elect. Sci.	46
Chem. Sci.	146
Build. Sci.	114
Mathematical & Physical Sci.	169
Others	216
<b>Total</b>	<b>1044</b>

In the academic year 1995-96, the Senate approved an increase in instructional days.

During the year, 1044 papers were published by the faculty members in refereed journals. In 1995-96, 157 faculty members participated in various Conferences, Seminars and Symposia conducted by other organisations / universities. 57 faculty members visited foreign countries for various academic activities. 17 faculty members went on sabbatical leave/earned leave / extra-ordinary leave for taking up various assignments.

A large number of conferences, seminars, symposia and short term courses are regularly organised at this Institute. During the period under report, 7 Symposia/Conferences were conducted.

The following faculty members were awarded prizes and nominated as members by various organisations for their contributions:

- Prof R S Sirohi, PH : Humboldt Research Award by the Alexander von Humboldt Foundation, to work at the University of Oldenburg, Germany and elected for the second term as the President of the Optical Society of India for the year 1995-96.
- and
- Awarded the 1995-Galileo Galilei Award of the International Commission for Optics (ICO). He is the first Indian to receive this honour, given in recognition of his outstanding contributions in the field of Optics.
- Prof H S Paul, MA : Active Member of the New York Academy of Sciences.
- Prof V V Sastry, EE : Fellow of the Indian National Academy of Engineering.
- Prof N V C Swamy, AM and  
Prof B Yegnanarayana, CS
- Prof A V Narasimham, PH : Active Member of the New York Academy of Sciences.
- Prof Ashok Jhunjunwala, EE : Prof. S N Mitra Memorial Award by the IETE.

- \* Prof S Srinivasa Murthy, ME : Area Editor-in-charge of Asia-Pacific Region Countries of "International Sorption Heat Pump Newsletter".
- \* Prof K Prasad Rao, MT : Panthaki Award-95 at the National Welding Seminar held in Cochin.
- \* Prof PA Aswathanarayana, AM and Prof K N Seetharamu, ME : Dr M G Deshpande Prize for the paper entitled "Finite Element Analysis for Transient Fluid Flow and Heat Transfer in Line Bundle of Cylinders."
- \* Prof V Ganesan, ME : SVRCET, Surat Prize for the paper entitled "Theoretical and Experimental Investigation of Carburettor Metering."
- \* Prof H Suresh Rao, CE : Certificate of Merit for 1994-95, by the Institution of Engineers (India) for the paper entitled "One-Dimensional Distributed Flow Routing in Channels by Finite Element Method."
- \* Prof K A Padmanabhan, MT : Member of the International Advisory Board and Associate Editor of the Journal Materials Transactions, JIM (Japan Institute of Metals).
- \* Prof S Srinivasa Murthy, ME : Awarded the Hari Om Ashram Prerit S S Bhatnagar Research Award 1992 based on the work done by him during 1987-92 in the area of Energy Conservation (Heat Pumps and Heat Transformers).

and

Elected as a Honorary Member of International Academy of Refrigeration, one of the oldest academies situated in Odessa, CIS. This authorises him to the title of Academician.

- \* Dr Harish Chandra, Librarian : Nominated as a Member of the ABI's Research Board of Advisers citing in the ABI reference volumes of American Biographical Institute, North Carolina.
- \* Prof AR Balakrishnan, CH : Elected as a Fellow of the Tamil Nadu Academy of Sciences.
- \* Prof BSThandaveswara, CE : Elected as a Member of the Executive Council of the Indian Society for Hydraulics for the year 1996-98.

The Central Library is well equipped and has modern facilities and services with rich resources in the form of CD-ROM, On-line databases, printed and non-printed documents on Applied Sciences, Engineering, Technology, Humanities, Social Sciences and other new emerging areas.

During the year, a multimedia setup with 3D graphics/animation was installed in our Education Technology Cell. A video lesson production workshop was conducted for our IIT faculty members. To date **seven** lecture series programmes, **two** documentaries and **one** thematic programmes are available in the Education Technology Cell and a few more are under preparation.

The Department of Aerospace Engineering completed 25 years of existence in the year 1994. To mark this occasion, the Aeronautical Society of India organised its Annual General Body Meeting at this Institute. The meeting was held between 6th and 8th January 1996. On this occasion, a get-together of alumni was also organised and a special technology session was addressed by some distinguished alumni of the Department.

During the year the computer facilities were modernised by the addition of the following computer configurations:

- The modernisation proposal featured 3 models of IBM RISC System/6000. The systems support a common Operating System, AIX (Advanced Interactive Executive).
- The Central File and Database server is a high-end system, IBM RS6000 model 590 based on the latest POWER2 architecture.
- Four numbers IBM RS6000 model 370 based on POWER architecture function as dedicated Computer servers (Headless servers) to process batch jobs.
- Two Workstations IBM RS6000 model 25T based on POWERPC architecture offering powerful Graphics is provided.
- Forty eight numbers of IBM 3151 Terminals serve as Clients.
- Networking LAN topology is star type with ACCESS/ONE UNGERMANN BASS product as hub of cabling layout.
- Every RISC SYSTEM/6000 has the System Management Tool (SMIT) as part of OS AIX. Network Management station runs a Network Monitoring Software Net Director.

#### **Continuing Education Activities :**

During this year, there was good response from the industries and educational institutions for Continuing Education programmes organised by the Centre for Continuing Education.

A total of 35 continuing education programmes were conducted for industrial participants and 569 participants attended these programmes. Nearly 80 lectures were given by 51 faculty of this Institute at various institutions. During this year 5 modules were completed and 24 modules are under various stages of preparation. Besides the Continuing Education programmes, a number of other short term courses/training programmes were also held.

The Quality Improvement Programme, funded by the MHRD, continues to be one of the very popular and effective schemes and promotes interaction between IIT and other engineering colleges in the country. During the year, under the QIP 10 Ph.D scholars and 17 M.Tech scholars were admitted. 37 Ph.D. scholars and 17 M.Tech. scholars were on rolls this year. Apart from upgrading the qualifications of the teachers selected from other engineering colleges, the scheme has enabled IIT over the years to play an important role in improving the general level of technical education. During the year, 4 summer/winter schools under the Quality Improvement Programme and one course under the ISTE were conducted, mainly for teachers of other engineering institutions.

## Research and Development Activities :

In the year 1995-96, 55 sponsored research projects of value totalling Rs.841.17 lakhs were handled. Even though the resource crunch was faced by many of the funding agencies, this Institute has continued to obtain the same level of funding as in the previous years.

The Ministry of Human Resource Development sanctioned plan schemes to the Institute in emerging areas such as CAD-CAM, VLSI, Telematics, Fibre Optic Communication, Environmental Eng., etc.

During the year, consultancy assignments to the tune of Rs.340.35 lakhs were obtained. Research-based industrial consultancy activities contributed nearly 50 per cent of the total value of the assignments. 14 faculty members were retained as consultants of various industries.

Consultancy assignments at international level have been taken up for development of software and products in the area of Telecommunication.

Eight joint research projects taken up through BMBF, Germany, apart from the six earlier ongoing support for the development of facilities in Catalysis, Materials Science, Electronics, Production Engineering, Metallurgy (Materials Testing) and Ocean Engineering Centre have continued. Several MoUs have been signed with industries for Technology Development Mission Projects in the area of New Materials including Composites and Energy Efficient Technologies. The Institute from its own resources has also helped new faculty to develop at the Institute facilities in the areas of their activities and facilitate taking up projects through various funding agencies. Also, the collaboration between German universities and IIT Madras continued and projects are being taken up through BMBF. A number of projects have been sanctioned by Volkswagen Foundation, Germany and also under the Indo-French and Indo-EEC collaborative programmes.

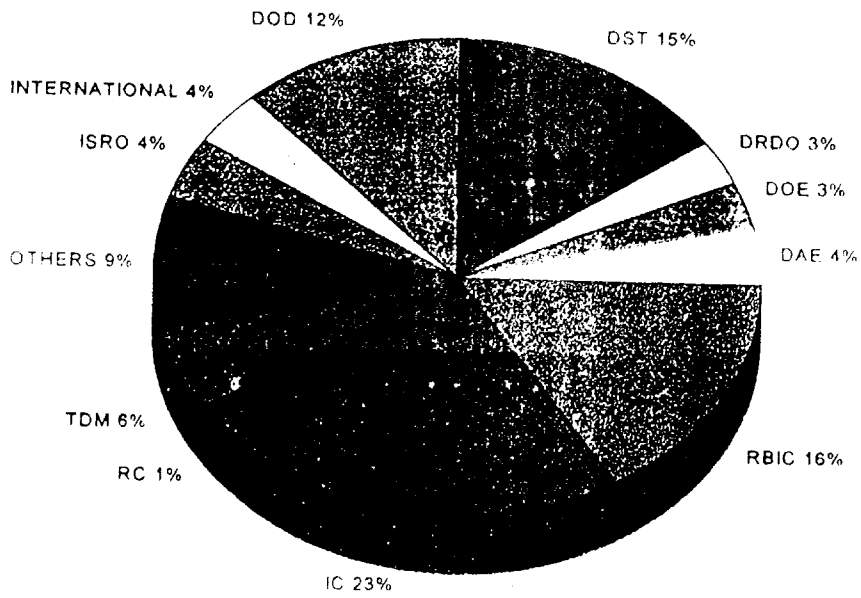
It is heartening to note that the following three projects were sanctioned by the Volkswagen Foundation during 1995-96:

- Fatigue behaviour of new micro-alloyed ferritic-pearlitic steels
- Development of a production integrated quality control loop for NC machining
- Impact loads on platforms above the sea level due to freak waves

Following are the details of project funding:

Item	Sponsored Projects (1995-96)	
New Projects	..	55
Sanctioned outlay (Rs. in lakhs)	..	841.17
Ongoing Projects	..	151
Projects Completed	..	57
No. of faculty involved	..	157

## VALUE OF CONSULTANCY AND SPONSORED RESEARCH



### Consultancy

IC	-	Institutional Consultancy
RC	-	Retainer Consultancy
RBIC	-	Research Based Industrial Consultancy

### Sponsored Research

DAE	-	Dept. of Atomic Energy
DOE	-	Dept. of Electronics
DST	-	Dept. of Science and Tech
DOD	-	Dept. of Ocean Development
DRDO	-	Defence Research & Development Organisation
TDM	-	Technology Development Mission

## 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 six Institutes of Technology (others being at Bombay, Kanpur, Kharagpur, Delhi and Guwahati) are administered centrally by the Council of IITs, an apex body established by the Government of India to coordinate the activities of these Institutes. The Minister for Human Resource Development of the Government of India is the Chairperson 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 on page i.

The Senate decides the academic policies of the Institute. It approves and controls curricula, courses, examinations 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 Appendix II.

Financial advice to the Institute is given by the Finance Committee, whose constitution is given in Appendix 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 Appendix II.

In addition, 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 are also given in Appendix II.

### 2.2 Staff Position

As on 31.3.96, 346 Faculty, 23 Scientific Officers, 63 Officers, and 1530 supporting staff were in position. 37 new appointments for higher positions were made. 71 Faculty/Officers retired from their services. 8 staff members took voluntary retirement. During the period under report, 21 faculty and other staff were and on long leave. The details of them are given below:

#### Faculty/Officers Appointed during the year:

S.No.	Name and Department	Designation	Date of Appointment
1.	Dr.P Sriram Aerospace Engineering	Asst.Professor	21.06.95

S.No.	Name and Department	Designation	Date of Appointment
2.	Dr.Koshy Varghese Civil Engineering	Asst.Professor	27.07.95
3.	Dr.C Mathiazhagan Electrical Engineering	Asst.Professor	27.07.95
4.	Dr. Vinitha Vasudevan Electrical Engineering	Asst.Professor	27.07.95
5.	Dr. M S Sivakumar Applied Mechanics	Asst.Professor	08.09.95
6.	Dr.J Ravi Prakash Chemical Engineering	Asst.Professor	08.09.95
7.	Dr. Sreenivas Jayanti Chemical Engineering	Asst.Professor	08.09.95
8.	Dr. T Pradeep RSIC	Asst.Professor	11.09.95
9.	Dr. Devendra Jalihal Electrical Engineering	Asst.Professor	11.09.95
10.	Dr. A Damodharan Chemistry	Asst.Professor	13.09.95
11.	Dr. K Giridhar Electrical Engineering	Asst.Professor	15.09.95
12.	Dr.K Sethupathi Physics	Asst.Professor	15.09.95
13.	Dr. R Aravind Electrical Engineering	Asst.Professor	18.09.95
14.	Dr. Suresh Govindarajan Physics	Asst.Professor	25.09.95
15.	Dr.M S Ramachandra Rao Physics/MSRC	Asst.Professor	04.10.95
16.	Dr. S Gopalakrishnan Civil Engineering	Asst.Professor	03.11.95
17.	Dr. P Rajakumar Chemistry	Asst.Professor	22.11.95
18.	Dr. Dhirendra Bahuguna Mathematics	Asst.Professor	29.11.95
19.	Dr.M Venkatasatya Narayana Physics	Asst.Professor	11.12.95
20.	Dr. M.Thamban Nair Mathematics	Asst.Professor	11.12.95
21.	Dr.Indrapal Singh Aidhan Chemistry	Asst.Professor	11.12.95
22.	Dr.Raju Sethuraman Mechanical Engineering	Asst.Professor	11.12.95
23.	Dr Arindama Singh Mathematics	Asst.Professor	15.12.95
24.	Dr.(Mrs.)Rama Mathematics	Asst.Professor	20.12.95



S.No.	Name and Department	Designation	Date of Appointment
25.	Dr. A Ramesh Mechanical Engineering	Asst.Professor	18.12.95
26.	Dr.Sarit Kumar Das Mechanical Engineering	Asst.Professor	22.12.95
27.	Dr.Sachin C Patwardhan Chemical Engineering	Lecturer (3 years contract)	17.04.95
28.	Dr.R I Sujith Aerospace Engineering	Lecturer (3 years contract)	24.07.95
29.	Dr.N Kumar Pitchumani Civil Engineering	Lecturer (3 years contract)	18.12.95
30.	Dr.K Mangalasundar Chemistry	Asst.Professor	01.02.96
31.	Dr.Siddhartha Das Metallurgical Engineering	Asst.Professor	08.01.96
32.	Dr.(Mrs.)Neelima Madhukar Gupte Chemistry	Asst.Professor	05.02.96
33.	Dr. G Ranga Rao Chemistry	Asst.Professor	16.02.96
34.	Dr.Shankar Narasimhan Chemical Engineering	Asso.Professor	11.12.95
35.	Dr.BVSSS Prasad Mechanical Engineering	Asso.Professor	11.12.95
36.	Sri M Rajasekaran	Asst. Registrar	20.04.95
37.	Dr.T Suryakumar	Deputy Registrar	27.07.95

**Faculty /Officers who have retired/resigned during the year :**

S.No.	Name	Designation and Department	Date of Retirement
1.	Dr.S.Meenakshi Sundaram,	Asso. Prof., OEC	30.04.95
2.	Dr.C.M.Purushotham,	Asso. Prof., Maths	30.04.95
3.	Sri D. Malli,	Office Attdt.(SG), Regr's Office	30.04.95
4.	Sri R.Subramani,	Sr.Mech.(Carp), Eng. Unit	30.04.95
5.	Dr.R.Vasudevan,	Prof., Met. Eng.	31.05.95
6.	Sri V. Ramamurthy,	AFAO, Eng. Unit	31.05.95
7.	Sri M.N.Gangaiah,	Sr.Tech.Asst., Physics	31.05.95
8.	Sri Syed Jallaludin,	Supdt., Eng. Unit	31.05.95
9.	Sri S.A. Hussainy,	Supdt., Stores	31.05.95
10.	Sri V.Manickam Pillai,	Helper Gr.I(SG), Eng.	31.05.95
11.	Sri D.Ramanathan,	Exec.Engr., Eng. Unit	31.05.95
12.	Sri S.Ramaswamy,	Helper Gr.I(SG), Elec.Eng.	01.06.95 (VR)
13.	Sri A.Angamuthu,	Asst.Engr., Eng. Unit	01.06.95 (VR)

S.No.	Name	Designation and Department	Date of Appointment
14.	Dr. H.Md.Roshan,	Professor, Met. Eng.	10.06.95 (VR)
15.	Dr.P.T.Manoharan,	Professor, RSIC/Chemistry	30.06.95
16.	Dr.V.B. Johri,	Professor, Maths	30.06.95
17.	Dr.A.V.Narasimham,	Asso.Prof., Physics	30.06.95
18.	Sri.R.Durairaju,	Asst.(SG), Stores & Pur.Sec.	30.06.95
19.	Sri M.Rangaswamy,	Foreman, Civil Eng.	30.06.95
20.	Sri K.M.Kanagasundaram,	Foreman, CWS	30.06.95
21.	Sri N. Murugesan,	Foreman, CWS	30.06.95
22.	Sri Doorvasulu Reddy,	AE(SG), Eng.Unit	30.06.95
23.	Sri V.M.Balasundaram,	W/S Supr., Civil Eng.	30.06.95
24.	Sri T.Arumugam,	Supervisor, Civil Eng.	30.06.95
25.	Sri R.Sankaiah,	HSG(SG), Security Section	30.06.95
26.	Sri M.Amaloss,	Xerox Operator, Cen. Library	30.06.95
27.	Sri T.Sargunadoss,	Sr.Mech(W'Man), Eng.Unit	30.06.95
28.	Sri C.Gopal,	Helper Gr.I(SG), Eng. Unit	30.06.95
29.	Sri A.Sardar Jhan,	Asst.Engr., Eng. Unit	03.07.95 (VR)
30.	Sri R.N.Sankaran,	Asst. Registrar, Audit	31.07.95
31.	Sri T.N.Ranganathan,	C.I.E., CEC	31.07.95
32.	Sri G.Babu,	Supervisor, CWS	31.07.95
33.	Sri S.Manickam,	Sr.Lab.Asst., Chemistry	31.07.95
34.	Sri D.Chellamaiah,	Helper, Eng. Unit	31.07.95
35.	Sri P.B.Ramakrishnan,	Overseer, Eng. Unit	31.07.95
36.	Sri V.N.Rajan,	Asst.Prof., Mech. Eng.	31.08.95
37.	Sri K.R. Raghavan,	Asst.Registrar, IC & SR	31.08.95
38.	Sri A.Raman,	Jr.Mechanic, Chemistry	31.08.95
39.	Sri K.Ranganathan,	Maistry (Hort.), Eng. Unit	31.08.95
40.	Dr. S.Ramakrishna Iyer,	Asso.Prof., Met.Eng.	31.08.95
41.	Dr.S.S.Yegnanarayanan,	Prof., Elec. Eng.	30.09.95
42.	Sri R.Perumal,	HSG, Security Section	30.09.95
43.	Dr. R.L.Roy Choudhry,	Asso.Prof., OEC	31.10.95
44.	Dr.Y.Syamasundara Rao,	Asso.Prof., Physics	31.10.95
45.	Sri S.Venkataramayya,	Supdt., GATE Office	31.10.95
46.	Sri A.N.Shanmugam,	St.Attdt.Gr.I(SG), ME	31.10.95
47.	Sri V.Ayyilu,	Sr.Mali, Eng. Unit	31.10.95
48.	Dr.N.V.C. Swamy,	Director	27.11.95
49.	Dr.R.Vedaraman,	Asso.Prof., Chemical Eng.	30.11.95
50.	Dr.T.K.K.Srinivasan,	Prof., Chemistry	30.11.95
51.	Sri K.Ramamurthy,	Supdt.(Stores), Mech.Eng.	30.11.95
52.	Sri G.L.Bakthavatsalu,	Sr.Mech., Elec.Eng.	30.11.95
53.	Dr.D.V.Ramana,	Professor, Chemistry	30.11.95
54.	Sri M.R.Venkatesan,	Sr.Steno, Administration	07.12.95 (VR)
55.	Sri D.M.Devasagayam,	Jr.Mech., CWS	07.12.95 (VR)
56.	Sri S.D.Shanmugam,	Supr., Eng. Unit	31.12.95
57.	Sri P.V.Radhakrishnan,	S.A.Gr.I(SG), Stores	31.12.95
58.	Sri S.Thiruvengadam,	Helper Gr.I(SG), Eng. Unit	31.12.95
59.	Sri M.Arumugam Achar,	Carpenter(SG), Eng. Unit	31.12.95

S.No.	Name	Designation and Department	Date of Appointment
60.	Sri V.Ankaiah,	Jr.Mech., CWS	31.01.96 (VR)
61.	Sri P.C. Prasad,	Off.Attdt.(SG), Gymkhana	31.01.96
62.	Dr.V.Paramasivam,	Prof., Civil Eng.	31.01.96
63.	Dr.S.Ambirajan,	Professor, HSS	31.01.96
64.	Dr.K.Srinivasaraghavan,	Prof., Met. Eng.	31.01.96
65.	Smt.P.Anasuya,	Supdt., IC & SR	08.02.96 (VR)
66.	Sri D.Kandasamy,	HSG(SG), Security Section	29.02.96
67.	Sri N.Boomaiah,	Head Sweeper(SG), Eng. Unit	31.03.96
68.	Sri R.Kannan,	Dy.Regr.(F&A), Accounts	31.03.96
69.	Sri G.Srinivasulu,	AR(F&A), Accounts	31.03.96
70.	Sri V.Shanmugam,	Registrar	31.03.96
71.	Dr.K.S.Padiyar	Asst.Prof., Mech. Eng.	31.03.96

**Faculty/Officers who are on long leave :**

S.No.	Name & Designation	Duration	Nature of leave
1.	Dr.S.K. Rakshit Asst. Professor, Chemical Eng.	23.12.94 - 21.05.96	Extra-ordinary leave - seeking VR
2.	Dr.C.Siva Ram Murthy Asso.Professor, CSE	30.06.95 - 30.12.95	Leave on Duty
3.	Dr.M.Mukunda Rao Professor, EE	09.01.95 - 08.01.96	Sabbatical leave
4.	Dr.V.S.Raju Professor, OEC	09.01.95 - 08.01.97	Extra-ordinary leave (on lien)
5.	Dr.K.Swaminathan Asst.Professor, MT	09.10.95 - 08.10.96	Extra-ordinary leave
6.	Dr.C.Rajendran Asst.Professor, HSS	03.02.96 - 02.04.97	Sabbatical leave + Earned leave
7.	Dr.M.Ravindran Professor, OEC	09.11.93 - 08.11.98	Extra-ordinary leave (on lien)
8.	Sri P.Sambandam Asst.Professor, OEC	25.03.96 - 24.03.98	Extra-ordinary leave
9.	Dr.P.Bhattacharyya Professor, Maths	22.01.96 - 21.01.98	-do-
10.	Sri B.Prabhakaran SSO-I, CSE	07.09.95 - 06.09.96	-do-
11.	Dr.V.R.Muraleetharan Asst.Professor, HSS	28.08.95 - 27.08.96	Sabbatical leave
12.	Dr.S.Rajeev Asst.Professor, CE	16.01.96 to 15.01.97	Extra-ordinary leave
13.	Dr.(Mrs)Hema Arunachala Murthy Asst.Professor, CSE	16.06.95 - 30.06.96	Sabbatical leave + Earned leave

S.No.	Name & Designation	Duration	Nature of leave
14.	Dr.P.Seshasayi Manager, CSE	06.02.95 - 05.02.96	Extra-ordinary leave
15.	Dr.V.Jayaprakash Asst.Proiessor, ME	22.01.96 - 21.01.98	Extra-ordinary leave
16.	Dr.K.A.Padmnabahan Professor, MT	01.08.94 - 23.11.95	Sabbatical leave + Earned leave
17.	Dr.P.R. Vaya PSO, Elec. Eng.	01.07.94 - 30.06.96	Extra-ordinary leave
18.	Dr.O.V.Krishnaiah Chetty Professor, ME	12.12.94 - 11.12.96	-do-
19.	Dr.O.Prabhakar Professor, MT	02.01.95 - 01.01.97	-do-
20.	Sri V.K.Ranganathan STA, CEC	05.09.94 - 04.09.96	-do-
21.	Dr.R.Balachandran Pillai STA, Chemistry	07.06.95 - 06.06.96	Extra-ordinary leave

### 2.3 Meetings of the various Bodies:

#### Board of Governors

Five meetings of the Board of Governors were held on 6.5.95, 27.7.95, 12.10.95, 7.12.95 and 29.1.96.

#### Finance Committee

One meeting of the Finance Committee was held on 6.11.95.

#### Senate

Four meetings of the Senate were held on 16.6.95, 24.7.95, 22.9.95 and 19.1.96.

#### Board of Academic Courses

Five meetings of the Board of Academic Courses were held on 30.5.95, 14.9.95, 14.11.95, 12.1.96 and 19.3.96.

#### Board of Academic Research

Three meetings of the Board of Academic Research were held on 5.6.95, 19.7.95 and 8.1.96.

#### Building and Works Committee

Two meetings of the Building and Works Committee was held on 8.5.95 and 24.10.95.

#### Board of Industrial Consultancy & Sponsored Research

Four meetings of the Board of Industrial Consultancy and Sponsored Research were held on 18.7.95, 2.11.95, 6.12.95 and 16.1.96.

**Director**

**N.V.C.Swamy (till 26.11.95)**  
**R. Natarajan (from 27.11.95)**

**Deputy Director**

**C.R. Muthukrishnan (from 5.1.96)**

**Deans**

Academic Courses	C.R.Muthukrishnan (till 30.4.95) M.S.Ananth (from 1.5.95)
Academic Research	C.S.Krishnamoorthy
Administration	N Rajagopalan
Industrial Consultancy & Sponsored Research	K.V.S.Rama Rao
Students	P.Srinivasa Rao

**Heads of Departments**

Aerospace Engineering	E.G. Tulapurkara
Applied Mechanics	B.S.Prabhu
Chemical Engineering	Ch.Durga Prasada Rao
Chemistry	M.R. Udupa
Civil Engineering	N.Rajagopalan (till 03.08.95) K.Elango (from 04.08.95)
Computer Science & Eng.	(Mrs.) Kamala Krithivasan (till 03.10.95) S.V.Raghavan (from 04.10.95)
Electrical Engineering	K.Radhakrishna Rao (till 16.07.95) G.Sridhara Rao (from 17.07.95)
Humanities & Social Sciences	R.Rajagopalan
Mathematics	S.N.Majhi
Mechanical Engineering	R.Natarajan (till 26.11.95) K.A.Bhaskaran (from 27.11.95)
Metallurgical Engineering	K.J.L. Iyer (till 26.07.95) D.R.G.Achar (from 27.07.95)
Ocean Engineering Centre	M.R.Pranesh
Physics	G.Rangarajan

**Heads of Centres**

Computer Centre	C.R.Muthukrishnan (till 16.01.96) V.V. Sastry (from 17.01.96)
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Fibre Reinforced Plastics Research Centre	N.G.Nair
Material Science Research Centre	K.V.S.Rama Rao (till 25.12.95) B. Viswanathan (from 26.12.95)
Regional Sophisticated Research Centre	S. Subramanian

#### Central Administration

Director	R. Natarajan
Deputy Director	C R Muthukrishnan
Registrar	V. Shanmugam (on leave from 12.12.95 to 31.3.96) G. Subramaniam
Deputy Registrars	
Academic	K. Panchalan
Administration	T. Suryakumar
Finance & Accounts	R. Kannan
Stores & Purchase	A. Thirunavukkarasu
Trg. & Placement	A.K. Pattabiraman
Secretary (SG) to Director	V.V. Natarajan
Secretary to Director	G. Natarajan
Assistant Registrars (SS)	
Hostels	K. Sekar
Stores & Purchase	M. Manickam
Assistant Registrars	
Academic	M. Rajasekaran
Admn.I i/c	C. Narayanan Kutty
Admn.II	K. Gopalan
Admn.III	V. Ganesan
Audit i/c	E. Henry
Engg. Unit	P. Paramanandam
Fin. & Accounts	R. Esakkimuthu
Fin. & Accounts	K. Chidambaram
Fin. & Accts.IC&SR i/c	P. Ramachandran
Hostels	K. Ramaswamy
Chief Security Officer (In-charge)	G. Selvamani

#### Engineering Unit

Chairman, Estate and Works Committee	C. Ganapathy
Institute Engineer	N. Malayalam
Executive Engineer	C. Ganesan
Assistant Engineers	J.C. Jinadass S.K. Pati K. Ramakrishnan S. Swaminathan R.M. Parameswaran F. John De Britto

## **List of Other Officers**

### **Central Library**

Librarian	Harish Chandra
Deputy Librarians	R. Vengan M. Koteswara Rao
Assistant Librarians	K. Sankaran M. Murugan C.C. Tom C.R.Sekar
Senior Professional Assistant	P.N.Swamy D.Sobha Rao R.K.Sankaran P.Natarajan Tapati Datta K.Sethu Lalitha Rajendran K.Kamaraj N.Gnanasekaran K.Bhasker Rao T.Ramakrishnan

### **Central Electronics Centre**

Sr. Instrumentation Engineer	M. Kumaravel
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### **Industrial Consultancy & Sponsored Research**

Dean	K.V.S. Rama Rao
Chief Techno-Economic Officer	D.Balakrishnan
Senior Techno-Economic Officer	Y.G.Narasimha R.Sundaram

### **Central Workshop**

Senior Workshop Superintendent	S.Jambunathan
Asst. Workshop Superintendent	N.L.N.N.Kumar
Technical Officers (SG)	G.S.Ramachandran A.V.Sundaram

### **Centre for Continuing Education**

Chairman	V.Kalyanaraman
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### **Central Glass Blowing Section**

Head	C.S.Venkatachalam
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### **Central Photographic Section**

Convenor  
S.Santhakumar (till 6.3.96 )  
D.K.Sharma (from 7.3.96)

### **Central Gas Supplies Unit**

Head  
K.K. Balasubramanian

### **Airconditioning Unit**

Head  
K.A.Bhaskaran (till 30.1.96)  
R. Raman (from 31.1.96)

Technical Officer  
S.Krishnaswamy

### **Sports Activities**

Adviser  
S.S.Gokhale

### **Cultural Activities**

Adviser  
Ajit Kumar Kolar (till 12.3.96)  
V.G. Idi Chandu (from 13.3.96)

### **National Cadet Corps**

Officer Commanding- 4(TN)AIR SQN (TECH) N.C.C.      Wg. Cdr. R.S.Kumar

### **Training and Placement**

Adviser  
A.Venkatesh

### **Foreign & Weaker Section Students**

Adviser  
R.M.S. Gowda

### **Vigilance**

Chief Vigilance Officer  
P.Sankaran

### **Guidance & Counselling**

Head  
N.Sivaprasad

### **Journal of Mathematica and Physical Sciences**

Editor-in-Chief  
G.Subramaniam

### **N.S.S.**

Co-ordinator  
K.V.Gopalakrishnan



### 3. ACADEMIC PROGRAMMES AND AWARD OF DEGREES

The Institute offered the Ph.D. programme in 13 departments, the M.S. programme in 10 departments, the M.Tech programme in 35 streams/ specialisations, the M.Sc. programme in 3 disciplines and the B.Tech. programme in 8 disciplines during the year under report.

#### 3.1 Admissions 1995-96

Candidates for the B.Tech. and the M.Tech. programmes were selected through JEE and GATE respectively. Quite a few candidates were also selected under M.Tech. Sponsored and User Oriented Programmes through interview and/or written test. Selection for the Ph.D. and the M.S. programmes was done through interview/test. For M.Sc. programmes selection was done through written test.

The number of students and scholars admitted to various courses during 1995-96 is given in Table 1.

TABLE - 1

SI.No.	Department	B.Tech.	M.Tech.	M.Sc.	M.S.	Ph.D.	Total
1.	Aerospace Eng.	24	17	-	3	-	44
2.	Applied Mechanics	-	10	-	6	7	23
3.	Chemical Eng.	46	19	-	5	6	76
4.	Chemistry	-	-	29	-	19	48
5.	Civil Eng.	44	40	-	10	7	101
6.	Computer Sci.Eng.	27	46	-	16	2	91
7.	Electrical Eng.	71	29	-	23	3	126
8.	Hum. & Soc.Sciences	-	23	-	3	6	32
9.	Mathematics	-	-	24	-	1	25
10.	Mechanical Eng.	76	61	-	20	11	168
11.	Metallurgical Eng.	30	12	-	3	4	49
12.	Ocean Eng. Centre	22	8	-	3	5	38
13.	Physics	-	8	22	-	3	33
<b>Total</b>		<b>340</b>	<b>273</b>	<b>75</b>	<b>92</b>	<b>74</b>	<b>854</b>

The total 854 includes the following:

Foreign Nationals	9	QIP Scholars (Ph.D & M.Tech.)	26
Scheduled Castes	54	Sponsored Candidates (M.Tech.& MS.)	32
Scheduled Tribes	20	Project Staff (M.S. & Ph.D.)	29
Women	94	External Registration (M.S. & Ph.D.) (in residence)	7

### 3.2 Students/Scholars Enrolment

The total number of students on rolls in various programmes of the Institute in the academic year 1995-96 is given in the following Table.

TABLE - 2

S.No.	Department	B.Tech.	M.Tech.	M.Sc.	M.S.	Ph.D.	Total
1.	Aerospace Eng.	89	24	-	14	16	143
2.	Applied Mechanics	-	21	-	23	29	73
3.	Chemical Eng.	200	41	-	15	43	299
4.	Chemistry	-	-	52	-	109	161
5.	Civil Eng.	174	83	-	25	35	317
6.	Computer Sci. and Eng.	114	88	-	41	17	260
7.	Electrical Eng.	299	77	-	47	15	438
8.	Hum.& Soc.Sciences	-	46	-	8	27	81
9.	Mathematics	-	-	51	-	18	69
10.	Mechanical Eng.	326	144	-	42	62	574
11.	Metallurgical Eng.	118	23	-	7	23	171
12.	Ocean Eng. Centre	80	19	-	6	27	132
13.	Physics	-	22	47	-	50	119
<b>Total</b>		<b>1400</b>	<b>588</b>	<b>150</b>	<b>228</b>	<b>471</b>	<b>2837</b>

The total 2837 includes the following:

Foreign Nationals	47	Project Staff (M.S. & Ph.D.)	101
Scheduled Castes	185	Defence (M.Tech.)	30
Scheduled Tribes	42	CSIR (Ph.D.)	35
Women	304	Handicapped	2
QIP Scholars	77	Institute staff (M.S. & Ph.D.)	13
Sponsored Candidates	69	External Registration (M.S. & Ph.D.) (in residence)	13

In addition to the above, 31 M.S. and 172 Ph.D. scholars were keeping their registration alive and doing their research in their organisations. The department-wise details of these scholars are given below:

TABLE - 3

Sl.No.	Department	M.S.	Ph.D.	Total
1.	Aerospace Eng.	-	11	11
2.	Applied Mechanics	5	18	23
3.	Chemical Eng.	1	14	15
4.	Chemistry	-	10	10
5.	Civil Eng.	3	20	23

Sl.No.	Department	M.S.	Ph.D.	Total
6.	Computer Sci Eng.	4	5	9
7.	Electrical Eng.	9	17	26
8.	Hum.& Soc.Sciences	2	-	2
9.	Mathematics	-	6	6
10.	Mechanical Eng.	6	39	45
11.	Metallurgical Eng.	1	18	19
12.	Ocean Eng. Centre	-	8	8
13.	Physics	-	6	6
<b>Total</b>		<b>31</b>	<b>172</b>	<b>203</b>

### 3.3 Convocation

The 32nd Convocation was held on 28.7.1995. Sri Madhavrao Scindia, Minister for Human Resource Development, Govt. of India, delivered the Convocation Address. 790 candidates were awarded various degrees. 579 candidates received their degrees in person. The break-up is given department-wise in the following Table:

TABLE - 4

S.No.	Department	B.Tech.	M.Tech.	M.Sc.	M.S.	Ph.D.	Total
1.	Aerospace Eng.	20	1	-	3	1	25
2.	Applied Mechanics	-	14	-	2	8	24
3.	Chemical Eng.	44	16	-	4	4	68
4.	Chemistry	-	-	23	-	19	42
5.	Civil Eng.	38	26	-	9	7	80
6.	Computer Sci Eng.	30	41	-	12	5	88
7.	Electrical Eng.	75	34	-	7	8	124
8.	Hum.Soc.Sciences	-	22	-	4	5	31
9.	Mathematics	-	-	23	-	7	30
10.	Mechanical Eng.	75	74	-	6	13	168
11.	Metallurgical Eng.	27	9	-	3	6	45
12.	Ocean Eng.Centre	15	3	-	7	4	29
13.	Physics	-	11	17	-	8	36
<b>Total</b>		<b>324</b>	<b>251</b>	<b>63</b>	<b>57</b>	<b>95</b>	<b>790</b>

With this Convocation the number of degrees awarded so far by the Institute is 18,474 the details of which are as follows:

Ph.D. : 1733                      M.Tech. : 6051                      B.Tech. : 8085  
M.S. : 1021                      M.Sc. : 1319                      DIIT : 245    B.Sc.(TA) : 20

### 3.4 Award of Prizes at the 32nd Convocation

The following are the details of Prizes awarded to the students at the 32nd Convocation for their best academic records:

#### President of India Prize :

B.Tech. - Srinivas, M.A. - Electronics and Communication Engineering

#### Governor's Prize :

B.Tech. - Ranjit Thomas - Mechanical Engineering

#### Other Prizes :

Donor	Department	Name of Student
<b>Doctor of Philosophy - Ph.D.</b>		
1. Prof.C.N.Pillai Prize	Chemistry	T Balasubramanian
2. Prof Langmuir Prize	Chemistry	S Kannan
3. Prof. Werner Prize	Chemistry	K V Govindankutty
4. Prof.A.L. Laskar Prize	Physics	M Senthil Kumar
<b>Master of Technology - M.Tech.</b>		
1. Institute Merit Prize	Eng. Mechanics	Balachandra Shripad Kulkarni
2. Indira Sivasailam Merit Prize	Maint. Eng. and Management	Vinod Menon N
3. Dr.K.Subba Raju Memorial Prize	Chemical Engineering	Mahendra Kavdia Errol Flynn Jacob
4. Mico-Bosch Prize	Chemical Engineering	Mahendra Kavdia
5. Valli Anantharamakrishnan Merit Prize	Civil Engineering	Joga TVSSS Kumar Remadevi M
6. K Devarajan Memorial Prize	Civil Engineering (Transportation Eng.)	Remadevi M

	<b>Donor</b>	<b>Department</b>	<b>Name of Student</b>
7.	CMC Prize	Computer Sci. & Eng.	Umesh Sirsiwal
8.	Prof.H N Mahabala Endowment Prize	Computer Sci. & Eng.	R S Ramesh
9.	Siemens Prize	Electrical Engineering	Sivakumar P S
10.	Coka Parthasarathy Memorial Prize	Industrial Management	Shailesh Kumar S
11.	K.V.Arunkumar Memorial Prize	Industrial Management	Shailesh Kumar S
12.	Prof B Sengupto Prize	Mechanical Eng.	Santosh Kumar Ranganath
13.	Dr S Vaidyanathan Memorial Prize	Mechanical Eng. (Computer Integrated Mfg./Manuf. Eng.)	Santosh Kumar Ranganath
14.	Giri Brothers Prize	Mechanical Eng. (Project in Metrology)	Santosh Kumar Ranganath
15.	S Anantharama- krishnan Merit Prize	Mechanical Engineering	B.Ramakrishna
16.	Prof.BVA Rao Endowment Prize	Mechanical Engineering (Machine Dynamics)	Subhendu Choudhury
17.	Prof.Ramamohana Rao Memorial Prize	Mechanical.Engineering (Machine Design Stream)	Thirugnanamuthuvelan S
18.	Sudarshan Bhat Memorial Prize	Metallurgical Engineering	Srikanth K C
19.	American Bureau of Shipping Prize	Ocean Engineering	Thikkireddy Surya Rao
20.	Institute Merit Prize	Solid State Tech.	Shyam Hardikar
21.	Institute Merit Prize	Transducer Physics and Instrumentation	Daniel K J

Donor	Department	Name of Student
<b>Master of Science - M.Sc.</b>		
1. Dr S R Ramadas 60th Birthday Commomeration Award	Chemistry	Vinodh Kumar S
2. Ratna Rao Memorial Prize	Chemistry	Vinodh Kumar S
3. Mrs.Mira Paul Memorial Prize	Mathematics	C Rama
4. Prof.Chilukury Rama Sastry Memorial Prize	Physics	Jogy George
<b>Bachelor of Technology - B.Tech.</b>		
1. Dr.Shanker Dayal Sharma, President of India Prize	Chemical Eng.	A Preeti
2. HAL Prize	Aerospace Eng.	Jyothish D George
3. B.Ravichandran Memorial Prize	Chemical Eng.	G Venkatraghavan
4. Reliance Heat Transfer (P) Ltd., Prize	Chemical Eng.	G Venkatraghavan
5. Prof C A Sastry Endowment Prize	Chemical Eng.	A Preeti
6. Larsen & Toubro - ECC Endowment Medal	Civil Engineering	Niranjan K
7. Alumni Association Prize	Computer Sci. & Eng.	Rohan Felix Martin Aranha
8. B Ravichandran Memorial Prize	Computer Sci. & Eng.	Rohan Felix Martin Aranha
9. Philips (India) Prize	Electronics & Communication Eng.	Srinivas M A
10. Siemens Prize	Electrical and Electronics	Anand S
11. Motorola Prize	Electrical and Electronics Eng.	Ranjit Thomas Joseph
12. Prof.Achim Bopp Endowment Prize	Electronics & Commn. Engineering	K Mahesh Ramakrishna Vetury
13. Dr.Ing.Dieter Kind Prize	Electronics & Commn. Eng. Electrical and Electronics	S Anand Raju Sivakumar S

	Donor	Department	Name of Student
14.	Sir Viswesvaraiiah Memorial Prize	Electronics & Commn. Eng.	Srinivas M A
15.	Banco Foundation Prize	Mechanical Eng.	Balakrishnan S
16.	Prof. GVN Rayudu Memorial Prize	Mechanical Eng.	Balakrishnan S
17.	Sivasailam Merit Prize	Mechanical Eng.	K A Chandrashekara
18.	Dr.Dhandapani Prize	Metallurgical Eng.	K Satyasrayan
19.	American Bureau of Shipping Prize	Naval Architecture	S Srikumar

### 3.5 Institute Day Prizes

On the basis of performance during the Academic Session 1993-94, the following students were awarded Institute Merit and other Prizes :

#### 1. B.Tech. ( I and II Semesters) 1993-94

First Prize	)	Hariharan Shankar Rahul
(Book value of Rs. 500/-)	)	CS 93118
Second prize	)	R Bhaskaran
(Book value of Rs. 250/- )	)	CS 93116

#### 2. B.Tech ( III and IV semesters) 1993-94 (Book value of Rs. 500/- for each branch)

Aerospace Engineering	:	AE 92004 Girish Shrikant Nandgaonkar
Chemical Engineering	:	CH 92030 Chandrasekar P
Civil Engineering	:	CE 92068 G Bhanu Prakash
Comp. Science	:	CS 92114 Eshwar Belani
Electronics & Commn. Engineering	:	EC 92134 M Ashok Krishna ) Bracketed EC 92147 Neellesh B Mehta)
Electrical & Electronics Eng.	:	EE 92202 R Srivaths
Mechanical Engineering	:	ME 92234 P Laxmi Prasad
Metallurgical Engineering	:	MT 92280 C Balaji
Naval Architecture	:	NA 92309 Biren Mohan

**3. B.Tech ( V & VI Semesters) 1993-94**  
(Book value of Rs. 500/- for each Branch)

Aerospace Eng.	:	AE 91007 Jyothish D George
Chemical Eng.	:	CH 91061 G Venkatraghavan
Civil Eng.	:	CE 91073 B Krishna Kishore
Comp. Science	:	CS 91015 Rohan Felix Martin Aranha
Electronics & Commn. Eng.	:	EC 91197 Srinivas M A
Mechanical Eng.	:	ME 91004 Harshawardhan Shetty
Metallurgical Eng.	:	MT 91293 K Satyasrayan
Naval Architecture	:	NA 91313 M V Guruprasad

**4. Ramasarma V Kolluri Memorial Prize**

(Silver Medal to the best student in the Electrical & Electronics Engineering V & VI semesters)

EE 91162 Anand S

**5. Raghavendra Memorial Prize**

(Book value of Rs. 580/- to the Mechanical Engineering student of the III year with best academic record in the First Four semesters)

ME 92234 P Laxmi Prasad

**6. Rajalakshmi Krishnamurthy English Prize**

(Book value of Rs.200/- to the best student in English in the I and II semesters)

CH 93068 Vishwanath Kanda ( Bracketed  
EE 93164 Nandakumar S )

**7. Chilikuri Ramasastry Memorial Prize**

(Cash award of Rs.1,500/- for M.Sc. Physics student with the best academic record during the first two semesters - 1993-94)

PH 93484 Suneeta Varadarajan

**8. Padmanabhan Memorial Prize**

(Cash award of Rs.1,500/- for M.Sc. Chemistry student with lowest parental income and CGPA equal to or greater than 7.00 in the I & II semesters - 1993-94)

CY 93405 J Edward Nesakumar



## **4. DEPARTMENTS AND CENTRES**

The Institute is having following Departments and Centres:

### **Departments**

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

### **Centres**

- Biotechnology Research Centre**
- Regional Sophisticated Instrumentation Centre**
- Material Science Research Centre**
- Fibre Reinforced Plastics Research Centre**
- Computer Centre**
- Centre for Industrial Consultancy & Sponsored Research**
- Central Electronics Centre**

The activities of these Departments and Centres during the year 1995-96 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	Specialisation
<b>Professors</b>	
T.K.Bose, Dr.Ing. (Stuttgart)	Computational Fluid Dynamics, Plasma Physics, Gasdynamics, Heat Transfer and Propulsion
S.Krishnan, Ph.D. (IIT Madras)	Aerospace Propulsion, Solid Propellant Combustion, Solid Rocket Technology
G.Subramanian, Ph.D.(IIT Madras)	Structural Analysis, Finite Element Method, Experimental Moire and Holography
E.G.Tulapurkara, Ph.D.(IIT Madras) <b>[Head]</b>	Aerodynamics, Turbulent Flows, Flight Dynamics, Wind Tunnels and Aircraft Design
T.K.Varadan, Ph.D. (IIT Madras)	Structural Mechanics, Composites Non-linear Structural Mechanics
<b>Associate Professors</b>	
S.S.Gokhale, Ph.D.(Illinois)	Propulsion, Computational Fluid Dynamics, Simulation & Optimization, Multiphase Flows
R.M.S.Gowda, Ph.D.(IIT Madras)	Structural Mechanics, Experimental Stress Analysis, Thermal Stress Analysis
A.Krishnan, Ph.D. (IIT Madras)	Aircraft Structural Analysis and Design, Finite Element Method and Composites
J. Kurian, Ph.D.(IIT Madras)	Gasdynamics, Experimental Aerodynamics, & Shock tube flows and measurements
S.Santhakumar, Ph.D.(IIT Madras)	Aerodynamics, Flight Dynamics and Instrumentation

**Name and Qualification****Specialisation****Assistant Professors**

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

Structural Mechanics, Elasticity, Composites

S.C.Rajan, M.Tech.(IIT Madras)

Aerodynamics, Vortex dominated flows

M.Ramakrishna, Ph.D.(Arlington)

Aerodynamics, Numerical Methods, Computational Fluid dynamics

P.Sriram, Ph.D. (Georgia)

Structural Mechanics, Composites Fatigue and fracture

**Lecturer**

R.I.Sujith, Ph.D. (Georgia Tech)

Gasdynamics, Acoustics, Combustion

**4.1.3. Students on Roll**

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	-	-	1	-	5	-	5	-	5	-	16	-	16
M.S.	2	-	5	2	1	1	1	1	1	-	10	4	14
M.Tech.	17	-	6	1	-	-	-	-	-	-	23	1	24
B.Tech.	22	2	21	1	18	3	21	1	-	-	82	7	89
<b>Total</b>	<b>41</b>	<b>2</b>	<b>33</b>	<b>4</b>	<b>24</b>	<b>4</b>	<b>27</b>	<b>2</b>	<b>6</b>	<b>-</b>	<b>131</b>	<b>12</b>	<b>143</b>

**4.1.4. Number of Scholarship holders**

Programme	Institute	CSIR	Others	Total
Ph.D.	6	-	1 (QIP)	7
M.S.	8	-	-	8
M.Tech.	9	-	5	14
<b>Total</b>	<b>23</b>	<b>-</b>	<b>6</b>	<b>29</b>

#### 4.1.5. Number of Degrees Awarded

Programme	Number Awarded
Ph.D.	1
M.S.	3
M.Tech.	1
B.Tech.	20
<b>Total</b>	<b>25</b>

#### 4.1.6. New Facilities added and Major Equipment procured

- 1) Erosive burning facility
- 2) Self-correcting transonic wind tunnel
- 3) Duct losses in oscillatory flow
- 4) Supersonic combustion facility with air heater
- 5) PC XT added to the drawing room along with Autocad
- 6) PC 486 added to the Aerospace Office
- 7) New computer tables in students computer room

#### 4.1.7. Short-term Courses/Workshops/Seminars/Symposia Conferences organised.

Sl. No.	Name & Address	Topic of the Lecture	Date
<b>Seminars</b>			
1.	Dr.S.Pavitrn University of Southern California, U.S.A.	Absolute Convective Instability	18-9-1995
2.	Mr.V.Kanagarajan, N.A.L., Bangalore	Opportunities at NTAF, NAL	05-1-1996
3.	Dr.S.Sundararajan Pratt & Whitney, Canada	Gas Turbine Engine Product development	12-1-1996
4.	Dr.D.B.S.Gujral Retd. Manager (Airsafy)	Aircraft accident investi- gation and recovery procedure	15-3-1996
5.	Mr.S.Paneerselvam DRDL, Hyderabad	Aerodynamics, Aspects of IGMDP Missiles	29-3-1996

Sl.No.	Faculty	Topic	Date	Conducted at
<b>Workshops</b>				
1.	Dr.S.S.Gokhale	ZOPP Workshop	July '95	WRI, Trichy
2.	Dr.S.S.Gokhale	Zopp Workshop	Oct. '95	NIRD, Hyd.
<b>Conferences</b>				
	Entire faculty with Dr.Job Kurian as Organising Secretary and HOD as Co-chairman	Annual General Meeting of Aero Soc. of India and Alumni get-together	6-8, Jan. 1996	IIT, Madras

#### 4.1.8. Invited Lectures Delivered by the Faculty in Academic Institutions/Public Bodies

S.No.	Name of Faculty	Topic of the Lecture	Delivered at	Date
1.	E.G.Tulapurkara	Experimental and numerical study of wake subjected to curvature and pressure gradient	Ruhr Univ. Bochum, Germany	10-7-1995
2.	E.G.Tulapurkara	Enhancement of Reverse Flow	RWTH, Aachen Germany	12-7-1995
3.	R.I.Sujith	Optical Flow Diagnostics	V.S.S.C., Trivandrum	25-1-1996
		Experimental and Theoretical investigation of wave propagation in ducts with axial mean temperature gradient	V.S.S.C., Trivandrum	29-1-1996
4.	Dr.P.Sriram	National Science Day (Interview with a Scientist)	All India Radio	08-2-1996

#### 4.1.9 Visits Abroad

Name of Faculty	Country visited	Date	Purpose of visit
Dr.E.G.Tulapurkara	Germany	May-July 1995	To carryout experimental work at Bochum
Dr.S.Krishnan	Germany	May-August 1995	Research on Ram Rockets
Dr.Job Kurian	Germany	June-August 1995	Free jets Shock Tubes studies in Univ. of Essen
	U.S.A.	July 1995	To present paper in Inst. Shock Wave Symposium at Caltec
	Hong Kong	Dec. 1995	To present paper in III Asian Pacific Intl Symposium on Combustion
Dr.T.K.Bose	U.S.A.	Jan. 1996	To present paper at the 34th Aerospace Science Meeting

#### 4.1.10. Distinguished visitors to the Department

Sl. No.	Name of the Visitor and Occupation	Date of visit	Purpose of visit
1.	Prof.Maier	6th to 8th January 1996	Discussion with Dept. faculty
2.	Mr.V.Kanagarajan Deputy Head, (Mgt.) N.A.L., Bangalore	5-1-1996	Guest Lecture
3.	Dr.S.Pavithran University of Southern California, U.S.A.	18-9-95	Guest Lecture

#### 4.1.11. Sponsored Projects

	Title of the Project	Period	Funding Agency	Amount Rs. in Lakhs.	Co-ordinators
1.	Preliminary design study of hypersonic airbreathing flying test bed	1 year	ISRO	3.800	All Faculty of Aerospace Engg.
2.	Flow around 3-d bluff bodies with relevance to building aerodynamics	3 years	DST	8.000	Dr.E.G.Tulapurkara Dr.B.H.L.Gowda, (AM)
3.	Studies on low speed turbulent flows in complex enclosures	3 years	VOLKS-WAGAN FOUNDATION	20.000	Dr.E.G.Tulapurkara Dr.T.K.Bose
4.	Evaluation of models of turbulence using DNS data base	1 year & six months	CSIR	1.860	Dr.E.G.Tulapurkara
5.	Symbolic computation as an aid for structural analysis	1 year	IRDF	0.500	Dr.K.Bhaskar
6.	Erosive burning studies of solid propellants under transonic and supersonic cross flow Mach numbers	3 years	ARDB	5.980	Dr.S.Krishnan
7.	Development of solid fuel and combustion chamber system for hybrid rocket motor	3 years	ISRO-IIT(M)	5.700	Dr.S.Krishnan
8.	Burning rate prediction in AP/HTPB propellants with burning rate modifiers	3 years	ISRO-IIT(M)	4.290	Dr.S.Krishnan
9.	Computer aided design of aerodynamically heated structure	3 years	ARDB	11.850	Dr.T.K.Bose Dr.R.Palaninathan (AM)
10.	Nozzle flow with secondary injection Phase-II	2 years	ISRO	5.000	Dr.T.K.Bose
11.	Computation of performance of Cryogenic rockets using detailed chemical reactions	3 years	ISRO	9.960	Dr.T.K.Bose Dr.S.S.Gokhale
12.	Vibration relaxation effects in gasdynamics	2 years	ISRO	3.900	Dr.T.K.Bose
13.	A higher order theory of laminated composites shells under transverse loads	4 years	ARDB	3.210	Dr.T.K.Varadan
14.	Thermal stress analysis of laminated composites with specific reference to aerospace applications	3 years	ARDB	5.005	Dr.T.K.Varadan Dr.K.Bhaskar
15.	Theoretical studies in composite airbreathing propulsion	2 years	ISRO	4.950	Dr.S.S.Gokhale
16.	Study of flow through axisymmetric/ two dimensional variable area convergent-divergent nozzle	2 years	ADA	6.025	Dr.M.Ramakrishna

	Title of the Project	Period	Funding Agency	Amount Rs. in Lakhs.	Co-ordinators
17.	Analysis of flow through as augmented rocket	3 years	ISRO-IIT(M)	4.400	Dr.M.Ramakrishna
18.	Development and calibration of preliminary experiments on a hypersonic shock tunnel	3 years	ARDB	6.450	Dr.Job Kurian
19.	Studies on shock wave propagation in gas particle mixtures	3 years	DAE	6.100	Dr.Job Kurian
20.	Ignition studies on solid propellants	3 years	ISRO	4.700	Dr.Job Kurian Dr.K.A.Bhaskaran (ME)
21.	Studies on advanced propulsion for aerospace vehicles	4 years	DRDL	19.980	Dr.Job Kurian Dr.V.Sriramulu (ME)
22.	Testing of ramjet combustors	1 year	ISRO	1.550	Dr.Job Kurian
23.	Studies of plume flows and plume impingement	2 years	ISRO	5.966	Dr.Job Kurian
24.	Dev. of self-correcting wind tunnel Technology	3 years	ARDB	6.650	Dr.S.Santhakumar
25.	Duct losses in Oscillatory flow (Wave Energy Group)	6 months	DOD	1.460	Dr.S.Santhakumar
26.	Study of flow through axisymmetric two dimensional variable area convergent-divergent nozzles	2 years	ADA	6.225	Dr.M.Ramakrishna
27.	Escape from military aircraft at very high mach numbers (M=2.0)	4 years	ARDB	5.450	Dr.S.Krishnan
28.	Comp.aided instruction for airbreathing propulsion	18 months	ARDB	9.075	Dr.S.S.Gokhale
29.	Modelling of impinging plasma jet	3 years	DAE	10.144	Dr.T.K.Bose
30.	Duct Optimisation and Automatic pitch control for wave power generator	2 years	-	2.990	Dr.S.Santhakumar

#### 4.1.13. Major Consultancy Assignments

	Title of the Project	Organisation	Amount Rs. in Lakhs.	Co-ordinators
1.	Analysis of gas generator in the missile canister	DRDL	1.20	Dr.S.Krishnan
2.	Studies on nozzle flow separation	LPSC	1.00	Dr.S.S.Gokhale



	Title of the Project	Organisation	Amount Rs. In Lakhs.	Co-ordinators
3.	Model testing of ALH helicopter with EFG (Jt.project with OEC)	HAL	19.50	Dr.S.Santhakumar Dr.S.Sambandan (OEC)
4.	Aerodynamic and structural performance of airfoil and mounting (Joint project)	BCEL	6.00	Dr.E.G.Tulapurkara Dr.A.Krishnan Dr.T.K.Varadan Dr.G.Subramanian Dr.S.Santhakumar Dr.M.Ramakrishna Mr.S.C.Rajan

#### 4.1.14. Research Publications

##### Refereed Journals

1. Anwar, K.O. and Kurian J., "Study of low density conductance through composite geometries". Vacuum, 46, No.4, (1995), pp 331-335.
2. Bhaskar, K. and Librescu, L., "A Geometrically Non-linear Theory for Laminated Anisotropic Thin-walled Beams," Int. J. of Engg. Science, 33(9), 1995, 1331-1344.
3. Bhaskar, K. and Librescu, L., "Buckling under Axial Compression of Thin-walled Composite Beams Exhibiting Extension- Twist Coupling," Composite Structures, 31, 1995, 203-212.
4. Dhinakaran, R. Bose, T.K., "Numerical Computation of Jet Supersonic cross-flow Interaction," J. Aero. Soc. of India, 1995, pp.215-221.
5. Ganapathi, M. and Varadan, T.K., "Nonlinear free flexural vibrations of laminated circular cylindrical shells," Composite Structures, Vol.30, No.1, 1995, pp.33-50.
6. Ganapathi, M. and Varadan, T.K., "Dynamic buckling of laminated anisotropic spherical caps," Jl. of Applied Mechanics, Vol.62, March 1995, pp.13-19.
7. Ganapathy Subramanyam, P.P. and Gokhale, S.S., "Development of an Authoring System for Engineering Education for PC-DOS Applications," Int. J. of Engg. Education, Vol.11, No.1, 1995.
8. Gowda, B.H.L., Tulapurkara, E.G., and Kannababu, A. "Wind pressure distribution on a low-size and high-size presmatic bodies due to mutual interference effect," J. Aero. Soc. of India, Feb.1996.
9. Hodges, D.H. and Sujith, R.I., "Exact solution for the free vibration of a rotating cord with a tip mass," Jl. of Sound and Vibration, 181, 1995, pp.911-914.
10. Krishnan, A. and Krishnadasan, C.K., "Similarity of stiffness and mass matrices for plate bending elements," Communications in Num. Methods in Engg., Vol.11, 1995, pp.491-495.
11. Krishnan, A., Dhanaraj, S. and Suresh, Y.J., "Free vibration studies of arches," Jl. of Sound and Vibration, Vol.186(5), 1995, pp.556-563.

12. Madhusudan, R.S, Balabaskaran, V, Tulapurkara, E.G. and Aswatha Narayana, P.A., "Effect of Maximum Blade Thickness on the performance of Symmetrical's - Blades", *Jl. of Aero. Soc. of India*, Vol.47, pp.73-79, 1995.
13. Paneerselvam, S. Soundararajan, P. Santhakumar,S. "Aerodynamic Design of Unguided Submunition for Achieving Required Dispersion," *J. of Aero. Soc. of India*, Vol.47, No.4, Nov.1995, pp.159-165.
14. Paneerselvam, S. Vasantharaj, C. Ramaswamy, M.A. and Santhakumar,S."Separation Dynamics of Nose Petal of a Missile" *J. of Aero. Soc. of India*, Vol.47, No.4, Nov.1995, pp.200-204.
15. Rajamanohar, D. and Kurian, J., "Preliminary studies on dual mode combustion ramjet using petal nozzle," *AIAA Jl. of Propulsion and Power*, March-April issue (1996)
16. Raju, C. and Kurian, J., "Effect of aspect ratio on free jet properties", *Vacuum*, 46, No.4, (1995), pp 389-395.
17. Ramesh Kumar, R and Kurian, J. "Studies on free jets from radially lobed nozzles," *Experiments in Fluids*, 19, 2 (1995), pp.95-102.
18. Ramesh Kumar, R. and Kurian, J., "Estimation of mixing of isothermal high speed streams," *AIAA Jl. of Propulsion and Power*, March-April (1996).
19. Ramesh Kumar, R. and Kurian, J., "Studies on free jets from radially lobed nozzles," *Experiments in Fluids*, Vol.19, 2, (1995), pp.95-102.
20. Ravisundar, T. Tulapurkara, E.G. and Balabaskaran, V. "Effects of fans in a curved duct," *J. Aero. Soc. of India*, Feb. 1996.
21. Sarkar, S. Bose, T.K. "Numerical simulation of a 2D jet cross flow interaction related to film-cooling applications: Effect of blowing rate, injection angle and free-stream turbulence," *Sadhana*, Dec.1995, pp.915- 935.
22. Sarkar, S.S. and Bose, T.K., "Comparison of Different Turbulence Models for Prediction of Slot Film Cooling: Flow and Temperature Field," *Jl. Numerical Heat Transfer*, Vol.28, No.2, Sept. 1995, pp.217-238.
23. Sarma, A.V.S.S.S.R., Pillai, S.A., Subramanian, G. and Varadan, T.K., "Digital Image Processing for the Determination of Isochromatics," *J.Ae.S.I.*, 47(3), 127-130, 1995.
24. Srikrishnan, A.R., Kurian, J. and Sriramulu, V., "An experimental study on mixing enhancement by "petal nozzle" in supersonic flow," *AIAAJl. of Propulsion and Power*, Vol.12, No.1, 1996, pp.165-169
25. Subramanian, G. and Raveendra, V.V.S., "A simple mesh definement procedure for arbitrary planar triangulations," *Int. J. Engg. Anal. and Design*, Vol.2(2), 1995, pp 107-116.
26. Subramanian, G., Radhakrishnan, S., Bibhuti Bhusan Patel and Balachandar, K., "Intensity Integration Technique for Slope Contouring of Reflecting Plates," *J.Ae.S.I.*, 47(4), 234-237, 1995.

27. Subramanian, G. and Raveendra, V.V.S., "Algorithms for Unstructured Triangular Mesh Generation," J.Ae.S.I., 47(4), 238-245, 1995.
28. Sujith, R.I. and Hodges, D.H., "Exact solution for the free vibration of a hanging cord with a tip mass," Jl. of Sound and Vibration, 179, 1995, pp.359-361.
29. Sujith, R.I., Waldherr, G.A. and Zinn, B.T., "Exact solution for one dimensional acoustic fields in ducts with an axial temperature gradient," Jl. of Sound and Vibration, 184, 1995, pp.389-402.
30. Sujith, R.I. and Matta, L.M., "On the eigenvalues of the wave equation for ducts with an axial temperature gradient," Jl. of the Ae.S.I., 47, 1995, pp.222-226.
31. Sundar, K., Ramakrishna, M. and Sriramulu, V., "A Comparison of High Resolution Schemes Applied to Flows Containing Strong Shocks," AIAA Jl. Nov. 1995, pp.2087-2091.
32. Sundar, K., Ramakrishna, M. and Sriramulu, V., "Numerical Computation of Internal Flows using an Implicit TVD Scheme," J. Ae. S.I., Vol.47, No.4, pp.187-192, 1995.
33. Tulapurkara, E.G., Ramjee, V. and Jacob George, "Development of a bluff body wake under the combined influence of curvature and pressure gradient," Experiments in Fluids, Vol.18, pp.311-318, 1995.
34. Tulapurkara, E.G., Ramjee, V. George, J. "Prediction of Airfoil wake subejected to the effects of curvature and pressure gradient," Int. J. Num. Methods in Fluids, Vol.22, pp.29-41, 1996.

#### **National/Internantional Conferences**

1. Ali, J.S.M., Bhaskar, K. and Varadan, K., "Thermoelastic solutions for cross-ply plate and shell strips," Proc. of the Conf. Engg. Applications of Solid Mechanics, Madras, 7-8 Dec., 1995; Recent Advances in Solid Mechanics, Allied Publishers, New Delhi, 1996, pp.197-202.
2. Bhaskar, K. and Librescu, L., "Flexural Buckling of Extension-Twist Coupled Thin-Walled Beams," Proc. ASME Int. Mech. Engg. Congress and Exposition, San Francisco, 12-17 Nov. 1995; Recent Advances in Solids and Structures, 1995, ASME PVP- Vol.321/NE-Vol.18, pp.185-192.
3. Dhinakaran, R. and Bose, T.K., "Flow and Heat Transfer in a Nozzle with Secondary Injection," 13th NHMTC and 2nd ASME- ISHMT Conf., Suratkal, 1995.
4. Dhinakaran, R. and Bose, T.K., "Numerical Simulation of Liquid Injection into a Supersonic Flow," Proc. Int. Sym. on Two-Phase Flow Modelling and Experimentation, Rome/Italy, Oct.9-11, 1995.
5. Dhinakaran, R. and Bose, T.K., "Two-Dimensional Jet Interaction Simulation with an Algebraic Turbulence Model," AIAA 26th Fluid Dyn. Conf, San Diego/CA (USA), AIAA Paper 95-2242, June 19-22, 1995.
6. Gowda, B.H.L., Tulapurkara, E.G. and Swain, S.K., "On the interaction of shear layers," Proc. 22nd FMFP Conference, Madras, Dec.13-15, 1995, pp.230-236.

7. Job Kurian and Das, H.K., "Effective sphere drag coefficient for unsteady gas particle flows," Presented at the 20th Int. Symp. on Shock Waves held at the California Inst. of Tech, USA, July 1995.
8. Job Kurian and Raja Manohar, D., "Studies on supersonic combustion aided by radially lobed nozzle," Proc. of Third Asian Pacific Int. Symp. on Combustion and Energy Utilization, Hong Kong, 1995 (December).
9. Job Kurian, Ramana Rao, T.V., and Ramesh Kumar, R., "Mach disc and Shock Structure in Co-flowing dual axisymmetric jets". Presented at the 20th Int. Symp. on Shock Waves held at the California Institute of Technology, USA, July 1995.
10. Krishnan, S. and Rajesh, K.K. "Solid Propellant Erosive Burning Test Facility," XIV National Conference on IC Engines and Combustion, Dec 8-10, 1995, Pune.
11. Manjunath, P., Subramanyam, JDA, Kurian J., and Sriramulu, V., "Development and testing of a model annular combustor," Presented at the XIV Nat. Conf. on IC Engines and Combustion held at IAT Pune, Dec. 1995.
12. Menon, S., Jagoda, J.I. and Sujith, R.I., "Premixed Turbulent Flame Propagation in Microgravity," 3rd Int. Microgravity Combustion Workshop, April 11-14, 1995.
13. Rajamanohar, D. and Job Kurian, "Experimental Studies on mixing of supersonic coaxial streams using radially lobed nozzles," 12th Int. Symp. on Airbreathing Engines held at Melbourne, Australia, Sept. 1995.
14. Ramjee, V., Tulapurkara, E.G. and George, J., "Comparison of Wakes developing in Diffusers," Proc. 22nd FMFP Conference, Madras, Dec.13-15, 1995, pp.162-167.
15. Santhakumar, S., "Duct losses in oscillatory flow," Accepted for presentation at the Second European Wave Power Conference held at Lisbon, Portugal from 8-10, November, 1995.
16. Sarkar, S. and Bose, T.K., "Numerical Study of Film Cooling: A 3D Calculation," 13th NHMTC and 2nd ASME-ISHMT Conf., Suratkal, 1995.
17. Sarkar, S. and Bose, T.K., "A Three-dimensional Calculation of Film Cooling on a Turbine Cascade," RAN 95, Nagoya (Japan), Dec. 1995.
18. Sarkar, S. and Bose, T.K., "A Navier-Stokes analysis applied to film-cooled turbine cascades," Accepted for presentation in 9th Int. Conf. on Num. Methods in Laminar and Turbulent Flow, Atlanta/GA (USA), July 10-14, 1995.
19. Sarkar, S. and Bose, T.K., "Numerical Simulation of Influence of Free-Stream Turbulence on Film Cooling," First Asian CFD Conference, Hong Kong, Jan. 1995, pp.561-566.
20. Sarkar, S. and Bose, T.K., "A Navier-Stokes Analysis of Steady Two-Dimensional Transonic Cascade Flows," First Asian CFD Conference, Hong Kong, Jan. 1995, pp.881-886.
21. Sujith, R.I., Waldherr, G.A., Jagoda, J.I., and Zinn, B.T., "Experimental Investigation of the Evaporation of Droplets in Axial Acoustic Fields," 33rd Aerospace Sciences Meeting, Reno, Nevada, Jan. 9-12, AIAA 95-0495, 1995.
22. Sundar, K., Ramakrishna, M. and Sriramulu, V., "Numerical Simulation of Flow Through Inlets," The Sixth Asian Congress of Fluid Mechanics, May 22 to 26, 1995, Singapore.

23. Suresh, V., Job Kurian, Bhaskaran, K.A., "Ignition of compo-site metalised propellants under convective heating," Presented at the XIV Nat. Con. on IC Engines and Combustion held at IAT Pune, Dec. 1995.
24. Tulapurkara, E.G., Gowda, B.H.L. and Susheel Kumar Swain, "Pressure distribution inside a channel with obstruction at the entry," The Sixth Asian Congress of Fluid Mechanics, May 22-26, 1995, Singapore, pp.903-906.
25. Balakrishnan, S.R. and Santhakumar, S. "Fuzzy logic control for single spool aircraft gas turbine engine", Proc. International Conference on Automation (IC Auto '95), Indore, India, Dec.1995, pp-771-778.
26. Balakrishnan, S.R. and Santhakumar, S."The applicability of fuzzy type control for high performance aircraft gas turbine engines", Proc. of International Conference on Advances in Mechanical Engg., Bangalore, India, Dec. 1995, pp.1793-1804.
27. Channa Raju and Job Kurian., "Mach disc and Freezing point location for Low density freejets," Presented at the Aero. Soc. of India Annual General Meeting held in Madras (1996)
28. Suresh, V. Kurian, J and Bhaskaran, K.A., "Ignition of Aluminium particles in an oxidising stream," Presented at the Aero. Soc. of India Annual General Meeting held in Madras (1996)
29. Sujith, R.I., Matta, L.M. "On the Eiginvalues of the Wave Equation for Ducts with an Axial Temperature Gradient, 47th Annual General Meeting of the Aeronautical Society of India, IIT, Madras. Jan.6-8, 1996

#### 4.1.16. Any other details

##### Participation in Corporate activities:-

- 1) Dr.S.S.Gokhale, Advisor (Sports)
- 2) Dr.S.Santhakumar, President (Film Club) & Chairman, (Central Photographic Section)
- 3) Dr.S.Krishnan, Chairman (Canteen Committee)
- 4) Dr.G.Subramanian, Registrar
- 5) Dr.R.I.Sujith, Assistant Warden

##### Other Activities:-

The Department has 15 faculty members, 15 non-teaching technical and 11 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. and M.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 Bioinstrumentation, Biomechanics and Biomedical Image and Signal processing. The faculty of this Division are carrying out research in collaboration with hospitals and medical research institutes, in the areas of Biomechanics of Leprotic hand and foot, Rehabilitation aids, Finite element method and Image and Signal processing applications etc. Recent emphasis of the division is to develop medical diagnosis modalities in the areas of Macro-Micro- Hemodynamics, Laser and Artificial Neural Networks based instrumentation.

The faculty in the **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 planar, 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 Details of Faculty

Name and Qualification	Specialisation
<b>Professors</b>	
Aswatha Narayana, P.A. Ph.D (IIT Madras)	Fluid Mechanics, CFD with heat transfer, non-conventional energy resources and Atmospheric boundary layer
Chandrasekara Swamy, N.V. Ph.D. (IISc)	Fluid Mechanics
Ganesan, N. Ph.D (IIT Madras)	Vibration, Stress Analysis, Tribology, Acoustics and Noise control
Lakshmana Gowda, B.H. Ph.D (IIT Madras)	Fluid Mechanics

**Name and Qualification****Specialisation**

Megha Singh, Ph.D (Carolina)	Lasers and ultrasound in medicine, Biofluid mechanics, Biomedical Instrumentation
Narayanan, S. Ph.D. (IIT, Kanpur)	Vibration, Random Vibration, Chaos & Nonlinear Dynamical Systems, Acoustics and Noise Control
Palaninathan, R. Ph.D (IIT Madras)	Structural Mechanics, Composite Structures, Metal Matrix Composites
Patil, K.M. D.Sc. (Washington)	Biomechanics, Rehabilitation Engineering
Raamachandran, J. Ph.D (IIT Madras)	Solid Mechanics, Experimental Stress Analysis, Composite Structures, Bio-mechanics, Boundary Element Methods
Ramamurti, V. Ph.D (IIT Madras)	Machine Dynamics, Vibration, Stress Analysis, Rotor Dynamics, Computer Aided Design
Ramjee, V., Ph.D (IISc)	Fluid Mechanics, Turbulence
Srinivasa Prabhu, B. Ph.D (IIT Madras)	Rotor Dynamics, Tribology, Maintenance Engineering

**Associate Professors**

Balakrishnan, M. Ph.D (IIT Madras) F	Fluid Mechanics/Low speed Aerodynamics
Radhakrishnan, S. Ph.D (IIT Madras)	Biomechanics, Rehabilitation Engineering

**Emeritus Fellow**

Krishna Iyer, P. Ph.D (IIT Madras)	Solid Mechanics, Stress Analysis, Elasticity and Plasticity
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**Assistant Professor**

Lakshminarasimhan, J. Ph.D (IIT Madras)	Fluid Mechanics: Incompressible Aerodynamics, Internal flows
Lakshmana Rao, C. D.Sc (MIT, USA)	Fracture Mechanics, Micromechanical Modelling of Materials, Biomaterials, Boundary Element Methods
Ramasubba Reddy, M. Ph.D (IISc)	Neural network applications in medicine, Biomedical Instrumentation, Medical Imaging & Signal Processing
Sujatha, C. Ph.D (IIT Madras)	Machine Dynamics, Acoustics, Instrumentation, Condition Monitoring, Fibre Optics, Vehicular vibration

<b>Name and Qualification</b>	<b>Specialisation</b>
Swamamani, S. Ph.D (IIT Madras)	Instrumentation, Machine Dynamics, Tribology, Medical Ultrasonics, Acoustics, Biomedical Instrumentation
Santhanakrishnan, G. Ph.D (IIT Madras)	Tribology, Composites-Materials & Processing, Natural Fibre Composites, Manufacturing Engineering
Sivakumar, M.S. Ph.D (Louisiana State Univ.)	Plasticity, Solid Mechanics
<b>Senior Scientific Officer, Gr.I</b>	
Thomas, G. M.Sc. (Madras)	Experimental Stress Analysis
<b>Technical Officer</b>	
Ganesh, V. M.S. (IIT, Madras)	Engineering Mechanics, Stress Analysis, Design of machine elements

#### 4.2.3 Students on Roll

Pro-gramme	I		Year II		Year III		Year IV		Year V		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	3	1	5	1	6	-	5	1	6	1	25	4	29
M.S.	4	1	9	1	6	-	2	-	-	-	21	2	23
M.Tech	9	1	10	1	-	-	-	-	-	-	19	2	21
<b>Total</b>	<b>16</b>	<b>3</b>	<b>24</b>	<b>3</b>	<b>12</b>	<b>-</b>	<b>7</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>65</b>	<b>8</b>	<b>73</b>

#### 4.2.4 Number of Scholarship/Fellowship holders

Programme	Institute	Others	Total
Ph.D.	22	6	28
M.S.	21	0	21
M.Tech	30	1 [QIP]	31
<b>Total</b>	<b>73</b>	<b>7</b>	<b>80</b>



#### 4.2.5 Number of Degrees Awarded

Programme	Number Awarded
Ph.D.	8
M.S.	2
M.Tech	26
<b>Total</b>	<b>36</b>

#### 4.2.6 New Facilities Added and Major Equipment procured

- 1) Underwater Transducers
- 2) Sound Intensity Analyzer

#### 4.2.7 Short-Term Courses/Workshops/Seminars/Symposia/Conferences organised

S.No.	Co-ordinator(s)	Title of Course/Workshop/ Seminar/Symposia/Conference	Period
1.	Dr.S. Narayanan	Random Vibration Theory Testing of Analysis at RCI-Hyderabad	Nov. 1995
2.	Dr.S. Narayanan	47th AGM of Aeronautical Society of India	Jan. 1996
3.	Dr.P.A. Aswatha Narayana	22nd National Conference on Fluid Mechanics and Fluid Power	Dec.13-15, 1995
4.	Dr.K.M. Patil	Advances in Biomedical Engineering Applications	August 16, 1995
5.	Dr.K.M. Patil (Co-Chairman) Dr.S.Radhakrishnan (Secretary) Dr.Megha Singh (Jt. Secretary) Dr.M.Ramasubba Reddy (Treasurer)	5th National Conference of Biomechanics	Feb.22-24, 1996
6.	Mr.G. Thomas	Resistance Strain gages Industrial Applications	4th to 6th July 1995

**4.2.8 Short-Term Courses/Workshops/Seminars/Symposia/Conferences/ Training attended by the Faculty in recognized Academic Institutions and Public Sectors**

S.No.	Name of Faculty	Title	Period/Duration
01.	Dr.B.S. Prabhu	National Conference on improved maintenance strategy in power plants, Hyderabad	May 19-20, 1995
02.	Dr.S. Narayanan	National Symposium on Acoustics, New Delhi	Dec.1995
03.	Dr.S. Narayanan	International Conference on Advances in Mech. Engg., I.I.Sc. Bangalore	Dec.1995
04.	Dr.P.A. Aswatha Narayana	22nd Conference on Fluid Mechanics & Fluid Power	Dec.13-15, 1995
05.	Dr. Megha Singh	The Second Asian Congress for Microcirculation, Beijing, China	Aug.18-20, 1995
06.	Dr. Megha Singh	International Conferences on Physiological Fluid Dynamics Gwalior	Dec. 8-10, 1995
07.	Dr. Megha Singh	5th National Conference of Biomechanics, Madras	Feb.22-24, 1996
08.	Dr.K.M. Patil	5th National Conference of Biomechanics, Madras	Feb.22-24, 1996
09.	Dr.S.Radhakrishnan	5th National Conference of Biomechanics, Madras	Feb.22-24, 1996
10.	Dr.M.Ramasubba Reddy	5th National Conference of Biomechanics, Madras	Feb.22-24, 1996

**4.2.9 Special Lecture(s) Delivered**

S.No.	Name of Faculty	Topic of Lecture	Delivered at	Date
01.	Dr.S. Swamamani	Vibration Measurement and Testing-Instrumentation Case Studies	Short Term Course at Ocean Eng. Centre, IIT Madras	5-16, June 1995
		Tissue Characterization	Technology Appreciation Programme at IIT Madras	16th August 1995

S.No.	Name of Faculty	Topic of Lecture	Delivered at	Date
02.	Dr.V. Ramamurti	Cyclic Symmetry	Georgia Tech.	Sept. 1995
		Cyclic Symmetry	Univ. of Colorado, Boulder	Sept. 1995
		Dynamics of Turbo Charges	Univ. of New Foundland, St. Goams	Sept. 1995
		Cyclic Symmetry	Univ. of Texas, Austin	Oct. 1995
		CAD-Indian Scenario	Seth Memorial Lecture, ISTAM Congress, Bhip	15th Dec. 1995
		CAD-Indian Scenario	INSA Award Lecture, Gurunanak Dev.Univ.	27th Dec. 1995
03.	Dr. S.Narayanan	Chaos in nonlinear dynamical systems-Recent developments	RCI, Hyderabad	13-14.Oct. 1995
04.	Dr.C. Sujatha	Random Vibration Testing-case Studies	RCI, Hyderabad	Nov. 1995
05.	Dr.K.M. Patil	Online walking foot-pressure measurements in normal and Leprosy patients	Satyabama Eng. College, Madras	17th May 1995
06.	Dr.Megha Singh	Lasers in Medical Diagnostic	Dept.of Physics, Anna Univ.Madras	Dec. 1995
		Aggregation and deformability of erythrocytes	Dept.of Biochem. Madras Univ.	Dec 1995
07.	Dr.S.Radhakrishnan	Assessment & clinical studies of scoliosis	IC & SR, IIT Madras	Aug. 1995
08.	Dr.M.Ramasubba-Reddy	Biosignal Acquisition and Analysis	Satyabama Eng. College, Madras	17th May 1995
		Expert Systems and Medical Diagnosis	S.R.M. College of Engg. Madras	June 3, 1995
		New trends in Computer applications in Biomedical Signal Processing	ICSR, IIT Madras	August, 1995

#### 4.2.10 Visits Abroad

S. No.	Name of Faculty	Country visited	Date	Purpose of visit
01.	Dr. V.Ramamurti	U.S.A.	Sept. '95	15th ASME Bienal Vibration Conference, 1995
02.	Dr.P.A. Aswatha Narayana	U.S.A.	July 13th - 17th 1995	9th International Conference on Numerical Methods in Laminar and Tubulent flow

#### 4.2.11 Distinguished Visitors to the Department (Important dignitaries above the level of Professors)

S. No.	Name of the Visitor and Occupation	Date of visit	Purpose (Lecture/Discussion)
1.	Dr. R. Seshadri Faculty of Engg. & App. Science Memorial Univer. of Mewfoundland St. John's, Newfoundland Canada	December 7 - 11, 1995	Lecture-cum-visit
2.	Prof.K. Matsuno Dept of Bioengineering Nagaoka Univ. Technology Nagaoka, Japan	March 2-4, 1996 1996	Lecture-cum-visit

#### 4.2.13 Sponsored projects

S. No.	Title	Perfod	Funding Agency	Amount (lakhs)	Co-ordinator(s)
01.	Augmentation of vortex formation during discharge of liquids from container due to disturbances induced on the liquid	3 yrs	ICSR-ISRO	2.88	Dr.B.H.L. Gowda Dr.S. Swamamani
02.	Dynamic test facility	2 yrs	NIOT	35.00	Dr.S. Narayanan Dr. Meher Prasad Dr.S. Swamamani
03.	Design and Development of micromachined silicon accelerometers	2 yrs	DRDO	24.75	Dr.K.N. Bhat Dr.P.R.S. Rao Dr.B. Rama Bhat Dr.B.S. Prabhu Dr.S. Swamamani

S. No.	Title	Period	Funding Agency	Amount (lakhs)	Co-ordinator(s)
04.	Statistical energy analysis prediction of structural acoustic response of launch vehicle structures	2 yrs	ISRO	8.5	Dr.S. Narayanan Dr.S. Swamamani
05.	Performance monitoring of Wave energy power module Phase-II Vibration and Noise	1 yr	NIOT	9.775	Dr.B.S. Prabhu Dr.S. Swamamani Dr.V.Jagadeesh Kumar
06.	Development of micromachined silicon sensors for mechanical and Biomedical applications	2 yrs	TAPTEC	20.00	Dr.B. Rama Bhat Dr.B.S. Prabhu Dr.S. Narayanan Dr.S. Swamamani Dr.C. Sujatha
07.	Development of Metal Matrix Composite Products for Automotive Applications	3 yrs	MHRD(under TDM)	-	85.00 Dr.R. Palaninathan Dr.C.V. Gokulrathnam, Dr.G. Santhanakrishnan
08.	Automatic and adaptive grid generation for engineering analysis	2 yrs	ARDB	7.45	Dr.T.Sundararajan Dr.K.N.Seetharamu Dr.P.A.Aswatha Narayana  Dr.N. Sivaprasad
09.	Development of a software for space craft technical analysis using the finite element methods	3 yrs	ISRO	4.92	Dr.K.N. Seetharamu Dr.T. Sundararajan Dr.P.A. Aswatha Narayana
10.	Development of an operational level storm surge model	1 yr	NIOT	3.83	Dr.R.Mahadevan Dr.P.A.Aswatha Narayana
11.	Acoustic Emission Studies on Aerospace Materials	2 yrs	ISRO	3.00	Dr.S.K. Malhotra Dr.R. Krishnamurthy Dr.G. Santhanakrishnan
12.	Studies on Machining of FRP	2 yrs	ISRO	4.50	Dr.S.K. Malhotra Dr.R. Krishnamurthy Dr.G. Santhanakrishnan

#### 4.2.13 Major Consultancy Assignments

S. No.	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
1.	Analytical/ Experimental Investigation on the Dynamic Behaviour of Combined performance Test Rig	C.V.R.D.E. Avadi, Madras-54	42,000	Dr.V.Ramamurti Dr.S.Swamamani

S. No.	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
2.	Seismic Test on 220 kV Isolator	Switchgear Mfg. Co., Hyderabad	40,000	Dr.S.Narayanan Dr.N.Ganesan Dr.S.Swamamani
3.	Measurement of frequency and Damping Ratios of HP and LP Rotors	Nuclear Power Corporation,	30,000	Dr.V.Ramamurti Dr.C.Sujatha Bombay
4.	Seismic Test on AB Isolator	AMEI Power Ltd., Hyderabad-34	78,000	Dr.S.Narayanan Dr.N.Ganesan Dr.S.Swamamani
5.	TAPS Unit No.1 Turbine Generator Supporting Structures and Soil Effect Analysis	Nuclear Power Corporation, TAPS, Thane, PIN: 401 504	30,000	Dr.V.Ramamurti
6.	Seismic Test on 2-Unit Arrester	W.S.Industries (India) Ltd., Porur,Madras-116	21,000	Dr.S.Narayanan Dr.N.Ganesan Dr.S.Swamamani
7.	Checking Finite Element Analysis	Micro CAD Systems, Madras-86	3,000	Dr.V.Ramamurti
8.	Earthquake Test on Transformers	Hivoltrans Electricals P.Ltd., Halol, Gujarat-389 350	84,000	Dr.S.Narayanan Dr.S.Swamamani Dr.B.S.Prabhu
9.	Seismic Testing of 245 kV Breaker	Asea Brown Boveri Ltd., Vadodara, PIN: 390 001	24,000	Dr.S.Swamamani Dr.N.Ganesan Dr.C.Sujatha
10.	Mechanical Endurance Test on 36kV Outdoor VCB	S&S Power Switchgear Ltd., Madras-600 116	18,000	Dr.S.Narayanan Dr.S.Swamamani
11.	Measurement of Natural frequency for Torsional Vibration Dampers	Vibromech Engineers Ltd., Madras-600 096	2,000	Dr.V.Ramamurti

S. No.	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
12.	Seismic Test on 390 kV 10 KA Lightning Arresters	Oblum Electrical Industries P.Ltd., Hyderabad-500 037	25,000	Dr.V.Ramamurti Dr.S.Swamamani
13.	Seismic Testing of 245 kV CVT	Crompton Greaves Ltd., Nasik-422010	25,000	Dr.S.Narayanan Dr.B.S.Prabhu
14.	Measurement of Natural Frequency of Vibration Damper	Vibromech Engineers and Services Ltd., Madras-600 096	1,500	Dr.V.Ramamurti Dr.C.Sujatha
15.	Determination of Natural Frequency and Damping Ratios of Turbine Blade	Nuclear Power Corporation [MAPS], Bombay	18,000	Dr.V.Ramamurti Dr.C.Sujatha
16.	Design and Development of FZG Lubricant Tester	DUCOM, Bangalore-560 058	10,000	Dr.B.S.Prabhu
17.	Stress Analysis of Legs, Socket and Grid	M.K.Electric (India) Limited, Madras-600 040	25,000	Dr.V.Ramamurti
18.	Vibration Measurement on Tracked Vehicle	CVRDE, Avadi, Madras-600 054	15,000	Dr.C.Sujatha
19.	Mech. End. Test on 12 kV/1250A/20KA VCB	S&S Power Switch-gear Ltd., Madras 116	12,000	Dr.S.Narayanan Dr.S.Swamamani Dr.N.Ganesan
20.	Acoustic Evaluation of Key Board Switches Designs	Armaan Electric Ltd. Gummidipundi-601201	3,500	Dr.S.Swamamani
21.	Noise Level Test for Ductline Impellers	Nadi Airtechnics, H.J.J.Engineers, Bangalore-560 024	22,000	Dr.S.Swamamani Dr.S.Narayanan
22.	Vibration Test of Transformer Box	Lambda Electric P.Ltd., Madras-600 041	21,000	Dr.S.Swamamani Dr.C.Sujatha Dr.N.Ganesan

No.	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
1	Natural Frequency Measurement of Axial Flow Fan	Auto Parts and Accessories, Ambattur, Madras	3,000	Dr.S.Swamamani Dr.C.Sujatha
2	Vibration Problems Associated with Phosphoric Acid Plant Rock Grinding Mill	Southern Petrochemical Industries Corporation Ltd., Tuticorin-628 005	5,000	Dr.V.Ramamurti
3	Seismic Testing of CT	W.S.Industries (I) Ltd., Bangalore	48,000	Dr.V.Ramamurti Dr.S.Swamamani Dr.C.Sujatha
4	Dynamic Analysis of Drive Chain	Liquid Propulsion Systems Centre, Mahendragiri, PIN: 627 133	52,000	Dr.V.Ramamurti
5	Natural Frequencies Determination of Bladed Discs of HP Rotor and LP Stage I&II	Nuclear Power Corporation, Bombay-400 094	50,000	Dr.V.Ramamurti
6	Stress Analysis of LA of Key Switch	Armaan Electric Ltd., Gummidipundi 601 201	5,000	Dr.V.Ramamurti
7	Seismic Test on 216 kV Lightning Arresters	Oblum Electrical Industries P.Ltd., Hyderabad-500 037	25,000	Dr.S.Narayanan Dr.S.Swamamani Dr.Dr.G.Santhana-krishnan
8	Natural Frequency Determination of Vibration Dampers	Vibromech Engineers & Services Ltd., Nandanam, Madras-35	2,500	Dr.V.Ramamurti Dr.S.Swamamani
9	Seismic Testing of 138 kV Arrester	W.S.Industries (India) Limited, Porur, Madras-116	25,000	Dr.S.Swamamani Dr.C.Sujatha Dr.G.Santhana-krishnan



S. No.	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
32.	Analytical and Experimental Stress Analysis of Sugar Mill Stands	The Indian Sugar and General Engineering Corporation, New Delhi-65	70,000	Dr.V.Ramamurti Dr.S.Swamamani
33.	Vibration Measurement at Kaiga	Nuclear Power Corporation, Kaiga	30,000	Dr.V.Ramamurti Dr.C.Sujatha
34.	Seismic Testing of Breakers	Crompton Greaves Ltd., Nasik, PIN: 422 010	50,000	Dr.S.Swamamani Dr.N.Ganesan Dr.G.Santhana-krishnan
35.	Frequency Testing of Damper Assembly	Autolec Mfg. & Marketing Co.Ltd., Ambatur, Madras-58	2,000	Dr.S.Swamamani
36.	Frequency Analysis of Axial Fans	Auto Parts and Accessories, Ambattur, Madras-98	7,000	Dr.C.Sujatha Dr.V.Ramamurti
37.	Seismic Test on 198 kV Arrester	W.S.Industries (India) Ltd., Madras-116	25,000	Dr.S.Swamamani Dr.V.Ramamurti Dr.G.Santhana-krishnan
38.	Torque Measurement on Gear Boxes	The K.C.P.Limited, Madras-19	16,000	Dr.V.Ramamurti Dr.S.Swamamani
39.	Seismic of Lightning Arrester	Crompton Greaves Ltd., Nasik-422010	25,000	Dr.S.Swamamani Dr.B.S.Prabhu Dr.G.Santhana-krishnan
40.	Technical Clarification on Dynamic Receiver	The Commissioner of Customs, Custom House, Madras	1,500	Dr.S.Swamamani
41.	Opinion of the items imported	Arul Mariamman Textiles Limited, Pollachi, 642 002	1,500	Dr.V.Ramamurti Dr.M.Balakrishnan Dr.S.Swamamani
42.	Noise Measurement on DC Power System	Elcot Power Controls Limited, Thiruvanniyur, Madras	3,000	Dr.S.Swamamani Dr.S.Narayanan

S. No.	Title	Organisation	Amount Rs. in (Lakhs)	Co-ordinator(s)
43.	Stress Analysis of Atomospheric Distillation Column	Madras Refineries Ltd., Madras	0.40	Mr.G. Thomas
44.	Investigation of 45" Tyre Curing Press	L & T-Mcneil Ltd. Madras	0.40	Mr.G. Thomas
45.	Structural Integrity Assessment of Control Plug Mockup	IGCAR Kalpakkam	7.20	Mr.G. Thomas
46.	Failure Analysis of Mud-gum bearing	M/s Usha Ispat Maharashtra	0.25	Dr.N.Sivaprasad Mr.G. Thomas
47.	Investigation of leakage in Vacuum Oven	India (Furnaces) Instruments, Madras	0.02	Mr.G. Thomas
48.	Trouble shooting and calibration of load cell	IGP Engineers Madras	0.02	Mr.G. Thomas
49.	Calibration of orifice Plates	Bells Controls Ltd., Madras	0.45	Dr.J.Lakshmi-narasimhan
50.	Calibration of Cup type Anemometers	Devices & Systems Madras	0.10	Dr.J.Lakshmi-
51.	Calibration of Vane type Anemometers	CETL, Kakkalur	0.05	Dr.V. Ramjee
52.	Aerodynamic force measurement on Nose cap models	DRDL,Hyderabad	0.50	Dr.M.Balakrishnan
53.	Flow studies of Electrostatic Precipitators	ACC Babcock	1.00	Dr.M.Balakrishnan Dt.J.Lakshmi-narasimhan Dr.S.S.Gokhale

#### 4.2.14 Honours and Awards

S.No.	Name of Faculty	Honours/Awards	Purpose
1.	Dr.V.Ramamurti	INSA Syed Hussain Zaheer Medal, 1995	Engineering & Technology
2.	Dr.S.Swamamani	Mrs.Meera Paul Memorial Award to H.Sujana for the Best Student Paper in Medical Acoustics co-authored by Dr.S.Swamamani, 1995  Dr.Chawla Award to Dr.Arunachalam (Co-authored by Dr.S.Swamamani) for Best Paper Dissertation	In Acoustical Society of American Regional Chapter, Madras, 1995  Annual Conference on Periodontology, Jan.'95
3.	Dr.P.A.Asawatha Narayana	Dr.M.G.Deshpande Memorial Prize	Best paper in 22nd National Conference in FM & FP
4.	Dr. Megha Singh	Member-World Council of Biomechanics Marquis' Who's Who in the World  Honorary membership of Chinese Society of Microcirculation	
5.	Dr.S.Radhakrishnan	Co-author of 2nd best student paper award in 5th NCB	
6.	Dr.M.Ramasubba Reddy	Coauthored a paper - Won First best student paper award in 5th NCB  Coauthored a paper - won Second best student paper award in 5th NCB	

#### 4.2.15 Books/Monographs Published

S.No.	Name of Faculty	Title	Publisher
01.	Dr.V.Ramamurti	Revised and Enlarged Computer Aided Mechanical Design and Analysis	Tata McGraw Hill, New Delhi, 1996.

S.No.	Name of Faculty	Title	Publisher
02.	Dr.V. Ganesan and Dr.P.A.Aswatha Narayana	Proc. 22nd National Conference on Fluid Mechanics and Fluid Power	BI Publications, Mount Road, Madras
03.	Dr. Megha Singh and V.P. Saxena	Advances in Physiolo- gical Fluid Dynanmics	Narosa, New Delhi - 1996
04.	Dr.S.Radhakrishnan and Dr.M.Ramasubba Reddy	Current Trends in Biomedical Engg.	Allied Publishers Limited, 1996

#### 4.2.16 Research Publications

1. V.Ramamurti, Comparison of semi analytic and cyclic symmetric approaches, Computers and Structures, V 54, n6, pp. 1105-1111 1995.
2. V.Ramamurti, D.Subramani and K.Sridhara, Dynamic analysis of turbo charger centrifugal compressor impeller, Mechanism and Machine Theory, V 30, n4, pp. 619-628 1995.
3. D. R. Al Ansary, N. U. Khan, V. Ramamurti, On the role of Rayleigh damping, Jl. Sound and Vibration, V 85, n2, pp. 207-218 1995
4. P. Arumugam, S. Swarnamani and B. S. Prabhu, Experimental identification of linearised oil film coefficients of cylindrical and tilting and bearings, Jl. of Engg. for Gas Turbines and Power (ASME), V 117, pp. 593-599 1995.
5. A.Joseph Stanley and N.Ganesan, Impulse Response of cylindrical Shells with a discontinuity in the thickness subjected to an axisymmetrical load, Jl. of Sound and Vibration, V 184, pp. 369-387, 1995.
6. A.Joseph Stanley and N.Ganesan, Dynamic response of cylindrical shells with discontinuity in thickness subjected to axisymmetrical load, Jl. of Sound and Vibration, V 184, pp. 703-724, 1995.
7. A.Joseph Stanley and N.Ganesan, Dynamic response of cantilever cylindrical shells with discontinuity in thickness subjected to axisymmetric load, A. Computers and Structures, V 55, pp. 667-685, 1995
8. A.Joseph Stanley and N.Ganesan, Impulse response of beams with discontinuity in thickness subjected to a point load, Jl. of Sound and Vibration, V. 181, pp. 391-400, 1995.
9. A.Joseph Stanley and Dynamic response of cantilever beams with discontinuity in thickness subjected to a point load, Computers and Structures, V 54, pp. 167-176, 1995.
10. A.Joseph Stanley and N.Ganesan, Deformation of orthotropic cylindrical shells with discontinuity in thickness subjected to asymmetric loading, Composite Structures, V30, 69-83, 1995.

11. P.K.Roy and N.Ganesan, Studies on the dynamic behaviour of a cantilever beam of varying thickness subjected to an end moment, *Jl of Sound and Vibration*, V 180, pp. 89-97, 1995.
12. Studies on the dynamic behaviour of square plate with varying thickness, P. K. Roy and N. Ganesan, *Jl. of Sound and Vibration*, V 182, pp. 355-367, 1995.
13. N. Madhusudhana, B. P. Gautham, N. Ganesan, Buckling behaviour of uniformly and non-uniformly pre twisted beams, *Computers and Structures*, V54, pp. 551-556, 1995.
14. T.C.Ramesh and N.Ganesan, Influence of Constrained damping layer on the resonant response of orthotropic cylindrical shells, *Jl. of Sound and Vibration*, V 185, pp. 483-500, 1995.
15. S. Kumaresan, S. Radhakrishnan and N. Ganesan, Generation of geometry of closed human head and discretisation for finite element analysis, *Medical and Biological Engg. and Computing*, V 33, pp. 349-353, 1995.
16. A.S.Sekhar and B.S.Prabhu, Effects of coupling misalignment on vibrations of rotating machinery, *Jl. of Sound and Vibration*, V 185, 4, pp. 655-671 1995.
17. B.S.Prabhu and A.S.Sekhar, Severity estimation of cracked shaft vibrations within fluid film bearings, *Tribology Transactions (STLE)*, V 38, pp. 583-588 1995.
18. A.S.Sekhar and B.S.Prabhu, Condition Monitoring of cracked rotors- a comparative study of fluid film bearing supports, *Machine Vibration*, V 3, n4 1995.
19. S. Narayanan and P. Sekhar. "Periodic and chaotic responses of a sdof system with piece wise linear stiffness to combined harmonic and flow induced excitations" *J. Sound and Vibration*, 182(5), pp. 1-32, 1995.
20. S. Narayanan and P. Sekhar. "Bifurcation and Chaos in contact vibrations". *Nonlinear Dynamics : New theoretical and applied results* Edited by Jan Awrejcewicz, pp. 376-392, Academic Verlag., 1995.
21. C. Sujatha, P. V. Bhaskara Rao and S. Narayanan. "Whole body vibration exposure in Indian buses" *Heavy vehicle systems special series, Int. j. of Vehicle design*, Vol 2, pp. 12-24, 1995.
22. Subramanian, V.Ramamurti and K.Sreedhara, Finite element analysis of an automotive turbocharger turbine rotor, Presented at the 15 th ASME Biennial Vibration conference, 1995.
23. H. Sujana, S. Swarnamani, Sheila John and S. Suresh, Ultrasonic image parameters for differentiating intraocular, *Proc. I Regional Conf. IEEE, EMNS and 14th Conference of Biology Society of India, Delhi, Feb. 15-18, 1995.*
24. P.Arumugam, S.Swamamani and B.S.Prabhu, The transient response of a cracked rotor system passing through critical speed, *The International Conference on Mechanics of Solids and Materials Engineering, Singapore, June 5-7, 1995.*
25. Prakash Kamath, K. Gopinath and S. Swarnamani, Vibration and noise to monitor failure in rolling contact fatigue testing, 9 th World Congress, IFTOMM, Italy, Aug. 30-Sep. 2, 1995.
26. Sheila John, H. Sujana, S. Swarnamani, S. Suresh, K. Biswas and S. S. Badhrinath Tissue characterisation of malignant melanoma using ultrasound wave spectral analysis - presented at Annual Meeting of American Academy of Ophthalmology, Oct., 1995.

27. V.Krishnakumar and S. Swarnamani, D. M. Reddy and K. Mukhopadyay, Sliding wear studies of plasma sprayed Al<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub> ceramics in dry and lubricated contacts, accepted for presentation at Int. Conf. on advances in Mechanical Engineering (ICAME), Bangalore, Dec. '95.
28. P.Arumugam, S.Swarnamani and B.S.Prabhu, Vibration of a cracked rotor system with different types of journal bearing, Proc. of International Conference on Advances in Mechanical Engineering (ICAME), IISc, Bangalore, Dec. 20-22, 1995.
29. Mahesh Bhat, V.Ramamurti and C.Sujatha Studies on Determination of Natural frequencies of Industrial Turbine Blades, presented at the 15th ASME Biennial Vibration conference, 1995.
- 29A. P.Arumugam, S.Swarnamani and B.S.Prabhu, Effects of coupling misalignment on the vibration characteristics of a two stage turbine rotor, Proceedings of the 15th ASME Biennial Conference on Mechanical Vibration and Noise and the Design Technical Conference, Boston, Massachusetts, USA, Sept. 17-21, 1995.
30. A.S.Sekhar and B.S.Prabhu, Condition monitoring of cracked rotors through transient response, Proceedings of International Conference on Advances in Mechanical Engineering (ICAME), IISc, Bangalore, Dec. 20- 22, 1995.
31. V.Ramamurti, H.V.Nayak and C.Sujatha, Static and dynamic analysis of spur and bevel gears using FEM, V. Ramamurti, H. V. Nayak and C. Sujatha, Proc. International Conference on Advances in Mechanical Engineering, Dec. 20-22, 1995, Bangalore, India, pp. 1291-1313.
32. S. Senthil and S. Narayanan. "Stationary response of a four dof vehicle model with look ahead preview". In the Proc. of Int. Conference on Mechanical Engineering held at IISc Bangalore pp. 995- 1005, Narosa Publications House, New Delhi, 1995.
33. S.V.Muthukrishna Selvam and C.Sujatha, Twist drill deformation and Optimum drill geometry, Computers and Structures, V 57, n5, pp. 903- 914 1995.
34. M.Subrahmanyam and C.Sujatha, Tool Wear recognition in drilling through neural networks, Proc. International Conference on Advances in Mechanical Engineering, Dec. 20-22, 1995, Bangalore, India, pp. 603- 623.
35. E.G. Tulapurkara, V. Ramjee & Jacob George, "Experiments of Fluids, 1995, Vo.18, pp.311-318, Development of bluff body wake under the combined influence of curvature and pressure gradient.
36. V. Ramjee, E.G. Tulapurkara & Jacob George, 22nd FMFP Conference, Dec. 1995 pp.162-167, "Comparison of wakes developing in diffusers".
37. K. Velusamy & V. Ramjee, 22nd FMFP Conference, Dec. 1995, IIT Madras, "Laminar mixed convection in vertical semi-elliptical ducts", pp.168- 176.
38. A.S. Sarma, A.K. Shenoy, T. Sundarajan, U.S.P. Shet & V. Ramjee, "Finite element simulation of 2D incompressible laminar jet flows", pp.387-393.
39. V. Ramjee, E.G. Tulapurkara & Jacob George, "Comparison of wakes developing in diffusers", 22nd FMFP Conference, IIT Madras, Dec. 1995 pp.162-167.

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110. S. Swarnamani, Ultrasonic tissue characterization, invited talk, Technology Appreciation Programme on Advances in Bio-Medical Engg. Applications, 16th Aug. 1995, I. I. T. Madras.
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## 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

#### Specialisation

##### Professors

M.S. Ananth, Ph.D(Florida)	Thermodynamics, Mathematical Modelling
A.R. Balakrishnan, Ph.D(Waterloo)	Heat Transfer, Computer Aided Design
M.Chidambaram, Ph.D(IIT Madras)	Non-Linear Control, Periodic operation of Reactors
Ch. Durgaprasada Rao, Ph.D(Andhra) [Head]	Mathematical Modelling, Computer Process Control
K. Krishnaiah, Ph.D(IIT Madras)	Chemical Reactor Analysis and Design, fluidization
T.K.Ramanujam, Ph.D(IIT Madras)	Environmental Engineering, Particle Technology
T. Panda, Ph.D(IIT Delhi)	BiochemicalEngineeringand BioTechnology, Protoplast Fusion Technology
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

D.V.S.Murthy, Ph.D(IIT Madras)	ParticleTechnology, Environmental Engineering
N.R. Neelakantan, Ph.D(Swansea)	Polymer Processing, Rheology
S.K. Rakshit, Ph.D (IIT, Delhi)	Biochemical Engineering and Biotechnology Downstream Processing
V.S.Ramachandra Rao, Ph.D(IIT Madras)	Internal Model Control, Adaptive Control
Shankar Narasimhan, Ph.D(North Western)	Computer aided design

**Name and Qualifications****Specialisation**

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

Chemical Reactor Analysis and Design,  
Rotary Kilns

S. Subba Rao, Ph.D(Connecticut)

Mass Transfer, CAD

T.Swaminathan, Ph.D(IIT Kanpur)

Environmental Management, Biotechnology,  
Membrane Technology

R. Vedaraman, Ph.D(IIT Madras)

Particle Technology, Mineral processing

**Assistant Professors**

J.Ravi Prakash, Ph.D(IISc)

Mechanics of Granular, Materials, Rheology

S. Sankaranarayanan, Ph.D(Queens Land)

Optimum Control of Grinding  
Circuits and other Mineral Beneficiation Process

Srinivas Jayanti, Ph.D(UK)

Computational Fluid Dynamics

**Adhoc Lecturer**

Sachin C Patwardhan Ph.D. (IIT, Bombay)

Process Control

**Emeritus Professor**

A. Baradarajan, Ph.D(IIT Madras)

Bio-reactors, Modelling of Bio-reaction processes,  
Solid- Solid reactions**4.3.3. Students on Roll**

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	1	1	3	1	9	2	9	-	15	2	37	6	43
M.S.	1	1	8	3	2	-	-	-	-	-	11	4	15
M.Tech.	19	-	19	3	-	-	-	-	-	-	38	3	41
B.Tech.	45	1	46	4	50	4	47	3	-	-	188	12	200
<b>Total</b>	<b>66</b>	<b>3</b>	<b>76</b>	<b>11</b>	<b>61</b>	<b>6</b>	<b>56</b>	<b>3</b>	<b>15</b>	<b>2</b>	<b>274</b>	<b>25</b>	<b>299</b>

#### 4.3.4. Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	Others	Total
Ph.D.	35	8	43
M.S.	14	-	14
M.Tech.	40	1	41
<b>Total</b>	<b>89</b>	<b>9</b>	<b>98</b>

#### 4.3.5. Number of Degrees Awarded

Programme	Number
Ph.D	4
M.S.	4
M.Tech.	16
B.Tech.	44
<b>Total</b>	<b>68</b>

#### 4.3.6. Short-term Courses/Workshops/Seminars/Symposia/Conferences Organised

S.No.	Co-ordinator(s)	Title of Course/Workshop/ Seminar/Symposia/Conference
1.	Dr.T.K. Ramanujam	Workshop on waste water treatment
2.	Dr. T.Swaminathan	Environmental Audit
3.	Dr.V.S.Ramachandra Rao & Dr.Sachin C Patwardhan	Short term course on System identification and Adoptive Control
4.	Dr.Y.B.G.Varma	Future Trends in Chemical Engineering

**4.3.8 Short-term Courses/Workshops/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.S. Jayanthi	National Conference on Fluid mechanics and Fluid power, IIT M	Dec.13-15, 1995
		2nd ASME - ISHMT Surathkal	Dec.28-30, 1995
2.	Dr.T.K.Ramanujam	Workshop on waste water treatment, Bangalore	Sept. 1995
		CHEMCON 95, Kalpakkam	Dec.27-30, 1995
		Int. Conference on Environmental Science, Trivandrum	Jan. 96
3.	Dr.V.S.Ramachandra Rao	CHEMCON 95, Kalpakkam	Dec. 27-30, 95
4.	Dr.S.S.Narayanan	Engineering Foundations Conference on particle Science & Technology, Pune	-
5.	Dr.A.R.Balakrishnan	ASME - ISHMT, Surathkal	Dec.28-30, 95
6.	Dr.T.Venkatram	ASME - ISHMIT, Surathkal	Dec.28-30, 95

**4.3.9 Special Lecture(s) delivered**

S.No.	Name of Faculty	Title	Delivered at	Period/Duration
1.	Dr.T.Panda	Introduction to Biochemical Engg.	Anna Univ. Madras.	Feb. 1996
		Curriculum development on Bioprocess engineering	IIT New Delhi	Feb. 1996
		Advances in Bio-chemical engg.	Annamalai Univ.	March 30, 96
2.	Dr.S.Subba Rao	Multicomponent Distillation	Anna Univ.	March 96
3.	Dr.DVS Murthy	Atmospheric Chemistry, Air Pollution and its effect noise poll.& its control	Ambedkar Instt. of Productivity	March 96

#### 4.3.10 Visits abroad

Sl. No.	Name of the faculty	Country Visited	Date	Purpose of Visit
1.	Dr.D.V.S.Murthy	Germany	1-6-95 to 31-8-95	DAAD
2.	Dr.V.S.Ramachandra Rao	Germany		DAAD

#### 4.3.11. Distinguished Visitors to the Department

Sl.No.	Name of the visitor and Occupation	Date of visit	Purpose of visit (Lecture/Discussion)
1.	Dr.David C. Wilson ERM, UK	10-3-95	Lecture
2.	Dr.R.Ravi Univ. of California, USA	17-3-95	Lecture
3.	Dr.Guhan Jayaraman Anna Univ. Madras	7-4-95	Lecture
4.	Prof.K.Sambamurthy Andhra Univ., Waltair	Jan. 96	Discussion
5.	Dr. S. Bedi Dupont, New Delhi	Jan. 96	Discussion
6.	Prof. Dinakar S Kompala Univ. of Colorado, USA	Jan. 96	Lecture
7.	Prof. V.S.Bisaria IIT New Delhi	Feb. 96	Discussion
8.	Prof. Gajendra Singh ICAR, New Delhi	Feb. 1996	Discussion
9.	Dr.J.R.Bandekar BARC, Bombay	Feb. 1996	Discussion
10.	Dr.A.Savitri NEPC Agro Food Ltd. MS	Mar. 1996	Discussion
11.	Dr.M. Jaya Sheela BCG Vacume Lab., Madras	Mar. 1996	Discussion

#### 4.3.12. Sponsored Projects

Sl. No.	Title	Funding Agency	Amount in lakhs	Coordinator(s)
1.	Robust Control of a M.S.F Desalination plant	IFFWSAT	7.30	Dr.M.Chidambaram
2.	Effect of surface roughness on Boiling Heat transfer	DAE	4.21	Dr.A.R.Balakrishnan Dr.V.M.K.Sastri
3.	Radially pulsed liquid Extraction Columns	DAE	5.10	Dr.A.R.Balakrishnan Dr.Y.B.G.Varma
4.	Alternative to CFCS	Indo-German	-	Dr.A.R.Balakrishnan Dr.S.S.Murthy
5.	Model Predictive control of Nonlinear Processes using Laguerre Models	AICTE	7.00	Dr.Sachin C Patwardhan
6.	Pilot plant studies on the production of activated carbon from coconut shells in a Fluidized Bed	CSIR	3.00	Dr.K.Krishnaiah
7.	Flow of coal through Bins and chuters	CBIP	4.30	Dr.TK Ramanujam
8.	Environmental Engg.	MHRD	10.00	-do-
9.	Evaluation of Bioreactors for Hazardous waste treatment	CSIR	4.25	Dr.T.Swaminathan
10.	Development of high productivity process for Lactic acid through membrane technology application	DBT	22.22	Dr.S.K.Rakshit Dr.T.Swaminathan
11.	Effect of Feed entry on Hydrocyclone performance	Germany		Dr.S.S.Narayanan



#### 4.3.13. Major consultancy Assignments

Sl. No.	Title	Funding Agency	Amount (in lakhs)	Coordinator(s)
1.	Modelling of gas pipe Network Trivandrum	ERDC	0.50	Dr.A.R.Balakrishnan Dr.Ch.D.P.Rao
2.	Maldistribution in radial EIL flow reactors		5.02	Dr.Y.B.G.Varma Dr.S.Subba Rao
3.	Assessment Reprot Insurance	United	0.10	Dr.Y.B.G.Varma
4.	Tar felt Manufacture	STD Ltd	0.10	Dr.Y.B.G.Varma
5.	Lubricating Oil	Excel Oils & Chemicals	0.05	Dr.Y.B.G.Varma
6.	150 TPD PFBC	BHEL	12.0	Dr.K.Krishnaiah Dr.V.M.K.Sastri Dr.A.K.Kolar
7.	Evaluation of project report on DEO	TIDCO	0.5	Dr.M.S.Ananth Dr.K.Krishnaiah Dr.P.S.T.Sai
8.	Analysis of Activated carbon	FCTC, Madras	0.05	Dr.K.Krishnaiah
9.	Feasibility studies on water	TAMIN	0.10	Dr.TK Ramanujam
10.	Studies on graphite flotation	TAMIN	0.10	- do -
11.	Development of Battery grade Nickel Hydroxide	TAFE	0.49	- do -
12.	Retainer consultancy	HITECH	0.12	- do -
13.	Test work on Haromog crusher	Birla Pariclase	0.3	Dr.S.S.Narayanan

#### 4.3.14. Research Publications

1. G. Muralikrishnan and M. Chidambaram, 'Control of a Bioreactor using a neural network model', Bioprocess Engineering, 12, 35-39, 1995.
2. M. Srinivas and M. Chidambaram, 'Fuzzy logic control of an unstable bioreactor', Bioprocess Engg.12, 135-139, 1995.

3. G.P. Reddy and M. Chidambaram, 'Nonlinear control of bioreactors with input multiplicities in dilution rate', *Bioprocess Engineering*, 12, 151-155, 1995.
4. K.B. Ramkumar and M. Chidambaram, 'Fuzzy self-tuned PI controllers for bioreactors', *Bioprocess Engineering*, 12, 263-267, 1995.
5. M. Subramaniam, A. Rajakumar and M. Chidambaram, 'Robust control of a nuclear reactor', *Control theory and Techn., (C-TAT)*, 10, 1531-1540, 1995.
6. M. Chidambaram, 'Design of PI and PID controllers for unstable first order plus time delay systems', *Hun. J. Ind. Chemistry*, 28, 123-127, 1995.
7. V. Midha and M. Chidambaram, 'Periodic operation of transport reactors for catalytic reactions', *Ind. J. Chem. Tech.* 2, 11-17, 1995.
8. M. Chidambaram and G.P. Reddy, 'Nonlinear IMC for systems with input multiplicities', *Ind.J.Chem. Tech.*, 2, 115-118, 1995.
9. M. Chidambaram, 'Design Formulae for PID controllers', *Ind. Chem. Engr.*, 37, 90-93, 1995.
10. B. Srinivas and M. Chidambaram, 'Robust control of a semi batch copolymerization reactors', *Ind. Chem. Engr.*, 37, 28-31, 1995.
11. M. Subramaniam, A. Rajakumar and M. Chidambaram, 'Evaluation of control loop interaction in liquid metal cooled nuclear reactors', *Ind. J. Chem. Tech.*, 2, 301-306, 1995.
12. G.P. Reddy and M. Chidambaram, 'Near optimal production by control of a continuous bioreactor', *IEE Process Design*, 142, 1995.
13. Ramana Vittal, P. Sundar and Ch. Durga Prasada Rao, 'The generalized PTD gradient descent back propagation Algorithm', *Neural Net works*, 8, 563-569, 1995.
14. T. Dayananda Rao, R.C. Panda and V.S. Ramachandra Rao, 'Estimation of particle moisture content from temperature measurements in a Fluidized Bed Dryer', *Ind. Chem. Engr.*, 7, 22-26, 1995.
15. M. Sadasivam and A.R. Balakrishnan, 'On the Effective Driving Force for Transport in cooling Towers', *Trans. ASME J. Heat Transfer*, 117, 512-515, 1995.
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17. C. Hari, K.S. Balaraman and A.R. Balakrishnan, 'Fluid catalytic cracking: Selectivity and product yield patterns', *Chem. Engg. Tech.*, 18, 364-369, 1995.
18. C. Srinivasa Kannan, P.P. Thomas and Y.B.G. Varma 'Drying of Solids in Fluidised bed', *Ind.Eng. Chem.Res.* 34, 3068, 1995.
19. M. Vinaya and Y.B.G. Varma, 'Some hydrodynamic aspects in Multistage bubble columns', *Bioprocess Engg.*, 13, 231, 1995.
20. Shiny Joseph and Y.B.G. Varma, 'Flow pattern and pressure drop in gas-liquid cocurrent downflow through packed beds', *Bioprocess Engg.*, 12, 215, 1995.

21. L. Pan, S.A. Fisher, S. Jayanti and G.F. Hewitt, 'Measurement and prediction of temperature rise following sudden compression in a high-pressure pipe line', *Trans. I.Chem. Engr.*, 73, 18-20, 1995.
22. A. Salkishan, M.B.Kishore and P.S.T. Sai, 'Suspension of solids in mechanically agitated contactors', *Hung. J. Ind. Chemistry*, 23, 113-118, 1995.
23. J.P. Bouchand, M.E. Cates, J. Raviprakash and S.E. Edwards, 'Hysterisis and Metastability in a continuum sand Pile model', *Phys. Rev. Lett.*, 74, 1982-85, 1995.
24. K.H. Radwan and T.K. Ramanujam, 'Treatment of Sugar cane waste waters using Modified Rotating Biological Contactor', *Ind. J. Env. Health*, 37, 77-83, 1995.
25. M. Velan and T.K. Ramanujam, 'Mixing time in Downflow jet loop Bioreactors', *Bioprocess Engg.*, 10, 81-86, 1995.
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28. K.S. Jayantha and T.K. Ramanujam, 'Applicability of Upflow Anaerobic Sludge Blanket (UASB) reactor for treatment of distillary spent waste', *Ind. J. Env. Protection*, 15, 106- 110, 1995.
29. K.S. Jayantha and T.K. Ramanujam, 'Start up criteria for a Upflow Anaerobic Sludge Blanket (UASB) reactor', *Bioprocess Engg.*, 13, 307-310, 1995.
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34. S.Sivakesava, S.K. Rakshit and T. Panda, 'Production of ethanol by Zymomonas mobilis - effect of batch step feeding of glucose and relevant growth factors', *Process Biochemistry*, 30, 41-47, 1995.
35. Nand Lal and T. Panda, 'Studies on Protein enrichment in Saw dust by Pleurotus Sajor-Caju', *Bioprocess Engg.*, 12, 163- 165, 1995.

36. Sushma R. Naik, S.K. Rakshit and T. Panda, 'Effect of Carbon sources on the Synthesis of pectinase by *Aspergilli*', *Bioprocess Engg.*, 13, 37-40, 1995.
37. D. Srinivas, K. Jagannadha Rao, K. Theodore and T. Panda, 'Direct conversion of cellulosic material to ethanol by intergeneric fusant *Trichoderma reesei* QM 9414 and *Saccharomyces Cerevisiae* NCIM 3288', *Enzyme and Microbial Technol.*, 17, 418-423, 1995.
38. K. Theodore and T. Panda, 'Application of response surface methodology to evaluate the influence of temperature, initial pH on the production of B-1,3- glucanase and carboxy methyl cellulose from *Trichoderma harzianum*, *Enzyme and Microbial Technol.*, 17, 1043-1049, 1995.
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40. K. Theodore and T. Panda, 'Self-directing optimization of B- 1, 3- glucanase production by *Trichoderma harzianum* in batch stirred tank Bioreactor', *Bioprocess Engg.*, 14, 111-112, 1996.
41. M. Shankar, G. Sasank Mohan, M. Babu Srinivas, S.S.Srinivas and T. Venkatram, 'Desalination of Brackish water by Membrane separation Techniques', *Ind. J. Chem. Tech.*, 3, 17-22, 1996.

## 4.4 Chemistry Department

### 4.4.1. Introduction

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

Analytical and Nuclear Chemistry  
Organic Chemistry  
Biochemistry  
Photochemistry  
Electrochemistry  
Inorganic Chemistry

Catalysis  
Polymer Chemistry  
Chemical Kinetics  
Spectroscopy  
Theoretical Chemistry

### 4.4.2. Details of Faculty

#### Name and Qualification

#### Specialisation

##### Professors

K.K.Balasubramanian, Ph.D.(Madras)

Synthetic and Mechanistic Organic Chemistry

M.S.Gopinathan, Ph.D.(IIT Kanpur)

Quantum Chemistry, Theoretical Chemistry, Molecular Spectroscopy, Nonlinear Dynamics and Chaos

T.V.Ramakrishna, Ph.D.(Birmingham)

Analytical and Environmental Chemistry

D.V.Ramana, Ph.D.(IIT Madras)

Organic Mass Spectrometry, Synthetic Organic Chemistry

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

Electrochemistry, Oscillatory Reactions

C.S.Swamy, Ph.D.(IISc)

Heterogeneous Catalysis, Metal Hydrides, Clays

M.R.Udupa, Ph.D. (IIT Madras)(Head)

Coordination Chemistry, Solid State Chemistry

C.S.Venkatachalam, Ph.D.(IIT Madras)

Electrochemistry, Mechanism of Electrode Reactions

B.Viswanathan, Ph.D.(IIT Madras)

Surface Science, Materials Science

##### Professors (Adjunct)

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

Theoretical Chemistry, Spectroscopy

**Name and Qualification****Specialisation**

S.Subramanian,Ph.D.(Leicester)

Magnetic Resonance, Theoretical Chemistry

Surjit Singh,Ph.D.(IIT Kanpur)

Molecular Spectroscopy. Theoretical Chemistry

**Associate Professors**

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

Analytical and Environmental Chemistry

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

Biochemistry, Microbiology

K.Lalitha,Ph.D.(Mysore)

Biochemistry, Biotechnology

M.N.Sudheendra Rao,Ph.D.(IISc)

Inorganic Heterocycles, Chemistry of Main Group Elements

S.Vancheesan,Ph.D.(IIT Madras)

Homogeneous Catalysis, Organometallics

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

Heterogeneous Catalysis

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

Solid State Chemistry, Material Science

**Assistant Professors**

Archita Patnaik,Ph.D.(BHU)

Nuclear Spectroscopy, Ion Implantation

R.Dhamodharan,Ph.D.(Massachusetts)

Polymer Surface Structure and Properties, Polymer Adsorption

Indrapal Singh Aiden,Ph.D.(Pune)

Synthetic Organic Chemistry, Carbohydrate Chemistry

D.Loganathan,Ph.D.(IIT Bombay)

Synthetic Organic Chemistry, Carbohydrate Chemistry

K.Mangala Sunder,Ph.D.(McGill)

Theoretical Chemistry, Spectroscopy, Chemical Reaction Dynamics

A.K.Mishra,Ph.D.(IIT Kanpur)

Photophysics, Photochemistry

T.Pradeep,Ph.D.(IISc)

Chemical Physics, Spectroscopy

P.Rajakumar,Ph.D.(Madras)

Synthetic Organic Chemistry

G.Ranga Rao,Ph.D.(IISc)

Heterogeneous Catalysis, Surface Science

M.V.Sangaranarayanan,Ph.D.(IISc)

Electrochemistry, Mathematical Modelling

S.Sankararaman,Ph.D.(Victoria)

Synthetic and Physical Organic Chemistry, Organic Photochemistry

Name and Qualification	Specialisation
M.S.Subramanian, Ph.D.(IIT Madras)	Radioanalytical Chemistry
N.Sundaram, Ph.D.(IIT Madras)	Organic Mass Spectrometry, Organic Synthesis and Reaction Mechanism
G.Sundararajan, Ph.D.(Rutgers)	Organometallics, Polymer Synthesis, Asymmetric Synthesis
K.Vidyasagar, Ph.D.(IISc)	Solid State Chemistry
R.P.Viswanath, Ph.D.(IIT Madras)	Heterogeneous Catalysis

During the year under review the following faculty members were recruited.

Dr R.Dhamodharan, Ph.D(Massachusetts)  
 Dr Indrapal Singh Aidhen, Ph.D(Pune)  
 Dr Managalasunder, Ph.D(McGill)  
 Dr T.Pradeep, Ph.D(IISc)  
 Dr P.Rajakumar, Ph.D(Madras)  
 Dr G.Ranga Rao, Ph.D(IISc)

During the year under review the following faculty members retired after superannuation.

Dr P.T.Manoharan  
 Dr D.V.Ramana  
 Dr T.K.K.Srinivasan

#### 4.4.3 Students on Roll

Pro-gramme	I Year		II Year		III Year		IV Year		I Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	7	6	8	8	13	10	12	7	22	16	62	47	109
M.Sc.	18	11	15	8	-	-	-	-	-	-	33	19	52
<b>Total</b>	<b>25</b>	<b>17</b>	<b>23</b>	<b>16</b>	<b>13</b>	<b>10</b>	<b>12</b>	<b>7</b>	<b>22</b>	<b>16</b>	<b>95</b>	<b>66</b>	<b>161</b>

#### 4.4.4 Number of Scholarship/Fellowship holders

Programme	Institute	CSIR Fellowship	Others	Total
Ph.D	62	23	16	101
M.Sc.	16 (merit scholarship) 6 (free studentship)	-		22
<b>Total</b>	<b>84</b>	<b>23</b>	<b>16</b>	<b>123</b>

#### 4.4.5 No. of Degrees Awarded

Programme	Number
Ph.D	19
M.Sc	23
<b>Total</b>	<b>42</b>

#### 4.4.6. Instruments/Equipment Designed and Developed

1. Schlenkline and hydrogenation apparatus was designed to carry out reaction under anaerobic conditions.
2. Attaching a quadrupole mass spectrometer and a FTIR spectrometer to the beam port of a variable energy cyclotron was designed for IUC-Calcutta.

#### 4.4.7. New facilities added and major equipment procured

1. Preparative gas chromatograph
2. IBM Workstation and LAN
3. Autoclave from PARR Instruments
4. Inert/Atmosphere box (Glove box)
5. Deep freezer (-70°C)
6. Temperature controlled Incubator
7. Glucose Bio analyser
8. Rotary flash evaporators
9. Vacuum oven
10. UV-Vis spectrophotometer
11. Liquid N<sub>2</sub> transfer device to the existing nuclear spectroscopy system.
12. INSREF constant temperature water bath (0.01°C).
13. Waters gel permeation chromatograph.
14. HP Pentium PC and HP Laser jet printer.
15. Programmable temperature controllers and furnaces.



#### 4.4.8 Seminars/Conferences/Short-Term Courses Conducted

1. In-House Seminar-95: October 07, 1995 (A one-day seminar programme by the faculty of the department).
2. CHEMISTS' MEET-95: December 15-16, 1995. A two days seminar programme consisting of plenary lectures, paper presentation and poster presentations. Researchers from Academic Institutions and Industrial R & D Laboratories in and around Madras participated.
3. Short-Term Course on "Advances in Photochemistry" conducted during December 11-22, 1995.

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

S.No.	Name of Faculty	Title	Period/Duration
1.	Dr K K Balasubramanian	15th International Congress of Heterocyclic Chemistry Taipei, Taiwan	Aug 6-11, 1995
		National Seminar on Chemical Education Loyola College, Madras	Nov 23-25, 1995
		5th NOST Symposium Tirupathi	Dec 2-5, 1995
		QIP short-term course on Recent Advances in Photochemistry, IIT Madras	Dec 14, 1995
		Symposium on challenges in organic synthesis, IACS, Calcutta.	Jan 29-30, 1996
		Regional Seminar on Current Trends in Heterocyclic Chemistry Gandhigram University	Feb 27, 1996
		UGC Refreshers Course at Cochin Uni.	March 7-8, 1996
2.	Dr D V Ramana	International Mass Spectrometry Conferences.	June 6-9 1995
3.	Dr R Ramaswamy	Recent Developments in the Science & Technology of Rare Earths, Ernakulam, Cochin.	December 14-16, 1995

S.No.	Name of Faculty	Title	Period/Duration
4.	Dr B Viswanathan	National Workshop on Catalysis, CSMCRI, Bhavnagar	Dec 20-22, 1995
		National Seminar on Catalysts for Synthetic Fuels and Pollution Control, Anna Uni.Madras	Jan 23-25, 1996
5.	Dr T S Chandra	Annual Conference of AMI Hisar, Haryana	Nov 1995
		ISMAR, 12th International Conference, Sydney, Australia	Jul 16-21, 1995
6.	Dr M N S Rao	Recent Advances in Stereochemistry, Vivekananda College, Madras	Dec 1, 1995
		UGC Refreshers Course in Chemistry, Mysore University	Dec 26-27, 1995
7.	Dr Archita Patnaik	Vith DAE Appreciation Course, IGCAR, Kalpakkam	Jan 29-Feb.9 1995
		Physics of thin films, Cochin Univ. Cochin	Nov 23-25, 1995
		National Seminar on Solid State Physics, Jadavpur Univ. Calcutta	Dec 26-30, 1995
8.	Dr D Loganathan	National Seminar on Chemical Education & Research, Loyola College, Madras	Nov 23-25, 1995
9.	Dr A K Mishra	International Conference on Spectroscopy, Perspectives and Frontiers, BARC, Bombay	Jan 1996
		Trombay Symposium on Radiation and Photo-Chemistry BARC, Bombay	Jan 1996
		32nd Annual Convention of Chemists, Jaipur	Dec 1995
		XIth National Symposium of the Indian Photobiology Society Pondicherry	Nov 1995
		Short-term course on Advances in Photochemistry	Dec 11-12, 1995

S.No.	Name of Faculty	Title	Period/Duration
10.	Dr S Sankararaman	5th NOST Conference, Tirupathi	Dec 2-5, 1995
		UGC Refreshers Course for PG Teachers Univ.of Madras	Sep 11, 1995
		Short-term course on Advances in Photochemistry	Dec 1995
11.	Dr M S Subramanian	The Pittsburg Conference on Analytical chemistry & Applied Spectroscopy, Chicago, USA	Mar 3-8, 1996
		Nuclear and Radio-chemistry Symposium, IGCAR, Kalpakkam	Feb 21-24, 1996
12.	Dr G Sundararajan	Macro'95, Trivandrum	Jan 11-13, 1996
13.	Dr K Vidyasagar	Physics and Chemistry of Transition Metal Oxides, IISc, B'lore	Nov 19 - Dec 5, 1995

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

S.No.	Name of Faculty	Topic of the Lecture	Delivered at	Date
1.	K K Balasubramanian	Arylation of enolates by triphenylbismuth(V) carbonate and Aryllead (IV) triacetates-synthesis of Isoflavanones and Isoflavones	Loyola College Madras	Nov. 23-25 1995
		A potential stereocontrolled approach to linearly fused Cis-anit-Cis and Cis-syn-Cis triquinanes	Univ.of Calcutta	Dec.15 1995
		Photochemical -hydrogen abstraction and 1,5-biradical cyclisation	IIT Madras	Dec.14 1995
		Chemistry of 1,2 and 2,3-unsaturated sugars-some interesting findings	IACS Calcutta	Jan. 29-30 1996

S.No.	Name of Faculty	Topic of the Lecture	Delivered at	Date
	K.K.Balasubramanian	Photochemical -hydrogen abstraction and 1,5-biradical cyclisation-synthetic applications	Jadavpur Univ.	Jan.31 1996
		New routes for the synthesis of vinylbenzofurans, vinylindoles, 4-chromanone and flavanones	Gandhigram Univ. Ambathurai	Feb.27 1996
		Investigations of reaction mechanism in organic chemistry	Cochin Univ. Cochin	March 7 & 8 1996
2.	M S Gopinathan	Chaos in Chemistry & Biology	IIT Bombay	Aug. 1995
3.	D V Ramana	Mass spectrometer as a probe in organic synthesis	IICT Hyderabad	Feb. 1995
4.	R Ramaswamy	Oscillatory Reactions	CECRI, Karaikudi	May 1995
5.	B Viswanathan	Secondary Batteries SIEMEN's workshop	IIT, Madras	
		Lectures in Physical Chemistry for PG teachers in chemistry	Madras Univ.	Sept. 1995
6.	M N S Rao	Multiple bonds of silicon - A success story Manasa Gangothri	Mysore Univ.	Dec.1 1995
		Inorganic rings & polymers, Polysilanes-versatile inorganic polymers	Mysore Univ. Mysore	Dec. 26-27 1995
7.	Archita Patnaik	Chemical interaction at metal polymer interface. A study through cluster ion beam implantation	Inst. of Physics Bhubaneswar	Jul. 1995
		Micro structure determination of photoconducting polymers by positron polymers annihilation life time spectroscopy.	CHEMISTS' MEET - 95	Dec. 1995

S.No.	Name of Faculty	Topic of the Lecture	Delivered at	Date
8.	D Loganathan	Development of approaches towards enzymecatalysed solid phase synthesis of oligosaccharides	IIT Bombay	June 1995
9.	MV Sangaranarayanan	Charge transfer through chemically modified electrodes	MKU Madurai	Mar. 1995
10.	S Sankararaman	NMR in organic structure elucidation - a lecture to PG teacher, Madras University	Madras Univ.	Dec. 1995
		Fundamentals of organic photochemistry in QIP short term course	IIT Madras	Dec. 1995
11.	R P Viswanath	Photocatalysis - QIP short term course	IIT Madras	Dec. 1995

#### 4.4.11. Visits Abroad

S.No.	Name of the Faculty	Country	Date	Purpose
1.	Dr R Ramaswamy	UK	Aug 21-23 1995	Presented a paper at the 3rd Experimental Chaos Conference
2.	Dr D V Ramana	Germany	Jun-Aug 1995	Visiting Scientist
3.	Dr B Viswanathan	Russia	Sep 17-30 1995	As a delegate of DST
4.	Dr U V Varadaraju	Japan	19 Sep - 12 Oct 1995	As a member of DST delegation on Material Science
5.	Dr A K Mishra	Japan	Jun-Aug, 1995	Short visit under Govt of Japan 'Monbusho' program
6.	Dr M S Subramanian	USA	Mar 3-8, 1996	Presented a paper in the Pittsburg Conf.
7.	Dr G Sundararajan	France	Sep 18-26, 1995	Participated and delivered a Lecture at the Indo-French Symposium on Polymer chemistry
8.	Dr K Vidyasagar	Germany	May-Jul, 1995	For collobarative research program.

#### 4.4.12. Distinguished Visitors to the Department

S.No.	Date	Name of the Visitor and Occupation	Purpose
1.	Aug 1995	Dr Nitui K Labhsetwar Scientist, NEERI, Nagpur	Discussion meeting
2.	11 Sep 95	Prof A K Singh Head, Dept of Chemistry IIT Bombay	Discussion and lecture
3.	13 Nov 95	Prof Robert J Linhardt University of Iowa, USA	Discussion and lecture
4.	29 Nov 95	Prof Edward Lochmann Hungary	Lecture
5.	Nov 1995	Dr (Mrs) Kveta Jiratova Academy of Science of Czech Republic	Discussion meeting
6.	Nov 1995	Prof P Hagenmuller CNRS, University of France	Discussion and lecture
7.	Nov 1995	Prof K Dharmalingam Madurai Kamaraj University Madurai	Discussion meeting
8.	Jan 1996	Prof B Raveau Director, CRISMAT-ISMRA Cedex, France	Discussion meeting
9.	Feb 15-19, 1996	Prof C Naccache, Dy Director, Institute of Catalysis Lyon, France	Discussion meeting
10.	23 Feb 96	Prof Gerold Baier University of Tübingen Germany	Discussion meeting
11.	Feb 1996	Prof V S Bisaria BERC, IIT Delhi	Discussion meeting
12.	Feb 1996	Dr Kompala Biochem Engg, USA	Discussion meeting
13.	Mar 1996	Prof Elankovan Ponriambalam Director, Bioprocess Engg Michigan State Biotechnology Institute, USA	Discussion meeting

#### 4.4.13. Sponsored Projects

S.No.	Title	Period	Funding Agency	Amount (in lakhs)	Coordinators
1.	New routes to c-aryl glycosides	1995-98	DST	12.7	Dr K K Balasubramanian
2.	Synthesis of c-aryl glycosides	1995-98	CSIR	1.88	- do -
3.	Development and Characterisation of copper clad PTFE/WOVEN glass type laminates for microwave applications	1995	DTSR	9.26	Dr B Viswanathan Dr V R K Murthy (Phy)
4.	Novel Phosphine Oxides and their Nitrogen Analogues- Synthesis, Characterisation and Extraction Studies of Actinides from Radioactive Wastes	1996-99	DAE	5.4	Dr M N S Rao Dr P R Vasudeva Rao (IGCAR, Kalpakkam)
5.	Application of metal carbonyls as Catalysts for hydrogenation.	1996-99	DST	7.74	Dr S Vancheesan
6.	Glycosidase Catalyzed oligosaccharide synthesis A Biomimetic Approach to Transglycosylation.	1996-99	DST	10.49	Dr D Loganathan
7.	Stereoselectivity in Acetal Substitution in Lithium Perchlorate-Diethyl Ether Medium	1996-99	CSIR	5.05	Dr S Sankararaman
8.	Synthesis of Novel Polymers and small organic molecules by soluble and tunable olefin metathesis catalysts	1995-98	DST	22.4	Dr G Sundararajan

#### 4.4.14 Major Consultancy Assignments

S.No.	Title	Organisation	Amount (in lakhs)	Coordinators
1.	Synthesis of Pharmaceutical Intermediates	Sun Pharmaceuticals, Baroda	3.48	Dr K K Balasubramanian
2.		MITECH Engineers, Madras	0.50	-do-
3.	Development of new amines	MEDHI Pharmaceuticals,	1.91	-do-
	Research and development in the area of N <sub>2</sub> O decomposition catalysts	Air Products & Chemicals Inc, USA, Patent 18195	US \$ 10,000	Dr C S Swamy
5.	Process development for C11-aldehyde	Ace Aromatics Pvt Ltd Bangalore	1.50	Dr C S Swamy
6.	Development of methanol fuel cells	High Energy Batteries	0.70	Dr B Viswanathan Dr M V Sangaranarayanan
7.	Modification of environmental chamber for H <sub>2</sub> S, SO <sub>2</sub> testing	Electronics Test and Development Centre Madras	0.20	Dr N Balasubramanian
8.	Investigation on animal feed supplements	Chimique Laboratories Madras	0.60	Dr T S Chandra
9.	Sodium cyanate purification	Tribology India Ltd Madras	0.40	Dr M N S Rao

#### 4.4.15 Honours and Awards

S.No.	Name of Faculty	Honours/Awards	Purpose
1.	Dr K K Balasubramanian	Special Invitation from Alexander von Humboldt foundation	to visit various univ. in Germany



S.No.	Name of Faculty	Honours/Awards	Purpose
2.	Dr T V Ramakrishnan	Dr S Krishnamurthy award in the field of electroanalysis	for the best paper published in the Journal of Electro-chemical Society of India
3.	Dr D V Ramana	Elected as a reviewer for the international journal, "Journal of Mass Spectrometry"	Nominated for inclusion in "Marquis who's who in the world" USA in 1997 edition
4.	Dr T S Chandra	Dadha award by Mukti organization	for outstanding achievements as a handicapped person
		Significant Achievement award of the Rotary Club Cosmos	for contribution in the field of education
		Honorary Membership of Rotary organization	Nominated for inclusion in "Marquis who's who in the world" USA, in 1997 edition.
		Editorial board member in Indian Journal of Microbiology	
5.	Dr U V V Raju	Materials Research Society of India Medal	for contribution in the area of materials science
6.	Dr Archita Patnaik	Sir Harold Thompson award, nominated by spectrochimica Acta	for best paper publication

#### 4.4.17 Research Publications

1. N.Palani and K.K.Balasubramanian, "Formal [1,3] rearrangement of 2-Furylmethyl and 2-Thienylmethyl vinyl ethers", Tet, Lett., 36, 9527-9530, 52(1995).
2. V.Kabaléeswaran, S.S.Rajan, C.Booma and K.K.Balasubramanian, p-Chlorophenyl 3,4,6-tri-O-benzyl-2-deoxy-2-methylene-beta-D-glucopyranoside", Acta Cryst, C52, 768-769 (1995).

3. G.Ramesh and K.K.Balasubramanian, "Mitsunobu reaction of 1,5-anhydro-3,4,6-tri-O-benzyl-2-deoxy-2-hydroxymethyl-hex-1-enitols and 5-Anhydro-2-deoxy-4,6-O-protected-hex-1-enitols. A novel method for the synthesis of 2-methylene glycosides and an useful alternative to Ferrier rearrangement", *Tetrahedron* **51(1)**, 255-272 (1995).
4. M.Vijayakumar and M.S.Gopinathan, "Study of the importance of relativistic, correlation and relaxation effects on ionization energy of atoms by a relativistic and correlated local density method", *J.Chem.Phys.* **103**, 6576-6580 (1995).
5. T.K.Varadarajan, R.Parvathy, T.V.Ramakrishna and C.Kalidas, "Gibbs energies of solvation and solvent transport of some silver(I) salts in water + N-methyl-2-pyrrolidinone at 30°C" *J.Chem.Engg.Data*, **40**, 883 (1995).
6. S.Nalini, N.Balasubramanian and T.V.Ramakrishna, "Spectrophotometric determination of nanogram amounts of tin after extraction from iodide media", *Bull.Chem.Soc.Jpn.*, **68**, 1145 (1995).
7. K.Muthukumar, N.Balasubramanian, and T.V.Ramakrishna, "Removal of fluoride by chemically activated carbon", *Ind.J. of Env.Protection*, **15**, 514-517 (1995).
8. K.Muthukumar, N.Balasubramanian and T.V.Ramakrishna, "Removal and recovery of chromium from plating waste using chemically activated carbon", *Metal Finishing*, **93**, 46-53 (1995).
9. T.K.Varadarajan, T.V.Ramakrishna and C.Kalidas, "Gibbs transfer energies of some uni-univalent salts in water-N-methyl-2-pyrrolidinone solvent mixtures at 30°C", *Z.Naturforsch.* **55a**, 969 (1995).
10. U.S.Shoba and M.R.Udupa, "Solid state reactions in the system oxalate-bromate-chromium (III) oxide, *Thermochemica Acta.*, 101-107 (1995).
11. D.V.Ramana and E.Kanthalraj, Dual ortho interaction in 2-alkyl-3 (2-methylphenyl)-4(3H)-quinazolinone and their thioanalogues under electron impact condition, *J Mass Spectrom*, **30**, 262-268 (1995).
12. D.V.Ramana and E.Kanthalraj, Cycloreversal reactions and ortho interactions in 2-aryl-4H-3,1-benzoxazin-4-ones on electron impact, *J.Mass.Spectrom*, **30**, 1195-1200 (1995).
13. D.V.Ramana, K.K.Balasubramanian, M.S.Sudha and T.Balasubramanian, Electron impact induced 3,3 sigmatropic rearrangement in phenyl allenylmethyl ethers, *J.Am.Soc.Mass Spectrom*, **6**, 195-201 (1995).
14. D.V.Ramana and E.Kanthalraj, Synthesis of 2-substituted benzoxazoles based on mass spectral ortho interactions, *J.Chem.Soc.Perkin Trans. 2*, **14**, 97-1501 (1995).
15. D.V.Ramana and M.S.Sudha, Intramolecular aromatic substitution and amino-claisen rearrangement in substituted N-(2-propynyl) anilines on electron impact, *J.Mass Spectrom*, **30**, 1028-1033 (1995).
16. D.V.Ramana and E.Kanthalraj, One step synthesis of 2-methyl-3-aryl-4-(3H) quinazolinethiones, *Indian J.Heterocyclic Chem.* **5**, 7-10 (1995).

17. V.Jayalakshmi and R.Ramaswamy, "Current and Potential oscillations in Belousov-Zhabotinsky systems, *Bull.of Electrochem*", **11**, 153-158, 1995.
18. V.Jayalakshmi and R.Ramaswamy, "Reply to comment, on the action of organic solvent in the B-Z oscillation in aqueous organic mixed media by Zhan bo He", *Int.J.Chem.Kinet*, **27**, 197-201, 1995.
19. V.Jayalakshmi and R.Ramaswamy, "New experimental findings in the Belousov-Zhabotinsky system with mixed substrates", *Chem.Phys Lett*, **247**, 38-44, 1995.
20. V.Jayalakshmi and R.Ramaswamy, "New experimental findings in the B-Z system employing mixed substrates", *Can.J.Chem.*, **74**, 000, 1996.
21. K.T.Ranjit, R.Krishnamurthy, and B.Viswanathan, "Photocatalytic reduction of nitrite on CdS", *J.Photochem. Photobiol.A.Chem.*, **86**, 185-189, (1995).
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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 Department has been in the forefront in training engineers and technologies of high calibre, who would engage in research, design and development and thus contribute to building a nation which is self-reliant in its technological needs and aspirations. Ever since its inception, the Department has grown and achieved international recognition.

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. An M.Tech programme in Environmental Engineering is being offered exclusively for sponsored candidates. M.Tech. degree programmes prepare students to meet the advanced technology requirements of the industry. M.S. degree programmes give an exposure to the process of research, whereas the Ph.D degree programmes give training for original research on advanced topics in the six areas of specialisation and prepare the scholars for academic as well as research and development careers.

There is extensive interaction between the faculty and industries belonging to both the 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 collaboration schemes and national agencies.

### 4.5.2 New Courses Introduced

#### Revision of Curriculum:

The revised curriculum for M Tech. Structural Engineering Specialisation was implemented in the Academic Year 1995-1996 (July-Nov.1995). Approved in 181st Senate-Resolution No.1/95(iv).

### 4.5.3 Details of Faculty

#### Name and Qualification

#### Specialisation

#### Professors

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

Structural Engineering

P.K.Aravindan, (Ph.D.(IITMadras)

Structural Engineering

**Name and Qualification****Specialisation**K.Elango, Ph.D.(IIT Madras) **[Head]**

Hydraulic &amp; Water Resources Engg.

V.Kaiyanaraman, Ph.D(Cornell)

Structural Engineering

C.S.Krishnamoorthy, Ph.D.(London)

Structural Engineering

N.R.Krishnaswamy, Ph.D.(IIT Kanpur)

Geotechnical Engineering

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

Building Tech.&amp; Constrn. Management

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

Geotechnical Engineering

V.Paramasivam, Ph.D(IIT Madras)

Structural Engineering

N.Rajagopalan, Dr.-Ing(Stuttgart)

Structural Engineering

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

Hydraulic &amp; Water Resources Engg.

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

Transportation Engineering

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

Structural Engineering

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

Hydraulic &amp; Water Resources Engg.

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

Hydraulic &amp; Water Resources Engg.

**Visiting Professors**

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

Hydraulic &amp; Water Resources Engg.

R.Pitchai, Ph.D.(Harvard)

Environmental Engineering

Shan Somayaji, Ph.D.(Illinois)

Building Tech.&amp; Constrn. Management

**Associate Professors**

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

Hydraulic &amp; Water Res. Engg.

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

Transportation Engineering

K.Rajagopal, Ph.D.(Florida)

Geotechnical Engineering

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

Transportation Engineering

**Assistant Professors**

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

Building Tech.&amp; Constrn. Management

A.Boominathan, Ph.D.(USSR)

Geotechnical Engineering

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

Geotechnical Engineering



**Name and Qualification****Specialisation**

K.Gopalakrishna, M.Tech(IIT Kanpur)	Environmental Engineering
Koshy Varghese, Ph.D.(Texas Austin)	Building Tech. & Constrn. Management
A.Meher Prasad, Ph.D.(Rice Houston)	Structural Engineering
S.Rajeev, Ph.D. (IIT Madras)	Structural Engineering
A.Ramachandraiah, Ph.D(IIT Madras)	Building Tech.& Constrn. Management
K.Ramamurthy, Ph.D.(IIT Madras)	Building Tech.& Constrn. Management
K.N.Satyanarayana, Ph.D.(Clemson)	Building Tech.& Constrn. Management
K.Srinivasan, Ph.D.(IIT Madras)	Hydraulic & Water Res. Engineering

**Lecturer**

N.Kumar Pitchumani

Geotechnical Engineering

**Senior Scientific Officer: Gr-I**

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

Environmental Engineering

**Scientific Officers: Gr-I**

K.Ananthanarayanan, Ph.D (IIT Madras)

Building Tech.&amp; Constrn. Management

M.Subbi Reddy, M.S.(IIT Madras)

Transportation Engineering

**Technical Officers**

P.R.Kothandaraman (SG)

M.Innaci

K.Bhaskaran

**4.5.4 Students of Roll**

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D	3	3	5	1	7	-	7	-	8	1	30	5	35
M.S.	3	2	7	1	7	3	2	-	-	-	19	6	25
M.Tech	35	5	36	7	-	-	-	-	-	-	71	12	83
B.Tech	41	3	43	4	39	4	37	3	-	-	160	14	174
<b>Total</b>	<b>82</b>	<b>13</b>	<b>91</b>	<b>13</b>	<b>53</b>	<b>7</b>	<b>46</b>	<b>3</b>	<b>8</b>	<b>1</b>	<b>280</b>	<b>37</b>	<b>317</b>

#### 4.5.5 Number of Scholarships/Fellowships

Programme	Institute Scholarship	Others	Total
Ph.D	23 (17 FT + 7 QIP)	29	52
M.S.	17	10	27
M.Tech	23 (25 GATE +3 QIP)	9	37
<b>Total</b>	<b>68</b>	<b>48</b>	<b>116</b>

#### 4.5.6 Number of Degrees Awarded

Programme	No. Awarded
Ph.D	7
M.S.	9
M.Tech	26
B.Tech	38
<b>Total</b>	<b>80</b>

#### 4.5.7 Instrument/Equipment Designed and Developed (Including Software)

S.No.	Name of Faculty	Instrument/Equipment/Software developed
1.	Dr.K.Ramamurthy	Engineers Plumb
2.	Dr. K. Rajagopal	Special grips for tensile testing Geosynthetic Reinforcement for use by students in the department.
3.	Dr.Nainan P.Kurian	Software package "NOSFIN" (Nonlinear Soil-Foundation Interface Interaction Analysis)
4.	Dr.A.Boominathan	A System (using Data Acquisition Card with PC) for Automatic Measurement and Monitoring of Vibration Characteristics of Foundation Soil System.
5.	Dr.H.Raman	Software for IIT Campus water supply pipe network analysis and rehabilitation
6.	Dr.K.Srinivasan	Software for Flood Routing in Reservoirs and Channels
7.	Dr.K.Srinivasan	Software for Regional and At-site Flood Frequency Analysis

S.No.	Name of Faculty	Instrument/Equipment/Software developed
8.	Dr.C.S.Krishnamoorthy	Software for Adaptive Finite Element Analysis
9.	Dr.A.Meher Prasad	Coordinating works related to establishing servo controlled actuator system
10.	Dr.S.Gopalakrishnan	Development of new structural dynamics laboratory
11.	Dr.V.Thamizh Arasan	Software for Disaggregate mode-choice (DIMOCAN)
12.	Dr.V.Thamizh Arasan	Software for Traffic simulated at uncontrolled intersections (SIMUINT)

#### 4.5.8 New Facilities and Major Equipment Procured

- 1) 100 Tonne capacity hydraulic jacks with motorised pumping unit along with 2 Nos. 100 Tonne load cells and digital load indicator with peak load hold facility for masonry prism testing facility.
- 2) UTM for Testing Geosynthetic Reinforcements
- 3) Data Acquisition Systems for Geotechnical Engineering Lab.
- 4) Pressure Transducers, Strain Measuring Equipment etc.

#### 4.5.9 Sponsored Research Projects

S. No.	Title	Period (years)	Funding Agency	Amount (Rs.in Lakhs)	Coordinator(s)
1.	GIS laboratory for Engineering applications	2	AICTE	10.00	Dr.Koshy Varghese Dr.K.N.Satyanarayana Dr.S.Rajeev Mr.S.K.Ramesh
2.	Development of design criteria for structural masonry with concrete hollow blocks	2	DST	4.45	Dr.K.Ramamurthy Dr.R.Ambalavanan

S. No.	Title	Period (years)	Funding Agency	Amount (Rs.in Lakhs)	Coordinator(s)
3.	Cost-effective construction techniques*	3	AICTE	5.00	Dr.R.Ambalavanan Dr.K.Ramamurthy Dr.M.S.Mathews
4.	Technical video program on construction materials testing	1	AICTE	0.60	Dr.M.S.Mathews Dr.K.Ramamurthy
5.	Geosynthetics in Reinforced Earth Embankments	3	DST	9.77	Dr.N.R.Krishnaswamy Dr.K.Rajagopal Dr.S.R.Gandhi Dr.A.Boominathan
6.	Modernization of Geotechnical Engg. Lab.	2	AICTE	5.00	Dr.A.Boominathan Dr.K.Rajagopal Dr.N.R.Krishnaswamy
7.	Design of Ash ponds and dams (Tech.Dev.Mission Project)	1	DST	22.84	Dr.S.R.Gandhi Dr.A.Boominathan
8.	Structural Design and Detailing of Wave Energy Caisson	1	NIOT	4.13	Dr.S.R.Gandhi Dr.R.Sundaravadivelu
9.	Expert System for optimal water Resources Management	2.1/2 1	Indo-German IT & T.U Aachen	2.00	Dr.H.Raman Dr.K.Elango Dr.S.Mohan
10.	Expert Systems for Water Resources Management	3	DST	4.50	Dr.H.Raman Dr.S.Mohan
11.	Creek Hydrology	3	CODAPS Cell NIOT	5.70	Dr.H.Suresh Rao Dr.B.S.Thandaveswara
12.	Numerical Modelling of the Pollutant load in River System	2	INCHR Ministry of Water Resources	18.75	Dr.H.Suresh Rao Dr.B.S.Thandaveswara
13.	Effectiveness of percolation ponds	4	DST	4.08	Dr.K.Elango Dr.S.Mohan

S. No.	Title	Period (years)	Funding Agency	Amount (Rs.in Lakhs)	Coordinator(s)
14.	Standardisation of damage frequency relations for flood damage assessment	3	DST	5.04	Dr.B.S.Thandaveswara Dr.K.Srinivasan
15.	CODAPS Cell core facilities	1	CODAPS NIOT	0.98	Dr.B.S.Thandaveswara
16.	KBES for FE analysis for Engineering Design	3	DST	7.18	Dr.C.S.Krishnamoorthy Dr.K.N.Seetharamu
17.	Indo-US Project on optimal Design processor for structural system	3	NSF USA	5.00	Dr.C.S.Krishnamoorthy Dr.S.Rajeev
18.	Testing Facilities for Advanced studies on Dynamic and Nonlinear behaviour of Strl. Mechanical Systems.	-	NIOT	80.00	Dr S Swamamani Dr S Narayanan Dr N Rajagopalan
19.	Instability and Non-linear behaviour of CFC elements and panels(ARDB)	-	A R D B New Delhi	5.21	Dr V Kalyanaraman
20.	Dynamic Response Analysis Using Experimentally Characterised Transient Signals	-	IC&SR	0.50	Dr.S.Gopalakrishnan
21.	Ultimate Strength of Prestressed containment of Buildings	-	A E R B	12.00	Dr.H.Achyutha

#### 4.5.10 Major Consultancy Assignments

S.No.	Title	Organisation	Amount (Rs.In Lakhs)	Coordinator(s)
1.	Investigations on concrete mix design/building materials	Several organisations	2.00	Dr.F.Ambalavanan
2.	Assessment and evaluation repair measure of a building	Balmer & Lawrie	0.40	Dr.Nainan P.Kurian Dr.M.S.Mathews Dr.K.Ramamurthy
3.	Project management services for locker facility	M/S Dedicated Lockers Ltd.,	0.35	Dr.K.N.Satyanaryana Dr.R.Ambalavanan
4.	Design and construction of common effluent treatment plants	TNPCB-TALCO	10.00	Dr.R.Ambalavanan Dr.K.Ramamurthy Dr.K.N.Satyanarayana
5.	Review of the Soil Investigation report for comments and final recommendation	Indian Overseas Bank, Madras	0.06	Dr.Nainan P.Kurian
6.	Assessment of Sea Bed Condition for Ennore Port Area	National Institute of Ocean Tech. Madras.	2.00	Dr.S.R.Gandhi Dr.K.Muthukrishnaiah Dr.N.R.Krishnaswamy
7.	Sub-soil Investigation for determining dynamic soil properties & Recommendations for design of foundation for the proposed Coop.Sugar Mill,Puduvoyal	Gummidipoondi Cooperative Sugar Mills Ltd., Gummidipondi	1.70	Dr.N.R.Krishnaswamy Dr.K.Rajagopal Dr.A.Boominathan
8.	Foundation Recommendations for jetty near Jamnagar	Julelal Industries, Jamnagar	0.50	Dr.S.R.Gandhi Dr.R.S.Sundaravadivelu
9.	Text on rock samples and interpretation of test results.	F.S. Engineers (P) Ltd. Madras.	0.12	Dr.N.R.Krishnaswamy Dr.Nainan P. Kurian
10.	Recommendation of Design Parameters for Construction of a Retaining Wall	Shri V.Manickam, Engg.Contractor, Madras-40	0.12	Dr.K.Rajagopal Dr.N.R.Krishnaswamy
11.	Analysis of Soil Characteristics required for Slope Stability Evaluation	Neyveli Lignite Corporation Ltd., Neyveli	2.40	Dr.N.R.Krishnaswamy Dr.A.Boominathan Dr.K.Rajagopal

S.No.	Title	Organisation	Amount (Rs.in Lakhs)	Coordinator(s)
12.	Site Investigation and Foundation recommendation	Garisson Engineers Air Force Station Tambaram, Madras-46.	0.60	Dr.Nainan P. Kurian
13.	Recommendation and Design of Foundations for Slum Tenaments	Tamil Nadu Slum Clearance Board, Madras-5	0.20	Dr.K.Rajagopal Dr.N.R.Krishnaswamy Dr.R.Ambalavanan
14.	Recommendations & Design of Foundations for Mechanical Press	Wheels India Ltd., Madras	0.06	Dr.K.Rajagopal Dr.A. Boominathan
15.	Testing Soil samples and Interpretation of results	Tarapore Constn. Pvt. Ltd., Mount Road Madras.	0.05	Dr.Nainan P. Kurian
16.	-do-	-do-	0.05	-do-
17.	Recommendation of Sand-gravel Design Mix for Construction of Road Approaches	Shri V.Manickam, Engg. Contractor, Madras-40	0.12	Dr.K.Rajagopal Dr.N.R.Krishnaswamy
18.	Foundation Recommendation for 100 Flats at Mogappair East	Tamil Nadu Housing Board, Spl.Divn.I, Anna Nagar, Madras-101	1.44	Dr.K.Rajagopal Dr.N.R.Krishnaswamy Dr.Nainan P. Kurian
19.	Remedial Measures for Foundation for ESSAR Plant at Vizag	Metallurgical & Engg. consultants (India), Hyderabad	0.50	Dr.S.R.Gandhi Dr.P.K.Aravindan
20.	Foundation Recommendation for 48 HIG Flats at Mogappair East	Tamil Nadu Housing Board, Spl.Divn.I, Anna Nagar, Madras-101	0.48	Dr.K.Rajagopal Dr.N.R.Krishnaswamy Dr.Nainan P. Kurian
21.	In-situ Dynamic Testing on Piles at Hazira	Larsen & Tubro Ltd, ECC Constn. Group, Madras	0.50	Dr.A.Boominathan Dr.S.R.Gandhi Dr.N.R.Krishnaswamy
22.	Foundation Recommendation for 549 Flats at Mogappair Eri Scheme	Tamil Nadu Housing Spl.Divn.I, Anna Nagar, Madras-101	1.44	Dr.K.Rajagopal Dr.N.R.Krishnaswamy Dr.Nainan P. Kurian
23.	Measurement of Vibration - Piling for MFL Revamp Area	Madras Fertilizers, Limited, Manali, Madras.	0.95	Dr.A.Boominathan Dr.N.R.Krishnaswamy Dr.S.R.Gandhi

S.No.	Title	Organisation	Amount (Rs.in Lakhs)	Coordinator(s)
24.	Design of the foundation Super structure of Bank building at Colombo, Sri Lanka	Indian Overseas Bank Madras	3.50	Dr.Nainan P. Kurian Dr.P. Srinivasa Rao
25.	Design of embankment of BG Line at Karuvatta in Alleppey	Southern Railway Madras.	0.10	Dr.S.R.Gandhi
26.	Soil Electric Power Corporation Ltd., Madras	SPIC Elec.Power Corpn. Ltd., Madras	1.00	-do-
27.	Soil Investigation work for BHEL Trichy	BHEL, Trichy	0.25	-do-
28.	Soil Test for Pavement Design.	A.A.I., Madras	0.05	--do-
29.	Soil Investigation work for Andaman PWD	Andaman PWD Port Blair	3.00	-do-
30.	Recommendations for foundation on Rock	Geo Engineers, Madras.	0.05	-do-
31.	Soil Test for Airports Authority of India	A.A.I., Madras	0.02	-do-
32.	Foundation for Lighthouses at Kodikari	Dept.of Lighthouses & Lightships	0.10	-do-
33.	Foundation Recommendations for construction of Residential Complex of ONGC	Tamil Nadu Housing Board, Spl.Divn.I Anna Nagar, Madras.	0.96	Dr.K.Rajagopal Dr.N.R.Krishnaswamy Dr.A.Boominathan
34.	Recommendation of Soil Design Parameters for construction of Bridge on GST Road.	Shri V.Manicakm, Engg.Contractors, Madras-40	0.12	Dr.K.Rajagopal Dr.N.R.Krishnaswamy
35.	Computer Modeling of Thambaraparani River System	T.N.PWD, World Bank funded Project	25.25	Dr.H.Raman Dr.K.Elango Dr.S.Mohan
36.	Drought Analysis for Cauvery Basin in Tamil Nadu	Cauvery Technical Govt. of Tamilnadu	1.48	Dr.H.Raman Dr.S.Mohan
37.	Artificial Recharge Studies of Neyveli Aquifer	Neyveli Lignite Corporation Limited	1.00	Dr.H.Raman Dr.S.Mohan



S.No.	Title	Organisation	Amount (Rs.in Lakhs)	Coordinator(s)
38.	Analysis of pumping test data and artificial recharge by injection well technique	Neyveli Lignite Corporation Limited	1.00	Dr.H.Raman Dr.S.Mohan
39.	Sump Model Test for VT pumps in Takari Lift Irrigation Project Stages I & II	Kirloskar Brothers Limited, Pune	14.20	Dr.H.Suresh Rao Dr.B.S.Thandaveswara
40.	Water Quality Testing, Analysis and Advice	Madras Fertilizers Limited, Manali Madras	0.98	Dr.H.Suresh Rao Dr.B.S.Thandaveswara Dr.K.D.Chandrasekaran
41.	Hydrographic Survey, Discharge of Reverse Osmosis plant, rejects into the Sea - Analysing the data, advising and guidance	Madras Fertilizers Limited, Manali Madras	1.50	Dr.H.Suresh Rao Dr.B.S.Thandaveswara
42.	Sump model test for VT pumps in Mhaisal Lift irrigation Project Stages I & II	Kirloskar Bros. Limited, Pune	24.00	Dr.H.Suresh Rao Dr.B.S.Thandaveswara
43.	Analysis and design of Water supply system for ELSHIDYA Project (Jordan)	SPIC-SMO, Madras	-	Dr.H.Suresh Rao Dr.K.Elango
44.	Soil consultancy for the proposed prawn cultivating unit	Nagarjuna Aqua Exports Limited Nellor	2.00	Dr.B.S.Thandaveswara Dr.V.S.Raju
45.	Analysis and design of improvements to the existing storm water nullar within AROCHEM Project site Manali	National Aromatics and Petro Chemicals Corporation Limited Madras	0.40	Dr.B.S.Thandaveswara Dr.K.Elango
46.	Calibration and flow analysis	Switzer Instrument Limited, Madras	0.12	Dr.B.S.Thandaveswara Dr.K.Srinivasan
47.	Storm Drainage scheme for Cochin Refineries Limited	Cochin Refineries Limited, Kerala	0.90	Dr.B.S.Thandaveswara Dr.K.Elango Dr.P.K.Aravindan
48.	Measurement of flow from double helical gear pumps	Mather and Platt (India) Ltd., Madras	0.12	Dr.B.S.Thandaveswara
49.	Testing of PVC pipes for hydraulic pressure	TWAD Board, RWS Division Thiruvannamalai	0.10	Dr.B.S.Thandaveswara

S.No.	Title	Organisation	Amount (Rs.in Lakhs)	Coordinator(s)
50.	Rating of current meters of various organisations	Various gauging divisions Govt. of India	1.57	Dr.B.S.Thandaveswara
51.	Design of sewerage system for Pallikaranai Scheme	Tamil Nadu Slum Clearance Board	0.46	K.Gopalakrishna
52.	Design of R C Microwave Tower at Machilipatinam	Dept. of Telecommn., Hyderabad	5.00	Dr.P.Srinivasa Rao Dr.S.Narasimha Rao
53.	Checking of design/ Advice of SAF Games Village Structures	T.N.Housing.Board Madras	0.65	Dr.P.Srinivasa Rao Dr.S.Narasimha Rao
54.	Optimal Design of Transmission line towers	Tata Consulting Engr.	9.00	Dr.C.S.Krishnamoorthy
55.	Software for Adaptive 2D FEA and GA for Discrete size optmn.	Aeronautical Devept. Agency, Bangalore	4.98	Dr.C.S.Krishnamoorthy Dr.S.Rajeev
56.	Development of an Expert System Shell	QED Software Systems, M adras	6.00	Dr.C.S.Krishnamoorthy Dr.S.Rajeev
57.	Study of Relaxation Properties of HT Strand/wire	Bureau of I S I.,	0.50	Dr.N.Rajagopalan
58.	-do-	Paradeep Phosphates Ltd.,	0.25	- do -
59.	-do-	Special Steels Ltd.,	0.40	- do -
60.	-do-	Various Organisations	1.00	- do -
61.	Fatigue Testing	Axles India Ltd.,	0.40	- do -
62.	Design Checking	S P I C	0.60	- do -
63.	-do-	Naval Base Cochin	0.40	- do -
64.	Flat Slab Testing	Freyssinet Prestressed Concrete (P) Ltd.,	0.75	- do -
65.	Physical Testing of NTS	M/s.South Central Rly	0.17	- do -
66.	Constm of sugar factry with 15MW Cogeneration plnt, T.S.Dt-Soil Analys	M/s. Dharani Sugars &Chemicals Ltd, Madras	0.80	Dr.P.K.Aravindan

S.No.	Title	Organisation	Amount (Rs.in Lakhs)	Coordinator(s)
67.	Constn. of Pumping Stn. for TELCO	M/s. SACEDE Engrs.	0.20	Dr.P.K.Aravindan
68.	Desn. Checking of Strl. Design for M/s.H M T Ltd.	C.R.Narayana Rao Madras - 4	0.15	- do -
69.	Desn. a consultancy for the Constn. of RCB at Katpadi	M/s.V.Manickkam Engrs.	0.20	- do -
70.	Engg.Services for Marine Platform at Tuticorin	M/s. Esquire Engrs. and Consultants	0.75	- do -
71.	Design details of hoardings on parapet of MRTS near simsons	M/s. Ivar Metal Fabrs	0.15	- do -
72.	Design checking of Constn. of 8th Cargo berth at Kandla	M/s. Kantla Port Trust	3.50	Dr.P.K.Aravindan Dr.S.R.Gandhi
73.	Analy. and Design of the proposed bridge across Austin.	M/s. Andaman Harbour	0.15	Dr.P.K.Aravindan
74.	Design checking/ Analyse/Testings	Various Organisations	1.50	- do -
75.	Design Checking and Foundation Consultancy	Nagarjuna International	5.00	- do -
76.	Investn. of Strl.Soundness of Norton Spher at FACT Cochin Divn.	M/s. FACT Limited	1.00	- do -
77.	Modification for the virtual Jetty Project at Kandla Port.	M/s. India Oil Corpn. Bombay	1.20	- do -
78.	Development of Offshore Platform Structures using core loaded sleeved column system	Tube Investment India Ltd.,	3.00	Dr.V.Kaiyanaraman

S.No.	Title	Organisation	Amount (Rs.in Lakhs)	Coordinator(s)
79.	Design of Doppler Weather Radar Antenna	I S R O., Bangalore	3.00	Dr.V.Kalyanaraman
80.	Design of Pallets	M/s Nagarijuna Steels	0.40	- do -
81.	Stability Analysis of Mechanically Launched Multi-Span Bridges	Research Development Estt.(Engrs).	3.00	- do -
82.	Testing of Shrinkage-30 grade materials	M/s. Associate Cement co., Bombay	1.08	Dr.H.Achyutha Dr.K.Ananthanarayana
83.	Testing of Sample of Elastometric Neoprene bearings.	M/s Havea Rubber Indts	0.15	Dr.H.Achyutha
84.	Alternate Design for Underground Tanks	Trafalgar House Const. India Ltd.	0.15	Dr.A.Meher Prasad
85.	Development of Offshore Platform Structures using core loaded sleeved column system	Tube Investment	3.00	- do -
86.	Design of Communication Structures	E C I L	0.70	- do -
87.	Design of Communication systems	E C I L	1.20	- do -
88.	Design of limited steer-Antenna System	Cosmat, Hyderabad	0.30	- do -
89.	Feasibility Report for Chemical storage terminal off Ennore Coast	S P I C, Madras		Dr.A.Meher Prasad Dr.V.S.Raju
90.	Retrofitting Reliance	Reliance Company		Dr.A.Meher Prasad Dr.P.K.Aravindan Dr.V.S.Raju

#### 4.5.11 Honours and Awards

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S.No.	Name of Faculty	Honours/Awards
1.	Dr.K. Rajagopal	<p>Invited to deliver a general report on the session "Ground Improvement and Soil Reinforcement Techniques" at the <b>Indian Geotechnical Conference</b>, Dec. 19-22, 1995, <b>Bangalore</b>.</p> <p>Appointed as one of the <b>Organising Secretaries</b> for <b>Indian Geotechnical Conference</b> being held during Dec.1996, at <b>Madras</b>.</p>
2.	Dr.N.R.Krishnaswamy	<p>Invited to be a panellist for the session on "Environmental <b>Geotechnical Engineering</b>", at the <b>Indian Geotechnical Conference</b>, Dec. 19-22, 1995, <b>Bangalore</b>.</p>
3.	Dr.Nainan P. Kurian	<p>Invited to chair a session at the <b>Fifth East Asia-Pacific Conference on Structural Engineering and Construction</b>, held at <b>Gold Coast, Australia</b>, in <b>July, 1995</b>.</p> <p>Invited to be a member of the <b>International Advisory Committee</b> for the <b>Sixth East Asia-Pacific Conference on Structural Engg. and Construction</b> to be held in <b>Taiwan, R.O.C.</b></p> <p>Designated as <b>Editor-in-Chief</b> of '<b>FOUNDATION ENGINEER; An International Professional Journal for Civil Engineers</b>' brought out by <b>Wiley Eastern Limited, New Delhi</b>.</p>
4.	Dr.H.Raman	<p>Elected <b>President</b> of <b>Indian Water Society Madras Centre</b></p>
5.	Dr.H.Suresh Rao & Mr.Asim Kar (Research scholar)	<p><b>Certificate of Merit (Best Paper Award)</b> by <b>Institution of Engineers, India, Dec., 1995</b></p>
6.	Dr.K.Srinivasan & Mr.M.C.Philipose (Research Scholar)	<p><b>Best paper award for the year 1995</b> by <b>Jl. of the Indian Water Works Assn</b></p>
7.	Dr.S.Gopalakrishnan	<p>Members of a <b>Core Group</b> for (to be commissioned) <b>Centre for Finite Element Analysis Design</b></p>

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#### 4.5.12 Distinguished Visitors to the Department

Sl.No.	Name of the visitor	Purpose
1.	Prof.Fritz Wenzel, University of Karlsruhe, Germany	Lecture / discussion
2.	Prof. J. Brauns, Inst. of Soil and Rocks Mechanics, Univ. of Karlsruhe, Germany	- do -
3.	Prof. Dr.Wolfgong. F.Weiger Universtat Gesomthochschule Essen Germany	- do -
4.	Dr.L.Srinivasa Reddy Assistant Professor Department of Civil Engineering University of Kentucky, USA	- do -
5.	Dipl. Ing. Oliver Buchholz, Technical Universitat of Aachen, Germany	- do -
6.	Dr.Mohana Reddy Joint Director Supporting System for Irrigation Department of Civil Engineering Univesity of Wyoming, Laramie, USA	- do -
7.	Mr.G.M.Sustrac Research Division & Director of Publications "Hydrogeology" BRGM, P.O.Box.No.6009 45066 Orleans Cedex-2, France	- do -
8.	Dr Philip L Gould Harold Jolley Professor Department of Civil Engineering Washington, USA	- do -
9.	Dr.Shunji Ohya Institute of industrial Science University of Tokyo, Japan	- do -
10.	Dr.Seisha Yamada Toyohashi University of Technology Toyohashi, 441, Japan	- do -
11.	Dr.Peter Osterieder BTU Cottbus, HAB Weimae, Germany	- do -
12.	Prof N C Shanmugam Department of civil Engineering Singapore University, Singapore	- do -

#### 4.5.13 Visits of Faculty members to other Institutions

S.No.	Name of Faculty	Institution Visited	Purpose/Period
1.	Dr.M.S.Mathews	Kerala State Nirmithi Kendra Karunya Institute of Technology, Coimbatore	To deliver lectures Chief Guest: Civil Engg.Assn.Inauguration
		Builders Association of India, Tanjore	Annual Convention
2.	Dr.Koshy Varghese Dr.K.N.Satyanarayana	Kerala State Nirmithi Kendra	To deliver lectures
3.	Dr.K.Ramamurthy	Institut of Technologi Mara, Malaysia	To attend a Conference
		National University of Singapore	Technical visit
4.	Dr.A.Boominathan	Neyveli Lignite Corpn. Neyveli	To deliver lectures on 12.3.96
5.	Dr.H.Raman	Technical University of Aachen	Indo-German Project June 15 to July 15, 1995
6.	Dr.V.Thamizh Arasan	School of Civil Engg., Univ.of New South Wales Australia	Technical visit July 1995

#### 4.5.14 Seminars/Symposia/Conferences/Short-Term Courses/Workshops Organised

S.No.	Coordinator(s)	Title of Course/Workshop Seminar/Symposium/Conference	Period
1.	Dr.M.S.Mathews Dr.S.Somayaji	Workshop on Deterioration, Durability and Repair of Concrete, IIT., Madras	Dec. 1-3, 1995
2.	Dr.K.N.Satyanarayana Dr.Koshy Varghese	State-of-art methods for efficient resource management in engineering and construction projects	Sept.14-16, 1995
3.	Dr.M.S.Mathews Dr.K.Ramamurthy	Building Technology and Construction Management	July 3-7, 1995

S.No.	Coordinator(s)	Title of Course/Workshop Seminar/Symposium/Conference	Period
4.	Dr.K.Rajagopal Dr.N.R.Krishnaswamy	CEP Short term course on "Finite Element Techniques for Geotechnical Engineers"	July 17-19, 1995
"	"	CEP short term course on "Geosynthetic Reinforced Soil Structures"	Dec. 4-6, 1995
5.	Dr.Nainan P. Kurian	CEP short term course on "Special Foundation Techniques"	Feb. 1-3, 1996
6.	Dr.A.Boominathan Dr.S.R.Gandhi	ISTE-CEP Short term course on "Foundation Aspects of Industrial Structures"	June 5-9, 1995
7.	Dr.H.Raman Dr.S.Mohan	CEP course on Computer Applications in Irrigation water management	Dec.4-8, 1995
8.	Dr.H.Suresh Rao	Workshop on Need Analysis of Short Term Training Programme - organised at Coimbatore, Madurai and Madras sponsored by AICTE	One Day
9.	Dr.R.Pitchai Dr.T.Swaminathan	CEP on Environmental Audit	Dec.13-15, 1995
10.	Dr.N.Rajagopalan	Workshop on "Quality Control Assurance and Monitoring of Bridge Structures	June '95
11.	Dr.V.Paramasivam	Workshop on Vibration Testing Facilities	March '95
		CEP Course on Finite Element method in Engg. Analysis	Nov.'95
12.	Dr.V.Kalyanaraman	International Conference on Fibre Reinforced Structural Plastics in Civil Engg.	December'95
13.	Dr.S.B.Pattnaik	CEP course on transportation systems analysis and modelling	December'95



#### 4.5.13 Visits of Faculty members to other Institutions

S.No.	Name of Faculty	Institution Visited	Purpose/Period
1.	Dr.M.S.Mathews	Kerala State Nirmithi Kendra Karunya Institute of Technology, Coimbatore	To deliver lectures Chief Guest: Civil Engg.Assn.Inauguration
		Builders Association of India, Tanjore	Annual Convention
2.	Dr.Koshy Varghese Dr.K.N.Satyanarayana	Kerala State Nirmithi Kendra	To deliver lectures
3.	Dr.K.Ramamurthy	Institut of Tecknologi Mara, Malaysia	To attend a Conference
		National University of Singapore	Technical visit
4.	Dr.A.Boominathan	Neyveli Lignite Corpn. Neyveli	To deliver lectures on 12.3.96
5.	Dr.H.Raman	Technical University of Aachen	Indo-German Project June 15 to July 15, 1995
6.	Dr.V.Thamizh Arasan	School of Civil Engg., Univ.of New South Wales Australia	Technical visit July 1995

#### 4.5.14 Seminars/Symposia/Conferences/Short-Term Courses/Workshops Organised

S.No.	Coordinator(s)	Title of Course/Workshop Seminar/Symposium/Conference	Period
1.	Dr.M.S.Mathews Dr.S.Somayaji	Workshop on Deterioration, Durability and Repair of Concrete, IIT., Madras	Dec. 1-3, 1995
2.	Dr.K.N.Satyanarayana Dr.Koshy Varghese	State-of-art methods for efficient resource management in engineering and construction projects	Sept.14-16, 1995
3.	Dr.M.S.Mathews Dr.K.Ramamurthy	Building Technology and Construction Management	July 3-7, 1995

S.No.	Coordinator(s)	Title of Course/Workshop Seminar/Symposium/Conference	Period
4.	Dr.K.Rajagopal Dr.N.R.Krishnaswamy	CEP Short term course on "Finite Element Techniques for Geotechnical Engineers"	July 17-19, 1995
"	"	CEP short term course on "Geosynthetic Reinforced Soil Structures"	Dec. 4-6, 1995
5.	Dr.Nainan P. Kurian	CEP short term course on "Special Foundation Techniques"	Feb. 1-3, 1996
6.	Dr.A.Boominathan Dr.S.R.Gandhi	ISTE-CEP Short term course on "Foundation Aspects of Industrial Structures"	June 5-9, 1995
7.	Dr.H.Raman Dr.S.Mohan	CEP course on Computer Applications in Irrigation water management	Dec.4-8, 1995
8.	Dr.H.Suresh Rao	Workshop on Need Analysis of Short Term Training Programme - organised at Coimbatore, Madurai and Madras sponsored by AICTE	One Day
9.	Dr.R.Pitchai Dr.T.Swaminathan	CEP on Environmental Audit	Dec.13-15, 1995
10.	Dr.N.Rajagopalan	Workshop on "Quality Constrol Assurance and Monitoring of Bridge Structures	June '95
11.	Dr.V.Paramasivam	Workshop on Vibration Testing Facilities	March '95
		CEP Course on Finite Element method in Engg. Analysis	Nov.'95
12.	Dr.V.Kalyanaraman	International Conference on Fibre Reinforced Structural Plastics in Civil Engg.	December'95
13.	Dr.S.B.Pattnaik	CEP course on transportation systems analysis and modelling	December'95

#### 4.5.15 Participation in Seminars/Conferences/Symposia

S.No.	Name of Faculty	Title	Date	Nature of participation
1.	Dr.K.Ramamurthy	4th Int.Conference on Concrete Engg.& technology	6-8 June 1995	Presented three papers
2.	Dr.K.Rajagopal	Indian Geotechnical Conference, Bangalore	Dec.19-22 1995	Presented a general report
3.	Dr.N.R.Krishnaswamy	Indian Geotechnical Conf. Bangalore	Dec.19-22 1995	Panelist, Presented a paper.
4.	Dr.S.R.Gandhi	National Workshop on Ash Ponds and Ash Disposal System	Apr.11-13, 1996	Presented a Theme paper
5.	Dr.Nainan P. Kurian	Fifth East Asia Pacific Conference on Structural Engg. & Construction, Gold Coast, Australia	25-27 July 95	Presented a paper and Chaired a Session
6.	Dr.H.Raman	Challenges in ground Water Devpt. - organised CBIP & CGWB	23-25 Jan.	Chairman of a Technical Session and invited delegate
7.	Dr.K.Elango	31st Leather Research Industry Get-to-gether	28th Jan.'96	Co-chairman of a technical session
		Int.Conference on Disaster & Mitigation	19-22 Jan.1996	Co-chairman of a session
8.	Dr.B.S.Thandaveswara	22nd Ntl. Fluid Mechanics & Fluid Power	13-15 Dec. 1995	Delegate
9.	Dr.B.S.Thandaveswara	Intl. Conf. on Water Management CII	8-9 Dec. 1995	Delegate
10.	Dr.S.Mohan	All India Sem. on Ground Water Potential: Assessment, Devpt. and Management , Tirupathi	9-10 Mar. 1995	Delegate & Presented a paper
		Ntl. Sem. on Role of Agricultural Engg. in Dryland forming, Madras	13-14 Oct. 1995	Delegate & presented a paper

S.No.	Name of Faculty	Title	Date	Nature of participation
	Dr.S.Mohan	22nd Ntl. Fluid Mechanics and Fluid Power	13-15 Dec. 1995	Co-Chairman for a Technical Session
		Intl. Conf. on Disasters and Mitigation, Madras	9-12 Jan. 1996	Delegate Reporter for technical session on Draughts
11.	Dr.K.Srinivasan	VII National Symposium on Hydrology, Jaipur	4-7 Oct. 1995	Presented two Technical papers
		22nd National Conf. on Fluid Mechanics and Fluid Power, IIT, Madras	13-15 Dec. 1995	Presented one Technical paper
12.	Dr.R.Pitchai	Regional Course on Rural Water and waste water management,, Calcutta	28th Aug. to 2nd Sep. 1995	Invited speaker
		Intl. Sem. on Women in Environmental Management, Madras	5-6 Oct. 1995	Invited Speaker
		Seminar on Environmental Pollution - Facing the Challenge, Madras	17.10.95	Chaired a Technical Session
		VRD Sem. on Environmental Pollution Control	28.10.95	Invited Speaker
		Seminar on Role of PCB and ETI in the context of sustainable devpt.	6th Dec. 1995	Invited Speaker
		Intl. Conf. on Water Management	8-9 Dec. 1995	Delegate
		Intl. Sem. on Increasing role of Science and Technology in National Devpt.	16-17 Dec. 1995	Invited Delegate

S.No.	Name of Faculty	Title	Date	Nature of participation
	Dr.R.Pitchai	Intl. Conf. on Disaster and Mitigation, Madras	19-22 Jan. 1996	Chaired one Technical Session
		31st Leather Research-Industry get-together CLRI, Madras	29th Jan. 1996	Invited Speaker
		Ntl. Ptg. Meet for Testing Level Education, Madras	1-2 Feb. 1996	Invited Delegate
13.	K.Gopalakrishna	XI Ntl. Convention of Env. Engineers Roorkee	10-11 Nov. 1995	Presented a paper & Chaired one Session
		Indian Geotech. Conf., Bangalore	19-22 Dec. 1995	Presented a paper
		3rd Intl. Conf. on Env. Planning & Management	22-25 Feb.96	Presented a paper & Chaired one session
14.	Dr.V.Paramasivam	8th World Tamil Conf., Thanjavur,	1995	Presented a paper
15.	Dr.S.GopalaKrishnan	Workshop on Computer aided Model analysis, at NAL, Bangalore.	Feb 1996	Participant
16.	Dr.V.Kalyanaraman	Int.Conference on Stability of Structures P.S.G., College of Tech., Coimbatore.	7-9, June 1995	Presented papers.
17.	Dr.V.Thamizh Arasan	7th World Conf. on transportation Research Australia	16-21 July 1995	Presented a paper
		Int.Conf.on Development and planning of urban transport in developing countries, New Delhi	12-16 Feb. 1996	Chaired a session & presented a paper
19.	Dr.S.B.Pattnaik	2nd Int.Conf. on Roads and road transport, New Delhi	December 1995	Presented a paper

#### 4.5.16 List of Publications

##### i) Book

1. C.S.Krishnamoorthy and S.Rajeev, *Artificial Intelligence and Expert Systems for Engineers*, CRC Press, USA, 1996.

##### ii) Monographs and other publications

1. Dr.Ing.N.Rajagopalan, Dr.M.S.Mathews, and Dr.K.Ramamurthy (Editors) "Research Methodology", published by the Department of Civil Engineering, I.I.T., Madras, May 1995.
2. Dr.Ing.N.Rajagopalan. (Ed) "Quality Control Assurance and Monitoring of Bridge Structures", published by the Indian Institution of Bridge Engineers"- June 1995
3. "Somayaji, S. and Prasad A.M., "Cyclone and Its Effects" First edition, A monograph sponsored by Department of Agriculture, Government of India.
4. R.Jayaraman, "Hydraulic Modelling" - I ed., 1995, published by Centre for Continuing Education, IIT, Madras.

##### iii) Journals

1. Ramachandraiah A., Rama Reddy B., "Some studies on Traffic Noise in typical urban lanes", *Journal of Acoustical Society of India*, 1995.
2. K.Varghese and J.T. O'Connor, "Automated Routing of Large Vehicles on Industrial Construction Sites" *ASCE Journal of Construction Engineering and Management*, March 1995.
3. K. Persad, J.T.O'Connor and K.Varghese. "Forecasting Engineering Manpower Requirements for Highway Pre-Construction Activities", *ASCE Journal of Engineering Management*, April 1995
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#### **v) Reports**

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2. Somayaji, S., Prasad, A.M., Mathews M.S. and Hemalatha, V. "A study of Cyclone Shelters in Tamil Nadu and Andhra Pradesh" Tech. Report No.NHMC/94/02/October 1994.

#### **4.5.17 Other Details**

The Structural Dynamics Testing Facility is being installed.

## **4.6. Computer Science and Engineering Department**

### **4.6.1. Introduction**

Academic programmes in Computer Science and Engineering at the Master's and research level started in 1973 with the installation of the IBM system 370. The department of computer science and engineering was formally started in 1983 and the B.Tech. program was initiated. The department has well equipped laboratories including a network of SUN workstations. Several sponsored projects have helped to create specialized laboratories in the areas of Expert systems, Speech, CAD for VLSI, Computer networks, Information technology, AI, etc.

### **Research Activities**

The Department is actively engaged in research in the following frontier areas of Computer Science and Engineering.

Impact of technological developments in processors, I/O devices and communication on the architecture and design of computing environments, with special emphasis on Reliable Ultra Highspeed networks, multiprocessor systems their architecture, protocol and design, and time critical applications such as multimedia.

Studies in new methodologies and techniques for the design of a new generation of operating system software that are sensitive to the new generation computing requirements, with special emphasis on languages, runtime systems, development environments, Federated Information Bases, and heterogeneity.

Understanding of Man-Machine interface in the form of voice, natural language, etc. with emphasis on speech signal processing, speech understanding, image recognition, image understanding, natural language understanding, natural language text generation, using appropriate techniques such as fuzzy logic, neural networks, expert systems, genetic algorithms etc.

Foundation studies on both the limitations and capabilities of emerging tools, models and technologies such as random services, genetic computations, parallel distributed and VLSI systems. Strong emphasis on pragmatics in the design of algorithms for important hard problems arising in problem domains such as graph theory, combinatorics, computational geometry, computational biology, generative grammars for description of hierarchical systems, with special emphasis on application to hardware systems, software systems, communication systems, man-machine interface and High Performance Computing.

The department emphasizes on the following properties in all the solutions it generates:

- Systems with high degree of Functionality
- High Performance
- Reliable
- Secure
- Simplicity
- Scalable

The Research activities in the Department Since 1980 have resulted in the publication of about 400 papers in reviewed journals and conferences.

#### 4.6.2. New Courses Introduced

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

Sl.No.	Course No.	Title	Faculty
1.	CS762	High Performance Computing	C.Siva Ram Murthy C.Pandu Rangan
2.	CS776	Knowledge Structures for Planning and Understanding	Deepak Khemani

#### 4.6.3. Details of Faculty

##### Name and Qualification,

##### Specialization

##### Professors

R. Kalyanakrishnan, Ph.D. (Univ. of Yale, USA)

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

Kamala Krithivasan, Ph.D. (Univ. of Madras)

Analysis of Algorithms, Automata Theory, and Formal Languages, Computational Geometry

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

Computer Architecture, Distributed Computing, Software Quality Assurance, Object Oriented Programming, Parallel Processing, Text and Image Systems.

C. Pandu Rangan, Ph.D. (IISc, Bangalore)

Computational Geometry, Graph Algorithms, Machine Learning, Parallel and Randomized algorithms.

S.V. Raghavan, Ph.D.(IIT, Madras)  
[Head]

Computer Networks, Computer Architecture, Distributed Systems, Fault Tolerant Computing, Multimedia Systems, Protocol Engineering, Software Engineering, Performance Evaluation.

B.Yegnanarayana, Ph.D. (IISc, Bangalore)

Computer Vision, Digital Signal Processing, Neural Networks, Speech Processing



## Specialization

### Associate Professors

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

Computer Networks, Distributed Systems,  
Operating Systems, Performance Evaluation

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

Parallel and Distributed Computing,  
Real-Time Systems.

### Assistant Professors

Deepak Khemani, Ph.D. (IIT, Bombay)

Artificial Intelligence, Knowledge Based  
Systems, Natural Language Processing,  
Neural networks.

Hema Arunachalam Murthy, Ph.D. (IIT, Madras)

Computer Graphics, Digital Signal  
Processing, Pattern Recognition,  
Speech Processing

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

Software Engineering, Object Oriented  
Programming, Distributed Databases,  
CAD/CAM, Distributed Computing.

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

Digital System Design, Microprocessors,  
Multimedia Systems, Natural Language  
Processing

Ravi Mittal, Ph.D.(IIT, Delhi)

Computer Networks, Fault Tolerant  
Computing, Parallel Architectures,  
VLSI Design

P. Sreenivasa Kumar, Ph.D.(IISc, Bangalore)

Graph Theory and Algorithms, Parallel  
Computing

Sukhendu Das. Ph.D. (IIT, Kharagpur)

Analog and Digital Systems, Computer  
Graphics, Computer Vision,  
Neural Networks

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

Microprocessors, Parallel Processing,  
Speech Processing

### Lecturers

C. Chandrasekhar, M.Tech. (IIT, Madras)

Digital Signal Processing, Neural  
Networks, Speech Signal Processing

G.V. Ramana Rao, Ph.D. (IIT, Madras)

Artificial Intelligence, Speech Processing,  
Natural Language Processing

### Senior Scientific Officers Gr.I

B. Prabhakaran, Ph.D. (IIT, Madras)

Computer Networks, Multimedia Systems

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

Pattern Recognition, Computer Vision

#### 4.6.4. Students on Roll

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total & above		
	M	W	M	W	M	W	M	W	M	W	M	W	Total
Ph.D.	2	-	2	-	3	-	2	-	8	-	17	-	17
M.S.	8	2	16	4	7	1	3	-	-	-	34	7	41
M.Tech.	38	8	35	7	-	-	-	-	-	-	73	15	88
B.Tech.	27	-	30	-	28	2	26	1	-	-	111	3	114
<b>Total</b>	<b>75</b>	<b>10</b>	<b>83</b>	<b>11</b>	<b>38</b>	<b>3</b>	<b>31</b>	<b>1</b>	<b>8</b>	<b>-</b>	<b>235</b>	<b>25</b>	<b>260</b>

#### 4.6.5. Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	Number Others	Total
Ph.D.	8	4	12
M.S.	29	-	29
M.Tech.	53	-	53
<b>Total</b>	<b>90</b>	<b>4</b>	<b>94</b>

#### 4.6.6. Number of Degrees Awarded

Programme	Number awarded
B.Tech	30
M.Tech	41
M.S	12
Ph.D	5
<b>Total</b>	<b>88</b>

**4.6.8. Short-term Courses/Workshops/Seminars/Symposia/Conferences organized**

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SI No.	Co-ordinator(s)	Title of the Course/workshop/seminar/ Symposia/Conference	Period
1.	Ravi Mittal C.R.Muthukrishnan	Fault-Tolerant Systems	December '95
2.	S.V.Raghavan	Networks '96, Bombay	January '96
		ACM Multineural Workshop, Bombay	January '96

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**4.6.9. Short-term Courses/ Workshops/ Seminars/ Symposia/ Conferences/Training attended by the Faculty In Recognized Academic Institutions and Public Sectors**

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SI.No.	Name of Faculty	Title	Period/Duration
1.	K.Krithivasan	FST & TCS, Bangalore	Dec. 1995
2.	Deepak Khemani	Indian Congress on Knowledge and Language, Mysore	Jan. 1996
3.	D.Janaki Ram	Networks '96, Bombay	Dec. 1995
4.	G.V.Ramana Rao	EDUCOMP '96, Chandigarh	Mar. 1996
5.	B.Yegnanarayana	ICASSP-95, Michigan, USA	May 1995
		Conf. on Signal Processing -and Communication, IISc, Bangalore	Aug. 1995
6.	S.V.Raghavan	HPN '95, Palma, Spain JENC 6, Tel Aviv, Isreal	Sep. 1995 May 1995

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#### 4.6.10. Special Lecture(s) Delivered

Sl. No.	Name of the Faculty	Topic	Delivered at and Date
1.	B.Yegnanarayana	Trends in Computing	National Workshop on Object-Oriented Computing, Vijayawada, Feb. 22-23, 1995
		Computation Techniques with Special reference to Neural Networks	Mahatma Gandhi University, Kottayam, Feb.27, 1995
		Speech Processing for Detecting Voice for Disorders	Speech and Hearing Conference, Madras, Mar.11,95
		Boltzmann Machine	National Conference on Neural Networks , Anna University, March 13, 1995
		Digital Signal Processing for Speech Applications	IIT-ISRO short term course on Signal Processing, IIT Madras, Mar. 21, 1995
		Determining the instants of Significant Excitation in Speech Signal	IBM Thomas J Watson Research Labs, New York, May 22, 1995
		Artificial Neural Networks	University of Hyderabad Aug.5, 1995
		On Timing in Time-Frequency Analysis of Speech	Conference of Signal Processing and Communication IISc, Bangalore, Aug.9-12, 1995
		New Models of Computing	Pushpam College, Tanjavur , Sept. 21, 1995
		Probability Information Theory and Neural Networks	Conference on Advance in Mathematics, University of Hyderabad, Dec.20, 1995
		Constraint Satisfaction Models for Texture Classification	Third Conference on for Advanced Computing Taj Residency, Bangalore Dec.22, 1995
		Trends in Computing	All India Seminar on Computers and Application in Rural, Industrial and Engg. Fields , SV University, Tirupati, Jan. 21, 1996
		Speech Processing	IIT Kharagpur, Mar.23, 1996

Sl. No.	Name of the Faculty	Topic	Delivered at and Date
2.	S.V.Raghavan	Networking in Developing Country: Indian Experience	Telkom 95, Johansberg South Africa March 1996
		Advances in Networking Technology	Seminar organised by Bio-Informatics Centre, University, of Pondicherry Feb. 1996
3.	Kamala Krithivasan	Algorithms for Path Planning	Ramanujam Memorial Symposium, Annamalai Univ. Feb. 1996

#### 4.6.11. Visits Abroad

Sl. No.	Name of Faculty	Country Visited	Date	Purpose of Visit
1.	B.Yegnanarayana	OGI, Oregon, USA	Mar. 95	Guest Lectures
		IBM TJ Watson Centre New York, USA	Mar. 95	Guest Lectures
3.	C.Siva Ram Murthy	Univ. of Washington, Seattle, USA	June-Dec 1995	Visiting Scholar
4.	Hema A. Murthy	SRI, California, USA	June '95 May '96	Visiting Scientist
5.	Sukhendu Das	Neunkirchen, Germany	Oct-Nov'95	Visiting Scientist

#### 4.6.12. Distinguished Visitors to the Department (Important dignitaries above the level of Professors)

Sl.No.	Name of the Visitor and Occupation	Date of Visit	Purpose of Visit (Lecture/Discussion)
1.	Prof. Krithi Ramamritham University of Massachusetts USA	Aug '94-June '95	Visiting Faculty

#### 4.6.13. Sponsored Projects

Title(s)	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
FDDI Station Management Protocols and Ethernet Bridge	1994-96	DOE	27.2	T.A.Gonsalves A.Jhunjunwala(EE) B.Ramamurthy (EE) C.Mathiazhagan(EE)
Wireless Local Loop	1993-95	Analog Devices	126+ Royalty	T.A.Gonsalves A.Jhunjunwala(EE) B.Ramamurthy (EE) C.Mathiazhagan(EE)
Fibre Optics Railway Signalling and Communication System	1993-95	DOE	17.0	T.A.Gonsalves A.Jhunjunwala(EE) B.Ramamurthy (EE) C.Mathiazhagan(EE)
Development of Neuron-Based Distributed Control SCADA System	1993-95	Alacrity Electronics	15.0	T.A.Gonsalves A.Jhunjunwala(EE) B.Ramamurthy (EE) C.Mathiazhagan(EE)
Development of New DSP Based Products	1993-95	Analog Devices	7.875	T.A.Gonsalves A.Jhunjunwala(EE) B.Ramamurthy (EE) C.Mathiazhagan(EE)
ERNET	1989-97	DoE UNDP	225.0	S.V.Raghavan
Development of Software for Russian-English Translation	-	ISRO	4.95	S.Raman
Development of Software for Content Based Search Telemetry Data for Flight Analysis	-	ISRO	1.25	S.Raman
Voice Conversion	1992-95	DST	8.0	B.Yegnanarayana Hema A.Murthy C.Chandra Sekhar R.Sundar
Development of Neural Network Models for Classification of Sonar Targets	1991-95	DOE	19.63	B.Yegnanarayana C.Chandra Sekhar

Title(s)	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
Studies in Computational Geometry and Relavant Data Structures	1993-95	MHRD & BMFT	-	Kamala Krithivasan C.Pandu Rangan
Studies in Computational Geometry and Applications to Robotics	1994-96	DST	5.5	Kamala Krithivasan C.Pandu Rangan
Task Allocation in Parallel Computers	1993-96	INSA	0.6	C.Siva Ram Murthy
On Allocation Problems in Parallel and Distributed Computing Systems	1994-96	DST	2.0	C.Siva Ram Murthy
Application of Artificial Neural Networks for Remote Sensing	-	ISRO	5.0	B.Yegnanarayana R.Sundar C.Chandra Sekhar
Indo-German Project	1993-96	IIT-FRG (BMFT)	-	B.Yegnanarayana N.Alwar, R.Sundar W.Anheier C.Chandra Sekhar
Expert Systems in Indian Space Applications for ISRO	1995-96	ISRO	5.0	Deepak Khemani

#### 4.6.14. Books/Monographs Published

Sl. No.	Name of Faculty	Title	Publisher
1.	Ravi Mittal C.R.Muthukrishnan with V.P.Bhatkar	Fault-Tolerant Systems and Software	Narosa Publishing House, 1995
2.	B.Yegnanarayana M.Narendranath S.Rajendran	Voice Conversion	Department Monograph
3.	B.Yegnanarayana N.Sudha C.Chandrasekhar P.P.Raghu	Artificial Neural Networks for Classification of Sonar Targets	Department Monograph
4.	B.Prabhakaran	Multimedia Synchronization	Chapter in a book pub. by Kulwer Academic Pub. January 1996

#### 4.6.15. Research Publications

1. R.F.M.Aranha, V.Ganti, S.Prasanna, C.R.Muthukrishnan, S.T.S.Prasad and Krithi Ramamritham, Design Implementation and Performance of a Real-Time Version of a Commercial RDBMS, Advances in Data Management '95 Proc. Seventh International Conference on Management of Data, pp.88-105, December 1995.
2. R L H M Smits and B Yegnanarayana, Determination of instants of significant excitation in speech using group delay function, IEEE Trans. on Speech and Audio Processing, vol.3, no.5, pp.325-333, 1995.
3. M.Narendranath, H.A.Murthy, S.Rajendran, and B.Yegnanarayana, Transformation of formants for voice conversion using artificial neural networks, Speech Communication, vol.16, no.2, pp.206-216, Feb.1995.
4. A.Ravichandran and B.Yegnanarayana, Studies on object recognition from degraded images using neural networks, Neural Networks, vol.8, no.3, pp.481-488, 1995.
5. P.P.Raghu, R.Poongodi, and B.Yegnanarayana, A combined neural networks applications for texture classification, Neural Networks, vol.8, no.5, 1995.
6. Babu Thomas, B.Yegnanarayana, and Sukendur Das, Stereo-correspondence using Gabor Ligons and neural networks, Proc. IEEE International Conference on Image Processing, Washington D.C, Oct.23-26, 1995.
7. V.Darsinos, C.d'Alessandro, and B.Yegnanarayana, Evaluation of a periodic/aperiodic speech decomposition algorithm, European Conference on Speech Communication and Technology, Madrid, Spain, pp.393-396, Sept.1995.
8. C.d'Alessandro, V.Darsinos, and B.Yegnanarayan a Eavluation of periodic/aperiodic decomposition for analysis of aperiodicities in the voice source, Proc. International Conference on Musical Acoustics, Le Normont, Dourdau, France, pp.446-452, July 2-6, 1995.
9. B.Yegnanarayana and R.L.H.M.Smits, A robust method for determining instants of major excitations in voiced speech, ICASSP-95, Detroit, USA, May 8-12, 1995.
10. C.d'Alessandro, B.Yegnanarayana, and Darsinos, Decomposition of speech signals into deterministic and stochastic components, ICASSP-95, Detroit, USA, May 8-12, 1995.
11. V.Kamakoti, Kamala Krithivasan, and C.Pandurangan, An Efficient Randomized Algorithm for the Closest Pair Problem on Colored Point Sets, Nordic Journal of Computing, vol.2, pp.28-40, 1995.
12. Kamala Krithivasan and Meena Mahajan, Non-deterministic, Probabilistic and Alternating Computations on Cellular Array Models, Theoretical Computer Science, vol.143, pp.23-49, 1995.
13. Kamala Krithivasan and A.Renuka, Path Planning in 3d Grid Amidst Movable Obstacles. International Symposium on Intelligent Robotic Systems-95, pp.22-24, 1995 (Procs. is yet to be printed).



14. Neelakantan and S.V.Raghavan, Scientific foundations of Multilevel Method, Accepted for publication in IEEE/ACM Trans. on Networks, in 1996.
15. Mukesh Prabhu and S.V.Raghavan, Security for Computer Networks and Distributed Systems, Accepted for publication in Computer Communication Journal, Elsevier, UK, 1996.
16. S.V.Raghavan and G.Rajeev, A New Learning Bridge Approach for OSInet, Accepted for publication in Computer Communication Journal, 1996.
17. S.Radhakrishnan, S.V.Raghavan, and Ashok K.Agrawala, A flexible Traffic Shaper with Adjustable Burstiness for High Speed Networks, Computer Networks and ISDN Systems, vol.28, pp.453-369, 1996.
18. S.V.Raghavan, B.Prabhakaran, and Satish K.Tripathi, Synchronization Representation and Traffic Source Modelling in Orchastrated Presentation, IEEE Journal of Selected Areas in Communication, vol.14, no.1, Special Issue on Multimedia Synchronization, Jan. 1996.
19. S.V.Raghavan, D.Vasukiamaiyar, and Gunther Haring, Hierarchical Approach to Building Generative Workload Models, Computer Networks and ISDN Systems, vol.27, pp.1193-1206, 1995.
20. R.S.Kripanandan and S.V.Raghavan, Experiences in Test Generation Using MultiLevel Approach, Computer Networks and ISDN Systems, 27, pp.591-610, 1995.
21. S.Radhakrishnan, S.V.Raghavan, and Ashok K.Agrawala, Performance Comparison of New Traffic Shaper and Leaky Bucket for Bursty Real-Time Traffic, Proc. MMM'95: Internation Conference on Multimedia Modeling, Singapore, Nov. 1995.
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25. S.Radhakrishnan and S.V.Raghavan, Congestion Control in multimedia Communications, Proc. ConMicro '95 National Conference on Microcomputer Systesms (CSI), Trivandrum, India, Feb. 1995.
26. B.Neelakantan and S.V.Raghavan, Functional Software Testing, CONSEC'95 International Conference on S/W Engineering Practices, New Delhi, India, 1995.

27. N.N.Raju, Ravi Mittal, and S.V.Raghavan, ATM Network for Multimedia Communications, Proc. ConMicro '95 National Conf. on Microcomputer Systems (CSI), Trivandrum, India, Feb.1995.
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#### 4.6.16. Any other relevant details

Prof. C.Pandu Rangan was invited to serve as a specialist referee by Hong Kong Research Grants Council for refereeing research proposals for the award of grants.

Our department was instrumental in IIT Madras signing on MOU with uof Md, CP, USA for collaborative Research.

## **4.7 Electrical Engineering Department**

### **4.7.1 Introduction**

The Department of Electrical Engineering is an integrated one encompassing both the areas of Electrical and Electronics Engineering. At present the Department comprises the following laboratories.

- \* Communication and Digital Signal Processing Laboratory
- \* Electronic Circuits/Microelectronics Laboratory
- \* Amorphous Semiconductor Laboratory
- \* Aeronomy and Laser Communications Laboratory
- \* Television Engineering Laboratory
- \* Control Engineering including Robotics Laboratory
- \* Electrical Machines and Drives Laboratory
- \* Measurements and Instrumentation Laboratory
- \* Power Systems Laboratory
- \* High Voltage Engineering Laboratory
- \* PC Laboratory
- \* Microprocessor and Digital Systems Laboratory
- \* Optical Communication Laboratory
- \* Photonics Laboratory

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

1. B.Tech Degree in Electrical & Electronics Engineering with emphasis on power systems, machinery, control engineering and related subjects.
2. Electronics and Communication Engineering with emphasis on electronics circuits, control engineering, communication systems and related subjects.

Beginning July 1993 there is an integrated Electrical Engineering degree course that combines the aspects of Power, Control and Communication Engineering.

### **M. Tech Degree in Electrical Engineering**

Four major streams of study are available at M.Tech level:

- i) Communication Systems Engineering
- ii) Energy Systems Engineering
- iii) Integrated Electronic Circuits and Systems
- iv) Control, Guidance and Instrumentation Systems

The first and third streams are under review and pending approval substantially revised courses will be offered under these streams.

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

Electronic Circuits, Communication Systems, Digital Techniques and Computer Technology, Electromagnetic Interference and Compatibility, Fibre Optic Communication, Image and Digital Signal Processing, Laser Communication, Microwave Engineering, Television Engineering, 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

Sl. No.	Course	Title	Faculty
1	EE 721	Special Semiconductor Devices	Dr. S. Karmalkar
2	EE 612	Error Control Coding	Dr. V.V. Rao Dr. B. Ramamurthy
3	EE 638	Characterization of Semiconductor Material and Devices	Dr.E.Bhattacharya
4.	EE 614	Detection and Estimation Theory	Dr. Devendra Jalihall Dr. K. Girdhar Dr. V.V. Rao Dr. B. Ramamurthy
5.	EE 604	Adaptive Signal Processing	Dr. K. Girdhar Dr. K.M.M. Prabhu Dr. D. Jalihal Dr. B. Ramamurthy

#### 4.7.3 Details of Faculty

##### Name and Qualification

##### Specialisation

##### Professors

Ashok Jhunjunwala, Ph.D.(Maine)	Communication Networks, Fibre Optics, Surface Acoustic Wave Devices
M.V.Chalapathi Rao, Ph.D.(IIT Madras)	Control Theory
C.Eswaran, Ph.D.(IIT Madras)	Networks, Digital Filters, Microprocessors
P.A. Janakiraman, Ph.D.(IIT Madras)	Robotics, Control Systems, Instrumentation, Image Processing
A. Kuppurajulu, Ph.D. (Moscow)	Power Systems, Computer Applications



M. Mukunda Rao, Ph.D. (Andhra)  
 M.S.Narasimhan, Ph.D.(IIT Bombay)  
 K.Narayana Bhat, Ph.D.(IIT Madras)  
 Y. Narayana Rao, Dr.Ing.(Braunschweig)  
 K.M.M. Prabhu, Ph.D. (IIT Madras)  
 K.Radhakrishna Rao, Ph.D.(IIT Kanpur)  
 J.P. Raina, D.Sc.(Louvain)  
 K. Ramar, Ph.D.(IIT Madras)  
 P. Sankaran, Ph.D.(IIT Madras)  
 V.V. Sastry, Ph.D.(IIT Kharagpur)  
 G. Sridhara Rao, Ph.D.(IIT Madras)  
**[Head]**  
 S. Srinivasan, Ph.D.(IIT Madras)  
 Vedam Subrahmanyam, Ph.D.(IIT Madras)  
 V. Venkata Rao, Ph.D. (Iowa)  
 C. Venkateshaiah, Ph.D.(IIT Madras)  
 S.S.Yegnanarayanan, Ph.D.(IIT Madras)

**Associate Professors**

Bhaskar Ramamurthi, Ph.D.(California)  
 C. Dattatreyan, Ph.D. (Sheffield)  
 V. Jagadeesh Kumar, Ph.D.(IIT Madras)

**Assistant Professors**

Amitava Dasgupta, Ph.D.(IIT Kharagpur)  
 M. Antony Reddy, Ph.D.(IIT Madras)  
 Enakshi Bhattacharya, Ph.D.(TIFR Bombay)  
 S. Karmalkar, Ph.D.(IIT Madras)

**Specialisation**

Lasers, Fibre Optics  
 Antenna Eng., Applied Electromagnetics  
 Semiconductor Fabrication  
 High Voltage Engineering  
 Signal Processing  
 VLSI, Analog and Digital IC's  
 Fibre Optics, Television  
 Power Systems, Computer Applications  
 Networks, Magnetic Materials  
 Machines, Power Electronics, Simulation  
 Machines, Power Electronics, Simulation  
 Microprocessors, Microcomputers  
 Power Electronics  
 Digital Signal Processing, Communications  
 High Voltage, Power Systems  
 Electrical Machines, Simulation  
 Digital Communication and Communication networks, Signal processing  
 Microwaves  
 Measurements, Instrumentation  
 Si and GaAs Devices, Tech. and Simulation  
 Electronic Circuits  
 Solid State Devices  
 VLSI, Semiconductor Devices

	<b>Specialisation</b>
M. Krishnamurthi, M.Tech.(IIT Madras)	Power Systems
P.C.Majhee, M.Tech. (IIT Madras)	Measurements, Instrumentation
G.T. Manohar, M.Tech.(IIT Madras)	Microprocessors, Computers, Control Systems
Nandita Dasgupta, Ph.D.(IIT Madras)	Si and III-V Semiconductor Devices, Technology & Simulation
P. Sasidhara Rao, Ph.D.(IIT Madras)	Electrical Machines
Varadarajan Subrahmanyam, M.E.(IISc.)	Microwaves
T.J.Vitto, Ph.D. (IIT Madras)	Semiconductors
C. Mathiazhagan, Ph.D. (Univ. of California)	Telematics, RF Communication, Analog Circuits
Vinita Vasudevan, Ph.D.(IIT Bombay)	Devices, CAD for VLSI
Devendra Jalihal, Ph.D. (Duke)	Statistical Signal Processing
R. Aravind, Ph.D.(California)	Image Processing and Compression
K. Giridhar, Ph.D. (California)	Communication and Signal Processing
<b>Principal Scientific Officer</b>	
P.R. Vaya, Ph.D.(IIT Madras)	Semiconductors and Opto-electronic Device Technology
<b>Senior Scientific Officers Grade II</b>	
T.V.Gopal, M.S.(IIT Madras)	Measurements and Instrumentation, Computer System Management, Graphics
M. Kumaravel, Ph.D. (IIT Madras)	Instrumentation, Digital Systems, Microprocessors
K. Ponnuraju, Ph.D. (IIT Madras)	Solid State Electronic Devices, Semiconductor Technology
H. Renganathan, M.S.(IIT Madras)	DSP, Microprocessor Systems
<b>Senior Design Engineers</b>	
P.Ramaseshagiri Rao, M.S.(IIT Madras)	Semiconductor Fabrication
Ranjana Shukla, M.S.(IIT Madras)	Microprocessors and Computers
V.N. Shukla, M.S.(IIT Madras)	Microprocessors and Computers

#### 4.7.4 Students on Roll

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D	2	-	4	-	2	-	2	-	3	2	13	2	15
M.S.	11	1	19	1	9	-	3	2	1	-	43	4	47
M.Tech.	24	5	44	4	-	-	-	-	-	-	68	9	77
B.Tech.	69	2	74	2	63	3	82	4	-	-	288	11	299
<b>Total</b>	<b>106</b>	<b>8</b>	<b>141</b>	<b>7</b>	<b>74</b>	<b>3</b>	<b>87</b>	<b>6</b>	<b>4</b>	<b>2</b>	<b>412</b>	<b>26</b>	<b>438</b>

#### 4.7.5 Number of Fellowship/Scholarship Holders

Program	Institute	Total
Ph.D	4	4
M.S.	35	43
M.Tech	43	43
<b>Total</b>	<b>82</b>	<b>82</b>

#### 4.7.6 Number of Degrees Awarded

Programme	No. Awarded
Ph.D.	8
M.S.	7
M.Tech.	34
B.Tech.	75
<b>Total</b>	<b>124</b>

#### 4.7.7 Instruments/Equipment Designed and Developed

1. Energy Monitoring System
2. Intelligent Monitoring and Control Panel
3. Automatic Mains failure Control Panel for Diesel Generator
4. HUD Electronic
5. Power Systems Simulator
6. Four quadrant energymeter (for Wave Energy Project)
7. Digital Control Systems Interface for IBM PC via serial link

3. Single chip controller based soft-start for and induction motor
9. Will System
10. Digital pair-gain system
11. Tapeless Digital Answering telephone machine
12. Automating the DLTS system in the microelectronics laboratory.

#### 4.7.8 New Facilities added and Major Equipment procured

1. Surface Mount Rework Station
2. DEC-Alpha Mini Computer System
3. ROTEK 811A, 3-Phase, 4-wire Voltage/current/power/Energy calibrator.
4. Department Computing Facility consisting of 2 DEC-Alpha and IBM PC on a LAN.
5. Eshed Robot-ER V and Controller (interfaced with IBM PC486)
6. IR Mask Aligner has been imported from OAI (USA) and installed. This can be used for aligning with respect to patterns on the backside of the wafer.
7. SUN SPARC 20 workstation, Pentium-based computer (Hardware); SABER Simulator, MATLAB-SIMU LINK simulator and DYMOLA- object oriented modeling language
8. Two PC/AT-486 and a LQ1050 series printer .
9. VLSI Design Laboratory with two work stations (one SWN & one DEC-Alpha).
10. RF Lab facility including HP spectrum Analysers and HF Signal generators (upto 2.2. GHZ).
11. Digital Signal Processing Laboratory has been set up.

#### 4.7.9 Short-term Courses/Workshops/Seminars/Symposia/Conferences conducted

S.No.	Co-ordinator(s)	Title of Course/Workshop/ Seminar/Symposia/Conference	Period
1.	Dr. Y. Narayana Rao and SAMEER.	International Conference on Electromagnetic Interference & Compatibility (INCENIC-95) Madras.	6-8, Dec. 1995
2.	Dr. C. Mathiazhagan Dr. T.A. Gonsalves	Advanced Topics in Telematics (Workshop)	12-22, Dec. 1995

#### 4.7.10. Special Lecture(s) Delivered

S.No.	Name of Faculty	Topic of Lecture	Place and date
1.	V.Jagadeesh Kumar	Feedback compensation in Instrumentation Pondicherry, May 95	Pondicherry Eng. College,
2.	P.R. Vaya	Bandgap manipulation and semiconductor Devices	Samrat Ashok Technological Institute, Vidisha, Dec.1995

S.No.	Name of Faculty	Topic of Lecture	Place and date
3.	Devendra Jalihal	3 lectures on Digital Modulation Technique short term course on Telematics	Dec. 1995
4.	R. Aravind	4 Lecturers on video compression as part of Short term course on Telematics	Dec. 1995
5.	P.A. Janakiraman	Estimation of mass in in oscillatory systems QIP course on system identification and adaptive control	Department of Chemical Engg. IIT Madras Dec. 1995
		Inverters and applications to Solar Energy Covnersion	CEC, IIT , Madras Jan. 1996
6.	K.N. Bhat	Micro devices & micro-maching Seminar on Recent developments in Precision Engineering	CMTI, Bangalore Jan. 1996
		Effects of High energy Electron Irradiation on International conf. on "R&D using electron accelerators	Mangalore University Sept.1995
7.	S.Srinivasan	Keynote address on "Image Compression techniques for multimedia Application	Anna University Feb. 1996
8.	K.Radhakrishna Rao	Analog VLSI Design Anurag,	DRDO Lab Aug1995
9.	K. Ramar	Power System Voltage stability studies	Annamalai Univ. Mar. 1996
		Power System Voltage stability study	Tennessee Tech. Univ. Tennesse USA, Apr. 1995
	Power System Voltage	City Univ.London, stability study	UK, April 1995
		Power System simulator including load dynamics	Washington Univ. Seattle, Apr.1995
		Power System Voltage stability studies	North Dakota State Univ. Fargo, USA. April 1995

S.No.	Name of Faculty	Topic of Lecture	Place and date
10.	E. Bhattacharya	Amorphous Silicon Solar cells	Anna Univ. Madras Dec. 1995
		Photovoltaic systems	-do-
		Hydrogen passivation effect in Porous Silicon	Institute of Physics Bhubaneswar Dec. 1995
11.	K. Giridhar	Global standard for Mobile Communication (GSM) Tutorial lecture as part of National Conference on Communication (NNC-96)	IIT Bombay Feb.1996

#### 4.7.11. Visits Abroad

S.No.	Name of Faculty	Country visited	Date	Purpose of visit
1.	Dr. P.R. Vaya	Singapore	July '94-June '95	Senior Fellowship at National Univ of Singapore
2.	V.V. Sastry	U.S.A.	May 15-July 15, 1995.	Consultant on an EPRI Project Washington Univ, Seattle.
3.	K. Ramar	U.S.A. U.K.	1.4.95-26.4.95 26.4.95-30.4.95	To delivery lectures - do -

#### 4.7.12. Visitors to the Department

Sl.No.	Name of the Visitor and Occupation.	Purpose of visit (Lecture/Discussion)
1.	Dr.P.R. Kumar Professor, Univ of Illinois	Lecture (TOKTEN Programme)
2.	Dr. Shiela Prasda North Eastern Univ. USA	Lecture
3.	Peter O. Louritzen Univ of Washington, USA	Lecture
4.	Dr. V.C. Pratapa Reddy Rochester Institute of Technology	Visiting Professor
5.	Prof. A. Braunstein Chairman, Dept of Interdisciplinary Studies Tel Aviv University, Israel	Lecture

#### 4.7.13. Sponsored Projects

S. No.	Title	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
1.	Development of Intelligent Monitoring Control Panel with remote Interface.	-	DOD N. Delhi	-	Faculty, EE Dept.
2.	Energy Monitoring on the wave energy System - Phase II Electrical Parameters and Instrumentation.	one year	NIOT	12.76	Dr.V.Jagadeesh Kumar Prof. G.Sridhara Rao Prof.SS.Yegna Narayanan
3.	Development of Fibre-optic Sensors for simultaneous measurement of voltage and current	Two years	AICTE N Delhi	9.00	Prof. P. Sankaran Dr. V.Jagadeesh Kumar

S. No.	Title	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
4.	Feasibility studies on DSP basic block design	Two years	ISRO	8.00	Mr. H. Renganathan Prof. C. Eswaran Prof. S. Srinivasan
5.	NN-based coding schemes for telemetry data	Two years	ISRO	2.85	Mr. H. Renganathan Prof. C. Eswaran Prof. S. Srinivasan
6.	Development of an optical power tethered cable for aerostat applications	Two years	ADRDE Agra	2.00	Prof. Y.N. Rao
7.	Expansion of Robotics Laboratory	Three years	AICTE N. Delhi	10.00	Prof. P.A. Janakiraman
8.	Design and Development of Micromagnetized Silicon Accelerometer	One year	DRDO N. Delhi	24.00	Prof. K.N. Bhat Dr. A. Das Gupta Dr. N. Das Gupta Dr. S. Karmalkar Mr. P.R.S. Rao
9.	SOI MOSFET Technology for Operation in Radiation environment	One year	DRDO N. Delhi	2.00	Prof. K.N. Bhat Dr. A. Das Gupta Dr. N. Das Gupta Dr. S. Karmalkar Mr. P.R.S. Rao
10.	Development of Micromachined Smart Sensors for Mechanical and Biomedical Applications	Two years	AICTE N. Delhi	20.00	Prof. K.N. Bhat Dr. A. Das Gupta Dr. N. Das Gupta Dr. S. Karmalkar Mr. P.R.S. Rao
(Projects at Sl. No. 8 and 10 are jointly with Applied Mechanics Dept)					
11.	Design of Analog and Mixed-mode ASICs and Development of Analog ASIC Design Tools	-	DST N. Delhi	35.59	Prof. S. Srinivasan Dr. Vinita Vasudevan Prof. K.R. Rao Prof. K.N. Bhat Dr. C. Mathiazhagan



S. No.	Title	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
12.	Variable-speed constant frequency generator applied to standalone sea-wave energy extraction.	-	-	-	Prof. V.V. Sastry
13.	Adaptive Moving Target Detection for Radar Signal Processing	Threeq years	-	9.97	Prof. K.M.M. Prabhu
14.	Analog VLSI Design	Three years	Analog Devices Inc,USA	6.00	Prof. K.R. Rao Dr. Vinita Vasudevan
15.	Study of Si-Ge Alloys	Two years	DST N. Delhi	4.60	Dr.E.Bhattacharya Dr.A.Subrahmanyam (Physics Dept)
16.	Developmet of Amorphous Silicon Thin Film Transistors	Three years	DST N. Delhi	13.21	Dr.E.Bhattacharya Dr. N. Das Gupta
17.	Development of Bipolar and MOS Device Simulator	-	DOE N. Delhi	21.15	Dr. A. Das Gupta Prof. K.N. Bhat Dr. N. Das Gupta Mr. P.R.S. Rao
18.	Development of GaAs based MESFET and HEMT logic circuits	-	AICTE N. Delhi	10.00	Dr. A. Das Gupta Prof. K.N. Bhat Dr. N. Das Gupta Mr. P.R.S. Rao
19.	Design of Analog and Mixed-mode ASICs & Dev.of Analog ASIC Design Tools	Three years	DST N. Delhi	35.59	Prof.S.Srinivasan

#### 4.7.14 Major Consultancy Assignments

S.No.	Title	Year	Sponsor	Amount (Rs.in lakhs)	Coordinator
1.	Development of HUD Electronics (RBIC)	1994-95	CSIO	15.00	V.N. Shukla
2.	Common Effluent Treatment Plant	Pollution Control Board N Govt.		600.00 (approx)	Y.N. Rao K. Ramar
(Joint project with Depts of Civil, Chemical & Mechanical Engineering)					
3.	Fuzzy-logic based soft-start for induction motor devices	1994-96		2.00	V.V. Sastry P.Chidambaram (ChE. Dept)
4.	Speed controller for induction motor used in Industrial drills	1995-96	ICICI & Electrodyne	3.00	K.R. Rao G.S. Rao S.S.YegnaNarayanan S. Kumaravel
5.	WILL System	1995	Analog Devices	\$400,000	C.Mathiazhagan A.Jhun Jhunwala B.Ramamurthy
6.	Computer Networking Activities	-	Analog Devices	\$400,000	-do-
7.	Building Automation System	1994-96	Alacrity Electronics Limited		-do-
8.	Type Tests on Alternators	1995	UCAL Power Systems Ltd	0.30	P.Sasidara Rao
9.	Efficiency tests on Alternators	1995	LUCAS TVS Limited	0.36	-do-

#### 4.7.15. Research Publications

##### (a) Papers published in Journals:

- 1 Kuppurajulu, A. "Identification of Transients in Power Systems by Recursive Procedures", Journal of Institute of Engineers (India), vol. 76, Nov. 95, pp. 158-60.

- 2 Veera Raju, V., and Kuppurajulu, A., "An Approach to Power System Restoration in Real-time", Recent Advances in Control and Management of Energy Systems, Interline Publishing Co., Bangalore, 1995.
- 3 Kuppurajulu, A., "Voltage Stability in Power Systems", National Workshop on Voltage Instability in Electric Power System Networks and FACTS Technology, IIT, Kanpur, July 20-21, 1995.
- 4 Veera Raju, V. and Kuppuraju, A., "A closed-Loop Reactive Power Controller for Power System Voltage Stability", *ibid*, pp. 34-37
- 5 Kuppurajulu, A., "Analytical Tools to Aid Power System Restoration", International Journal of Power and Energy Systems, Vol. 16, No. 1, 1996.
- 6 Kuppurajulu, A., "Reactive Power Reserve Enhancement", International Conference on Transmission and Distribution INDIA 2000, 26-28, Feb. 1996.
- 7 V. Jagadeesh Kumar, "A novel method of measurement of L and C", IEEE Trans. on Instrum. and Meas., August 1995.
- 8 V. Jagadeesh Kumar, "A microcontroller-based scheme for measurement of L and C", Measurement Science and Technology, Vol. 1, No. 6, June 1995.
- 9 V. Jagadeesh Kumar, "A simple and inexpensive implementation of time division multiplier for two quadrant operation", IETE Technical Review, Vol. 12, Jan, 1995, pp. 33-35.
- 10 Hussain Arbab Tafti, F.F. Papa, Fatima N. Farokhrooz and P.R. Vaya, "Circuit modeling of Semiconductor lasers", Journal of IETE, 41, No. 2, pp.101-112, 1995.
- 11 Jacob Thomas, V., Vaya, P.R. and Megha Singh, "Development of biosensor for glucose estimation by ion sensitive field effect technique", Ind. Journal of Exp.Biology, Vol. 33, pp. 747-748, 1995.
- 12 Raman, A., Chua, S.J., Karunasiri, G., and Vaya, P.R., "Heavily silicon doped InGaAs/InP epilayer grown by molecular Beam Epitaxy", Journal of Crystal Growth, Vol. 156, pp. 186-190, 1995.
- 13 Elwin Chandra Monie and Srinivasan, S., "Adaptive Vector Quantization Scheme for Image Coding using Adaptive Resonance Theory Neural Networks", Advances in Modeling and Analysis, 13, Vol. 36, No. 3, pp. 49-55, Autumn 1995.
- 14 Rao, M.M., and Prabhu, K.M.M., "Fixed-point Error Analysis of Radix-4 FHT Algorithms with optimized scaling schemes", IEE Proc. Vis. Image Signal Processing, Vol. 142, No. 2, pp. 65-70, April 1995.
- 15 Kalidas, P., and Prabhu, K.M.M., "An improved LMS Algorithms for narrowband interference suppression in Direct sequence spread spectrum", IEEE Trans. on Aerospace & Electron Systems, Vol. 31, No. 3, pp. 1198-1201, July 1995.
- 16 Radhakrishna Rao, K., and Srinivasan, A, "Front End Filtering", Electronics & Wireless World, pp 276-278, April 1995.

- 17 Karthikeyan, M.R., and Radhakrishna Rao, K., "A Software Tool for Analog Filter Design", *JIETE*, Vol. 41, No. 5& 6, Sept-Dec. 1995.
- 18 Ramar, K., and Raviprakash, M.S., "Determination of weak bus ordering vector in multimachine power systems from voltage stability point of view", *Electric Machine and Power Systems*, Vol. 23, No. 5, pp. 597-609, 1995.
- 19 Ramar, K., and Raviprakash, M.S., "Design of compensation schemes for Long Transmission lines for Max. power Transfer limited by voltage stability", *In. J of Electric Power and Energy Systems*, Vol. 17, No. 2, pp. 83-88, 1995.
- 20 Krishna Vasudevan and Sasidhara Rao, P., "Simulation of Power Electronic Circuits using sparse Matrix Techniques", *IEEE Trans. on Industrial Electronics*, Vol. 42, No. 4, pp. 409-413, August 1995.
- 21 Giridhar, K., Shynk, J.J., and Iltis, R.A., "Blind Adaptive MAP symbol detection and TDMA digital Mobile Radio Application" (Chapter contribution), in *Computer Techniques and Algorithms in Digital Signal Processing*, (T. Leondes, Editor), *Control and Dynamic System: Advances in Theory Applications*, Vo. 75, Academic Press (San Diego, CA, USA).

**(b) Papers presented at Conferences/Symposia**

- 1 Jagadeesh Kumar, V., Biju, B.N., and Sankaran, P., "Design and development of a microcontroller based trivector meter for non-conventional energy sources", *International conference on Energy management and Power Delivery (EMPD'96, IEEE Singapore, November 1995.*
- 2 Jagadeesh Kumar, V., Biju, B.N., and Ravindran, M., "Instrumentation for the 150 kW prototype wave energy system", *International conference on Energy management and Power Delivery (EMPD'96), IEEE, Singapore, November 1995.*
- 3 Sudhakar Rao, K., Jagadeesh Kumar, V., and Sankaran, P., "Microcontroller based precision variable phase shifter", *Proceedings ETD 2000, Electronic Association of South Australia, Adelaide, Australia, May 1995.*
- 4 Pukraj Vaya, Soo Jin Chua and Kiran Kumar, "Optimized Design parameters of InGaAs/InP quantum well lasers", *LDS 95, Singapore, May 8-10, 1995.*
- 5 Pukraj Vaya, Soo Jin Chua and Cadambi, S., "Threshold current density and gain calculations of InGaAs/GaAs strained layer Quantum well lasers", *PDS 95, May 8-10, 1995.*
- 6 Vaya, P.R., "Quantum well structures" (invited paper), *National Seminar on Emerging Trends on Thin Film Technology, Cochin, Nov. 27-29, 1995.*
- 7 Vaya, P.R., "Recent Trends in MBE Technology", (invited paper), *National Conference on Fundamentals of Crystal Growth, Anna University, Madras, Jan. 29-30, 1996.*
- 8 Chua Soo Jin, Lim Swee Hong and Vaya, P.R., "Optical bistability in GaAs/AlGaAs interdigitated contact semiconductor laser", *XXIII National Symposium of the Optical Society of India on Optics and Optoelectronics, Mar. 14-16, 1996, Dehradun.*
- 9 Venkateswarlu, V., Sarathy, R., and Rao, Y.N., "Modelling of an electromagnetic pulse simulator and evaluation of its radiated field", *Proceedings of INCEMIC-95 Conference, pp. 184-189.*
- 10 Venkateswarlu, V., and Rao, Y.N., "Shielding efficiency measurements under pulsed electromagnetic field", *Proceedings of INCEMIC-95 Conference, pp. 161-165.*

- 11 Elwin Chandra Monie and Srinivasan, S., "Vector Quantization of Color Images using Adaptive Resonance Theory Neural Networks", 6th International Symposium on IC Technology Systems and Applications, Singapore, Sept. 1995.
- 12 Vishwanatha, N.L., and Srinivasan, S., "Efficient Implementation of JPEG Compression using Dual Processors, 6th International Symposium on IC Technology Systems and Applications, Singapore, Sept. 1995.
- 13 Elwin Chandra Monie and Srinivasan, S., "Coding of Image Sequences using Adaptive Resonance Theory Neural Networks", IASTED Intl Conf on Signal & Image Processing, Las Vegas, USA, Nov. 1995.
- 14 Prasad, G.V.K., Patil, K.M., Srinivasan, S., and Oomhaer, P.K., "Spectral Analysis of EMG Signals using TMS 320C25 Processors" 5th National Conference on Biomechanics, Madras, Feb. 1996.
- 15 Nagaraj, H.C., Radhakrishnan, S., Srinivasan, S., Ayyar, S.S.K., and Ramesh, M., "Spectral Analysis of Braingtem Auditory Evoked Responses", 5th National Conference on Biomechanics, Madras, Feb. 1996.
- 16 Raja, N.R., Venkata, S.S., Kagalawala, R.A., and Sastry, V.V., "An active power quality conditioner for reactive power and harmonic compensation", Intl. Conference, PESC (Power Electronics Specialists Conference), June 1995, Atlanta, pp 209-214.
- 17 Janardhana Iyengar, R.S., and Sastry, V.V., "Fuzzy-logic based self-start for induction motor drives", IEEE Intl. Conf. Industry & Applications Society, Oct. 1995, Orlando.
- 18 Kagalawala, R.A., Venkata, S.S., Lauritzen, P.O., Sundaram, A., Adapa, R., and Sastry, V.V., "Models of a distribution static condenser (STATCON) for EMTP", Intl. conf. on Electromagnetic Transients, Lisbon, Sept. 1995.
- 19 Sastry, V.V., Ganesh, P.S., and Madhavi, V., "High performance induction motor controller using thyristor voltage feed-back", Intl Conf. on Power Electronics, Driver I Energy Systems (PE 96) for Industrial Growth, Jan. 1996, pp. 44-47.
- 20 Arvind, R., and Tsuhan Chen, "On comparing MPEG-2 Intraframe codign with a Wavelet-based Codec", Proc. of the International Picture Coding Symposium, Australia, Mar. 1996. (work done at AT&T Bell Labs).
- 21 Krishna Vasudevan and Sasidhra Rao, P., "A modular approach to the simulation of Doubly-fed induction machine systems", Proc. of the IEEE Intl. Con. on Power Electronics, Drives and Energy Systems for Industrial Growth, PEDES-96, New Delhi, Jan. 1996.
- 22 Srinivasan, C., and Radhakrishna Rao, K., "A 20 MHz CMOS variable gain Amplifier", Intl. Con. VLSI design, IISc., Bangalore, Jan.3-6, 1996.
- 23 Ramar, K., and Rafeezudin, M, "Digital Power System Simulator Including load Dynamics", First Intl. Conf. on Digital Power System Simulators, Texas A&M University, College Station, USA, Apr 1995, pp. 205-210.
- 24 Ramamurthy, B., and Mathiazhagan, C., "DECT based WLL System", Intl Workshop on Personal Communication, Bangalore, Dec. 94.(??)
- 25 Vasudevan, K., Ramaurthy, B., and Giridhar, K., "Split- Trellis Viteobi Decoder: A new computationally efficient MLSE", the Second National Conference on Communications, Bombay, Feb. 1996, pp. 59-62.

## 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 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 & Qualification	Specialisation
<b>Professors</b>	
S. Ambirajan, Ph.D.(Andhra), Ph.D.(Manchester)	Economics, Economic History, Development Economics.
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.
Dipak Chaudhuri, Ph.D.(IIT Kharagpur)	Reliability Engineering, Operations Research, Production & Materials Management, Maintenance Management.

L.V.L.N. Sarma, Ph.D. (IISc)  
T.T. Narendran, Ph.D. (IIT Madras)  
R. Rajagopalan, Ph.D. (IIT Kanpur)  
[Head]

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

#### Associate Professors

(Mrs) Elizabeth Nainan Kurian, Ph.D. (IIT, Madras)  
(Ms) Evangeline Manickam, Ph.D. (Madras)  
L.S. Ganesh, Ph.D. (IIT Madras)  
(Mrs) Malathy Duraisamy, Ph.D. (Madras)

B. Subramanian, Ph.D. (Karnatak)

#### Assistant Professors

M. Durgaprasada Rao, M.B.A. (Andhra)  
S. Jayachandran, Ph.D. (IIT Madras)  
T.J. Kamalanabhan, Ph.D. (Madras)  
S. Mohan, M.A. (Madras)  
V.R. Muraleedharan, Ph.D. (IIT Madras)  
C. Rajendran, Ph.D. (IIT Madras)  
G. Srinivasan, Ph.D. (IIT Madras)  
D. Veeraraghavan, Ph.D. (IIT Madras)

#### Visiting Faculty

(Mrs) Zoya Abraham  
(Mrs) Devaki Reddy

#### Specialisation

Financial Management, Business Policy & Corporate Strategies.

Operations Management, Decision Support Systems, Group Technology

Production Management, Group Technology, Science and Technology Policy, German

Modern Indian History, Labour History.

American Fiction

English, French

Technology Forecasting, Multicriteria Decisions, Project Management and Applied Systems Analysis.

Applied Economics/Econometrics, Labour Economics, Economics of Science and Technology

German and Philosophy

Management Accounts, General Management

Marketing Management

Industrial Psychology, Organisational Behaviour.

English, Science Fiction

Health Economics, Public Policy, History of Health care in South India

Production Management, Scheduling, Computer Simulation.

Group Technology, Production Management, Operations Research.

Social and Economic History, Labour Movements.

German Language Teaching

English

#### 4.8.3 Students on Roll

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	4	-	3	4	2	2	7	-	2	3	18	9	27
M.S.	1	1	4	-	1	-	-	1	-	-	6	2	8
M.Tech.	22	1	20	3	-	-	-	-	-	-	42	4	46
<b>Total</b>	<b>27</b>	<b>2</b>	<b>27</b>	<b>7</b>	<b>3</b>	<b>2</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>66</b>	<b>15</b>	<b>81</b>

#### 4.8.4 Number of Scholarships/Fellowships holders

Programme	Institute	Number		Total
		CSIR	Others	
Ph.D	21	1	5(QIP) 1(Ext)	28
M.S.	9	-	2(P-1) (S-1)	11
M.Tech.	42	3(SPON)	1(QIP)	46
<b>Total</b>	<b>72</b>	<b>1</b>	<b>9</b>	<b>85</b>

#### 4.8.5 Number of Degrees Awarded

Programme	Number
Ph.D	5
M.S.	4
M.Tech.	22
<b>Total</b>	<b>31</b>

#### 4.8.6 New Facilities added and Major Equipment procured

The Department's LAN was upgraded and extended.



#### 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 of Educational Tech.for Language Teachers"	20-22 July'95
2.	Mr Durgaprasada Rao Dr T J Kamalanabhan	Small Industries Management Assistant Programme	22.5.95 to 25.8.95
3.	Dr Elizabeth N Kurian	"English for Career Devlp."  Offered 4 lectures in a Short-term course on "Professional Communication in English" in HSS Dept.	26-30 June'95  September 1995
4.	Dr Evangeline Manickam	Workshop on "Professional Commun. & Resh. Meth."	1-15 September 95
5.	Dr T J Kamalanabhan	Small Industries Management Assistant Programme	22.5.95 to 25.8.95
6.	Dr L V L N Sarma	Tech. Appreciation Prog. under "The Industl. Assoc. Shipscheme" of IC&SR	March 1995
7.	Dr R Rajagopalan	Executive Devl. Prog. Bld. Qlty. into after Sales Service	17-18 Nov.'95
8.	Dr G Srinivasan Dr T T Narendran	Cellular Manufacturing Experience	1-2 July'95

#### 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	"Some Aspects of change in Honour & Gender Paradigon in Maithili" - National Seminar on Modernization in Address and Reference Systems in Indian Languages, Telugu Univ., Hyd.	24-25 March'95
		"Language and Dialect". Towards a Definition" 18th All India Conference of Linguists at Central Instt. of Indian Languages, Mysore	05-07 Oct.'95

Sl.No.	Name of Faculty	Title	Period/Duration
2.	Dr D Malathy	Presented a paper on "Human Resource Development: Issues, Evidence and Policy Implications", in the seminar on Economic Issues Relating to Social Welfare in Post Liberalisation India, Dept. of Econometrics, Univ. of Madras.	10th Feb.'95
		Workshop of Elementary Education in South India, MIDS.	23-24 March'95
		Presented a paper on "Women's Labour Market Participation and Choice of Work in Urban Tamil Nadu", in the 31st. Annual Conference of The Indian Econometric Society, NIBM, Pune.	12-14 May'95
		Presented a paper on "Women's Choice of work and Fertility in Urban T.N., India", in the The Econometric Society 7th. World Congress, Tokyo, Japan.	22-29 Aug.'95
		Presented a paper on "Implications of Structural Reforms on Pub.-Pvt. Wage Differentials in India", in 37th. Annual Conf. of the Indian Society of Labour Econ., Pondicherry Univ.	22-24 Dec.'95
3.	Dr G Srinivasan	28th Annual Convention of O R S I	27-29 Dec.'95
4.	Dr B Subramaniam	Diswelreise des Agathon IX World Congress of the Intl. Assn. for Germanic Studies held at Vancouver, Univ. of British Columbia	August 1995
5.	Dr S Jayachandran	7th World Marketing Congress Melbourne Australia, Paper Presented and Published in The Academy of Marketing Science USA.	6-10 July'95
6.	Dr T J Kamalanabhan	Quality Circles convention held at Anna University	13-16 Dec'95
7.	Dr R N Anantharaman	Ageing of Population & Soci. policies Univ. of Phillipines, Manila.	15-16 Dec'95

#### 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	"Materials for Teaching Spoken English" at 28th Annual Conference of the English Language Teachers Association.	Madras	6 Jan'96
2.	Dr L V L N Sarma	"Capital Market in India" School of Management Pondicherry Univ.	Pondicherry	13 Oct.'95
		CAPM, Acad. Staff College Bharathiar University	Coimbatore	10 May '95
3.	Dr T J Kamalanabhan	Group Dynamics personnel Selection.	Regional Labour	22 Nov.'95
		Interpersonal skills	Indian Airline	14-15 Mar.'96
		Human Resource Mgmt	Institute of Materials Mgmt.	20-21 Dec'95
4.	Dr R N Anantharaman	Psychology of Accidents	Regional Labour Inst., Madras	1 Jan'96
		Change of Attitudes of workers	Regional Labour Inst., Madras	26 Feb'96
		Quality circles, stress and coping techniques	Annamalai Univ.	28 Mar'96

#### 4.8.10 Sponsored Projects

Title	Period	Funding Agency	Amount (in lakhs)	Co-ordinator(s)
"Access to Quality of and Demand for Education"	2 years	UNDP/GOI	2.0	Dr D Malathy
DSS for Cell Formation in Group Technology	Aug94-96	DST	1.45	Dr G Srinivasan
DSS for Aggregate Planning and Scheduling	Feb94-96	HRD	6.0	Dr G Srinivasan Prof R Rajagopalan Prof T T Narendran

#### 4.8.11 Major Consultancy Assignments

Title	Organisation	Amount (in lakhs)	Co-ordinator(s)
Software for Life cycle cost estimation of aircraft	DRDO Bangalore	1.0	Dr G Srinivasan
Software for scheduling	Quanteck Imaging systems Madras -96	0.6	Dr G Srinivasan
Methods Improvement	Hallmark Industries Madras	0.6	Dr G Srinivasan Dr T T Narendran
Retainer consultant on Capital Market for	Somayajulu & Co. Ltd.,	0.7 p/m from 1.4.95	Dr L V L N Sarma

#### 4.8.12 Honours and Awards

Name of Faculty	Honours/Awards
Dr S Jayachandran	Nominated as a Senate Member of The University of Madras for a Period of Three years w.e.f October'95 by the Governor of Tamilnadu.

#### 4.8.13 Books

Name	Title	Publisher
Dr L V L N Sarma	Investment Management	Commissioned by UGC to write Univ. level Text Books. It is in progress.

#### 4.8.14 Research Publications

##### a. Papers Published In Journals

1. R N Anantharaman, Organisational Climate and Identical accidents, 1996 JAP 33, 1, 28-35.
2. R N Anantharaman & N Balachandar, 1996 Causal model of Organisational Commitments. JPR 40, 1, 26-42.
3. R N Anantharaman & S Radha, 1995 Quality emerging perspective journal of Psychometry Vol.8, No.1, pp. 5-9.

4. Chaudhary S C, "Syllable Types and conspiracies in Maithili and Maithili Speakers English" in Indian Linguistics, 55. 1- 4, pp. 115-22.
5. Elizabeth N Kurian, A Piper entitled "Racial conflict in Bernard Malamud's, The Tenants accepted for publication in IJAS Hyderabad.
6. Evangeline Manickam & Sangeetha Menon, "The Library as a Post-Modernist Code; A Study of John Gerdner's 'The Library of Horror' and Jorge Luis Borges 'The Library of Babel', "Critical Practice, Vol.II, No 2, 47-57, June 1995.
7. Evangeline Manickam & Latha Rengachari, " How Navaranjini, Beame jean: A Study of the Expertriatte Experiences in Jasmine gooneratne's 'A Change of skies', Literary Half- yearly, Vol.XXXVI, No.1, 1995.
8. Evangeline Manickam & Sangeetha Menon, "Magical Roalism and The American Connection Strageties of Appropriation in Loi Chamberlau's 'Majicking the Real: Paraxoded in Postmem Writing". Pakistan Journal of American Studies, Vol.12, 1&2, 56-67, Spring and Fall'94 - Issued Brought out in June'95.
9. T J Kamalanabhan, "Identification of Entrepreneurship" Journal of Psychometry, Vol 8, No.2, PP.1-5.
10. T J Kamalanabhan & D L Sundar, "Relationship between risk- taking and information-seeking in decision-making". Indian Journal of Applied Psychology, Vol.32, No.1&2, PP.80-83.
11. T J Kamalanabhan & D L Sündar, "Entrepreneurial Risk-taking" SEDME Journal
12. T J Kamalanabhan & D L Sundar, "Managerial Risk Taking - Fact or Fallacy" Pakistan Journal of Psychology. (communicated)
13. T J Kamalanabhan & D L Sundar, "An Evaluation of Choice Dilemma Questionnaire as a measure of risk-taking", Educational and Psychological Measurements
14. Malathy D & P Duraisamy, "Returns to Higher Education in India", Journal of Educational Planning and Administration Vol.9 (1), pp. 57-68, January 1995.
15. Malathy D & P Duraisamy, "Determinants of Investment in Health of Boys and Girls: Evidence from Rural Households of Tamil Nadu, India", Indian Economic Review, Vol.30 (1), pp. 51-68, January-June, 1995.
16. Malathy D, "Investment in Women's Education and Welfare", in Welfare Economics: Theory and Applications, (Volume in Honour of Mrs Yasoda Shanmugasundaram), pp.103-122, Allied Publishers, 1995.
17. Malathy D & P Duraisamy, "Does Women's Time Allocation Respond to Economic Incentives? Evidence from a Developed and a Developing country" The Indian Journal of Labour Economics, Vol.38 (2), pp. 217-231, April-June, 1995.
18. Malathy D & P Duraisamy, "The Implications of Structural Reforms for Public-Private Wage Differentials in India" The Indian Journal of Labour Economics, Vol.38 (4), pp.597-602, Oct.-Dec.,1995.

19. ~~Malathy D & P Duraisamy~~, "Do Parents Favour Boys over Girls in Health Investments"? In A Rama Reddy (ed.) Health Care Services Management, pp.20-36, Delta Publishing House, Hyderabad, 1995.
20. Malathy D, "Women's Choice of Work and Fertility in Urban Tamil Nadu, India", Research in Population Economics. Vp.;8, pp.3-24.
21. Ramachandran C & Veeraraghavan D 'Working Class: The Left and the Congress Ministry 1937-39 A Study of Press Workers of Madras City'.
22. Santhakumar V, Rajagopalan R and Ambirajan S, " Planning Kerala's Immigration Proj.:Technological Prejudice and Policies of Hope, "EPW, 30(12), A-30, 1995.
23. Santhakumar V, and Rajagopalan R, "The Problems of understanding the Natural-cultural system of Developing societies, System Practice, 1995
24. Sudhir V, Muraleedharan V R & Srinivasan G, Integrated Solid Waste Management in Urban India: A Critical Operational Research Framework - accepted for publication in Socio-Economic Planning Sciences .
25. G Thangamani, T T Narendran & R Subramanian " Assessment of availability of a Fluid catalytic cracking unit through simulation", Reliability Engineering & Systems safety Vp.47, pp 207-220, 1995
26. Venkat Ramana Murthy Ch and Srinivasan G (1995) Fractional cell formation in Group Technology. Intl.journal of Production Research Vol 33 NO 5 1323-1337.
27. D Veeraraghavan & V R Muraleedharan, 'Disease, Death and Local Admn.: Madras City in the Early 1900's, Radical Journal of Health Vol.1, No.1 Jan 1995

#### **Papers Presented in Conferences/Symposia**

1. Evangeline Manickam, "Love and Death in The Poetry of John Keats and Wallace Stevens," National Conference on John Keats, British and American Literature, 4-6 August'95, Mysore.
2. Evangeline & Meera Viswanathan, "Rejecting patriarchy and asserting, Female Anatomy in Jay Weldon's 'The Fact Women's Joke'" V66 Conference on Women's Literature, Tirupati, March'95
3. Evangeline Manickam & Meera Viswanathan, "The Fractured Family in Anne Tyler's Dinner at the Homesick Restaurant " IAAS Annual Conference, Pondicherry, Jan'95
4. Evangeline Manickam, "The Mind of the Migrant in Salman- Rushdie's East-West', Seminar on Asian-Immigrant Literature, March'95, IIT Madras
5. C Ramachandran & R K Maya South Indian History Congress 9-11 Feb'96 XVI session at Gulbange, "The Gold Rush and the Decline of Coffee Cultivation Wynd."
6. D Veeraraghavan, "Professional regulation and health care in Colonial South India, 1914-1939", Paper presented at the round table on "State, Disease and Society. The politics of public health", 18th World Congress of Historical Sciences, Montreal, 29th Aug-8th Sept, 1995.

7. Bhaskar K and Srinivasan G "Cell Management System - A decision support system for operator allocation and sequencing in cellular Manufacturing Systems" - 28th Annual convention of ORSI New Delhi Dec. 1995.
8. Gowrishankar K and Srinivasan G "Flowshop scheduling with batches" - 28th Annual convention of ORSI New Delhi Dec. 1995.
9. Bhaskar K and Srinivasan G "Dynamic Operator Scheduling in Just-in-time Cellular Mfg. Systems" 28th Annual convention of ORSI N.Delhi Dec.'95.

**4.8.15 Any other Relevant Details.**

1. G Srinivasan, Invited to chair a session on Sequencing and Scheduling in the 28th Annual convention of ORSI.
2. G Srinivasan, Invited as guest faculty in the in-house training program on cellular Manufacturing in HAL Ltd. Bangalore.
3. T T Narendran, Referee for several international journals

## 4.9 Mathematics Department

### 4.9.1 Introduction

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

- Algebra and its Application
- Applied Probability
- Approximation Theory
- Computational Fluid Mechanics
- Continuum Mechanics
- Coding Theory
- Fluid Mechanics
- Functional Analysis
- Fuzzy Sets and Systems
- Graph Theory and Combinatorics
- Mathematical Modelling
- Operations Research
- Statistical Quality Control
- Stochastic Process and their applications
- Theoretical Physics
- Theoretical Computer Science

### 4.9.2 New Courses Introduced

The following new course was introduced during the period under report.

	Course no.	Title	Faculty
1.	MA 770	Algorithmic Graph Theory	Dr.S.A. Choudum

### 4.9.3 New Facility Introduced

1. A eminar hall with all facilities
2. M.Sc. Computer Lab.

### 4.9.4 Details of Faculty

Name and Qualifications	Specialisation
A. Avudainayagam, Ph.D.(IIT Madras)	Fluid Mechanics, Suspension Rheology, Polar Fluids, Low Reynolds number flows
P.Bhattacharyya, Ph.D.(Londong)	Complex analysis, Theoy of Splines, Lacunary interpolation, Approximation Theory

### Specialisation



(Mrs.)S.Kalapakm, Ph.D.(IIT Madras)	Applied Probability and Stochastic Process, Operations Research
S.H.Kulkarni, Ph.D.(IIT Bombay)	Functional Analysis, Numerical Analysis
S.N.Majhi, Ph.D.(IIT Madras) [Head]	Fluid Mechanics, Bio-Fluid Mechanics, Mathematical Modelling
P.R.Parthasarathy, Ph.D.(Annamalai)	Applied Probability and statistic Models, Mathematical Ecology, Operations Research, Statistical Inference
H.S.Paul, Ph.D.(IIT Karagpur)	Elasticity, Piezoelasticity, Wave propagation, Bio-medical Engineering
C.V.Raghava Rao, Ph.D.(IIT Madras)	Fluid Mechanics, Numeical Methods in Fluid Mechanics
U.N.Srivastava, Ph.D.(IIT Madras)	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
P.V.Subrahmanyam, Ph.D.(IIT Madras)	Fixed Point Theory/Analysis
R.Subramanian, Ph.D. (IIT Madras)	Applied Probability, Application of Stochastic Processes
N.Venkatarangan, Ph.D.(IIT Madras)	Fluid Mechanics, Variational Principles, Pade' Approximation Decomposition, Methods
<b>Associate Professors</b>	
S.A.Choudum, Ph.D.(IIT Madras)	Graph Theory, Combinatorics
S.G.Kamath, Ph.D.(Delhi)	Theoretical Physics, Elemen- tary particle Physics
A.Rangan, Ph.D.(IIT Madras)	Probability Theory, Stochastic Processes, Operations Research, Applications to Biological sciences, Neural Methods, Inventory Controls, Ecology Reliability
<b>Assistant Professors</b>	
D.Bahuguna, Ph.D.(IIT Kanpur)	Non-linear Analysis, Differential Equations
Y.Nagendra, Ph.D. (IIT Kharagpur)	Statistical Quality Control
M.T.Nair, Ph.D.(IIT Bombay)	Functional Analysis, Linear Operator Equations
(Mrs.)R.Rama, Ph.D. (Anna, Madras)	Theoretical Computer Science, L-Systems, Formal Languages, Automata Theory <b>Specialisation</b>

A.Singh, Ph.D. (IIT Kanpur)	Numerical Analysis, Mathematical Logic
(Mrs.)R.Usha, Ph.D.(IIT Madras)	Fluid Mechanics, Bio-fluid Mechanics
(Mrs.)W.B.Vasantha, Ph.D.(Madras)	Algebra, Coding Theory, Fuzzy, Sets and Systems, Application of Algebra
P.Veeramani, Ph.D. (IIT Bombay)	Functional Analysis
<b>Senior Scientific Officer Gr.I</b>	
K.Swaminathan, Ph.D (Agra)	Fluid Dynamics, Ship Hydro- dynamics, Systems Simulations and Development of Software for Control Systems

During the year under review, the following faculty members retired on superannuation.

Dr. V.B. Johri  
Dr. C.M. Purushotham

#### Research Associates

1. Dr. R. Radha, Ph.D. (Madras)
2. Dr. K.P. Sapna, Ph.D (IIT Madras)
3. Dr. G. Sarada, Ph.D. (IIT Madras)

#### 4.9.5 Students on Roll

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	-	1	3	2	1	2	2	-	6	1	12	6	18
M.Sc.	9	15	12	15	-	-	-	-	-	-	21	30	51
<b>Total</b>	<b>9</b>	<b>16</b>	<b>15</b>	<b>17</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>6</b>	<b>1</b>	<b>33</b>	<b>36</b>	<b>69</b>

#### 4.9.6 Number of Scholarship holders

Programme	Institute	Project	CSIR	NBHM	QIP	Total
Ph.D	15	3	5	2	1	26
M.Sc.	8	-	-	-	-	8
<b>Total</b>	<b>23</b>	<b>3</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>34</b>

#### 4.9.7 Number of Degrees Awarded

Programme	Number Awarded
Ph.D	7
M.Sc.	23
<b>Total</b>	<b>30</b>

#### 4.9.8. Short-term Courses/Workshops/Seminars/Conferences Organised

S.No.	Title	Date	Co-ordinator(s)
1.	One day symposium on Mathematical Methods and Applications (conf.)	22.11.95	Prof. S.H.Kulkarni
2.	FORAYS '96	09.3.96-10.3.96	Prof.PV Subrahmanyam

#### 4.9.9 Short term courses/Workshops attended by the faculty

S.No.	Name of the Faculty	Title	Period
1.	Prof.C.V.Raghava Rao	IX Int. Conf. on Numerical Methods in Laminar and Turbulent flows, USA, Atlanta	10-14, July 95
2.	Prof.H.S.Paul	130th meeting of A.S.A.	26 Nov.-1 Dec.1995
3.	Dr.S.A.Choudum	Int. Conf. on Discrete Mathematics and Number Theory, Trichy, India	3-6 Jan. 1996
4.	Dr.P.Veeramani	One day Seminar on Topology and Differential Equations, Madras Univ., PG Centre, Salem	15 March, 1996

#### 4.9.10 Special Lecture Delivered

S.No.	Name of Faculty	Topics of Lecture	Delivered at	Date
1.	Prof.S.H.Kulkarni	Teacher Linear Algebra without Determinants	Anna Univ.	6.3.96

S.No.	Name of Faculty	Topics of Lecture	Delivered at	Date
2.	Dr.P.Veeramani	Some Results in Fuzzy Metric Spaces	UGC Seminar Salem	24.8.95
		On Fuzzy metric spaces	Seethalakshmi Ramaswamy College, Trichy	24.2.96
		Ascoli-Arzela Theorem in Fuzzy metric spaces	Madras Univ. PG Centre Salem	15.12.95
3.	Dr.S.A.Choudum	H-colouring of Graphs	M.S. Univ. Trinelveli	Feb.96
4.	Prof.S.N.Majhi	Mathematical Modelling and its applications	Berhampur	19-20 Feb, 1996

#### 4.9.11 Visits Abroad

S.No.	Name of Faculty	Country visited	Date	Purpose of visit
1.	Prof.C.V.Raghava Rao	USA	10-14 Jan.	To present a paper in IX INT. Conf. on Numerical Methods in Laminar and Turbulant flows
2.	Prof.H.S. Paul	USA	26.11.95 1.12.95	To present a paper in 130th Meeting of A.S.A.
3.	Dr. S.G. Kamath	USA	1.1.96- 31.3.96	Visiting Scientist

#### 4.9.12 Distinguished Visitors to the Department

S.No.	Name of the Visitor and Occupation	Date	Purpose of visit
1.	Prof.K.P. Kistner Univ. of Bilefeld Germany	Dec.95 - Jan. 96	To give seminar lectures and to collaborative Research

S.No.	Name of the Visitor and Occupation	Date	Purpose of visit
2.	Dr. Raj Srinivasan Univ. of Sashatchewan, Canada	Nov. 1995	To give seminar lectures and to collaborative Research
3.	Prof. James Matis ATM Texas, Univ. USA	Nov.-Dec. 1995	-do-
4.	Dr.J.V.S. Krishna Rao Nagoya Inst. of Tech. Japan	14-2-96	To give lecture
5.	Prof.Dietergaier Mathematics Institute Giessen Univ., Germany	2-2-96	-do-
6.	Prof. J. Bagga Ball State Univ. USA	16-1-96	-do-
7.	Dr.A. Sarangarajan Centre for Infn. Techniques Berlin, Germany	10-1-96	-do-
8.	Prof. A.K. Rajappa Miami Univ., USA	11-1-96	-do-
9.	Dr.A.Sankaranarayanan Secom Inelligence Systems Lab. Tokyo, Japan	17-8-95	-do-

#### 4.9.13 Sponsors Projects

S.No.	Title	Period	Funding Agency	Amount (in lakhs)	Co-ordinators
1.	Algorithmic graph Theory	1992-96	NBHM	1.00	S.A. Choudum
2.	Design and Implementation of Graph Theory Algorithms	1995-97	ICSR	-	S.A. Choudum
3.	Centrifugal effects in annual squeeze film	1994-96	ICSR	1.00	R. Usha
4.	Transient Analysis of queueing and related systems	1994-97	NBHM(DAE)	3.50	P.R.Parthasarathy

S.No.	Title	Period	Funding Agency	Amount (in lakhs)	Co-ordinators
5.	On approximately solving ill-posed integral equations	1996-98	ICSR	-	M.T. Nair
6.	Implementation of Numerical Method for singularly perturbed two point BVP using partial decoupling	1996-98	ICSR	-	A. Singh
7.	Differential-Integro Differential Equations viscoelasticity	1996-98	ICSR	2.00	D. Bahuguna
8.	Design and Implementation of cell division patterns	1996-98	ICSR	-	R. Rama

#### 4.9.14 Honours and Awards

S.no.	Name of faculty	Honours/Awards	Purpose
1.	P.R.parthasarathy	Elected Member Association	Int.Statistical
2.	H.S. Paul	Elected Chapter Representative	A.S.A. Madras-India Chapter

#### 4.9.15 Weekly Seminar

Under the auspices of Mathematics Department, a seminar talk is being arranged on every Thursday during 3.00 p.m. to 4.00 p.m. The speakers include visitors from abroad, faculty members of various institutes in Madras and various departments from IIT Madras. The post-graduate students of the department, the research scholars and the faculty members of the department and interested persons from the other neighbouring institutions are highly benefitted by this programme. Topics dealt with by the speakers range from pure mathematics to applications relevant to engineering problems, social sciences and biological sciences. The co-ordinator of this programme for the period under report: Dr. P. Veeramani.

#### 4.9.17 Research Publications

1. S.H. Kulkarni and K.C. Sivakumar, Applications of generalized inverses to interval linear programmes in Hilbert Spaces, Numerical Functional Analysis and Optimization, 16 (7-8), 1995, 965-973.
2. S.H. Kulkarni and K.C. Sivakumar, Explicit solvability of a class of infinite linear economic methods, Indian J. Pure. Appl. Math. 26(3), 1995, 217-223.
3. S.H. Kulkarni and K.C. Sivakumar, Solutions of a special class of infinite interval linear programme, Approximation Theory and Applications, Wiley Eastern, 1996.
4. A. George and P. Veeramani, Some Theorems in Fuzzy Metric Spaces, The Journal of Fuzzy Mathematics, Vol.3, No.4, 1995, 933-940.
5. P.V.Subrahmanyam and S.K. Sudarsanam, On the Lipschitzian Solutions - a Fuzzy Functional Equation, The JI. of Fuzzy Mathematics, Vol.3, 1995, 285-290.
6. P.V.Subrahmanyam and s.K. Sudarsanam, On the integrable solution of a class of fuzzy functional equations, 10th Annual Conference of Ramanujan Math. Soc., May 25, 1996.
7. C.V. Raghava Rao and S.T.P.T. Srinivas, A note on parametric spline function approximation, Int. J. Comp. Math with appln. Vol.29, No.12, pp.67-73, 1995.
8. C.V. Raghava Rao and T.V.S. Sekhar, Translation of a sphere in a rotating viscous fluid - A Numerical study, Int. J. Num. Methods in Fluids, Vol.20, pp.1253-1262, 1995.
9. C.V. Raghava Rao and Y.V.S.S. Sanyasi Raju, Steady simple shear flow past a circular cylinder at moderate and high reynolds numbers - a Numerical study, J.Ind.Inst.Sci. Nov.-Dec, 1995.
10. G. Thangamani, T.T. Narendran and R. Subramanian, Assessment of availability of a fluid catalytic cracking unit through simulation, Reliability Engg. and System Safety 47(1995), pp:207-212.
11. R.Subramanian and V. Anantharaman, Reliability Analysis of a complex standby redundant system, Reliability Engineering and safety system - 48(1995), pp.57-70.
12. R. Subramaniam and V. Anantharaman, Probabilistic Analysis of a three unit cold standby redundant system with repair, Microelectron Reliab. Vol.35, No.6(1995), pp.1001-1008.
13. R. Subramanian and V. Anantharaman, A standby redundant system with delayed repair, selected topics in Mathematical Physics (Prof.R.Vasudevan Annual Volume). (Ed.) R.Sridhar, K. Sreenivasa Rao and V. Lakshminarayanan, Allied Publishers Ltd., (1995), pp.94-105.
14. R. Usha, Creep flow with concentric permeable spheres in Relative Motion, ZAMM, Vol.75, 1995, pp.644-646.
15. R. Usha and Rukmani Sridharan, The axisymmetric motion of a liquid film on an unsteady stretching surface, Trans. of ASME J. Fluids Engg., Vol.117, 1995, pp.81-85.
16. W.B. Vasantha, On the mod p-envelope of  $S_n$ , The Math Education, Vol.XXIX (191-174), No.3, 1995.
17. W.B. Vasantha, Complex fuzzy sets and systems, Inter.J.U.Sc.Phy.Sci.Vol.7, No.1 (110-111), 1995.
18. W.B. Vasantha, On semigroup rings in which  $(xy)^n = xy$ , J.Bihar Math. Soc. Vol.16, (47-50), 1995.

19. W.B. Vasantha, On orthogonal sets in group rings, J. Inst. Math. & Comp. Sci., Vol.8, (87-89), 1995.
20. W.B. Vasantha, A note on modular semigroup ring of a finite idempotent semigroup, J.Nat. & Phy.Sci.(91-94), Vol.5,1995 21. W.B. Vasantha, On fuzzy semifields and fuzzy semivector spaces, Inter U.I.Sci.J. of Phy.Sci.Vol.7, No.1, (115-116), 1995.
22. W.B. Vasantha, Obedient ideals in a finite ring, J.Inst. Maths. & Comp.Sci. Vol.8, (217-219), 1995.
23. W.B. Vasantha, Zero divisors in loop-loop near rings, J.Inst. Math & Comp.Sci. (139-143), 1995.
24. W.B. Vasantha, Regularly periodic elements of a group ring, Vol.58, J.Nat. & Phy Sci. (47-50), 1995.
25. W.B. Vasantha, On Fuzzy reflexive non-associative matrices, Inter. J. of U Sci. & Phy. Sci. Vol.7, (230-233), 1995.
26. W.B. Vasantha, On loop rings which are Marot loop rings U Sci.J. of Phy.Sci.(224-227), 1995.
27. W.B. Vasantha and N. Suresh Babu, On orthogonal ideals in group rings, J.Nat.Phy.Sci. Vol.58, (139-142), 1995.
28. W.B. Vasantha, Strongly modular subsemigroups in finite semigroups, Anal. Univ. Din galati, XI(XVI), 49-54, Romania.
29. W.B. Vasantha, Zero divisors in semiloop near rings, Matematyaka, Vol.127, 79-85, Poland.
30. W.B. Vasantha, On group semi group rings, Octogon, Math.Maz. (44-46), 1995, Romania.
31. W.B. Vasantha, Essential subgroups of a group, J.of Math Res. and Expo.(350-353), Vol.15, 1995, China.
32. S. Kalpakam and K.P. Sapna, A two recorder level inventory system with renewal demands, European Journal of Operations Research, (EJOR), Vol.84, 1995, 402-415.
33. S. Kalpakam and K.P. Sapna, (S-1,s) Perishable systems with stochastic leadtimes, Math. Comput.Modelling, Vol.21, 1995, pp.95-104.
34. S. Kalpakam and K.P. Sapna, A cost sales (S-1,s) Perishable inventory system with renewal demand, Naval Research Logistics, Vol.43, 1996, 129-141.
35. P.R. Parthasarathy and V.Vijayalakshmi, Transient analysis of multiple unit redundant systems, a continued fraction approach, 1995, Optimization, Vol.35, 171-185.
36. P.R. Parthasarathy, on quadrature approximation for the busy period density function of an M/M/1 queueing system, 1995, Int.J.Math.Mgmt.Sci.
37. P.R. Parthasarathy, The effect of super infection on the distribution of infectious period - A continued fraction approximation, 1995, IMA.JMath.Appl.in Med. and Biol.
38. P.R. Parthasarathy and V.Vijayalakshmi, Transient analysis of an (S-1,s) inventory model - a numerical approach, 1995, Int.J.Comp.Math.
39. P.R. Parthasarathy and V.Vijayalakshmi, Transient solution of a state dependent multi-server Poisson queue with balking - a continued fraction approach, 1995, J.Appl.Stat.Sci.



## 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 and Thermal Power  
Hydro Turbo Machines  
Internal Combustion Engines  
Machine Elements  
Manufacturing Engineering  
Mechanical Handling  
Precision Engineering and Instrumentation  
Refrigeration and Air Conditioning  
Thermal Turbo Machines  
Thermodynamics and Combustion

### 4.10.2 New Courses Introduced

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

	Course No.	Title	Faculty
1.	ME402	Combustion Engineering	Dr.USPShet Dr.T.Sundararajan
2.	ME781	Combustion Theory & Applications	Dr. R. Natarajan K.Ramamurthi (ISRO)

### 4.10.3. Details of Faculty:

#### Name and Qualifications

#### Specialization

#### Professors

Ajit Kumar Kolar, Ph.D (IIT Madras)

Fluidized Bed Combustion & Heat Transfer

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

Thermodynamics, Combustion and  
Propulsion, Kinetic Modelling of  
Combustion Reactions, shock Tube  
Studies, Soot & Pollution Control

Ganesan V, Ph.D, (IIT Madras)

I.C.Engines & Gas Turbines

Gopalakrishnan K.V, Ph.D (IIT Madras)

I.C.Engine

### Specialization

Gopinath K., Ph.D, (IIT Madras)	Machine Design, Friction & Wear Powder Metallurgy
Krishnaiah Chetty G.V., Ph.D (IIT Madras)	Manufacturing Engg./Metal Removal Processes
Krishnamurthy R, Ph.D (IIT Madras)	Manufacturing Engg/Tribology/ Ceramic & composite materials.
Krishna Sastri V.M., Ph.D (Delaware, USA)	Heat Transfer and Thermal Engg.
Lakshminarayana K, Ph.D (IIT Madras)	Mechanisms & Transmissions Design Optimization, Machine Design
Madhusudana Rao M., Ph.D (IIT Madras)	Design and Development of Mechanical Handling Equipment
Nagalingam B., Ph.D (IIT Madras)	I.C.Engines
Nagarajan T., Ph.D (IIT Madras)	Precision Eng. & Robotics
Natarajan R., Ph.D (Waterloo) [Director, IIT, Madras]	Hetrogeneous Combustion, Energy Conservation, Rocket and Ramjet Combustion, Thermo- dynamics, Analysis of Energy Systems
Philip P.K, Ph.D (IIT Madras)	Manufacturing Engg./CAD/CAM/ Material Removal Processes
Premananda Shet U.S., Ph.D. (IIT Madras)	Combustion & Propulsion, Thermodynamics, Turbulent Premixed Combustion, Swirl Combustion, Laser Doppler, Anemometry
Radhakrishnan V, Ph.D, (IIT Madras)	Manufacturing Engg/Metrology
Raman R., Ph.D (IIT Madras)	Precision Engineering
Seetharamu K.N, Ph.D (IIT Madras)	Heat Transfer, Fluid flow
Shunmugam M.S., Ph.D (IIT Madras)	Manufacturing Engg./Metrology & Quality Control, CAM
Sriramulu V, Ph.D, (IIT Madras)	Thermodynamics, Combustion & Propulsion.
Srinivasa Rao P, Ph.D (IIT Madras)	I.C.Engines
Srinivasa Murthy S, Ph.D (IIT Madras)	Refrigeration & Airconditioning Thermal Energy Conservation Food Processing and Preservation Solar Energy Utilisation Cryogenic Engineering

Venkatesh A, Ph.D (IIT Madras)  
 Venkateshan S.P., Ph.D (IISc,B'lore)  
 Vijay R Raghavan, Ph.D (IIT Madras)  
 Pramod S.Mehta (Loughborough, UK)  
 Sundararajan T, Ph.D (Pennsylvania)

**Specialization**

Thermodynamics, Thermal Applications of Solar Energy  
 Heat Transfer & Instrumentation  
 Heat Transfer  
 I.C. Engines  
 Spray Combustion, Mixing & Combustion of High Speed Jets, Computational Fluid Dynamics & Heat Transfer, Thermodynamics

**Associate Professors**

Balabaskaran V., Ph.D (IIT Madras)  
 Govindamallan K.R, Ph.D (IIT Madras)  
 Kumaraswamy S, Ph.D (IIT Madras)  
 Muthuveerappan G.,Ph.D (IIT Madras)  
 Narayansamy K, Ph.D (IIT Madras)  
 B.V.S.S.S Prasad, Ph.D (IIT Kharagpur)  
 Ramamoorthy B., Ph.D (IIT Madras)  
 Ramesh Babu N.,Ph.D (IIT Madras)  
 Singaperumal M., Ph.D (IIT Madras)  
 Siva Prasad N., Ph.D (IIT Madras)  
 Srinivasa Y.G., Ph.D (IIT Madras)  
 Vijayaraghavan L., Ph.D (IIT Madras)

Hydroturbomachines  
 I.C.Engines  
 Hydroturbomachines  
 Machine Design, Vibration & Stress analysis  
 Surface Topography, Manuf.Methods  
 Thermal Turbomachines (Heat Transfer in Turbine Blades, Cascade Flow Studies)  
 Metrology, CAI/sensors/Manufact. Eng/Quality Control  
 CIM/CNC/PLC /Sensors/Unconventional machining/Lasers  
 Fluid Power, Precision Engg.  
 Finite Element Analysis, Computer Aided Design  
 Instrumentation and Control  
 Metal cutting / CAD / Condition Monitoring

**Assistant Professors**

Gopalan K.N., Ph.D (IIT Madras)  
 Govardhan M., Ph.D (IIT Madras)  
 Jayaprakash V., Ph.D (IIT Madras)

Analysis, Simulation & Dynamics  
 Thermal Turbomachines (Tip Clearance Flows, Inlet Distortion Studies, Well's Turbine)  
 Machine Design, FEM analysis, CAD Chemical Machiavelli Design

## Specialization

Krishna Kumar R., Ph.D (IIT Madras)	Non-Linear/Linear F.E., CAD, Fracture Mechanics
Krishnamurthy S., Ph.D (IIT Madras)	Machine Design, Failure Analysis Gears
Kuppuswamy G., Ph.D (IIT Madras)	Manufacturing Engineering
Mayuram M.M., Ph.D (IIT Madras)	Surface engineering, Wear & Wear control, Stress Analysis
ManiA., Ph.D (IIT Madras)	Refrigeration & Airconditioning Thermal applications of Solar Energy Cryogenic Eng.
Prakash M. Maiya, Ph.D (IIT Bombay)	Thermal Sciences
Padiyar K.S., M.Tech (IIT Kharag.)	Thermodynamics, Combustion, Ramjet Propulsion, Design & Development of Gas Burners, Utilization of Solar Energy
Rajan V.N., M.S (IIT Madras)	Power Plant Engineering
Ramalingeshwara Rao, M.Tech (IIT Madras)	Instrumentation and Control
A.Ramesh, Ph.D, (IIT Madras)	Alternative Fuels, Performance Improvement of Two Stroke & Four Stroke Engines
Raju Sethuraman, Ph.D, (IIT Bombay)	Computational Mechanics, Stress Analysis, Design of Machine Elements and Fracture Mechanics
Sarit Kumar Das, Ph.D, (Sambhalpur)	Heat Exchangers, Analysis of Heat Transfer Equipments
Sitaram N., Ph.D (Pennsylvania - USA)	Thermal Turbomachines (Boundary Layer Studies, CFD, Tip Clearance Flows)
Venkatarathnam G., Ph.D (IIT Kharag)	Refrigeration Cryogenic Engg.
<b>Visiting Faculty</b>	
Subir Kumar Saha, Ph.D (McGill Univ., Canada)	Dynamic Modelling, Simulation of Robotic Systems & Mechanisms
<b>Chief Design Engineer</b>	
Chennabasavan T.S, M.Sc(Engg)(Aston)	Machine Design
<b>Senior Design Engineer</b>	
Kalandar Saheb S.D., M.Tech (IIT Madras)	Design of Mechanical machines/design of manufacture, Jigs and fixtures/ Powder Metallurgy parts.
<b>Scientific Officer</b>	
Boopathy S., M.E.(Bharathiyar)	Manufacturing Engg/Automation
<b>Senior Maintenance Engineer</b>	
Arun A., B.E (Madras)	Refrigeration Engineering

#### 4.10.4. ~~Number of~~

Pro-gramme	I year		II year I		II year I		V year		V year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	7	1	15	-	9	2	10	-	18	-	59	3	62
M.S.	10	1	12	-	15	-	4	-	-	-	41	1	42
M.Tech.	60	1	80	3	-	-	-	-	-	-	140	4	144
B.Tech.	76	-	83	1	82	2	81	1	-	-	322	4	326
<b>Total</b>	<b>153</b>	<b>3</b>	<b>190</b>	<b>4</b>	<b>106</b>	<b>4</b>	<b>95</b>	<b>1</b>	<b>18</b>	<b>-</b>	<b>562</b>	<b>12</b>	<b>574</b>

#### 4.10.5. Number of Scholarship/Fellowship holders

Programme	Institute Scholarship	Others	Total
Ph.D.	36	8 (QIP)	44
M.S.	29	-	29
M.Tech.	84	14 (QIP)	98
<b>Total</b>	<b>149</b>	<b>22</b>	<b>171</b>

#### 4.10.6. No. of Degrees Awarded

Programme	Number
Ph.D.	13
M.S.	06
M.Tech.	74
B.Tech.	76
<b>Total</b>	<b>169</b>

#### 4.10.7. Instruments/Equipment Designed and Developed

1. An Instrument was designed and developed for Fuel Injection in Two-Stroke Assignment.
2. Digital Data Acquisition and Analysing System was developed for Engine Research.
3. Bubble Pump Refrigeration System - Prof.S.Srinivasa Murthy, Dr.Prakash M.Malya
4. Metal Hydride Heat Pump - Prof.S.Srinivasa Murthy

5. Vapour Compression Heat Pump Dehumidifier - Prof.S.Srinivasa Murthy
6. Robot Workstation for Flexible Assembly system
7. One experimental Testrig has been designed for regenerative heat exchangers which is to be installed by the grant of IC& SR, under New Faculty Scheme allotted to Dr.S.K.Das.
8. A swirling fluidized bed has been designed and constructed and its hydrodynamic characteristics have been studied. The swirling fluidized bed is a novel variant of a conventional fluidised bed which is seen to be particularly efficient in combining a fluidised bed with tumbling of solids. This feature enables it to handle odd-shaped particles that are otherwise difficult to handle.

#### 4.10.8. New Facilities added and Major Equipment procured

1. Installation of Thyristor Control Panels for operating all the DC drive Units
2. M.K.S Capacitance Type Pressure Transducers
3. Diffusion Vacuum Pumping System
4. Liquid Nitrogen Dewars of different Capacities
5. On-line density / Concentration Measuring Instrument
6. CAD Lab has procured new Systems and Software.
7. Gamma Ray Density Meter
8. Electromagnetic Flow Meter
9. Scanivalve Pressure Transducer
10. Load Cells
11. Signal Converter
12. Pentium Computer with 90 MHz clock & 640 MB hard disk
13. Data Acquisition System
14. Non-contact, Infra-red (type) Temperature Measuring System applicable to Machining Processes.
15. Flexible Automated Assembly System commissioned in March 1995.

#### 4.10.9. Short-Term Courses/Workshops Organised

S.No.	Faculty	Title	Date
1.	Prof.S.Srinivasa Murthy	Conference Secretary, National Heat & Mass Transfer Conference/ II ISHMT - ASME Heat and Mass Transfer Conference, Suratkal.	13th Dec. 28-30, 1995
		Organiser, IITM-ISHRAE, Seminar on Alternate Refrigerants, Madras.	Jan 19, 1996

S.No.	Faculty	Title	Date
2.	Prof.B.Nagalingam	ISTE Summer School on Motor Vehicle Emission Regulations Test Cycles and Control Methods	May 15-26, 1995
3.	Dr.V.Radhakrishnan Dr.N.Ramesh Babu	Evening Course on CNC Technology & Applications for 19 Industrial Participants	Jan - Mar. 1995
		Evening Course on CNC Technology & Applications for 20 Engineers from Sundaram Clayton Ltd.	April - May 1995
		Evening Course on CNC Technology & Applications for 15 Industrial Participants	Aug - Oct. 1995
4.	Dr.R.Krishnakumar	Introduction to F.E. Analysis for M/S Sundaram Clayton	Sep - Dec. 1995
5.	Dr.R.Krishnamurthy	Coordinator, Technology Appreciation Programme on Quality Assurance in Manufac. Activities.	Jan. 1996
6.	Mr.S.Boopathy	Course on PLC for Sakthi Sugars (Foundry Division)	Dec. 1995

#### 4.10.10. Short-Term Courses/Workshops Attended by the Faculty

S.No.	Faculty	Title	Date
1.	Dr.M.Govardhan	XXII National Conf. on F.M and F.P.	Dec.1995
2.	Dr.V.Ganesan Dr.P.S.Mehta	14th National Conf. on I.C. I.C.Engines &Combustion at Institute of Armament Tech., Pune.	Dec. 8-10, 1995
3.	Dr.V.Radhakrishnan	Presented a Paper at NAMRC Meeting held at Houghton, USA	May 1995.
4.	Dr.S.Kumaraswamy Dr.V.Balabaskaran	22nd National Conf. on Fluid Mechanics & Fluid Power, IIT M.	Dec. 1995
		Annual General Body Meeting of Aeronautical Society of India	Jan. 1996

S.No.	Faculty	Title	Date
5.	Dr.S.Kumaraswamy	2 Day Workshop on Finance Orientation for Engineers, Institution of Engineers (India)	Dec. 1995
		Workshop on Video Production Technology at ETC,IIT Madras,	Dec. 1995
6.	Dr.M.S.Shunmugam	National Seminar on Robots and Sensors for Production Applications, MIT, Madras,	Feb. 1996
		National Seminar on CIM, Anna University.	March 1996
		National Conference on Computer Aided Inspection & Advanced Metrology, MIT, Anna University.	Feb. 1996
		Intl. Conf. on Advances in Mech. Engineering, IISc, Bangalore.	Dec. 1995
7.	Dr.B.Ramamoorthy	National Conference on Computer Aided Inspection and Advanced Metrology, MIT, Anna University.	Feb. 1996
		National Seminar on CIM, Anna University.	March 1996
8.	Dr.R.Krishnakumar	Intl. Conf. on Advances in Mech. Engineering, IISc, Bangalore.	Dec. 1995
9.	Dr.V M K Sastry Dr K N Seetharamu Dr S P Venkateshan	13th National Heat and Mass Transfer Conference Surathkal	Dec. 1995
10.	Dr K N Seetharamu	National Conference on Fluid Mechanics and Fluid Power, Madras	Dec. 1995
		XI International Conference on Wind Engineering, New Delhi	Jan. 1996
11.	Dr S K Das	Symposium on "Heat Exchangers" IGCAR, Kalpakkam	Feb. 1996
12.	Mr.S.Boopathy	Intl.Conference on Industrial Automation and Control, Hyderabad.	Jan. 1996



#### 4.10.11. Special Lectures Delivered

SN	Name of Faculty	Topic of Lecture	Delivered at	Date
1	Dr.G.Venkatarathnam	Alternate Refrigerants	IIT Madras	-
2	Dr.T.Nagarajan	Recent Trends in Robotics	Ntl.I Seminar - on Robots & Sensors for Prodn. Application	
3	Dr.K.V.Gopalakrishnan	Automotive Tech.in India	IIT Madras	May 96
4	Dr.R.Krishnamoorthy	Technology Applications programme on Quality Assurance in Manf.	IC & SR IIT Madras	Jan.96
		Lecture on CAM	Anna University	-
5	Dr.M.Madhusudana Rao	Materials Handling	ICF, Madras	May 95
6	Dr S Kumaraswamy	Pump Performance prediction-SIEMA-IPMA	National Sem. Coimbatore	Nov.95
		Pump for sPV Systems	IIT Madras	Dec.95
7	Dr.V.M.K.Sastri	Heat Transfer Augmentation in Rotating Tubes	Villanova Univ., USA	March 95
8	Dr.K.N.Seetharamu	Non-Conventional Energy Sources	College of Engineering	Dec.1995
9	Dr.Vijay R.Raghavan	Fouling in Heat Exchangers - the still unresolved Problem	Institution of Engineers	Jan. 1996
10	Dr.T.Sundararajan	Prediction of Rocket Plume Characteristics	DRDL, Hyderabad	Oct. 1995
		Automatic & Adaptive Grid Generation	NSTL, Visakhapatnam	Nov. 1995
14	Dr.U.S.P.Shet Dr.T.Sundararajan Mr.K.S.Padiyar	Thermodynamics and Fuels Technology	National Productivity Council Madras	Mar. 1996

#### 4.10.12. Visits Abroad

No.	Name of Faculty	Country Visited	Date	Purpose of Visit
1.	Dr.G.Venkatarathnam	Germany	15 June - 30 July 96	Indo-German Project
2.	Dr.T.Nagarajan	USA	Nov. 1995	Conference
3.	Dr.M.Singaperumal	Germany	Dec.1995- Feb.1996	DAAD Re-invitation Programme
4.	Dr.N.Ramesh Babu	Germany	Jan. - Feb. 1996	Volkswagen Foundation Project
5.	Dr.M.Madhusudana Rao	Germany	Dec.1995 - Feb.1996	DAAD Re-invitation Programme
6.	Dr.V.M.K.Sastry	Hawaii, USA	1995	ASME-JSME Thermal Engg. Joint Conference
7.	Dr.K.N.Seetharamu	Singapore	May 22-26 1995	VI Asian Congress of Fluid Mechanics Conference
8.	Dr.K.N.Seetharamu	Atlanta, UK	July 17-21 1995	Conference on Num. Methods in Thermal problems

#### 4.10.13. Distinguished Visitors to the Department (Important Dignatories)

S.No.	Name of the Visitor and Occupation	Date of visit	Purpose of Visit
1.	Prof.L.R.Oellrich, Institute for Thermodynamics and Refrigeration, Institute of Karlsruhe, Germany.	April, 1995	Lecture & Discussions
2.	Mr.John Leinonen, President, SAE,	February 1996	Starting of SAE Indian Section
3.	Mr.Rajasekhar,	March 1996	Discussion on a collaborative project work
4.	Prof.Andrew Nee, Dean Designate and Head of the Dept.of Mech. Engg. and Prodn. Engg. National University of Singapore.	November 1995	Special Lecture

S.No.	Name of the Visitor and Occupation	Date of visit	Purpose of Visit
5.	Prof.Stephen Malkin, Dept.of Mech. Engg., Univ. of Massechusetts, USA	January 1996	Special Lecture
6.	Dr.Geza Heidegger, Hungarian Academy of Sciences, Budapest,	January 1996	Special Lecture
7.	Dr.A.Weckermann, University of Erlangen, Neurenburg, Germany,	February 1996	Volkswagen Project Discussion
8.	Dr.A.Jayasankar, University of Florida, USA	February 1996	Special Lecture
9.	Prof.J.L.Chenot, Director, Director, Ecole Des Mines De Paris, Cedex, France.	April 1996	Project Discussion
10.	Prof.H.Von Puttkamar, Berline University	December 95 - March 1996.	DAAD Visit
11.	Dr.S.Chandrasekar, Professor, Purdue Univ., USA.	January 1996	Special Lecture
12.	Dr.P.Vaidyanathan, Professor, Centre for Precision Machining of Materials University of Florida, USA.	November 1995	Special Lecture
13.	Prof.J.P.Hartnett, Univ. of Illinois at Chicago	February 1996	Special Lecture & Discussions
14.	Dr.Arcot Ramachandran, Prof.of Heat Transfer Chair.	December 95 - January, 1996	Lecture & Discussions

#### 4.10.14. Sponsored Projects (under progress)

Sl. No.	Title	Period	Funding Agency	Amounts (Lakhs)	Coordinator(s)
1.	Tip Clearance Flows in Compressors	92-95	ARDB	5.00	Dr.N.Sitaram

Sl. No.	Title	Funding Agency	Amounts (Lakhs)	Coordinator(s)
2.	Development of pumpless solar absorption refrigeration system	MNES	11.00	Dr.S.Srinivasamurthy Dr.M.P.Maiya
3.	Technology Development Mission on High Temperature Heat Pumps	MHRD	100.00	Dr.S.Srinivasamurthy Dr.M.P.Maiya Dr.A.R.Balakrishnan
4.	Development of Continuous Solar Refrigerator with Transfer Tank	CSIR	4.52	Dr.S.Srinivasamurthy Dr.A.Mani
5.	Alternatives to CFCs for Refrigeration Applications - Energy and Environmental Aspects	MHRD/ BMFT	5.00	Dr.S.Srinivasamurthy Dr.A.R.Balakrishnan
6.	Development & Testing of Compact Cryogenic Heat Exchangers	DST	7.50	Dr.S.Srinivasamurthy Dr.G.Venkatarathnam
7.	Metal Hydride Heat Pumps, Heat Transformers and their Hybrids; Prototype Development & their Evaluation	MNES	6.90	Dr.S.Srinivasamurthy
8.	Development of Perforator Plate Heat Exchangers	DST	6.00	Dr.G.Venkatarathnam
9.	Development of Lean Burn Spark Ignited Natural Gas Engine for Generator Set and Automotive Application	AICTE	6.00	Dr.B.Nagalingam
10.	Development of Fuel Efficient Two Stroke SI Engine.	DST	3.59	Dr.A.Ramesh
11.	Finite Element Analysis of Weldments using Adaptive Grids	DST	6.95	Dr.N.Siva Prasad
12.	Automotive and Adaptive Grid Generation for Engineering Analysis	ARDB	5.23	Dr.N.Siva Prasad

Sl. No.	Title	Funding Agency	Amounts (Lakhs)	Coordinator(s)
13.	Applications of Waterjet Technology in Manufacturing	DST	46.10	Dr.N.Ramesh Babu Dr.O V K Chetty
14.	TIFAC Project on Future Technology Forecast for India 2020 Engg. industries	DST	-	Dr.V.Radhakrishnan
15.	Application of vision system for surface and dimensional Inspection	CSIR	6.80	Dr.V.Radhakrishnan Dr.B.Ramamoorthy
16.	Tribological Characteristics of Plasma sprayed ceramic coating	DST	8.00	Dr.R.Krishnamurthy Dr.M.M.Mayuram Dr.K.Narayanasamy
17.	Acoustic Emission studies on testing of Aerospace materials	ISRO-IIT cell	5.00	Dr.R.Krishnamurthy
18.	Development of an interactive computer based information and Guidance package for educational and employment planning	MHRD	6.00	Dr.M S Shunmugam Dr.V Jayaprakash
19.	Development of an improved Reciprocating Gait Orthosis for Paraplegics	MHRD	7.76	Dr.M S Shunmugam Dr.V Jayaprakash
20.	Development of a production integrated quality control loop	Volkswagen	99000 DM	Dr.V Radhakrishnan Dr.B Ramamoorthy Dr.N Ramesh Babu Mr.S Boopathy
21.	Rapid Prototyping with CIM Approach (with PSG CT)	DST	14.00	Dr.V Radhakrishnan Dr.N Ramesh Babu Mr.S Boopathy
22.	Automatic and adaptive grid generation for engineering analysis	ARDB	7.45	Dr.K N Seetharamu
23.	Technology Development Mission on "Atmospheric circulating Fluidized Bed Boiler for Industrial Application"	MHRD/ Planning Commission	364.00	Dr.A.K.Kolar Dr.V M K Sastri

Sl. No.	Title	Funding Agency	Amounts (Lakhs)	Coordinator(s)
24.	Supersonic combustion of Hydrogen jets in Air Flow	ISRO IITM	6.771	Dr.U.S.P.Shet Dr.T.Sundararajan
25.	Investigations of Steady & Transient Injection & Mixing in Liquid Rocket Combustors	ISRO	7.30	Dr.R.Natarajan Dr.T.Sundararajan
26.	Investigations of Multi-phase Jet Mixing & Combustion in a Dump Combustor	ARDB	8.03	Dr.R.Natarajan Dr.T.Sundararajan Dr.V.Ganesan
27.	Studies on Advanced Propulsion Systems	DRDL	19.98	Dr.V.Sriramulu Dr.J.Kurian
28.	Testing of Ramjet Combustion	ISRO	1.50	Dr.V.Sriramulu
29.	Ignition of Metallised Propellants	ISRO	4.95	Dr.K.A.Bhaskaran
30.	Development of a 3-D Unstructured grid for Configurations with Large Control Surface Deflections	DRDL	4.77	Dr.T.Sundarajan Dr.K.N.Seetharamu

#### 4.10.15. Major Consultancy Assignment

SN	Title	Organisation	Amount (Rs in Lakhs)
1.	Testing of Centrifugal Fans	Andrew Yule	0.50
2.	Testing of Radiator Fan Assembly	Lucas-TVS Madras	0.05
3.	Testing of Axial Cooling Fan	R.K.Industries, Madras	0.03
4.	Design, Fabrication Calibration of Wedge Probes	BHEL, Hyderabad	0.22
5.	Design, Fabrication Calibration of Five Hole Probes	BHEL, Hyderabad	0.40
6.	Design of centrifugal blower for Nitriding	Precision Controls	0.006

SN	Title	Organisation	Amount (Rs. in Lakhs)
7.	Calibration of "S" Type Type Probes	G.M.Industries, Hyderabad	0.008
8.	Design, Fabrication and calibration of KEIL Probes	Andrew Yule, Calcutta	0.018
9.	Design & Development of a test rig for Refrigerant Compressor testing (1 & 2 Phases completed; 3rd phase ongoing)	ICF, Madras	1.75
10.	Development of absorption Refrigeration Systems with environmentally safe working fluid	Sterling Strips Ltd. Bombay	1.50
11.	Graphite Beneficiation Plant	TNPCB	1% of Plant Cost
12.	Study of cyclone damage of machine tools	New India Assurance Velayudham & Co.	0.25
13.	Surface roughness testing	Tube Investments	0.025
14.	Retainers Consultancy (one year) Design and Manufacturing automation	Sriram Engg.	0.02
15.	Retainer Consultancy (one year) Manufacturing	Conveyor Equipment Ltd.	0.02
16.	Retainer Consultancy (one year) M/c Tools	Kerry Jost Engg.Ltd.	0.025
17.	Development of a 2 slurry pumping system using jet pumps	NIOT	43.67
18.	Consultancy for CET plants a) Amburetec b) Pertec c) Vanitec d) Ranitec	TALCO	1% of plant cost
19.	Preparation of detailed document for trytec	TALCO	0.5% of project cost

SN	Title	Organisation	Amount (Rs. in Lakhs)
20.	Experimental Investigation of air ingress on condensation in surface condensers & effect of spray on condenser	BHEL Hyderabad	17.00
21.	Development of code for flow and heat transfer	DRDL	0.75
22.	Technical Consultancy	Karnataka Engg. Enterprises	0.012
23.	Development of heat flux probes for furnace applications	BHEL, Trichy	3.6
24.	Retainer Consultancy	Fluidtherm (P) Ltd.	0.018
25.	A Finite Element study of the Automative Alternator Cooling	Lucas TVS	0.030
26.	A Numerical Study of Rocket Exhaust Plumes	DRDL, Hyderabad	0.025

#### 4.10.16. Honours and Awards

SN	Name of Faculty	Honours/Awards	Purpose
1.	Dr.S.Srinivasamurthy	Member	Editorial Board, Innovative Airconditioning & Refrigeration & Industry Oriented Journal.
		Area Editor	Intl. Sorppion News Letter, Published from Energy Research Centre, USA.
2.	Dr.V.Ganesan, Dr.K.R.Govindamallan	SVRCET Surat Prize	Best Paper
3.	Dr.K.N.Seetharamu	Dr.M.G.Deshpande Prize Award	Best Paper
4.	Dr.U.S.P.Shet	Chairman	Combustion Institute (Indian Section)



#### 4.10.17. Books/Monographs Published

SN	Name of Faculty	Title	Publisher
1	Dr.S.Srinivasa Murthy Yokesh Jaluria	Heat & Mass Transfer Proc. of 13th ASME/ ISHMT/HMTC	Tata McGraw Hill, New Delhi
2	Dr.V.Ganesan	Fluid Mechanics & Fluid Power, 22nd Nat. Conf.on FMFP.	BI Publications, Madras.
3	Dr.V.Ganesan	Computer Simulation of Spark Ignition Engine Processes.	University Press (Orient Longman Ltd)
4	Dr.K.A.Bhaskaran Dr.A.Venkatesh & Dr.R.Natarajan	Engineering Thermo- Dynamics	IGNOU, School of Engineering
5	Dr.T.Sundararajan Mr.K.Muralidhar	Computational Methods in Heat Transfer & Fluid Flow	Narosa Publishing House

#### 4.10.18. Research Publications

1. Viswanath, K and Govardhan, M, "Effects of Swirl and Circumferential Inlet Flow Distortion on the Flow Field of an Axial Flow Fan Rotor at Design Flow Condition", Intl. Conference on Advances in Mechanical Engineering, Bangalore, India, Dec.20-22, pp.1761-1772.
2. M.Govardhan, N.Sitaram, N.Venkatrayulu and R.Raghavendra Kumar, "Flow Studies on a Centrifugal Compressor with Inlet Flow Radially Distorted", J. of the Aero Society of India, Vol.47, No:2, May 1995, PP.103-111.
3. K.V.Murali, N.Sitaram, M.Govardhan and N.Venkatrayulu, "Effects of Circumferential Pressure Distortion on the Exit Flow of a Centrifugal Compressor at Design Condition", Proc. of the XI ISABE pp. 91-101.
4. N.Sitaram and S.K.Sikari, "Effect of Hub Diffuser Vanes on the Performance and Flow Field of a Centrifugal Compressor", presented at the Intl. Conf. on Advances in Mechanical Engineering, Dec.20-22, Bangalore.
5. N.Sitaram and M.G.Atre, "Effect of Tip Clearance on the Performance and Exit Flow of a Low Aspect Ratio Axial Flow Fan Rotor", Proc. of the XXII National Conference on Fluid Mechanics and Fluid Power, pp. 55-63.
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8. M.Ram Gopal and S.Srinivasa Murthy, "Predical of Metal Hydride Heat Transformer Performance based on heat transfer and reaction kinetics", *Indl. & Engg. Chem. Research*, Vol. 34, 1995, pp.2305-2313.
9. G.Karthikeyan, A.Mani, and S.Srinivasa Murthy, "Performance of Different Working Fluids in Transfer Tank Operated Vapour Absorption Refrigeration Systems", *Intl. Jr. of Renewable Energy*, Vol.6, 1995, pp. 835-842.
10. M.Fatouh and S.Srinivasa Murthy, "Performance of a HCFC22 Based Vapour Absorption Refrgeration System", *Intl. Jr. of Refrigeration*, Vol. 18, 1995, pp. 465-476.
11. M.Ram Gopal and S.Srinivasa Murthy, "Performance of a Metal Hydride Cooling System, *Int. Jr. of Refrigeration*, Vol.18, No.6, 1995, pp. 413-420.
12. M.Ram Gopal and S.Srinivasa Murthy, "Studies on Heat and Mass Transfer in Metal Hydride Beds", *Int. Jr. of Hydrogen Energy*, Vol.20, No.11, 1995, pp. 911-917.
13. M.Ram Gopal and S.Srinivasa Murthy, "Enhancement of Metal Hydride Reactor Performance using Metal Meshes", *Intl. Jr. Hydrogen Energy*, Vol.20, 1995.
14. M.Fatouh and S.Srinivasa Murthy, "HCF22 based vapour absorption refrigeration system, Part I: Parametric studies, *Intl. Jl. of Energy Research*, Vol.19, 1995.
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17. L.R.Oellrich, T.Engler, S.Srinivasa Murthy, G.Venkatarathnam and A.Mohanakrishnan, "Untersuchungen Zum Einsatz neuer Kaltemittel", *Annual Conference of Deutsche Kalte-Vereinigung (DKV)*, Ulm, Germany, 1995.
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19. R.Saravanan, M.P.Maiya & S.Srinivasa Murthy, "Theoretical Studies on Bubble Pump for H<sub>2</sub> O - LiBr Vapour Absorption Refrigerator", *National Conference on Thermal Systems*, Banaras Hindu University, Varanasi, 28-30, January 1995.
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21. Venkata Ramana, T.Nagarajan and Y.G.Srinivasa "Development of Force sensors for the application of robotic deburring" to *Intl. Conf. on Advances in Mechanical Engineering (ICAME 1995)*, IISC, Bangalore.

22. R.V.Ramana, T.Nagarajan and Y.G.Srinivasa "Design Phases for Robotic Deburring", National Seminar on Computer Integrated Manufacturing, Anna University, Madras, pp. 142-148, 1995.
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29. N.V.Ravi Sankar, N.Siva Prasad, T.Nagarajan, "Finite Element Analysis of Robot Manipulators made of Composite Materials,
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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
- b. Metal Forming
- c. Metal Joining
- d. Materials Technology

### 4.11.2 Details of Faculty

#### Name and Qualification

#### Specialisation

#### Professors

D.R.G Achar, Ph.D (IIT-Ms)  
[Head]

Metal joining, (welding technology) failure analysis, corrosion, industrial metallurgy

K.Anantha Padmanabhan, Ph.D (Cantab)

Metal forming (rolling, sheet metal, forging), Mechanical metallurgy, Superplasticity.

K.J.Lakshminarayana Iyer, Ph.D(IIT Madras)

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.

S.K.Seshadri, Ph.D (London)

Chemical metallurgy, surface technology, utilisation of renewable agricultural resources.

K.Srinivasa Raghavan, Ph.D (Pensilvaniya)  
(Retd - Re-employed)

Materials science, physical metallurgy and electron microscopy.

S.Sundaresan, Ph.D (IIT-Madras)

Metal joining, welding metallurgy, mechanical behaviour.

K.Prasad Rao, Ph.D (IIT-Madras)

Metal Joining, Corrosion

P. Venugopal, Ph.D (IIT-Madras)

Metal forming, extrusion of metals and metallic powder, metal forming equipment and tool.

R. Vasudevan, Ph.D (Aachen)  
Emeritus, Fellow AICTE

Physical metallurgy, Heat treatment, X-ray diffraction & materials technology

## Specialisation

### Associate Professors

C.V.Gokularam, Ph.D (Florida)	Physical metallurgy, X-ray diffraction, advanced ceramics SEM & TEM.
P.Kesavan Nair, Ph.D (IIT-Madras)	Physical metallurgy, X-ray diffraction
S.D.Pathak, Ph.D. (IIT-Madras)	Materials science and technology, mechanical behaviour, material testing, metal casting
S.Raghavan, Ph.D (IISc)	Physico-chemical aspects of process metallurgy, extractive metallurgy.
S.Ramakrishna Iyer, Ph.D (IIT-Madras) (Retd. Re-employed)	Furnace technology, extraction metallurgy, hot corrosion.

### Assistant Professors

B.Guha, Ph.D (IIT-Madras)	Mechanical testing, metal joining
Paramanand Singh, Ph.D (IIT-Bombay)	Powder metallurgy, ceramics and composites
V.Sampath, Ph.D (IISc)	Materials technology, electroslag refining.
Siddhartha Das, Ph.d (Univ. of Illinois Urbana-Champaign, USA)	Physical Metallurgy, electron microscopy, Dislocation theory intermetallic compounds and Composite materials.
K.Swaminathan, Ph.D (IIT-Madras)	Metal forming, materials science

### Senior Scientific Officers Gr I

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

### Technical Officer

B.Raghunatha Rao, Ph.D (IIT-Madras)	Heat treatment, failure analysis
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### Visiting Faculty

Mrs Sohini Paldey	Chemical Metallurgy
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#### 4.11.4 Students on Roll

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D	3	-	1	-	4	-	7	1	7	-	22	1	23
M.S	3	-	3	-	1	-	-	-	-	-	7	-	7
M.Tech	11	1	11	-	-	-	-	-	-	-	22	1	23
B.Tech	28	2	30	1	27	2	28	-	-	-	113	5	118
<b>Total</b>	<b>45</b>	<b>3</b>	<b>45</b>	<b>1</b>	<b>32</b>	<b>2</b>	<b>35</b>	<b>1</b>	<b>7</b>	<b>-</b>	<b>164</b>	<b>7</b>	<b>171</b>

#### 4.11.5 Number of Scholarships/Fellowships holders

Programme	Institute	Others	Total
Ph.D	19	4	23
M.S	6	-	6
M.Tech	23	-	23
<b>Total</b>	<b>48</b>	<b>4</b>	<b>52</b>

#### 4.11.6 Number of Degrees Awarded

Programme	No. awarded
Ph.D	6
M.S	3
M.Tech	9
B.Tech	27
<b>Total</b>	<b>45</b>

#### 4.11.7 Instrument/Equipment Designed and developed

1. Solid state chemical sensors for oxygen, silicon in melts and SO<sub>2</sub>/SO<sub>3</sub> sensor and gases.
2. Fixtures for mode II and mode III Fracture Toughness and Fatigue crack growth studies.

#### 4.11.8 New facilities added and major equipment procured

1. A UNIX based DEC ALPHA SYSTEM computer for modelling and simulation and welding studies.
2. Locally made ATTRITOR MILL of 1.5 litre capacity.

#### 4.11.9 Short term courses/Workshops/Seminars/Symposia/Conferences Organised

Name of Faculty	Title and Period
Prof S K Seshadri	Current trends in thermal treatment of engg. Components, 23-24 June 1995.
Dr S Raghavan	Course on Solid State Chemical Sensors in Industry, 9th Dec 1995.

#### 4.11.10 Short term Courses/Workshops/Seminars/Symposia/Conferences/ Training attended by the faculty in recognised Academic Institutions

S.No.	Name of Faculty	Title	Venue & Date
1.	Dr D R G Achar	International Workshop on "Recent Trends in Welding" as an invited speaker.	Bangalore, Oct.5-7, 1995
		National Welding Seminar	IIW Cochin, Nov 23-25, 1995
		Workshop on "Perspectives in Metallurgical & Materials Education", Golden Jubilee Celebrations of the Dept. of Metallurgy, as an invited speaker.	IISc, Bangalore March 4-5, 1996
		National seminar on surface Engineering - SURE96	MIT-Madras March 14-15 1996
2.	Dr S K Seshadri	ATM of IIM	Calcutta Nov. 14-17, 1995
3.	Dr Paramanand Singh	International Workshop on Sol-gel Processing of Advanced Ceramics,	Anna University Madras Jan 8-9, 1996



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

S.No.	Name of Faculty	Topic of Lecture	Date	Delivered at
1.	Prof D R G Achar	TIG & Pulsed TIG Welding Power Sources	16.6.95	Advanced Trg. Instt. Madras
		Welding Technology and Inspection & NDT Tools & Techniques	14.9.95 15.9.95	RESOT Centre
		Weldability Aspects of Aluminium Alloys	13.10.95	IIW-Madras
		Welding Processes Power sources & Automation	16.1.96	IIW-Madras
2.	Prof K A Padmanabhan	'Generic & Mechanistic Analyses for super-plasticity and high temp. Creep'	12.3.96	Indo-US Workshop, Goa
3.	Prof S Sundaresan	Welding Metallurgy, Technology & quality Assurance	16-20, Jan 1996	IGCAR Kalpakkam
		Fracture toughness and fatigue crack growth resistance of welds	2-3 Feb 1996	Jadavpur
		Advances in Welding Processes	24-25 Jan 1996	IIM Trivandrum
4.	Sri S. Annamalai	Metal forming Metallurgical Society	8.12.95	Madras
5.	Sri G Jothinathan	Various methods of NDT Ultrasonic testing methods	-	ISNT MERADO

#### 4.11.12 Distinguished Visitors to the Department

S.No	Name of the visitor and Occupation	Date of visit	Purpose of visit (Lecture/Discussion)
1.	Dr T Zacharia, Group Leader Mat.Proc.Modelling, Oak Ridge Tennessee, USA	23.8.95	Visiting Professor

S.No	Name of the visitor and Occupation	Date of visit	Purpose of visit (Lecture/Discussion)
2.	Dr A Neubrand, Dept of Mat.Sc Darmstadt, Germany	19.12.95	Lecture
3.	Dr S Venkatramani, Mat. Scientist, Ceramic Lab, GEC, USA	11.1.96	Lecture
4.	Mr T L Chandran Cryotech Asia, Singapore	07.02.96	Lecture
5.	Mr C Krishna Lucas TVS, Madras	-do-	-do-
6.	Mr V Adimoolam, Ashok Leyland	-do-	-do-
7.	Dr T R Anantharaman, INSA, Sr.Scientist, NPL, New.Delhi	08.03.96	-do-
8.	Prof M Schaper, Dept of Mat. Sc. Tech.Univ of Dresden, Germany	19.3.96	-do-

#### 4.11.13 Visits abroad

S.No	Name of the faculty	Country visited	Date	Purpose of visit
1.	Prof K A Padmanabhan	Germany	1.8.94	FORSCHUNGSPREIS (Res. Award) Alexander Von Humboldt Foundation
			23.11.95	
		China	5.12.95	Professional visit
			29.12.95	
2.	Prof O Prabhakar	Singapore	2.1.95	Visiting Fellow NANYANG Tehnological Univ. Singapore
			5.1.97	
3.	Dr K Swaminathan	Hongkong	9.10.95 8.10.96	Post doctoral fellowship at the City Univ. of Hongkong.

#### 4.11.14. Sponsored Projects

S.No	Title	Period	Funding Agency	Amount (in lakhs)	Co-ordinators
1.	Computer aided simulation & Design & Engg in Welding Technology.	4 yrs	DST	14.00	Dr DRG Achar Dr B Guha
2.	Fundamental studies on advanced Ferrous alloys	3 yrs	Indo-US	9.90	Dr KJL Iyer Dr V M Radha Krishnan Dr Siddhartha Das
3.	Evaluation of Texture profile of aluminium killed EDD steels	3 yrs	SAIL-Ranchi	6.21	Dr K A Padmanabhan Dr K Swaminathan
4.	Fundamental studies in Superplasticity and high temperature creep	3 yrs	Indo-US	10.34	Dr K A Padmanabhan Dr S S Bhattacharya
5.	Some studies on Low Cycle Fatigue behaviour of AISI Austenitic Stainless Steel	4 yrs	DAE	2.86	-do-
6.	Phenomenology and Rheology of Plastic and Superplastic deformation under different loading conditions for materials forming applications	3 yrs	DST	8.97	-do-
7.	Welding of Titanium alloys	5 yrs	DST	12.00	Dr S Sundaresan
8.	Welding of duplex stain steel	3 yrs	AICTE	3.00	-do-
9.	Application of Electron Beam welding techniques on Ti-6Al-4V	3 yrs	ISRO	3.99	Dr K P Rao Dr B Guha
10.	Open Die Extrusion of Sintered P/M preforms	4 yrs	DST	24.00	Dr P Venugopal Dr S S Bhattacharya
11.	Modernisation of Metal Forming Laboratory with Ironing Tooling facilities	4 yrs	AICTE	10.00	Dr P Venugopal
12.	Metal Matrix Composites for Automative Application	5 yrs	MHRD	86.00	Dr C V Gokularathnam Dr R Palaninathan
13.	Fracture Toughness by CTOD of Microalloyed steels	3 yrs	TISCO	6.00	Dr S D Pathak

#### 4.11.15 Major Consultancy Assignments

S.No	Title	Organisation	Amount (in lakhs)	Co-ordinators
1.	Failure analysis of elbow joints with reactor	TNPL, Ms.	0.15	Dr D R G Achar
2.	Corrosion failure in reactor - V-320	IAL, Ms	0.35	-do-
3.	Metallurgical study of Ammonia convertor pipe	FACT, Cochin	0.30	-do-
4.	Analysis of Ceramic Cutting Tool	Hema Inds.	0.15	Dr K J L Iyer Dr B R Rao
5.	Characterisation of the formability	Tata Iron & Steel	6.00	Dr K A Padmanabhan Dr K Swaminathan
6.	The evaluation of the formability of 3 grades	Ind.Stainless Dev.Assn. Ramanathan Asso.	3.00	-do-
7.	Recycling of H S S scrap	Addision & Co	1.00	Dr S K Seshadri Dr P Venugopal Dr K J L Iyer Mr N L N N Kumar
8.	Technical advice on Pro-duct identification by P/M Route.	Raanat Engg.Prod. (P) Ltd, Madras	0.05	Dr P Venugopal
9.	Evaluation of Ranitidine hydrochloride	Shasun drugs & Chemicals	2.06	Dr P K Nair
10.	Evaluation of Ferrite Magnets material	TI Miller, Madras	0.20	-do-
11.	XRD Analysis of PSZ	BHEL, Trichy	0.06	-do-
12.	Residual stress analysis on shaft pins	Hind.Motors	0.10	-do-
13.	Compressibility of Disc Pad Assemblies & Rivet Strength	Rane Brake Linings Ltd Madras	0.038	Dr S D Pathak
14.	-do-	-do-	0.08	-do-

S.No	Title	Organisation	Amount (in lakhs)	Co-ordinators
15.	Creep and High Temp. properties alloys	Kartik Steels Ltd, Ms	0.20	Dr. S D Pathak
16	-do-	-do-	0.08	-do-
17	Cycle behaviour of PVC pipe joints	Polytrusion P Ltd, Ms.	0.15	- do-
18.	Cyclic load behaviour of solvent cement	ORI-Plast Pvt Ltd, Balsore Orissa	0.15	-do-
19.	-do-	-do-	0.20	- do-
20.	Mech.Prop. of TISCO-BAR	TISCO, Ms	0.85	Dr B Guha Dr S Ramakrishnalyer
21.	Residual life of Steel Pipe	Fert.& Chemical Cochin	0.30	Dr B Guha Dr DRG Achar
22.	Design of a Roll profile for minimum thickness variation	Elgi Steel Rolling Mills, Karur	0.25	Dr SS Bhattacharya Mr S. Annamalai

#### 4.11.16 Honours and Awards

S.No.	Name of Faculty	Honours/Awards	Purpose
1.	Dr K A Padmanabhan	DFG Visiting Professorship  International Advisory Board of Japan, Instt. of Metals  Associate Editor, IIM Associate Editor, Materials Transaction, JIM	Research on Mono crystalline materials
2.	Dr K Prasad Rao	Panthaki Award-95 paper in the area of Non ferrous alloy welding	for best research

#### 4.11.17 Research Publications

1. Achar D R G, An Overview of current developments in Welding Consumables, Proc. of Int. Workshop on Recent trends in Welding, Bangalore, pp 1-11, 1995.
2. Angamuthu K, Guha B, Achar D R G, Static Tensile Behaviour of mismatched steel weldments, proc. of National Welding Seminar, IIW, Cochin pp 185-196, 1995.
3. Barathan V, Achar D R G, Selection of welding electrodes using Linear Programming, presented at XXVIII Annual Conv. of ORSI, 1995.
4. Achar D R G, Materials Joining in Metallurgical Engg. Education, Proc. of Workshop on "Perspectives in Metallurgical and Materials Education, IISc., Bangalore, 1996.
5. Achar D R G, Applications of Surfacing by Welding, Proc. of National Seminar on Surface Engg - SURE, MIT-Madras, 1996
6. Pandian S, Chandrasekaran V, Iyer K.J.L, Rama Rao K.V.S, Journal Processing of rare earth magnets, Proc. of seminar at IIT., Madras, 1995
7. Pandian S, Chnadrsekaran V, Patel M.L, Iyer K.J.L, Rama Rao K.V.S, Recent trends in the enhancement of the properties of NaFeB magnets-Recent developments in Science and Technology of rare earths, Cochin 1995
8. Ganesh Sundara Raman S, Padmanabhan K.A, Effect of electropolishing on the Room. temperature, low cycle fatigue behaviour of AISI 304 LN Stainless, Int.J. Fatigue, pp.179-182, 1995
9. Ganesh Sundara Raman S, Padmanabhan K.A, A comparison of the Room temperature behaviour AISI 304Ln Stainless Steel and Nimonic 90 under strain cycle, Int.J. Fatigue, pp.271- 277, 1995
10. Bhattacharya S S, Sathish Narayana G.V, Padmanabhan K.A, A generic analysis for high temperature power law deformation:The case of linear Ln (strain rate) - Ln (stress) relationship, J.Natural Science, 30, pp.5850 - 5866, 1995
11. Hahn H, Padmanabhan K.A, Mechanical response of Nanostructured materials, Nanostructured materials, 6, pp.191-200,1995
12. Ravishanker B.,Padmanabhan K.A, On the hot pressing of  $Y Ba_2Cu_3O_{7-8}$ , J. Materials science letter (other particulars are unknown as reprints are yet to be received).
13. Bhattacharya S.S, Padmanabhan K A & Schlipf J, A Mechanistic model for boundary sliding controlled optional superplastic flow I- theory. J. of Materials proc. and manufacturing Science, 1995 (reprints are yet to be received)
14. Bhattacharya S.S, Padmanabhan K A, A mechanistic model for boundary sliding controlled optional superplastic flow II - experimental verification, J. of Materials Proc. and manufacturing Science,1995.
15. Hahn H, Padmanabhan K A (a key note lecture ) Deformation behaviour and possible applications of Nanostructured materials. Advanced materials processing, Proc. of the Second Pacific International Conference on Advanced Materials Processing (PRICM-2) Eds. K.S Shin, J.K.Yoon and S J Kim, The Korean Institute of Metals and Materials. Kyongju, Korea, vol.3 pp 2119-2125 1995.

16. Padmanabhan K A, Nitsche R, H Hahn, (a key note lecture ) On the Deformation of Nanostructured metals and Ceramic EUROMAT '95. The fourth European Conference on Advanced Materials and Processes 1995. Symposium special and functional materials, Associazione Italia DiMetallurgia, Milane, Italy 289-298 1995
17. Padmanabhan K A and Hahn H, Microstructures mechanical properties and possible applications (a key note paper) Proc. of the Symposium Synthesis and Processing of Nanocrystalline Powder, Ed. D.L.Bourell, The Minerals Metals and Materials Society, Warrendale, USA pp21-32 1996.
18. Radhakrishnan V M, An energy based analysis of thermomechanical fatigue. Proc. Sym. on Creep Fatigue Interaction, IGCAR, Kalpakkam, Vol 1 pp I 82 - I 101, 1995.
19. Vikas Kumar Saxena, Malakondaiah G and Radhakrishnan V.M, Crack closure Maps. *ibid* pp C 39 - C 45, 1995
20. Gopala Krishna M S, Sreenivasa Murthy A.M and Radhakrishnan V.M, DC-PD Technique for crack monitoring in creep crack propagation study, *ibid* pp C 109 - C 119 , 1995
21. Kulvir Singh, Bose S.C, Chawdury K M and Radhakrishnan V M, Creep crack propagation in steam turbine casing casting steel, *ibid*, pp. C 72 - C 81 1995.
22. Periaswamy V M, Sundararajan S, Pathak S D and Radhakrishnan V M, Effect of Welding and Post Weld Heat Treatment on the Tensile and Fracture Toughness Behaviour of Al - Mg - Si Alloy, *Trans. IIM* 48 (5), pp 373 - 382, 1995.
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33. Amita Iyer, Rajiv E P and Seshadri S K, Corrosion resistance of cobalt electrocomposites. Paper presented at Fifth National Congress on Corrosion control, New Delhi, 1995.
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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. in Ocean Engineering and B.Tech. in Naval Architecture Programmes are being offered. The major areas of teaching and research at 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 Qualifications	Specialisation
<b>Professors</b>	
M.R.Pranesh, Ph.D.(IISc.), Head	Structure-soil-wave interaction studies, Coastline studies, Behaviour of materials in ocean environment
V.S. Raju, Dr.Ing.(Karlsruhe) (on lien to IIT, Delhi as Director)	Marine geotechnical Engineering, Foundation design for onshore and marine structures, Ocean Engineering
C. Ganapathy, Ph.D.,(IIT, Madras)	Analysis and design of offshore and ship structures
M. Ravindran, Ph.D.(IIT, Madras) (on lien to NIOT, Madras as Executive Director)	Turbomachines, pumps, Hydraulic turbines, Ocean Energy
S. Narasimha Rao, Ph.D (IISc., Bangalore)	Marine geotechnical engineering, Seabed soil characteristics under static and dynamic loads
C.P. Vendhan, Ph.D.(IIT, Kanpur)	Computer aided analysis of ocean, Civil and Aerospace structures, Dynamics of floating bodies and structures

### Specialisation

K.Muthukrishnaiah, Ph.D.(IIT, Madras)	Marine geotechnical engineering, Analysis and civil & aerospace structures, Dynamic of design of foundation for offshore and onshore structures
K. Ganesh Babu, Ph.D. (IIT, Madras)	Analysis and design of ocean structures, Behaviour of Material fatigue and in Ocean Environment
V. Sundar, Ph.D.(IIT, Madras)	Wave-structure interaction, Coastal Erosion and shore protection, Fluid flow problems
V.G. Idichandy, Ph.D.(IIT, Madras)	Experimental techniques, Instrumentation, Analysis and testing of structural models and prototypes
SP.Subramanian, Ph.D.(IIT, Madras)	Geological oceanography, Engineering geology

### Associate Professors

R.L. Roy Choudhury, Ph.D.(IIT, Madras)	Ship motions and maneuvering, Ship propulsion & resistance, Design of small crafts & fishing vessels
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. Sundaravadivelu, Ph.D. (IIT, Madras)	Computer aided analysis, design and experimental studies of coastal and offshore structures

### Assistant Professors

P. Sambandan, M.S.(IIT, Madras) - on lien to NSDRRC, Visakhapatnam	Ship design, ship structures, Computer Applications in ship design
J.S. Mani, Ph.D.(IIT, Madras)	Hydraulic and numerical modelling of Coastal and offshore Processes
S.K. Bhattacharyya, Ph.D. (IIT, Madras)	Computer aided structural analysis, Analysis of motion floating bodies, Model studies
S. Neelamani, Ph.D. (IIT, Madras)	Experimental and theoretical hydrodynamics, Wave structure interaction, Wave energy, Fluid Mechanics
Paul Mario Koola, Ph.D. (IIT, Madras)	Wave energy, Hydrodynamics, Oceanographic measurements
R. Natarajan, Ph.D. (IIT, Madras)	Ship design, Ship production and planning
V. Anantha Subramanian, Ph.D. (IIT, Madras)	Naval Architecture, Ship model testing

#### 4.12.3 Students on Roll

Programme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D	4	1	3	1	6	-	2	-	6	4	21	6	27
M.S.	1	-	4	-	1	-	-	-	-	-	6	-	6
M.Tech.	8	-	10	1	-	-	-	-	-	-	18	1	19
B.Tech.	22	-	18	1	19	-	20	-	-	-	79	1	80
<b>Total</b>	<b>35</b>	<b>1</b>	<b>35</b>	<b>3</b>	<b>26</b>	<b>-</b>	<b>22</b>	<b>-</b>	<b>6</b>	<b>4</b>	<b>124</b>	<b>8</b>	<b>132</b>

#### 4.12.4 Number of Scholarships/Fellowship Holders

Programme	Institute	Others	Total
Ph.D	17	-	17
M.S.	5	-	5
M.Tech	10	-	10
<b>Total</b>	<b>32</b>	<b>-</b>	<b>32</b>

#### 4.12.5 Number of Degrees Awarded

Programme	Number
PhD	4
MS	7
M.Tech	3
B.Tech	15
<b>Total</b>	<b>29</b>

#### **4.12.6 New Facilities added and Major Equipment Procured**

1. MARC Software for finite element analysis
2. TRIBON Software for Ship Design
3. INDIGO 2 Workstation (SGI)
4. Tektronix Colour Printer
5. HP Designing A0 size plotter
6. Three Siemens - Nixdorf PC 486

#### **4.12.7 Short-term Course/Workshop/Seminars/Symposia/Conference organised**

1. Inter Institutional Course on Dredging - 23.1.95 - 28.1.95 - Prof.M.R. Pranesh, Prof.S. Narasimha Rao and Prof.V. Sundar
2. Workshop on Dredging, Port Engineering, Coastal Engineering and Coastal Zone Management 30.1.95 to 31.1.95 Organising Secretary - Prof.M.R. Pranesh
3. Marine Corrosion and Control - June, 1995 - Prof.M.R. Pranesh
4. National Conference on Fluid Mechanics and Fluid Power December, 1995 - Prof.M.R. Pranesh
5. Model Analysis and Testing of Offshore Structures - June 6th - June, 16, 1995 - Prof.C. Ganapathy and Prof.V.G. Idichandy
6. Training cum Short Term Course on Dredging for Dredging Corporation of India - 8.12.1995 to 11.12.1995 - Prof.S. Narasimha Rao and Prof.M. Ravindran (NIOT)
7. Member Course Development Group for Regional Operational Centre of Intl.Ocean Institute, IIT, Madras. The task is to prepare course module on topics in Coastal Zone Management - Prof. V. Sundar
8. Organising Secretary (Publications), Conference on Ocean Engineering, 17-20, December, 1996, IIT, Madras - Prof.V. Sundar
9. Workshop on vibration Testing Facilities 27-28 March with CE Department and Applied Mechanics Department - Prof.V.G. Idichandy
10. Model Analysis and Testing of Offshore Structures (QIP Course) - 4-16 June, 1995 - Prof.V.G. Idichandy and Prof.C.Ganapathy
11. Strain gauges - Industrial Applications - 4-6 July, 1995 - Prof.V.G. Idichandy and Mr.G. Thomas
12. International Training Course on Coastal Zone Management as a Sustainable Process - 19th June to 26th July, 1995 - Prof.R. Rajagopalan, Prof.SP. Subramanian and Dr.L.S. Ganesh

13. Training Course on Integrated Coastal Zone Management for State Government (T.N.) Officials in Collaboration with N.I.C.T. - 4th to 20th October, 1995 - Prof.R. Rajagopalan, Prof.SP. Subramanian and Dr.L.S.Ganesh
14. Storage structures - May 8-12, 1995 - Dr.K.Rajagopalan
15. Finite Element Buckling Analysis of structures - May 15-19, 1995 - Dr.K. Rajagopalan
16. Course Module on Coastal Structures for Regional Operational Centre of Int I.Ocean Institute, IIT, Madras - Dr.R. Sundaravadivelu

#### 4.12.8 Special Lectures delivered

S.No.	Name of the faculty	Topic of Lecture	Delivered at	Date
1.	Prof. C.Ganapathy	Design of Marine structures	MECON Ranchi	13.9.95
2.	Prof.S.Narasimha Rao	Settlement problems in Madras	Anna Univ.	April 95
3.	Prof.C.P.Vendhan	Instability of large structure-computational issues	Keynote address, International Conference on stability of structures, Coimbatore	June 9,95
4.	Prof.V.Sundar	Coastal Engineering Problem along Indian Coast	Bergische University, Germany	17.6.95
5.	Prof.V.G.Idichandy	Mechanical measurement Course person - UGC sponsored course in Physics	CMS College Kottayam	17-21.2.96
6.	Dr.J.S.Mani	Dynamic Marine Environment	Natl. Symposium on Electro Chemistry in Marine Environment (Hotel Brezze, Madras)	7.2.95
7.	Dr.S.Neelamani	1. Introduction to Ocean wave dynamics & 2. Ocean Energy	Anna University (for PWD Engineers)	-
8.	Dr.Paul Mario Koola	Ocean Energy Wave Energy  Sea Solar OTEC Power Plant at Kulasekarapatnam	T.T.T.I. Madras  Anna Univ.	-  Jan.96

#### 4.12.9 Visits abroad

Sl.No.	Name of Faculty	Country visited	Date	Purpose of visit
1.	Prof.M.R.Pranesh	Malta	27.5.95 to 2.6.95	Meeting of Directors of Ocean Universities
2.	Prof.V. Sundar	Germany	14.5.95 to 6.7.95	Joint Project by German Science Foundation
3.	Prof.V.G.Idichandy	Malaysia	17-22, March,96	To attend an International Conference on Computational Methods and Testing for Structural Integrity
4.	Prof.SP.Subramanian	U.S.A.	Jan-Feb.95	U.N.sponsored 'Course developers' Workshop on Train Sea Coast - University of Stoney Brook, New York
5.	Dr.S. Neelamani	Portugal (Lisbon)	6-10 Nov.95	Conference (II European Wave Power Conference)
6.	Dr.Paul Mario Koola	Germany	May- June, 95	DFG Project

#### 4.12.10 Distinguished Visitors to the Centre

S.No.	Name of the Visitor and Occupation	Date of Visit	Purpose of visit (Lecture/Discussion)
1.	Muhammed Basheer Dept. of Civil Engineering Queen's University, Belfast, UK	1.8.95	Lecture
2.	Dr. D.V. Reddy Prof. & Director Centre for Marine Structures & Geotechnics Florida Atlantic Univ., USA	17.8.95	Lecture
3.	Mr. David Moss Senior Consultant (Support) & Mr. Adrian Box Kockums Computer Services, UK	14.11.95	Lecture
4.	Dr. Ian J Jordaan Memorial Univ. of Newfoundland St. John's, Canada	6.12.95	Lecture



S.No.	Name of the Visitor and Occupation	Date of Visit	Purpose of visit (Lecture/Discussion)
5	Prof. Lim Pin & Prof. Hang Chang Chief National Univ. of Singapore Singapore	18.1.96	MOU
6	Prof. Inoue Yoshiyuki Yokohama National Univ., Japan	9.1.96 to 12.1.96	INSA visitor

#### 4.12.11 SPONSORED PROJECTS

S.No.	Title	Period	Funding Agency	Amount (in lakhs)	Co-ordinator(s)
1.	Design of Standard vessel for west coast canal	2 years	Inland Water Water Authority of India	5.75	Prof.C.Ganapathy Prof.M.R.Pranesh Dr.V.Anantha Subramanian Dr.R.Natarajan
2	Dredging, Port Engg. Coastal Engg.and Coastal Zone Management	4 years	Indo-Dutch Co-operation	..	Sent to Delft Tech.Univ.for consideration
3	Development and Design of Barge system	3 years	Inland Waterway Authority of India	6.00	Prof.M.R.Pranesh Dr.R. Natarajan Dr.V.Anantha Subramanian
4	Application Core-loaded structure for offshore platform	2 years	Tube products of India	3.00	Prof.C.Ganapathy
5	Development of cyclic triaxial test apparatus	5 years	Volkswagen (Germany)	84,000 DM	---
6	Underwater Vibration of shells	1993-96	B.R.N.S.	4.20	Prof.V.G.Idichandy Dr.S.K.Bhattacharyya Prof.C.P.Vendhan
7	Development of underwater 3 comp. 5 - stage velocity meter	1995-1997	NIOT (DOD)	18.32	Prof.V.G.Idichandy Prof.C.P. Vendhan

S.No.	Title	Period	Funding Agency	Amount (in lakhs)	Co-ordinator(s)
8	Detached Break-water as a shore protection measure	1995-1997	NIOT	4.18	Prof.V.Sundar
9	Loads on Inclined Cylinders due to Steep Waves and Currents	Jan.95 to Dec.96	German Science Foundation (DFG) Germany	86,250 (DM)	Prof.V.Sundar Dr.Paul Mario Koola Dr.S.Neelamani
10	Development of Techniques for reliability of ships	89-Nov.95	Ministry of Surface Transport	3.380	Dr.K.Rajagopalan
11	Development of software for warping torsion of containerships	89-Feb.96	Ministry of Surface Transport	3.860	Dr.K.Rajagopalan
12	Structural analysis and design of wave energy caisson	1 year	Department of Ocean Development	1.96	Dr.R.Sundaravadivelu
13	Coastal Defence works	1 year	Ministry of Surface Transport	2.5	Dr.J.S.Mani
14	Data collection along North Madras Coast for validation of Numerical Models	2 years	NIOT	23.00	Dr.J.S.Mani
15	Wave force estimation on OWL Device	24 months	DOD	2.00	Dr.S.K.Bhattacharyya
16	Sea Trial of a 150 KW Wave power caisson off Trivandrum Coast	Till Dec.95	NIOT	25.00	Dr.Paul Mario Koola
17	Sea trial of a 150 KW Wave Power Plant Off Trivandrum	88-95	DOD	388.054	Dr.N.V.C.Swamy Dr.V.S.Raju Prof.M.Ravindran Dr.S. Neelamani Dr.Paul Mario Koola

S.No.	Title	Period	Funding Agency	Amount (in lakhs)	Co-ordinator(s)
18	Impact load on platforms above sea level due to freak waves	2 years From Feb.95	Volkswagen Foundation, Germany	65,200 DM	Dr.Paul Mario Koola
19	Wave Power Plant Monitoring and maintenance	95-96	NIOT	23.115 (DM)	Dr.Paul Mario Koola
20	Design and development of variable reluctance type pressure sensors	Jan.96- Jun.97	DRDO, Govt.of India	15.48	Dr.V.Jagadeeshkumar Dr.P.Sankaran Dr.P.C.Majhee Dr.Paul Mario Koola
21	Hydrodynamic Testing and optimisation of SWATH Ship Design	3 years	DST, New Delhi	1.50	Dr.R.Natarajan Dr.V.Anantha Subramanian Prof.C.P.Vendhan Dr.Paul Mario Koola
22	Hull module for Remotely operable sea skimmer	1.1/2 yrs	NIOT	2.50	Dr.V.Anantha Subramanian
23	Directional Wave Measuring Buoy	2 years	NIOT	20.00	Dr.Jagadeesh Kumar Dr.Paul Mario Koola Dr.V.Anantha Subramanian

#### 4.12.12 Major Consultancy assignments

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Co-ordinator(s)
1.	Design of sea water intake system	M/s.Entoma Hydro System, Madras-86	0.70	Prof.M.R. Pranesh Prof.V. Sundar Dr.R.Sundaravadivelu
2.	Dredging Advice	M/s.Dharti Dredging & Construction, Madras-8	0.25	Prof.S.Narasimha Rao Prof.M.R. Pranesh
3.	Study of land erosion	M/s.ICI India Ltd., Ennore	1.35	Prof.M.R. Pranesh Dr.J.S. Mani

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Co-ordinator(s)
4.	Foundation Consultancy	Ordinance Clothing Factory, Avadi	0.30	Prof.S.Narasimha Rao Prof.M.R. Pranesh
5.	Development of Colachel Port	State Port Office, Madras	9.10	Prof.M.R. Pranesh Prof.V. Sundar Dr.R.Sundaravadivelu
6.	Site inspection and advice	MVR Industries, Madras-2	0.05	Prof.M.R. Pranesh Prof.V.Sundar Dr.R.Sundaravadivelu
7.	Soil testing & advice	M/s.Vax Consultants, Madras	0.10	Prof.S.Narasimha Rao Prof.M.R. Pranesh
8.	Construction of LPG Terminal at Gopalpur	Gopalpur Port Project	2.00	Prof.C. Ganapathy Dr.R.Sundaravadivelu Prof.V. Sundar
9.	Preparation of Master Plan for Harbour	TISCO	1.00	Prof.C. Ganapathy Dr.R.Sundaravadivelu Prof.V.Sundar
10.	Design of Fishing harbour	Gopalpur Port Project	1.50	Prof.C. Ganapathy Dr.R.Sundaravadivelu Prof.V. Sundar
11.	Gemstone Beach Resorts Gem Granites	--	0.75	Prof.S.Narasimha Rao
12.	Salt Water Intake Jetty - Dredging	Hindustan Petroleum	1.50	Prof.V. Sundar
13.	Design of Phosphoric acid tanks, Kakinada	Godavary Fertilizers and Chemicals Kakinada	0.65	Prof.S.Narasimha Rao
14.	Design of various systems for Pandy Port	Square D	1.25	Prof.S.Narasimha Rao Prof.V. Sundar
15.	Cochin International Airport Runway	IIT project. Hence department share	-	Coordinated by Dean, IC & SR is not known
16.	Num.modelling of Buoy-Pontoon system	NSTL, Vizakapatnam	1.98	Dr.S.K.Bhattacharyya Prof.V.G.Idichandy

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Co-ordinator(s)
17.	Data acquisition and Analysis of HSTEE tests	DRDL, Hydrabad	19.23	Prof.C.P. Vendhan Prof.V.G. Idichandy Dr.S.K.Bhattacharyya
18.	Investigation and Advice	Cochin refineries Ltd.,	1.00	Prof.K.Muthukrishnaiah
19.	Investigation and Advice of Madras	Corporation	0.10	Prof.K.Muthukrishnaiah
20.	Assessment of Seabed condition for Ennore Port	NIOT, Madras	2.00	Prof.K.Muthukrishnaiah Dr.S.R.Gandhi
21.	Investigation and Advice	Bharat and Associates, Madras	0.25	Prof.K.Muthukrishnaiah Dr.J.S. Mani
22.	Investigation and Advice	Simplex concrete Piles	0.10	Prof.C.Ganapathy Prof.K.Muthukrishnaiah
23.	Investigation and Advice	The India Cements Ltd.,	0.35	Prof.K.Muthukrishnaiah
24.	Investigation and Advice Madras	Unides Consultants	0.10	Prof.K.Muthukrishnaiah
25.	Investigation and Advice	Camiceria Apparels India Pvt. Ltd.,	0.10	Prof.K.Muthukrishnaiah
26.	Investigations on the Efficiency of Silica Fume	Sun metals and Alloys, Coimbatore	2.00	Prof.K.Ganesh Babu
27.	Design and Evaluation of Heat Resistant Concrete	South India Corporation Ltd., Madras	3.00	Prof.K. Ganesh Babu
28.	Rehabilitation of Factory building	Cethar Vessels	0.25	Prof.K. Ganesh Babu
29.	Concrete mix designs for Vasista bridge	L & T, ECC, Madras	0.40	Prof.K. Ganesh Babu
30.	Development of all weather Port at Gopalpur	TATA Iron and Steel Company Ltd.,	1.0	Prof.V. Sundar Prof.C. Ganapathy Dr.R.Sundaravadivelu Dr.S.R. Gandhi
31.	Design of Diffusor System	Aban Constructions	0.30	Prof.V. Sundar
32.	Development of Collachel port	Government of Tamil Nadu, Tamilnadu Port Development	9.10	Prof.V. Sundar Prof.M.R.Pranesh Dr.R.Sundaravadivelu

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Co-ordinator(s)
33.	Project High test	DRDL	7.00	Prof.V.G.Idichandy Prof.C.P.Vendhan
34.	Project Hydrodynamic tests at NSTL	DRDL	19.00	Prof.V.G.Idichandy Prof.C.P. Vendhan
35.	Hydrodynamic Tests on the New configuration of PJ08	DRDL	14.20	Prof.V.G.Idichandy Prof.C.P.Vendhan
36.	Integrity test on oil jetty	Reliance Petroleum, Hazira	2.00	Prof.V.G.Idichandy Prof.V.S.Raju and Dr.S.R.Gandhi
37.	Foundation Consultancy for Petroleum Refinery Jamnagar,Gujarat	Reliance Petroleum Ltd.,Bombay	2.00	Prof.SP.Subramanian . Prof.V.S.Raju Prof.P.K.Aravindan
38.	Evaluation of Design basis flood level at Kalpakkam	Indira Gandhi Centre for Atomic Research, Kalpakkam	1.80	Dr.R.Mahadevan Dr.J.S. Mani
39.	Design of Jamnagar jetty	Julelal Industries	0.50	Dr.R.Sundaravadivelu Dr.S.R. Gandhi
40.	Design of Diffuser Block	Aban Construction	0.75	Dr.R.Sundaravadivelu Prof.C. Ganapathy Prof.V. Sundar
41.	Analysis of Pole mast	Mazagon Dock Ltd.,	1.00	Dr.R.Sundaravadivelu Prof.C. Ganapathy and Prof.V. Sundar
42.	Development of all Port at Gopalpur	TATA Iron and Steel Company Ltd.,	1.00	Prof.C. Ganapathy, Prof.V. Sundar and Dr.S.R. Gandhi
43.	Design of intake Wheel	Aban Constructions	0.03	Prof.V. Sundar
44.	Design of Diffuser Block	Aban Construction	0.30	Prof.V. Sundar
45.	Sea water intake	Esquire Engineering	0.15	Dr.R.Sundaravadivelu Prof.C. Ganapathy Dr.S.R. Gandhi and Dr.SP.Subramanian
46.	Study of wave dynamic anti-sea erosion works at Pondicherry	Public Works Department,Pondicherry	2.50	Dr.J.S.Mani Dr.S.Kathiroli,NIOT

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Co-ordinator(s)
47.	Design and Laboratory Investigations for Floating Breakwater	Finolex Industries Limited, Pune	1.00	Dr.J.S. Mani
48.	Design and Development of Stilling Well	DOD	0.50	Dr.J.S. Mani
49.	First Phase Study for Hydraulic and Geotechnical aspects for 21-hone Golf Course Construction near Kalpakkam	-	0.60	Dr.J.S.Mani Prof.K.Muthukrishnaiah Dr.R. Ambalavanan
50.	Shore Protection works	Imperial chemical works, Ennore	1.50	Prof.M.R. Pranesh
51.	Design of a tower	SPIC	0.50	Dr.S.K.Bhattacharyya Prof.C.P. Vendhan
52.	Design of Submarine Pipeline and Ship Mooring Systems for Transfer of LPG/Propane from an offshore Moored Vessel off Pondicherry Coast	M/s.Southern LPG Ltd., Madras	4.00	Dr.S.Neelamani Prof.V.S. Raju Prof.P.K.Aravindan Dr.R.Natarajan
53.	Design of Sea Water Intake Structure and Shore Protection for Aquaculture at Gulf of Cambay, Gujarat	M/s.Cambay Aqua Tech. Ltd.,Baroda	2.50	Dr.S.Neelamani Prof.V.S.Raju Dr.S.R. Gandhi
54.	Environmental load assessment and general technical services for the construction of Marine Facilities for Import/Export of Petroleum Products	Southern Petro-chemicals Industries Ltd., Madras	2.20	Dr.S.Neelamani Prof.V.S.Raju Prof.P.K.Aravindan Dr.R.Natarajan Dr.S.Kumaraswamy Dr.S.Subba Rao Dr.S.R.Gandhi Dr.A.Mehar Prasad Dr.J.S. Mani
55.	Techno Economic Feasibility study for the construction of a mini Tidal power plant at Durgaduani, Sundarban Islands, West Bengal	West Bengal renewable Energy Development Agency	7.00	Prof.M. Ravindran Dr.S.Kathirolu Dr.A.G.Pathak Dr.V.Jayashankar Dr.V.Balabaskaran

Sl.No.	Title	Organisation	Amount (Rs. in lakhs)	Co-ordinator(s)
56.	Preliminary study on the design of a sea water intake system for Aquaculture to be owned by Integrated Rubian Exports Limited, Cochin	M/s.Simplex Concrete Piles India Ltd., Madras	0.50	Dr.S.Neelamani Prof.P.K. Aravindan
57.	Metocean Data for the operation and design of Offshore Unloading facility for E.I.D. Parry off Ennore Coast	John Brown Engg. (India) Ltd.,Bangalore	0.80	Dr.S.Neelamani
58.	Estimation of Non Breaking wave Current and Breaking wave forces and Moments on the Dabhol Open Sea Fuel Unloading Jetty	Asia Foundations Constructions Limited, Bombay	3.36	Dr.S.Neelamani
59.	Stability of Ravva Offshore pipelines, Rv 10A & Rv 17A	ONGC, Govt.of India	0.40	Dr.K.Muthukrishnaiah
60.	Training for Dredging of India	Dredging Corporation	0.30	Dr.S.Narasimha Rao Dr.Paul Mario Koola Dr.V.Anantha Subramanian Dr.SP.Subramanian
61.	Ship Motion Study for personnel of DCI, India Deep water berth	Gopalpur Port Project	1.50	Dr.S.Neelamani Prof.C. Ganapathy Dr.V.Sundar Dr.R.Sundaravadive
62.	Experimental Ship Hydrodynamics & Instrumentation	Cochin University	0.20	Dr.R.Natarajan Dr.V. Anantha Subramanian
63.	Review of Coastal Reasearch vessel	DOD	0.80	Dr.V.Anantha Subramanian Sri P.Sambandan
64.	Flotation tests of ALH Helicopter with EFG	HAL	20.0	SriP. Sambandan Dr.R.L.Roy Choudhury Dr.S.Santhakumar
65.	Seakeeping, Resistance test on CRV	NSDRG	3.0	Dr.V.Anantha Subramanian Sri P.Sambandan



#### 4.12.13 Honours and Awards

S.No.	Name of the Faculty	Honours/Awards	Purpose
1.	Prof. S.Narasimha Rao	ONGC & Indian Geotechnical Society Award (Cash award of Rs.1000/-)	For the best paper on "Marine Geotechnical Eng. Published in the proceedings of Indian Geotechnical Society

#### 4.12.14 Research Publications

1. M.R. Pranesh and Mr.Arvee Sujil Johnson Submarine pipeline routing software computers and structures, Vol.57, No.2,pp.233-252, 1995
2. P. Alagusundaramoorthy, R. Sundaravadivelu & C. Ganapathy Ultimate strength of stiffened panels with cutouts under uniaxial compression - (iii) Marine structures 8 (1995) 279-308 Elsevier Science Limited, Great Britain-1995
3. Narasimha Rao, S. and Mathew, P.K., "Effects of Exchangeable Cations on Hydraulic Conductivity of a Marine Clay", Clays and Clay Minerals, U.S.A., Vol.43, pp.433-437, 1995.
4. Prasad, Y.V.S.N. and Narasimha Rao, S., "A new two point method of obtaining CV from a consolidation test", Canadian Geotechnical Journal, Vol.32, pp.741-746, August, 1995.
5. Rajasekharan, G. and Narasimha Rao, S., "Studies on Lime diffusion in Marine Clays", Geotechnical Engineering, Bangkok, Vol.26, December, 1995.
6. P. Krishnankutty and C.P.Vendhan, 'Three-dimensional finite element analysis of the diffraction - radiation, problem of hydrodynamically compact structures', Marine Structures, Vol.8, pp.525-542, 1995
7. Anandkumar, G., Sundar, V., Graw, K.U. and Kaldhenhoff, H., "Pressures and Forces on Inclined Cylinders due to Regular Waves" Ocean Engineering Jl.Vol.22, No.7, pp.747-759, 1995.
8. Sundar, V., Noethel, H., and Holz, K.P. "Velocity fields in Coastal Waters", Marine Structures Jl.Vol.8, No.3, 1995, pp.309- 333.
9. C. Kalyani Devasena, M.M. Ali and SP. Subramanian, Study of seasonal current variability in the Arabian sea using Geosat altimeter data, International Journal of Remote Sensing, 1995. Vol.16, No.14, pp.2691-2701
10. J.S. Mani, S. Jayakumar "Wave Transmission by Suspended Pipe Breakwater" Journal of Waterway, Port, Coastal and Ocean Engineering, ASCE, U.S.A. Vol.121, No.6, Nov/Dec.1995, pp.335-338

11. Wave transmission by suspended pipe breakwater J.S.Mani, S.Jayakumar Journal of Waterway, Port, Coastal and Ocean Engineering, ASCE, U.S.A., Vol.121, No.6, Nov./Dec. 1995, pp.335-338.
12. GNRK Mahider, C. Srinivas and S.K. Bhattacharyya Numerical study of a Fourier approximation method for nonlinear gravity waves, Advances in engg.software, 22, 127-133, 1995
13. S.K. Bhattacharyya, on two solutions of fifth order gravity waves, Applied Ocean Research, 17, 63-68, 1995
14. Suchitra N., Koola P.M., "A study of wave impact on horizontal slabs" Ocean Engineering, Pergamon, Elsevier Science Ltd., Vol.22, No.7, pp.687-697, 1995.
15. R. Natarajan and C.Ganapathy Analysis of Moorings of a Berthed Ship - International Journal of Marine structures Vol.8, pp.481-499, 1995
16. Prasad, Y.V.S.N., and Narasimha Rao, S. "Uplift capacities of Screw Anchors in Marine Clays under Vertical Cyclic Loading", Indian Geotechnical Journal, Vol.25, pages 233-248, April, 1995
17. Narasimha Rao, S., and Mallikarjuna Rao, S., "Behaviour of Rigid Piles in Clay under Lateral Loading", Indian Geotechnical Journal, Vol.25, pages 287-313, July, 1995

## 4.13 Physics Department

### 4.13.1 Introduction

Department of Physics was established in the year 1959. Now Ph.D. and M.Sc. Programmes in Physics are offered. In addition, the Department teaches courses in Physics to B.Tech. students. We also have M.Tech. Programmes in Solid State Technology and Transducer Physics and Instrumentation. The Department also undertakes a large number of sponsored and consultancy projects. The highlights are summarized below:

### 4.13.2 Areas of Teaching and Research

The thrust areas of teaching and research are Condensed Matter Physics, Applied Optics, Photonics, Nonlinear Dynamics, Statistical Physics, Thin Film Physics, Atomic and Molecular Physics.

The main research groups are:

- Low Temperature Physics and Superconductivity
- Magnetic Resonance and Magnetic Materials
- Applied Optics
- Lasers and Photonics
- Microwave phenomena, Dielectrics and Ferroelectrics
- Defects in Solids
- X-Ray Crystallography
- Atomic and Molecular Physics
- Statistical Physics and Dynamical Systems
- Semiconductor Physics and Photovoltaics
- Solid State Ionics
- Conducting Polymers
- Elastic Properties of Solids

### 4.13.3 Details of Faculty

Name and Qualification	Specialization
<b>Professors</b>	
V.Balakrishnan, Ph.D (Brandeis Univ.)	Theoretical and Statistical Physics
V.Damodara Das, Ph.D (SPU,Vidyanagar)	Thin Film Materials Science & Technology
P.C.Deshmukh, Ph.D (Nagpur Univ.)	Theoretical Atomic and Molecular Physics
M.P.Kothiyal, Ph.D (IIT Madras)	Applied Optics
(Mrs) Maha Seshasayee, Ph.D (RPI, NY.)	Condensed Matter Physics, Structural Studies in Disordered Systems

Y.V.G.S.Murti, Ph.D (IIT Madras)  
 V.R.K.Murthy, Ph.D (IIT Madras)  
 K.V.S.Rama Rao, Ph.D (Andhra Univ. Waltair)  
 G.Rangarajan, Ph.D (IISc Bangalore)  
**[Head]**  
 R.S.Sirohi, Ph.D (IIT Delhi)  
 B.M.Sivaram, Ph.D (Sussex Univ.UK)  
 S.Srinivasan, Ph.D (IIT Madras)  
 K.Viswanatha Reddy, Ph.D (IIT Madras)

**Associate Professors:**

B.S.V.Gopalam, Ph.D (IIT Madras)  
 K.Hariharan, Ph.D (IIT Madras)  
 J.Majhi, Ph.D (IIT Madras)  
 T.A.Prasada Rao, Ph.D  
 (Andhra Univ. Waltair)  
 V.Ramachandran, Ph.D (IIT Madras)  
 B.Subrahmanyam, Ph.D  
 (Andhra Univ. Waltair)  
 A.Subrahmanyam, Ph.D (IIT Kharagpur)  
 K.Srinivasan, Ph.D (IIT Madras)  
 Y.Syamasundara Rao, Ph.D. (IIT Madras)

**Assistant Professors**

(Mrs) S.Lakshmi Bala, Ph.D (Madras Univ)  
 G.Markandeyulu, Ph.D (IIT Madras)

**Specialization**

Condensed Matter Physics, Photonics,  
 Defect theory  
 Microwave Physics and Materials  
 Magnetism and Magnetic Materials  
 Low Temperature Physics, Condensed  
 Matter Physics  
 Optics, Holography, Speckle  
 Phenomenon & Coherent Optics  
 Laser Physics, Quantum Electronics,  
 Fiber Optics and Photonics.  
 X-ray Crystallography, Educational  
 Technology  
 Solid State Physics, Diffusion and  
 Electromigration  
 Semiconductor Physics &  
 Semiconductor Devices.  
 Solid State Ionics  
 Semiconductor Devices  
 Lasers, Spectroscopy and Nonlinear  
 Optics  
 Condensed Matter Physics &  
 Lattice Dynamics  
 Elastic Dielectric and Piezoelectric  
 Properties of Condensed matter  
 Semiconductor Devices, Photovoltaics  
 Electro Optics, Dielectrics  
 Dielectrics, Electronic Instrumentation  
 High Energy Physics, Chaos, Field Theory  
 Magnetism and Magnetic Materials

V.S.Murty, Ph.D (IIT Madras)  
 T.S.Natarajan, Ph.D (IIT Madras)

(Mrs) Neelima M. Gupte Ph.D  
 (SUNY,Stony Brook,N.Y)

M.S.Ramachandra Rao, Ph.D(IIT, Kharagpur)  
 S.Ramaprabhu, Ph.D (IIT Madras)  
 V.Sankaranarayanan, Ph.D (IIT Madras)

M.V.Satyanarayana, Ph.D(Madras Univ.)  
 K.Sethupathi, Ph.D(Moscow State Univ)

G.Sreenivasa Murthy, Ph.D (IIT Madras)  
 Suresh Govindarajan, Ph.D(Pennsylvania Univ)

V.Venkateswara Rao, Ph.D (IIT Madras)

C.Vijayan, Ph.D (IIT Madras)  
 T.M.Vimala, Ph.D (IIT Madras)

**Chief Design Engineer**

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

**Senior Scientific Officer Gr.I**

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

**CSIR Pool Officer**

A.R.Ganesan, Ph.D (IIT Madras)

**Research Associates**

V.Subramanian, Ph.D (IIT Madras)  
 (Mrs) T.Sarkar,Ph.D (IACS, Calcutta)  
 H.S.Chakraborty, Ph.D(PRL, Ahmedabad)

**Visiting Faculty**

S.D.Mahanti, Michigan State University, USA.

**Specialization**

Magnetic Resonance  
 Conducting Polymers, Molecular  
 Electronics and Electronic Instrumentation  
 Nonlinear Dynamics  
 Ceramics and Intermetallics  
 Metal Hydrides, NQR  
 Low Temperature Physics,  
 Superconductivity and Cryogenics  
 Photonics, Quantum Optics  
 Low Temperature Physics and  
 Superconductivity  
 X-ray Crystallography  
 Quantum Field Theory, Statistical  
 Physics and Dynamical Systems  
 Applied Optics, Holography and  
 Optical Instrumentation  
 Photonics and Nonlinear Optics  
 X-ray Crystallography  
 Optical Instrumentation, Lens Design  
 Thermal Expansion of Materials by  
 Optical Methods  
 Applied Optics, Holography  
 Microwaves  
 Magnetism, Superconductivity  
 Atomic & Molecular Physics  
 Solid State Physics & Magnetism

#### 4.13.4 Students on Roll

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D	1	2	5	2	6	2	8	1	16	7	36	14	50
M.Tech.	7	1	13	1	-	-	-	-	-	-	20	2	22
M.Sc.	18	4	22	3	-	-	-	-	-	-	40	7	47
<b>Total</b>	<b>26</b>	<b>7</b>	<b>40</b>	<b>6</b>	<b>6</b>	<b>2</b>	<b>8</b>	<b>1</b>	<b>16</b>	<b>7</b>	<b>96</b>	<b>23</b>	<b>119</b>

#### 4.13.5 Number of Scholarship/Fellowship holders

Programme	Institute	Others	Total
Ph.D.	29	18	47
M.Sc.	8 (Scholarship)	3 (Free Studentship)	11
M.Tech	3 (HTA)	1 (QIP)	4
<b>Total</b>	<b>40</b>	<b>22</b>	<b>62</b>

#### 4.13.6 Number of degrees awarded

Programme	Number
Ph.D.	8
M.Sc.	17
M.Tech. (SST)	6
M.Tech. (TPI)	5
<b>Total</b>	<b>36</b>

#### 4.13.7 Instruments/Equipment Designed and New Methods Developed

1. An automated reed type Kelvin Probe for work function and surface photovoltage studies in semiconductors.
2. Electronic Speckle Pattern Interferometry (ESPI)/Electronic Speckle Pattern Shear Interferometry(ESSI) for ISRO.
3. Fibre Optic based ESPI.
4. Hydrogen absorption - desorption for decrepitation equipment.
5. Coaxial sample holder for the measurement of dielectric constant of ceramics.
6. Drop-Calorimeter as a part of heat capacity measurement.
7. Three simple electrical resistivity measuring cryostats to measure the superconducting transition temperature of high  $T_c$ -superconductors.

8. Closed cycle refrigerator attachment to the existing vibrating sample magnetometer.
9. Vibrating reed set up for measuring low frequency, velocity and attenuation in materials.
10. A temperature controller upto 350 degrees celsius with an accuracy of 0.1 degree celsius has been designed and fabricated.
11. Semiconductor Quantum Dots have been successfully prepared in a polymer matrix with sizes in the range of about 1 nm to 6 nm.
12. A computer controlled pulse selecting spectrometer has been designed and built for use in dye laser studies.
13. A pico-second optical pulse width measuring autocorrelator has been designed and built for measuring pico-second laser pulses.
14. The design aspects of nonlinear optical loop mirrors.
15. A co and contra pumped Erbium doped fiber amplifier has been developed.
16. A PC-based controller for climatic chamber.

#### 4.13.8 New Facilities added and Major Equipment Procured

1. Characterization facilities of SONARs for underwater applications.
2. Dielectric constant studies of semiconducting samples in AF, RF and microwave frequencies.
3. Impedance analyser HP-4192A.
4. He-Ne lasers, Diode lasers, Personal Computers, Digital Multimeters and CROs have been added to B.Tech. Physics Laboratory.
5. DC Magnetron Power Supply.
6. Manual insertion utility probe attachment to the existing Squid magnetometer to measure magnetoresistance and Hall effect.
7. DEC-ALPHA high performance 300LX workstation.

#### 4.13.9 Short-term Courses/Workshops/Seminars/Symposia, Conferences organized

	Title of Course	Duration	Co-ordinator(s)
1.	Laser Based Instrumentation Under QIP Programme	4-15 Dec. 1995	Dr.V.Venkateswara Rao Dr.N.Krishna Mohan
2.	Second National Conference on Solid State Ionics	15-17 Feb. 1996	Dr.K.Hariharan (Secretary)
3.	Technology appreciation programme on Photovoltaics for terrestrial and space applications.	26 Feb. 1996	Dr.A.Subrahmanyam Dr.K.N.Bhat.

**4.13.10. 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.J.Majhi	DAE Solid State Physics Symposium, IACS, Jadavpur	27-31, Dec.95
2.	Dr.K.V.S.Rama Rao	INTERMAG 1995, San Antonio,USA	18-21, April 95
		Materials Research Society of India (MRSI), IIT Kharagpur	8-10, Feb.1996
3.	Dr.R.S.Sirohi	Workshop on Photonics	28-30, Nov.1995
		National Laser Symposium	17-19, Jan.1996
		National Seminar on Computer Aided Inspection and Advanced Metrology	1-2, Feb.1996
		National Seminar on Photonics Instrumentation	25-27, March 95
		XXIII OSI Symposium	14-17, March 95
4.	Dr.D.K.Sharma	XXIII OSI Symposium	14-17, March 95
5.	Dr.V.V.Rao	XXIII OSI Symposium	14-17, March 95
6.	Dr.K.V.Reddy	International Workshop on Physics of Semiconductor Devices, New Delhi	11-16, Dec.95
7.	Dr.V.R.K.Murthy	Recent Advances in Microwaves and Light Waves, Univ. of Delhi	4-6, Dec.95
8.	Dr.A.Subrahmanyam	8th International Workshop on Physics of Semiconductor Devices, New Delhi.	11-16,Dec.95
9.	Dr. Suresh Govindarajan	First L.A.Meera Memorial Meeting on Frontiers in Physics, Mysore.	8-14, Feb.96
10.	Dr. K.Sethupathi	Internet for Educational & Research Organizations, Institute of Mathematical Sciences, Madras	9, March 1996
		DAE Solid State Physics Symposium,IACS, Calcutta.	26-31,Dec 1995
11.	Dr.G.Markandeyulu	International Conference on Strongly Correlated Electron Systems, Bangalore	27-30,Sep 1995
		7th Annual Meeting of the Materials Research Society of India, Bangalore.	Feb. 1996.



Sl.No.	Name of the Faculty	Title	Period/Duration
12.	Dr. S.Lakshmi Bala	CIMPA-CIMI International School on Nonlinear Systems, Pondicherry University.	8-26, Jan 1996
13.	Dr. Y.V.G.S.Murti	Defects in Condensed Media IGCAR, Kalpakkam.	20-22, Sep 1996
		National Conference on Luminescence and its Applications, Coimbatore.	17-19, Jan-1996
		Second National Conference on Solid State Ionics, IIT, Madras.	Feb, 1996.
14.	Dr.P.C.Deshmukh	X National Conference on Atomic & Molecular Physics, Meerut.	7-11, Mar 1996.

#### 4.13.11. Invited Lectures delivered by the Faculty in Academic Institutions/Public Bodies

Sl.No.	Name of Faculty	Topic of the Lecture	Delivered at	Date
1.	Dr.J.Majhi	Electronic Instrumentation	Berhampur Univ.	Sept.95
2.	Dr.Maha Seshasayee	Amorphous Materials	MG Univ. Kottayam	26-27 Feb.96
3.	Dr.R.S.Sirohi	2-D Optics and Applications	IRDE, Dehradun	29, Nov. 1995
4.	Dr.C.Vijayan	Novel Materials for Photonics	Dept. of Chemistry, IIT, Madras	20,Dec. 1995
		An Overview of Photoacoustic Spectroscopy	Dept. of Chemistry, IIT, Madras	20,Dec. 1995
5.	Dr.B.S.V.Gopalam	Stark Effect-Low Dimensional Semiconductors	Delhi Univ.	Dec.95
6.	Dr.V.R.K.Murthy	Dielectric Resonators	Delhi Univ.	5, Dec. 1995
		Microwave studies on YBCO Films	Delhi Univ.	6, Dec. 1995
7.	Dr.K.Harharan	Emerging Trends in Solid State Ionics	CECRI Unit, Madras	9, Aug. 1995
8.	Dr.A.Subrahmanyam	Recent Trends in Photovoltaics	ECIL, Hyderabad	16 Feb. 1996.
		Photovoltaics and Plasma Processing	Institute for Plasma Research, Gandhinagar.	7-8 Mar. 1996.

Sl. No.	Name of Faculty	Topic of the Lecture	Delivered at	Date
9.	Dr.G.Rangarajan	Thermal Properties at Low Temperatures	IUC-DAEF, Indore	Dec 1995
		Transport and Magnetic Properties of Conducting Polymers	Symposium on Conducting Polymers, Loyola College, Madras.	Feb 1995
10.	Dr.V.Sanakaranarayanan	Thermometric Techniques for Low & Ultra Low Temperatures.	IUC-DAEF, Indore	Dec 1995
11.	Dr.V.Ramachandran	Phonons	UGC Symposium AC College, Madras.	8, Nov 1995
12.	Dr.Suresh Govindarajan	Higher Dimensional Uniformisation and W-Geometry.	IMSc, Madras	
13.	Dr.V.Damodara Das	Peculiarities and Characteristics of Matter in the Thin Film State	Sivaji Univ. Kolhapur	Jan.23-24, 1995
		Electrical and Thermo-electric Characterisation of Semiconductors, Its Thin Films for Thermo-electric Applications	Cochin Univ. Cochin	Nov.27-29, 1995
14.	Dr.B.M.Sivaram	Recent Advances in Lasers	PRL, Ahmedabad	5-6, Oct 1995.
15.	Dr.P.C.Deshmukh	Atomic and Molecular Photoabsorption Processes.	PRL, Ahmedabad	5, Oct 1995.
		Atomic Photoabsorption Studies using Synchrotron Radiation.	IUC-DAEF,	24 Jan 1996.

#### 4.13.12. Visits Abroad

Sl.No.	Name of Faculty	Country Visited	Date	Purpose of Visit
1.	Dr.K.V.S.Rama Rao	Japan	3-6, April 1995	Discussions with Shinshu Univ. regarding MOU
		U.S.A.	April 1995	To attend INTERMAG, 1995

Sl.No.	Name of Faculty	Country Visited	Date	Purpose of Visit
2.	Dr.N.Krishna Mohan	Sweden	May-June 1995	Invited lectures and Research
3.	Dr.K.V.Reddy	U.S.A.	24-28, April 1995	Intl.Conf. on Metallurgical Coatings and Thin Films
4.	Dr.K.Hariharan	Belgium	7-12, May 1995	III Intl.Symp. on Electrochem. Impedance Spectros.
		Germany	13-30, May 1995	Max Planck Inst., Stuttgart for Research
5.	Dr.V.Balakrishnan	Belgium	May-July, 1995	Research Collaboration on chaos, nonlinear dynamics etc.
6.	Dr.V.S.Murthy	Malaysia & Australia	July, 1995	Int. Conference on Magnetic Resonance
7.	Dr.P.C.Deshmukh	USA	May-July 1995	NSF sponsored collaborative work at Georgia State Univ. & Research Discussions at Lawrence Berkeley Lab.

**4.13.13. Distinguished Visitors to the Department (Important Dignitaries above the level of Professors)**

Sl.No.	Name of the Visitor	Date of Visit	Purpose of Visit (Lecturees/Discussion)
1.	Prof.T.P.Das Univ. of Albany, USA	-	Visiting Faculty
2.	Prof.S.D.Mahanti Michigan State Univ. USA	Feb- Mar.96	Discussion and Lecture
3.	Dr.Madan M.Gupta Univ. of Saskatchewan, Canada.	Jan. 5, 96	Lecture
4.	Prof.P.N.Butcher Univ. of Warwick, UK	Jan.96	Discussion and Lecture

Sl.No.	Name of the Visitor	Date of Visit	Purpose of Visit (Lecturees/Discussion)
5.	Dr. Barsarn Istvan Hungarian Acad. of Sciences, Budapest	13-17, Nov 95	Discussions on collabo- rative project
6.	Dr. Roman Dabowski Liquid Crystal Group, Military University of Technology, Poland.	Feb. 1996	Research Interaction
7.	Dr.G.Suryan Dep. of Physics, I.I.Sc, Bangalore.	3 Nov 1995	One Day Symposium 'Raman Day'
8.	Dr. Srikanth Sastry National Inst. of Health, Maryland, USA.	4 Sep 1995	Lecture & Discussion
9.	Dr.A. K. Arora IGCAR, Kalpakkam.	3 Nov 1995	One Day Symposium 'Raman Day'
10.	Dr. Vladimir Nekvasil Inst. of Physics, Academy of Sciences, Chechoslovakia.	9 Sep 1995	Lecture & Discussion (under CSIR-Czech Acad. of Sciences Exchange Programme)
11.	Dr. A. K. Singhvi PRL, Ahmedabad.	12 Oct 1995	Lecture & Discussion
12.	Dr. S.Balasubramanian Univ. of Pennsylvania, USA.	30 Oct 1995	Lecture & Discussion
13.	Dr. Zsolt Horvath Res.Inst.for.Technical Physics, Academy of Sciences, Hungary.	14 Oct 1995	Lecture & Discussion
14.	Dr. S. T. Manson Dep. of Physics & Astronomy, Georgia State Univ., USA.	Dec 1995	Lectures, Discussions & collaboration (under NSF Project)
15.	Dr. P. Meinlschmidt Coherent Opticcs Group, Oldenburg Univ., Germany.	Nov 1995	Lecture & Discussion (under BMFT, Indo- German Project)
16.	Dr. Klaus W. Kher IFF der KFA, Julich, Germany.	31 Jan 1995	Lecture & Discussion
17.	Dr. K. S. Viswanathan Formerly Emeritus Prof. Dep. of Physics, IIT, Madras.	11 Nov 1995	Lecture 'Raman Day'

#### 4.13.14. Sponsored Projects

Sl.No.	Title	Period	Funding Agency	Amount (in Lakhs)	Co-ordinator(s)
1.	Magnetostrictive Materials		Technology Development Mission	160	Dr.K.V.S.Rama Rao Dr.K.V.Reddy and others
2.	Permanent Magnetic Materials		Technology Development Mission	54.60	Dr.K.V.S.Rama Rao Dr.K.V.Reddy and others
3.	Neutron Diffraction Study of $Li_2S-SiS_2$ , $Li_2-P_2S_5$ Glasses	95-97	IUC-DAEF	1.3	Dr.M.Seshasayee
4.	Development of Passive Devices by Ion Exchange	upto 31-3-95	DOE	8.8	Dr.R.S.Sirohi Dr.M.P.Kothiyal
5.	Optical Instrumentation	DAE		50.00	Dr.R.S.Sirohi Dr.M.P.Kothiyal Dr.D.K.Sharma Dr.V.V.Rao
6.	Study on Photorefractive Crystals for Real Time Holography	DST			Dr.R.S.Sirohi Dr.N.Krishna Mohan
7.	Single Interferogram Analysis and Wavefront Fitting	ISRO		4.5	Dr.D.K.Sharma Dr.V.V.Rao
8.	Development of a Photo-acoustic Spectrometer and its use in Solid State and Structural Chemistry	Till June 1996	DST	9.0	Dr. C.Vijayan Dr.J.Subramanian (Pondicherry Univ)
9.	Dielectric and Ultra-sonic studies on Polar liquids and liquid mixtures for micro-wave applications	95-98	CSIR	3.3	Dr.V.R.K.Murthy Dr.B.Subramanyam
10.	Development and Characterisation of Copper clad PTFE/woron laminates for microwave applications	95-97	DRDO	11.6	Dr.V.R.K.Murthy Dr.B.Viswanathan
11.	Determination of Magnetic Structure of $(Er,Pr)_2 Fe_{17-x}Al_xNy$ Compounds by neutron diffraction	1 year	IUC-DAEF	0.58	Dr.G.Markandeyulu Dr.K.V.S.Rama Rao
12.	Development of Optical Lens Coater	95-97	CSIR	4.00	Dr.A.Subrahmanyam
13.	Optimisation of Growth parameters in Si:Ge alloys by PECVD Technique	94-96	DST	6.00	Dr.A.Subrahmanyam Dr.Enakshi Bhattacharya (Elec.Engg.Dept.)

Sl.No.	Title	Period	Funding Agency	Amount (In Lakhs)	Co-ordinator(s)
14.	Magnetisation & AC susceptibility DST measurements on High Tc Superconductors	91-96	PMB		Dr.G.Rangarajan Dr.V.Sankaranarayanan. Dr.K.Sethupathi
15.	Production of News-letters	89-97	PMB DST		Dr.G.Rangarajan
16.	Magneto-Transport studies on Semiconductor like Mercury Cadmium Tellurids.	96-98	DRDO	9.10	Dr.V.Sankaranarayanan Dr.K.Sethupathi
17.	Thermal & Magnetic studies at ultra low temperatures and high magnetic fields.		BMFT		Dr.G.Rangarajan Dr.E.Gmelin
18.	Preparation of high quality Bi-Superconductor by melt texturing for applications	2 yrs	DST	3.00	Dr.M.S.Ramachandra Rao
19.	Ionization of Atoms by Electromagnetic Radiation and Charged Particles	1993-96	NSF (USA)	0.765	Dr. Deshmukh, Dr. Manson
20.	Ionization of Atoms by High Energy Radiation.	1994-97	NSF (USA)	7.32	Dr. Deshmukh, Dr. Manson

#### 4.13.15. Major Consultancy Assignments

Sl.No.	Title	Organisation	Amount (Rs.in Lakhs)	Co-ordinator(s)
1.	Development of Optical head for ESPI System	ISRO	1.65	Dr.R.S.Sirohi Dr.M.P.Kothiyal Dr.D.K.Sharma Dr.V.V.Rao Dr.N.Krishna Mohan
2.	Development of Fizeau Interferometer	Prism India Ltd. (Pondichery)	0.60	Dr.R.S.Sirohi Dr.M.P.Kothiyal Dr.D.K.Sharma Dr.V.V.Rao Dr.N.Krishna Mohan

Sl.No.	Title	Organisation	Amount (Rs.in Lakhs)	Co-ordinator(s)
3.	Development of High Efficiency Si Solar Cells	RES Photovoltaics (Hyderabad)	Retainer Consultancy	Dr.A.Subrahmanyam
4.	Development of PV Systems	Pentafour (Madras)	Retainer Consultancy	Dr.A.Subrahmanyam
5.	Thermal expansion of the material of the ring used in valve seal inlet	Ashok Leyland (Madras)	0.20	Dr.G.Sreenivasa Murthy Mr. K.Sarangapani Mr.M.V.Rao
6.	Specific heat capacity of liquids & anode	Titanium Equip. Mfg. Co, (Madras)	0.20	Dr.G.Sreenivasa Murthy Mr. K.Sarangapani Mr. M.V.Rao.
7.	Determination of leak rate of metallic bellows	Metallic Bellows Pvt.Ltd, Madras.	0.17	Dr.G.Rangarajan
8.	Supply of liquid Helium to maintain superconducting MRI System	Vita Diagnostics, Madras.	0.10	Dr.G.Rangarajan
9.	Consultancy work on Cryogenic vessels	Fluidyne Engineers	0.051	Dr.G.Rangarajan

#### 4.13.16. Honours and Awards

Sl.No.	Name of the Faculty/Student	Honours/Awards
1.	Dr.R.S.Sirohi	Humboldt Research Award
2.	Dr.Suresh Govindarajan	John Stewart Bell Scholarship in Quantum Physics
3.	Dr.Suresh Govindarajan	Alexander Von Humboldt Fellowship
4.	Dr.V.Damodara Das	Invited nomination for, ncluding in the World Directory of Marquis Who's who in the World, 16th Edition, to be published in 1997.

#### 4.13.17. Research Publications

1. C.Suresh Kumar, A.Subrahmanyam and J.Majhi - Automated reed- type Kelvin probe for work function and surface photovoltage spectroscopy studies. Rev.Sci. Instrum 67(3) March(1996).
2. K.G.Suresh and K.V.S.Rama Rao - Magnetic and Electrical Properties of  $(Er_{1-x}Pr_x)_2Fe_{17}Ni_y$ . IEEE Trans.Magn., 31, 3722 - 3724 (1995).
3. M.Senthil Kumar, K.V.Reddy and K.V.S.Rama Rao - Observation of domain wall pinning in  $Dy_{0.73}Tb_{0.27}Fe_{2-x}Ni_x$  and  $Ho_{0.85}Tb_{0.15}Fe_{2-y}Ni_y$  Systems. IEEE Tran. Magn., 31, 4160 - 4162 (1995).
4. Vijay Raghavan, Ch.V.Mohan and K.V.S.Rama Rao - A detailed morphological study on the magnetic fine particles produced by hydrogen absorption-desorption process, Powder Technology., 85, 91 -94 (1995).
5. M.Senthil Kumar, K.V.Reddy and K.V.S.Rama Rao -  $^{57}Fe$  Mossbauer studies on the  $Dy_{0.73}Tb_{0.27}Fe_{2-x}Ni_x$  and  $Ho_{0.85}Tb_{0.15}Fe_{2-y}Ni_y$  Systems.Phys.Rev. B52, 6542-6549 (1995).
6. T.R.Kesavan, R.Ramesh and K.V.S.Rama Rao - Hydrogen absorption Studies in  $Zr_{0.4}Ho_{0.6}Fe_2$ , J.Alloys and Compounds., 226, 46 - 50 (1995).
7. M.Senthil Kumar, K.V.Reddy and K.V.S.Rama Rao - Effect of Ni substitution on the magnetic and electrical properties of  $Dy_{0.73}Tb_{0.27}Fe_2$ , J.Appl. Phys.77, 4589 - 4594 (1995).
8. R.Ramesh, M.S.Ramachandra Rao and K.V.S.Rama Rao - A-C susceptibility studies on  $Zr_{1-x}Ho_xCo_2[0 < x < 1]$ , J.Appl. Phys., 77, 2090 - 2093 (1995).
9. B.Anusuya, V.S.Murty and K.V.S.Rama Rao - New rhenium centers in ammonium and potassium perrhenates, J.Mol. Struct., 344, 135 - 142 (1995).
10. R.S.Sirohi and N.Krishna Mohan - Role of lens aperturing in speckle metrology, J.Sci.Ind.Res.,54,67-74(1995)
11. P.R.Sreedhar, N.Krishna Mohan and R.S.Sirohi - Time evolution of fringes obtained with a two beam coupled photorefractive novelty filter, J.Opt.(India), 24, 15-22(1995).
12. T.Santhanakrishnan, N.Krishna Mohan, M.P.Kothiyal and R.S.Sirohi - A non-contact simultaneous measurement of out-of- plane displacement and tilt using a quadrant detector, J.Opt(India) 24, 109-112(1995).
13. P.R.Sreedhar and R.S.Sirohi - Real-time image processing with a cat conjugator, Appl.Opt., 34, 333-337(1995).
14. P.Senthilkumaran, K.V.Sriram, M.P.Kothiyal and R.S.Sirohi - Multiple beam wedge plate shear interferometer for collimation testing, Appl. Opt. 34, 1197-1202(1995).
15. M.P.Kothiyal, J.S.Darlin, K.V.Sriram and R.S.Sirohi - Modified double wedge plate shearing interferometer for collimation testing(Technical note), Appl.Opt. 34, 2886-2887(1995).
16. R.S.Sirohi, T.Eiju, K.Matsuda and T.H.Barnes - Multiple beam lateral shear interferometry for optical testing, Appl.Opt. 34, 2864-2870(1995).



17. Shanthi Bhattacharya, P.Senthilkumaran, J.S.Darlin, M.P. Kothiyal and R.S.Sirohi - Holographic array illuminator using tandem Michelson interferometers: Fabrication and Analysis, *J.Mod.Opt.* 42, 2275-2283(1995).
18. H.O.Saldeer, N.Krishna Mohan and N.E.Molin - Comparative TV holography for vibration analysis, *Opt.Engg.*, 34, 486-492 (1995).
19. S.Ramaprabhu, E.A.C.Lucken and D.Bernardinelli- Correlation between  $^{63}\text{Cu}$  NQR frequency and S(1)Cu(I)S(2) bond angle in  $\text{CuL}_2$  complexes, *J.Chem.Soc. Dalton Transaction*, 115 (1995).
20. C.Palivan, T.Berclaz, S.Ramaprabhu, M.Geoffroy and G.Bernardinelli - Formation of a Cu(II) complex in x- irradiated N-methyl imidazolidine-2-thione) $_2\text{ClCu(I)}$ : A single crystal ESR study, *J.Chem.Soc. Faraday Trans.*,91,2155(1995).
21. B.Kamalamban, K.V.Sivakumar and V.R.K.Murthy - Delta E effect on Mn-Zn ferrites in the Manganese rich region, *Indian Journal of Pure and Applied Physics*, 33, 38-41 (1995).
22. V.Subramanian, V.R.K.Murthy and J.Sobhandri - Microwave conductivity studies on some semiconductors, *Pramana - Journal of Physics*, 44,19-32(1995).
23. B.Subramanyam - Gyrotropic and piezoelectric coefficients and attenuation of elastic waves in  $\text{BaTiO}_3$ , *Pramana* 45, 227- 234(1995).
24. S.Uma, T.Sarkar, K.Sethupathi, M.Seshasayee , G.Rangarajan, Chen Changkang, Hu Yongle, B.M.Wanklyn and J.W.Hodby - Structural, magnetic and crystalline effects of  $\text{Y}_{1-x}\text{Pr}_x\text{Cu}_3\text{O}_{7-d}$ , *Phys.Rev.B*, 53 6828(1996).
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28. Nithya Ravindran, T.Sarkar, G.Rangarajan and V.Sankaranarayanan - Magnetic susceptibility and specific heat of  $\text{Pr}_{2-x} \text{Ce}_x \text{CuO}_{4-y}$ , *J. Superconductivity* 8, 641-642(1995).
29. A. Niraimathi, G.Rangarajan, R.Kremer and E.Gmelin - Influence of Ga substitution on the magnetic modelling of Nd ions in  $\text{NdBa}_2 \text{Cu}_{3-x}\text{Ga}_x\text{O}_{7-y}$  at low temperatures, *Ceramic International* 21, 367-370(1995).
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36. S.Govindarajan - Higher dimensional uniformisation and  $W$ - geometry, Nuc.Phy B 457, 357-374(1995).
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#### 4.13.19 Any other relevant details

1. Dr. B.M. Sivaram - Member of DST Programme Advisory Committee on Lasers, Optics, Atomic and Molecular Physics.
2. Dr. B.M.Sivaram - Member of the Project Advisory Committee & Awards Committee of the Tamilnadu Council for Science & Technology.
3. Dr. B.M. Sivaram - Member of the Committee to draw up a Vision Paper on Lasers, Optics, Atomic and Molecular Physics for DST.
4. Dr. B.M. Sivaram - Consultant for the Defence Metallurgical Research Laboratory, Hydrabad for the laser materials processing programme.
5. Dr. B.M. Sivaram - Member of AICTE Committee to draft syllabus in Photonics for B.E/M.E courses.
6. Dr. C. Vijayan - Member of Board of Studies, International School for Photonics, Cochin University of Sciences and Technology, Kochi.

## 4.14 Computer Centre

### 4.14.1. Introduction

The Computer Centre was established in 1973 and provides Central Computing resources - facility and support. The Centre started with IBM 370 and changed over to SIEMENS 7580-E in 1987. The mainframe was complemented with MX500 running Unix and several micro computers and PCs to support research and development in various areas. Applications for the institute are also supported.

The existing computing facilities were found to be inadequate and by present international standards obsolete. The committee constituted by the Senate shortlisted and recommended configuration. Based on site visits to various organisations/ installations, new systems have been identified and procured. These are listed under "New facilities/equipment added". The Siemens Systems were shutdown with effect from Nov.'95.

It is also planned to use existing cables to various departments for institute-wide extended ethernet network to start with. Internet connectivity has been established to Aerospace Engineering, M.E & M.H, Chemistry, Library and N I O T Departments using CISCO routers and modems. They were commissioned in May 1995.

### 4.14.2 Details of Staff

<b>Name and Qualification</b>	<b>Specialisation</b>
<b>Professor</b>	
Muthukrishnan C.R. Ph.D [Head]	Software Engg, Distributed and Parallel Systems, Object Oriented Systems.
<b>Manager</b>	
Seshasayi P, M.S.Semantics, (on leave)	Computer Systems, Natural Language Processing.
<b>Seniro Systems Engineer</b>	
Dheenadayalu R, M.Sc. (Engg)	Data Centre Operations, System Administration. Application Software System selection.
<b>Senior Systems Programmer (SG)</b>	
Ramanujam M K, Ph.D	Systems Programming, Operating Systems, Computer Networks.
<b>System Engineers</b>	
Jayaprakash S, M.S	Programming Methodology, Computer Networks, Fault - tolerant Distributed Systems.

### Specialisation

Ramesh S K, M.S

MIS, Data Management, Data Processing, Syst Programming.

### Assistant Systems Engineers

Baman Banavath B.Tech(C.S)

System Analysis & Design, Database Management Systems, DOS Utilities.

Vatsala,M.S

System Analysis & Design, Application Software Development, Systems Programming, Database Management.

### Assistant Systems Officers

Santhosh Arvind, M.Sc(Phy)M.Sc. (O.R & C.A)

Operations Research, System Analysis & Design, MIS, DBMS.

Sourirajan C S, M.Sc

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

(Mrs) Vijayalakshmi Sirohi, Ph.D

Software Engineering, Database Management Systems, Numerical Computing, Application Software, Parallel Computing, System Analysis & Design, Systems Programming.

### Junior Systems Engineer

Sreekumar P Y, B.Tech. (C.S)

Database Management Systems, Systems Programming, Application Programming.

### Junior Systems Officers

Ramalingam S, M.Sc (Comp.Applns)

System Analysis and Design, Database Management Systems, Software Development (Unix)

Ravichandran V, M.Sc.

Application Programming, Database Management systems, System Operations, Networking working, Systems Programming.

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

Computer Applications in Industry, Operating Systems, Systems Operation/Administration, Networking.

### 4.14.3 System Trainee on Roll

1995 - 97

13

#### **4.14.4 New Facilities/Equipment added**

##### **Computer Centre Additions - Hardwares**

The modernisation proposal features 3 models of IBM RISC System/6000. The systems support a common Operating System, AIX (Advanced Interactive Executive).

The Central File and Database server is a high-end system, IBM RS6000 model 590 based on the latest POWER2 architecture.

Four numbers IBM RS6000 model 370 based on POWER architecture function as dedicated Computer servers (Headless servers) to process batch jobs.

Two Workstations IBM RS6000 model 25T based on POWERPC architecture offering powerful Graphics is provided.

Forty eight numbers of IBM 3151 Terminals serve as Clients.

Networking LAN topology is star type with ACCESS/ONE UNGERMANN BASS product as hub of cabling layout.

Every RISC SYSTEM/6000 has the System Management Tool (SMIT) as part of OS AIX. Network Management station runs a Network Monitoring Software Net Director.

##### **Softwares**

The Softwares include:

Optimised Language Compilers ANSI C, C Set++, FORTRAN, Pascal, MF COBOL, Engg & Scientific Subroutine Library, IBM Load Leveller, Plot Library, AIX WINDOWS 2D/3D, Xstation Manager (Server component) TCP/IP, NFS, DB2, NISA, MAPLE & TECPLOT.

##### **Applications Development Laboratory**

The laboratory is used as support for the professional work in Computer Centre and as platform for development and transfer for Institute and other applications.

##### **Additions - Hardwares**

Pocket Hard Disks - 3 Nos.  
INK JET Printer - 1 No.  
SERVO Voltage Stabiliser - 1 No.  
LINE Drivers - 6 Nos.

##### **Softwares**

Powerbuilder  
Nashot Anti Virus Kit  
Wordperfect

##### **Networking**

Ten numbers CISCO 2501 Routers each with 2 Serial and 1 AUI ports have been procured for establishing Internet connectivity to Departments using the existing serial cables. Aerospace Engineering, MEMH, Library, Chemistry and NIOT Departments have been connected up.

#### 4.14.5 Short Term Course/Workshops/Conferences attended

S.No.	Name of staff	Course/Workshop	Place
1.	Computer Centre Staff	Basic System Administration	M/s TISL, Madras
2.	Mr S Ramalingam Mr Santhosh Arvind	'Etherswitch'	ExeLAN, Madras.
3.	Mr S Ramalingam Mr S Jayaprakash Mr P Y Sreekumar	High Speed Networks	OPEN 95, Madras
4.	Computer Centre Staff	Demonstration on Multi-media	PAX-Multimedia Madras-2)
5.	Mr C N Vijayaraghavan Mr D Hariharan	Ultra-Computing Technology	Sun Micro, Madras
6.	Computer Centre Staff	NISA-Training	EMRC.
7.	Mr Ramalingam Mr S Jayaprakash	Fault Tolerant Computing	First International Conference, Madras.
8.	Dr (Mrs) Sirohi	Combined Natural and Forced convection in Non-Newtonian fluids	International Conf. in Advances in Mech.Eng, Bangalore.
9.	Computer Centre Staff	Introduction to Network Management	TISL, Madras

#### 4.18.6. Staff served in Committees

S.No.	Name of the Staff	Honour/Award	Purpose
1.	Mr R Dheenadayalu	Member	Trade Tests for CDS
2.	Dr M K Ramanujam	Member	Review System Trainees Selection and PC Test for LDCs
3.	Mr R Dheenadayalu	Committee of authors	Computer Science books for Stds XI and XII on TN State Board of Higher Education.
		Author	6 units of Computer applications for IGNOU.
		Member, Staff grievance and welfare committee.	
		Selection Committee Member for Laboratory Assistants.	

#### 4.14.7. Visitors/Invited Talks

Sl.No.	Name of the visitor	Purpose
1.	High Level Delegation from Complete Business solutions (I) Ltd.	Visit to Computer Centre
2.	Mr N Krishnasamy, Former Addl DGP - Expert Consultant in Computers for Tamil Nadu Police Dept.	Visit to Computer Centre
3.	Prof. Prabhakar Mateti, Dept of CSE-Wright State University Of Ohio-USA	Software Engg Education
4.	Dr Swamy, University of Software Engineering Wisconsin, Chicago	Education

#### 4.14.8. Technical Presentations

1.	13.12.95	EMRC Bangalore	Introduction to NISA
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#### 4.14.9. Institute Projects

Sl.No.	Title	Coordinators
1.	Hospital Information System	Mr R Dheenadayalu
2.	JEE Data Processing	Mr C S Sourirajan Mr Santhosh Arvind
3.	GATE Data Processing	Mr B Baman Mr S Ramalingam
4.	M.Tech Admission	Mr S K Ramesh Mr P Y Sreekumar
5.	CARS System Management	Mr S K Ramesh Mr Santhosh Arvind
6.	Stores & Purchase Management	Dr (Mrs) Sirohi
7.	CLAM Management- Library	Mr S Jayaprakash Mr S Ramalingam
8.	Hostel Mess Management	Mr C S Sourirajan Mr Santhosh Arvind
9.	Hostel Billing System	Mr C S Sourirajan Mr V Ravichandran

#### 4.14.10 Sponsored Research Projects

Sl.No.	Staff Member	Title	Funding Agency	Amount (Rs.in Lakhs)
1.	S K Ramesh Joint Coordinator	GIS Laboratory for Engineering Applications under Thrust Area in Technical Education.	AICTE	8
2.	(Mrs) Sirohi Coordinator	Investigation on Holo-optical elements	ARDB	14
3.	Dr M K Ramanujam Coordinator	Applications of Computer Graphics-under Modernisation	AICTE	8

#### 4.14.11 Consultancy Projects

Sl.No.	Faculty	Title	Amount	Organisation
1.	Mr S Ramalingam	Advice on Ingress RDBMS	Free of cost	K.J. Hospital, Madras
2.	Dr M K Ramanujam	Re-engineering of PL/I	Rs.25000	M/s SQUARED Madras.
3.	Dr M K Ramanujam	Advice on setting up Electronic Database	Rs.7500	ELCOT, Madras.

#### 4.14.12 Lectures

Sl.No.	Faculty	Title	Delivered at
1.	S Jayaprakash	Lecture on "Internetworking"	Maths Dept. IIT Madras.
2.	M K Ramanujam	Lectures on "PL/I-Facilities"	M/s SQUARED, Madras.
3.	S Jayaprakash Coordinator	Lectures on UNIX operating system	M/s CGPL
4.	B Baman	Lectures on MS-DOS	Library Staff, IIT Madras
5.	Computer Centre Staff	Lectures on Induction Courses to users for RS6000 systems.	-



## 4.15. Regional Sophisticated Instrumentation Centre

### 4.15.1 Introduction

The Regional Sophisticated Instrumentation Centre was established in 1974-75. Now Ph.D programmes are being offered. The major areas of teaching and research of the Departments are:

- Molecular Spectroscopy
- Quantum Chemistry and Instrumentation
- Magnetic Resonance Spectroscopy
- Study of Biomolecules in Clusters in solids/solution
- Electron Spectroscopy and Mass Spectrometry

### 4.15.2 Details of Faculty

Name and Qualification

Specialisation

#### CSIR Emeritus Scientist

P T Manoharan, Ph.D (Columbia)

Theoretical Chemistry and Magnetic Resonance Spectroscopy & Bioinorganic

#### Professors

Surjit Singh, Ph.D (IIT Kanpur)

Molecular Spectroscopy and General Physical Chemistry

S Subramanian, Ph.D (Leicester)

Magnetic Resonance Spectroscopy & Theoretical Chemistry

T K K Srinivasan, Ph.D (Banaras)

Molecular Spectroscopy

#### Asst. Professor

T Pradeep, Ph.D (IISc., Bangalore)

Physical Chemistry, Molecular Spectroscopy, Electron Spectroscopy & Mass Spectrometry

#### 4.15.3 Students on Roll (as on January 1996)

Pro-gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D	-	2	3	-	3	-	6	-	4	2	16	4	20
Research Associates	Institute 1		Projects 2		CSIR 2								

(Student on roll beyond 5 years may be shown in V years)

#### 4.15.4 Number of Scholarships/Fellowships holders

Programme	Institute	Number CSIR	Others	Total
Ph.D	10	8	2	20

#### 4.15.5 Number of Degrees Awarded

Programme Ph.D : 1

#### 4.15.6 Instruments/Equipment Designed and Developed

FT-EPR Equipment being developed

#### 4.15.7 New Facilities added and Major Equipment procured

New Digital Station with 5 GB memory

#### 4.15.8 Invited Lectures delivered by the Faculty in Academic Institutes/Public Bodies

Sl. No.	Name of Faculty	Topic of the lecture	Delivered at	Date
1.	Dr. P T Manoharan	Indian Institute of Science,	Bangalore	-
		Central Electrochemical Research Institute	Karaikudi	-
		Mahatma Gandhi University,	Kottayam	-
		University of Geneva,	Switzerland	-
		University of Fribourg,	Switzerland	-
		Max Planck Institute, Mulheim,	Germany	-
		University of Mainz, Mainz,	Germany	-
2.	Dr. Surjit Singh	Institute of Molecular Sciences,	Okazaki,	Japan Oct'95
		National University	Singapore,	Oct'95
3.	Dr. S Subramanian	Department of Biophysics, Medical Centre, University of Milwaukee,	USA	
		61st Annual Meeting of the Indian Academy of Sciences,	Madras	November 1995
		Inorganic and Physical Chemistry Department, IISc.,	Bangalore	-
		School of Chemistry, Madurai Kamaraj University,	Madurai	-
4.	Dr. T Pradeep	Ion/Surface collisions, NCL,	Pune,	March 14' 96
		Electron spectroscopy M.G. University	Kottayam	March 1, 1996
		Surface modifications and Low energy Ion/Surface Collisions	CECRI, Karaikudi,	April 12, 1996

#### 4.15.9 Visits abroad

Sl. No	Name of Faculty	Country	Purpose	Date
1.	Dr. P T Manoharan	Italy Netherlands Switzerland Netherland	Attended the Chianti Conference Attended the 1st EPR Workshop Delivered lectures Delivered lectures	-
2.	Dr. Surjit Singh	Okazaki, Japan	Institute of Molecular Spectroscopy,	Oct. 1995
		Japan	Moelcular Spectroscopy and Dynamics	Oct. 1995
3.	Dr. S Subramanian	USA	Radiation Biology, Branch, National Institute of Health, MD,	-
		Australia	12th Conference of the International Society of Magnetic Resonancs,	July 16-21

#### 4.15.10 Distinguished visitors to the Department (important Dignitries above the leve of Professor)

Sl. No.	Name of the visitor & Occupation	Date of visit	Purpose of visit (Lecture/Discussion)
1.	Prof. Peter Day, Director The Royal Institute of Great Britain, London, UK	8.8.95	Lecture
2.	Dr. S A Jeevarajan Department of Chemistry University of Alabama Tuscaloosa, USA	4.1.96	Lecture
3.	Prof. L Whitten Department of Chemistry North Carolina State University Raleigh, NC 27695-8201, USA	8.1.96	Lecture
4.	Dr. Raghunathan National Institute of Health Bethesda, Maryland, USA	11.12.95	Lecture

#### 4.15.11 Sponsored Projects

Sl.No.	Title of Project	Period	Funding Agency	Amount Rs.in lakhs	Co-ordinator(s)
1.	Spectroscopic Investigations of inter and intra molecular interactions	1991-95	DST	18.00	Dr. P T Manoharan
2.	Construction of FT-EPR Spectrometer	1992-95	DST	84.00	Dr. P T Manoharan Dr. S Subramanian
3.	M.O. Station Solvation	-	AvH Germany Donated work station	6.00	Dr. Surjit Singh
4.	US-India Rupee Project	-	-	20.00	Dr. P T Manoharan Dr. S Subramanian
5.	Chemistry of Metallo-carbo-hedrenes	1995-98	DST	9.05	Dr. P T Manoharan
6.	Chemistry of functionalised	1995-98	DST	3.47	Dr. T Pradeep
7.	Chemical writing on organised molecular assemblies	1996-98	JNC	2.00	Dr. T Pradeep

#### 4.15.12 Research Publications

##### Dr. P T Manoharan

1. The Cu(II) promoted Supramolecular self-assembly of Core oxalo retro-lispeptides: Crystal structure and magnetic property of [Aib-COCO-Aib]Cu, J.Am.Chem.Soc.117, 1643-44 (1995)
2. A comprehensive Study of Exchange Coupling in a Macrocyclic Binuclear Cu(II) Complex in Solid and Solution States, Inorg.Chem. 34, 270-277(1995)
3. Electron Spin lattice Relaxation in some nickel dithiolence matrices with Cu(II) complexes, Proc. Acad. Sci.Chemical Sciences 106, 1691-1705 (1995)
4. Metallo-carbohedrenes: a new class of molecular clusters with cage structure, Currence Science, 68, 1017-1026 (1995)

5. Jahn-Teller Distortion in a Cage CuN Molecule, Chem. Phys. Letts., 241, 627-634 (1995).
6. Proc. Indian Acad. Sci. (Chem. Sci.), 107, 281-295 (1995)
7. Biradical as EPR probes of conformations in model b-turn peptides, Biochem. Biophys. Res. 213, 439-446 (1995)

**Dr. Surjit Singh**

8. abinitio M O Calculations on associated complexes of LiCn with NH<sub>3</sub> P. Mohandas, M.C. Shivaglal, J. Chandrasekhar and Surjit Singh, Instt. J. Quant. Chem. 55, 477 (1995).
9. abinitio M O Calculations on ion molecule and ion pair molecule interactions of H<sub>2</sub>O, P. Mohandas and Surjit Singh, J. Mol. Stonet (Theochem); 361, 229 (1996)

**Dr. S Subramanian**

10. Towards TOCSY-free ROESY. Bull Magn. Reson. 2nd Proceedings issue, 1996
11. Structural Elucidation of Synthetic Calmodulin Fragments : NMR and CD studies: Bull Magn. Reson. 2nd Proceedings issue, 1996
12. Pattern Recognition of specific Diplor networks in biomolecules by 2D NMR: 2nd Proceedings issue, Bull. Magn. Reson. 1996
13. The Solution structure of TRH - A<sup>1</sup>H NMR Reinvestigation - Magn. Reson. Chem. 34, 83 (1996)
14. Ab initio study of NMR spin-spin coupling constants of five and six membered heterocyclic compounds, J. Mol. Struct. (Theochem), 339, 245 (1995)
15. Theoretical studies of photochemical ring fission reaction of dicyclopropyl ketone and Norrish type II reaction of cyclopropyl 2, 2 dimethyl cyclopropyl ketone. J. Mol. Struct. (Theochem) (1996)
16. Oxidation state of mercury in HgBa<sub>2</sub>(Ca<sub>0.86</sub>Sr<sub>0.14</sub>)<sub>2</sub>Cu<sub>3</sub>O<sub>8</sub><sup>+</sup> studied by x-ray photoelectron spectroscopy, Phys. Rev. B, 52, R9879 (1995).
17. Stabilization of a superconducting TbSr<sub>2</sub>Cu<sub>2.85</sub> Re<sub>0.15</sub>O<sub>7</sub><sup>+</sup> compound and the valence state of terbium, Appl. Phys. Lett. 67, 2711 (1995)

**Dr. T K K Srinivasan**

18. Mechanically activated M<sub>2</sub>O<sub>3</sub>.3. Characterisation by Vibrational Spectroscopy Gerhard Mes+I, T.K.K. Srinivasan and H.Knoziinger Langmuir 11, 3795 (1995)

**Dr. T. Pradeep**

19. Metallocohedrenes: New class of molecular clusters with cage structure, T. Pradeep and P.T. Manoharan, Current Science 68 (1995) 1017.
20. Preferential order at the surface of a liquid perfluoro polyether revealed by X-ray photoelectron spectroscopy, S. Ramasamy and T. Pradeep, J. Chem. Phys. 103 (1995) 485.
21. Ion surface collisions leading to dissociation and reactions, R.G. Cooks, S.A. Miller, T. Ast, B. Feng and T. Pradeep, Adv. Mass Spectrom (1996).

22. Surface structure of a liquid perfluoro polyether examined by reactive ion/surface scattering, T. Pradeep, S.A. Miller, H.W. Rohrs, B. Ferg and R.G. Cooks, Mat. Res. Soc. Symp. Proc. Vol. 380, P.93, 1995.
23. Concerted hydrogen rearrangement in nickelocenium catam and the form atom of  $NiH_2^+$ , T. Pradeep, J.S. Patrick, B. Ferg, S.A. Miller, T. Ast and R.G. Cooks, J. Phys. Chem. 99 (1995) 2941.
24. Chemical modifications of fluorinated self assembled monolayer surfaces by low energy reactive ion bombardment, T. Pradeep, B. Ferg, T. Ast, J.S. Patrick, R.G. Cooks and S.J. Pachuta, J. Am. Soc. Mass Spectrom, 6(1995)187.
25. Chemical Constitution of a perfluoropolyetner liquid surface, T. Pradeep, Chem. Phys. Lett., 243 (1995) 125.

#### 4.15.13 Any other Relevant details

Sl.No.	Faculty	Name of the Award	Purpose
1.	Prof. P T Manoharan	Chairman Member Member Member Member VicePresident Morris Travers Lecture Award K S G Das Memorial Lecture Award' (1995)	UGC Panel in Chemistry PAC/DST (Inorganic Chemistry) RAC, I.A.C.S., Calcutta INSA-COSTED National Committee RAC and Executive Council, IUC, Indore National MagneticResonance Society Indian Institute of Science, (1995)
2.	Prof. Surjit Singh	Member, Editorial Board Distinguished Educator	Indian Journal of Chemistry 'World Who's Who'
3.	Prof. S Subramanian	Member	PAC/DST [Physical Chemistry]
4.	Dr. T. Pradeep	Rajiv Gandhi award Rs.53.00 lakhs	Innovative ideas in Science and Technology 1995. Towards Plan and Non-Plan.

## 4.16 Fibre Reinforced Plastics Research Centre

### 4.16.1 Introduction

Fibre Reinforced Plastics (FRP) Research Centre was established in 1974 with a view to taking up inter-disciplinary research, manpower development and do work in composites technology. The Centre offers elective courses for students registered through various departments for B.Tech., M.Tech., M.S. and Ph.D. The Centre also guides students for M.S. and Ph.D. programmes.

Teaching and research are done in the following main four areas of Composites Technology. Studies are taken on polymer, metal and ceramic matrix composites.

- Materials Research and Development of Structural and Functional Composites
- Manufacturing Technology including Process Modelling, Design and Development
- Product Design and Development
- Material testing characterisation and quality assurance in Industrial Production
- Studies are taken up on Polymer, Metal and Ceramic Matrix Composites

### 4.16.2. Details of Faculty

Name & Qualification

Specialisation

#### Chief Design Engineer

N.G.Nair, Ph.D.(IITKanpur)

Composite Materials Research and Development, Moulding and Process Development for Composite Manufacture, Composite Product Design and Development, Testing and Quality Assurance

S.K. Malhotra, Ph.D. (I.I.T. Madras)

Composite Materials and Technology, Development of Composite products, Testing and quality control of composites

### 4.16.3 Students on Roll

Pro-gramme	IYear		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	-	-	1	-	1	-	2	-	3	-	7	-	7
MS	2	-	2	-	1	-	-	-	1	-	6	-	6
<b>Total</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>4</b>	<b>-</b>	<b>13</b>	<b>-</b>	<b>13</b>

All Registered through departments



#### 4.16.4 Number of Scholarship/Fellowship Holders

Programme	Institute	Others	Total
Ph.D	7	-	7
MS	4	2	6
<b>Total</b>	<b>11</b>	<b>2</b>	<b>13</b>

#### 4.16.5. Short term courses/Workshop/Seminar/Symposia/Conference organised

S.No.	Coordinator(s)	Title of Course	Period
1.	Dr.N.G.Nair	Workshop on Fibre Reinforced Thermoset Plastics	May 22 to June 3, 1995

#### 4.16.6 Visits Abroad

S.No.	Name of Faculty	Country visited	Date	Purpose
1.	Dr. S.K. Malhotra	Hongkong	May 12-June 30, 1995	Res. assignment at University of Hongkong

#### 4.16.7 Sponsored Projects

S.No.	Title	Period Year	Sponsoring agency	Amount (Rs.in lakhs)	Coordinator
1.	Development of Orthotic Knee and Hip joints with composite for energy paraplegics	3	DST	6.07	Dr. N.G.Nair
2.	Development and evaluation of fibre reinforced Plastics Splints for Cerebral palsy	3	DST	1.82	Dr. N.G.Nair

S.No.	Title	Period Year	Sponsoring agency	Amount (Rs.in lakhs)	Coordinator
3.	Design & Technical support for the development of FRP blade for wind turbines	-	Gandhi & Associates	0.55	Dr. N.G.Nair
4.	Design and Development of Mechanically deployable Composite bridge	3	MHRD (Technology Dev.Mission)	68.00	Dr. N.G.Nair S.K.Malhotra
5.	AE studies on Aerospace Materials	2	ISO-IIT(M) Space Technology Cell	3.00	R.Krishnamurty S.K.Malhotra G.Santhanakrishnan

#### 4.16.8 Major consultancy Assignments

S.No.	Title	Amount (Rs. in lakhs)
1.	Testing consultancy under Composites Test Facilities	3.00
2.	Miscellaneous Design Projects	0.45

#### 4.16.9. Research Publications:

1. M.Balasubramanian, S.K. Malhotra and C.V. Gokulrathnam, "Influence of calcination temperature on the properties of spray dried alumina-Zirconia composite powder", JI. of Materials Science, V-30, 1995, pp.3515-3520.
2. M.Balasubramanian, T.Sornakumar, S.K.Malhotra, C.V. Gokulrathnam and R.Krishnamurthy," Grinding of Solgel derived alumina-Zirconia Composites", Int. JI. of Refractory Metals and Hard Materials, V-13, 1995, PP.359-363.
3. R.Suresh and S.K.Malhotra, "Analysis of Composite Materials Hollow box beam structure for bridges", proc. of Intl. Conf. on Fibre Reinforced Structural Plastics", in Civil Engineering, Dec. 18-20, 1995, IIT Madras, P.P109-120.

4. R. Suresh and S.K. Malhotra., "Studies on static analysis of a Composite thin walled fixed beam", Proc. of Intl. conf. on Advances in Mechanical Engg, Dec. 20-22, 1995, IISc Bangalore, PP.1233-1245.
5. M.Balasubramanian, S.K. Malhotra and C.V.Gokulrathnam, "Influence of particle characteristics on sintering behavior of alumina-Zirconia Compositess", Jl. of Materials Science Letters, V-14, 1995, PP. 1484-1485.
6. M. Subramanian, S.K. Malhotra and R. Krishnamurthy, "Studies on toughness and dynamic mechanical properties of rubber modified epoxy matrices", Jl. Intl. Plastics Engg. and Technology, V-2, PP.45-53, 1995.
7. Dr.N.G. Nair, Developments in Polymer Matrix Composites, National Seminar on Advances in Polymer Technology, Cochin University of Science & Technology, Kochi February 1996.
8. Dr. N.G.Nair, U.S.Manivannan and R.Suresh, "Analysis, Design and Fabrication of FRP Atrium Roof Sri Yantra Maha Meru - A case study, Proc. of International Conf. on Fibre Reinforced Structural Plastics", in Civil Engineering, Dec.18-20, IIT Madras.
9. K.A.V. Pandalai and N.G. Nair (Ed), Composite product Design Manual, Vol.2 Jan.1996. Book published by TIFAC RCI Board, Hyderabad, 1996.

## 4.17 Materials Science Research Centre (MSRC)

### 4.17.1 Introduction

The Department of 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  $T_c$ ,  $H_{c2}$ , 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 Intercalation 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 properties correlations - Applications in solar energy conversion; thermoelectric power conversion.
- (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 oxide bronze and hollandite and related materials for PEC conversion.
- (6) **Fast Ion Conductors**  
Fundamental studies on ion mobility and structure property correlations in fast ion conductors (channel type oxides and phosphates) and pyrochlore structures.
- (7) **Nuclear Waste Disposal Materials**  
Study of crystalline mixed oxide and phosphate systems with a view to fix radioactive ions for nuclear waste disposal applications.

4. R. Suresh and S.K. Malhotra,, "Studies on static analysis of a Composite thin walled fixed beam", Proc. of Intl. conf. on Advances in Mechanical Engg, Dec. 20-22, 1995, IISc Bangalore, PP.1233-1245.
5. M.Balasubramanian, S.K. Malhotra and C.V.Gokulrathnam, "Influence of particle characteristics on sintering behavior of alumina-Zirconia Composites", Jl. of Materials Science Letters, V-14, 1995, PP. 1484-1485.
6. M. Subramanian, S.K. Malhotra and R. Krishnamurthy, "Studies on toughness and dynamic mechanical properties of rubber modified epoxy matrices", Jl. Intl. Plastics Engg. and Technology, V-2, PP.45-53, 1995.
7. Dr.N.G. Nair, Developments in Polymer Matrix Composites, National Seminar on Advances in Polymer Technology, Cochin University of Science & Technology, Kochi February 1996.
8. Dr. N.G.Nair, U.S.Manivannan and R.Suresh, "Analysis, Design and Fabrication of FRP Atrium Roof Sri Yantra Maha Meru - A case study, Proc. of International Conf. on Fibre Reinforced Structural Plastics", in Civil Engineering, Dec.18-20, IIT Madras.
9. K.A.V. Pandalai and N.G. Nair (Ed), Composite product Design Manual, Vol.2 Jan.1996. Book published by TIFAC RCI Board, Hyderabad, 1996.

## 4.17 Materials Science Research Centre (MSRC)

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Synthesis, characterization and study of  $T_c$ ,  $H_{c2}$ , 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 Intercalation 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 properties correlations - Applications in solar energy conversion; thermoelectric power conversion.
- (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 oxide bronze and hollandite and related materials for PEC conversion.
- (6) **Fast Ion Conductors**  
Fundamental studies on ion mobility and structure property correlations in fast ion conductors (channel type oxides and phosphates) and pyrochlore structures.
- (7) **Nuclear Waste Disposal Materials**  
Study of crystalline mixed oxide and phosphate systems with a view to fix radioactive ions for nuclear waste disposal applications.

#### 4.17.2 Details of Faculty

##### Name of the faculty

##### Specialisation

##### Professors

Prof. B. Viswanathan[Head]

Materials Science, Catalysis, Hydrogen Energy.

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.

##### Associate Professor

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

Materials Science and Solid State Chemistry High  
 $T_c$  superconducting materials; High temperature  
oxide and phosphate based ceramics; R&D of  
new materials for nuclear waste disposal. Fast ion  
conductors.

##### Assistant Professor

M.S. Ramachandra Rao, Ph.D. (IIT Kharagpur)

Solid State Physics/Materials Science/ Magnetic  
Materials; Advanced Ceramics and Intermetallics.

#### 4.17.3 Students on Roll

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Pro- gramme	I Year		II Year		III Year		IV Year		V Year		Total		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Ph.D.	-	-	2	1	-	-	-	1	2	2	4	4	8

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#### 4.17.4 Number of Scholarships/Fellowships holders

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Programme	Institute	CSIR	Others	Total
Ph.D.	3	--	5	8

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4.17.5 Number of Degrees Awarded Ph.D : 2

#### 4.17.6 Instrument/Equipment Designed and Developed

Apparatus for the study of i-V characteristics of varistors has been set-up.

#### 4.17.7 New Facilities added and major equipment procured

1. Lock-in-Amplifier Model No. EG&G 7260 DSP
2. Eurotherm Temperature Programmer/Control, Model No. 902P

#### 4.17.8 Invited Lectures delivered by the Faculty in Academic Institutions/Public Bodies : 2

#### 4.17.9 Visits abroad

One of the faculty visited Japan between Sep. 95 and oct. 95 as a members of the DST delegates on Computational Materials Science

#### 4.17.10 Distinguished visitors to the Department

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Sl.No.	Visitor's Name & address	Date	Purpose of visit
1.	Prof. Dr. M. Groll Univ. of Stuttgart, Germany	16 May 95	Lecture & Discussion
2.	Dr. K. Krishnan Bio-Rad Pacific Ltd. USA	13 Oct. 95	-do-
3.	Prof. K.L. Chopra Director, IIT, Kharagpur	14 Nov. 95	-do-
4.	Prof. P. Hagenmuller Lab. de Chimie du Solide du CNRS-Univ. Bordeaux I France	23 Nov. 95	-do-
5.	Dr. Jurgen Hauck IFF-KFA Research Centre D-52428 Juelich, Germany	08 Dec. 95	-do-
6.	Prof. A. Revcolecchi Director Lab. de Chimie des Solids CNRS - Orsay, France	29 Dec. 95	Lecture & Discussion
7.	Prof. B. Reveau Director, Lab.CRISMAT-ISMRA 14050, Caen CEDEX, France	5&7 Jan. 96	-do-
8.	Dr. A. Das Lab. de Physique des solids CNRS - Meudon Cedex, France	04 Mar. 96	-do-
9.	Dr. G.V. Rama Rao Medicine Lodge, USA	18 Mar. 96	-do-

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#### 4.17.11 On-going Sponsored Projects

1. "Redox Mechanisms in High  $T_c$  Superconductors and search for new Copper and Non-Copper based Superconductors", IFCPAR, New Delhi
2. "Studies on High Temperature Superconductors", NSTB, New Delhi.
3. "Studies on Water Splitting by Photoassisted Electrolysis Using Solar Energy", MNES, New Delhi.

#### 4.17.12 Honours and Awards

One of the faculty is awarded the MRSI medal, Feb. 1996.

#### 4.17.13 Research Publications

1. V. Badri and U.V. Varadaraju, Suppression of superconductivity in the  $L_{1-x}Pr_xBa_{1.7}Sr_{0.3}Cu_3O_7$  (L=Yb and Lu) system: Observation of the hole localization effect. *Phys. Rev.*, **B52(14)** 10504-10509, 1995.
2. V. Ponnambalam and U.V. Varadaraju, Observation of VRH up to 900K in  $YBa_{2-x}La_xCu_3O_y$  system. *Phys. Rev.*, **B52(22)** 16213- 16216, 1995.
3. V. Badri and U.V. Varadaraju, Effect of  $La^{3+}$  substitution on the structure and superconductivity in  $TiBa_{2-x}La_xCaCu_2O_7$  ( $x=0.0-1.0$ ) *Solid State Commn.*, **93(12)**, 1003-1007, 1995.
4. G.V. Rama Rao, D.S. Suryanarayana, U.V.Varadaraju, G.V.N.Rao and S.Venkatesan, Synthesis of  $YBa_2Cu_3O_7$  by different gel routes. *J.Alloys and Compounds*, **217**, 200-208,1995.
5. C.Mallika, G.V. Rama Rao, O.M. Sreedharan and U.V.Varadaraju, Thermodynamic stabilities of ternary oxides in Ba-Pb-O system by EMF technique, *Mater. Sci. Engg.B.*, **B33**, 96, 1995.
6. K.V.Govindan Kutty, C.K. Mathews, Tata N Rao and U.V. Varadaraju, Studies on the oxide ion conductivity of the pyrochlores  $Nd_2Zr_2O_7$ ,  $Gd_2Zr_2O_7$  and their doped compositions, *Solid state ionics*, **80**, 99-110, 1995
7. R.Gopalan, A.K. Singh, T. Rajasekaran, G.Rangarajan and U.V. Varadaraju, Pole figure studies in melt-grown  $YBaCuO$  samples. *J. Material Science*, **14**, 1043-1045, 1995.
8. P.A. Ramakrishnan, U.V.Varadaraju and G.V. Subba Rao, Photoelectrochemical studies on the mixed oxides,  $A_6Nd_8Ti_2O_{30}$  (A=Ba,Sr), *Bull. Mater. Sci.*, **17** 959-965, 1995.
9. M. Sugantha and U.V. Varadaraju,  $Li^+$  ion conductivity in  $Li_2M^{3+}M^{4+}P_3O_{12}$ . Presented at the 10th international conference on Solid State Ionics, held at Singapore, 3-8 December, 1995. To appear in *Solid State Ionics*.
10. M. Sugantha, U.V. Varadaraju, L.E. Smart and F.J. Berry, Li intercalation studies in  $AFeMP_3O_{12}$  phases. Presented at the 10th international conference on solid state ionics, held at Singapore, 3-8 December 1995. To appear in *Solid State Ionics*.
11. N.R.S. Kumar, M. Sugantha and U.V. Varadaraju, Studies on NZP and Eulytine phases as hosts for radioactive wastes. Presented at SMART-95, National symposium on Management of Radioactive and Toxic wastes, 1995, Bombay.



Fibre Optic Communication, Environmental Engg, etc. The following schemes were sanctioned during the year.

1. Development of Lean Burn Spark Ignited Natural Gas Engine for Generator Set and Automotive Application.
2. Model Predictive Control of Nonlinear Processes using Laguerre Models
3. Welding of Duplex Stainless Steels
4. Development of Fibre-Optic Current and Voltage Sensors for HV Application
5. Cost-effective construction Techniques

#### **4.18.5 Consultancy Programmes**

The total value of consultancy assignments was Rs 340.35 lakhs in 1995-96. Research Based Industrial Consultancy activity contributes nearly 50% of the total value of the assignments. Also 14 faculty were retained as consultants of various industries. Interdisciplinary programmes for providing consultancy to Tamilnadu Pollution Control Board and Tamilnadu Leather Development Corporation continued.

#### **4.18.6 Collaborative Research Projects**

Eight joint research projects taken up through BMBF, Germany apart from the six earlier ongoing support for development of the facilities in Catalysis, Material Sciences, Electronics, Production Engineering, Metallurgy and Ocean Engineering Centre have continued. Also projects under Indo-US and Indo-EEC, Indo- French, etc. have continued. Following two projects were sanctioned by Volkswagen Foundation during 1995-96:

1. Development of a production integrated quality control loop for an NC machining
2. Import loads on platforms above the sea level due to freak waves

#### **4.18.7 Industrial Associateship Scheme**

The response from the industry towards this scheme has been highly encouraging. More than 300 industries are members of this Scheme. (Large scale - 35, Medium scale - 130 & small - 173) Six Technology Appreciation Programmes were organised.

1. Required Rate of Return: Conceptual and Computational Advances
2. Future Trends in Chemical Engg Applications
3. CD ROMs - Its Use in New Information Technology
4. Condition Monitoring for Quality Assurance
5. Advances in Biomedical Engineering Applications
6. Advances in Photovoltaics

Some of the facilities of the departments/ Centres were thrown open for the associates through "Presentation of the facilities".

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

#### **4.18.8 Other programmes:**

It is proposed to form an IGCAR-IITM R & D Cell. In this regard, a half-a-day Workshop was organised in October 95.

IIT faculty also visited IGCAR for discussions on proposed joint research projects.

It is proposed to provide technical consultancy for Development of a new International Airport at Nedumbassery, Kochi. The approximate total value of the assignment is estimated to be Rs 1 crore.

#### **4.18.9 ISRO-IITM Cell Joint Projects**

This is an ongoing research activity sponsored by the Indian Space Research Organisation where research projects of interest to ISRO are being taken. 8 new projects were taken up during the year. Review of the projects were carried out in Feb 96.

#### **4.18.10 Patents**

During the year, applications have been made for taking 6 patents in the name of the Institute.

#### **4.18.11 Visitors**

Following visited the Centre:

1. Mr N Vaghul, Chairman, ICICI, was the Chairman for an Industries meet held in March 95.
2. Formal inauguration of the IC & SR building was held on 28th July 95. Shri Madhavrao Scindia, former Minister for HRD, opened this building.
3. Mr A V Ganesan, IAS Retd. Commerce Secretary, Govt of India, addressed our Industrial Associates & faculty on "Intellectual Property Rights & GATT" in July 95.
4. Mr Sureshkrishna, CMD, Sundaram Fasteners Ltd. visited the Centre in Aug 95 in connection with the Annual Get-together of our Industrial Associates.
5. Sri S V Giri, former Secretary, MHRD visited IIT in Feb 96.

#### **4.18.12 Technology Development Missions**

In this Programme, IIT Madras is given the responsibility of implementing the following two Missions as a lead Institute.

1. New Materials
2. Energy Efficient Technologies & Devices

MoU has been signed with the user agencies for the following out of 6 projects under the Mission of New Materials at IIT Madras.

1. Development of all composite bridges by pressure bag/ autoclave molding methods

MoU has been signed with R & D Engineers Establishment, Pune, who are manufacturing agencies for special type bridges required for Indian Army.

2. Metal matrix composites for automotive applications

MoU has been signed with M/s. India Pistons Ltd., Madras.

3. Development of Magnetostrictive Rods

MoU has been signed with M/s. Asian Electronics Ltd., Bombay for this project.

4. Development of High Energy Density Permanent Magnets.

MoU has been signed with M/s. Asian Electronics Ltd., Bombay.

On the Mission on Energy Efficient Technologies and Devices, five projects were proposed by IIT Madras. Out of these, MoU has been signed for three projects.

1. Applications of Heat Pump Heat Recovery Systems

MoU has been signed with M/s. Thiru Arooran Sugars Ltd., Madras.

2. Atmospheric Circulating Fluidised Bed Boiler

MoU has been signed with M/s. Lakshmi Boilers Ltd., Bombay.

3. Design, Development & fabrication of SONAR dome employing pressure-bag moulding methods.

MoU has been signed with M/s. NPOL, Cochin.

## 4.19 Central Electronics Centre

### 4.19.1 New Course Started

- Twelfth Training Programme of one year duration was started on 3.1.96. Twelve candidates joined the programme.
- Three Training Programmes of two weeks duration were conducted for System Designers in the area of Solar Photo Voltaics in collaboration with Siemens Solar, U.S.A. Fifty one members were trained.

### 4.19.2 New Facilities added and major equipment procured

a)	One Pentium PC	Rs.64,800
b)	Arbitrary waveform generator (HP)	Rs.46,100
c)	100 MHz Digital Oscilloscope with FFT module (HP)	Rs.66,000
d)	Fax Machine (Modi)	Rs.40,700

### 4.19.3 Main Consultancy assignments completed

S.No.	Title of Assignment	Organisation	No.of Assign.	Amount (Rs. in Lakhs)	Co-ordinator-
1.	Special function modules for CNC Machines	HAPP Min. Min of Defence Hyderabad	14	2.93	Dr M Kumaravel
2.	PLC Modules/AC Drives	TAMIN, Madras	12	1.49	-do-
3.	CNC/M/C Modules	Engine Factory, Ministry of Defence, Madras	10	1.69	-do-
4.	Frequency Analyzer	Tata Keltron Madras	1	16,000	-do-

### 4.19.4 Any other relevant details

Developing Training Materials and Manuals for training 330 Field Technicians in the area of Solar PhotoVoltaic Systems in collaboration with Siemens Solar, U.S.A.

### 4.19.5 Staff Strength

The Centre has 12 technical, 3 administrative and 5 Project staff.

## **5. CENTRAL SERVICES**

### **5.1 Central Library**

The Central Library is well equipped and has modern facilities and services with rich resources in the form of CD-ROM, On-line databases, printed, and non printed documents on Applied Sciences, Engineering, Technology, Humanities, Social Science and other new emerging areas. Some important facilities and services are described below:

#### **CD-ROM Literature Search Services**

CD-ROM literature search service is now available on a Local Area Network (LAN) with 3 user terminals in the First Floor Reading Hall (FFRH). The service is available from 9 a.m. to 8 p.m. on working days and from 9.00 a.m. to 5 p.m. on Saturdays, Sundays and other holidays. The databases available are (COMPENDEX) PLUS and (INSPEC).

#### **On-line Information Retrieval Service**

Central Library also provides on-line information access to more than 400 databases including industrial databases through DIALOG Information Service. The service is being used by the members of the Industrial Associate Scheme (IAS) besides IIT faculty, students and staff of the Institute.

#### **Library Orientation**

The Library has conducted CD-ROM Orientation programme for the benefit of the faculty, scientific staff and Industrial Members to familiarize them with the search techniques.

#### **Library Automation**

Central Library has automated Circulation Control which is working satisfactorily. A & P Module is in operation for ordering new publications and printing catalogue cards. CDS/ISIS package is used to generate various in-house reports. Periodicals holdings has been automated. Databases of Ph.D theses submitted at IIT Madras, A directory of e-mail addresses of Libraries and Information Centres in India and abroad has also been created.

#### **Staff Training**

Two training programs (DOS and UNIX environments) for the benefit of the library staff have been organised with the help of the Computer Centre of the Institute.

#### **New Services started**

A weekly Tech News service based on six news papers (Business Line, The Hindu, Indian Express, Times of India, Economic Times, Hindustan Times) has been started. The service contains news, articles, press release covering the areas of specialisation of IIT, Madras.

## Library and Information Services Statistics

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

### a. Membership

Institute Members (Staff & Students)	3,588
Outside Members	184
Individual Members	1,138
Corporate Members	14
Industrial Associateship	215
Consultation Permits	1,500

### b. Collection Development Acquisition of Publications during 1995-96

Books	1,847
Theses	47
Pamphlets and Reports	6
Microfilms/Fische	35
Book-bank (General) (BBW)	32
Book-bank (Weaker Section) (BBW)	20
Current Periodicals by Subscriptions	700
Current Periodicals by Exchange/Gift	70
Back volumes of periodicals	1,564
Total Accessions at the end of March 1996 (Books & Journals)	3,411

### c. Library and Information Services

#### Circulation

Number of Readers visited	1,70,320
Number of volumes issued	1,34,899
Number of volumes issued through Book Bank (General)	4,450
Number of volumes issued through Book Bank (Weaker Section)	3,100

#### d. Amount Collected

Overdue & other charges collected	Rs.1,93,197
Xerox charges collected	Rs.2,70,948

#### Reservation for Books

Registered	9,709
Fulfilled	9,314

#### Loans

Department Loan	72
Permanent Loan	760

#### Inter-Library Loans

Borrowed from other Libraries	169
Loaned to other libraries	40



<b>Literature Search</b>	
Literature searches through DIALOG	8
CD-ROM searches by users	3,800
<b>Reprint Service</b>	
From International Sources i.e. British Library, Canadian Institute of Scientific Information, INSDOC, etc.	61
Supply of reprints to other libraries	65
<b>d. Audio-Visual Service</b>	
Number of Audio Cassettes	8
Number of Video Cassettes	4
Number of Video Programme screened	40
Number of persons attended	150
<b>e. Reprographic Service</b>	
Number of Xerox copies supplied	7,76,103
DTP output	30,540
Number of copies printed on Rotaprinter	4,86,105
<b>f. Binding</b>	
Number of Books and Journals bound (internal)	1,600
Number of Miscellaneous Publications	400
Number of books & Journals bound through external binders	3,562
Departments works (Miscellaneous)	2,200
<b>g. Visitors to the Library</b>	
Students from other Institute (about 30 students per group)	6 groups
Other visitors	6 VIPs
<b>h. Library Publication</b>	
New Addition to Library (NAL) (fortnightly)	24

**Participation of Library Officers in Conferences/Workshops:**

**Dr. Harish Chandra, Librarian**

- Delivered invited lecture on Information Services to Industries Technology Appreciation Program, IC&SR - 10.5.95.
- Participated in the "Awareness Programme for Academic and Administrative Leaders", conducted by IITM 17.2.1996 IC&SR Building.
- Delivered invited lecture on Application of Information Technology in Technical Institutions Workshop on CDS/ISIS, Pondichery Engg. College - 12th June 1995
- Delivered inaugural lecture on "Multi Media Application in Libraries" Bishop Heber College, Tiruchirapalli 12-13 October 1995.

- Delivered lecture on Refresher course in Library Science - 16-17.12.1995 at Pondicherry University.
- Presented invited paper entitled Automation activities at IIT Madras Library: Some Experiences. UGC National Seminar on Library Automation & Networking, Sri Venkateswara University at Tirupathi, 22-23.3.1996.
- Delivered keynote address for Database Society of India, Inauguration of Madras Chapter 26-4-95 at Anna University.

**Dr. R. Vengan, Deputy Librarian**

- Invited lecture on "CD-ROMs and its availability at Central Library, IITM" at the Technology Appreciation Programme on 'CD-ROMs - Its use in New Information Technology' by IC&SR, IITM, 10.5.1995.
- Invited lecture on i) "CD-ROM Technology", ii) "Information Society: Current and Future Scenario" at Pondicherry University during the Refresher Course in Library Science from 15.12.95 to 4.1.96.
- Participated in the "Awareness Programme for Academic and Administrative Leaders", conducted by IITM 17.2.1996 IC&SR Building.
- Resource person for the "Workshop on CDS/ISIS" at the Dept. of Lib. & Infn. Sci. Bishop Heber College, Tiruchirapalli, Tamil Nadu 23.2.96 & 24.2.96.
- Paper presented on "Role of Librarian in the changing Environment of Information Technology Application in Libraries - an Experience" at the UGC National Seminar on Library Automation and Networking" Sri Venkateswara University Library, Tirupathi, 22-24 March 1996.

**Sri M. Koteswara Rao, Deputy Librarian**

- Attended a Seminar on Intelligent Information Retrieval held at USIS, Madras
- Attended a lecture on Texts, Scholars & Libraries an eternal triangle by J.H. Nye at Madras Library Association, Madras
- Conducted a CD-ROM orientation programme for faculty in the Library.
- Participated in the Technology Appreciation programme on CD-ROM organised by IC & SR.

**Sri. K. Sankaran, Assistant Librarian**

- Participated in the "Awareness Programme for Academic and Administrative Leaders", conducted by IITM 17.2.1996 IC&SR Building.

**Sri C.R. Sekar, Assistant Librarian**

- Attended one day programme - Technology Appreciation Programme on 'CD-ROMs - Its use in New Information Technology' by IC&SR, IITM, 10.5.1995.

**5.2 Central Workshop**

The various units of Central Workshop are Carpentry and Pattern Making, Fitter's and Tool maker's Shop, Machinshop, Gearshop 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, manufacture 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 students (700 students).

For giving training in advanced machines like CNC machines, Central Workshop procured 3 CNC Lathes (Trainer) in the year 1992 and 1 CNC Milling machine in the year 1995.

An Advanced Workshop course was conducted during May-June 1995 for B.Tech students.

The following is the details of the work undertaken during the period under report:  
No. of Work Orders completed : 442

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

### 5.3 Central Glass Blowing Section

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

Number of work orders received and  
completed during April 95 - March 96 - 206

Amount earned in terms of service charges  
during the above period - Rs.15,758/-

#### Outside work

One meter Dewar flask with silver coating strip (for helium-nitrogen) was fabricated for the Inter-University Consortium for DAE facilities, Indore, at a cost of Rs.40,000/=.

### 5.4 Central Photographic Section

This Section with a staff strength of five experienced technical personnel caters to the needs of various departments/centres of the Institute. It is mainly involved in Slide Preparation and Phototaking for 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 750 work orders were executed during the year under report.

Saraswathi

Sarayu

Tapti

Dr.P.C. Deshmukh  
Professor of Physics  
Dr. Nandita Das Gupta  
Asst. Professor of Elec. Engg.  
Dr. M. Govardhan  
Asso. Professor of Mech. Engg.

## 6.2 Central Supplies Unit

The Central Supplies Unit is administered by a warden. It procures milk under the Milk Supply Scheme from the nearby villages and from Tamilnadu Co-operative Milk Producers' Federation Ltd. and distributes it 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. Advice is given to the students on a wide range of health problems. The details of medical facilities available are given in Chapter 10 - Campus Amenities.

## 6.4 4 (TN) Air SQN (TECH) NCC

This Senior Division Airwing (Tech) NCC unit is functioning at IIT Madras from 16th September 1965. It provides NCC training exclusively to the students of the Institute. Regular Air Force Officers and Airmen as PI Staff are posted to this unit to impart the training. Unit strength is augmented by two Associate NCC Officers and other supporting civilian staff drawn from the Institute. NCC syllabus includes Drill, Civil Defence, Weapon Training, Leadership Course, Health and Hygiene, History of Indian Air Force, Principles of Flight, Radio/Radar Navigational Aids, Air Armaments, Avionics and Instrumentation.

Highlights of the Training for year 1995-96:

- Range firing practice on 7.62 mm Rifle, Revolver and 12 Bore gun.
- Blood donation camp organised at NCC Building through the Red Cross Society, Madras on 7th October 1995 in which 50 cadets donated blood.
- Cycle expedition as part of Adventure Training activity from Madras to Thiruvannamalai and back by one ANO, One PI staff and nine cadets.
- Eye donation pledge by four volunteer cadets.
- Under the social service activities, the cadets carried out cleaning and face-lifting of the Institute hospital premises and planting sapplings in the area.
- The NCC unit helps to instil a sense of discipline, comradeship, a spirit of adventure and quality of leadership in the mind of the NCC cadets of the Institute.

Commanding Officer : Wg.Cdr. RS Kumar  
Associate NCC Officers : Fg. Offr. A Mani  
Plt. Offr. S Neelamani

## 6. STUDENT AMENITIES AND ACTIVITIES

### 6.1 Hostel

All 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 1932 men and 256 women students in these in residence.

Each hostel is administered by a Warden and 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 288 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  
Assistant Registrars

Dr.B. Viswanathan  
Professor of Chemistry  
Sri K. Ramaswamy  
Sri K. Sekar

#### Name of the Hostel/Unit

#### Warden

Alakananda

Dr.R.P. Viswanath  
Asst. Professor of Chemistry

Brahmaputra

Dr. D.V.S. Murthy  
Asso. Professor of Chem. Engg.

Cauvery

Dr. V. Ramakrishna Murthy  
Professor of Physics

C.S.U.

Dr.B. Viswanathan  
Professor of Chemistry

Ganga

Dr.S. Kumaraswamy  
Asso. Professor of Mech. Engg.

Godavari

Dr. M.N. Sudheendra Rao  
Asso. Professor of Chemistry

Jamuna

Dr. K. Ramar  
Professor of Elec. Engg.

Krishna

Dr. K.M.M. Prabhu  
Professor of Elec. Engg.

Mandakini

Dr. K. Krishnaiah  
Professor of Chem. Engg.

Narmada

Dr. T. Swaminathan  
Asso. Professor of Chem. Engg.

Saraswathi

Sarayu

Tapti

Dr.P.C. Deshmukh  
Professor of Physics  
Dr. Nandita Das Gupta  
Asst. Professor of Elec. Engg.  
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Commanding Officer : Wg.Cdr. RS Kumar  
Associate NCC Officers : Fg. Offr. A Mani  
Pit. Offr. S Neelamani

## **6.5 National Service Scheme (NSS)**

65 Students of the Institute were registered for the NSS for this Academic year, 1995-96.

30 students were teaching academically weaker children in the village of Taramani.

15 students were teaching academically weaker children at Vana Vani School IIT Madras.

20 students were engaged in improving the environment of our campus.

Apart from these regular activities, the NSS also arranged the following:

- Assistance to SWARM (of our Institute) in clearing up the areas around the hostels, quarters, etc.
- Assisted in blood donation activities.
- Lecture on Sahajamarg system of meditation - 21-8-95
- Yoga Camp from 11-18.9.95.
- Talk by Sri Ramakrishnan, Social Worker - 7-11-95
- Talk by a representative of Spastics Society of India.
- Talk by S. Vidyakar, Udavum Karangal - 15-2-96
- Visit of our students to Udavum Karangal - 21-2-96.

## **6.6 Gymkhana**

### **Sports Activities**

#### **Inter Collegiate Invitation Tournament**

The Institute Gymkhana organised the above Tournament from 6th September to 10th September 1995. This tournament was held by inviting only some selected colleges in and around the city. This tournament not only gives good practice to our students but forms the basis for selecting our teams for All India Inter IIT Sports Meet which is held every year by rotation. Our teams have done creditably well in all the games.

Our Hockey, Basket Ball, Volley ball, Badminton, Tennis teams reached quarter finals. Our girls' Table Tennis team won the runners-up position. The experience gained thus was the launching pad for the performance of our boys/girls at the Inter IIT Sports Meet.

#### **I.I.T Sportstar Cricket Tournament**

This year 20 teams took part in the IIT Sportstar Inter Collegiate Cricket Tournament. Pachayappas College won the finals defeating last year winner Gurunanak College. I.I.T. Madras lost to Anna University very narrowly in the quarter finals.

#### **Inter IIT Aquatic Meet**

This meet was held from 5th to 7th October 1995 at I.I.T Kanpur. Only four IITs took part in the above meet. IIT Madras was placed third.

## **Inter IIT Sports Meet**

The Main Inter IIT Sports Meet was held at Kanpur from 13th to 17th December 1995. IIT Madras was heading towards general championship (G.C) till the last day of the tournament. In the last day due to the failure in Volley ball, Hockey, Tennis and Weight lifting events IIT Madras finished overall second.

Our Athletic team performed very well and won the Athletics Championship. Mr. Murali Krishna of IIT Madras won the individual championship in Athletics. He won 4 golds, 3 silvers and 1 bronze. Mr. Venugopal won the best lifter award for the second year in succession.

Our girls Basket Ball team won the Silver. The behaviour and discipline of IIT Madras contingent was very good and was appreciated by the organisers.

## **All India Basket Ball Tournament**

The above tournament was conducted from 15th to 19th January 1996. Holders, R.V.C.E. Bangalore and Keralavarma did not turn up because of examinations. 12 teams took part in the men's section and 9 teams in the women's section.

IIT Madras team gave a very tough fight to the Anna University and lost very narrowly. Loyola College won the Gerhard Fischer Trophy and M.C.C was the runners up.

In the women's section Mt. Carmel took part in this tournament and after 4 years repeated their old performance by winning Kokila Rajaiah Trophy. Previous three years continuous winners R.V. Arts College lost to Mt. Carmel College.

## **Institute Open Bridge Tournament**

The Institute Open Bridge Tournament was conducted from March 20th to 22nd 1996 under the auspices of the Institute Gymkhana. Karthik R Sharma and Narayan Sriram, students of I.I.T. Madras performed very well and won the pairs event. In the Swiss league Nithyakalyani won the shield.

## **Inter Hostel Competition**

The Schroeter Trophy for General Championship was keenly contested by Ganga and Narmada Hostels and finally Narmada won the Schroeter Trophy after a lapse of 5 years.

## **Swimming Pool**

Swimming Pool is functioning very well, maintaining high standards. The Tamilnadu District Meet was held on 6th and 7th May and the Tamilnadu State Aquatics Meet was held at our Swimming Pool on 29th to 31st May.

The Swimming Club is conducting fortnightly "Learn to Swim" coaching classes for children of Madras city from April 15th onwards. About 450 children are getting coached in our pool.

## **Cultural Activities**

### **Independence Day Celebrations**

This year's cultural activities took off with the Independence day celebrations which were held in the hostel sector for the first time. The then Director of the Institute Prof. N.V.C. Swamy hoisted the national tricolor. Both faculty and students attended the function in large numbers.



### **Lit-Soc. Competitions**

The lit-soc competitions were conducted successfully this year and Jamuna hostel topped the overall tally to bag the coveted lit-soc. trophy.

### **Bharat Utsav**

The highlight of the events during the odd semester was the Bharat Utsav '95 which was conducted from 6th to 9th October 95. The stage was set for the festival by various literary and arts competitions in Elocution, Block and Tackle, Quiz, Painting etc., Workshops were conducted in tie and dye making, clay modelling, vegetable block painting etc., The two day - four evening festival had lectures on topics ranging from Indian traditional technology, epics to music. Lecture demonstrations also were organised in folk and classical music. There were three professional shows, a Kathak recital, a Mohini Attam recital and a classical music concert. A special movie "Sardar" on the life of Sardar Patel was screened as part of the activities. The programmes were well received by those present.

### **Teachers' Day**

Teachers day was celebrated for the first time with the novel idea of a joint cultural programme by staff and students.

### **Engineer's Day**

Engineer's day was celebrated with a debate competition and a technical design competition. There were enthusiastic participation from students.

### **Annual Cultural Festival**

The annual cultural festival of the Institute was renamed "Saarang" This year's festival Saarang '96 was conducted from 25th to 30th of January. Five days of hectic but enjoyable activities marked the scene. The festival started off with an inaugural programme of dance recital by Laxmi Vishwanathan and party. As usual there was keen competition for honors in the numerous literary, fine arts and music competitions. IIT Madras notched up the maximum points to be at the top. The best outstation team trophy was bagged by MES College Bangalore. The festival was taken to dizzy heights with a Jugalbandhi concert featuring Hari Prasad Chaurasia, N. Ramani, Zakir Hussain and Vikku Vinayakram.

The other shows included a light music concert by Murali's "Sriraag" featuring Suresh Peters and Swarnalatha and a Western music show by Gary Lawyer. It is heartening to note that our cultural festival attracts a lot of students from all over India and continues to be one of the best organised student's festival.

### **IIT - Odyseey Quiz**

Madras Open IIT - ODYSSEY Quiz, was held for the first time and took off with flying colours. We saw hundreds of teams participating and fighting it out till the end.

### **Stage Coach**

The last cultural event of the year was the play 'In praise of Love' by our theatre group Stage Coach.

## 6.7 Guidance and Counselling Unit

- More faculty and student counsellors volunteered to work in the Unit during this year than the previous years. The unit currently has 40 faculty and 80 student counsellors.
- A Campus Guide was prepared updating information in the form of a booklet and was made available to every fresh student of undergraduate programme.
- The first year B.Tech students were distributed to various student counsellors and faculty counsellors for individual attention immediately on arrival on the campus. A deviation this year, was that the student counsellors were chosen such that they lived in the same hostels in which their counsellees also lived. This had the benefit of informal meetings of the students even during late hours, if help was needed.
- In July 1995, 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 quickly.
- A get-together of all the counsellors and the parents guardians was arranged to make the fresh students feel 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 senior students who readily came forward to help in subjects like Mathematics, Physics, Chemistry and Engineering Drawing.
- A few problems of emotional nature were also attended to by the unit with the help of the medical officers of the institute.
- The unit helped the medical officers in blood grouping the first year students.
- A lecture to students by Dr. Vijaya Kumar of SNEKA on Stress Management 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 views for efficient functioning.

## 6.8 Placement of Students:

During the year 1995-96, 601 students were placed, as detailed below:

Branch	No. of Students registered for placement	Number placed		Total	No. placed more than one job
		OC	SC/ST		
<b>I. B.Tech</b>					
1. Aerospace Eng.	22	19	-	19	4
2. Chemical Eng.	50	39	2	41	12
3. Civil Eng.	40	33	1	34	11
4. Computer Science	27	20	2	22	5
5. Electronics & Comm.	37	25	3	28	3
6. Electrical Eng.	48	39	3	42	4
7. Mechanical Eng.	82	72	7	79	26
8. Metallurgical Eng.	28	27	-	27	5
9. Naval Architecture	20	18	-	18	-
<b>Total</b>	<b>354</b>	<b>292</b>	<b>18</b>	<b>310</b>	<b>70</b>

Branch	No. of Students registered for placement	Number placed		Total	No. placed more than one job
		OC	SC/ST		
<b>II. M.Tech.</b>					
1. Aerospace Eng.	6	5	-	5	2
2. Applied Mechanics	8	4	3	7	2
3. Chemical Eng.	21	16	2	18	2
4. Civil Eng.	32	19	1	20	-
5. Computer Science	26	21	4	25	8
6. Electrical Eng.	35	24	8	32	4
7. Industrial Management	20	18	1	19	-
8. Mechanical Eng.	52	28	15	43	6
9. Metallurgical Eng.	11	9	1	10	2
10. Ocean Eng.	11	5	1	6	-
11. Solid State Tech.	8	4	1	5	1
<b>Total II</b>	<b>230</b>	<b>153</b>	<b>37</b>	<b>190</b>	<b>27</b>

Branch	No. placed	No. got more than one job
<b>III. M.S.</b>		
1. Aerospace Engineering	2	-
2. Applied Mechanics	10	-
3. Chemical Engineering	5	1
4. Civil Engineering	8	-
5. Computer Science	12	1
6. Electrical Engineering	9	1
7. Industrial Management	3	2
8. Mechanical Engineering	18	2
9. Ocean Engineering	1	-
10. Metallurgical Engineering	3	-
<b>Total III</b>	<b>71</b>	<b>7</b>

Besides the above, the following were also placed.

**M.Sc.**

Physics	5
Mathematics	7
<b>Total</b>	<b>12</b>

**Ph.D**

Aerospace Eng.	1
Applied Mechanics	1
Chemical Eng.	1
Civil Eng.	1
Computer Science	1
Chemistry	2
Mechanical Eng.	4
Mathematics	4
Ocean Eng.	2
Physics	1
<b>Total</b>	<b>18</b>

Adviser, Placement and Training : Prof. A Venkatesh

Deputy Registrar  
Public Relation-cum-Placement & Training : Sri A.K. Pattabiraman

## 7. FINANCIAL ASSISTANCE TO STUDENTS

Financial Assistance is extended to meritorious students who are pursuing Engineering, Technology and Science education in this Institute in the form of Scholarships and Fellowships. The details of Scholarships and Fellowships sanctioned to the students of different programmes during 1995-96 are as follows:

### 7.1 B.Tech

SC/ST students admitted in B.Tech. programme up to the academic year 1995-96 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 31.3.96, 20 students benefitted. The year-wise details of such students are given in Table 7.1.

The Merit-cum-means scholarships of Rs.300/- p.m. were sanctioned to 25% of the students admitted to the B.Tech. programme besides the exemption from payment of tuition fees. During the period under report 51 students got benefitted. The year-wise details of such students are also given in Table 7.1.

TABLE 7.1

Year	Merit-cum-means scholarship	Free messing (basic menu) and pocket allowance concession to SC/ST students
I	6	4
II	8	7
III	13	6
IV	14	3
<b>Total</b>	<b>41</b>	<b>20</b>

In addition to the above the Institute sanctioned a nottional prize of Rs.100/- to the top ranking 25 B.Tech. students in the JEE.

### 7.2 M.Tech

Students who joined the M.Tech. programme through GATE were awarded scholarships at Rs.1800/- per month. During the period under report 191 fresh scholarships and 185 renewed scholarships were given. The department-wise details are given below:

## M.Tech

TABLE - 7.2

Sl.No.	Discipline	No. of M.Tech. Scholarships awarded	
		Fresh	Renewal
1.	Aerospace Engineering	8	8
2.	Applied Mechanics	8	8
3.	Chemical Engineering	19	15
4.	Civil Engineering	27	26
5.	Computer Science and Eng.	25	25
6.	Electrical Engineering	22	21
7.	Industrial Management	22	22
8.	Mechanical Engineering	42	42
9.	Metallurgical Engineering	12	12
10.	Ocean Engineering Centre	3	3
11.	Solid State Technology	3	3
	<b>Total</b>	<b>191</b>	<b>185</b>

## 7.3 M.Sc.

Students admitted to the M.Sc. programme were sanctioned Rs.300/-p.m. merit scholarship. Exemption from payment of tuition fee was also given to certain students. During the period under report 43 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 freeships without tuition fees waiver
Chemistry	I	10	3
	II	6	3
Mathematics	I	6	2
	II	8	4
Physics	I	5	2
	II	8	3
<b>Total</b>		<b>43</b>	<b>17</b>

## 7.4 M.S.

The scholars admitted to the M.S. programme through GATE or equivalent examinations are given Rs.2500/- p.m. for three years. During the period under report 177 students received this fellowship of whom 62 were fresh scholars. The department-wise details of the fellowships awarded and renewed are given below:

**TABLE 7.4**

Sl.No.	Discipline	No. of M.S. Scholarships awarded	
		Fresh	Renewal
1.	Aerospace Engineering	3	6
2.	Applied Mechanics	6	13
3.	Chemical Engineering	5	11
4.	Civil Engineering	5	13
5.	Computer Science & Eng.	11	21
6.	Electrical Engineering	16	19
7.	Humanities & Social Sciences	3	14
8.	Mechanical Engineering	9	20
9.	Metallurgical Engineering	3	3
10.	Ocean Engineering	1	5
	<b>Total</b>	<b>62</b>	<b>115</b>

**7.5 Ph.D.**

Scholars who are admitted to the Ph.D full-time programme in Engineering are sanctioned Rs.3000/- per month with effect from 1.1.96 for first two years and Rs.3200/- per month for another 3 years depending upon their progress. Scholars who are admitted to the Ph.D fulltime in the Science subjects are sanctioned Rs.2500/- p.m. for the first two years and for another three years Rs.2800/- p.m. During the period under report 215 students obtained fellowships of whom 41 were fresh scholars. The department-wise details of the fellowships awarded and renewed are given below:

**TABLE - 7.5**

Sl.No.	Discipline	No. of Ph.D. Scholarships HTRA awarded	
		Fresh	Renewal
1.	Aerospace Engineering	-	5
2.	Applied Mechanics	5	17
3.	Chemical Engineering	5	28
4.	Chemistry	10	54
5.	Civil Engineering	3	14
6.	Computer Science & Engg.	1	7
7.	Electrical Engineering	1	3
8.	Humanities & Social Sciences	5	11
9.	Mathematics	1	11
10.	Mechanical Engineering	5	31
11.	Metallurgical Engineering	2	13
12.	Ocean Engineering	2	11
13.	Physics	1	29
	<b>Total</b>	<b>41</b>	<b>234</b>

## 8. WEAKER SECTION AND FOREIGN STUDENTS

### 8.1 B.Tech:

As per the GOI orders 22.5% of the seats are reserved for SC and ST students in the B.Tech. programme. These students 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. 26 SC/ST students joined the B.Tech programme during the academic year 1995-96. During counselling prior to admission, the Adviser explained to each student the requirements of different branches. This helped the students in choosing suitable branches depending upon the capability and interest of each student. When a student finds the chosen branch, to be tough, he is allowed to switch over to lower JEE cut off branches, depending upon vacancies.

Students admitted against reservation are given the following benefits:

- Travelling allowance (IInd Class train fare/ordinary bus fare) from the place of residence to Madras to join the B.Tech programme.
- Free tuition.
- Free lodging and messing (basic menu) and pocket allowance of Rs.70/- p.m. provided their parents' income is Rs.24000/- net per annum or less (as per Government of India revised order).
- A Book Bank as part of Central Library is maintained for the benefit of the SC/ST students. The students are issued 12 tickets for taking books from the Book Bank. Books are issued for a semester.
- Drawing instrument (Mini-drafter) free of cost.
- Help in getting placement. Wherever possible, industries are requested to conduct separate interviews for SC/ST students and the requirements for these students are lower than those for the general category.

### 8.2 Preparatory Course for B.Tech.

A preparatory course of one academic year was initiated by the Ministry of Human Resource Development, Government of India, during the year 1983-84 exclusively for SC/ST students. Selection for this course is made from the SC/ST students' Joint Entrance Examination list who did not get admission through the Joint Entrance Examination. After successfully completing the preparatory course at the IIT, they would be eligible to join the B.Tech programme and they were not required to write the JEE again. This Institute conducted preparatory course during 95-96. 26 students joined and out of them 1 discontinued.

### 8.3 M.Tech./M.Sc.

22.5% of the seats are reserved for the students of SC and ST communities as per the Government of India orders. They are admitted through GATE with a relaxation. These students have to get only 60% of the GATE percentile obtained by the last student in the general category. 65 SC/ST students were admitted to the M.Tech programme during the academic year 1995-96.



Admission was made for the M.Sc. programme through entrance examinations only.

Students admitted against reservation are given following benefits:

- Book Bank facility is given with 12 library tickets. Books are issued for a semester.
- Both Public Sector and Private Sector industries were requested to recruit SC and ST students. Other special steps were also taken to enhance the recruitment of this category of students.
- The Scholarship is given to all students.

#### 8.4 Foreign Students

During the academic year 1995-96, 7 foreign students joined the B.Tech programme from the following countries:

Kenya	:	1
Sri Lanka	:	3
USA	:	1
Australia	:	1
Malaysia	:	1

Foreign students are also permitted to use the Book Bank. 4 Book Bank library tickets are issued to each student. Books are issued for a semester.

## 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 following 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 06.11.95 recommended the Non-plan revised estimates 1995-96 (Gross) for Rs.3499.01 lakhs. With regard to Budget Estimates 1995-96, Rs.2861.25 was indicated. Similarly with regard to Plan, the amount of Rs.300 & 320 lakhs respectively for 95-96 & 96-97 was indicated subject to review on a later date. The general view of the revised estimates approved for 1995-96 by Finance Committee is as indicated below:

Head	Rs. in Lakhs			
	Budget Estimates for 1995-96 ----- (as proposed)	(as allocated by the Board of Governors)	Revised Estimates 1995-96 as per Finance Committee	Budget Estimates 1996-97 (as proposed)
<b>Non-Plan</b>				
Recurring	3181.05	3181.05	3842.85	3279.95
Non-Recurring	100.00	100.00	100.00	Nil
<b>Total Non-Plan</b>	<b>3281.05</b>	<b>3281.05</b>	<b>3942.85</b>	<b>3279.85</b>
<b>Income</b>	429.70	429.70	366.04	418.70
<b>Plan</b>				
Opening Balance fully committed	237.44*			
Recurring	30.00	30.00	25.00	25.00
Non-Recurring	270.00	507.44#	512.44	295.00
<b>Total Plan</b>	<b>537.44</b>	<b>537.44</b>	<b>537.44</b>	<b>320.00</b>

\* carry over from 1994-95 account

# includes carry over of Rs.237.44 lakhs representing irrevocable commitment of 1994-95

## Audit

The Audit Report and the Annual Accounts of the Institute for 1994-95 in Hindi and English versions are being placed separately on the tables of Parliament with due certificates of the Accountant General, Tamil Nadu and Pondicherry.

The accounts of the Institute for the year 1994-95 was audited by the Accountant General between July '95 to September 1995. The audited report (both English and Hindi versions) on the accounts of the Institute for the year 1994-95 has already been sent to the Ministry of Human Resource Development, GOI.

The salient features of the 1994-95 accounts are given below:

		(Rs. in Lakhs)
<b>I. Receipts:</b>		
1.	Opening Balance	1713.59
2.	Grant from GOI	2320.40
3.	Institute Receipt:	
	Fees, etc.	64.06
	Application Fees	128.01
	Income from Vehicles	8.61
	Income from Buildings	47.34
	Other receipts	227.52
		-----
		475.54
4.	Recovery of Advances	61.21
5.	Deposits	1840.80
	<b>Total</b>	<b>6411.54</b>

## II. Payments:

<b>a. Capital account :</b>		
1.	Buildings and Constructions	78.20
2.	Furniture, equipment and fittings for Departments	87.38
	Research Centres & Central Services	54.88
		-----
		142.26
3.	Library	124.25
4.	Others	16.93
	<b>Total (a)</b>	<b>361.64</b>
<b>b. Revenue Account :</b>		
1. Academic Departments/Centres :		
	Pay & Allowances of Tech. Staff	537.65
	Pay & Allowances of Non-Teaching Staff	247.80
	Department expenses	62.04
	Library including staff salary	38.46
	Central Workshop including staff salary	56.09
	Indo-German Projects incl. Pay & Allowances	6.82
	Research Centres including Pay & Allowances	
	CEC and AC Unit	43.16
	Centres, Central Services working expenses	52.07
	Rural Development Research Activities	1.02

Institute Scholarship	190.46
Other items	70.06
NCC, NSS and NSO: Pay & allowances & others	3.22
	-----
	1308.85
	-----
<b>2. Central Administration:</b>	
Pay & Allowances	206.11
Hostel	82.90
Stores Pay & Allowances	14.96
Security & Fire fighting	5.55
Lawns & Garden	2.04
Service & Maintenance (Telephone, Power, Water, Furniture repair & Maintenance, Oil, Petrol, etc.)	211.42
Medical Dispensary	30.96
Atheletics and Gymkhana	12.27
Vanavani Matriculation Hr. Sec. School	3.25
Amenities	0.51
SC/ST Special coaching/Preparatory course	0.11
Guidance and Counselling	0.14
DDF	0.16
	-----
<b>Total (2)</b>	<b>570.38</b>
<b>3. Works &amp; Maintenance</b>	
Pay & allowances and other expenses	209.94
	-----
<b>Total (3)</b>	<b>209.94</b>
<b>4. General Expenses</b>	
Postage, Liveries, Stationery, Printing, etc.	33.93
TA of authorities & Institutes selection Committees members, candidates called for interview	8.88
Reimbursement of stamp duty, sundries, etc.	5.09
PF/Gratuity/Pension	360.17
Advances paid	50.45
Deposits refunded	1770.10
Investment of corpus fund	173.01
	-----
<b>Total (4)</b>	<b>2401.63</b>
Total a + b (1 to 4)	4852.44
<b>5. Closing Balance</b>	1559.10
	-----
<b>Total</b>	<b>6411.54</b>

## 10. CAMPUS AMENITIES

### 10.1 Engineering Unit

The Engineering Unit of this Institute is responsible for the construction of new buildings and the maintenance of the campus.

The following major works were completed during the year 1995-96.

S.No.	Name of Work	Rs. in Lakhs
1.	Modernisation of 2 Nos. ECE Lifts in the Administrative Block	9.00
2.	Construction of First floor & Second floor over the existing common room at the Taramani Guest House	5.84
3.	Extension of dining hall and other renovation works at Cauvery & Krishna hostels	5.25
4.	Supplying and laying PVC aluminium cable from Taramani Sub station to the new pillar box near Krishna Hostel	2.52

### 10.2 Guest Houses

There are two Guest Houses in the Campus viz. the Main Guest House and Taramani Guest House which have six suites and 30 rooms respectively.

### 10.3 Hospital

The Institute Hospital consisting of 36 beds, extends medical facilities to students, staff members and their dependents. The hospital offers out-patient and in-patient services for medical, surgical, obstetric, gynaecological, pediatric, ENT and ophthalmic treatments.

The following are the Officers in the Hospital:

Dr. A. Ganesan, M.D,	(on leave)
Dr. N.A. Jayavelan, M.B.B.S.(MD)	Chief Medical Officer I/C
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. A.Mahalakshmi, M.B.B.S.	Medical Officer
Dr. Arunkumar, M.B.B.S.	Jr. Medical Officer

Institute Scholarship	190.46
Other items	70.06
NCC, NSS and NSO: Pay & allowances & others	3.22
	<u>1308.85</u>
<b>2. Central Administration:</b>	
Pay & Allowances	206.11
Hostel	82.90
Stores Pay & Allowances	14.96
Security & Fire fighting	5.55
Lawns & Garden	2.04
Service & Maintenance (Telephone, Power, Water, Furniture repair & Maintenance, Oil, Petrol, etc.)	211.42
Medical Dispensary	30.96
Atheletics and Gymkhana	12.27
Vanavani Matriculation Hr. Sec. School	3.25
Amenities	0.51
SC/ST Special coaching/Preparatory course	0.11
Guidance and Counselling	0.14
DDF	0.16
	<u>570.38</u>
<b>3. Works &amp; Maintenance</b>	
Pay & allowances and other expenses	209.94
	<u>209.94</u>
<b>4. General Expenses</b>	
Postage, Liveries, Stationery, Printing, etc.	33.93
TA of authorities & Institutes selection Committees members, candidates called for interview	8.88
Reimbursement of stamp duty, sundries, etc.	5.09
PF/Gratuity/Pension	360.17
Advances paid	50.45
Deposits refunded	1770.10
Investment of corpus fund	173.01
	<u>2401.63</u>
Total a + b (1 to 4)	4852.44
<b>5. Closing Balance</b>	1559.10
<b>Total</b>	<u>6411.54</u>

#### **10.4 Bank**

State Bank of India IIT Branch is functioning on the campus. An extension counter of Canara Bank is also functioning on the campus.

#### **10.5 Post Office**

There is a post office on the campus opposite the State Bank of India to cater to the needs of the staff, students and residents of the campus.

#### **10.6 Schools**

Vanavani Matriculation Higher Secondary School (V.V.M.H.S.S.) administered by IIT Employees' Educational Society is functioning on the campus besides a Kendriya Vidyalaya (K.V.). VVMHSS school is offering courses from L.K.G. to XII Standards whereas the K.V. is offering courses from I standard to XII standard.

#### **10.7 Open Air Theatre**

An Open-Air Theatre is available for screening films by the Film Club during week ends and for use for other functions of the Institute and the Schools.

#### **10.8 Student Activities Centre**

This building is used for indoor games of the students as well as for the conduct of important functions such as the IIT Convocation etc.

#### **10.9 Cafeteria**

There is one Canteen, IIT Staff Canteen, on the campus to cater to the needs of the staff and students.

#### **10.10 Bus Services**

The Institute has buses which provide transport facility within the campus to the staff, students and residents of the campus.

#### **10.11 Campus News**

The Campus News is published every Friday highlighting the important events of the Institute.

## LIST OF MEMBERS OF COUNCIL OF IITS

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	iii. Madras	Dr. M.S. Swaminathan Chairman, Board of Governors, IIT Madras.
	iv. Kanpur	Shri Govind Hari Singhania Chairman, Board of Governors IIT Kanpur.
	v. Delhi	Dr. P.J. Kurien Chairman, Board of Governors, IIT Delhi. .
	vi. Guwahati	H.E. Shri L.N. Mishra Chairman, Board of Governors, IIT Guwahati.
3.	<b>Director of each Institute Ex-officio</b>	
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	ii. Bombay	Prof. S.P. Sukhatame Director IIT, Bombay 400 076.
	iii. Madras	Prof. R Natarajan Director IIT, Madras 600036.
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	v. Delhi	Prof. V S Raju Director IIT, New Delhi 110 016.
	vi. Guwahati	Prof.D N Buragohain Director IIT, Guwahati 781 001.
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Rafi Marg, New Delhi 110 001.
6. **Chairman**  
Indian Institute of Science  
Ex-officio
- Dr. Raja Ramanna  
Chairman Bangalore (Ex-officio)  
Indian Instt. of Science  
Bangalore 560 012.
7. **Director**  
Indian Institute of Science  
Ex-officio
- Prof. G. Padmanabhan  
Director Bangalore (Ex-Officio)  
Indian Institute of Science  
Bangalore 560 012.
8. **Three Nominees of the Central Government**
- i. To represent the Ministry  
concerned with Education
- Shri P R Dasgupta  
Secretary  
Dept. of Education  
New Delhi 110 001.
- ii. To represent the Ministry of  
Finance
- Shri S Satyamoorthy  
Financial Adviser  
Min. of Human Res. Dev.  
New Delhi 110 001.
- iii. To represent any other Ministry
- Dr. D Swaminadan  
Member (Tech & Higher Education)  
Planning Commission  
Yojana Bhavan, New Delhi 110 001.
9. **Nominee of the All India Council  
for Tech. Education**
- Prof. S.K. Khanna  
Chairman, AICTE  
Indira Gandhi Sports Complex  
(Coaching Block)  
Indira Gandhi Indoor Stadium  
New Delhi 110 002.
10. **Nominees of the visitor**  
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(Maximum - Five)
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Raj Bhavan, Bombay.
- Dr. Khurshid Alam Khan  
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Raj Bhavan, Bangalore.
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Governor of Uttar Pradesh  
Raj Bhavan, Lucknow.

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 Prof V M Radhakrishnan  
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 Prof V Ramjee  
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