



THIRTY SECOND ANNUAL REPORT 1990-91

**INDIAN INSTITUTE OF TECHNOLOGY
MADRAS 600 036**



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THE VISITOR

R. Venkatarāman
President of India

THE BOARD OF GOVERNORS

Chairman

M.S. Swaminathan

Director of the Institute

N.V.C. Swamy

Nominees of the IIT Council

Dr. V.C. Kulandaiswamy

Vice-Chancellor

Indira Gandhi National Open Univ.,

New Delhi

Nominees of State Governments

Shri P.K. Rastogi, I.A.S.,
Commr. & Director of Tech. Education
Govt. of Andhra Pradesh
Hyderabad.

Prof. (Mrs.) Lila Gulati

Aakulam Road

Ullor

Trivandrum.

Prof. B.N. Krishnamurthy
Director of Technical Education
Govt. of Karnataka
Bangalore.

Dr. M. Santappa

73, III Main Road

Kasturba Nagar

Adyar, Madras.

Dr. R. Jayaraman
Director of Technical Education
Govt. of Kerala
Trivandrum.

Shri Suresh Krishna

Chairman & Managing Director

Sundaram Fasteners Ltd

Padi, Madras.

Dr. T.R. Natesan
Director of Technical Education
Govt. of Tamil Nadu
Madras.

Nominees of the Senate

Prof. K. Srinivasa Raghavan

Prof. Y.V.G.S. Murti

Secretary

V. Shanmugam, Registrar.

1. REPORT BY THE DIRECTOR

1.1. General

The Institute continued to maintain its tempo of activities in various academic spheres during the period April 90 - March 91. The following are the salient features of the activities of the Institute:

1.2 Academic Programmes

New Courses

The Departments and Centres of this Institute introduced the following new courses during the period under report:

- Turbo Machines
- Heat Engines
- Refractories & Ceramics
- Material Science for Electronics Engineers
- Environmental & Resource Economics
- Industrial Economics
- Introduction to Robotics
- Geotechnics of Coastal Structures
- Special Topics in Chemical Metallurgy
- Advanced Metallurgical Thermodynamics
- Ceramic Science & Technology
- Statistical Systems for Indian Economy
- Advanced IC Engine Technology
- Irrigation Systems Engineering
- Introduction to Fracture Mechanics
- Introduction to Econometrics Techniques & Applications
- Non-linear optical Processes and Devices
- Protocol Software Engineering
- Psycholinguistics and
- Russian Language

Admission

The intake of students during 1990-91 was 715. Out of this the number of women students was 68 and that of SC/ST students was 62.

Enrolment

The enrolment of students in the academic year 1990-91 was 2,305 which includes 140 students belonging to SC/ST and 203 women students. This enrolment

included 489 Ph.D students, 149 M.S. students, 472 M.Tech. students, 125 M.Sc., students and 1070 B.Tech. students.

Hostel Students

The strength of students was 1938 in 12 hostels which included 1796 men students and 142 women students. Out of the total 76 were SC/ST students.

Degrees Awarded

27th Convocation was held on 11th August 1990. Shri Arif Mohammed Khan, Union Minister for Energy & Civil Aviation delivered the Convocation Address. 827 number of candidates were awarded various degrees. With this the total number of candidates who were awarded degrees so far by this Institute is 14,714.

Faculty Position

There were 179 Professors, 47 Associate Professors, 101 Assistant Professors and 32 Lecturers in different departments and centres of this Institute.

Short-term courses/seminars/symposia conducted

The faculty of various departments and centres of this Institute conducted 47 Short-term courses, seminars, symposia during the period under report.

Seminars and Symposia attended by Faculty

The faculty of this Institute attended 240 seminar and symposia.

Endowment Lectures

Three endowment lectures were conducted during the period under report.

1.3 Research Programmes

M.S./Ph.D. programmes:

In the M.S. and Ph.D. programmes 149 and 489 scholars registered during 1990-91 respectively and 62 M.S. scholars and 89 Ph.D. scholars obtained their degree in the convocation.

Continuing Education Programme

Centre for Continuing Education of this Institute is looking after the quality improvement programmes and curriculum development work. During the period under report 15 continuing education programmes were conducted and 350 participants attended these programmes. 19 modules were completed.

Publications

547 papers contributed by faculty were published in reputed national and international journals and presented.

Research Projects

During the period under report 87 research projects were under execution in this Institute and 391 persons were in position as on 31-3-1991 in these projects.

1.4 Consultancy

The Centre for Industrial Consultancy and Sponsored Research of the Institute earned Rs.94.57 lakhs in the financial year 1990-91.

1.5 Honours conferred on Faculty

Prof. K.K. Balasubramanian of the Department of Chemistry was elected as Fellow of Indian Academy of Sciences for his contributions in the field of Organic Chemistry.

Prof. P. Achuthan of the Department of Mathematics was elected as a Fellow of the Indian National Science Academy for his contributions in the field of Mathematics.

Prof. V.M. Krishna Sastri of the Department of Mechanical Engineering was elected a Fellow of the American Society of Mechanical Engineers for his service and contributions to the area of Mechanical Engineering.

Prof. S.P. Venkateshan of the Department of Mechanical Engineering was granted a Patent by the Patent Office of United States for his invention of a Polymer Hygrometer for Harsh Environments. He was also awarded a National Aeronautics and Space Administration (NASA) award for the development of an Acoustic Humidity Sensor.

Prof. C.A. Sastry, Department of Chemical Engineering was awarded the National Design Award for Environmental Engineering for the year 1990 by the Institution of Engineers (India).

Prof. B. Viswanathan, Department of Chemistry, was awarded the Hari Om Ashram Prerit Bhatnagar Award for Research in Photo- catalysis.

Dr. C. Siva Ram Murthy of the Department of Computer Science and Engineering was the recipient of the Young Scientist Award of the Indian National Science Academy for the year 1990.

1.6 Development Activities

Plan Grant

Institute spent Rs.304.08 lakhs Plan Grant during the period under report.

Library

The Central Library as on 31.3.1991 acquired 2,56,805 Volumes of books, journals and periodicals.

Building Programmes

The following building works were completed and thrown open for occupation/put into use during the period under report:

S. No.	Name of work	Amount (Rs. in Lakhs)
1.	New 'D' type quarters (12 flats) Block II	26.60
2.	Sarayu Hostel Annexe II Phase (80 rooms)	46.84
3.	Students Facilities Centre	7.90
4.	Cycle sheds in various places in the campus	2.83
5.	Additional rooms and modification in 'F' type quarters - Block II	5.60
6.	Replacing the Leaky A.C. sheet roof with R.C.C. slab at Metal Forming Lab. of Metallurgical Engineering Department	2.30
7.	Compound raising wall in the stretch from Sewage pumping station to Sri Ram Nagar corner (Eastern side of the campus)	9.00
8.	Extension to MSB middle wing for setting up Environmental Engg. Lab.,	3.75
9.	Control room for T.N.E.B. at I.I.T. Campus	7.50
10.	Extension to the Hydraulics Laboratory	6.20
11.	Renovation and modification works in 17 rooms of Tarainani House (VIP wing)	7.75

Finance

The non-plan revised estimate 1990-91 and budget estimate for 1991-92 were Rs.1994.00 lakhs and Rs.2,223-01 lakhs respectively.

2. ADMINISTRATION

2.1 General

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

The Senate decides the academic policy of the Institute. It controls and approves curriculum, courses and examination 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. Similarly, there is a Buildings and Works Committee which advises the Institute on matters relating to buildings and works activity. The constitution of this committee is also given in Appendix II.

In addition, there are two Boards viz., the Board of Academic Research and Board of Academic Courses appointed by the Senate to help in the efficient administration of academic activities of the Institute. The constitutions of these Boards are also listed in Appendix II.

The Academic and Administrative staff of the Institute is listed in Appendix III.

2.2 Staff Position

During the year 353 Faculty, 37 Scientist, 231 Officers and 1499 supporting staff were in position. 12 new appointments/ selections for higher positions were made. 1 Faculty/Officers left the Institute and 8 retired from services, the details of which are given below:

Faculty/Officers appointed during the year

Sl. No.	Name	Designation	Date of Appointment/ Selection
1.	Dr. S. Srinivasan	Professor	27-12-90
2.	Dr. S.Sanakaranarayanan	Asst. Professor	07-05-90
3.	Dr. T.Swaminathan	Asst. Professor	01-06-90
4.	Dr. V. Sampath	Lecturer	26-04-90
5.	Dr. G.Sundararajan	Lecturer	30-04-90
6.	Dr. S.Nellamani	Lecturer	02-05-90
7.	Sri J.T.Sajeevamurthy	S.S.O.-II	02-05-90
8.	Dr. G. Srinivasan	Lecturer	14-09-90
9.	Dr. D.Veeraraghavan	Lecturer	14-09-90
10.	Dr. S.S.Bhattacharya	S.S.O.-II	14-09-90
11.	Sri R.Vengan	Dy. Librarian	27-03-90
12.	Ms.Bhavani Kumar	Tech. Assistant	02-07-90

Faculty/Officers who have retired/resigned during the year

Sl. No.	Name	Designation	Date of Retirement/Resignation	Remarks
1.	Dr.P.Subbarami Reddy	Professor	30-06-90	(V.R.)
2.	Dr.T.P. Ganesan	Professor	31-08-90	Retired
3.	Dr.R.Srinivasan	Professor	11-12-90	(V.R.)
4.	Dr.M.Sathyanarayana	Professor	21-12-90	(V.R.)
5.	Dr.S.K.Srinivasan	Professor	31-12-90	Retired
6.	Dr.D.J. Victor	Professor	28-02-91	Retired
7.	Sri P.Venkatesan	Asst.Lib.(SG)	30-04-90	Retired
8.	Sri M.Amjed Hussain	Superintendent	31-01-90	Resigned
9.	Ms. Padma Venkatesan	Sr.Profl.Asst.	31-07-90	Retired

Meeting of the Institute Bodies

Board of Governors

Seven meetings of the Board of Governors were held on 8.6.90, 27.7.90, 10.8.90, 19.10.90, 8.11.90, 22.1.91 and 10.2.91.

Senate

Four meetings of the Senate were held on 17.4.90, 6.8.90, 7.11.90 and 1.2.91.

Board of Academic Research

Four meetings of the Board of Academic Research were held on 2.4.90, 18.7.90, 29.10.90 and 23.1.90.

Board of Academic Courses

Four meetings of the Board of Academic Courses were held on 3.4.90, 16.7.90, 26.10.90 and 28.1.91.

Finance Committee

A meeting of the Finance Committee was held on 8.11.90.

Building and Works Committee

A meeting of the Building and Works Committee was held on 1.2.91.

3. ACADEMIC PROGRAMMES AND AWARD OF DEGREES

3.1 Introduction

Institute offered Ph.D Programme in 13 disciplines, M.S. Programme in 9 disciplines, M.Tech programme in 11 disciplines, M.Sc., programmes in 3 disciplines and B.Tech programme in 9 disciplines during the period under report:

The details of admission, enrolment and degrees awarded are given below:

3.2 Admissions 90-91

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

The number of students and scholars admitted to various courses during 1990-91 is given in Table 1.

TABLE - 1

Sl. No.	Department	B.Tech	M.Tech	M.Sc	M.S	Ph.D	Total
1.	Aerospace Engg.	16	5	-	-	6	27
2.	Applied Mechanics	-	13	-	5	4	22
3.	Chemical Engg.	33	10	-	3	9	55
4.	Chemistry	-	-	25	-	18	43
5.	Civil Engg.	31	31	-	6	12	80
6.	Computer Sci. Engg.	24	33	-	8	2	67
7.	Electrical Engg.	65	38	-	3	5	111
8.	Humanities & Soc.Sci.	-	27	-	1	4	32
9.	Mathematics	-	-	24	-	5	29
10.	Mechanical Engg.	64	62	-	8	15	149
11.	Metallurgical Engg.	25	5	-	1	9	40
12.	Naval Architecture	15	-	-	-	-	15
13.	Ocean Engg. Centre	-	12	-	1	5	18
14.	Physics	-	2*	20	-	5	27
Total		273	238	69	36	99	715

* Solid State Tech.

The total 715 includes the following:

Foreign Nationals	: 11	QIP Scholars	: 44
Scheduled Castes	: 55	Sponsored Candidates	: 44
Scheduled Tribes	: 7	External Registration	: 8
Women	: 68	Project Staff	: 15

3.3 The total strength of students in various programme of the Institute in the academic year 1990-91 are given in Table 2.

Table - 2

Sl. No.	Department	B.Tech	M.Tech	M.Sc	M.S	Ph.D	Total
1.	Aerospace Engg.	61	13	-	5	17	96
2.	Applied Mechanics	-	21	-	16	28	65
3.	Chemical Engg.	123	21	-	8	47	199
4.	Chemistry	-	-	39	-	81	120
5.	Civil Engg.	107	72	-	19	43	241
6.	Computer Sci. Engg.	114	55	-	31	18	218
7.	Electrical Engg.	266	72	-	20	29	387
8.	Humanities & Soc.Sci.	-	44	-	8	22	74
9.	Mathematics	-	-	47	-	23	70
10.	Mechanical Engg.	257	121	-	26	69	473
11.	Metallurgical Engg.	93	19	-	5	33	150
12.	Naval Architecture	49	-	-	-	-	49
13.	Ocean Engg. Centre	-	26	-	11	25	62
14.	Physics	-	8*	39	-	54	101
Total		1070	472	125	149	489	2305

* Solid State Tech.

The total 2305 includes the following:

Foreign Nationals	: 31	External Registration	: 20
Scheduled Castes	: 120	Project Staff	: 78
Scheduled Tribes	: 20	Defence	: 22
Women	: 203	CSIR	: 28
QIP Scholars	: 87	Handicapped	: 2
Sponsored Candidates	: 85	Institute staff	: 43

3.4 Degrees Awarded

The Twenty-seventh Convocation of the Institute was held on 11th August, 1990 and 827 candidates were awarded degree which comprises candidates in person and in absentia, the discipline/degree-wise details are given in Table 3. Shri Arif Mohammed Khan, Hon'ble Minister for Energy & Civil Aviation, delivered the Convocation Address.

TABLE - 3

Sl. No.	Department	B.Tech	M.Tech	M.Sc	M.S	Ph.D	Total
1.	Aerospace Engg.	16	89	-	1	1	107
2.	Applied Mechanics	-	14	-	5	7	26
3.	Chemical Engg.	33	18	-	5	2	58
4.	Chemistry	-	-	15	-	29	44
5.	Civil Engg.	31	37	-	12	8	88
6.	Computer Sci. Engg.	30	19	-	6	1	56
7.	Electrical Engg.	73	48	-	14	4	139
8.	Humanities & Soc.Sci.	-	16	-	-	4	20
9.	Mathematics	-	-	19	-	2	21
10.	Mechanical Engg.	65	75	-	14	12	166
11.	Metallurgical Engg.	22	16	-	5	4	47
12.	Naval Architecture	13	-	-	-	-	13
13.	Ocean Engg. Centre	-	12	-	-	2	14
14.	Physics	-	7	8	-	13	28
Total		283	351	42	62	89	827

With this Convocation the number of degrees awarded so far by the Institute is, 14,714, the details of which are as follows:

Ph.D.	1281	B.Tech.	6716
M.S.	726	DIIT	245
M.Tech.	4750	B.Sc. (TA)	20
M.Sc.	996		

3.5 Award of Prizes

The following are the details of award of Institute Merit Prizes for the students with the Best Academic Record in each course:

M.Sc.,	- Mathematics	K. Anandhi
M.Tech	- Engineering Mechanics	Sanjay Suresh Chandra
	- Industrial Tribology	Barun Chakrabarti
	- Maintenance Engg & Management	Jose Mathew
	- Civil Engineering	S. Sheela
	- Solid State Technology	Pinaki Majumdar
B.Tech	- Civil Engineering	Ashok Kalidas

3.6 Endowment Prizes

The following are the details of endowment prizes awarded to the students in 1990-91.

Air India Prize for the best student in M.Tech Aerospace Engineering	R.S. Nagaraja
Siemens Prize for the best student in M.Tech Electrical Engineering	P. Devaraj
Philips India Prize for the best student in B.Tech Electrical Engg. (Electronics)	G. Harikumar
Banco Foundation Prize for the best student in B.Tech Mechanical Engg.	Dilip Prasad
Mico Bosch Prize for the best project in Environmental Pollution Control M.Tech Chemical Engg.	A. Kannan
Prof. B.Sengupto Prize for the best student in M.Tech Mechanical Engg.	K. Prasad
Reliance Heat Transfer (P) Limited Prize for the best student in B.Tech Chem. Engg.	R. Vasudevan
Dr.S. Vaidyanathan Memorial Prize for the best student in M.Tech Mechanical Engineering (Production Engineering)	K. Prasad
Dr. K.Subbaraju Memorial Prize for the best student in M.Tech Chemical Engg.	N. Sinivasa Subramaniam
K.V.Arunkumar Memorial Prize for the best student in M.Tech Industrial Management	T.Ravi Kumar

HAL Prize for the student with the best academic record passing the B.Tech Degree Course in Aerospace Engineering	Anju Agast
CMC Prize for the outgoing M.Tech student in Computer Science with the best academic record	R. Srinivas
V.Ratna Rao Memorial Prize to the outgoing M.Sc., (Chemistry) student with the best academic record	S. Uma Maheswari
Alumni Association Prize for the best student in M.Tech Industrial Metallurgy	K. Srinivas G.D.S. Ramkumar
Coka Parthasarathy Memorial Prize for the best student in M.Tech Industrial Management	T. Ravikumar
Sudharshan Bhat Memorial Prize to the full time Research scholar in Metallurgical Engg. with the best published research paper	M. Kamaraj
Giri Bros (P) Ltd. Prize for the best student in M.Tech Mech. Engg. with project in Metrology	Prashant Prabhakar Fulay
S. Anantharamakrishnan Memorial Prize for the best student in M.Tech Metallurgical Engg. (Metal Casting)	U.V.Suryanarayana Murthy
American Bureau of Shipping Prize for the best student in M.Tech Ocean Engineering	Velagapudi Poorna Venkata Ramana
American Bureau of Shipping Prize for the best student in B.Tech Naval Architecture	B.Manoj Keshavan
Indira Sivasailam Merit Prize for the Girl Student in B.Tech with best curricular performance	Anju Agast
Valli Anantharamakrishnan Merit Prize for the Girl student with the best Academic Record in B.Tech	Anju Agast

B.Ravichandran Memorial Prize for the best student in B.Tech Chemical Engg.

B.Ravichandran Memorial Prize for the best student in B.Tech Computer Science

Sivasallam Merit Prize for the student in B.Tech Mech. Engg. for the best individual project

K.Devarajan Memorial Prize for the student with highest CGPA in M.Tech Civil Engineering

R. Vasudevan

**K. Srinivas
G.D.S. Ramkumar**

K. Vaidyanathan

Anil Mukundan

4. DEPARTMENTS AND CENTRES

The Institute is having the following Departments and Centres :

Departments

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

Centres

Centre for Bio-Science & Bio-Technology
Regional Sophisticated Instrumentation Centre
Centre for Systems and Devices
Materials Science Research Centre
Fibre Reinforced Plastics Research Centre
Central Electronics Centre
Centre for Industrial Consultancy & Sponsored Research

The activities of these Departments and Centres during the year 1990-91 are as follows :

4.1 AEROSPACE ENGINEERING DEPARTMENT

1. Facilities added and major equipment procured

TGap DTA and Pressure DSC Pressure Analyser costing about Rs.12 lakhs has been procured and commissioned.

2. Sponsored Projects

Title	Period	Funding Agency	Amount	Co-ordinator
Erosive burning studies of solid propellants under Transonic and Supersonic Cross Flow Mach numbers	Three years	ARDB	Rs.5.986 lakhs	Dr.S.Krishnan
Computation of turbulent flows using zonal modelling	Approx. 1-1/2 years from Sep.90	C-DAC PUNE	Rs.1.05 lakhs	Dr.E.G.Tula-purkara
Computation of supersonic base flows, sponsored by Space Technology cell	Approx. 2 years from Oct.'90	ISRO-IIT(M)	Rs.4.00 lakhs	Dr.E.G.Tula-purkara

3. Major Consultancy Assignments

Title of Assignment	Organisation	Amount	Coordinator(s)
Development of software for calculation of flow field in a Rocket Exhaust Diffuser	ISRO	Rs.30000/-	Dr. T.K. Bose
Design of Low Turbulence wind tunnel for FCRI, Palghat.	FCRI	Rs.4,000/-	Dr.E.G.Tula-purkara
3-D traversing rig	IIT KANPUR	Rs.40000/-	Dr.E.G.Tula-purkara
Precision transverse with six degrees of freedom	IGCAR Kalpakkam	Rs.39000/-	Dr.E.G.Tula-purkara

4. Short-term Courses organised

One week Course on 'Introduction to Computational Fluid Dynamics', Sept. 17-22, 1990 under ISRO-IIT(M) Space Technology Cell.

Short course by Prof.K.A.Damodaran and Dr.S.S.Gokhale, Two weeks course on 'Airbreathing Propulsion', Nov. 19-30, 1990 under the ISRO-IIT(M) Space Technology Cell.

5. Research Publications

1. T.K. Bose, 'One-dimensional analysis of wall region multiple region plasma' Chem. Energy and Plasma Processing, 1990, Vol.10, pp.189-206.
2. T.K. Bose and C.J.Cremers, 'Thermal conductivity of argon-helium mixture and high temperature', **Thermal Conductivity**, Vol.21, 1990.
3. K. Bhaskar and T.K. Varadan, 'Analytical solution for a pinched laminated cylinder', ASME JI. of Applied Mechanics, 1990, Vo.57(4), pp. 1082-83.
4. T.K. Varadan and K. Bhaskar, Bending of laminated orthotropic cylindrical shells - an elasticity approach, Composite Structures, 1991, Vol. 17(2), pp. 141-156.
5. R. Sivaramakrishnan, C. Venkatesan and T.K. Varadan, 'Rotor/Fuselage vibration isolation studies by a Floquet-Harmonic Iteration Technique', Journal of Aircraft, 1990, Vol.27(1), pp. 81-89.
6. K.M. Udupa and T.K. Varadan, 'Hierarchical finite element method for rotating beams', J. of Sound and Vibration, 1990, Vol. 138(3), pp. 447-456.
7. S. Savithri and T.K. Varadan, 'Accurate bending analysis of laminated orthotropic plates, AIAA Journal, 1990, Vol.28, pp. 1842-1845.
8. S. Savithri and T.K. Varadan, 'Free Vibration and Stability of cross-ply laminated plates, J. of Sound and Vibration, 1990, Vol.141(3), pp. 516-520.
9. S. Savithri and T.K. Varadan, 'On Bending deformation of thick homogeneous clamped plates', J. of Aero. Soc. India, 1990, Vol.42(3), 193-196.
10. S. Savithri and T.K. Varadan, 'Comments on 'Rayleigh-Ritz vibration analysis of thick plates by a simple higher order theory', J.of Sound and Vibration, 1990, Vol.146(3), p. 348.
11. M.S.R. Prasad, T.K. Varadan and B.S. Sarma, 'Panel flutter analysis using

high precision shear flexible element, J. of Sound and Vibration, 1991, Vol.144(1) pp. 9-16.

12. E.G. Tulapurkara, V. Ramjee and R. Rajasekar, 'Interaction between boundary layers and wakes of different bodies', AIAA Journal, Vol.28, June 1990, pp. 1032-1037.
13. E.G. Tulapurkara, R.A. Antonie and W.B. Browne, 'Optimisation of k-Model for a turbulent for wake', J. Aero. Soc.of India, Vol.42, Aug.1990, pp. 221-228.

6. Papers presented in Symposia/Conference

1. T.K. Bose, 'Plasma Particle Interaction', Workshop-cum- Symposium on Beams and Plasmas; Appl. in Materials Technology, BARC, 1990.
2. G. Joseph, T.K. Bose and B.C. Pillai, 'Thermal response of plates welded using a moving heat source', Int.Sym. on Heat/Mass Transfer in Manufac. Technology, Yugoslavia, 1990 (presented in absentia).
3. K.B. Subrahmanyam, K.M. Udupa, V.T. Nagaraj and T.K.Varadan, A critical study on the stability analysis of a hingeless FRP, helicopter rotor blade under Hover', Int. Conf. on Advance in Structural Testing. Analysis and Design, 29th July-2nd Aug.1990 at IISc. Bangalore.
4. B.S. Sarma amd T.K. Varadan, 'Multimode Nonlinear free vibrations of Timoshenko beams', Int. Con. on Advances in Structural Testing, Analysis and Design, 29th July-03 Aug.1990, IISc., Bangalore.
5. K. Bhaskar, T.K. Varadan and S. Savithri, 'Analysis of thick laminates shells and plates', Presented in the Indo-US Workshop on 'Composites for Aerospace Applications', at Bangalore, India, July 1990.
6. E.G. Tulapurkara, S. Vengadesan and J.L. Narasimhan, 'Comparison of Direct Numerical Simulation of Channel Flow with Calculations Using k-Model, Proc. 17th National Conf. on FMFP, Warangal, Dec. 13-15, 1990.
7. E.G. Tulapurkara, R.A. Antonie and L.W.B. Browne, 'Optimisation of k-model for a turbulent far-wake' at the 5th National Conference on Aerodynamics at IAT, Pune, May 24-26, 1990.
8. E.G. Tulapurkara, 'LDA system at IIT Madras' during Workshop on 'Application of LDV in Flow Measurements' NAL Bangalore, May 29-31, 1990.

4.2 APPLIED MECHANICS DEPARTMENT

I. New Courses Introduced

Course No.	Title Structure	Faculty
AM 615	Biodynamics 3-0-0-3	Prof.K.M.Patil
AM 617	Orthopaedic 3-0-0-3 Mechanics	Dr.S.Radhakrishnan
AM 612	Biomaterials 3-0-0-3	Prof.Megha Singh Dr.S.Radhakrishnan

2. Instruments/Equipment Designed and Developed

In a project funded by ARDB, a new blower tunnel facility was designed and fabricated. This tunnel can have two different test sections namely 1000 mm x 330 mm and 400 mm x 300 mm. This test facility will be used to study wake development in a curved flow.

A blower tunnel facility funded on ARDB project has been designed and built for the study of aerofoil characteristics under low Reynolds number conditions.

An 1.0 m Diameter windturbine test facility has been designed and fabricated to study wind turbine characteristics

Electrodynamic Exciter with force gauges.

3. New Facilities added and major equipment procured

ISIS Scanner for Scoliosis.

EMED-F platform for Dynamic measurement of foot pressures.

Signal Analyser SD 380, Scientific Atlanta

HP Computer Instrument Controller 310, HP

Signal Processing Station.

4. Sponsored Projects

Title	Period	Funding Agency	Amount	Co-ordinator
Development of foot model and pressure monitoring	3 years	DST	Total Rs.21.68 lakhs	Principal Co-ordinator Prof. K.M. Patil Biomed Engg. Divn.

Title	Period	Funding Agency	Amount	Co-ordinator
system for better understanding and management of tarsal disintegration and plantar ulcers in neuropathic feet of Leprosy Patients.			(IIT share 9.01 lakh)	
Wake Development in a Longitudinally curved Stream		ARDB	8.6 lakhs	Dr. V. Ramjee & Dr.J.L.Narasimhan
Development of pump turbines Design and Analysis of 'S' Cambered profiles for fully reversible axial flow pump turbines.		CBIP	3.11 lakhs	Dr.H.C.Radhakrishna Dr.V.Balabaskaran Dr.P.A.Aswatha Narayana
Generation of aero dynamic data for blade section of wind energy system		DNES	5.2 lakhs	Dr.N.V.C. Swamy Dr.P.A. Aswatha Narayana
Numerical modelling of complex flows with heat transfer		NSF	17.39 lakhs	Dr.K.N.Seetharamu Dr.P.A.Aswatha Narayana
3-D conduction code for temperature distribution using FEM for GT blades		ARDB	6.75 lakhs	Dr.K.N.Seetharamu Dr.P.A.Aswatha Narayana
Computer aided design of aerodynamically heated stryctyres		ARDB	11.00 lakhs	Dr.R.Palaninathan Dr.M.Balakrishnan Dr. T.K. Bose
Fluid Mechanical and combustion aspects of interference effects in spray combustion	3 yrs	ISRO	5.00 lakhs	Dr.R.Natarajan Dr.B.H.L.Gowda

Title	Period	Funding Agency	Amount	Co-ordinator
Studies on the mixing and combustion phenomena in ramjet combustion chambers	3 yrs	ARDB	5.17 lakhs	Dr.R.Natarajan Dr.B.H.L.Gowda Mr.K.S.Padiyar
Industrial Tribology & Maintenance with emphasis on Tribotesting and Monitoring	1991-92	MHRD	10.00 lakhs	Dr.B.V.A.Rao Dr.B.S.Prabhu Dr.S.Swarnamani
Reswitching Transients and their effect on the design and operation of large induction motors	1989-90	CBIP	6.33 lakhs	Dr.S.S.Yegnanarayanan Dr.G.Sridhara Rao Dr.C.Venkateshaiya Dr.S.Narayanan
Dynamics of Bladed Disks	1988-90	V.W. Stiftung	7.00 lakhs	Dr.V.Ramamurti Dr.S.Swarnamani Mrs.C.Sujatha
Active Vibration control of flexible structures	3 yrs	ARDB	4.9 lakhs	Dr.S.Narayanan

5. Major Consultancy Assignments

Total of Assignment	Organisation	Amount	Cordinator(s)
Design development of a transducer system for measurement of tyre pressures.	MRF Ltd., Madras.	Rs.1.0 lakh	Dr.S.Radhakrishnan Mr.G.Thomas.
Development of Torsion Testing Equipment.	UCAL Pvt Ltd.	Rs.12,000	Dr.J.Raamachandran

Tital of Assignment	Organisation	Amount	Cordinator(s)
Multi-Barrel Launcher Analysis	Marshall Sons (India) Ltd. Madras	Rs.90,000	Dr.V.Ramamurti
Experimental Analysis of Auto Setting Mills	Walchandnagar Industries Ltd, Walchandnagar.	Rs.28,000	Dr.V.Ramamurti Dr.S.Swarnamani
Analysis and Measurement of Tyre Noise	MRF Limited, Madras	Rs.20,000	Dr.S.Narayanan Dr.S.Swarnamani
Earthquake Withstand test and performance Evaluation-HV Disconnecter	Switchgear Manufacturing P.Ltd., Hyderabad	Rs.45,000	Dr.B.S.Prabhu Dr.N.Ganesan Dr.S.Swarnamani
Vibration testing on their valves	Xomax India Ltd., Madras	Rs.16,000	Dr.S.Narayanan Dr.B.V.A.Rao Dr.N.Ganesan Dr.S.Swarnamani
Noise Level Measurements at their Community Centre	Cement Corporation India Ltd., Gulbarga	Rs.20,000	Dr.B.V.A.Rao Dr.S.Swarnamani Dr.A.Ramachandraith

6. Distinguished Visitors to the Department

Visitors's name	Affiliation	Purpose of visit
i) Dr.S.Balakrishnan	Associate Professor and Associate Head, Dept. of Mech.Engg. Univ. of Manitoba Winnipeg, Canada.	Visiting Professor
ii) Dr.Monohar M. Panjabi	Professor of Orthopaedics and Rehabilitation Dept. of Mech. Engg. and Director of Biomech. Research lab. Yale University.	Visitor to the Dept. Gave series of lectures on Spinal Biomech.

7. Visit of Faculty Members to other Institutions

Visitors's name	Affiliation	Purpose of visit
1. Prof. Megha Singh	Univ. of Northcarolina Chapel Hill, USA. 1 year and 3 months.	Research
2. Prof. K.M. Patil	Eindhoven Univ. of Technology, Netherlands. 1 year.	Research
3. Dr.B.H.Lakshmana Gowda	University of Windsor, Canada. One year Sabbatical leave till November 1990	Research
4. Dr.J.Lakshminara- simhan	Institute fur Computer - Anwendungen, University of Stuttgart, FRG. 3 months May, June, July 1990	DAAD Fellowship

8. Seminars/Symposium/Conferences/Short-term courses organised

Speaker	Topic	Date
i) Dr.K.P. Misra Consultant, Apollo Hospital.	Recent advances and scope of BME in Cardiology	22-2-91
ii) Dr.Krishnamoorthy Srinivas Prof. of Neurology MME, Madras.	An approach to Electro- physiology What way can Bio-medical Engineer's help?	28-2-91
iii) Dr.S. Balakrishnan Associate Professor Univ. of Manitoba.	Lecture Series on "Principles of Robotics"	From Jan. 1991 to April 1991.

	Speaker	Topic	Date
iv)	Prof. Manohar M. Panjabi. Yale University USA.	Biomechanics of the Spine	11-12-91.
v)	Dr. R. Ravi Dental Surgeon	The Role of technologists in future Dentistry.	23-11-90
vi)	Dr.S. Suresh Director, Mediscan System.	Sonography applications in Engineering and Medicine.	9-11-90
vii)	Dr.P.J. Doherty Univ. of Liverpool and Invitro techniques.	Bio-Compatability Evaluation using Invivi	22-10-90
viii)	Dr.S. Kameswaran ENT Surgeon	Sound and Noise	8-10-90
ix)	Dr.(Mrs) Priya Dharan Univ. of Oaklahoma.	Breaking the Silence Barrier	10-9-90

9. Participation in Seminars/Symposia/Conferences, Etc.

Staff Member	Particulars of participation Conf/Seminar/Symposia/ short-term course - Name, Date and Venue.	Nature of participation
i) Dr.Megha Singh Biomechanics July 30 - August 4.	First World Congress on Chairperson of	Organisation and
ii) Dr.J.Raamachandran of Singapore: Seminar on Indian Science and Culture, National University of Singapore, Singapore, 1-4-1990.	Silver Jubilee of formation on Astrology	Invited lecture

Staff Member	Particulars of participation Conf/Seminar/Symposia/ short-term course - Name, Date and Venue.	Nature of participation
iii) Dr.B.S.Prabhu Industrial Tribology, Bangalore.	National Conference on Technical 7th-8th February, 1991,	Chairman of Session.
iv) Dr.S.Narayanan on Structural Testing, Analysis and Design, August 1990, Bangalore.	International Conference as well as Chairman for Technical Session.	Paper presenta- tion

11. Research Publications

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2. Patil, K.M., Srinath, M.S. and Rao, K.S., "Foot pressure distribution in leprosy subjects using image processing technique", Proceedings of the First World Congress of Biomechanics, University of California, San Diego, U.S.A., Vol.I, 184, 1990.
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6. Swarnamani, S. and Singh, M., Analysis of macro- and micro- structures of normal and pathological tissues by ultrasonic backscattering techniques Med. Biol. Engg. Comput. 28, 561-568, 1990.

7. Kanakaraj, P., Meerarani, S., and Singh, M, Effect of hypercholesterolemia on mobility of erythrocyte membrane proteins, *Current Science*, 59, 59-61, 1990.
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12. Ramachandran, G., and Singh, M., Cardiac functional analysis by laser speckle interferometry, *Holography and Speckle Phenomenon and their Industrial Applications*, R.S. Sirohi, ed. World Scientific, Singapore, 1990, pp. 341-346.
13. Ramachandran, G. and Singh, M., Reconstruction of cardiac displacement patterns by laser speckle interferometry, *I World Cong. Biomechanics, La Jolla, 1990*, II-77.
14. Muralidharan, E. and Singh, M., Measurement of aggregation parameters of erythrocytes in health and diseases, *I World Cong. Biomechanics, La Jolla, 1990*, II-78.
15. Liepsch, D. and Singh, M., Flow visualization studies in tubes with different constructions, *I World Cong. Biomechanics, La Jolla, 1990*, II-277.
16. Ramesh, A.T.V. and Singh, M., Radius dependence of erythrocyte distribution in glass capillaries by tomographic analysis, *I World Cong. Biomechanics, La Jolla, 1990*, II-306.
17. Singh, M., Lucas, C.L., Henry, G.W., Ferreiro, J.I. and Wilcox, B.R., Three dimensional flow visualization in arterial branching models, *I World Cong. Biomech. La Jolla, 1990*, II-323.

18. Partha Roy, Radhakrishnan, S. and Sriram, K., "Clinical Assessment of Scoliosis using ISIS". First International Conference on Trauma and Orthopaedics at Kovai Medical Centre and Hospital, Coimbatore, Oct. 8-11, 1990.
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21. Raamachandran, J. and Sivakumar, T., "Experimental Study of Free Vibrations of Cantilevered Composite Helicoidal Shell", accepted for presentation at the First International Conference on Vibration Problems of Mathematical Elasticity and Physics, held at AC College, Jalpaiguri, Oct. 20-23, 1990.
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23. Raamachandran, J., "Vibrations of Plates Using Charge Simulation Method", in Computers and Structures, USA.
24. Raamachandran, J., "Nonlinear Vibrations of Helicoidal Shells" December 1990 issue of the Journal of Aeronautical Society of India.
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33. M.S. Ravisankar, P.A. Aswatha Narayana and K.N. Seetharamu, "Finite element simulation of developing turbulent flow in a smooth circular pipe", *17th National conference on fluid Mechanics and Fluid Power, Warangal, 1990*.
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95. N.Ganesan and K.R.Sivadas, Free vibration of cantilever circular cylindrical shells with variable thickness, Comput. and Struct. 34(4) pp.669-677, 1990.
96. N.Ganesan and K.R.Sivadas, Vibration analysis of orthotropic shells with variable thickness, Comput. and Struct. 35(3), pp.239-248, 1990.
97. K.R.Sivadas and N.Ganesan, Free vibration of cantilever conical shells with variable thickness, Comput. and Struct. 36(3), pp.559-566, 1990.
98. Mohandas, K., Chandhun, D and Rao, B.V.A., Optimal periodic replacement for a deteriorating production system with inspection and minimal report, accepted for publication in Reliability Engineering and System Safety.

4.3 CHEMICAL ENGINEERING DEPARTMENT

1. Visitors to the Department

Dr R I O Zeinalov, Institute of Petrochemical Processes, Academy of Sciences the Azerb, SSR, USSR.

2. Visit of Faculty Members to other Institutions

Name of Faculty	Institutions visited/purpose of visit/ duration
Prof. YBG Varma Prof.Ch.Durgaprasada Rao Dr.K.Krishnaiah	Visited twice KREC., Surathkal to help in setting up of laboratories
Dr.T.Swaminathan	Visited KREC., Surathkal for invited lecture and discussions on Bio- Technology programme Visited National Environmental Engg. Research Institute, Nagpur for discussions on Hazardous waste management.
Dr.S.K.Rakshit Dr.T.Panda	Visited REC, Trichy to deliver lecture at a Winter School on "Application in Biotechnology" during 19 Nov. - 2 Dec. 1990.
Prof.C.A. Sastry	Anna University, Madras, for Plenary Lectures Regional Labour Institute, Madras, for Lectures Engineering Staff College of India, Hyderabad, for Lectures Administrative Staff College of India, Hyderabad, for lectures TWAD Board, Madras, for lectures Tamil Nadu Pollution Central Board, Madras for lectures.

3. Seminar/Symposium Organised by Department

Prof A Baradarjan
and
Dr S K Rakshit

Short Term Winter School on 'Recent Advances in Downstream processing in Biochemical Engineering'.
during December 1990.

Quality Improvement Programme

During the year ONE teacher joined M.Tech. and TWO teachers joined Ph.D. programme.

4. Participation in Seminars, Symposium, Conferences, etc.

Name of Faculty	Particulars of participation in Seminars/ Symposium/Short Term course
Dr.T.Swaminathan	Participated in the Annual conference of IAEM at Nagpur. Participated at Workshop on Recent Trends in Pollution Control organized by CEI, Southern Regional Centre, Madras. Participated in a workshop at Anna Institute of Management, Madras.
Dr.S.K.Rakshit	Invited by the Jawaharlal Nehru Research Foundation, Bangalore to attend a workshop on Recent advances in Separation Science and Technology.

5. Research Publication

1. Sivagnanam, P. & Varma, Y.B.G., 'Subcooled Boiling of Binary Mixtures under Conditions of Forced Convection', Experimental Thermal and Fluid Science, 3, 515-522 (1990).
2. Chandran, A.N.Subba Rao, S. & Varma, Y.B.G., 'Fluidised Bed Drying of Solids', AIChE Journal, 36, 29-38 (1990).
3. Kannan A., Harikrishnan, T.L. & Varma, Y.B.G., 'A numerical technique for the estimation of the true mass transfer coefficient in extraction columns' The Chemical Engineering Journal, 45, 133-135 (1990)
4. Sundaresan, A. & Varma, Y.B.G., 'Interfacial Area and Mass Transfer in Gas-Liquid Cocurrent Upflow and Countercurrent Flow in Reciprocating Plate Column'. The Canadian J.Chem. Engg., 68, 952-957 (1990).

5. Sundaresan, A. & Varma, Y.B.G., 'Dispersed Phase Holdup and Bubble Size Distributions in Gas-Liquid Cocurrent Upflow and Countercurrent Flow in Reciprocating Plate Column', *The Canadian J. Chem.Eng.*, 68, 560-567 (1990).
6. Sastry, C.A. 'Public health considerations of waste recycling', *Indian J.Env.Protection*, Vol.10, No.1 (1990).
7. Raghuv eer, S. and Sastry, C.A., 'Characteristics of waste water Generated when different raw materials are used for pulp and paper making', *Indian J. Env. Protection*, Vol.10, No.4. (1990).
8. Srinivas, V. Subramanyam, Y.V., Lolla V.L.P.S. and Sastry, C. A 'Treatment of sugar mill waste water using anaerobic filter', *Indian J.Env. Prot.*Vol.10,No.8, (1990).
9. Raghuv eer, S. and Sastry C.A. 'Effect of simple inplant control measures on the characteristics of waste water from a pulp and paper mill', *Indian J.Env. Prot.*Vol.10, No.10 (1990).
10. Srinivas, V. Lolla, V.L.P.S. Subramanyam, Y.V. and Sastry, C.A. 'Treatment of phenolic waste water using two upflow anaerobic filters operated in series', *Indian J.Env.Prot.*Vol.10, No.9 (1990).
11. Deepak, S. and Venkatram, T., 'Computer Aided Thermal design and Rating of Shell and Tube Heat Exchangers', *Indian Chemical Engg.* 32 (1) Trans 65-68 (1990).
12. Salam Rajendra Babul, P., Satyanarayana, M. and Venkatram T. 'Zymomonas Mobilis as an Emerging ethanol producer' - A Review', *Indian Chemical Engineer*, 32 (2), 13-33 (1990).
13. Raghunand, N. Thyagarajan, S.Gopalakrishna, K. and Venkatram, T. 'Treatment of Starch wastes using Rotating Biological contactor', *Indian Chemical Engg.* 32(3) 11-16 (1990).
14. Padmini, P. Rakshit, S K and Baradarajan A. 'Studies on fermentative production of lipase', *Trans. II Chem. Engrs.* 32 No.4,51-54, 1990.
15. Chithra N and Baradarajan A 'Analysis of packed bed immobilized reactor', *J of Chem. Tech. and Biotech.* 49, 115-127, 1990.
16. Jha, R K. Prasad, G K. and Chandra Prasad C. 'Analysis of Cascade Control Systems to Parameter Variations', *CEW XXV*,83- 87 (1990).

17. Remananda Rao, K. 'Hydrodynamic studies in a reversed flow jet Loop Reactor', Proceedings of AP Bio CWE.C. 1990. Seoul, Korea, 509-512, 1990.
18. Remananda Rao, K. 'Axial Mixing Studies in a continuous reversed Flow Jet Loop Reactor', Institution of Chemical Engrs.(London) Symposium series 212 of Fluid mixing IV, 269- 280, 1990.
19. Srinivasan, P. and Subba Rao, S. 'Variation of diffusion Coefficient with Composition of Toluene - CC14 system at 30 and 40 C', Journal of Energy, Heat and Mass Transfer, 12, 1- 8 (1990).
20. Sievert, J. Loffler, F. and Murthy, D.V.S. 'Separation characteristics and cleaning efficiency of surface fabric filter', Indian Journal of Technology, Vol.28, 553-558 (1990).
21. John Kirubakaran, Seshadri, S K. & Krishnaiah, K. 'Some studies on activated carbon production from coconut shells in a fluidized bed reactor' (Accepted for publication in Indian Chem.Engr.).
22. Bisaria, V.S. Babu, P.S.R. & Panda T. 'Englucanase from the mixed cluture of Trichoderma reesei and Aspergillus wentii Bioprocess Engg., 9FRG) 5, 119-121, 1990.
23. Bhavsar V C. and Balakrishnan, A R 'Pebble Bed - Oil Thermal Energy Storage for Solar Thermo-Electric Power Systems' International Journal of Energy Research, 14, 233-240 (19
24. Balakrishnan, A.R. and D C T Dei, 'Thermal Transport in Gas- Solid Suspension Flow Through Packed Beds', Powder Technology, 62, 51-57 (1990).
25. Subrahmanyam, P.V.R. and Swaminathan T. 'R and D in Hazardous Waste Management; Chemical Engineering World Vol. XXV, 143-149 (1990).
26. Verma, K.V.R, Swaminathan, T. and Subrahmanyam, P.V.R. 'Heavy Metal Removal with Lignin,'Journal of Environmental Sciences and Health, Part A-25 (3), 243-265 (1990).
27. Padmini, P., S.K.Rakshit and Baradarajan A. 'Fermentative production of lipase', Indian Chemical Engineer, Vol.XXXIII, 51-54 (1990).
28. Rakshit, S.K. and Sahai, V. 'Cellulase production by a partially catabolite resistant mutant of Trichoderma reesei, J. of Gen. and Appl. Microb. 35, 441-450 (1989).

International

1. Rajendran Nair, P.B. and Ramanujam, M. 'Circular Fluid Energy Mill' 7th European Symposium on Comminution, June 12-14, Ljubljana, Yugoslavia, 1990.
2. Rajendran Nair, P.B., Ramanujam, T.K. and Ramanujam, M. 'Effect of moisture and clay content on the shear Strength and tensile strength of raw coal', II World Congress on Particle Technology, Kyoto, Japan, Preprint Part 1, 124-133, 1990.
3. Reji John, Neelakantan, N.R. and Subramanian, N. 'Rheokinetic Studies of curing Reaction of a Polyol with TDI', International Conf. on Rheology and Polymer Processing, Seoul, Korea, 1990.
4. Salam Rajendra Babu, P., T Venkatram and Satyanarayana, M. 'Continuous and Simultaneous Saccharification and Fermentation of Tapioca Starch to Ethanol', Second Internat. Symp. on Renewable Energy Sources, Cairo-Egypt, 10, 1990.
5. Padmini, P, Rakshit, S.K. and Baradarajan, A. 'Kinetic of Lipase catalysed hydrolysis of Rice Bran Oil', Proc. of AbBioChec 90 Apr. 22-25 Kyjungju, 49-52, Kores.
6. Gowtham, M.K. Rakshit and Baradarajan, A. 'Studies on Biomass Growth in a tapered and non-mechanically agitated Bioreactor', *ibid* p. 521-524.
7. Chitra, N. and Baradarajan, A. 'Continuous production of Ethanol from tapioca starch' *ibid*.
8. Balu, K, Baradarajan, A. and Satyanarayana, M. 'RTD studies in Static Mixers' International Conf. organised by ASME, Association for the Advancement of Modelling and Simulation Techniques in Enterprises, Dec. 10-12, Tirupathi, 1990.
9. Balu, K. Baradarajan, A. and Satyanarayana, M. 'RTD studies in Static Mixers', IACHEMA Congress June 9-15, Frankfurt, FRG, 1991.
10. Selvaraj, P.G., Balasubramanian, G.R. and Remananda Rao, K. 'Holdup Models for Two-phase flow' International Congress of Chem. Engg. Chem. Equipm Design and Automation Chisa, Aug. 26-31, 1990. Czechoslovakia.
11. Paramasivam, R. and Vedaraman, R. 'Studies in Additive grinding of minerals', Second World Cong. Particle Tech. Sept. 12-22, Kyoto, Japan, 272-279, 1990.

12. Babu, P.S.R. and Panda, T. 'Recycling of fermentation broth for the production of penicillin amidase' in Proc. Asia-Pacific Biochemical Engg. Conf. '90 (APBioCHEC'90, Apr.22-25), Kyungju, Korea, 110-113.
13. Venkataraman, A. and Panda, T. 'Studies on the *in-vitro* development of chick-embryo, in Proc. APBioCHEC '90, 149- 515, Kyungju, Korea.
14. Babu, P.S.R. and Panda, T. 'Studies on the improvement of Catalytic efficiency of penicillin amidase from *E.coli* Congress CHISA '90, 10th Intl. Congress of Chemical Engg., Chemical Equip. design and Automation (Aug. 26-31) Praha, Czechoslovakia, p. 406.
15. Panda, T. and Anjani Kumari, J. 'Integrated approach for biofuels production by protoplast system' 'Int. Symp.: Applications and Management of Energy in Agriculture, Centre for Advanced Studies on Energy Management in Agriculture, (FAO and ICAR) May 21-23) PAU.
16. Venkataraman, A. Anjani Kumari, J., Babu, P.S.R. and Panda, T. 'Critical analysis of process development on *in-vitro* growth of chick-embryo : Abst. in 3rd Ann. Meeting of Japanese Association for Animal Cell Technology, Kyoto, Japan, p.32, Dec. 11-13, invited paper.
17. Venkataraman, A. Babu, P.S.R. and Panda, T. 'Studies on physiological aspect of *in-vitro* development of chick- embryo : Abst. in 3rd JAACT'90, Kyoto, p.52, Japan.
18. Gowthaman, M.K., Rakshit, S.K. and Baradarajan, A. 'Studies on SCP production in tapered and cylindrical reactors CHISA Conf. Prague, Czechoslovakia, 1990.
19. Padmini, P, Rakshit, S.K. and Baradarajan, A. 'Kinetics of fat splitting of rice bran oil using lipase enzyme, *ibid.*

National

1. Rehi John, Neelakantan, N.R. and Subramanian, N. 'Chemorheology of Urethane Network Polymerization', National Conf. on Recent Trends in Polymer Science, Society of Polymer Scientists, Madras, March 1990.
2. Padmini, P, Rakshit, S.K. and Baradarajan, A. 'Studies on a Omt. recycle reactor for a lipase catalysed processing of rice bran oil' Indo-Swiss seminar on Biotech., Industrial Applications of Biotechnology, Feb. 27-28, Bangalore, 1991.
3. Padmavathi, G. and Remananda Rao, K. 'Some aspects on Hydrodynamics in a reversed flow jet Loop Reactor' Indian Chem. Engg. Congress (1990) ChemCONG 90. Dec. 1990 Varanasi, India.

4. Jyothi, B., Kirubakaran, C.J. and Krishnaiah, K, 'Experimental studies on Adsorption of dyes on to activated carbon in Fluidized Bed' IICChE Conference, BHU, Banaras, Dec. 1990.
5. Salim, M.A. and Balakrishnan, A R., 'Heat Pump Assisted Distillation', Indian Chemical Engineering Congress, Varanasi, Dec. 1990.
6. Swaminathan, T. 'Hazardous Waste Management, Seminar on Emerging Areas of Pollution Control [CEI (Br) ENTPCB] Sept. 1990, Madras.
7. Swaminathan, T. Membrane Recycle Bioreactor - Filtration Studies, Ind. Association For Environmental Management Annual Conf. Dec. 1990, Nagpur.
8. Sastry, C.A. and Murthy, D.V.S 'Effluent Treatment Plant upsets - causes and Remedies' Workshops on Dairy Pollution Management - NDOB Anand March 1990, p.5.1 - 5-9.
9. Srinivas, S., Kapaleeswar, M. and Murthy, D.V.S. 'Pollution Control through better stack designs' - 6th National Convention of Chemical Engineers, held at Nagpur, Oct. 1990.
10. Subba Rao, S. 'Design of an Experiment to Measure Thermal Diffusivities of Solids', presented at IICChE Conf. in Banaras, Dec. 18-21, 1990.
11. Sivasankaran, G, Chandraprasad, C. 'Electrochemical Corrosion Control - A Self Tuning Approach', Electro- Chemistry Students Meet, CSIR, Oct. 1990, Madras
12. Durgaprasada Rao, Ch. and Suryanarayana, Drying of Rice husk in fluidised beds, IICChE, Banaras, Dec.1990.
13. Ramanujam, T.K. 'Factors influencing siting on Tannery and Refinery Industries - A case study, Workshop on siting of Industries and Environmental Compatibility, Bangalore, 15-21, June 1990.
14. Gopakumar, B. and Ramanujam, T.K, 'Oxygen Transfer Studies in Rotating Biological Contractor', Indian Chem. Engg. Congress, ChemCon '90, Varanasi, Dec. 18-21, 1990.
15. Velan, M and Ramanujam, T.K. 'Mixing Characteristics of Down Flow Jet Loop Reactor,' Indian Chem. Engg. Congress, ChemCon.'90, Varanasi, Dec. 18-21, 1990.
16. Prakash, J. and Panda, T. 'Synthesis of bioenergy intermediates by bioacetification of condensed tannin - a bioengineering challenge: in Proc. 22nd National Seminar on Energy, Madras, Jan 1990.

17. Anjani Kumar, J. and Panda, T. 'Nature of protoplasting of T. reesei and S. cerevisiae : Invited Plenary Lecture Abst. in 30th Ann. Conf. of Association of Microbiologists Annamalai Univ., T N p. XVI.
18. Babu, F.S.R. and Panda, T. 'Effect of environmental shocks on the biosynthesis of penicillin amidase in E. Coli Containing penicillin amidase : in Abst. National Symp. cum-workshop on 'Immobilized Enzymes and Cells', R R L., Trivandrum (Aug. 6, 1990) p. 43.
19. Rakshit, S.K., Srinath Reddy, S. and Sesha Srinivas, M.Tech. Session of IICHe Annual Meeting, Dec. 1990, Varanasi 'Determination of optional profiles of two critical parameters in a nongrowth associated batch fermentation.

4.4 CHEMISTRY DEPARTMENT

1. Research & Development Activities

1. Advancement made in theory and application of valency concept. Development of a Local Density potential (Dr.M.S. Gopinathan)
2. Selective solvation of ions in mixed solvents, Organic electrochemistry and thermodynamic aspects of ion solvation (Dr. C.Kalidas)
3. Research in various aspects of Catalysis (Dr.J. Kuriacose)
4. Electrochemistry, electrochemical mechanism, photoelectro- chemical studies and electrochemisry in molten amides (Dr.R.Narayan)
5. Fundamental studies in Catalysis for the developmen of an FCC Catalyst R & D project sponsored by NRL, Development of Fluorobromocarbons, Research Consultancy project with SRF and Retainer consultancy w M/s. Shasurn Chemical P. Ltd. (Dr.C.N. Pillai)
6. Trace analysis and monitoring and control of environment pollution (Dr.T.V. Ramakrishna)
7. Organic mass spectrometry and synthetic organic chemistry (Dr.D.V. Ramana)
8. Oscillatory chemical reactions, mechanistic aspects of the uncatalysed and catalysed bromate oscillator (Dr.R.Ramaswamy)
9. Radiation catalysis and Radioisotope exchange studies (Dr.V.R. Satyanarayana Rao)
10. Substoichiometry (Dr. M.S. Subramanian)
11. Co-ordination chemistry of selenium and Tallurium (Dr.T.Subramanyam)
12. Inorg. heterocycles & Polymers, Nonmetal & Organometallic Chemistry (Dr. M.N. Sudheendra Rao)
13. Organometallics and homogenous catalysis (Dr.S.Vancheesan)
14. Catalytic properties of heteropolyacids and their salts- decomposition of propan-2-ol, use of superconductors as catalyst - decomposition of propan-2 ol (Dr.T.K.Varadarajan)

15. High Tech polymer synthesis (Dr.M. Srinivasan)
16. (i) Photocatalysis of CdS AND H₂S decomposition in CdS based FEC cells
(ii) Flashphotolysis studies - A new borate radical identified and studied (Dr.V.Ramakrishnan)
17. (i) Spin-flip ESR Transition and its relevance to lattice properties
(ii) Fluidity of erythrocyte membrane as a function of cholesterol intake has been investigated;
(iii) Calculation of exchange interactions indications in exchanged coupled dimers and the nature of variation of line intensities as a function of temperature in biradicals using Louville density matrix tehory (Dr.P.T. Manoharan)
18. (i) Fundamental reaction mechanism in the field of electrochemistr, (ii) Electro adsorption and Electrochemical Kinetics and (iii) Large scale electrolysis leading to synthesis of new organic compounds (Dr.C.S.Venkatachalam)
19. Development of complex oxide catalysts for oxidation reaction and development of intermetallics for storage of hydrogen (Dr.V.Srinivasan)
20. Coordination chemistry, Solid State Chemistry (Dr.G.Aravamudan)
21. Organometallic Chemistry (Dr. G.Sundararajan)

2. Improvement/Development of New Labs

Spray Dryer Buc Mini Model B-190

3. Sponsored Projects

Title	Agency value (in Lakhs)	Name of Faculty	Other co-ordinators
Fundamental studies on FCC catalysis	MRL (28)	C.N.Pillai	J.C.Kuriacose V.Srinivasan
Hydrogen storage alloy	CSIR (0.9)	C.N.Pillai	C.S.Swamy B.Viswanathan

Title	Agency value (in Lakhs)	Name of Faculty	Other co-ordinators
Prepn. & catalytic reaction studies of complex metal oxides	CSIR (0.9)	C.N.Pillai	C.S.Swamy V.Srinivasan
Reductive Alkylation over heterogeneous catalysts	CSIR (0.9)	C.N.Pillai	-
Synthesis of C-aryl glycosides	DST (6.28)	K.K.Balasu- ramanian	-
Mechanism & reaction of aromatic hydrocarbons.... to fuels	Indo-US (8.5)	-do-	-
Generation & reaction of organic molecules	Indo-US (24.01)	-do-	V.Ramakrishnan B.Viswanathan
End capping of iso cyanates for HTPB-TDI	ISRO-IIT(M) (6.25)	M.Srinivasan	-
Migration of chemical ingredients in rocket	ISRO-IIT(M) (4.53)	-do-	S.Krishnan Aerospace Dept.
Chemical composition of ground water - its effects on foundation & remedial measures	IC&SR-IIT(M) (5.0)	N.Balasubra- manian	K.Muthukrishnan Ocean Engg.Dept T.Ramanatha Iyer Civil Engg. Dept
Influence of ionising radiation on cracking of hydrocarbon absorbed on solid catalyst	CSIR (2.66)	V.R.S. Rao	-
Oxygen non-stoichiometry and copper oxidation state of $YBa_2Cu_3O_7$	DST (40)	C.S.Swamy	-
Microwave studies of some materials	ADA (1.0)	B.Viswanathan	-

Title	Agency value (in Lakhs)	Name of Faculty	Other co-ordinators
Photolytic polymerisation of alkynes with 1, derivatives of group VI metal carbonyls as catalysts.	DST (1.75)	G.Sundararajan	Young Scientist Scheme

4. Honours and Awards

Name of the Award	Name of the Faculty	Honour
1. FICCI	Prof. P.T.Manoharan chemical physics	For his eminent work in
2. FASc	Prof.K.K.Balasubramanian	For his research work in Organic Chemistry
3. Sri Hari OM Ashram prerit	Prof.B.Viswanathan catalysis	Research endowment award 1988 for photo-
4. Best research paper Prof.V.Ramakrishnan Prof.J.C,Kuriacose Student: Mr.Prince C.Korah	Guides: Prof.V.R.S. Rao	First prize - cash award of Rs.300/-
5. Besst research paper Student: Mr.N.Rajesh	Guide: Dr.M.S.Subramanian	Certificate of merit

5. Distinguished Visitors to Department from Abroad

Sl. No.	Name	Affiliation
1.	Prof. B.N. Figgis	Department of Physical and Inorganic Chemistry, Univ. of Western Australia
2.	Prof. R.L. Scott	Dept. of Chemistry, University of California.
3.	Dr. David N.A. Fox	University of Bath, UK.
4.	Dr. M.I. O. Rustamov	Institute of Petrochemical Processes, USSR.
5.	Dr. S.S.O. Vezirov	Institute of Petrochemical Processes, USSR.
6.	Dr. F.G. Berry	University of Birmingham, UK.
7.	Prof. J.H. Block	Fritz-Haber Inst. der Max Planck Gesellschaft Berlin, Germany.
8.	Prof. J. Weitkamp	University of Stuttgart, Germany.
9.	Dr. Ernst	University of Oldenburg, Germany.
10.	Prof. H. Knoezinger	University of Munchen, Germany.
11.	Prof. J. Gaute	Tech. Institute, Darnstadt, Germany.
12.	Prof. H. Karge	Fritz-Haber Inst. der Max Planck Gesellschaft Berlin, Germany.
13.	Mr. H. Baumann	Technical University, Stuttgart.
14.	Mr. R. Schurnacher	Technical University, Stuttgart.

6. Visit of Faculty Members to other Institutions

Name of the Faculty	Institution visited/purpose/duration
R. Narayan	Electrochemical Society, Washington DC, S.P.C.A. in St. Paul, USA - attended the meetings/6.5.91-31.5.91
P.T. Manoharan	Univ. of Western Australia, Dept. of Physical and Inorganic Chemistry, Nedlands perth - visiting professor - Sebatical leave

Name of the Faculty	Institution visited/purpose/duration
M.S.Gopinathan	Institute for physical chemistry Technische Hochschule Darmstadt Germany - AVH Foundation Fellowship - 6 months
Ch. KalidasMax plank	Institute, Gottingen Germany - AVH Foundation Fellowship - Sebatlcal leave
M.N.S. Rao	University of Calgary Canada - visiting teaching assignment - sebatlcal leave
V.R.S. Rao	KFA Julich, Technische Hochschule Aachen Germany - Exchange programme of GTZ - 2 weeks
S. Vancheesan	University of Bielefeld, Technische Hochschule Aachen - Exchange programme of GTZ - 2 weeks
R.P. Viswanath	Max plank Institute, Berlin, Univ. Dusseldorf Germany - Exchange programme of GTZ - 2 weeks
T.K.Varadarajan	University of Karlsruhe Germany - DAAD short term reinvitation programme - 3 months
C.N. Pillai	University of Munich, Karlsruhe July 6-10 and July 21-25, 1989.
C.S. Swamy	Fritz Haber Inst. Berlin, Institute of Physical chemistry, Univ. of Erlangen, University of Karlsruhe, July 1989
D.V. Ramana	Univ. Bielefeld, DAAD short term reinvitation programme
M. Srinivasan	On invitation as Head R & D Sri Ram Fibres, Manali, Madras from 1.2.90.

7. Seminar/Symposia Organised

Department	Seminar / Symposia organised
Chemistry	(i) 15th Annual Symposium (ii) X National Symposium on Catalysis (iii) IV Indo-Soviet Seminar on Catalysis
RSIC & Academic of Science, Bangalore	(iv) Discussion meeting on Trends in Theoretical chemistry

8. Participation of Faculty in Conference/Seminars/Symposia

Name of the faculty	Name of Conf./Seminar/Symposia, Type of participation, venue and dates
V. Ramakrishnan J.C. Kuriacose J.Rajaram C.N. Pillai C.S. Swamy B. Viswanathan R.P.Viswanath V.R.S. Rao S. Vancheesan T.K. Varadarajan	X National Symposium on Catalysis and IV Indo-Soviet seminar on Catalysis. December 1990 IIT Madras
S. Vancheesan	VII International Conference on homogeneous catalysis, poster presentation 3.9.90 - 8.9.90
V.R.S. Rao	V International Conference on 'Scientific bases for the preparation of catalysts' at Louvain Belgium, Sept. 3-6. 1990/
R.P. Viswanath	International conference on photochemical conversion and storage of solar energy at Palermo, Italy, Poster presentation, July 15-20, 1990.

Name of the faculty	Name of Conf./Seminar/Symposia, Type of participation, venue and dates
C.N. Pillai	VII International Zeolite conference July 10-14, 1989, Amsterdam. European conference on Catalysis (SCHWAB) Berlin, July 16-21, 1989.
C.S. Swamy	European conference on catalysis (SCHWAB) Berlin, July 16-21, 1989.
R. Sankarasubramanian	Synthetic approach towards K.K.Balasubramanian Robustadiol, 17th IUPAC International Symposium on the chemistry of Natural products, New Delhi, feb.4-9, 1990.
N.G. Ramesh K.K.Balasubramanian	A potential novel approach to C-Glycosides 17th IUPAC International symposium on the chemistry of Natural products, New Delhi Feb. 4-9, 1990.
K.C.Santhosh K.K.Balasubramanian	Investigation on arylation using Bismuth reagents 17th IUPAC International symposium on the chemistry of Natural products. New Delhi. Feb. 4-9, 1990.
C.Booma K.K.Balasubramanian	New approaches to C-Arly glycosides 17th IUPAC International symposium on the chemistry of Natural products. New Delhi. Feb. 4-9, 1990.
R.Sankarasubramanian K.K.Balasubramanian	Investigations on the Mitsunobu reactions in bicyclo (2.2.1) systems.National symposium on Newer perspectives in Synthetic organic chemistry. Madurai. March 14-16,1990.
S.Dhanalakshmi K.K.Balasubramanian C.S.Venkatachala	Electrochemical oxidation of some substituted phenl propargyl ethers at a platinum electrode National Symposium on Newer perspectives in in Synthetic organic cheistry. Madurai. March 14-16, 1990.

Name of the faculty	Name of Conf./Seminar/Symposia, Type of participation, venue and dates
S.Kumaresan K.K.Balasubramanian	Thermal Claisen rearrangement of Aryl propargyl ethers National symposium on Newer perspective in Synthetic Organic chemistry. Madurai. March 14-16, 1990.
T.Sumathi K.K.Balasubramanian	O-Alkenylomylbenzophenones-Potential precursors for 2-Alkenyl- 3-phenylbenzofurans National Symposium on Newer perspectives in synthetic organic chemistry. Madurai.
T.Balasubramanian K.K.Balasubramanian	Thermal and catalysed Claisen rearrangement of Aryl allenic ethers and radical cyclisation of O-bromophenyl allenic ethers and Bis(o-bromophenoxy)-2-butyne Sixth National Symposium on recent advances in organic chemistry
T.Balasubramanian K.K.Balasubramanian	A novel synthesis of 2-(O-hydroxy-phenyl)-1,3-butadienes, 4-methyl-2H-1-benzopyran, VIII IUPAC Conference on organic synthesis (International Conference), Finland, July 23-27, 1990.
N.Bhuvanewari K.K.Balasubramanian C.S.Venkatachalammeet,	Electroreduction of O-halogeno- anphenoxy-methyl oxirane, SAEST Students Madras, Oc. 29, 1990.
R.Saraswathi R.Narayan	Electrochemical Society, Bangalore 1990.
K.Suba M.R.Udupa	X National symposium on catalysis and IV Indo-Soviet Seminar on catalysis, IIT, Madras, 18-21 Dec. 1990.
S.Ganesamoorthy	A comparative study of metathetical polymerisation of alkynes under thermal and electroanalytical conditions, X National symposium on catalysis and IV Indo-Soviet Seminar on catalysis, IIT, Madras, 18-21 Dec. 1990.

Name of the faculty	Name of Conf./Seminar/Symposia, Type of participation, venue and dates
S.Sampath R.Narayan	Electrochemical reduction of O ₂ at the G1 Electrode, 178th meeting Electrochemical Society Seattle, USA, October, 1990.
S.Sampath R.Narayan	PEC reduction of quinones at the MoSe ₂ electrode (poster), 8th International Conference on Photochemical conversion and storage of solar energy-palermo, May 1990.
R. Narayan	International conference on Bio-electrochemistry, Bombay, TIFR 1990.
K.Suba M.R.Udupa Y.Syamasundara Rao	Solid state synthesis of double molybdates of K and Ln and their conductivity behaviour
N.Rajesh M.S. Subramanain	Detn. of trace amounts of indium by radiochemical displacement, International symposium on Radiochemistry and Radiation Chemistry, BARC Bombay, Feb. 4-7, 1991.
T.S.Ramanatha Iyer V.Raman A.Raja N.Balasubramanian	Influence of sulphate on the complex-ability of lime treated bentonites, Indo Geotechnical Society, Bombay, Dec. 20-23, 1990.
K.Lalitha N.Vasanthy	Selenium mediated regulations, International conference on oxidative damage pasadena, California, USA, Nov.1990.
Mary Babu B.Uma K.Lalitha	Anerobic digesion of tannery washes Symposium on Recent Developments in Leather Technology, Madras, Jan. 1990
H.Maheswaran G.Sundararajan R.Ramaswamy	Electrocatalytic polymerisation of alkynes with metal carbonyl derivatives as catalysis, National Symposium on Synthetic organic Chemistry, Madurai Kamaraj Univ., March 14-16, 1990.

Name of the faculty	Name of Conf./Seminar/Symposia, Type of participation, venue and dates
H.Maheswaran G.Sundararajan	Mechanistic studies in electro-alytic polymerisation, National R.Ramaswamy Symposium on Synthetic Organic Chemistry, Bharathiar Univ., Coimbatore, July 9-10, 1990.

9. Professional Activities

R. Narayana Vice President	Electrochemical Society 90-91
Editor	JECS (India)
R.P. Viswanath	Treasurer, Catalysis Society of India December, 1990
C.S. Swamy	Member - The Council of the International Congress in Catalysis 1988-92.
C.N.Pillai	President of Catalysis Society of India 1991-92.

10. Books and Monographs

R. Narayan	'Reference Electrodes' part of the book 'Ion selective Electrodes and Electro-chemical Instrumentation' World Pub., 1990.
B.Viswanathan C.N.Pilla	Recent Developments in Catalysis i Narora, Delhi, 1990.

11. Research Publications

1. G.Carolig, J.Rajaram and J.C.Kuriacose, Selective oxidation of Unsaturated alcohols and primary alcohols by RuCl₃/N- methyl morpholine N-oxide (NMO) system kinetic study, J.Mol. Catal., Vol.58(2), 235, 1990.

2. G.Caroling, J.Rajaram and J.C.Kuriacose, $\text{Cis-RuCl}_2 (\text{DMSO})_4$ - Catalysed oxidation of sulphides by N-methylmorpholine N- oxide (NMO), Int. J. Kinet (in press).
3. S.Padmaja, J.Rajaram, V.Ramakrishnan and J.C.Kuriacose, Reactions of the Borate radicals p-substituted benzoic acids (Photo Kolbe reaction), J.Photochem. & Photobiolog (in press).
4. I.Bernard Rufus, V.Ramakrishnan, B.Viswanathan and J.C.Kuriacose, Rh and RhS coated Cds as a photo catalyst for photochemical decomposition of aqueous sulphide, Langmuir, Vol.6, p.565, 1990.
5. A. Selvanathan, B.Viswanathan and J.C.Kuriacose, Mechanism of methanol synthesis on Cu/Zno/Cr₂O₃ catalyst, Ind.J.Chem. Vol.29A, p.522, 1990.
6. P.Selvam, B.Viswanathan and V.Srinivasan, The influence of atomospheric CO₂ on the surface properties of Mg₂ NiH₄ and a comparison with some hydrogen storage alloys, Vol.158, p.11, 1990.
7. P.Selvam, B.Viswanathan and V.Srinivasan, A note on the formation of surface carbides, J.Electron Spectro.Rel. Phenomen., Vol.50, p.277, 1990.
8. P.Selvam, B.Viswanathan and V.Srinivasan, Iron induced carbide formation on FeTi, J.Less Common met., V.161, 77, 1990.
9. P.Selvam, B.Viswanathan and V.Srinivasan, Surface properties and their consequences on the hydrogen
10. B.Viswanathan, M.J.Omana and T.K.Varadarajan, Mechanism of hydrocarbon formation from alcohols on heteropoly compounds, Ind.J.Chem. (in press).
11. B.Viswanathan, N.S.Raman and T.K.Varadarajan, Conversion of isopropyl alcohol on Y-Ba-CU-O system, Ind.J.Chem. (in press).
12. T.Lakshmi and B.Viswanathan, Cluster model for titania supported iron in SMSI state, Ind.J.Chem. (in press).
13. B.Viswanathan, EHMO calculation on the anionic units of simulated for heteropoly acids, Ind.J.Chem. (in press).
14. B.Viswanathan, Co oxidation and No reducion on perovskite oxide.
15. R.B.C.Pillai, K.K.Bhattacharyya and C.N.Pillai, Reductive alkylation of aromatic amines over copper chromite; Deactivation of Catalyst, Ind.J.Chem. (in press).

16. J.Mathew and V.Mahadevan, Transition metal ions supported hydrogels as hydrogenation catalyst, *J.Mole. Cat.*, V.60, p.189, 1990.
17. M.P.Sridharkumar, B.Viswanathan, C.S.Swamy and V.Srinivasan, Investigation on the oxidation behaviour of FeTi alloy, *Mater. Chem.Phys.*, V.24, p.495, 1990.
18. U.Kameswari, J.Christopher and C.S.Swamy, Studies on the catalytic decomposition of N_2O over the solid solution $La_2Cu_xZn_{1-x}O_4$, *React. Kinet. Catal. Lett.*, V.41, p.381, 1990.
19. J.Christopher, M.P.Sridharkumar and C.S. Swamy, Thermal studies on the high temperature oxidation behaviour of Nickel containing ABS type intermetallics, *Thermochim.Acta.* V.161, p.207, 1990.
20. J.Christopher, I.A.P.S.Murthy and C.S.Swamy, High temperature oxidation behaviour of Mg containing intermetallic by thermal analysis, *Thermochim. acta.* (in press).
21. J.Christopher and C.S. Swamy, Catalytic decomposition of N_2O on ternary oxides containing copper in different valence states, *J.Mol.Cat.* (in press).
24. V.Padmasubashini, I.A.P.S.Murthy, M.P.Sridharkumar and C.S.Swamy, Studies on the hydrogen storage alloy, Mg_2Ni ; Catalytic activity and XPS, *Ind.J.Chem.* (in press).
25. B.Viswanathan, U.D.Marr and R.P.Viswanathan, Photocatalytic dehydrogenation of methanol on Pt/TiO_2 , *Ind.J.Chem.* (in press).
26. M.O.Alias and V.Srinivasan, N-Butylamine and 1-butene adsorption on molybdena and tungsta hydrodesulfurisation catalysts promoted by Ni and Co., *Ind.J.Chem.*, V.29a, p.515, 1990.
27. M.O.Alias, V.Srinivasan, Surface acidity in promoted molybdena hydrodesulfurisation catalyst, *Proc.Ind.Acad.Sci.*, V.102, p.117, 1990.
28. M.O.Alias, V.Srinivasan, Adsorption and reactivity of thiophene on promoted molybdena and tungsta systems, *Ibid.*, V.29a, p.624, 1990.
29. M.O.Alias and V.Srinivasan, Magnetic properties of nickel Molybdena Hydrodesulfurisation catalysts, *Ind.J.Chem.*, V.29A, 104, 1990.
30. R.Sunooararajan and V.Srinivasan, Studies on the Catalytic decomposition of N_2O on $M_xCo_{3-x}O_4$, *Appl.Catal.* (in press)

31. G.Caroling, J.Rajaram and J.Kuriacose, Cis-RuCl₂(DMSO)₄- catalysed oxidations of sulphides by N-Methylmorpholine N- oxide (NMO), Int.J.Chem.Kinet. 22, 1137-51, 1990.
32. S.Padmaja, J.Rajaram, V.Ramakrishnan and J.C.Kuriacose, Reactions of borate radicals with p-substituted benzoic acids (photo Kolbe reaction), J.Photochem & Photobiology, 52, 451, 1990.
33. P.Selvam, B.Viswanathan, C.S.Swamy and V.Srinivasan, Surface properties and their consequences on the hydrogen sorption characteristics of certain metals, J.Less common metals, V.163, p.89-108, 1990.
34. B.Viswanathan, M.J. Omana and T.K.Varadarajan, Mechanism of hydrocarbon formation from alcohols on Heteropoly compounds, Ind.J.Tech. V.28, p.571-579, 1990.
35. B.Viswanathan, N.S.Raman and T.K.Varadarajan, Conversion of Isopropyl alcohol on Y-Ba-Cu-O system, Ind.J.Chem. V.29A, p.1135-1137, 1990.
36. T.Lakshmi and B.Viswanathan, Cluster model of titania supported iron in SMSI state, Ind.J.Chem., V.29A, p.1077- 1079, 1990.
37. R.B.C.Pillai, K.K.Bhattacharya and C.N.Pillai, Reductive alkylation of aromatic amines over copper chromite; Deactivation of catalyst, Ind.J.Chem. V.29A, p.1115-1117, 1990.
38. V.Padmasubashini, I.A.P.S.Murthy, M.P.Sridharkumar and C.S.Swamy, Studies on hydrogen storage alloy Mg₂Ni; Catalytic activity and XPS, Ind.J.Chem.,V.29A, p.1101-1105, 1990.
39. J.Christopher and C.S.Swamy, Catalytic activity of La₂CuO₄, method of preparation and XPS study, V.29A, p.1106-1110, 1990.
40. B.Viswanathan, U.D.Mary and R.P.Viswanathan, Photocatalytic dehydrogenation of methanol on Pt/tiO₂, V.29A, p.1138-1139, 1990.
41. S.Padmaja, J.Rajaram and V.Ramakrishnan, Substituent effect on the rates of one-electron oxidation of anilines by borate radical - a flash photolysis study, V.29A, p.422-424; 1990.
42. B.Viswanathan, N.S.Raman and T.K.Varadarajan, Analysis of Cu³⁺ in 123 oxide superconductor by cyclic voltametry, Bull.Electro-Chem, V.6, p.785, 1990.
43. B.Viswanatha, Extended Huckel MO calculations on anionic units simulated for heteropoly acid catalysts, Ind.J.Chem., V.29A, p.509-511, 1990.

44. P.Selvam, B.Viswanathan and V.Srinivasan, The influence of atmospheric CO₂ on the surface properties of Mg₂NiH₄ and a comparison with hydrogen storage alloys, *J.Less common metals*, V.158, p.L1-L7, 1990.
45. M.Krishnarathnam, K.R.Sudhakar Rao, B.Viswanathan and R.Ramaswamy, Effect of gamma irradiation on the catalysed borate oscillator, *J.Radio and Nuclear Chem.*, V.140, p.247- 253, 1990.
46. M.Krishnarathnam, B.Viswanathan and R.Ramaswamy, Perturbation in borate oscillators by gamma radiation, *Czech. Chem.Comm.*, V.55, p.668-673, 1990.
47. J.Christopher and C.S.Swamy, Catalytic decomposition of N₂O on Ternary oxides containing copper in different valence states, *J.Molecular Catalysis*, V.62, p.69-78, 1990.
48. J.Christopher, I.A.P.S.Murthy and C.S.Swamy, Investigation of the oxidation behaviours of Mg containing intermetallics by thermal analysis, *Thermochimica Acta*, V.164, p.191-198, 1990.
49. J.Christopher and C.S.Swamy, Surface characterisation and catalytic activity of Ln₂Ti₂O₇ (Ln = Y, Sm, Gd, Td), *J.Materials Science* (in press).
50. J.Christopher and C.S.Swamy, Studies on the catalytic decomposition of N₂O on LNSrFeO₄, *J.Molecular Catalysis*, (in press).
51. U.Kameshwari, J.Christopher and C.S.Swamy, Catalytic decomposition of N₂O and La₂Cu_{0.5}M_{0.5}O₄ (M = Co, Ni, Cu and Zn), *React.Kinet.Catal, Litt.*, (in press).
52. R. Sundarajan and V.Srinivasan, Studies on catalytic decomposition of N₂O on M_xCu_{3-x}O₄, *Appl.Catal.*, (in press).
53. V.R.Parameswaran and S.Vancheesan, Polystyrene anchored Rh(I) bidentate ligand complexes as catalysts for hydrogenation, *Proc.Ind.Acad.Sci. (Chem. Sci.)* (in press).
54. V.R.Parameswarahn, S.Vancheesan, Hydrogenation of olefinic substrates in aqueous and aqueous organic biphasic systems using Rh complex of sulphonated triphenyl phosphine, *Chem. Sci.*, (in press).
55. Y.V.S.Narayana Murthy and C.N.Pillai, Diels-Alder reactions catalysed by Zeolites. *Synthetic Communication* (in press).

56. S.Subramanian and C.S.Swamy, Oxygenation of Y-Ba-Cu-O using nitrous oxide gas, *Jl. of Materials Science Letters.*, (n press).
57. R.Shanti, K.S.Nagaraja and M.R.Udupa, Thermodynamic stability of Ternary complexes of chromium (III) with amino acids, *Ind.J.Chem.*, p.189-190, 1990.
58. R.Vijayanthimala and M.R.Udupa, Complexes of Palladium (II), *Inorg.Chim. Acta*, V.175, p.160-170, 1990.
59. K.Palanively and T.V.Ramakrishna, Separation and spectro- photometric Determination of arsenic as ternary complex with molubdate and rohodamine-B, *Ind.J.Technol.*, V.28, p.67-70, 1990.
60. P.Selvapathy,R.Pitchai and T.V.Ramakrishna, A rapid spectro- photometric method for the detn. of CO in ambient air, *Talanta*, V.37, p.539-44, 1990.
61. I.Ibnu Saud, E.J.P.Malar and N.Sundaram, Synthesis of stable Aryl free 1,3 diazabutadiene and its Diel-Alder reactions, *Tetrahedron*,V.31, p.735-7, 1990.
62. S.Aravamudan, C.Kalidas, C.S.Venkatachalam, Electrochemical behaviour of 2-2' and 3-3' dinitrobenzidine in N,N-dimethyl formamide, *Ind.J.Chem.*, V.29A, p.431-434, 1990.
63. R.Ramaswamy and P.V. Lalitha, Potentiometric behaviour of bromine and its application in the trace detn. of certain substances, *Bull. Elect-chem.*, V.6(3), p.339, 1990.
64. N.Rajesh and M.S.Subramanian, Detn. of trace amounts of palladium by radiochemical displacement, *J.Radioanal Nucl.Chem. Letters*, V.6(6), p.421-6, 1990.
65. N.Balasubramanian and B.S.M.Kumar, Extraction-spectro photo- metric detn. of hydrogen sulphide, *Analyst*, V.115, p.859-63, 1990.
66. Shanthi Krishnan and K.Lalitha, Physiology and metabolic features of a novel methogenic isolate, *Ed.J.P.Belaich*, NY, p.403-5, 1990.
67. Shanthi Krishnan and K.Lalitha, Interactive metabolic regulation during biomethanation of L-Leuco cephal, *Applied Biochem and Bio Tech.*, V.26, p.73-85, 1990.

4.5 CIVIL ENGINEERING DEPARTMENT

1. New Courses Introduced

Sl. No.	Course No.	Title	Structure	Faculty
1.	CE 791	Advanced Finite Element Analysis (Mech. Engg)	3 0 0 3	Dr C S Krishnamoorthy Dr R Krishnakumar
2.	CE 649 Structures	Reinforced soil	M.Tech Elective 3 0 0 3	Dr T S Ramanatha Ayyar & Dr N R Krishna Swamy
3.	CE 660	Geotechnics of Coastal Structures	"	Dr S R Gandhi / Dr A Boominathan.

2. New Facilities added and major equipment procured

- 100 tonne universal testing machine.
- Electronic theodolite
- Lux and Luminance Meters.
- Acoustic equipment.
- NEXUS WORKSTATION 3500 (2 Nos. cost around Rs 9 Lakhs)
- ANSYS - Package Program installed.
- RAPS Programs for Pre processing Finite Element Results installed.
- Engineering Work Station.
- Dot Matrix Printer, A3 size Pen Plotter and Personal Copier.
- Upgradation to Laser Printer 512 K to 2.512 MB
- Logitech Mouse
- DAC System with IEEE
- LVDT Module imported for the above.
- WIPRO dot Matrix Printer 24 Pin LQ 1050

3. Sponsored/Consultancy Projects

Title/Funding Agency	Amount	Co-ordinator(s)
1. 300 slot T.V tower at Chohtan hills, Rajasthan. (Larsen & Toubro)	25,000	Dr V Kalyana Raman
2. Soil-Structure Interaction effects on Design of Circular Raft Foundations. (IRDF)	Result awaited	Dr. A.Meher Prasad Dr. S.R.Gandhi
3. Advanced Research on Dynamics and fatigue behaviour of structural and mechanical systems. (MHRD)		Dr A Meher Prasad.
4. Knowledge - systems for civil engineering design. (National Science Foundation, Washington, D.C.)	19,47,000	Prof C S Krishnamoorthy Prof V Kalyanaraman Sri S Rajeev Prof N Rajagopalan
5. Research Cell for structures for Nuclear Power Reactor Technology (MHRD, New Delhi)	15 Lakhs	Prof V Paramasivam Prof H Achyutha
6. Stress Analysis of TEE junction in PHT system of Nuclear Reactor.(BRNS, Bombay)	4 Lakhs	"
7. Indo-German Project on Finite Element on finite element Analysis of Reactor Structure. (International Buro, Juelich, Germany & MHED)	260,000 DM + 160,000 Rs	" "

Title/Funding Agency	Amount	Co-ordinator(s)
8. Mathematical modelling of the Flow in Transportation Network System (IC&SR) (IRDF) and IIT, Madras	Approx 1 Lakh	Dr S N Majhi Dr S B Pattnaik Dr T Panda.
9. Chemical Composition of ground water, its effects on foundation & remedial measures (ICSR/IRDF)	Staff salary only	Dr K Muthukrishnaiah Dr T S Ramanatha Ayyar Dr N Balasubramanian Dr P K Aravindan.
10. Expert systems for water resources Management (Department of Science and Technology, Govt.of India)	4.67 Lakhs	Dr H Raman Dr S Mohan
11. Hydraulic Routing of floods towards flood management (Department of Science and Technology, Govt.of India)	4.57 Lakhs	Dr B S Thandaveswara Dr H Suresh Rao
12. Water Resources Project Management (Min. of Human Resources Development)	7.5 Lakhs	Dr H Raman Dr S Mohan
13. Flood simulation and Multi-objective Multireservoir operation (CBI & P)	7.96 Lakhs	Dr H Raman Dr K Elango Dr S Mohan
14. Type design of various capacity of water tanks (10,000 Lts to 8,00,000 Lts) (TWAD)	1.25Lakhs	Dr N Rajagopalan
15. Checking of the of the design of Cantilever Bridge across Ganges in Varanasi. (Hindustan Construction Co. Ltd)	25,000	"

Title/Funding Agency	Amount	Co-ordinator(s)
16. Checking of the Intake Tower at M.P (Viger Coconcrete Consultants)	15,000	"
17. Stress Analysis of Tracks (C.V.R.D.E., Avadi)	1,70,000	Dr C S Krishnamoorthy
18. Design of Ammonia Storage tank & foundation of Prill towers. (Bindal Agro)	Approx. 2 Lakhs.	Dr V S Raju Dr P K Aravindan
19. Vibrations at L & T House Bombay (L & T)	30,000 +	Dr V S Raju Dr P K Aravindan
20. Design of oil Jetty @ Kandla. (Kandla Port Trust)		Dr V S Raju Dr P K Aravindan
21. Analysis of Layered Fibre Composite stiffened Plates. (ARDB)	3.45 Lakhs	Dr V Kalyana Raman
22. Expert System based computer aided engineering of steel structures (DST)	16.37 Lakhs	"
23. Structural design and drawings for foundation and superstructure of tenemental blocks (Tamilnadu Slum Clearance Board)	59,500	Dr T P Ganesan Mr R Ambalavanan
24. Advice on execution of remedial measures for the corrosion affected Ammonium chloride plant building. (SPIC)	10,000	Dr T P Ganesan Dr P Kalyanasundaram

Title/Funding Agency	Amount	Co-ordinator(s)
25. Quality control in civil works of ammonia storage facility at Tuticorin. (SPIC)	20,000	Dr P Kalyanasundaram
26. Supply of technical know-how on hollow block system including supply of a demonstration machine (M/S Best Blue Metal Ltd.) (M/S Rajeswari Enterprises)	21,000	-do-
27. Concrete mix design and quality control (TNEB, Madras)	40,000	Dr T P Ganesan Dr P Kalyanasundaram Mr R Ambalavanan
28. Performance evaluation of 'TORKARI' reinforcement bars. (M/S Subekshsa Steels)	15,000	Dr P Kalyanasundaram Dr T P Ganesan Mr R Ambalavanan
29. Investigation and advice on plywood beams. (BIS, Bangalore)	30,000	Dr P Kalyanasundaram Mr R Ambalavanan
30. Check structural designs (Tamilnadu Pollution Control)	75,000	Dr T P Ganesan
31. Investigation of fire affected multi-storeyed building (National Minerals Corpn, Ltd. Hyderabad)	15,000	Dr T P Ganesan Dr P Kalyanasundaram Mr R Ambalavanan
32. Investigation on factory made door shutters & advice (Enkay Timber Indus.Ltd.)	20,000	Dr M S Mathews Dr P Kalyanasundaram Mr R Ambalavanan.
33. Soil investigation for Hospital Complex and Advice on Foundations (Siva ENT Hospital)	4,250	Dr Nainan P Kurian

Title/Funding Agency	Amount	Co-ordinator(s)
34. Specialised tests on coal rock specimens, interpretation & advice on mine prospecting based on the results (The Singareni Collieries Co.)	65,000	"
35. Soil Investigation and advice on evaluation of results and foundation. (Govt. and Private Agencies)	6,19,520	"
36. Specialised tests on coal rock specimens Interpretation and advice on mine prospecting based on the results (Govt. & Private Agencies)	70,200	"
37. Retainer consultancy (Kerala Electricity Board)	6,000	Dr T S Ramanatha Iyer
38. Foundation design for a fertilizer (Sindal Agro)	3,00,000	Dr V S Raju Dr S R Gandhi
39. Design of ash pond for Rayalseems Thermal Power Plant (APSEB, Hyderabad)	1,50,000	"
40. Design of foundations for tenemental blocks (Tamilnadu Slum Clearance Board)	28,000	Dr A Boominathan Mr R Ambalavanan
41. Calibration of water current meters including analysis of data and curve fitting (Government/Public/Private sectors)	3.7 Lakhs	Dr H Raman Dr K Elango

4. Honours & Awards

- Dr A Meherprasad
Norman Award (ASCE), received on Nov. 1990.
- Dr C S Krishnamoorthy
Included in the Directory of distinguished Computer Professionals of India, 1991, published by the Institute of Chartered Computer Professionals of India, Secunderabad.
- Dr V R Rengaraju & Dr V Thamizh Arasan
'Brij Mohan Lal Memorial' prize for a paper published in the JI. of Institution of Engrs. (I) awarded by Institution of Engrs. (I) in Dec 1990.
- Dr H Raman, Dr S Mohan and Mr Santosh G Thampi
Best Paper Award given by Indian Water works Association, Bombay.
- Mr L Srinivasa Reddy (Research Scholar)
Second Prize in National Essay Competition by Indian Water Works Association.

5. Distinguished Visitors to the Department

Visitor's Name & Purpose of visit	Affiliation
1) Prof Stevan J Fenves (To hold discussions on the Indo-US Cooperative Science Program on 'Knowledge-Based Expert	Sun Company University Professor Dept. of Civil Engineering Carnegie-Mellon Univ., Pittsburgh, Pennsylvania 15213 - 3890. System for Civil Engg. Design)
2) Dr Ing J Altes (To take part in workshop on computational mechanics)	Nuclear Research Centre, Juelich, Germany.
3) D Koschmieder (For collaborative research work unswe Indi-German Research)	- do -
4) Dr R K Dhir The University of Dundee, Scotland.	Concrete Technology Unit,

Visitor's Name & Purpose of visit	Affiliation
5) Dr B P Sinha	University of Edinburgh, U.K
6) Prof Abang Abdullah Abang Ali Malaysia.	University Pertanian Malaysia,
7) Mrs Lilia Robles Austriaco Bangkok, Thailand.	Asian Institute of Technology,
8) Dr M Sivakumar Australia. (Guest Lecture)	University of Wollongong,
9) Dr Lynn E Johnson USA (Guest Lecture)	University of Colorado at Denver,

6. Visit of Faculty Members to other Institutions

Name of Faculty & Purpose of visit	Institution visited & Duration
Prof H Achyutha (For collaborative research work under Indo-German Project.)	Nuclear Research Centre, Juelich, Germany - 1 year.
Dr A Ramachandriah	Visiting the Bartlett School of Architecture and Planning, London, from Jan to July 1991.
Prof T S Ramanatha Ayyar (Ph.D. Evaluation)	Indian Institute of Science, Bangalore.
Dr K Srinivasan (Post Doctoral Fellowship)	Technical University Aachen, Germany, 1 year
Prof K Elango (IIT-REC Network Scheme)	Regional Engineering College, Warangal. 3 days
Prof H Suresh Rao (IIT-REC Network Scheme)	"

Name of Faculty & Purpose of visit	Institution visited & Duration
Dr B S Thandaveswara (IIT-REC Network Scheme)	Regional Engineering College Warrangal. 3 days.
Dr K Elango (To deliver a special lecture)	Irrigation Management Trg. Institute, Truchi, 2 days

7. Seminars/Symposium/Conferences/Short-term courses Organised.

Topic	Date
STC Structures for Nuclear Power Plants. Work Shop on Computer Graphics in Computational Mechanics.	
US-India Binational Workshop on Advances in Construction Materials, Techniques and Management.	10-14 dec 90
Analysis and design of foundations for static and Dynamic Loads	Nov 1991
Co-Ordinators : Dr N R Krishnaswamy & Dr T S Ramanatha Ayyar	
Short term course on 'Analysis, Computation and Management of Floods'	3 to 16/12 90
National Workshop on 'Water Resources Project Management'	18 to 20/6/90

8. Participation in Seminars/Symposium/Conferences Etc.

Name of the Faculty Nature of Participation.	Particulars of Symposium, Name, Date and Venue
Prof C S Krishnamoorthy (Chairman, VIII Session on 'Computer Integrated Design)	Indo-US Binational Workshop on Advances in Construction Material, Management and Techniques', 10th to 14th December 1990, funded by NSF, USA.
Dr A Meher Prasad. (Lecture on Soil-Structure Interaction effects on Nuclear Containment Building.)	Short term course on Structures for Nuclear Power Plants June 18 - 30, 90, IIT Madras.
Dr R Radhakrishnan. (Presented a paper.)	International conference on Steel & Aluminium Structures, Singapore 22 - 24 May 1991.
Prof V Paramasivam (Presented a Paper.)	Intl.Conference on Advances in Structural Testing, Analysis and Design - 29th July - 3rd Aug 90, Bangalore.
Dr S B Pattnaik (Presented a paper)	Annual Paper Meeting Production Engg. Division Institution of Engrs(I) Sep 90, Bombay.
Dr V Thamizh Arasan (Presented a paper)	Second National Conference on Transportation System Studies, IIT, Delhi, Dec 90.
Prof Nainan P Kurian	International conference on structural (Presented paper and chaired Engg. and computation Beijing, China, technical session.) April 90
Prof T S Ramanatha Ayyar	IGC - 90, Bombay 20th to 22nd Dec 90

Name of the Faculty Nature of Participation.	Particulars of Symposium, Name, Date and Venue
Prof. T.S. Ramanatha Iyer	ACMATAM, Madras 10th Dec - 14th Dec 90
Dr S R Gandhi (Presented one technical paper & one invited paper.)	Indian Geotechnical Conference-90 VJT1, Bombay Dec 20-22 1990
Prof K Elango (Paper Presentation.)	National workshop on water resources, Project Management, June 18-20, 1990. Madras.
(Invited Speaker)	Regional Seminar on Hydrological Problems relating to tanks, Oct 4-5 1990, Madras.
(Paper presentation)	National Workshop on percolation Ponds. Dec 12- 14, 1990.
Dr S Mohan	'Sprinkler and drip Irrigation system' (Delegate) Centre for water resources, Anna Univ., Madras. July 16 - 26, 1990.

9. Research Publications

1. G. Narayanan and C S Krishnamoorthy, 'An Investigation of Geometric Non-Linear Formulations for 3D Beam Elements', Intl. Jl. of Non-Linear Mechanics, Vol. 25, No. 6, Pergamon Press, England, 1990, pp. 643 - 662.
2. C.S. Krishnamoorthy, ' Computer Integrated Design and Construction and Role of Knowledge-Based Expert Systems', Proc. of the US-India Binational workshop on Advances in Construction Materials, Management and Techniques, 10th to 14th December 1990, IIT, Madras.
3. T Zacharia Verghese and C.S.Krishnamoorthy, 'Inelastic Behaviour of Concrete Framed Structures', The Institution of Engineers (India), Vol. 20, May 1990, pp. 1-7.

4. T Zacharia Verghese and C.S.Krishnamoorthy, 'Computer-Aided Inelastic Analysis and Design of Reinforced Concrete Framed Structures', The Institution of Engineers (India), Vol. 71, September 1990, pp. 24-31.
5. Status reports on Indo-US Cooperative Science Program on 'Knowledge-Based Expert Systems for Civil Engineering Design', submitted to National Science Foundation, USA, January, 1991.
 - a. S.Suresh, S. Rajeev, C.S.Krishnamoorthy and S.J Fenves, 'State-of-the-Art Report on Knowledge-Based Expert System Development Shells'. Report No. CE-91-01.
 - b. Shaikh Karimulla Raja, S. Rajeev and C.S.Krishnamoorthy, 'Data Structure for Rules and Frames-Part 1 Rules', Report No.CE-91-02 (1)
 - c. Shaikh Karimulla Raja, S. Rajeev and C.S.Krishnamoorthy, 'Data Structure for Rules and Frames - Part 1 Frames', Report No. CE-91-02 (2).
 - d. Shaikh Karimulla Raja, Anil Mukundan, S.Rajeev and C.S.Krishnamoorthy, 'System and Interaction with Rules', Report No. CE-91-03.
 - e. H.Shivakumar, S.Suresh, C.S.Krishnamoorthy and S.Rajeev, 'Development Environment for Knowledge-Based Systems in Engineering Design - Implementation Manual, Report No. CE - 91 - 04.
 - f. H.Shivakumar, S.Suresh, C.S.Krishnamoorthy and S.Rajeev, 'Development Environment for Knowledge-Based Systems in Engineering Design - User's Manual', Report No. CE -91- 05.
 - g. C.Srinivasa Rao, C.S.Krishnamoorthy and S.Rajeev, 'Engineering Design Synthesiser (EDESYN) - Implementation Manual', Report No CE-91-06.
 - h. C.Srinivasa Rao, C.S.Krishnamoorthy and S.Rajeev, 'Engineering Design Synthesiser (EDESYN) - User's Manual', Report No CE-91-07.
6. R Radhakrishnan, 'Steel Construction in Earthquake Zones', Paper Presented in the Intl. Conference on 'Steel and Aluminium Structures', Singapore.
7. D.K. Ghosh and V Kalyanaraman, ' A Relational Database Interface for Design Expert Systems', Micro Computers in Civil Engineering, Vol 5, No. 2, June 1980, pp. 151 - 156.
8. S.Somayaji and V.Kalyanaraman, 'Andhra Cyclone of May 1990: Damage to Structures', Civil Engineering and Construction Review, Nov. 1990, pp. 37-41.

9. V.Kalyanaraman 'Steel Institute for India?', Science Express, Indian Express, Jan 14, 1991.
10. Muthiah Raj, D, Khadakkar, A.G, Narayanan R and Paramasivam V, 'A Theoretical and Experimental Study on Vibration of Shells of Revolution. Proceedings of the International Conf. on Advances in Structural Testing, Analysis and design. 29th July - 3rd Aug 1990, Bangalore, Vol.I, pp 289-295.
11. Kulkarni D and Paramasivam V, Expert Systems in Structural * Engineering, Bridge and Structural Engineer, Vol 20, No.3, Sept. 1990, pp. 11-16.
12. Paramasivam V, Indian Nuclear Power Program. Irrigation and Power Journal, Vol. 47, No.4, Oct 1990, pp. 51-56.
13. M.S Mathews, V.Sudhakumar, S.Sheela and P.R Seetharaman, 'Analytical and Experimental Investigations of Hollow Ferrocement Roofing Units', Jl. of Ferrocement, Vol 21 No.1 Jan 91.
14. P.Kalyanasundaram and K Ramamurthy 'Performance evaluation of elevator system in Multistory Office buildings - A case Study', Jl. of the Institution of Engineers (I), Civil engg divsn, May 1990, pp 23-28
15. P.Kalyanasundarm, K. Ramamurthy and R. Ambalavanan ' A Study on load factor in elevator system design for Indian conditions', Jl. of the Institution of Engineers (I), Civil Engg divsn, May 1990 pp 23-29
16. P.Kalyanasundaram, S.Rajeev and H.Udayakumar 'REPCON: Expert system for building repairs', American Society of Civil Engineers, Jl. of Computing divsn, April 1990, pp. 84-101.
17. T.P. Ganesan, P. Kalayanasundarm and R.Ambalavanan 'A study of the behaviour of concrete hollow block masonry walls using a three-dimensional finite element analysis', Masonry International Jl., U.K, vol 4, No1 1990, pp 31-35
18. D.J. Victor, 'Securite routiére en Inde', Recherche Transports Securite, Institut National De Recherche Sur Les Transports Et Leur Securite (INRETS), Paris, No. 26, June 1990, pp 37-48.
19. V. Thamizharasan, V.R.Rengaraju and K. Govinda Rao, ' Modelling of City Bus Fuel Consumption', Indian Highways, Vol. 18, No 7, July 1990, pp 23-29
20. D.J Victor and T.G Boraiah, ' A Study of transport costs for freight trucks', Jl. Indian Roads Congress, Paper No 399, Vol 51-2, Sept 1990, pp 301-332.

21. D.J Victor, 'Organisation of urban transport in developing countries', Proc. fifth conference on Urban transport in Developing countries, CODATU V, Sept 1990, Suo Paulo, Brazil, pp 545-550
22. S.P Pattnaik, Y Sudheerbabu and M.S Reddy, 'Effect of Route overlap on Passenger Waiting Times', Journal of the Institution of Engineers (I), Vol 71, Nov 1990, pp 52-57
23. V.Thamizharasan and M Ramanajee. 'Demand Modelling for Intercity Travel by Bus and Rail', proc. second National conference on Transportation System Studies, IIT, Delhi, Dec 90, pp. 184-190.
24. S.B.Pattnaik, 'Inland Water Transportation Systems Planning', Jl. of the Institute of Transportation Planners, India, January 1991.
25. Kurian, N.P., Ultimate strength of Hyperbolic paraboloid combined shell footings subjected to vertical loads and moments - Proc. of the Intl. conference on structural engg., and computation, Beijing, China, 25-28 April 1990, pp 829- 836
26. T S Ramanatha Ayyar, N.R Krishnaswamy, H.R Shantha Rajanna and M.L.N.B Prasad, 'Shear strength of clay reinforced by gravel columns in a triaxial test' - July 1990, Calcutta Seminar Institution of Engineers (India)
27. T.S Ramanatha Ayyar, N.R Krishnaswamy, S Ravishankar and S.P Parashar, 'Bearing Capacity of clay reinforced with geosynthetics' Proc. IGC 90, Bombay.
28. Krishnaswamy N.R and Raghavendra, H.B., 'Triaxial behaviour of soil reinforced with Geotextiles', proc. All India Seminar on Soil Improvement by Geotextiles, Stone Columns, and Chemical Grouting, The Institution of Engineers (I), July 1990, Calcutta.
29. T.S.Ramanatha Ayyar, N.Balasubramanian, V Raman, A Raja andd S Esakku 'Influence of Drying on the Liquid Limit Behaviour of a Marine Clay', Geotechnique Vol 40, No 4, Dec 1990
30. Sundaravadivelu R., Idichandy, V.G Gandhi, S.R, and Raju, V.S, (1990) 'Measurement of tie-rod forces for a bearing structure ' J. of Waterway, Port, Coastal and Ocean Engineering, ASCE, Vol. 116, No.1, pp 43-56
31. Gandhi S.R (1990) 'Can NDT replace conventional load testing of piles? Why and how?' Invited paper for presentation at Indian Geotechnical Conference to be held at Bombay during 20-23 December, 1990.

32. Ram Manohar, N and Gandhi, S.R (1990), 'Tests on Model Piles for t-z and q-z curves' Paper accepted for presentation at Indian Geotechnical Conference to be held at Bombay during 20-23 December, 1990.
33. Elango K and K W Easter, 'Simulation-Module for crop yield from a tank irrigated system', National Workshop on Water Reseources Project Management, Madras, June 1990, pp 162 - 173.
34. Ramalingam M and K Elango, 'Hydrologic Budgeting of a Tank - Aquifer System', Regional Seminar on Hydrological Problems relating to Tanks, Madras. Oct 1990 pp 10-1 to 10-10.
35. Ramalingam M, K Elango and R Raman, 'Assessment of the Influence of Percolation Ponds - case studies', National Workshop on Percolation Ponds, Madras, Dec 1990, pp 170 - 180.
36. Srinivasa Reddy L, and K Elango, ' A new approach to the analysis of water starved networks', Jl. of Indian Water Works Association. Vo. XXIII, No.1, Jan - Mar 1991, pp 31-38
37. S Vedula and S Mohan, 'Real time Multipurpose Reservoir Operation - A case study'. Hydrological Sciences Jl, Vol 35, No. 4, 1990, pp 463 - 478.
38. H Raman, S Mohan and Santhosh G Thampi, 'Simulation Study of Madras Water Supply System', Jl. of Indian Water Works Association, June 1990, pp 275 - 279.
39. S. Mohan, 'Application of Stochastic models for water use time series', Jl of Instituion of Public Health Engineers (I), Vol. 1990, No.2 pp 50 - 56

10. Any Other Relevant Details

Construction of new Laboratory space of approximately 260 sqm to accomodate the Nuclear Structures Research Cell has been taken up.

4.6 COMPUTER SCIENCE & ENGINEERING DEPARTMENT

1. Awards/Distinctions received

Dr. C. Siva Ram Murthy was awarded INSA (Indian National Science Academy) Medal for Young Scientists for 1991.

2. Sponsored Research Projects

(a) Dr. Kamala Krithivasan

1. Cellular Automata and Applications - DST
2. Algorithms for robot motion planning - DAR

(b) Dr. T. A. Gonsalves

1. Electronic Keyboard Concentrator - Hindustan Teleprinters Ltd., Madras, with A. Jhunjhunwala and B. Ramamurthi
2. Fibreoptic Counter-rotating Telemetry Systems - Instruments Ltd., Kota with A. Jhunjhunwala and B. Ramamurthi
3. Operator's console for EPABS, W.S. Insulators, Bangalore with A. Jhunjhunwala and B. Ramamurthi
4. Central Library Computerization, IIT Madras with A. Jhunjhunwala.

3. Research Publications

Journals

1. S.T.Fathima and B.Yegnanarayana, "A maximum entropy approach to interpolation", Signal Processing, Vol.21, No.1. Sept 1990, pp. 17-24.
2. C.P Mariadossu and B. Yegnanarayana, "Image reconstruction from noisy digital holograms", IEE Proceedings, Part F, Vol.137. No.5, October 1990, pp. 351 - 356
3. M. V. Nagendra Prasad, M. Mahajan and K. Krithivasan, "Fuzzy L-systems", International Journal of Computer Mathematics, 1990, Vol.36, pp.139-162.
4. R. Srikant and K. Krithivasan, "Fastest path across constrained moving rectilinear obstacles", Information Processing Letters, 37, 1991, 349-353.

5. A. Datta, R. Srikant and K. Krithivasan, "Fast sequential and parallel algorithms for finding the largest rectangle separating two sets", *International Journal of Computer Mathematics*, 1990, Vol.37, pp. 49-61
6. A. B. Mahamuni and T. A. Gonsalves, "Heuristic Load Sharing in Distributed Systems: Developments and Directions", *Computer Science and Informatics*, Computer Society of India, Vol.20, No.2, Dec 90, pp.15-27
7. C. Siva Ram Murthy, "Solving Nonlinear Partial Differential Equations on Hypercubes", *Advances in Engineering Software*, Vol.12, No.1, pp.17-20, 1990.
8. C. Siva Ram Murthy, "Parallel, Iterative Solution of Large, Linear Systems on Hypercubes", *International Journal of High Speed Computing*, Vol.2, No.3, pp.257-264, 1990.
9. C. Siva Ram Murthy and V. Rajaraman, "Analytical and Simulation of a Multiprocessor system for Highspeed numerical computations", *Mathematics and Computers in Simulation*, Vol.32, pp.393-401, 1990.
10. C. Siva Ram Murthy, "Solving Hyperbolic PDEs on Hypercubes", *International Journal of Computers and Mathematics with Applications*, Vol.21, No.5, pp.79-82, 1991.

Conferences

11. B. Yegnarayana and Hema A. Murthy, "Spectrum estimation using Fourier transform Phase", *Proc. of the Workshop on Signals, Systems, Communications and Networking*, Bangalore, July 1990, pp.44-53
12. B. Yegnanarayana, Hema A. Murthy and V. R. Ramachandran, "Speech enhancement using group delay functions" *Proc. ICSLP 90*, Kobe, Japan, Vol.2, Nov.1990, pp.301-304.
13. B. Yegnanarayana and Hema A. Murthy, "New methods of processing noisy signals using group delay functions", *Int. Conf. on Communication Systems'90*, Singapore, Nov.1990
14. B. Yegnanarayana, "Processing of noisy speech using group delay functions", *Proc. of Workshop on Speech Processing*, TIFT, Bombay, Dec. 1990
15. C. Chandrasekar, G.V. Ramana Rao, P. Eswar, J. Saikumar, N. Ramasubramanian, R. Sundar and B. Yegnanarayana, "Development of a speech-to-text system for Indian languages", *Frontiers in Knowledge-based Computing*, Proceedings of the KBCS'90, Pune, Dec.1990, pp.457-466

16. B. Yegnanarayana , Hema A. Murthy, R. Sundar, V. R. Ramachandran, A.S. Madhukumar, N.Alwar, and S.Rajendran, "Development of a text-speech systems for Indian languages", *Frontiers in Knowledge-based Computing, Proceedings of the KBCS'90, Pune, Dec.1990*, pp.467-476
17. B. Yegnanarayanan, R. Ramaseshan and A. Ravichandran, "Improving Resolution of Sensor array images using multiple frames of Data", *19th International symposiums on Accoustical Imaging, Bochum, FRG, April 3-5, 1991*
18. A. Ravichandran and B. Yegnanarayanan, "A two stage neural network for translation, rotation and size-invariant visual pattern recognition", *Proceedings of the ICASSP-91, Toronto, May 1991*, pp.2393-2396
19. B. Yegnanarayana , Hema A. Murthy and V. R. Ravichandran, "Speech processing using modified group delay functions", *Proc. of the ICASSP-91, May 1991*, pp.945-948
20. A. Datta and K. Krithivasan, "Efficient algorithms for the maximum empty rectangle problem in shared memory and other architectures", *International conference on Parallel Processing, Pennsylvania, State University, August 1990*
21. M. Mahajan and K. Krithivasan, "Time varying cellular automata", *Parcella, Berlin, Sept.1990*
22. A. Datta and K. Krithivasan, "An efficient path planning algorithm for a point mobile automation moving in an unknown environment", *International Conference on Automation, Robotics and Computer Vision, Singapore, September 1990, Proc. pp.549-563.*
23. R. Srikant and K. Krithivasan, "Motion across a rotating line segment obstacle", *Indian Computing Congress-90, Nov. 1990, Hyderabad, Proc. pp.301-310*
24. B. Gopal, T. A. Gonsalves and J. K. Dey, "IMTP: An Efficient Message-Transaction Protocol: PC Implementation", *Proc. IETE Seminar on Telematics in the year 2000, Madras, Nov.1990, pp.5*
25. N. Alwar, et al, "The Design of a Dictionary Module for MT in Indian Languages", *Proc. of the Seoul International Conference of Natural Language Processing (SICONLP 90), Seoul, Korea, Nov.1990, pp. 19.3.1-19.3.10.*

4. Any Other Activities

1. Dr. Kamala Krithivasan served as Programme Committee member for FST&TCS and National Seminar on Theoretical Computer Science.
2. Dr. T. A. Gonsalves was invited by Pondicherry Engineering College for 3-day invited lecture series on "Design and Implementation of Practical Networks."
3. Dr. T.A. Gonsalves was Faculty Advisor, IITM Ham Radio Club.

4.7 ELECTRICAL ENGINEERING

1. New Courses Introduced

EE 600 Electrical Engineering Lab I
 EE 409 Advanced Electrical Engg. Lab
 EE 476 Introduction to Robotics

2. Instruments Developed/Procured

Measurements: Microprocessor based Transformer testing Unit HFT Lab:
 Hewlett Packard Spectrum Analyser, H.P. Power Meter (50Hz to 22 Ghz)

3. Continuing Education

Noise and Interference - Refresher Course IETE-Dr.TAR.Bhat Design Tool for
 Single Phase Motors - Veinoth. Implemented on IBM PC by G S Rao

Transient Phenomena in Electrical Machines
 by Dr. SS Yegnanarayanan.

4. Sponsored Research

Title of the project	Funding Agency	Amount	Co-ordinator
Power Systems Simulator for Training and Testing at EMC,	DST 3 Years	12.2 Lakhs	Dr. A Kuppurajulu Dr. K Ramar
Simulation of Power Electronic Circuits	DOE 3 years	2.0 Lakhs	Dr. VV Sastry Dr. G.Sridhara Rao
Over Voltage Studies in Motors	CBIP 3 Years	2.0 Lakhs	Dr. SS Yegnanarayanan Dr. G Sridhara Rao Dr. PRS Rao Dr. S Karmalkar
LPCVD Polycrystalline Silicon MOSFET Technology for 3-D Integration	DOE 3 Years	36.77 Lakhs	Dr. KN Bhat Dr. PRS Rao Dr. S Karmalkar Dr. M K Achuthan Dr. K Gopinath

Title of the project	Funding Agency	Amount	Co-ordinator
Development of TDMA for Rural Radio Communication Systems	TRC/ CDOTL 2 years	0.23 lakhs	Dr.A Jhunjunwala Dr.B Ramamurthy
Telematics Phase II	HRD 3 Years	15.0 lakhs	Dr.A Jhunjunwala Dr.B Ramamurthy
Fibre Optic Systems for Service Sector Applications	DOE 6 years	90.0 lakhs	Dr.J P Raina and others
Development of Fibre Optic Couplers	ARDB 5 Years	46.8 lakhs	Dr. J P Raina and others
Development of Engg. Version of Fibre Optic Communication Systems	DRDO 5 years	32.2 lakhs	Dr. J P Raina
Development of 1553 Compatible Fibre Optic Data Bus	ARDB 5 years	38.66 lakhs	Dr. J P Raina and others

5. Consultancy Projects/Testing Etc.

Title	Organisation	Co-ordinator(s)
ARNO Converters	Kirloskar Electric Co. Bangalore	Dr.SS Yegnanarayanan Dr.G Sridhara Rao
Line Trap Design	W.S. Insulators, Bangalore	Dr.SS Yegnanarayanan Dr.G S Rao
Design of Single Phase Motor,	BEMA	Dr.SS Yegnanarayanan Dr.G Sridhara Rao
1.0 KVA Ferroresonant Voltage Stabilizers	ACE Industries	Dr.SS Yegnanarayanan

Title	Organisation	Co-ordinator(s)
Development of 16 Channel Fibre Optic Mux-demux for RS 232 Interface	ECIL Hyderabad	Dr.J P Raina and others
Wireless Multiaccess Messaging Systems - Intelligent	Communication Equipments Pvt.Ltd., Hyderabad	Dr.A Jhunjunwala Dr.B Ramamurthy
Development of EKB with LCD Displays,	HTL Madras	Dr.A Jhunjunwala Dr.B Ramamurthy
Telephone Sharing Systems	Innovation Commun. Systems, Hyderabad	Dr.A Jhunjunwala Dr.B Ramamurthy
Development of Digital Communication Educational Kit	Universal Instruments	Dr.A Jhunjunwala Dr.B Ramamurthy
Fibre Optic Double Ring Telemetry System	IL Kota	Dr.A Jhunjunwala Dr.B Ramamurthy
Fibre Optic Communicator	Benchmark Systems	Dr.A Jhunjunwala
Development and Applications of High Temperature Super Conductors in the Microwave Range		Dr.D K Banerjee
Consultations	Kaybee Powerlec, India Cements, MRF Ltd., Instruments Technique	Dr.VV Sastry
Development of Fault Location Algorithm	English Electric Co.	Dr.A Kuppurajulu Dr.K Ramar Dr.M Krishnamurthy

Title	Organisation	Co-ordinator(s)
Development of Software	English Electric Co	Dr.A Kuppurajulu Dr.K Ramar
Insulation Testing of High Power Apparatus,		Dr.C Venkateshaiah

6. Distinguished Visitors and Lectures

Visitor's Name	Affiliation	Purpose of visit
Dr.S Seinekell	Siemens Information Systems, Munich, W.Germany	Lectures delivered <ul style="list-style-type: none"> a) Coherent Optical Communication Systems b) ERT Doped Amplifier c) 4-G bits Optical Links for Computers
Dr.Ing H Harer	University of Hamburg, W Germany	Lectures delivered <ul style="list-style-type: none"> a) AC Servomotor Drives b) GTO based Current Controlled Induction Motor Drives c) Variable Speed Motor Drives
Dr.Ing Besslich	Tech.Univ. of Bremen, W.Germany	Lectures delivered <ul style="list-style-type: none"> a) 3-Dimensional Information from Monocular Images b) Spectral Processing of Switching Functions

Visitor's Name	Affiliation	Purpose of visit
Dr.W A Gambling	Univ. of Southampton, UK	Lecture delivered on Fibre Optics
Dr.Anandakumar	Rice University, USA	Lecture delivered on Introduction to Fractal Point Processors
Mr Manisundaram	Univ. of California, USA	Lecture delivered on Parabolic Quantum Wells
Dr.Guna Seetharaman	Univ. of South Western, USA	Lecture delivered on Recovery of 3-D Shape and Orientation from Intensity Images
Dr.K Venkatesh Prasad	Rutgers Univ., NewBrunswick	Lecture delivered on Extracting Depth Information from Defocussed Images
Dr. O P Malik	Univ. of Calgary, Canada	Lecture delivered on a) Adaptive Control of Power Systems b) Application of Fuzzy Logic to Power Systems Stabilizer
Dr.Bharat Deshj	AT and T Bell Labs USA	Lecture delivered on Integrated Broad Band Networks
Dr.K Sriram,	AT and T Bell Labs, USA	Lecture delivered on Integrated Access and Cross Connect Systems
Dr.Ravi Subrayan	Motorola INC USA	Lecture delivered on a) Simulation of SOI like Structures b) Doping Profile Measurments c) Thermal Budget Anneals on Arsenic Motivation

Visitor's Name	Affiliation	Purpose of visit
Dr.K Rajagopal	Edwards High Vacuum UK	Lecture delivered on World Semiconductor Industry
Mr Mohan Krishna	Intel Corp., USA	Lecture delivered on Current Methodology on VLSI Design
Mr Gunther Konig	Univ. of Stuttgart, W.Germany	Lecture delivered on Adaptive Digital Filter for Partial Discharge Measurements
Mr S Ravishankar	IISc. Bangalore	Lecture delivered on Multistage Interconnection Networks
Mr V Poonkuzhai	Madras Telephones	Lecture delivered on Telephone networks in Madras

7. Visit of Faculty Members to other Institutions

Name of Faculty	Institution visited	Purpose of visit
Dr.SS Yegnanarayanan	BHEL	a) House Programme on Transient Phenomena in Electrical Machines b) Power Conditioning Systems for MHD Power Plants
	Institute of Plant Engineers	c) Diesel Engine Power Generator Sets

Name of Faculty	Institution visited	Purpose of visit
	Annamalai Univ.	d) Electromagnetic Field Calculations
Dr.Bhaskar Ramamurthy		a) Multiple access Techniques for wireless Networks, IETE b) Low bit rate Data Network, IETE
Dr.A Jhunjunwala	Univ. of Illinois, Urbana	Cybernetics Activities in Electrical Engg. Dept. IIT
Dr.M Mukunda Rao	Institute of Armament Technology Gandhi Institute of Technology All India Radio Siddhartha Engg. College REC Visakhapatnam	Laser Communications Optical Communications Laser and their Applications Optical Communications Optical Sensors

8. Participation in Conferences

Name of the Faculty	Title of the conference venue and date	Purpose
V.V. Sastry	6-th National Convention of Electrical Engineers, Visakhapatnam, Nov. 1990 Circuits	Paper presented on Digital Simulation of Power Electronic
V.V. Sastry	IEEE Power Electronics Specialists Conference, Texas, June 1990	Paper presented on A Three Phase Real time Optimal Reactive Power Compensator

Name of the Faculty	Title of the conference venue and date	Purpose
C Eswaran	International Symposium on Signal Processing Australia, Aug, 1990 of Filter Noise	Paper presented on An Adaptive Median Filter for the Removal from Images.
C Eswaran	IEEE International Conference, USA Nov 90 Analysis using 2-D Scans	Paper presented on Cardiac Wall Motion
A Kuppurajulu	Workshop on Power System Simulators, CPRI, Bangalore, 1990	Paper presented on Strategies for Power System Simulation
M Mukunda Rao	National Space Science Symposium, Nagpur Univ. 1990	Paper presented on Geometric Activity and Day to Day Variability in TEC
M. Mukundarao	National Seminar on Instrumentation, Cochin Univ., Nov. 1990	Paper presented on Laser Bathymetry for Indian Coastal Waters
D K Banerjee	14th National Systems Conference, Aligarh Muslim Univ., March 91 Gunn Oscillator	Paper presented on A GHz Microstrip Dielectric-stabilized
D K Banerjee	Conf. on Recent Advances in Solid State Physics, IIT Madras, June 1990 at 9 MHz.	Paper presented on A Dielectric Stabilized Tunable Gunn Oscillator
P Sankaran	Proc. of Int. Conf. on Measurement and Control, Singapore, Jan 1991 Protocol Handlind Instrumentation	Paper presented on Microprocessor based IEEE 488 Interface
P Sankaran	Int. Conf. on Instrumentation, Measurement and Control, Singapore, Jan. 1991	Paper presented on A Novel Wide Range Microprocessor based Temperature Indicator, using a Thermistor

Name of the Faculty	Title of the conference venue and date	Purpose
P Sankaran	International Conference on Instrumentation, Measurement and Control, Singapore, Jan 91.	Paper presented on Signal Recovery technique in Optical Fibre Current Sensors
P Sankaran,	International Conference on Instrumentation, Measurement and Control Singapore, Jan 1991.	Paper presented on Successive Substraction type Analog to Digital Convertor
Y Narayana Rao	Int. Workshop on Methods for Partial Discharge Measurements and their Traceability Como, Italy, Sept. 1990.	Paper presented on Experiences with Educational Seminars in Germany dealing with Partial Discharges in Power Apparatus

9. Research Publications

1. K.N. Bhat, LPVCD SOI MOSFET Technology for 3-D Integration, IETE, Vol.36, No.3, pp.137-147, 1990.
2. K.N. Bhat, Numerical and Charge Sheet Model for Thin Film SOI MOSFETS, IEEE Trans. on Electron Devices, USA, pp.2037- 205, Sept. 1990.
3. K.N. Bhat, Collector Recombination Life Time from the Quasi Saturation Analysis of HV Bipolar Transistors, M.Jagdesh Kumar, IEEE Trans on Electron Devices, Vol 37 no 11, pp 2395-2398, Nov. 1990.
4. S. Jagannathan and B. Ramamurthy, Diffraction Tomography of Strongly Scattering Infinite Cylindrical Objects, Journal of Aeronautical Society of America, Oct. 1990.
5. C.P. Mammen and B. Ramamurthy, Vector Quantisation and Compression of Multichannel ECG, IEEE Transactions on Biomedical Engg., Sept. 1990.
6. S. Jagannathan and B. Ramamurthy, Scattering from a Circular Dielectric

- Cylindrical Shell, A fast Algorithm, *Electronics Letters*, Vol 26, No.7 PP 484-85, March 1990.
7. C.P. Mammen and B. Ramamurthy, Classified Vector Quantization of Multi Beta M-Aztec Coded ECG *IEEE Trans on Bio- medical Engg.*, Nov. 1990.
 8. A. Jhunjhunwala and E. Elizabeth, Theoretical Analysis of Planar Bulk Acoustic Wave Devices, *IEEE Trans on UFFC* Vol 37, No 3, pp.1-12, Jan. 1990.
 9. A. Jhunjhunwala and E. Elizabeth, A New Orientation for Bulk Acoustic Wave Devices, *IEEE Trans. on UFFC*, Vol. 37, No.3, pp.230-32, May. 1990.
 10. T. Venkateswarlu and C. Eswaran, On the Minimal Multiplier Realization of All Pass Digital Filters, *IEEE Trans. on Circuits and Systems*, Vol.37, pp.670-672, May 1990.
 11. T. Venkateswarlu and C. Eswran, Realization of Multidimensional GIC Digital Filters T, *IEEE Trans. on Circuits and Systems*, Vol.137, pp.685 - 694, June 1990.
 12. M.V.C. Rao and P. Subbaraj, On the Performance of Unidirectional Search Schemes in Quadratic Algorithms, *Engineering Optimization*, Vol.16, pp.191-204, 1990.
 13. A. Kuppurajulu, Closed Loop Reactive Power Control in Energy management Systems, Vol.71, pp. 159-161, Oct. 1990.
 14. A. Kuppurajulu, A Multivariable Closed loop Controller for Real-time Applications, *Journal IE(Ind)*, Vol.70, pp.203- 205, Feb. 1990.
 15. M. Mukunda Rao, A Numerical Analysis of Backscattered Signal, *Journal of Pure and Applied Physics*, (Ind) Vol.1, No.4, pp. 241-255 Oct. 1990.
 16. P. Sankaran, V. Jagadesh Kumar and others, Error Estimation of Current Transformers using Single or Composite Cores of Ferromagnetic Materials, *IEEE Trans. on Magnetics*, Vol. 26, pp.3086-88, Nov. 1990.
 17. S. Srinivasan, A Graphics System Design using a novel Colour Mapping Scheme, *IEEE Trans, on Consumer Electronics*, Vol.CE 36, Nov. 1990.
 18. S. Srinivasan, A. Singh, S.S. Gill, Two dimensional Addressing Scheme for Digital Signal Processors, *Electronics letters*, pp.677-679, Vol 27, No.11, April 1990.

4.8 HUMANITIES AND SOCIAL SCIENCES DEPARTMENT

1. New Courses Introduced

Course No.	Title	Structure	Faculty
	Psycholinguistics		Dr.R.N. Anantharaman Dr.S.C. Chaudhary
HS 431	Environmental and Resource Economics	3-0-0-3	Dr.V.R. Muraleedharan Dr.R. Malathy
HS 432	Industrial Economics	3-0-0-3	Dr.V.R. Muraleedharan Dr.R. Malathy

2. New facilities added and major equipment procured

Ergonomic Laboratory	:	Cardioline Delta Model for recording ECG
Reliability Engineering Laboratory	:	Godrej 922 Dot Matrix Printer Machine Alignment Computer BAS 10 Shock Pulse Meter BEA 52 Bearing Analyzer Wear Particle Analyzer UPS for Computer

3. Sponsored Projects

Title	Period	Funding Agency	Amount	Co-ordinators
1. Evaluation of Engineering Education	88-90	Tamil Nadu State Council for Science & Technology	1.18 Lakhs	Dr.R.N. Anantha- raman

Title	Period	Funding Agency	Amount	Co-ordinators
2. Basic Business Writing	Apr 90- Mar 91.	ISTE	15,000	Mr.V.S. Kumar Dr.S.C.Chaudhary
3. Effective Presentations	Apr 90- Mar 91	ISTE	15,000	Dr.E.N.Kurian Dr.S.C.Chaudhary
4. Reliability Engineering	Jan 89-	MHRD	10 Lakhs	Dr.Dipak Chaudhuri
5. History of Science & Technology in Madras Presidency	1990-92	CSIRO	2 Lakhs	Dr.S.Ambirajan Dr.R.Rajagopalan Dr.V.R.Muraleedharan
6. Modernisation of IE Lab		MHRD	20 Lakhs	Dr.T.T.Narendran Dr.L.S. Ganesh Mr.C.Rajendran

4. Major Consultancy Assignments

Title	Organisation	Amount	Co-ordinators
Development of DSS for Career Management	Eharat Dynamics Ltd	1.414 Lakhs	Dr.T.T.Narendran Dr. L. S. Ganesh

5. Honours and Awards

Name	Honours/Awards
1. Dr. L.S. Ganesh	President of Futures and Perspective Planning Society, (India)

6. Distinguished Visitors to the Department

Visitors' Name	Affiliation	Purpose of Visit
1. Dr.M.K. Ghose	Vikram Sarabhai Space Centre, Trivandrum	To deliver 4 lectures on Software Reliability on 28/3/91
2. Dr.Vasant Kaiwar Dr. Sucheta Majumdar	State University of New York, USA	Seminar/Discussion with Staff & Students, 10/1/91

7. Visit of Faculty Members to other Institutions

Name of Faculty	Institution Visited and duration of visit	Purpose of visit
Dr.S.C.Chaudhary	Institute For English Language Education, Lancaster University, UK Oct 8,90 - Dec 6,90.	Teacher Training in ESP
Dr.Dipak Chaudhuri	Dept. Of Mechanical & Manufacturing Engg., Univ. of New South Wales, Australia from July 23, 90 to Oct 21, 90.	To work as a Visiting Professor
Dr.C.Ramachandran	South Asia Institute of Heidelberg University, Heidelberg, Germany. Jul 1, 90 - Sep 31, 90	As a DAAD short term invitation fellow as a Guest Faculty

8. Seminars/Symposium/Conferences/Short Term Courses organised

1. Dr. R.N. Anantharaman Course on Manpower Management for Administrative Staff, IIT Madras, 9-11 Feb, 1990.

Course on Management for Officers of IIT Madras, 16-18 Nov, 1990.

9. Participation in Seminars/Symposia/Conferences, etc.

Name of Faculty	Particulars of participation in Seminar/Symposia/Short-term Course - Name, Date and Venue
1. Dr. R.N. Anantharaman	Psychology of Accidents - Regional Labour Institute, Madras, 5/2/91. Psychological Impact of Retirement - Indian Oil Corporation, Madras, 27/11/90 Interviewing Techniques - Indian Oil Corporation, Madras, 7/12/90 Human Behaviour - District Industries Centre, Madras, 11/12/90. Supervisory Skills - Indian Airlines, Madras, 21/1/91 Communications - Neyveli Lignite Corporation, Neyveli, 25/2/91
2. Dr. Dipak Chaudhuri	Reliability and condition based maintenance-University of New South Wales, 7/10/90

Name of Faculty

Particulars of participation
in Seminar/Symposia/Short-term
Course - Name, Date and Venue

3. Dr. A.V. Krishna Rao
- Reliability and Industrial
Maintenance - University
of New South Wales, 17/10/90
- Workshop for Research Guides
at the American Studies
Research Centre, Hyderabad,
March, 91.
- Chaired a session at the
All India English Teachers
Conference at the
University of Madras,
December 90.
4. Dr. T.T. Narendran
- Presented three papers at
the International
Conference on Signals and
Systems, organised by the
AMSE, France at Tirupati,
Dec 10-12, 1990.
5. Dr. S. Ambirajan
- John Stuart Mill
Conference, Canada(Calgary)
27-29 June, 1990
- History of Economics Society
annual Conference, Lexington
Virginia, USA, 23-25 Jun, 90
- Seminar on World Development
Report, IFMR, 6/11/90
- History Association of Madras
University, 26/11/90
- Rotary Club, Madras, 13/3/91
- Max Muller Bhavan, Madras
10/4/90

Name of Faculty	Particulars of participation in Seminar/Symposia/Short-term Course - Name,Date and Venue
6. Dr. L.S. Ganesh	<p>Madurai Kamaraj University Bharathidasan University</p> <p>Conducted ISTE sponsored programmes on "Technology Forecasting" at Mysore</p>
7. Dr. V.R. Muraleedharan	<p>10th International Economic History Congress, Leuven (Belgium) Sept 1990</p> <p>51st Annual Conference Indian History Congress, Calcutta, Dec 1990</p>
8. Dr. D.Veeraraghavan	<p>10th International Economic History Congress, Leuven (Belgium) Sept 1990</p> <p>51st Annual Conference Indian History Congress, Calcutta, Dec 1990</p>

10. Research Publications

1. Dr. R.N. Anantharaman "Certain associates of Physical health in old age - Journal of Psychological Researches, 1990, 34,2, 88-93"
2. "Antecedents and Consequences of stress at work - Journal of Psychology, 1991, 4, 1, 20-25".
3. "A study of need satisfaction and its importance - Indian Journal of Applied Psychology, 54-58".

4. Dr. L.V.L.N. Sarma : "Corporation Financing : Need for focus on Individual Shareholders", Indian Journal of Finance and Research, January 1991. (Publication of the Indian Financial Management Association)".
5. Dr. Dipak Chaudhuri : "Two in Microelectronics & Reliability Two in Industrial Engineering, India One in Reliability & Systems Safety".
6. Dr. A.V. Krishna Rao : "Guest-edited the Journal of Indian Writing in English, Vol. 18, No. 2. July, 1990".
7. Published the paper entitled " Historical Consciousness in the novels of Nayantara Sahgal", JIWE, pp 24-43, July 1990.
8. "Nayantara Sahgal's Recent Fictions of History A Study". Essays in Criticism on Indian Literature in English, ed. by Prof. M.S. Nagarajan. et. al. pp 117-124, December 1990.
9. Dr. T.T. Narendran : "V. Venugopal and T.T. Narendran "An Interactive Procedure for multi-objective optimization using Nash Bargaining Principle", Decision Support Systems , Vol. 6, No. 3, pp 261-268, 1990.
10. Mahadevan and T.T. Narendran : "Design of an automated guided vehicle-based material handling system", International Journal of Production Research, Vol. 28, No. 9, pp 1611-1622.
11. G. Srinivasan and T.T. Narendran : "GRAFICS - a non hierarchical clustering algorithm for group technology", International Journal of Production Research, Vol. 29, No. 3, p.463-478, 1990.
12. Dr. S. Ambirajan : "The Changing Attitudes towards Business in India A Long View", South Asia Journal of the South Asian Studies Association of Australia, Vol. XII, No. 1
13. "The Political Economy of Indian Economic Development" as above, Vol. XII, No. 2
14. Dr. L. S. Ganesh : "Suresh, B. and Ganesh, L.S. "Modeling Group Interactions using AHP and Fuzzy Automata".
15. Ganesh, L. S. , Suresh, B. and Ramanathan, R. "Dynamic evaluation of expert opinion".

16. Dr.V.R. Muraleedharan, "Malady in Madras : The Colonial Government's Response to Malaria in the early Twentieth Century" in Deepak Kumar(ed.) Science and Empire Essays in Indian Context (Anamika Prakashan. New Delhi, 1991).

12. Other items

1. Dr. S.C. Chaudhary, need for English in India and Syllabus Reform - New Quest - May - June 1990.

How to shape our Official Language Policy - The Hindu - August 1990.

2. Dr. L.V.L.N. Sarma, nominated with the approval of the Ministry of Finance, Government of India, as PUBLIC REPRESENTATIVE on the council of Madras Stock Exchange Ltd, Madras.

Invited lecture on "Contribution of Three Winners of NOBEL PRIZE IN ECONOMICS for the year 1990" at Madras University in January 1991.

3. Dr. S. Ambirajan, Member Academic Council of Stella Maris College, MIDS, Institute of Labour Studies, Madras.

Broadcast talks in the All India Radio on economic topics as well as participated in a discussion in the Doordarshan on the Current State of Industries in Tamil Nadu.

Written articles of Current interest in the areas of Economics and Education in The Hindu, Indian Express, Industrial Economist, Freedom First etc.

Written book reviews on a regular basis in The Hindu, Indian Economic and Social History Review, Journal of Imperial and Common Wealth History, Freedom First, Artha Vijnana etc.

Have started to write a regular column on Economic matters in the Economic Times.

4. Dr. L.S. Ganesh, designed and conducted the IIT (M) Perspective Planning Exercise.
5. Mrs Victoria Tatarinova, was appointed as visiting faculty to teach Russian Language during 1990-91.
6. Dr. J. L. Sharma, was appointed as visiting faculty, in Financial Management during 1990-91.

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4.9 MATHEMATICS DEPARTMENT

1. Sponsored Project

Title	Funding Agency	Co-ordinator
Mathematical Modelling for the Flow in Transportation Network systems,	IRDF Project	S.N.MAJHI

2. Collaboration with Foreign Institutions

INDO-USSR PROGRAMME OF CO-OPERATION.

P.ACHUTHAN - Mathematical Modelling : Accepted by the Govt. of India, (in progress)

3. Distinguished Visitors to the Department

Visitor's Name	Affiliation	Purpose of visit
Prof.Dr.Franz	Ferschl of Univ. of Munich, Germany, 2-1-91 TO 5-1-91	delivered a lecture on "Output processes of a pure Assemblage system".
Prof.Martin J.Beckmann	Tech. University of Munich and Brown University 23-1-90 to 7-2-1990. His visit was sponsored by the DAAD.	Few lectures on 'Selected Topics in Mathematical Economics and Operation Research.
Dr.D.V.Kasture	Professor, Department of Mathematics and Statistics Marathwada University, Aurangabad. Mar.-April 91	Gave a series of ten lectures on " Applications of Inequalities to Mechanics".

4. Visit of Faculty Members to other Institutions

Name of Faculty	Institution visited and duration of visit	Purpose of visit
S.K.SRINIVASAN	Non-markov population theory of light beams-seminar at Dept. of Physics, University of Texas at Austin - 25th April, 1990.	Lecture delivered
S.K.SRINIVASAN	General (S,S) inventory system - seminar at New York University, 27th April 1990.	Lecture delivered
S.K.SRINIVASAN	S-S inventory system with general lead time distribution, University of Texas at Dallas, 10th May 1990.	-do-
S.K.SRINIVASAN	Multiphase population evolution and its applications - A & M University, College Station, 15th May 1990.	-do-
S.K.SRINIVASAN	General Analysis of Inventory systems - National University of Singapore, 6th June, 1990.	-do-
PACHITHAN	Modern Developments in Mathematical Sciences, Gurunanak College, Ethiraj College, Madras.	-do-
PACHUTHAN	A talk in the Central School, IIT Campus, Madras.	
S.KALPAKAM	On continuum review Inventory systems, XII Annual conference of the Indian Society for Probability and Statistics, Bombay, 1990.	-do-
P.R.PARTHASARATHY	Lectures on population models at the Anna University, 1990.	-do-

5. Participation in Seminars/Symposia/International Conferences

Name of Faculty	Particulars of participation/ Conf./Seminar/Symposia/ - Name, Date and Venue	Nature of participation
S.K.SRINIVASAN	Fifty years of Cascade Theory - at the Annual meeting of the Indian Society for Probability and Statistics, Bombay, Dec. 27-30, 1990.	Keynote address
P.ACHUTHAN	Rational Approximants, continued fractions, differential equations and applications: Intl. Symp. on Differential equations and Industrial Maths., M.U. Aligarh, Sept. 1990.	Paper presentation
P.ACHUTHAN	Algebraic Aspects of Model Continued Fraction and Approximations, Asian Mathl. Conference, Honkong, Aug. 1990.	-do-
P.ACHUTHAN	Ramanujam Function, Continues Fraction and Non-linear approximations, Intl.Conf. of Mathematicians, Kyoto, Aug. 1990.	-do-
P.ACHUTHAN	Continued Fraction solutions of Matrix Riccati Equations, Intl. Conference on Mathl. Theory of Control, I.I.T., Bombay, Dec., 1990.	Paper Presentation
R. RANGARAJAN	Continued Fraction solutions of Matrix Riccati Equations, Intl. Conference on Mathl. Theory of Control, I.I.T., Bombay, Dec., 1990.	-do-

Name of Faculty	Particulars of participation/ Conf./Seminar/Symposia/ - Name, Date and Venue	Nature of participation
P.ACHUTHAN	Maths Education - Today and Tomorrow Proc.(P.96-98) of the Southern Regional Seminar on Mathematics Education & Res, Oct, 1990.	Paper Presentation
P.ACHUTHAN	Non-linear Modelling, ISTAM Conference, Anna University, December, 1990.	-do-
W.B.VASANTHA	Quasi Regular elements in loop Algebra, 56th Annual Conference of Indian Mathematical Society, Gujarat University, Dec.27-30, 1990.	-do-
W.B.VASANTHA	Superboolean Algebras, The Tamil Nadu Academy of Sciences, 17th Nov. 1990.	-do-
W.B.VASANTHA	Semi simplicity of loop rings. Diamond Jubilee Session at Allahabad, Feb.13-16, 1991.	-do-
S.N.MAJHI	10th National Symposium on catalysis and 4th Indo-Soviet seminar on catalysis, Dec.1990.	-do-
R.SUBRAMANIAN	Correlation Functions in Reliability Theory, XII Annual conference of the Indian Society for Probability and Statistics, I.I.T., Bombay, Dec. 1990.	-do-
N.RAVICHANDRAN	Correlation Functions in Reliability Theory, XII Annual Conference of the Indian Society for Probability and Statistics, I.I.T., Bombay, Dec. 1990.	-do-

Name of Faculty	Particulars of participation/ Conf./Seminar/Symposia/ - Name, Date and Venue	Nature of participation
S.KALPAKAM	A lost sales Inventory system with multiple recorders. Int. Sym on stochastic processes and their applications, XII Annual Conference of Indian Society for Probability and Statistics, IIT, Bombay, Dec. 1990	Paper Presentation
G.ARIGARIGNAN	A lost sales Inventory system with multiple recorders. Int. Sym on stochastic processes and their applications, XII Annual Conference of Indian Society for Probability and Statistics, IIT, Bombay, Dec. 1990	-do-
S.KALPAKAM	On Control of production rates of an Inventory system. XII Annual Conference of the Indian Society for Probability and Statistics, IIT, Bombay, Dec. 1990	-do-
V.B.JOHR	Inflationary Cosmology, Conf.on Advances in Mathematics, Banaras Hindu University, Varanasi, 21-22, Dec., 1990.	-do-
P.R.PARTHASARATHY	Density-dependent birth and death processes with immigration, XII Annual Conference of Indian Society for Probability and Statistics, Bombay. Dec. 1990.	-do-
B.KRISHNAKUMAR	Density-dependent birth and death processes with immigration, XII Annual Conference of Indian Society for Probability and Statistics, Bombay. Dec. 1990.	-do-

Name of Faculty	Particulars of participation/ Conf./Seminar/Symposia/ Name, Date and Venue	Nature of participation
K.R.PARTHASARATHY	Geometric Colourings, Graph Theory Conference, Cochin University of Science and Tech., May 17-19, 1991.	Paper presented

6. Journal of Mathematical and Physical Sciences (JMPS)

Journal of Mathematical and Physical Sciences, which has been in existence for the last twenty four years, continues to attract research papers of quality and current significance. Issues of this bi-monthly journal are being brought out regularly catering to the needs of the research community. In the ensuing volumes it is planned to widen the scope of the Journal and include theoretical research papers of interest to the engineering and technological subjects as well. The Journal, during its Silver Jubilee Year, hopes to enhance its utility and value by introducing several innovations.

7. Seminars/Symposia Organised

Srinivasa Ramanujan Day was celebrated by the Department on 22nd December, 1990 in the Ramanujan Hall. Eminent speakers like Prof. Alladi Krishnaswami, Prof.(Mrs.) Rani Siromoni and Prof. G.Ramanaiah, in addition to the faculty of the Department, gave lecture. An exhibition was also arranged in this regard.

An on-day symposium on 'Mathematics in Engineering - A perspective plan for the next 10 years' under the auspices of the Department was held on 17-1-91. Speakers from various Departments participated. Prof.S.D.Nigam and Prof.K.A.V.Pandalai delivered the keynote address.

8. Lectures Organised

S.No.	Speaker	Topic	Date
1.	Dr. R.Sahadeven Ramanujan Inst. of Non-linear Advanced Studies Madras	Complete Integrability of differential equation singularity analysis	09-08-91

S.No.	Speaker	Topic	Date
2.	Prof. N.Bala-krishnan,CANADA	A Fallacy on moments of order statistics	16-08-90
3.	Dr.S.Sridharan France	Good characterization and the subgraph problem	30-08-90
4.	Prof.V.Devanathan Madras University	Mathematics Model of Hadrons	06-09-90
5.	Prof.V.Krishna murthy	On schur functions in in Combinatorics	13-09-90
6.	-do-	-do-	20-09-90
7.	Dr.Anand Srivastav University of Bonn	Absolute continuity and the Radon-Nikodym theorem in non-cumulative Balance algebras	04-10-90
8.	Prof.V.Krishna-murthy,BITS,Pilani	On schur functions in in combinatorics	04-01-90
9.	Prof.S.D.Nigarn University of Hyderabad	Fractals and their fractal dimensions	11-10-90
10.	-do-	-do-	12-10-90
11.	-do-	-do-	13-10-90
12.	Dr.Jayaram Sankaran I.I.Sc., Bangalore	Finding the Lexico minimal vector in a subset of R	18-10-90
13.	Prof.P.Achuthan I.I.T.,Madras	Modern Mathematics and Internationsl congress of Mathematicians	01-11-90

S.No.	Speaker	Topic	Date
14.	Dr.D.Ivanchev Bulgaria	Net work Optimization	12-12-90
15.	Prof.F.Ferschl University of Munich	Output processes of a pure Assemblage system	02-01-91
16.	Dr.B.R.K.Kashyap I.I.M., Calcutta	On some infinite server queues	07-01-91
17.	Prof.M.J.Beckmann Technical Univ. of Munich and Brown University	Mathematical Models in Economics	25-01-91
18.	-do-	-do-	28-01-91
19.	Prof.H.N.Mahabala	Artificial Intelligence	08-02-91
20.	Prof.Yegnanarayana I.I.T.,Madras	Artificial Neural Network	21-02-91
21.	Dr. S.Nag	Riemann surfaces and their moduli-I (Introduction)	14-03-91
22.	Dr. D.Y.Kasture	Applications of Inequalities to Mechanics	18-03-91
23.	-do-	-do-	19-03-91
24.	-do-	-do-	20-03-91
25.	Dr. S.Nag	Riemann surfaces and their moduli-II (Recent application)	21-03-91
26.	Dr. D.Y.Kasture	Applications of Inequalities to Mechanics	22-03-91
27.	-do-	-do-	25-03-91

S.No.	Speaker	Topic	Date
28.	Dr. D. Y. Kasture	Applications of inequalities to Mechanics	26-03-91
29.	-do-	-do-	27-03-91
30.	-do-	-do-	28-03-91

9. Research Publications

1. S.K. Srinivasan and V. Sridharan, Multiphase evolution of population and its application to Optics and Colliding-beam experiments, Journal Physics A (Math and Gen.) 23, 491- 508m 1990.
2. S.K. Srinivasan, Squeezing of light within the frame work of the population theoretic approach, Journal Physics A Letters 23, L369-373, 1990.
3. P. Achuthan and R. Rangarajan, On a continued fraction representation of general cauer third form, JMPS 24,6, 369- 380,1990.
4. P. Achuthan and S. Ponnuswamy, On general Two Point continued fraction expansions and Pade Tables, Journal of Approximation Theory, 64, 291-314, 1991.
5. P. Achuthan, H.J.W. Muller-Kirsten and A. Wiedemann, Perturbation Theory and Boundary conditions: Analogous Treatments of Anharmonic Oscillator and Double Wells, Fortshritte der Physik, 38,2.77-164, 1990.
6. P. Achuthan and S.N. Majhi, On Mathematical Modelling in Chemical Processes, Proc. National Symmp. on Recent Developments in Catalysis, Editors: B.Viswanathan and C.N.Pillai, Narosa Pub.House, 274-284, 1990.
7. P. Achuthan, On Mathematical Modelling,. Journal of Maths. Teachers, Andhra Pradesh, 1990.
8. W.B. Vasantha, On Group Rings which p-rings, Ganita, No.40, NO.1, 1-2, 1989.
9. W.B. Vasantha, Semi-group rings of ordered semigroups which are reduced rings, J.Mat Res. and Exp. China, 10, No.4, 493- 494, 1990.

10. W.B. Vasantha, Semi group rings which are p-rings *Bulls, Cal. Math. Soc.*, 82, 191-192, 1990.
11. W.B. Vasantha, On Quasi group Rings, *J.S. Ph.Sc. 2, No.2*, 137-1388, 1990.
12. W.B. Vasantha, Near loop rings of Moufang loops, *Extracta Mathematica*, 5, No.3, 1990.
13. W.B. Vasantha, A note on semi-group rings which are Boolean rings, *J.S.Ph.Sc. 3, No.1*, 67-68, 1991.
14. S.N. Majhi and V.R. Nair, Effect on Microgravit on Microcirculation, *Int. J.1. for Microgravity Research & Application III, 2*, 117-120, 1990.
15. R. Subramanian and R. Natarajan, A Two unit Redundant ststem with different types of failure and "imperfect" repair, *Microelectronics and Reliability*, 30, No.4, 697-699, 1990.
16. S. Kalpakam and G. Arivarigan, Inventory system with Random supply quantity, *O.R.Spectrum*, 12, 139-145, 1990.
17. V.B. Johri and R. Sudarsan, Transition to a New Radiation Era in Cosmic Evolution, *Astrophys. Lett & Comm* 26 (5), 1991.
18. V.B. Johri and D. Kalyani, Big bang, the changin scenario, *Bulletin of Allahabad Mathematical Society*, June, 1991.
19. P.R. Pathasarathy and B. Krishnakumar, On the number and sum of life times of overaged cells, *Ind.J.Pure.Appl.Math.* 21, 390-395, 1990.
20. P.R. Parthasarathy and B. Krishnakumar, Two Stochastic analogues of the logistic process, *Ind.J.Pure Appl.Math.*, 21, 965-969, 1990.
21. P.R. Parthasarathy and N. Balakrishnan, On the continued fraction approximation of the modified Bessel function, $I(t)$, *Appl. Math. Lett.* 3, 13-15, 1990.
22. P.R. Parthasarathy and M. Sharafali, A queue with birth process arrival and state-dependent service, *Int.J.Mod.Sim.*, 10, 13-16, 1990.
23. P.R. Parthasarathy and B. Krishnakumar, Density-dependent birth and death processes with state dependent immigration, *Math.Comp. Mod.*, 15, 11-16, 1990.
24. P.R. Parthasarathy and B. Krishnakumar, The number of sum of lifetimes of overaged cells in modified branching process, *Math. Comp.Mod.*, 15, 41-47, 1991.

25. P.R. Parthasarathy and M. Sharat Ali, Age-dependent branching processes with birth process immigration, *Int. J. Math. Edn. in Sci. and Tech*, 22, 317-320, 1991.
26. P.R. Parthasarathy and B. Krishnakumar, Stochastic logistic growth models in Ecology, *Hardbook of logistic distribution (Ed) N. Balakrishnan*, Marcell Dekker, 1991.
27. P.R. Parthasarathy and B. Krishna Kumar, A birth and death process with logistic mean population, *Comm. Stat. Theor. Methods*, 20, 621-629, 1991.
28. H.S. Paul and M. Venkatesan, Wave propagation in human bone of arbitrary cross section with a circular cylindrical cavity, *Journal of the Acoustical Society of America*, 29, 196-199, 1991.
29. H.S. Paul and M. Venkatesan, Wave propagation in a piezoelectric bone with cylindrical cavity of arbitrary shape, *International Journal of Engineering Science*, 29m 1991.
30. H.S. Paul and M. Venkatesan, Wave propagation in a hollow pyroelectric circular cylinder of crystal class 6, *Acta Mechanica* 33, 37-46, 1991.
31. H.S. Paul and G.V. Raman, Flexural vibrations of Pyroelectric solid circular cylinder, *Proceeding of Indian National Science Academy, Part A, Physical Sciences*, 57, 1991.
32. H.S. Paul and G.V. Raman, Vibrations of Pyroelectric plates. *Journal of the Acoustical Society of America*, 90m 1991.

10. Other Relevant Data

1. The department has now 4 PC's (1-XT and 3-AT) and one Siemens main frame terminal. One PC (AT) and the Siemens terminal are connected to UPS. Thus these can be used continuously even during power failures. These are used mainly for research work. It is hoped that the much-needed greater computing facilities of the Department will be enhanced in due course.
2. The research scholars of the department meet regularly under a forum called "Integration" to organise their academic activities.
3. Prof. P. Achuthan was elected as a fellow of the National Academy of Sciences.
4. Prof. S.K. Srinivasan was honoured by the Indian Society for Probability and Statistics. A One-day symposium on "Stochastic Processes and Their Applications" was held.

4.10 DEPARTMENT OF MECHANICAL ENGINEERING

1. Instruments/Equipment Designed and Developed

- a) Programmable Controller
- b) Laser - doppler velocimeter for determining laminar burning velocity.
- c) Microprocessor based leak detector for automobile radiators - developed for India Radiators Ltd., Madras. S.P. Venkateshan and N.Devasahayam
- d) Non-Uniform motion Cyclogearing as Indexing Mechanism
Prof.K.Lakshminarayana
- e) Telemetry for deep-hole drilling

2. New facilities added and major equipment procured

- a) A 3KVA online UPS system has been installed for use with the computing systems available in the Hydrothurbomachines Laboratory
- b) PC AT/386 system available in the Precision Engineering and Instrumentation Laboratory.
- c) A thermal solar water pump is built A new helical swirl burner is fabricated and tested available in the Thermodynamics & Combustion Engg. Laboratory.
- d)
 1. Pressurised fluidized bed combustion facility for combustion of Low grade fuels, built on a part of INDO-US NSF Project, V.M.K. Sastri and Ajit Kumar Kolar
 2. 10 Cm square circulating fluidized bed facility - Ajit Kumar Kolar
- e) Plasma spraying equipment capable of coating metals and ceramics
Dr.M.M. Mayuram Department has developed New Laboratory, to teach Engineering Graphics through Computers.
- f) Summer computer PC/AT (80 KB Hard disk) in Mechanical Handling Laboratory
- g) Full fledged CIM training system installed.
- h) Plasma spraying system installed.

3. Sponsored Projects

Title	Period	Funding Agency	Amount Rs. in lakhs	Co-ordinator
a) LPR Turbopump Cavitation Prediction	5 yrs.	RDE	8.88	H.C.Radha Krishnan S.Kumuaraswamy
b) Research on Flow through Axial Flow pumps	4 yrs	CBIP	3.40	H.C. Radha Krishna V.Balabaskaran S. Kumaraswamy
c) Development of pump turbine and analysis of 'S' campered profiles for fully reversible axial flow pump turbine	4 yrs.	CBIP	3.10	H.C. Radha Krishna P.A.Aswatha Narayana V.Balabaskaran
d) Cavitation & unsteady flow studies in tubular/bulb turbine suitable for minimicrohydro power plants	4 years	DST	8.90	H.C. Radha Krishna S. Kumaraswamy
e) Detailed studies special reference to the inlet flow variations	4 Years	CBIP	2.40	H.C. Radha Krishna S. Kumaraswamy
f) Studies on Super-Combustion	4 years from March 91	ISRO	7.00	K.A. Damodaran V. Sriramulu U.S.P. Shet
g) Interference Effects in Spray Cornbustion	1988-91	ISRO	4.96	R. Natarajan
h) Studies on the Mixing and Combustion Phenomena in Chambers.	1989-92	Aeronautics R&D	4.98	-do-

Title	Period	Funding Agency	Amount Rs. in lakhs	Co-ordinator
i) Numerical Modeling of Complex flows	3 years	NSF, USA	22.00	K.N.Seetharamu
j) Pressurised Fluid-		NSF, USA	37.60	V.M.K.Sastri Ajit Kumar kolar
k) CAD of Gear Cutting Tools	2 years	CSIR	2.00	M.S.Shunmugam V J yaprakash
l) Development of an Integrated approach for the system Adaptive control of CNC Machines based on workpiece monitoring	3 years	DST	21.65	V.Radhakrishnan R. Krishnamurthy Y.G.Srinivasa
m) CAD-CAM	Till 90	MHRD	Ongoing	V.Radhakrishnan C.S.Krishnamoorthy
n) CIM	Till 90	MHRD	35.00	V.Radhakrishnan
o) Set up of Laser machining facility	1 Year	MHRD	15.00	R.Krishnamurthy N.Ramesh Babu
p) Accoustic emission technique for condition monitoring of Mfg. systems	3 Years	ARDB	7.44	R.Krishnamurthy L.Vijayaraghavan

4. Major Consultancy Assignments

Title of Assignment	Organisation	Amount Rs.in Lakhs	Coordinator(s)
a) Design of impeller	Beacon Weir, Madras	0.10	S.Kumaraswamy
b) Development of jet	BEAMA, Madras	0.35	S. Kumaraswamy
c) Check of impeller design and improvement of pump performance	Best and Crompton, Bangalore	0.10	S.Kumaraswamy
d) Testing of pumps, Analysis and Advice	Best and Crompton, Madras	0.09	S.Kumaraswamy
e) Consultation for ETP Project	Best and Co., Madras	0.30	V.S. Raju
[+ Aspects concerning pumps are handled by S. Kumaraswamy]			
f) RBIC	BEL,Ranipet	4.60	M.Singaperumal Y.G. Srinivasa
g) Development of design correlations for industrial steam Turbines based on Transient thermal studies	BHEL	2.0	V.M.K. Sastri
h) Development of an inprocess gage for grinding	Pilot Engines Pvt. Ltd.	0.20	S.P.Venkateshan
i) Design Analysis of Calenders drum	MRF Ltd.	0.035	M.M. Mayuram M.A.Veluswami S.Krishnamurthy

Title of Assignment	Organisation	Amount Rs.in Lakhs	Coordinator(s)
j) Development of triangular Engine	Hindustan Motors	0.74	V.K. Gopala-krishnan P.Srinivasa Rao V. Ganesan
k) Evaluation of Diesel additives for improved performance	Petcon Consultants Delhi.	0.60	
l) Investigation of Drilling Holes in CFC plates	Aeronautical Development Agency, Bangalore.	0.95	V.Radhakrishnan R.Krishnamurthy
m) Retainer	Guindy Machine Tools Ltd, Madras.	0.12	V.Radhakrishnan
n) Work simplification and qty. improvement	Southern Ind. Corpn.Pozhal Madras.	0.10	O.V.K.Chetty
o) Modernisation of tool room	Tube Products Madras.	0.12	O.V.K.Chetty

5. Honours and Awards

Name	Designation	Honours/Awards
1. V.M.K. Sastri	Professor	Elected Fellow of the American Society of Mechanical Engineering (Fellow ASME)

Name	Designation	Honours/Awards
2. S.P. Venkateshan	Professor	NASA Tech. Rvief Award for "Acoustic Humidity Sensor", Certificate and Cash Prize of U.S. Dollars 150, Awarded by NASA, Washington DC, U.S.A.
3. S.P.Venkateshan	Professor	US Patent No.4,915,816 on April 10, 1990 granted for "Polymer Hygrometer for Harsh Environments".

6. Distinguished Visitors to the Department

Visitor's Name	Affiliation	Purpose of Visit
1. a) Mr.E.Alagappan b) Mr.P. Arumugam c) Mr.J. Jeyaprakash	Beacon Weir, Madras	Visit during Open House for Industries
2. A F.Dolidovich	Luikov Heat and Mass Transfer Istt., BSSR Academy of Sciences, Minsk, 22 - 29 Nov.'90	Interaction with faculty on area of mutual interest and Academy of lectured on "Environmental mental protection from Harmful Organic Substances"
3. Bernard Roth	Professor of Mechanical Engg. Stanford University, CA, USA	Interaction with Faculty and Students
4. Prof.W.Massberg	Rektor, Ruhr University Bochum, Germany.	-do-

Visitor's Name	Affiliation	Purpose of Visit
5. Prof.Ranga Komanduri	Oklahoma State University, USA.	Interaction with Faculty and students.
6. Prof.V.C.Venkatesh	Chairman, Mech. Engg., Tennessee.Univ., Cookeville, USA.	-do-
7. Prof.Hans.Wagner	Fachhochschule, Karlsruhe, Germany.	-do-

7. Visit of Faculty Members to other Institutions

Name of Faculty	Institution visited and duration of visit	Purpose of visit
a) Dr.S.Kumaraswamy	Coimbatore Institute of Technology, Coimbatore 2 days	Deliver Lectures at ISTE Summer School
b) Dr.V.Balabaskaran	-do-	-do-
c) Dr.S.Kumaraswamy	Institution of Enggs. (India) Coimbatore	Deliver a Technical Lecture
d) Dr.S.Kumaraswamy & Dr.V.Bala-Baskaran	TNPL, Kagihapuram one day	Discussion regarding performance testing of River Water intake
e) Dr.S.Kumaraswamy	Sam Engineering Co. Coimbatore	Witness testing of wet type sump pumps for amburtec.
f) Dr.S.Kumaraswamy	BEAMA, Madras	Industrial Consultancy work

Name of Faculty	Institution visited and duration of visit	Purpose of visit
g) Dr.V. Balabaskaran	University of Karlsruhe, West Germany during Sept. to No. 1990.	Under short term Invitation Programme of DAAD
h) Dr.U.S.P. Shet	Engler Bunte Instte. Karlsruhe University Germany 3 months upto Sept.90	R & D work on a new Swirl Burner.
i) Dr.Ajit Kumar Kolar	New York University for 2 Weeks in October 1990	INDO-NSF Project consultations.
j) Prof.S.P.Venkateshan	IISC Bangalore, 3 days in Aug. 1990 as UGC invitee	Special Lecutre on "Differential interferometry" and discussion with faculty.
k) Prof.S.P.Venkat-	REC - Calicut, 3 Days in November 1990	Delivered an invited lecture on "Research in Heat Transfer-Problems and Prosputs".
l) Prof.V.Radhakrishnan	Ruhr University, Bochum, Germany. (17.8.90. to 1.11.90)	Study visit
	Technical University, Vienna, Austria.	Invited Seminar talk
	Asian Institute of Technology, Bangkok, Thailand. (March, 91).	Invited Lectures

Name of Faculty	Institution visited and duration of visit	Purpose of visit
m) Prof.P.K.Phillip	Ruhr University Bochum, Germany. (02.11.90 to 15.1.91)	Study visit
n) Prof.O.V.K.Chetty	Ruhr University Bochum, Germany. (17.8.90 to 1.11.90)	Study visit
o) Dr.G.Kuppuswamy	Ruhr University Bochum, Germany. (1.6.90 to 13.8.90)	Study visit
p) Dr.R.Krishna Kumar	Ruhr University Bochum, Germany. (1.6.90 to 13.8.90)	Study visit
q) Mr.S.Boopathy	Ruhr University Bochum, Germany. (02.11.90 to 15.1.91)	Study visit

8. Seminars/Symposium/Conferences/Short-Term courses organised

Topic	Date
a) QIP Summer School on "Trends in Precision Manufacturing". Co-ordinators : Dr.K. Narayanaswamy and Prof.R.Krishnamurthy.	June 4-15, 1990.
b) Seminar Tank - Performance Characteristics of a New Helical Swirl Burner, at Engler-Bunte-Inst. der Universitat Karlsruhe (T.H.) Lehrstuhl 1 Und Bereich Feuerungstechnik, Germany.	18.9.1990

Topic	Date
c) National seminar on Thermal spraying	March 8, 9-1991
d) ISTE Summer School on Flexible Automated Mfg.	20.5.91 to 1.6.91
e) Short term course on CAD for TAFE, Madras	April-May 91
f) Short term course on manual part programming for TAFE, Madras	Feb. 22, 23 and Mar.1 & 2, 91.

9. Participation in Seminars/symposia/conferences, etc.

Staff Member	Particulars of participation - Conference/ Seminar/ Symposia/Short-term course - Name, Date and Venue	Nature of Participation
a) Dr.S.Kumaraswamy	ISTE Awareness programme on utilisation of ETV facilities and Programmes ETC,CCE, IIT, May 14-21, 1990	Participant sponsored by IIT, Madras
b) Dr.S.Kumaraswamy	BHEL-IIT Workshop on collaborative research, BHEL, Hyderabad, Aug 3, 1990	Represented as a member of IIT Madras team
c) Dr.S.Kumaraswamy	6th National Convention of Computer Engineers (1), Tichy Sep 21-23, 1990	Delegate - presented a paper
d) Prof.T. Nagarajan	i) International AMSE Conference "Signals and Systems" Tirupati, India, 10-12 Dec. '90.	Presented a Paper

Staff Member	Particulars of participation - Conference/ Seminar/ Symposia/Short-term course - Name, Date and Venue	Nature of Participation
	ii) International Conference "Design Automation and Computer Intergrated Manufacturing, at PSG Tech. Coimbatore 7-10 Jan. '91.	Presented a paper
e) Dr.M.Singaperumal	i) FPSI Regional Seminar on "Proportional and Servo-hydraulic Controls" at Hotel Connemara, 7 Dec. '90.	Invited lecture
f) V.Radhakrishnan	One line tool wear estimation using a linear discriminant function, 13th AIMTDR, Dec.1990, IIT, Bombay.	Presentation of paper.
g) Dr.AjitKumar Kolar	Third International Conference on Circulating Fluidized beds, Oct 15-18, 1990, NagoyaUniversity Nagoya, Japan	Presented a paper "Heat Transfer Model for the Membrane wall of High Temperature circulating Fluidized Bed" by M.Mahalingam and Ajit Kumar Kolar.
h) K.Lakshminarayana	Sixth National Convention of Mechanical Engineer, Bangalore, October, 1990.	Invited lecture
i) Prof.M.A.Parameswaran Dr.K.Ramakoteswara Rao	The Institute of Engineers (India) All India Seminar an Bulk Materials Handling Techniques August 4-5,1990. Visakhapatnam	Presented 2 papers

Staff Member	Particulars of participation - Conference'/ Seminar/ Symposia/Short-term course - Name, Date and Venue	Nature of Participation
j) Prof.M.A.Parameswaran	Sixth National Conventors of Mechanical Engineering, Bangalore. October 1990.	Presented 2 papers
k) Dr.B. Nagalingam	National Symp. on Natural Gas Utilisation April 19-21, 1990.	Paper presented
l) Dr.P.Srinivasa Rao Dr.V.K. Gopala-Krishnan	Performance of Vegetable oils as Fuels in Diesel Engines, The Sixth Annual Convention of Bio-Energy Society of India, Madurai 29-31 Jan, 1990.	Paper Presented
m) Prof.V.Radhakrishnan	CIRP Conf. at Berlin, 1990 14th AIMTDR Conf. at IIT, Bombay, 1990	Delegate Chairing a Session & Delegate
n) Prof.P.K.Philip	CIM Seminar at Univ. Bochum, Germany, 1990.	Delegate
o) Prof.R.Krishnamurthy	Int. Conf. on signal monitoring and processing, Dec. 90, Tirupathi. 14th AIMTDR Conf. at IIT, Bombay, Dec. 1990.	Chairing a Session Chairing a Session
p) Dr.L.Vijayaraghavan	Int. Conf. on Design Atmn. and Computer Integrated mfg. at PSG College, Coimbatore, Jan. 1991.	Chairing a Session

Staff Member	Particulars of participation - Conference/ Seminar/ Symposia/Short-term course - Name, Date and Venue	Nature of Participation
q) Dr.B.Ramamoorthy	Int. Conf. on Design Atmn. and Computer Integrated mfg. at PSG College, Coimbatore, Jan. 1991.	Delegate
	14th AIMTDR Conf. at IIT, Bombay, Dec. 1990.	Delegate
r) Dr.R.Krishna Kumar	44th Annual Technical Meet., Indian Institute of Metals, Nov.14-17,1990,Tiruchirapalli.	Guest lecture
	78th Indian Sc.Congress, Indore, 3-8 Jan., 1991.	Guest lecture
s) S.Boopathy	Short term course on "Design of Robots and Manipulators" at DRDO Centre for AI & Robotics, Bangalore, July'90.	Participant

10. Research Publications

1. Aswatha Naryana, P.A. & H.C. RadhaKrishna, Flow Visualisation studies over 'S' blade of a fully eversible pump - turbine, Irrigation and Power Journal, July, 1990.
2. S.V. Subbaramiah, S. Kumaraswamy and H.C.Radha Krishna, Integration of FORTRAN and AUTOCAD for design and drafting of a Radial Flow Pump, 6th National Convention of Computer Engineers Inst. of Engineers (India.), Trichy, Sept. 21-23rd, 1990.
4. K. Annamalai & V.Sriramulu, "High Frequency Combustion Instability problem encountered in LPR engine with radial injectors" - 17th Int. Symp. on Space Technology and Science, May 20-25, 1990, Tokyo, Japan.

5. V.B.Gandhe, A. Venkatesh & V. Sriramulu, "FMDE Solar collector system for application in power generation in thermal energy facility", Proc. National Solar Energy Convention, 1990, pp.349-353.
6. A.Mani, A.Venkatesh & V.Sriramulu, "Theoretical and Experimental Investigations of Generators in a two stage solar regenerator", Energy, Vol.16, pp.675-683, March,1991.
7. K. Thyagarajan and K.A. Bhaskaran, "Effect of Argon Dilution on the preignition oxidation kinetics of Benzene, International Journal of Energy Research, Vol.15, pp.235-248,(1991)..
8. Banerjee, B.Rao, K.V.C. and Sastri, V.M.K., Transient free convective heat transfer from co-rotating concentric disks' International J. Heat Mass Transfer, Vol.33, No.6 pp.1177- 1182, 1990.
9. Sablani, S.Venkateshan, S.P. and Sastri, V.M.K. 'Numerical study of two-dimensional freezing in an annulus', Journal of Thermophysics and Heat Transfer, Vol.4, No.3, 398-400, July 1990.
10. A.Sarkar, and Sastri, V.M.K., 'Finite Element Analysis of two-dimensional melting in rectangular enclosures in the presence of convection', Proceedings of 9th Intl.Conference, Jerusalem, Isrel, 1990.
11. R.Rajamani,C.Srinivas and K.N. Seetharamu, Finite Element analysis of convective heat transfer in porous media, Int. J. Numer. Methods in Fluids, Vol.11, 331-339,1990.
12. K.N. Seetharamu and S.Swaroop, The effect of size of the performance of a fluidized bed cooling tower, Wärme und Stoff 26, 17-21, 1990.
13. K.N. Seetharamu and P.Datta, Free convection in a saturated porous Medium adjacent to a non isothermal vertical impermeable wall, Wärme und Stoff, 25, 9-15, 1990.
14. N. Meikandan, R.Raman, M.Singaperumal,K.N.Seetharamu, Theoretical analysis of tapered pistons in high speed hydraulic actuators, Wear, 137, 299-321, 1990.
15. M.S. Ravishankar,K.N.Seetharamu, P.A.A.Narayana, Finite element simulation of developing turbulent flow through a smooth circular pipe. - comparative evaluation of nine turbulent models, 17th National conference on Fluid Mech. and Fluid Power, REG Warangal, 13 - 15 Dec. 1990.
16. M.Mahalingam and Ajit Kumar Kolar, Heat Transfer model for the Membrane wall of a high temperature circulating Fluidized Beds, Nagoya University, Japan, 15 - 18 Oct. 1990.

17. S.P. Venkateshan and O.Soliappan, A general integral method for one dimensional ablation, *Warne and Stoff*, 25, 141-14, 1990.
18. C.B.Sobhan, S.P. Venkateshan and K.N.Seetharamu, Experimental studies on steady free convection heat transfer from fins and fin arrays, *Warne and Stoff*, 25, 345-352, 1990.
19. V.Ram'nohan Rao, C.B. Sobhan and S.P. Venkateshan, Differential interferometric studies on natural convection heat transfer from horizontal retangular fin arrays, 9th Inst. Heat Transfer Conference paper No. 2NC - 09, 211-216, Jerusalem, Agu.1990.
20. S.P. Venkateshan, Simultaneous determination of thermal conductivity and thermal diffusivity of liquids by a trans- ient technique, ASME Heat Transfer Div. Publ, V-129, General papers, 5th ATAA/ASME Thermophysics and Heat Trasfer Conference Seattle, USA, June 18-20, 1990, pp. 127-152, Nov. 1990.
21. S.Krishnamurthy & A.Ramamohana Rao, A comparitive study on the performance of differently treated plain carbon steel gears, *journal of Wear*, March, 1991 (IAL., 239-252
22. P.V. Mohan Ram, S. Krishnamurthy and A. Ramamohana Rao, A numericalmethod for the lubricant pressures in Journal Bearing operating under mixed lubrication condition, National Conference on Industrial Tribology, Bangalore, Feb., 1991. Dr. N. Siva Prasad - 2
23. K.Lakshminarayana, Variable Ratio Gearing with Backlash Adjustment: Recent Advances in Mechanical Power Transmission, Sixth National Convention of Mechanical Engineers, Bangalore, October, 1990.
24. G. Muthuveerappan - One paper - 1990.
25. M.Madhusudana Rao, T. Ramakrishnan, P. David, Numerical Study of Plug-Type Pneumatic Conveying Powder Handling and Processing V1.3, No.1, March 1991.
26. C.J.G.Chandra, Y.L. Srinivas, K.N. Seetharam and M.A. Parameswaran, "Investigation of Airfilm conveyor Pressurised through multiple holes" Finite elements in Analysis and Design No.6, P.235-243, 1990.
27. M.A. Parameswaran, S.Narahimhan and V. Srinivasan, "An the bending of a stressed wire - case study of a Tension measuring device strain, August 1990, p 99/106.

28. Dr.V. Ganesan, Automotive Gas Turbines - A Review of Alternative Solutions, Jl. of Instn of Engineers (India., Vol.70, pp.88-92, 1990.
29. Ramachandra Raju, V., Mahalakshmi, N.V. Srinivasa Rao, P. and Ganesan, V., Theoretical Studies in a Two-Dimensional Diffuser With and Without Velocity Distortion, Proceedings of the Seventeenth National Conf. on Fluid Mechanics and Fluid Power, Regional Engineering College, Warangal, India, pp.C-39-C.43, 1990.
30. Subramaniam, S., Sampath, S., Srinivasa Rao, P. and Ganesan, V. Turbulent Flow Inside the Cylinder of a Diesel Engine - An Experimental Investigation Using Hot-wire Anemometer, Jl. of Experiments in Fluids, Vol.9, No.3, pp. 167-174, 1990.
31. V. Ramachandra Raju, N.V. Mahalakshmi, P. Srinivasa Rao, and V. Ganesan, Predictions of Flow and Boundary Layer Development in Adverse Pressure Gradient Flows, Jl. of Aeronautical Society of India, Vol.42, pp.287-292, Nov. 1990.
32. Meikandan N, R.Raman, M.Singaperumal, "Theoretical Analysis of Tapered Pistons in High speed Hydraulic Actuators", Jl. of Wear, Vol.137, p299-321, 1990.
33. Meikandan N, R.Raman and M.Singaperumal,"Computer Aided Analysis on the effects of certain Profiles on Sealless Pistons and Spools", Proc.METACUTFORM 90-National Seminar on Advances in Metal Cutting and Metal Forming, May, 1990, Madras.
34. Meikandan N, R.Raman and M.Singaperumal, "Theoretical studies using FEM on the Effect of Mid-point Pressure in Tapered Sealless Pistons of Hydraulic Actuators", Proc. 14th AIMTDR Conference, Bombay, p121-126, 1990.
35. Prasad K, M.Singaperumal and P.C. Sasidharan Nair, "Analysis and Design Improvements of a Hydraulic Turret System", Proc.14th AIMTDR Conf., Bombay, p.145-148, 1990.
36. G.Sekar, M.Singaperumal and V.H. Purushotham, "Design, Analysis and Implementation of Proportional Hydraulics in Plastic Injection Moulding Machines", Proc.14th AIMTDR Conf., Bombay, p 411-415, 1990.
37. Junaid Basha A.M., M.Singaperumal and K. Narayanaswamy, "Hydrostatic Transmission for Steering of Armoured Fighting Vehicles, Proc. National Seminar on Recent Advances in Mechanical Power Transmission, Bangalore, p75-86,1990.

38. R.Lakshmi Naryana, M.Singaperumal, B.K. Garudachar and M.K.Ramamurthy "Simulation of Aircraft Gas Turbine Engine Hydromechanical Fuel Control System using Digital Computers, Accepted for Presentation at Sixth National Convention of Aerospace Engineers, 24-25, Jan. 1991, Bombay.
39. M.Singaperumal, "Proportional and Servohydraulic Controls", Invited lecture at FPSI Regional Seminar, Madras, 1990.

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40. P.R.Nakkeeran, V.Radhakrishnan, 'A study on the effect of regulating wheel error on the roundness of workpiece in centreless grinding by computer simulation', Int. J. Mech.Tools Manufacturing, V.30, 191-201, 1990.
41. P.R.Nakkeeran, V.Radhakrishnan, 'Role of regulating Wheel shape on the workpiece form in centreless grinding', J.Instrn.Engrs. (India) V.70, 84-87, 1990.
42. A.Gangadhar, M.S.Shunmugam and P.K.Philip, 'Surface modification in electrodischarge processing with a powder compact tool electrode', wear, 143 (1991) 45-55.
43. M.V.Kowstubhan, P.K.Philip, 'On the tool-life equation of Tin-coated high speed steel tools', wear, 143 (1991) 267-275.
44. P.K.Philip and Y.Basheerkutty, 'Reclamation of metal cutting brass chips using powder metallurgy', Powder metallurgy, London, UK, Vol.34, No.1.
45. G.Santhanakrishnan and R.Krishnamurthy, 'Preliminary investigation of machining of reinforced composites', JI. Aero.Soc., India, Vol.42, No.1, 1990, pp.57-62.
46. D.S.Roosevelt and R.Krishnamurthy, 'Natural/open leather drying in contrast with controlled drying', JALCA JI, Vol.Lxxxv, No.4, April, 1990, pp.105-113.
47. Kurapati Venkatesh, O.V.Krishnaiah Chetty, and K.Ravi Raju, 'Simulating Flexible Automated Forming and Assembly Systems', Int.J of Materials Processing Technology, V.24 (1990), pp 453- 462.
48. M.P.Rajith, C.Eswara Reddy and O.V., Krishnaiah Chetty, 'A Simulation for scheduling in FMS', selected papers from 10th Int. Conf. on Production Research, Univ. of Nottingham, UK, 1990.

49. Lakshmanan, O.V.Krishnaiah Chetty and E.Unnikrishnan, 'Evaluation of dust hazard index in ferrous foundries', Indian Foundry Journal, Jn. (1990), pp.41-45.
50. Mr.S.D.Kalandar Saheb and K.Gopinath, 'Powder Metallurgy gears - A brief review', Powder Metallurgy Science and Technology, Vol. 1 No.4, pp.43-66, July, 1990.
51. R. Krishnakumar, R. Narasimhan and O. Prabhakar, 'Finite Element Analysis of dynamic crack growth under plane stress in a viscoplastic material' - Accepted for publication in Eng. Fracture Mechanics - An International Journal.
52. R.Krishnakumar, R.Narasimhan and O.Prabhakar, 'Temperature rise in a viscoplastic material during dynamic crack growth'. Accepted for publication in Int. JI. of Fracture
53. M.S.Shunmugam and G.Somasundaram, 'Investigations into reaming process by frequency decomposition technique', Intl. JI. of Production Research, 1990, V.28, n.11, pp.2065-74.

International Conferences

54. S.Ramesh, B.Ramamoorthy and V.Radhakrishnan, 'Surface finish monitoring by a Laser diffraction technique' Intl. conf. on Design Automation and Computer Integrated Manufacturing at PSGCT Coimbatore, Jan '91.
55. P.Venkateswara Rao, B.Ramamoorthy and V.Radhakrishnan, 'Role of plating on the load carrying capacity of shrink fitted assemblies', 11th Intl. Conf. on Production Research (ICPR), at Hefei, China, Aug. 1991.
56. G.Santhanakrishnan and R.Krishnamurthy, 'Investigation on machining of GFRP, CFRP and KFRP Composites', Int. Conf. on Advances in Comp. Materials, ICACM, 1990, IIT, Bombay.
57. B.L.Anantharamu and R.Krishnamurthy, 'Grindability of ceramics using CBN', Int. Conf. on Powder Metallurgy, PM 90, July, 1990, U.K.
58. M.Raghunandan and R.Krishnamurthy, 'Condition monitoring system for machining applications', COMADEM-90, II Int. Cong. on condition monitoring, Brunel, U.K., July 16-18, 1990.
59. M.Raghunandan and R.Krishnamurthy, 'Review of condition monitoring for manufacturing', IInd International machinery monitoring and diagnostic conf., Union College, Schnectady, New York, Oct.22-25, 1990.

60. V.Sivasankaran and R.Krishnamurthy, 'Fatigue characteristics of oxide ceramics', Fatigue 90, Soc. of Materials Sci., Japan, July, 1990.
61. T.S.Chelladurai and R.Krishnamurthy, 'Developing a criterion for the real-time structure integrity monitoring of M250 maraging steel pressure chamber', Xth Intl. A.E. Simp., Tohoku Univ., Japan, Oct.22-25, 1990.
62. M.Pugazhendi and R.Krishnamurthy, 'Condition monitoring in drilling', Int. AMSE Conf., on signals and systems, Tirupati, Dec.10-12, 1990. Vol.3, pp.163-171.
63. Kurapati Venkatesh, K.Ravi Raju and O.V.Krishnaiah Chetty, 'Simulating Flexible Automated Forming and Assembly systems', International Conference on Developments in Forming Technology, Lisbon, Portugal, Sept. 12-14 (1990).
64. C.Eswara Reddy, O.V.Krishnaiah Chetty and Dipak Chaudhuri, 'Expert Tool in Flexible Manufacturing System' Proc. of Int. Conf. on Automation, Robotics and Computer Vision, Singapore, Sept. 18-21 (1990), pp 133-137.
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66. M. D.Sreekumar, C.Eswara Reddy and O., V.Krishnaiah Chetty, 'An improved Lot Sizing Policy for variable demand', Proc. of 5th Int. Conf. on CAD/CAM Robotics and Factories of the Future, Virginia Dec 1990.
67. C.Eswara Reddy, O.V.Krishnaiah Chetty and Dipak Chaudhuri, 'An objective SIMTOOL in FMS', Proc. of 5th Int. Conf. on CAD/CAM Robotics and Factories of the Future, Virginia, Dec. 1990.
68. C.Eswara Reddy, O.V.Krishnaiah Chetty and Dipak Chaudhuri, 'Information flow and tool management strategies in FMS', Proc. of Int. Conf. on AMSE - Signals and Systems Tirupati, Dec. 1990.
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80. Roy Jacob, N.G.Nair and P.K.Philip, 'Computer aided mould design for SMC compression moulding', 14th AIMTDR conference Dec. '90 at IIT Bombay, pp.453-457.

81. L.M.Arunachalam and R.Krishnamurthy, 'Machining study of ferrous materials SAE1010 with TTZ inserts', XIV AIMTDR Conf., Dec.19-21, IIT, Bombay, 1990, pp.9-14.
82. N.Sitarama Prasad and R.Krishnamurthy, 'Studies on Grinding of annular elements', *ibid*, pp.29-36.
83. V.Sivasankaran and R.Krishnamurthy, 'Plastic deformation characteristics of ceramic tools, *ibid*, pp.351-356.
84. P.Venkitakrishnan and R.Krishnamurthy, 'Electron beam welding of aerospace materials', National workshop-R&D on welding Tech., DST, New Delhi, July, 1990.
85. C.Eswara Reddy, O.,V.Krishnaiah Chetty and Dipak Chaudhury, 'A Design of tool delivery system using Expert simulation in FMS' Proc. of 6th Natl.Convention of computer Engineers, Trichy, Sept.(1990), pp I - 8 to 12.
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87. K.Ravi Raju, K.Venkatesh and O.V.Krishnaiah Chetty 'Application of Petri Nets for unmanned Flexible Manufacturing Systems', 14th AIMTDR IIT Bombay, Dec. (1990)
88. K.Ravi Raju, K.Venkatesh and O.V. Krishnaiah Chetty, 'Facilities scheduling in Flexible Manufacturing Systems using Petri Nets' , National Seminar on Advances in Metal Cutting and Metal Forming, MIT Madras, May 24-25, (1990).
89. G.Prabhakara Rao. O.V.Krishnaiah Chetty and R.Narayan 'Investigations on Electrochemical Anodic Shaping' Proc. of 14th AIMTDR Conf.Bombay Dec. 1990.
90. C.Eswara Reddy, O.V.Krishnaiah Chetty and Dipak Chaudhury, 'Tool replacement strategy in Flexible Manufacturing systems, 14th AIMTDR Conf. Bombay, Dec. (1990).
91. V.Sajeew and L.Vijayaraghavan, 'An investigation into the broaching process, National Seminar on Advances in metal cutting and metal forming, Madras Institute of Technology, Madras, May 1990.
92. K.I.Ramachandran, L.Vijayaraghavan, N.Ganesan and R.Krishna- murthy, 'Three dimensional analysis of grinding wheel stresses', Intl. Conf. on Design Automation and Computer Integrated Manufacturing at PSGCT, Coimbatore, Jan.'91.

11. Any other relevant

1. Design and assembly of throttle actuator using microprocessor
2. Development of an expert system for fault diagnosis of a single cylinder diesel engine.
3. Simulation of curling system and optimal layout of cooling system components.

4.11 METALLURGICAL ENGINEERING DEPARTMENT

1. New Courses introduced

S.No.	Course No.	Title	Structure	Faculty
1.	MT 222	Mech. Met. Lab. Students are exposed to the latest material testing facilities like Servo- hydraulic machine, Electro-mechanical closed loop machine, Instrument Impact, Cracktronic etc.Experiments are devised on these equipment and demonstrated/conducted.		Dr.S.D.Pathak
2.	'MT	Trasport phenomena in Metallurgy	3-0-0-3	Dr.S.Ramakrishna Iyer
3.	'MT	Advanced Metallurgical Thermodynamics	3-0-0-3	Dr.S.Raghavan
4.	'MT	Metallurgical Process Modelling	3-0-0-3	Dr.D.G.R.Sharma
5.	MT 665	Ceramic Science and Technology	3-0-0-3	Dr.Paramanand Singh
6.	MT 321	Refractories and Ceramics	3-0-0-3	„
7.	MT 322	Materials Science forElectronic Engineers	3-0-0-3	Dr.R.Vasudevan Dr.K.Swaminathan

2. Instrument/Equipment Designed and Developed

- 1) A High power ultrasonic transducer-concentrator together with power source was designed and developed as part of the ISRO-IIT(M) joint project.
- 2) Descaling chamber for sheet metal formability assessment.
- 3) High temperature testing attachment for the Schenck Trebel Electromechanical testing machine.
- 4) Dies for superplastic forming of Titanium and other alloys.
- 5) Data base on Superplasticity (software)

- 6) Software for digitizing curves etc.
- 7) Software for die sinking for axi-symmetric forgings
- 8) Facility for data logging on the Schenck Trebel Electromechanical testing machine
- 9) Designed and fabricated the visious extrusion tooling for the production of superconducting wire (YBCO)
- 10) Designed and fabricated special backward a extrusion tooling.
- 11) Designed and fabricated twenty dies in respect of open die extrusion for Titanium and its alloys, aluminium, steel and sintired powder metallurgical performs.
- 12) A fracture toughness fixture for (TOD studies of thick plates (upto 30 mm) has been designed and fabricated.
- 13) Experimental set up for determination of thermodynamic properties of metal oxide systems by the high temperature solid electrolyte galvanic cell technique.
- 14) Hydrogen gas measurement set up by quantitative reduced pressure technique and by hydrogen probe.
- 15) Set up facility for low resistance measurement.
- 16) Setting up vacuum sintering furnace
- 17) Setting up Atmosphere controlled sintering furnace.
- 18) A Software called "CADCAST" to Simulate solidification has been developed.

3. New facilities added and major equipment procured

1.	Image analyser system with accessories	1 No.	Rs.	7,53,000-00
2.	X-ray diffraction equipment Micro-processor Centrallised x-ray stress analyser	1 No.	Rs.	8,75,000-00
3.	Static and Dynamic testing machine	1 No.	Rs.	12,98,5000-00

4. Sponsored Projects

Title	Period	Funding Agency	Amount (Lakhs)	Co-ordinator(s)
Solidification Modelling in Metallic Molds with thermal resistance at Mold/metal interface	3 years	DST	3.52	Prof. O. Prabhakar Dr. D. G. R. Sharma

Title	Period	Funding Agency	Amount (Lakhs)	Co-ordinator(s)
Thordynamics and phase relations in the system NiO-MgO-ZnO by a high temperature solid electrolyte galvanic cell.	3 years	CSIR	1.5	Dr.S.Raghavan Dr.S.K.Seshadri
Indo-German Project on Extending and Revamping the material testing facilities.	86-92	GTZ	310MDM	Dr.K.A.Padmanabhan Dr.S.D.Pathak
Fatigue behaviour and Fatigue crack growth studies on Mg and Al alloys	87-91	AR&DB	6.62	Dr.V.M.Radha-krishnan Dr.S.D.Pathak
REC-IIT interaction Development of Material Testing lab. at REC, Calicut.		HRD	5.0	Dr.S.D.Pathak Dr.V.George (REC, Calicut)
Synthesis and fabrication of High temperature super-conductivity wire	88-91	DST	1.02	Prof.G.V.Subba Rao Dr.P.Venugopal
Study of the effect of ultrasonic vibrators in heat treatment of some age hardening alloys of aluminium and magnesium.	3 yrs	ISRO	4.00	Dr.R.Vasudevan Dr.K.J.L.Iyer
Superplastic forming of some aluminium and titanium alloys-Phase II	87-91	ARDB		Dr.K.A.Padmanabhan
	88-91	SAIL		-do-
Explosive Bending of Higher T_c super-conducting powders	88-90	DST	2.3	-do-

Title	Period	Funding Agency	Amount (Lakhs)	Co-ordinator(s)
Indo-USSR project on the Physical fracture of superplastic deformation	89-	DST	Only exchange of Scientist	
CAD in Metal casting	90-93	DST	10.32	Dr.O.Prabhakar

5. Major Consultancy Assignments

Title of assignment	Organisation	Amount	Co-ordinator(s)
		Rs.	
Investigation of FD grid failures	National Thermal Power Corpn.Ltd., New Delhi	20,000	Prof.KJL.Iyer
Failure analysis	F A C T Ambalamedu,Cochin	15,000	-do-
Failure analysis	Coromandal Fertilizers Ltd., Visakhapattinam	25,000	-do-
Impact testing	Coromandal Engg. Co.,Ltd., Madras	10,000	-do-
Mechanical Metallographic test	Madras Refineries Ltd., Madras.	30,000	-do-
Failure analysis	The Tamilnadu Petroproducts, Madras.	15,000	„
Study the problem of rejection in the wing bay castings	D.R.D.L., Hyderabad	40,000	Prof.H.Md. Roshan

Title	Period	Funding Agency	Amount (Lakhs)	Co-ordinator(s)
Testing of condenser tubes	Ennore Thermal Power Station Madras.		17,000	Prof.KJL Iyer Dr.S.K.Seshadri
Tensile testing	K.C.P. Ltd., Madras		11,250	Prof.K.A. Padmanabhan

6.Honours and Awards

Name/Designation		Honours/Awards
Prof.K.A.Padmanabhan,	Professor	Materials Research Society of India, Madras 1990 Life Member, Materials Research Society of India.
Prof.H.Md.Roshan,	Professor	Was awarded a certificate of recognition by the International committee of Foundry Technical Associations for his Scientific Contribution on the occasion of the 56th World Foundry Congress in Dusseldorf, Germany.
Prof.P.Venugopal,	Asso.Prof.	Best paper award at the National Seminar on Advances in Metal Forming and Metal Cutting at MIT, Chrompet, Madras - Organised by the Anna University.

7.Distinguished visitors to the Department

Visitor's Name	Affiliation	Purpose of Visit
1. Prof.A.K.Mukherjee	University of California Davis Camp, UNIDO expert at DMRL Hyderabad	Seminar talk

Visitor's Name	Affiliation	Purpose of Visit
2. Sri T.A.Abinandan	Carnegie Mellon University Pittsburgh, USA	Seminar talk
3. Prof.T.R.Anantharaman	Director, Thaper Inst.of Engg. and Tech.and Thaper Corporate Research and Development.	-do-
4. Dr.P.Ganesan	INCO Alloy Corporation, Huntington, West Virginia	-do-
5. Prof.Dr.-Ing.Lother Issler	Federal Republic of Germany	Workshop
6. Prof.R.L.Apps	Cranfield Inst. of Tech. U.K.	Seminar talk
7. Dr.G.Venkataraman	B H E L., Tiruchi	-do-
8. Dr.Sood and Dr.C.Ganguli	B.A.R.C. Bombay	-do-
9. Prof.Placid Rodriguez	IGCAR, Kalpakkam	Workshop
10. Dr.V.S.Raghunathan	-do-	-do-
11. Dr.D.Ramakrishnan	Carborandum Universal Madras	-do-
12. Dr.U.Diwakar	W.S.Insulators, Madras	-do-
13. Dr.K.Balasubramaniam	Tribology India Ltd., Madras	-do-
14. Dr.Sreeramesh Kalluri	Lewis Research Centre Cleveland, Ohio, USA	Seminar talk

8. Visit of Faculty Members to other Institutions

Institution visited and duration of visit	Purpose of Visit	Name of Faculty
Institut fur Metallkunde Technical University of Aachen, Germany May-June, 1990	Joint Research in the area of Grain Boundary sliding and superplasticity.	
Annamalai University June 1991 M.F.L.	Guest Speaker Invited lecture	
IIT Delhi 18.12.90-24.12.90	Advisor (Sports) Inter IIT meet.	
Univ. College of Swansea, University of Wales, UK 2 months (April-June 1990)	Indo-British link programme organised by British Council	
Oregon Graduate Institute (Dept. of Materials Science) Sept. 23-30, 1990.	Invited to deliver lectures on "Corrosion aspects of clad joints"	
IIT Kharagpur	Short term course	

9. Seminars/Symposium/Conference/Short-term courses organised

Topic	Date
Computer Applications in Foundries	21-22 Jan 1991
Workshop on MODERN METALLOGRAPHY IIT Madras.	4-5 March 1991
Workshop on WELDING TECHNOLOGY IIT Madras.	14-15 March 1991

10.Participation in seminar/symposia/conferences,etc.

Name	Particulars of partici- pation/Conf.Seminar/Symposia/ short-term course - Name, Date and Venue	Nature of partici- pation
Prof.K.A.Padmanabhan	International Symposium at Yugoslavia, Aug.27-31, 1990.	Chaired a session
	Annual Technical Meeting of the I.I.M., at Tiruchi Nov.14-17,1990	Invited Lecture
Prof.H.Md.Roshan	57th World Foundry Congress, Osaka, Japan, Sept.23-28, 1990.	Presented a paper
	39th Annual Convention of the Institute Calcutta Feb. 1991.	Presented a paper
Prof.O. Prabhakar	Modeling of Casting, weld- ing and Advanced Solidifi- cation processes. 17.9.1990, Davos, Switzerland.	Presented a paper.
Dr.P.Kesavan Nair	National Welding Seminar IIW, Bombay, Nov.22-24,1990	Paper presentation
Prof.K.J.L. Iyer	International Conference on Ceramics, at Orlando, Florida, Nov.12-14, 1990.	Paper presentation
Dr.P.Venugopal	National Seminar at Anna University, Madras May 1990.	Chairman of one of the session
Dr.S.D.Pathak	Fifth National Convention of Aerospace Engineers, Chandigarh.	Paper presentation

Name	Particulars of participation/Conf.Seminar/Symposia/short-term course - Name, Date and Venue	Nature of participation
Dr.S.Raghavan	International Conference on Chemical Metallurgy ICCM - 1991, Jan.9-11, 1991, BARC, Bombay	Paper presentation
Jr.D.G.R.Sharma	National Metallurgist Day and 44th Annual Technical Meeting, Nov.14-17, 1990 At Tiruchi.	Paper presentation
Dr.K.Prasad Rao	71st AWS Annual Conference, Anaheia, U.S.A. April 22-27, 1990	4 papers presented
Dr.Paramanand Singh	National Welding Seminar, Bombay, Nov. 22-24, 1990.	Paper presentation
Dr.Paramanand Singh	Short term course on Principles and Tech. for Processing of Advanced Materials IIT Kharagpur, June 25, July 10, 1990	Participant
Dr.Paramanand Singh	International Symposium on Materials for Advanced Tech. System,	Author of a paper.
Dr.K.Swaminathan	National Metallurgist Day, ATM 1990, Nov.14-17, 1990	Paper presentation
Dr.K.Swaminathan	Annual Technical Meeting of National Metallurgist Day of the IIM Trichi - Nov.14-17, 1990.	Paper presentation
Dr.K.Swaminathan	Indian Science Congress Assn. Material Science Section, 78th Session, Indore Jan.3-8, 1991.	Deliver a contributory

11. List of Publications

1. P.Kesavan Nair and R.Vasudevan, Characterisation of Aluminium / Nickel explosive welds, National Welding Seminar, 22-24 Nov 1990, pp.1-10 Pap.No.IV.2, Bombay.
2. George Thomas and R.Vasudevan, Metallurgical Investigations of Ti-6 Al-4 V welds, PRAKATISCHE METALLOGRAPHIE, 1991, 28, 171-178.
3. C.Ramakrishna Prasad, R.Somasundaram and R.Vasudevan, Corrosion fatigue behaviour of some copper based condenser tube materials, PRAKATISCHE METALLOGRAPHIE, 1991.
4. X-ray evidence for structural transformations in Ni1 Al alloy, at higher temperatures, die NATURWISSENSCHAFTEN, 1990, 77, 129.
5. N.D.Theodore and K.A. Padmanabhan, Numerical Optimisation of super plastic deformation, Journal of Materials Science, 25(1990) 2133 - 2143.
6. K. Swaminathan and K.A. Padmanabhan, 'Tensile Flow and Fracture Behaviour of a Superplastic Al- Ca-Zn Alloy', Journal of Materials Science, 25 (1990) 4579 - 4586.
7. K. Swaminathan and K.A. Padmanabhan, 'The Formability and Fracture Behaviour of an Extra-Deep Drawing Steel and Two Aluminium-based Alloys' Indian Journal of Technology, 28 (1990) 681 - 690.
8. D. Viswanathan, S. Venkatasamy and K.A. Padmanabhan, 'Macro-, Micro- and Re-entrant shape Forming sheets of Alloy Ti-6Al-4V', Journal of Materials Processing Technology, 24 (1990) 213 - 223.
9. K. A. Padmanabhan, 'On the Scientific Basis of Metals Processing', Materials Research Society of India Medal 1990 Acceptance Lecture, MRSI News letter 2 (1990) 45-48.
10. O.Prabhakar, A new stress update algorithm for viscoplastic materials, Int.Conf. on Advances in structural testing, Analysis and Design, Bangalore, Aug 1990.
11. O. Prabhakar, Dynamic Growth of Tensile cracks in rate sensitive elastic-plastic materials Ibid.
12. O. Prabhakar, Fatigue damage monitoring and assessment by acoustic emission technique, -ibid- pp 1319 - 1324.

13. O. Prabhakar, Soundness profiles in Aluminium alloy castings, Engg. Foundation Conference, Davos, Switzerland, Sept.1990, p.6.
14. O. Prabhakar, Dynamic Growth of tensile cracks in rate sensitive elastic plastic materials, Int. National Conf. on Computer Assessment and Control of localized damage, U.K., June 1990.
15. B.B.Jha, B.Raj, A.S. Kanna, D.K. Bhattacharya and K.J.L. Iyer, 'Correlation of A.E. events with parabolic oxidation behaviour of 2.25 Cr - 1 Mo steel, Journal of Materials Science letters 10(1990) 64-66.
16. K.J.L. Iyer, 'Some experiments and a critical discussion on the effect of atomic hydrogen on Martensite formation in eutectoid steel, Practical Metallography, 27 (1990) 406-411.
17. B.B.Jha, D.K. Bhattacharya, Baldev Raj and K.J.L. Iyer, 'Characterising the spallation of oxide scales from 2 - 25 Cr - 1 Mo ferritic steel using A.E. Technique, Paper presented - National Seminar on Nondestructive examination - 90 held at NFC Hyderabad during 12 - 14 April 1990.
18. B.B.Jha, B.Raj, A.S. Kanna, D.K. Bhattacharya and K.J.L. Iyer, 'Study of spallation characteristics of oxide scales by A.E. Technique, 28th National Metallurgist day 44 Technical Meeting. International symposium on Materials and advanced technology system, 14 - 17 Nov., 1990 Tiruchirappalli, paper 9.5.
19. C.S. Ramesh, S.K. Seshadri, and K.J.L. Iyer, 'Wear resistant electrocomposite coatings, Paper presented at the second International Ceramic Science and Technology congress and symposium on Ceramic, polymer and metal matrix composites, Orlando, Florida, 12-15 Nov.1990.
20. Devaraj, G. Guruviah, S. Seshadri, S.K., Pulse plating Mater. Chem. Phys. Aug 1990, Vol.25(5). 439-461.
21. C.S.Ramesh, S.K. Seshadri, K.J.L. Iyer, Environment resistant Nickel-Silicon Nitride composite coating, Second International Ceramic Science and Technology Congress and Symposium on Ceramic, polymer and metal matrix composites, Orlando, Florida, 12 - 15 Nov. 1990.
22. M.B.Lele, S.K.Seshadri, and Rajiv Nambiar, Passivation studies of lead-graphite, lead-MoS₂ and lead-CaF₂ composites obtained by sediment codeposition, Internat. Conf. MICMAR 91, Baroda, 14 - 16 Feb. 1991.
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23. P. Venugopal and T. Senthilvelan, 'Comparative Investigations on Compaction of Metal Powder - High velocity Hammer and Hydraulic Press', -ibid-, page 247 - 253.
24. P. Venugopal and K. Srinivasan, 'Some Experiences with open Die cold Extrusion', -ibid-, page 193 - 198.
25. S. Venugopal, S. Venkatesan and P. Venugopal, 'Problems in Working commercially Pure Titanium, Seminar on Advances in Metalcutting and forming (METCUTFORM 1990), May 1990.
26. P. Venugopal, S. Venugopal, and V. Seetharaman, Dynamic strain Ageing of unalloyed Titanium, Inter. Jour. of Materials Processing Tech., Amsterdam 21 (1990) 91/100.
27. P. Venugopal, S. Venugopal, and V. Seetharaman, Some Aspects of Flow curve Dependence of Ti on Temperature and Strain rate, -ibid-, 21 (1990) 201/217.
28. P. Venugopal, S. Venugopal, and V. Seetharaman, Influence of strain rate and Temperature on Friction Factor of unalloyed Titanium, -ibid-, 22 (1990) 91/97.
29. P. Venugopal, S. Venugopal and V. Seetharaman, Strain rate Influence on cold Extrusion of Titanium, -ibid-, 22 (1990) 163/175.
30. S. Nazare and P. Venugopal, Processing and Characterization of solid $Y_1Ba_2Cu_3$ ceramic superconductors, Powder Metallurgy International, A Verlag Schmic Publication, Germany, June 1991, p. 174/179.
31. S. Raghavan and D.A.R. Kay, M., Gibbs free energies of formation of magnesium vanadates from e.m.f. measurements, Mater. Sci. Lett., 9 (1990) 655 - 658.
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33. K. Raghavan, Electrochemical determination of activities in $NiAl_2O_4$ spinel solid solutions from a solid electrolyte galvanic cell in the temperature range 1173 to 1273 K, J. Electrochem. Soc. India, 40 (1991) 37 - 39.
34. S. Raghavan, Calculation of enthalpies of mixing of NaCl- Tupe ternary metal oxide solid solutions, Mater. Research Bull., 26 (1991) I.
35. Electrochemical determination of the stability of calcium ditantalate, Indian J. Technol., 29 (1991) 313 - 314.

36. S. Raghavan, Gibbs free energies of formation of magnesium tantalites from EMF measurements, paper contributed to ICCM - 1991, BARC, Bombay.
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38. K. Prasad Rao, SEM observations of sensitized austenitic clad metals Practical Metallography - (German), Vol. 28, 1991 pp.75-82.
39. K. Prasad Rao and C.V. Sarma, Studies on flashbutt welding of Nb bearing microalloyed steel, joining Sciences, (U.K) Vol.1, No.1, 1991, pp. 43-48.
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41. K.N.Krishnan and K.Prasad Rao, Effect of initial ferrite content on phase transformations in niobium stabilised austenitic clad metals, J. of Materials Science - Vol. 26, 1991, pp. 407 - 411.
42. K.N. Krishnan and K.Prasad Rao, SEM observations of Room temperature stress corrosion cracking of austenitic clad metals, Practical Metallography - German - Vol. 27, Nov.1990, pp.570 - 576.
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47. K.N. Krishnan and K.Prasad Rao, Room temperature stress corrosion cracking resistance of post weld heat treated austenitic weld metals (Corrosion - NACE - Vol. 46, No.9, 1990, pp. 734 - 742).

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61. K. Swaminathan and K.A. Padmanabhan, Room Temperature formability and Fracture behaviour of a High strength Al-Zn- Mg alloy, Trans ASME J. Eng. Materi. and Tech. 113, (1991) 236 - 243.
62. K. Swaminathan and K.A. Padmanabhan, On the room temperature formability and high temperature tensile flow behaviour in a superplastic Al-Ca-Zn alloy, Proc. of Int. Conf. on Superplasticity in Advanced Materials (ICSAM - 1991), Osaka, Japan June 3 - 6, 1991.
63. H.Md.Roshan and P. Jain, A knowledge representation for diagnosing defects in steel castings, AFS Transactions, paper No. 90 - 101 (1990)
64. H.Md.Roshan and K. Suresh, Computer simulation of Foundry Activities, Proceedings of the 57th World Foundry Congress, Paper No. Osaka, Japan (Sept. 1990)
65. H. Md. Roshan, Foundry Technology - The changing scenarios Indian Foundry Journal, Vol.37, No.2, p. 17 - 24 (Feb. 1991)
66. H.Md. Roshan, Computer applications in casting design and process control, Proceedings of the 39th Annual Convention of the Institute of Indian Foundrymen, Calcutta, p. 73 - 79 (Feb. 1991).

12. Any other relevant data ,

R. Vasudevan

Technology Transfer

TECHNICAL KNOW-HOW of 'The portable thermocouple welding gadget' transferred (through IC & SR) to Messrs. Zephyr Industries, Cuddalore.

K.J.L.Iyer

Many industrial consultancy projects were carried out in Metallography laboratory.

1.	Coromondel Fertilisers	Rs.	35,000
2.	Coromondel Engg.	Rs.	9,000 (approx.)
3.	C E C R I	Rs.	4,500
4.	Tamil Nadu Petro products.Ltd.	Rs.	18,000
5.	Utham Traders	Rs.	2,500
6.	M.R.L.	Rs.	30,000
7.	Tamilnadu Petro products.Ltd.	Rs.	5,000
8.	Tamilnadu Petro products.Ltd.	Rs.	9,000
9.	K.C.P.	Rs.	7,000
10.	Gem granites	Rs.	4,500
11.	BHEL Boronising Project	Rs.	1,16,000

Dr S.D. Pathak

Advisor Sports, Institute Gymkhana

Dr. Paramanand Singh

Member of American Powder Metallurgy Institute, USA., Membership No.0061144
AF, From June 91 - June 92.
(131)

4.12 PHYSICS DEPARTMENT

1. New Course Introduced

S.No.	Course No.	Title	Structure	Faculty
1.	PH 761	Methods of Computational Physics (Elective)	3 0 0 3	Dr.P.C.Deshmukh Dr.S.Srinivasan

2. Equipment Designed and Developed

1. Kelvin's probe for contact potential Difference measurement being developed.
2. Apparatus for measurement of heat capacity from 4.2 to 300 K and automation of the same.
3. Apparatus to measure thermal conductivity of plate type samples from 4.2 to 35 K automatically.

3. New facilities added and major equipment procured

1. Lock in Amplifier EG & G model 5210 procured.
2. C-V measurements soft ware developed.
3. Depositor Rate/Thickness Monitor, Digital Multimeters.
4. Flash Evaporation Assembly.
5. High Peak Power (1000 Megawatt) Mode Locked Nd YAG Laser.
6. Argon Ion - Dye Laser.
7. A Box car averager system.
8. Fibre Optics KIT
9. Position Detection Equipment
10. Image Processing System for Moptine Vision
11. Linear Stages

4. Sponsored Projects

S. No.	Title	Period	Funding Agency	Amount	Co-ordinator(s)
				(Rs. in lakhs)	
1.	Thermoelastic character of thin films of the thermopile materials Pb: Te and PbTe, Se prepared by flash evaporation	13.03.90 to 31.03.93	DAE	4.67	Dr.V.Damodara Das
2.	Third order optical Response of Materials	14.03.90 to 14.03.93	CSIR	3.46	Dr.YVGS.Murti
3.	Microwave Absorption on Measurements on polymer Based	10.12.90 to 12.12.93	ADA	1.06	Dr.VRK.Murthy Dr.B.Viswanthan (Dept of Chemistry)
4.	Study of Transient by Microwave absorption and Laser Flash Photolysis	19.12.90 to 19.12.93	DST	20.61	Dr.J.Sobhanadri
5.	Training of Man-power and Development of Expertise and Tecchnical competence in optical photonic Amplifying Technology	6.03.91 to 6.03.93	HRD	10.00	Dr.B.M.Sivaram Dr.J.P.Raina
6.	Location of Hydrogen positions in leaves phase compound of Erni by neutron diffraction	20.02.91 to 20.02.93	(IUC-DAEF) [Inter University consortium for DAE facilities]	0.40	Dr.KVS.Rama Rao

S. No.	Title	Period	Funding Agency	Amount	Co-ordinator(s)
				(Rs. in lakhs)	
7.	Fabrication of six prototypes of the single chip micro-computer controlled instrumentation for stirling cycle nitrogen liquefiers for performance evaluation	25.02.91 to 25.02.92	DST	3.72	Dr.G.Rangarajan Dr.T.S.Natarajan
8.	Cryogenic Studies at Millikelvin Temperature	15.02.91 to 15.02.94	HRD	18.0	Dr.G.Rangarajan
9.	Conductor Evaluation and Estimation of Magnetic Fields of Superconducting Magnets	1.07.89 to 31.12.91	BHEL	10.0	-do-
10.	Instrumentation control of cold Box for a Helium Liquefier	13.02.89 to 12.02.92	DST	6.12	Dr.G.Rangarajan Dr.T.S.Natarajan
11.	Automatic Lens Design for space Applications	1988 to 1994	ISRO	7.15	Dr.D.K.Sharma Dr.R.S.Sirohi
12.	Optical Sensors	1990 to 1992	HRD	10.00	Dr.R.S.Sirohi Dr. .P.Raina Dr.M.P.Kothiyal
13.	Development of Manpower in the area of Engg. Application of Lasers and to carry out advanced R and D programme	1989 to 1992	-do-	20.00	Dr.R.S.Sirohi

5. Major Consultancy Assignments

Title	Organisation	Amount Rs.	Co-ordinators
Supply of liquid helium	Indian Instt. of Chemical Tech. Hyderabad.	27000	Dr.R.Srinivasan Dr.G.Rangarajan Dr.V.Sankaranarayanan
	Centre for Cellular and Molecular Biology, Hyderabad.	20000	-do-
	Central Leather Research Institute, Madras	10000	-do-
Fabry Perot Etalon	BARC, Bombay	5000	Dr.V.V.Rao
Dispersion Prism	IGCAR, Kalpakkam	3000	Dr.V.V.Rao

6. Honours and Awards

Name	Designation	Honours/Awards
Dr.K.V.S.Rama Pao	Professor	Elected as a Senior Member of the Institute of Electrical and Electronics Engineers, U.S.A.
Dr.R.S.Sirohi	Professor	Elected as a Fellow of the Optical Society of America, U.S.A. and as an Associate of the International Centre for Science and High Technology, ICTP, Trieste, ITALY.

7. Distinguished visitors to the department

Visitor's Name	Affiliation	Purpose of visit
Prof. V.Ivanov	Instt. for General and Inorganic Chemistry Soviet Acad. of Sciences, Moscow, USSR	To give a seminar talk and interact
Dr.J.Cisowski	Instt. of Solid State Phys. Polish Academy of Sciences, Poland	INSA Polish Academy of Sciences Exchange Programme
Mr.M.W.J.Prins	Visitor, SSCU, Indian Instt. of Science, Bangalore	-do-
Prof.K.S.Chandra- sekar	Madurai Kamaraj University, Madurai	To give seminar and interact with the faculty.
Prof.A.L.Laskar	Clemson University, U.S.A.	Visiting Professor
Dr.Stefan Lanyi	Senior Professor Instt. of Physics Slovak Academy of Science, Bratislava, Czechoslovakia	-do-
Mr.Martin P. Stenlake	Technical Officer Dept. of Physics, Univ. of Tech. Loughborough, England	To interact with faculty
Dr.Zhang Xinyi	Changchun Instt. of Physics Chinese INSA Chinese Academy Sciences, Changchun, China	To give a seminar Academy of Exchange Programme

Visitor's Name	Affiliation	Purpose of visit
Dr. Koichi Shimakawa	Professor, Dept. of Electronics Gifu Univ. Gifu, Japan,	To interact with faculty, INSA-JSPS Exchange Programme.
Prof. Jacques Raynal	CEN, Saclay, France	To give a seminar talk and to interact with the faculty
Prof. D.V.G.L. Narasimha Rao	Dept. of Physics, Univ. of Massachusetts, Boston, USA	To give a seminar & interact with the Faculty
Dr. B.K. Sharma	Associate Professor, Univ. of Wisconsin Milwaukee, U.S.A.	To give a seminar & interact with the faculty
Prof. G.V.S. Rayudu	Chicago Medical Centre, U.S.A.	To give seminar and interact with the Faculty
Prof. Y. Iwasa	Francis Bitter National Magnet Lab., Massachusetts Instt. of Technology, U.S.A.	-do-
Prof. L.C. Gupta	Solid State Phys. Group, Tata Institute of Fundamental Research, Bombay	-do-
Prof. E. Gmelin	Professor in Max-Planck, Instt. fur Festkorperschaft Stuttgart, FRG	Under exchange programme in MSRC-GTZ project to discuss the project and deliver lectures on thermal conductivity measurements.
Prof. E.R. Dobbs	Emeritus Professor Univ. of London, UK	To deliver a lecture on "Solid Helium-3"

Visitor's Name	Affiliation	Purpose of visit
Prof.E.Fawcett	Professor, Physics Dept. University of Toronto, Canada	To deliver a lecture on "Inelastic neutron scattering in Chromium and its dilute alloys" and to discuss our work.
Dr.H.D.Denner	Frei University Berlin, FRG FRG	To discuss MSRC-GTZ Project and GTZ Project on "Promotion of Cryo- genic Engineering in India"
Prof.P.K.Katti	Formerly with DST, Delhi	Discussions/lecture
Dr.P.Hariharan	CSIRO, Australia	Discussions

8. Visit of Faculty Members to other Institutions

Name of Faculty	Institution visited and duration of visit	Purpose of visit
Dr.K.Srinivasan	Bhabha Atomic Research Centre, Bombay 17.12.90 to 28.12.90	Attended Appreciation Course on Nuclear Science and Technology
Dr.V.Sankara- narayanan	Tiefemperaturlabor Max-Planck-Institut fur Festkorperschaftung Stuttgart, Germany	To carry out heat capacity studies on high Tc superconductors from 0.3 to 20 K using He-3 cryostat
Dr.R.S.Sirohi	University of Malaya, KL	ICTP Fellow
Dr.M.P.Kothiyal	PTB, Braunschweig	DAAD Reinvitation

9. Seminars/Symposium/Conferences/Short-Term Courses Organised

	Topic	Date
1.	Engineering considerations for Optical optomechanical Instrument Design (QIP)	14.05.90 to 25.05.90
2.	Short Term Course on Non-linear Photonics (QIP)	17.12.90 to 29.12.90
3.	A course on Applied Optics	28.01.91 to 06.05.91
4.	IX International course on Physics of Materials	04.02.91 to 15.02.91
5.	One day Seminar on "Acoustics and Noise Pollution" - Acoustical Soc. of India	23.03.91
6.	Cryogenic Applications in Industries one day seminar organised under the Industrial Associateship Scheme of IIT, Madras	16.07.90
7.	Recent Trends in Opto-Mechanical Instruments Design	20.05.90 to 01.06.90
8.	A course on Applied Optics & Opto-Electronics	28.01.91 to 06.04.91
9.	Holo - Fiber Seminar	03.12.90

10. Participation in seminars/symposia/conferences, etc.

Sl. No.	Authors	Title	Conference details Place and Date
1.	K.V.Sriram M.P.Kothiyal R.S.Sirohi	'Measurement of curvature and focal length using compensation of collemated beam'	18th Optical Society of India Symposium, 21-23 Mar., 90, IIAF Bangalore

Sl. No.	Authors	Title	Conference details Place and Date
2.	K.V.Sriram M.P.Kothiyal R.S.Sirohi	'Use of Talbot interferometry for curvature measurement in non collimated beam' ibid	18th Optical Society of India Symposium, 21-23 Mar, 90, IAP Bangalore
3.	R.Vijaya Y.V.G.S.Murti G.Sundararajan T.A.Prasada Rao	'Optical phase conjugation in iodine solutions'.	18th Optical Society of India symposium Bangalore, (1990)
4.	YVGS.Murti	'Recent Trends in colour centre Research'	Seminar on Recent Advances in Solid State Research IIT, Madras June (1990)
5.	R.Vijaya YVGS.Murti T.A.Prasada Rao G.Sundararajan'	'Nonlinear Optics in Polymers'	Recent Advances in Solid State Research, IIT, Madras, June 1990
6.	K.R.Murali YVGS.Murti	'Laser Bleaching of colour centres in Na F crystals'	Recent in solid state Research, IIT, Madras, June 1990
7.	Radha D. Banhatti YVGS,Murti A.L.Laskar	'Interionic potential for silver chloride'	Recent Advances in Solid State Research (1990)
8.	R.Vijaya YVGS.Murti G.Sundararajan T.A.Prasada Rao	'Degenerate four wave mixing in solutions of pure and iodine doped polyphenylacetylene'	Optics Communication 76, 256 (1990)
9.	K.R.Murali YVGS.Murti	'Colour Centres in Irradiated NaF:Mn ⁺⁺ crystals'	Physica status solidi (a) 117,377 (1990)
10.	K.R.Murali YVGS.Murti	'Ovulation of a new colour centre band in irradiated NaF'	Physics Letters, 151, 425 (1990)

Sl. No.	Authors	Title	Conference details Place and Date
11.	YVGS.Murti G.A.Popson A.L.Laskar	'Correlation of Melting Temperature and Formation Enthalpy of Schottky Defects in Ionic Solids'	Physics status solidi (a) 120, K133 (1990)
12.	K.R.Murali YVGS.Murti	'Photonic Information Storage in NaCl Crystals via F - C conversion'	Optics and Laser Technology 22, 340 (1990)
13.	L.S.Vaidhyathan A.M.Niraimathi P.Majumdar G.Rangarajan N.Muralidhar D.Maiyapathi Rao M.Nayobhusanan V.Haribabu	Investigation of the role of lead in the growth of the high T _c phase in the Al ₂ Pb _x Sn ₂ Ca ₂ Cu ₃ O _y system.	International Conference on Superconductivity Bangalore Jan. (1990)
14.	L.S.Vaidhyathan C.K.Subrahmaniam G.Rangarajan	DC magnetisation studies of (Pr _x Y _{1-x})Ba ₂ Cu ₃ O ₂	-do-
15.	L.S.Vaidhyathan G.Rangarajan	A Magnetic study of the oxide superconductors of the type (Pr _x Y _{1-x})Ba ₂ O ₂	International Conference on 'From modern superconductivity towards application', Grendble, October (1990)
16.	SBS.Sastry S.M.M.Kennedy	'Luminescence Studies on CaF ₂ :DyPb' 'Recent Advances in Solid State Research	Proc. Seminar on 27-28 June 1990, IIT, Madras
17.	V.S.Kumar BSVSR.Acharyulu	'TL Mechanism in Dy doped alkali sulphate'	Ibid Page 32 (1990)

Sl. No.	Authors	Title	Conference details Place and Date
18.	R.S.Sirohi	Industrial Applications of fourth Tropical college on Appl. Physics	Laser and Plasma Technology, Univ. of Malaya, Kuala-Lumpur, Malaysia May-28 to June 16, 1990
19.	R.S.Sirohi	Talbot interferometry for measurement	-do-
20.	R.S.Sirohi	Phase shifting Techniques in interferometric measurements	-do-
21.	C.K.Ang A.R.Ganesan B.C.Tan Y.H.Chen R.S.Sirohi	Fringe compensation in Digital Speckle pattern Interferometry	-do-
22.	C.K.Ang A.R.Ganesan B.C.Tan R.S.Sirohi	Low light illumination DSPI	Fourth Asia Pacific Physics conference Seoul, Korea, Aug. 13-17, (1990)
23.	R.S.Sirohi	Talbot interferometry in non-collimated illumination	18th symposium of OSI, IIAR, Bangalore during March 21-23 (1990)
24.	K.V.Sriram M.P.Kothiyal R.S.Sirohi	Measurement of curvature and focal length using compensation of collimated beam	-do-
25.	M.Perumal Pillai R.S.Sirohi	Detection of crack using digital Speckle Technique	-do-
26.	R.S.Sirohi H.Kumar	Measurement of focal length using diffraction	-do-
27.	K.V.Sriram M.P.Kothiyal R.S.Sirohi	Use of Talbot interferometer in non-collimated beam for curvature measurement	18th symposium of OSI IIAR, Bangalore during March 21-23, 1990.

Sl. No.	Authors	Title	Conference details Place and Date
28.	N.K.Mohan R.S.Sirohi	White light speckle anemometry	-do-
29.	B.M.Sivaram L.Vetrivel C.Babu Reddi	Generation of Ultra short duration dye laser tubes using distributed feedback Techniques. Invited Paper, International workshop on lasers and their Applications	Centre for Advanced Technology, Indore Nov. 12-30 (1990)
30.	B.M.Sivaram L.Vetrivel C.Babu Reddi	Invited paper, National Symposium on Photo Science	Kamaun Universiy, Nainital, April, 4-7, (1990)
31.	P.J.Sebastian	The potentials of cds thin films as solar control coatings	Proc. ICTF 8, April (1990) San Diego,, USA.
32.	P.J.Sebastian V.Sivarama-krishnan	The structural phase transition in Cd Se - Cd Te Precedo binary system.	Proc. Recent advances in Solid State research June (1990) IIT, Madras
33.	P.J.Sebastian V.Sivarama-krishnan	The change of electrical conduction in valence/conduction band to impurity band in CdSe _x Te _{1-x} thin films	J.Appl.Phys. 67, 3536 (1990)
34.	P.J.Sebastian V.Sivarama-krishnan	The influence of thickness and deposition temperature on the conduction activation energy of CdSe _{0.2} Te _{0.8} thin films	J.Mater.Sci.25, 1803 (1990)
35.	P.J.Sebastian V.Sivarama-krishnan	Studies on ageing and electrical conduction in CdSe _{0.2} Te _{0.8} thin films	J.Phys, Chem.Solids 51.401 (1990)
36.	P.J.Sebastian V.Sivarama-krishnan	Oxygen adsorption on the surface of CdSe _x Te _{1-x} thin films	Vacuum 41, 647 (1990)

Sl. No.	Authors	Title	Conference details Place and Date
37.	P.J.Sebastian V.Sivarama- krishnan	Investigation of oxygen adsorption on the surface of CdSe _{0.8} Te _{0.2} thin films by XPS and TEM	Thin Solid Films 189,183 (1990)
38.	P.J.Sebastian V.Sivarama-	CdSe _x Te _{1-x} thin films for solar control applications	J.Phys. D23, 1114 (1990)
39.	M.Pattabi P.J.Sebastian V.Sivarama- krishnan	Influence of a magnetic field on the ageing rate island silver films	J.Phys. D23, 371 (1990)
40.	K.V.Reddy	Self Diffusion and Electromigration in Metallic Films San Diego (USA) 1-6	Eight International Conference on Thin Films April (1990)
41.	V.Damodara Das D.Karunakaran	Thermoelectric power of annealed Beta-Ag(2)Se alloy thin films: Temperature and size effects-possibility of a new Beta (2) Phase	J.Appl.Phys.67, 2, p, 878-883, (1990) American Inst. of Physics, USA
42.	V.Damodara Das K.Seetharama Bhat	A two layer model to explain the size effect in semiconducting thin films-Application to PbTe thin films	J.App.Phys., 67, 8, p, 3724-3727(1990) American Instt. of Physics, USA
43.	V.Damodara Das D.Karunakaran	Thickness dependence of the phase transition temperature in Ag(2)Se thin films	J.Appl.Phy.68.5, p.2105-2111,(1990) American Inst. of Physics, USA
44.	V.Damodara Das N.Soundara- rajan	Nature of principal scattering mechanism in well-annealed Antimony thin films-Analysis from thermoelectric data	Vaccum, 41, 4-6,p. 1405-1407, (1990), British Vacuum Council, Inst. of Physics Pergamon Press, Great Britain

Sl. No.	Authors	Title	Conference details Place and Date
45.	V.Damodara Das K.Seetharama Bhat	Temperature variation of thermoelectric power of vacuum-deposited PbSe thin films and its thickness dependence	J.Mater. Science: Materials in Electronics 1,4,p.169-174 (1990) Chapman and Hall Publications, G.Britain.
46.	V.Damodara Das S.Aruna	Studies on the Thermoelectric Properties of Vacuum-Deposited Thin Films of the Semiconducting Ternary Alloy $Se_{10}Sb_{10}Te_{80}$	Physics of Semiconductor Devices (Suppl) p.85-88, (Ed:W.W.Khokle and S.C. Jain) Mac Millan India Limited, New Delhi (1990)
47.	V.Damodara Das N.Soundararajan	Application of Jain-Verma Theory to the Thermoelectric Data of vacuum-Deposited Semi-conducting Thin Bismuth Films	Physics of Semiconductor Devices (Suppl) p.89-92 (Ed:W.S.Khokle and S.C. Jain) Mac Millan India Ltd. New Delhi (1990)
48.	V.Damodara Das D.Subbu	Preparation of transparent Indium Oxide semiconductor thin films by thermal oxide semiconductor thin films by thermal oxidation of vacuum deposited Indium thin films	8th Interna. Conf. on Thin Films and 17th Interna. Conf. on Metall. Coatings, (April 1-6, 1990), San Deigo, California, USA
49.	V.Damodara Das N.Soundararajan	Major scattering process in semiconducting, crystalline Antimony telluride thin films Deduction from thermoelectric data	8th Interna. Conf. on Thin Films and 17th-interna. Conf. on Metall. Coatings, (April 1, 1990) San Diego, California, USA
50.	V.Damodara Das G.Nirmala	Studies on the thermoelectric properties of vacuum-deposited thin films of the ternary semi-conducting alloy $Se_{10}Bi_{10}Te_{80}$	-do-
51.	V.Damodara Das	Good Quality Quarternary Chalcogenide $CuInSe_{2-y}S_y$ Alloy Thin Films for use in Film Solar Cells	Proc.Prof.C.Ramasastri Commemorative Seminar on Recent Advances in solid State Research, p.11, (June 27-28, (1990) IIT, Madras, India

Sl. No.	Authors	Title	Conference details Place and Date
52.	K.C.James Raju V.R.K.Murthy	Effects of Microstructure on dielectric properties of Barium titanate	4th national conference on Ferro electrics, Warangal, A.P. 1990 Dec.
53.	K.C.James Raju V.R.K.Murthy	Effects of change in the radius on dielectric properties of Barium titanate	5th national conference on Ferro electrics, Warangal, A.P. 1990 Dec.
54.	Gilroy Alex S.Srinivasan N.Vasumati S.R.Ramadas	Crystal Structure of 6,7 diphoyl-4 oxo 4H-threno-(3,2-c) carboxylate	Calcutta, Dec. 26-28, (1990)
55.	C.Sangamithra K.Hariharan	Superionic conduction in the ternary glass system AgI-Ag ₂ SO ₄ -AgPO ₃ crystals, (Croningen. The Netherland (Sep. 1990)	Sixth Ferrophysical Topical Conference: Lattice defects in ionic
56.	K.Hariharan	Fast ion conducting glasses, polymers and composites as materials for solid state batteries	Second National Convention of Electro chemists CECRI, Karaikudi, Feb. (1990)
57.	Mary Suke-shini K.Hariharan	Transport and thermal properties of Ag _x Cu _{2-x} Hgl ₄ Solid Recent Advances in Solid State Research electronic system	Dept. of Physics. IIT Madras (June 1990)
58.	E.T.Paul Benny J.Majhi	Growth of Tunnel Oxide in Al/SiO _x /p-Si M/S. Siodes by High Pressure Oxidation of Si-Effect of Ambients	8th International conference on Thin Films April 1-6, 1990, San Diego California, USA
59.	V.S.Murty	History and Philosophy of Physics. It relevance to student community	5th Annual national convention of Indian association of physics teachers. Dec. 23, 24, 25, 1990 Ambala paper 3,4

Sl. No.	Authors	Title	Conference details Place and Date
60.	John Philip T.A.Prasada Rao	Electro-Optic Kerr effect studies in liquids and binary mixtures	Paper presented at the OSI symposium of India held at IAP Bangalore March 21-23 (1990)
61.	R.Vijaya YVGS.Murti G.Sundara- rajan T.A.Prasada Rao	Optical phase conjugation in iodine solution	Paper presented at the OSI symposium of India, IAP, Bangalore, March 21-21 (1990)
62.	V.Vasu A.Subrah- manyam	Reaction Kinetics of the formation of Indium Tin Oxide Films grown by Spray Prollysis Proc.pp.696-703	17th International Conference on Metallurgical Coating 2-6, April 1990
63.	V.Vasu A.Subrah- manyam	Electrical and Optical properties of SuO_2 films: dependence on the Oxidizing agent in the starting materials Proc. pp.973-980	-do-
64.	N.Balasubra- manian A.Subrah- manyam	Schottky Barrier at the Indium Tin Oxide/H-Ga as Interface effect of Arsenic deficiency. Proc. pp.528-535	-do-
65.	P.J.Masalkar V.V.Rao R.S.Sirohi	Gradient-Index Lens fabrication by Ion-exchange in Glass XVIII Optical Society of the India Symposium	March 1990, Bangalore
66.	D.K.Sharma D.Shyam G.Sujatha	'An Aspheric Grain Ray Trace program for thermal Analysis of Optical System.	Presented at 17th OSI symposium held at IAP Bangalore, 21-23 March 1990
67.	D.K.Sharma G.Sujatha D.Shyam	Towards a tolerance Analysis program	Presented at 17th OSI symposium held at IAP Bangalore, 21-23 March 1990

Sl. No.	Authors	Title	Conference details Place and Date
68.	H.Krishnan R.Srinivasan V.Sankaranarayanan C.K.Subramaniam C.V.Subba Rao	Fluctuation induced excess conductivity in the compounds $\text{CaREBaCu}_3\text{O}_{7-y}$	International conference on superconductivity, January 10-14 Bangalore, India (1990)
69.	H.Krishnan V.Sankaranarayanan R.Srinivasan	Paracoherence studies in $\text{Ti}_2\text{CaBa}_2\text{Cu}_2\text{O}_8$, $\text{CaLaBaCu}_3\text{O}_{7-y}$ and $\text{CaSmBaCu}_3\text{O}_{7-y}$	XIX International Conference on Low Temperature Physics (LY19), August 1990 Sussex, UK
70.	G.Rangarajan	Int.Conf. ICMAS-90 from modern Super conductivity towards applications	To present a paper
71.	G.Rangarajan	National Symposium on Physics and Chemistry of High Temperature Superconductors,	To present a paper, Hyderabad
72.	V.Sankaranarayanan	Indo-EEC meeting discussion meeting on Superconductivity	Invited talk, IISc., Bangalore
73.	R.S.Sirohi	Lasers in Science and Technology	Invited lecture, 8.8.1990 CAT Indore
74.	R.S.Sirohi	International workshop on lasers and their Applications	Invited lecture, Nov. 12-30, 1990, CAT Indore

11. Research Publications

Sl. No	Authors	Title	Name of the journal	Vol., Issue No., Month, year & page
1.	M.Dhanabalan Y.Syama- sundara Rao K.V.Reddy	Automatic Scanning of Diffusion Profiles	Journal of Institution of Engineers Electronics and Telicommn.	1, May, 1990 & 1-7
2.	M.Raman Murti K.V.Reddy	Grain Boundary Effects on Carrier Mobility	Physica Status Solidi (a)	119, 1990 & 237-240
3.	V.Domadara Das D.Karunakaran	Thermoelectric power of annealed Beta-Ag(2) Se alloy thin films: Temperature and size effects-Possibility of a new Beta (2) phase	J.Appl. Phys.	67,2, 1990 & 878-883
4.	V.Damodara- Das K.Seetharama- Bhat	A two layer model to explain the size effect in semiconducting thin films-Application to PbTe thins films	J.Appl. Phys.	67,8, 1990 & 3724-3727
5.	V.Damodara- Das D.Karunakaran	Thickness depedence of the phase transition temperature in Ag(2)Se thin films:	J.Appl.Physics	68,5, 1990 & 2105-2111
6.	V.Damodara- Das N.Soundara- rajan	Nature of principal scattering mechanism in well annealed Antimony thin films Analysis from thermoelectric data	Vacuum	41,4-6,1990 & 1405-1407
7.	V.Damodara- Das K.Seetharama- Bhat	Temperature variation of thermoelectric power of vacuum-depo-sited PbSe thin films and its thickness dependence.	J.Mater.Science Materials in Electronics	1,4, 1990 & 169

Sl. No.	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
8.	V.Damodara-Das S.Aruna	Studies on the Thermo- electric Properties of Vacuum-Deposited Thin Films of the Semiconducting Ternary Alloy $Se_{10}Sb_{0.0}Te_{30}$	Physics of Semiconductor devices	-- 1990 85-88
9.	V.Damodara-Das N.Soundararajan	Application of Jain-Verma Theory to the Thermoelectric Data of Vacuum-Deposited Semiconductor Thin Bismuth Films	Physics of Semiconductor Devices	-- 1990 & 89-92
10.	A.K.Padma V.R.K.Murthy B.Viswanathan	Measurement of conductivity of graphite intercalation compounds by the contactless method	Technology	28, 1990 & 208-10
11.	V.Sundararajan V.R.K.Murthy	Microwave characteristics of metalized PTFE substrals	Technology	28, 1990 & 609-611
12.	R.Pragasam V.R.K.Murthy B.Viswanathan	Development of a micro processor Based four Prose method for Tc measureur of Superconducting materials	IEEE Transaction as Institutation & Measure	39, 1990 & 792-796
13.	A.V.Narasimham A.T.Seshadri	Ultrasonic Morpholine -ITP Ultrasonic Relaxation organic liquids ITP. A simple organic liquids	Journal Physics education	6, 1990 & --

Sl. No.	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
14.	A.V.Narasimham A.A.Ramjee	Pressure Variation- Ultrasonic Acoustics, A study Distribution A theory of ultrasonic absorption, calculation Binding Data-	Journal & Science	2,3,4 ,1990 & --
15.	Ramesh Konde- pudi S.Srinivasan	'Performance evalua- tion of a luminent solar concentrator with a liquid polymer matrix	Ind.J.Pure Appl.Physics	28, 1990 & 334-337
16.	C.Sudarsan- kumar S.Srinivasan B.Chandrasekar S.R.Ramadas	Structure of 6 methoxy -do- -1, [4-methoxy] amines Acta Crystallographica		46, 1990 & 448-451
17.	C.Sudarsana- Kumar S.Srinivasan B.Chandrasekar S.R.Ramadas	Structures of 2,4 dihy- -do- dis-substituted - indol-1- one & 2,4 dihydroxy methy- one II Acta Crystallographica		C46,1990 & 1475-1477
18.	R.Kondepudi S.Srinivasan	Optical studies on some dyes for LSCs	Solar energy Materials	20, 1990 & 257-263
19.	A.N.Durga Rani K.Hariharan	Effects of Dispersoid on the condition characteristics of Ag ₂ HgI ₄	Material che- mistry and Physics	25, 1990 & 127-133
20.	A.Mary Sukeshini K.Hariharan	Transport Studies on Fast Ionic Glasses in the system X PUI - [100-x][Cu ₂ O + Mo O ₃]	Material	9, 1990 & 544-546

Sl. No.	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
21.	S.Neela P.R.Vaya J.Majhi	'Effects of Grain Boundaries on Barrier Height of P-poly-silicon/-Aluminium Schottky Structures'	Indian J.Pure Appl.Physics	28, 1990 & 555-556
22.	R.Sridhar R.Venketta-subbiah J.Majhi R.Ramachandran	Thickness Dependence of optical properties of a-Si: H Thin Films	J.Non-Cryst. Solids	119, 1990 & 331-341
23.	V.S.Murty D.P.Khandelwal	'Same serious revelations from W 18EP, 89'	Bulletin of Indian Association of Physics teachers	7, Jan.1990 & 15-17
24.	R.Pragasam VRK.Murthy B.Viswanathan T.S.Natarajan	Development of Micro-processor based form probe DC Resistivity setup for Tc measurement of superconducting materials	IEEE Transactions on Instrumentation & Measurement	39, Oct.1990 & 792-794
25.	R.Vijaya YVGS.Murti G.Sundararajan T.A.Prasada Rao	'Degenerate fourwave mixing in solutions of pure and iodine doped polypehynyl-acetylene'	Optics communications	74, 1990 & 256
26.	H.Krishnan R.Srinivasan V.Sankaranarayanan C.K.Subramanyam G.V.Subba Rao	Fluction induced excess conductivity in the pounds $CaREBaCu_3O_{7-y}$	Bulletin of Materials Science	--, 1990 & --

Sl. No	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
27.	K.Muraleedharan C.K.Subramaniam N.Venkataramani T.K.Gundu Rao C.M.Srivastava V.Sankaranarayanan R.Srinivasan	On the magnetic susceptibility of CuO_x	Solid State Sci. Commun.	76, 1990 & 727-730
28.	Ravikumar A.K.Grover P.Chaddah C.K.Subramaniam V.Sankaranarayanan	Measurement of Higher Multipole Moments of an Inhomogeneous State of a Superconductor	Solid State Commun.	76, 1990 & 175-179
29.	A.K.Grover Ravikumar P.Chaddah C.K.Subramaniam V.Sankaranarayanan	A Reappraisal of Irreversible Behaviour in Intermediate State of a Type-I Superconductor	Physica	C170, 1990 & 431-436
30.	R.Vijayashree C.K.Subramaniam V.Sankaranarayanan G.V.Subba Rao R.Srinivasan	Logarithmic temperature dependence of resistivity of $\text{Nd}_{2-x}\text{Ce}_x\text{CuO}_{4-y}$	Physica	C167, 1990 & 53-58

Sl. No.	Authors	Title	Name of the journal	Vol., issue No. Month, year & page
31.	A.Rajalakshmi M.Seshasayee G.Aravamudan T.Yamaguchi N.Nomura H.Ohtaki	EXAFS and RDF studies on glass AgI-Ag ₂ O-MoO ₃	J.Physics	59, 1990 & 1252-1263
32.	V.Ganesh M.Seshasayee G.Aravamudan D.Heijdenrijk H.Schenk	Crystal and molecular structure of hexaaquo Fo (II) dichloride Bis (Hexamethyltetramine) tetrahydrate	Acta Cryst.	C46, 1990 & 949-951
33.	V.Ganesh A.Radha M.Seshasayee T.Subrahmaniyam, G.Aravamudan	Structure of (Hexamethyl enetetraminiumdidithiodi salicylate(II)	Acta Cryst.	C46, 1990
34.	V.Kumar G.Aravamudan M.Seshasayee	A centric thiurandisulphide structure of tetraisopropyl thiurandisulphide	Acta Cryst.	C46, 1990 & 674-676
35.	V.Kumar G.Aravamudan M.Seshasayee	synthesis and structure of bisiodobis (disoproyldithio carbamate) Te (IV)	J.Cryst.	21, 1990
36.	R.Vijaya YVGS.Murti G.Sundararajan T.A.Prasada Rao	Degenerate four wave mixing in solutions of pure and iodine doped polyphenylacetylene	Optics commun.	76, 1990 & 256
37.	K.R.Murali YVGS.Murti	Colour Centers in irradiated NaF:Mn Crystals.	Physica Status solidi	117, 1990 & 377

Sl. No.	Authors	Title	Name of the journal	Vol., Issue No., Month, year & page
38.	K.R.Murali YVGS.Murti	Evaluation of a new colour centre band in irradiated NaF.	Physics Letters	151, 1990 & 425
39.	YVGS.Murti G.A.Popson A.L.Laskar	Correlation of Melting Temperature and Formation Enthalpy of Schottky Defects in Ionic Solids	Physica Status Solidi	k133, 1990 & 120
40.	K.R.Murali YVGS.Murti	Photonic Information Storage in NaCl Crystals via F - C conversion	Optics and Laser Technology	22, 1990 & 340
41.	S.Annapoorni KVS.Rama Rao	^{57}Fe Mossbauer studies in $\text{Ho}_{0.85}\text{Tb}_{0.15}\text{Fe}_2\text{H}_x$ and $\text{Dy}_{0.73}\text{Tb}_{0.27}\text{Fe}_2\text{H}_x$	J.Appl. Phys	67, 1990 & 424-429
42.	K.R.Dhilsha KVS.Rama Rao	Magnetic and electrical studies of $\text{Ho}_{0.85}\text{Tb}_{0.15}\text{Fe}_2\text{H}_x$	J.Appl.Phys.	68, 1990 & 259-262
43.	S.Annapoorni G.Markandeyulu KVS.Rama Rao	Ferromagnetic resonance studies on $\text{Ho}_{0.85}\text{Tb}_{0.15}\text{Fe}_2\text{H}_x$	J.Appl.Phys.	68, 1990 & 1394-1395
44.	S.Annapoorni G.Markandeyulu KVS.Rama Rao	Electrical resistivity measurements in $\text{Ho}_{0.85}\text{Tb}_{0.15}\text{Fe}_2$ and $\text{Dy}_{0.73}\text{Tb}_{0.27}\text{Fe}_2\text{H}_x$	J.Phys.soc.	59,1990 & 3014-3015
45.	R.Ramji Rao A.Padmaja	Fourth Order elastic constants of cry. Mg & Er	J.Appl.Phys.	67, 1990 & 227
46.	N.P.Raju G.Rangarajan	Electrical conductivity and thermoelectric power of the compounds	J.Phys.condensed matter	3, 1990 & 3539-3546

Sl. No.	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
47.	N.K.Mohan D.K.Sharma R.S.Sirohi	Determination of longitudinal displacement using white light speckle photography	Optical Commun.	78, 1990 & 222-26
48.	P.J.Sebastian V.Sivarama-krishnan	The change of electrical conduction in valence/conduction band to impurity band in CdSe _x Te _{1-x} thin films	J.Appl. Phys.	67, 1990 & 3536
49.	P.J.Sebastian V.Sivarama-krishnan	The influence of thickness and deposition temperature on the conduction activation energy of CdSe _{0.2} Te _{0.8} t.f.	J.Matter Science	25, 1990 & 1803
50.	P.J.Sebastian V.Sivarama-krishnan	Studies on ageing and electrical conduction in CdSe _{0.2} Te _{0.8} thin films	J.Phys.Chem. Solids	51, 1990 & 401
51.	P.J.Sebastian V.Sivarama-krishnan	Oxygen adsorption on the surface of CdSe _x Te _{1-x} thin films	Vacuum	41, 1990 & 647
52.	P.J.Sebastian V.Sivarama-krishnan	Investigation of oxygen adsorption on the surface of CdSe _{0.8} Te _{0.2} XPS and TEM	Thin Solid Films	189, 1990 & 183
53.	P.J.Sebastian V.Sivarama-krishnan	CdSe _x Te _{1-x} thin films for solar control applications	J.Physics	D23, 1990 & 1114
54.	M.Pattabi P.J.Sebastian V.Sivarama-krishnan	Influence of a magnetic field on the ageing rate of island silver films	J.Physics	D23, 1990 & 371

Sl. No.	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
55.	K.Vedasankari M.R.Udupa	Structure of 2,4,N-Tieni troanilinoacetic acid	Acta Cryst	C46, 1990
56.	N.Ramesh K.Srinivasan	Evaluation of the true electro-optic effect in some doped Kcl crystals.	J.Physics	2, 1990 & 95411-9522
57.	N.Ramesh K.Srinivasan	Characteristic of the assured phase in Kcl Ca^{2+} of Kcl. Mn^{2+}	PH ILOSOPHI AL MAGAZINE LETTER	62, 1990 & 315-330
58.	N.Balasubramanyam A.Subrahmanyam	Schottky Diode Properties and the Photovoltaic behaviour of Indium Tin Oxide (ITO)/ - GaAs junctions-effect of arsenic deficient GaAs surface	Semicond. Science Tech.	5, 1990 & 871-876
59.	N.Bala-subrahmanyam A.Subrahmanyam	Investigations on the photovoltaic properties of Indium Tin Oxide (ITO)/ GaAs heterojunctions	Solar Cells	28, 1990 & 319-325
60.	A.Subrahmanyam V.Vasu	Electrical and Optical Properties of Pyrolytically sprayed SnO_2 films Dependence on substrate temperature and substrate-nozzle distance	Thin Solid Films	180, 1990 & 217-225
61.	V.Vasu A.Subrahmanyam	Reaction Kinetics of the formation of Indium Tin Oxide films grown by spray pyrolysis	Thin Solid Films	193, 1990 & 696-703

Sl. No.	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
62.	V.Vasu A.Subrahmanyam	Electrical and optical properties of $S_n O_2$ films: dependence on the oxidizing agent in the starting material	Thin Solid Films	190, 1990 & 973-980
63.	A.T.Seshadri B.Subrahmanyam	Excess compressibility and excess dielectric constant in some liquid mixtures	J.Pure Appl. Ultrasonic	12, 1990 & 42-52
64.	A.T.Seshadri B.Subrahmanyam	Excess compressibility and excess dielectric constant for a morpholine n lithyl alcohol liquid mixture	J.Physics C.Matter	2, 1990 & 7353-7360
65.	N.Krishna mohan D.K.Sharma R.S.Sirohi	Determination of Longitudinal displacement using white light photography speckle, optics communication	Optics Commun.	78.3,4, Sep. 1990
66.	Y.Syama-sundara Rao M.N.Gangaih	A continuously available power supply from 6000V to 1100V at i.O.M.A. current using all solid state devices.	J.of Inst.	19,3, 1990 & 227-278
67.	M.Dhanabalan Y.Syama-sundara Rao K.V.Reddy	Development of Electronic circuits for automatic securing of Diffusion profiles	J. of Inst. Engineers	71, May 1990
68.	L.S.Vaidhyathan G.Rangarajan	A magnetic study of the oxide superconductors of the type $Pr_x Y_{1-x} Ba_2 Cu_3 O_{7-y}$; $0 < x < 1$	Int. Conf. ICMAS-90, Grenoble, Paris	1990

Sl. No.	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
69.	G.Rangarajan L.S.Vaidhyathathan	Magnetic properties of rare earth substituted 123 high temperature superconductors	Proc. National Symp. on Phys. and Chemistry of High Tc Superconductors Hyderabad	March 1991
70.	K.Muraleedharan C.K.Subramanyam N.Venkataramani T.K.Gundu Rao C.M.Srivastava V.Sankaranarayanan R.Srinivasan	On the magnetic susceptibility of CuO_x	Solid State Commun.	76, 1990 & 727-730
71.	Ravikumar A.K.Grover P.Chaddah C.K.Subramaniam V.Sankaranarayanan	Measurement of Higher Multipole Moments of an Inhomogeneous State of a Superconductor	Solid State Commun.	76, 1990 & 175-179
72.	Ravikumar A.K.Grover P.Chaddah C.K.Subramaniam V.Sankaranarayanan	A Reappraisal of Irreversible Behaviour in Intermediate State of a Type-I Superconductor	Physica	C170, 1990 & 431-436
73.	R.Vijayashree C.K.Subramaniam V.Sankaranarayanan G.V.Subba Rao R.Srinivasan	Logarithmic temperature dependence of resistivity of $\text{Nd}_{2-x}\text{Ce}_x\text{CuO}_{4-y}$	Physica	C167, 1990 & 53-58

Sl. No.	Authors	Title	Name of the journal	Vol., issue No., Month, year & page
74.	H.Krishnan V.Sankaranarayanan R.Srinivasan	Paracoherence studies in $Tl_2CaBa_2Cu_2O_8$, $CaLaBaCu_3O_{7-y}$ and $CaSmBaCu_3O_{7-y}$	XIX Int. Conf. on Low Tc Phys. (LT19), Sussex, UK	Aug. 1990
75.	A.R.Ganesan C.K.Ang B.C.Tan Y.H.Chen R.S.Sirohi	Subtractive moire' Technique for evaluating the wedge angle of a beam splitter	Appl.-Opt.	30, 1991 & 1173-74
76.	R.S.Sirohi T.S.Swaminathan	Study of Electronic cards with Digital Speckle Pattern Interferometry	J.Opt. (India)	19, 1990 & 14-49
77.	R.S.Sirohi	On the Resolving Power of a grating	J.Opt. (India)	19, 1990 &

12. Other Information

A monograph titled "Science and Technology of Ferrite Materials", jointly edited by Dr.V.R.K. Murthy of this department and Dr.B.Viswanthan, Department of Chemistry of this Institute published by Springer-Verlag, F.R.G. and Narosa Publishing House, New Delhi, has been released in June 1990.

4.13 OCEAN ENGINEERING CENTRE

1. Instruments/Equipment Designed and Developed

- (i) 16 channel wave height measuring system was developed

2. New facilities added and major equipment procured

- (i) Ultrasonic Laboratory current meter (3 axis)
- (ii) Pressure transducers :
 - 0.2 bar
 - 1.0 bar
 - 2.0 bar
 - 100.0 bar

3. Sponsored Projects

Sponsored Projects (Ongoing)

Sl. No.	Title/Funding Agency	Period	Amount Rs.	Coordinator(s)
1.	Sea trial of 150 kw wave energy system off Trivandrum coast. (Department of Ocean Development (DOD))	1987-91	317 lakhs	Prof.V.S. Raju Prof.M. Ravindran
2.	Chemical Composition of ground water-its effects on foundations and remedial measures (ICSR, IIT Madras)	1 year	50,000 (approx.)	Prof.K. Muthukrishniah Prof.T.S.Ramathalayar (Civil Engg) Dr.N.Balasubramanian (Chemistry)
3.	Development of numerical model for storm surge prediction along East Coast of India (DST)	March 1987- March 1992	5,84,700	Dr.R. Mahadevan Prof.D. Srinivasan

Sl. No.	Title/Funding Agency	Period	Amount Rs.	Coordinator(s)
4.	Impact of sea level rise due to green house effect - Andaman and Nicobar Islands (Min. of Environment and Forests)	March 1990- March 1992	4,42,528	Dr.R. Mahadevan Prof.D. Srinivasan
5.	Impact of sea level rise due to green house effect - statistical analysis of the past tide gauge data along the entire east coast of India (Min. of Environment & Forests)	March 1990- March 1991	1.82,928	Dr.R. Mahadevan Prof.D. Srinivasan

4. Major Consultancy Assignments

CONSULTANCY ASSIGNMENTS (in Progress)

S. No.	Title of Assignment/ organisation	Amount Rs.	Coordinator(s)
1.	Analysis & Advice for 7th Cargo Berth for Kandla (Kandla Port Trust)	3,00,000	Prof.V.S. Raju Prof.P.K. Aravindan Dr.Mehar Prasad Civil Engg. Dept.
2.	Foundation consultancy (Godavari Fertilizers and Chemicals Ltd.)	2,00,000	Prof.V.S.Raju
3.	Foundation consultancy (VTPS, Andhra Pradesh State Electricity Board)	2,00,000	Prof.V.S. Raju Dr.S.R. Gandhi Civil Engg. Dept.

S. No.	Title of Assignment/ organisation	Amount Rs.	Coordinator(s)
4.	Foundation Consultancy (Bindal Agro Chemicals Ltd.)	2,00,000	Prof.V.S. Raju Dr.S.R. Gandhi Civil Engg. Dept.
5.	Multipurpose cargo berth Paradeep port foundation consultancy and design (Paradip Port Trust)	4,50,000	Prof.V.S. Raju Dr.R.Sundaravadivelu Dr.S.R. Gandhi Prof.P.K. Aravindan Civil Engg. Dept.
6.	Ship motion analysis (software development) (Aeronautical Dev. Agency)	1,15,800	Dr.S.K. Bhattacharyya
7.	Checking the design (Cochin Refineries Ltd.)	60,000	Prof.K.Muthukrishnaiah Prof.P.K. Aravindan Civil Engg. Dept.
8.	Investigation and advice (Garrison Engineers, Avadi)	50,000	Prof.K.Muthukrishnaiah
9.	Investigation, analysis and advice (Cochin Refineries Ltd.)	75,000	Prof.K.Muthukrishnaiah
10.	Review consultancy for the design, construction and commissioning of Effluent Treatment Plant (TALCO, Ambur)	1,30,000	Prof.V.S. Raju Prof.P.K. Aravindan Prof.K. Elango Civil Engg. Dept. Prof.C.A. Sastry Chem.Engg. Dept. Prof.M.A. Parameswarn Mech. Engg. Dept.

5. Honours and Awards

Name	Designation	Honours/Awards
Dr.V.S. Raju	Professor	<ol style="list-style-type: none"> 1. Expert member, National Geotechnical Centrifuge Facility, DST 2. Organising Secretary (Publications) XIII ICSMFE 1994
Dr.S.Narasimha Rao	Professor	Jt. Org. Sec. (Publications) XIII ICSMFE, 1994
Dr.M.R. Pranesh	Professor	Jt. Org. Sec. (Publications) XIII ICSMFE, 1994
Dr.R. Mahadevan	Assoc. Prof.	<ol style="list-style-type: none"> 1. Member, National Project on "Ocean Acoustic Tomography" being carried out at NIO, Goa 2. CSIR Visiting Associateship to work in NIO, Goa, for 2 months every year for 3 years.

6. Distinguished Visitors to the Centre

Visitor's Name	Affiliation	Purpose of visit
His Excellency Dr.Richard Von Weizsaecker along with German delegation	President of Germany	Inauguration of Wave Basin
Prof.H. Kaldenhoff	Institut fur Wasserbau und Wasser Wirtschaft Technical Univ. Berlin, Germany	Delivering special lecture

8. Visit of Faculty Members to other Institutions

Name of Faculty	Institution visited & duration of visit	Purpose of visit
Prof.M. Ravindran	Marine Science and Tech. Centre at Tokyo, Japan, 22-25 Jan. 1991	Paper presentation
Prof.K. Muthu-Krishnaiah	Universitat Hannover 1-5-90 to 30-6-90	Advanced training in Germany under GTZ Programme
Dr.R.Sundaravadivelu	Technical Univ. Hamburg Harburg, 11-5-90 to 5-5-91	-do-
Sri R. Natarajan	Institut fur Schiffbau Univ. Hamburg 1-5-90 to 12-12-90	-do-
Dr.K. Ganesh Babu	Tech. University, Aachen 5-3-91 to 3-5-91	Advanced training in Germany under GTZ Programme
Prof.V.S. Raju	University of Karlsruhe 30-4-90 to 15-5-90 & 8-6-90 to 23-6-90	-do-
Dr.R. Mahadevan	Tech. Univ. Hannover 1-6-90 to 31-8-90	-do-
Prof.M.R. Pranesh	Tech. Univ. Hamburg 3-12-90 to 21-12-90	-do-
Dr.V. Sundar	Tech. Univ. Hannover for 6 months from	Post Doctoral Fellowship offered by the commission of European community through the Min. of Science & Tech., Govt. of India.

8. Participation in Seminars/Symposia/Conference etc.

Staff member	Name, Date and Venue	Nature of participation
Dr.V.S. Raju	National Workshop on Geotech Engg., 26.7.90 & 27.7.90, IISc., Bangalore	Lecture
Dr.S.Narasimha Rao	National Workshop on Geotech Engg., 25.7.90 - 27.7.90 IISc., Bangalore	Lecture
	Indian Geotech. Conf. VJT. Bombay 17.12.90 - 23.12.90	Paper presentation
Dr.M.R.Pranesh	National Workshop on Geotech. Engg., 24.7.90 - 27.7.90 IISc., Bangalore	Lecture

10. Research Publications

1. S.NARASIMHA RAO, Y.V.S.N.PRASAD, M.D.SHETTY and V.V.JOSHI, "Uplift capacity of screw pile anchors", Geotechnical Engineering Journal of South East Asian Geotechnical Society AIT Bangkok, Thailand, 1990.
2. S. NARASIMHA RAO and C.V. PRASAD, "Use of stone column foundation for an oil storage tank" All India Seminar on soil Improvement by Geo Textile stone columns and chemical grouting, Institution of Engineers (India), Calcutta, 1990.
3. S. NARASIMHA RAO, J.R. SOMAYAZULU and G. RAJASEKARAN, "Studies on lime columns", All India Seminar on Soil Improvement by Geo Textile stone columns and chemical grouting, Institution of Engineers (India) Calcutta, 1990.
4. S. NARASIMHA RAO, Y.V.S.N. PRASAD and C.V. PRASAD, "Experimental studies of model screw pile anchors", Indian Geotechnical Conference, Bombay, 1990.

5. S. NARASIMHA RAO, P. SIVAKUMAR and K. MALLIKARJUNA RAO, "Studies on pile cap interaction using model piles", Indian Geotechnical Conference, Bombay, 1990.
6. S. NARASIMHA RAO, J.V. SOMAYAZULU and G. RAJASEKARAN, "Physico chemical behaviour of soils stabilized with lime", Indian Geotechnical Conference, Bombay, 1990.
7. V. SUNDAR, S. NEELAMANI and C.P. VENDHAN, "Diffracted wave field and dynamic pressures around a vertical cylinder", Ocean Engineering, Vol.17, No.1/2, 1990, pp.125-154.
8. S. NEELAMANI and V. SUNDAR, "Diffraction of water waves by surface piercing vertical cylinders", accepted for Pacific/Asia Offshore Mechanics Symposium, Seoul, S. Korea, June 24-28, 1990.
9. K. MUTHUKRISHNAIAH and V.R. ALAGUVEL, "Ground improvement by heavy energy impact". Proc. Indian Geotechnical Conference, Bombay, Dec.20-23, 1990, pp 137-143
10. K. MUTHUKRISHNAIAH and V.S. RAJU, "Dynamic soil-pile parameters", Proc. Second International Conference on Recent advances in Geotechnical Earthquake Engineering and Soil Dynamics, St. Louis, Missouri (USA), March 11-15, 1991.
11. K. NAGAMANI and C. GANAPATHY, "Steel articulated towers for offshore construction-Advances in steel structures", Proceedings of National Symposium on Advances in steel structures, 1990. Madras, Tata MGHill Publishing Co., New Delhi.
12. C. GANAPATHY, Offshore steel structures, Proceedings National Symposium on Advances in Steel Structures, Madras, 1990, Tata MGHill Publishing Co. New Delhi
13. R. NATARAJAN, "Side launching of an offshore supply vessel", National Seminar on Research Design and construction of offshore structures, Visakapatnam, 1990, pp.84-94.
14. M.R. PRANESH and P.V.S.N. RAJU, "Marine exposure studies on corrosion behaviour of steel in concrete - offshore mechanics and arctic engineering, OMAE, 1990, Houston, pp.731-738.
15. M.R. PRANESH, "Sea floor ocean structure environment interaction, Proceedings, National Workshop on Geotechnical Engineering, July 25-26, 1990, Bangalore, pp VI 1-4.

16. R. SUNDARAVADIVELU, V.G. IDICHANDY, S.R. GANDHI and V.S. RAJU, "Measurement of tie-rod forces for a berthing structure", Journal of Waterway, Port, Coastal and Ocean Engineering, Vol.116, No.1, pp43-56.
17. S.R. GANDHI, "Can NDT replace conventional load testing of piles? Why and How?", Invited paper for presentation at Indian Geotechnical Conference, Bombay, 1990.
18. N.RAM MANOHAR and S.R. GANDHI, "Tests on Model piles for t-z and q-z curves", Geotechnical conference, Bombay, 1990.
19. V.G. IDICHANDY and C. GANAPATHY, "Model parameters for structural integrity monitoring of fixed offshore platforms, accepted for publication in the Quarterly Journal of the Society for Experimental Mechanics, USA.
20. V.G. IDICHANDY, "Full scale testing some techniques and experiences", 19th Scientific and Methodological Seminar on Ship Hydrodynamics, 1-6, Oct. 1990, Varna, Bulgaria
21. V.G. IDICHANDY, "Instrumentation for monitoring large structures", accepted for publication in the International Conference on Bridges and Flyovers, 8-10 Feb. 1991, Hyderabad, India.
22. V.G. IDICHANDY and C. GANAPATHY, "Influence of marine growth and deck mass on the dynamic response of fixed offshore platforms", INCOE-90, Goa, Dec.90.
23. A. MAHESWARI and V.G. IDICHANDY, "A computer controlled random wave generator - design and testing", Annual meeting of the Institution of Engineers (India).

4.14 CENTRE FOR BIOSCIENCE & BIOTECHNOLOGY

1. Introduction

The centre was established in October, 1982. Now, Biotechnology is the major thrust area in manufacturing and service industries. However, the activity of this Centre is limited to the faculties from the departments of Chemical Engineering and Chemistry. A few of them are actively engaged in research and teaching in different aspect of Biochemical Engineering and Biotechnology. At present there is no faculty exclusively employed for the centre.

Faculty Expertise

1.	Dr A. Baradarajan	Ph.D (IIT Madras)	Professor in Chemical Engg. and Head
2.	Dr. T.S.Chandra	Ph.D (IISc. Bangalore)	Asst. Professor in Chemistry
3.	Dr. K. Lalitha	Ph.D (Mysore)	Asst. Professor in Chemistry
4.	Dr. T. Panda	Ph.D (IIT Delhi)	Asst. Professor in Chemical Engineering
5.	Dr. S.K.Rakshit	Ph.D (IIT Delhi)	Asst. Professor in Chemical Engineering
6.	Dr. C.A. Sastry	Ph.D (Univ. of Bombay)	Professor and Head Dept of Chemical Engg.
7.	Dr. T.Swaminathan	Ph.D (IIT Kanpur)	Asst. Professor in Chemical Engineering

2. New Courses Introduced

Following courses have been introduced in M.Tech (Chemical Engineering) - Specialization in Chemical Reaction Engineering & Biochemical Engineering).

S.No.	Course No.	Title	Faculty
1.	CH 641	Bioprocess Engineering	Dr. T.Panda
2.	CH 642	Bioreactor Design & Analysis	Dr. T.Panda
3.	CH 741	Bioconversion and Fermentation Technology	Dr.A.Baradarajan

S.No.	Course No.	Title	Faculty
4.	CH 742	Upstream and Downstream Bioprocessing	Dr. S.K.Rakshit
5.	CH 841	Advanced Biochemical Engg. & Biotechnology	Dr.S.K. Rakshit Dr. T. Panda
6.	CY 730	Advanced Biochemistry & Biotechnology	Dr.K.Lalitha
7.	CY 815	New reagents, new reactions & modern concepts in organic synthesis - Relevant topics in Biochemistry	Dr.K.Lalitha

3. New facilities added and major equipment procured

- Development of new environmental Engineering Laboratory for post graduate studies in the Dept. of Chemical Engineering
- Development of Biochemical Engineering Laboratory for post graduate, undergraduate studies and research.
- Freeze dryer
- Remi make High Speed Centrifuge
- Remi model High speed refrigerated centrifuge
- Tissue culture facilities

4. Sponsored Projects

Title	Period	Funding Agency	Amount (in Lakhs)	Coordinator
Colour removal from Industrial waste waters	3 years	CSIR	3.00	Dr.C.A.Sastry Dr.D.V.S.Murthy

5. Major Consultancy Assignments

(i) Regular Consultancy

Title of Assignment	Organisation	Amount (in Rs.)	Co-ordinators
a. Waters & Waste water analysis	M/s.Britannia Industries, Madras	5,000	Dr.C.A.Sastry

Title of Assignment	Organisation	Amount (in Rs.)	Co-ordinators
b. Water analysis	M/s.B.K. Rao Associates, Madras	2,500	Dr.C.A.Sastry
c. Water analysis	National Remote Sensing Agency	6,000	Dr.C.A.Sastry
d. Advice & Consultancy	M/s.Catazyme Drugs & Pharmachuticals, Madras.	2,000	Dr.C.A.Sastry

(ii) Retainer Consultancy

a. M/s. Laxmi Starch Ltd., Hyderabad.	Rs.1,600/- p.m.
b. M/s. SPIC, Madras.	Rs.1,500/- p.m.
c. M/s. Esquire Engineers, Madras.	Rs.1,500/- p.m.
d. M/s.Nircon Engineering Consultant	Rs.1,200/- p.m.,

6. Honours and Awards

Name and Designation	Honours/Awards
Dr.C.A.Sastry, Professor and Head Dept. of Chem. Engg.	(a) Environmental Engg., Design award for 1990 (by the Institution of Engineers (India) Calcutta. (b) Certificate of Merit (by the Institution of Engineers (India) Calcutta.

7. Distinguished visitors to the centre

Prof.R.E. Blankenship	Director, Centre for Adavanced studies in photosynthesis, Arizona State University, USA	Research and Discussion
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8. Visit of Faculty Members to other Institutions

Name of Faculty	Institution Visited	Purpose of visit
Prof.C.A. Sastry	Anna University, Madras	Plenary Lecture
	Regional Labour Institute, Madras	Lecture
	Engineering Staff College of India, Hyderabad	-do-
	Administrative Staff College of India, Hyderabad	-do-
	TWAD Board, Madras	-do-
	Tamilnadu Pollution Control Board, Madras	-do-
Dr.S.K.Rakshit	BHEL, Haridwar	-do-
	REC, Trichy	Invited Lecture
Dr.T.Panda	Institution of Engineers (India) Madras	do-
	REC, Trichy	-do-
	Energy & Fuel Users Assn. of India, Madras	-do-
	REC, Surathkal	-do-
Dr.T.Swaminathar.	Karnataka REC, Suratkal	-do-
	Anna Institute of Management, Madras	-do-

9. Seminars/Symposium/Conference/Short-term courses organised

Short-term course on	Date	Co-ordinator
Recent Advances in Downstream Processing in Biochemical Engg.	1-7, Dec. 1990	Dr.S.K.Rakshit Dr.A.Baradarajan

10. Participation in Seminars/Symposia/Conference, etc.

Staff member	Particulars	Nature of participation
Dr.T.Swaminathan	Seminar on Emerging Areas of Pollution Control, Sept. 1990, Madras (CE(SR)&TNPCB)	Keynote address for Tech.session
	Annual Conference of Indian Association of Environmental Management, Dec. 1990, Nagpur	Chairing a Tech. session and Presentation of paper
Dr.S.K.Rakshit	Workshop on New Challenges in separation Science and Technology, Jawaharlal Nehru Centre for Advanced Scientific Res., 13-16, Dec., 1990 Bangalore.	Invited Participant
Dr.T.Panda	23rd National Seminar on Energy Options for the 90's, Energy & Fuel Users, Association of India, Jan.1991, Madras.	Invited Lecture
	31st Annual Conf. of the Association of Microbiologists of India,TNAU, Coimbatore, Jan.23-25, 1991	Presentation of paper
	Indo-Swiss Seminar on Biotechnology - Industrial applications of Biotech. Feb.27-28, 1991, IVRI, Bangalore.	Invited to participate & present a paper
Dr.K.Lalitha	16th Annual Symposium in Chemistry, Feb. 1991, Madras	Presentation of paper

11. Research Publications

1. P.Padmini, S.K.Rakshit & A.Baradarajan, Studies on a recycle reactor for a lipase catalysed processing of rice bran oil, Indo-Swiss Seminar on Biotechnology, IVRI, Bangalore, Abst. No.32, 1991.
2. S.K. Rakshit, S.Srinath Reddy and M.Sesha Srinivas, Determination of optimal profiles of two critical parameters in a non-growth associated batch fermentation Annual Session of Ilche (CHEMECON '90, BHU, 1990.
3. T.Swaminathan, Harardous waste management, Seminar on Emerging areas of pollution control (CE I (SR) & TNPCB), Madras, 1990.
4. T.Swaminathan, Membrane recycle bioreactor-filtration studies, Annual Conference of Indian Association for environmental management, Nagpur, 1990.
5. J. Praksh and T. Panda, Synthesis of bioenergy intermediates by bioacetification of condensed tannin - a bioengineering challenge, 22nd National Seminar on Energy, Madras.
6. P.S.R.Babu and T.Panda, Studies on improved technique of immobilized whole cell of E.coli containing penicillin amidase, National Symp-cum-workshop on Immobilized Enzyme, Enzyme and Cells, RRL Trivandrum, p.43, 1990.
7. P.S.R. Babu and T.Panda, Characterization and performance of immobilized whole cell of E.coli containing penicillin amidase, 31s Annual Conference AMI, TNAU, Coimbatore, pp.26- 27, 1991.
8. J.Anjani Kumari and T.Panda, Studies on intergeneric hybridization of *T.reesei* and *S.cerevisiae* - Comparative analysis of protoplast generation in two genus, 31st Annual Conference AMI, TNAU, Coimbatore, p.61, 1991.
9. T.Panda, Will biofuels fill the oil vacuum? Proc. 23rd National Seminar on Energy Option for the 90's, Energy & Fuel Users Association of India, Madras, pp.107-110, 1991.
10. P.S.R. Babu & T. Panda, Improved processes for the immobilization and stabilization of whole E.coli containing pencillin amidase, Proc. Indo-Swiss seminar on Biotechnology, IVRI, Bangalore, Abst No.27, 1991.

International Conferences

1. P.Padmini, S.K. Rakshit and A.Baradarajan, Kinetics of lipase catalysed hydrolysis of rice bran oil Proc. APBioChEC, Kyungju, Korea, pp.49-52, 1990.

2. M.K. Gowthaman, S.K.Rakshit and A.Baradarajan, Proc. APBioChEC, Kyungju,Korea, pp.521-524, 1990.
3. K.Balu, A.Baradarajan and M.Satyanarayana, RTD studies in static mixers, International Conference ASME, Tirupathi, India, 1990.
4. M.K.Gowthaman, S.K. Rakshit and A.Baradarajan, Studies on SCP production in tapered and cylindrical reactors, CHISA, Prague, Czechoslovakia, 1990.
5. P.Padmini, S.K.Rakshit and A.Baradarajan, Kinetics of fat splitting of rice brain oil using lipase enzyme, CHISA, Prague, Czechoslovakia, 1990.
6. P.S.R. Babu and T. Panda, Recycling of fermentation broth for the production of penicillin amidase, Proc. Asia-Pacific Biochemical Engg. Conference '90, (APBioChEC '90),Kyungju, Korea, pp.110-113, 1990.
7. A.Venkataraman and T.Banda, Studies on the in-vitro development of chick-embryo, Proc. APBioChEC '90, Kyungju, Korea, pp.149-151, 1990.
8. P.S.R.Babu and T.Panda, Studies on the improvement of catalytic efficiency of penicillin amidase from E.coli Congress CHISA '90, Praha, Czechoslovakia, P.No.406.
9. J.Anjani Kumari and T.Panda, An attempt to a viable single stage bioconversion of agropolymers by fused *S.cerevisiae* and *T.reesei*, Proc. 2nd International Symp. on Renewable energy sources, (A.I.E1 - Sharkawy, ed.) Vol.2, Cairo, Egypt, 593-601, 1990.
10. C.I.Mathai and T.Panda, Kinetic analysis on the effect of condensed tannin on bioacetification of cow dung, Proc. 2nd International Symp. on Renewable energy sources, (A.I.E1 - Sharkawy, ed.) Vol.2, Cairo, Egypt, 639-646, 1990.
11. A.Venkataraman, J.Anjani Kumari, P.S.R.Babu and T.Panda, Critical analysis of process development on in-vitro growth of chick - embryo, Proc. 3rd Annual Meeting of Japanese Association for Animal Cell Technology (JAACT '90), Kyoto, Japan, p.32, 1990.
12. A.Venkataraman, P.S.R.Babu and T.Panda, Studies on Physiological aspect of in-vitro development of chick- embryo, 3rd JAACT '90, Kyoto, Japan, p.52, 1990.

Indian Journal

1. P.Padmini, S.K.Rakshit and A.Baradarajan, Studies on fermentative production of lipase, Trans. Indian Chemical Engineers, 32,(4), 51-54, 1990.
2. P.V.R.Subrahmanyam and T.Swaminathan, R&D in hazardous waste management, Chemical Engineering World, 25, 143-149, 1990.
3. S.Kammatchiammal and C.A.Sastry, Statistical method for estimating medium lethal concentration in toxicity assays, Indian J.Env.Protection, Vol.9, No.10, October 1989.
4. C.A.Sastry, Public health considerations of waste recycling - Indian J.Env. Protection, Vol.10, No.1, Jan. 1990.
5. S.Raghuveer and C.A.Sastry, Characteristics of waste water generated when different raw materials are used for pulp and paper making, Indian J.Env. Protection, Vol.10, No.4, April 1990.
6. C.A.Sastry, V.Srinivas, Y.V.Subramanyam and V.L.P.S.Loola, Treatment of sugar mill waste water using anaerobic filter, Indian J. Env. Prot. Vol.10, No.8, August 1990.
7. C.A.Sastry, V.Srinivas, V.L.P.S.Lolla & Y.V.Subramanyam, Treatment of phenolic waste water using two upflow anaerobic filters operated in series, Indian J.Env. Prot.Vol.10, No.9, Sep. 1990.
8. S.Raghuveer and C.A.Sastry, Effect of simple inplant control measures on the characteristics of waste water from a pulp and paper mill, Indian J. Env. Prot. Vol.10, No.10, October1990.
9. S.Raghuveer and C.A.Sastry, Agricultural utilisation of biologically treated pulp and paper mill waste water, Indian J. Env. Prot. Vol.10, No.11, Nov., 1990.

International Journal

1. N.Chitra and A.Baradarajan, Analysis of packed bed immobilized reactor, J.Chem.Tech. & Biotechnology, 49, 115- 127, 1990.
2. S.K.Rakshit and V.Sahai and P.V.R.Subrahmanyam, Heavy metal removal with lignin, J.Enviroin.Sciences & Health, Part A, 25,(3), 243-265, 1990.
3. K.V.R.Verma, T.Swaminathan and P.V.R.Subrahmanyam, Cellulose production by a partially catabolito resistant mutant of T.reesei, J.Gen.Appl. Microb. 35, 441-450, 1989.

4. V.S.Bisaria, P.S.R.Babu and T.Panda, Endoglucanase from the mixed culture of *T.reesei* and *A.Wentii*, *Bioprocess Engg.*, 5, 119-121, 1990.
5. P.S.R.Babu and T.Panda, The role of phenylacetic acid in biosynthesis of penicillin amidase in *E.coli*, *Bioprocess Engg.*, 6, (12),71-74, 1991.
6. K. Lalitha and Shanti Krishnan, Isolation of a rod shaped methanogen growing on methanol and 2-propanol, *Archives of Microbiology*, 1991, Vol.155, p.402-409.
7. Shanthi Krishnan and K.Lalitha, Features of a novel methanogenic isolate KL, 16th Annual Symposium in Chemistry, Dept. of Chemistry, IIT, Madras, Feb.23-24, 1991.
8. K.Lalitha, K.R. Swaminathan, V.P. Shanthi and R.Padma Bai, Biomethanation of tannery waste, 16th Annual Symposium in Chemistry, Dept. of Chemistry, IIT, Madras, Feb.23-24, 1991.
9. K.Lalitha and K.Easwari, Metabolic significance of selenium during germination of *Phaseolus aureus*, 16th Annual Symposium in Chemistry, Dept. of Chemistry, IIT, Madras, Feb.23-24, 1991.

Present areas of research

- Protoplast fusion
- Biomethanation
- Production of industrial enzymes viz., Penicillin amidase, lipase, amylase, laminarinase, etc.
- Production of organic acids, viz., gluconic & citric acids
- Down stream processing, viz., membrane separation
- Environmental biotechnology.

4.15 REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

1. Sponsored Projects

Title	Period	Funding Agency	Amount	Co-ordinators
Matrix isolation studies	3 years	DST	Rs. 8.6 lakhs	Dr.Surjit Singh
Spectroscopic Studies of Metal ions	3 years	DST	Rs.13.5	Dr.P.T.Manoharan

2. Major Consultancy Assignments

Title of Assignment	Organisation	Amount	Co-ordinators
Development of Microprocessor in Progress Gauge (Project No. ICSR/01/RSIC/90-91)	M/s.Pilot Engines Pvt. Limited, Madras	Rs. 20,000/-	Dr.S P Venkateshan Dr.N Devasahayam

3. Honours and Awards

Name	Designation	Honours/Awards
P.T. Manoharan	Professor	FICCI

4. Distinguished Visitors to the Department

Visitor's Name	Affiliation	Purpose of visit
Dr. Drazen Vikić	Ruder Bosković Institute Univ. of Zagreb, Yugoslavia	Special Seminar on 15-5-90
Dr K Krishnan International Sales Manager	Digilab Div. Biorad USA	Special Lecture on 17-5-90
Dr G Krishnamoorthy	Chemical Phy. Lab TIFR, Bombay	Talk on 2-7-90
Dr Pinaki Gupta Bhaya	Dept of Chemistry IIT Kanpur	Special Seminar on 31-8-90
Dr B N Figgis	Dept of Inorg Chy. The Univ. of Western Australia	Visiting Faculty (one month Nov.90)
Dr Blankenship, H E	Dept of Chemistry Arizona State Univ. Tempe, Arizona 1604 USA	Workshop on Bio- Inorganic Chy. Dec. 9 - 15, 1990
Dr Likhtenshtein, G I	Institute of Chemical Physics, Academy of Sciences of USSR Chernogolovka Moskow Region 142432 USSR	- do -
Dr McLendon G	Dept of Chemistry University of Rochester Rochester, New York 14627, USA	- do -
Dr Penner-Hahn James E.	Dept of Chemistry University of Michigan 930 North University Ave ANN Arbor, Michigan 48109 1055 USA	- do -

Visitor's Name	Affiliation	Purpose of visit
Dr Solomon, E I	Dept of Chemistry Stanford University Stanford CA 94304 USA	- do -
Dr Watt G D	Graduate School of Biochemistry, Dept. of Chemistry, Brigham Young University, Provo, Utah 84602, USA.	- do -
Dr. William, D.R.	Dept. of Applied Chemistry - U.W.I.S.I., Post Box 13 Cardiff CFI 3XF, UK.	do -
Dr.B.Rajagopalan	MRC Biochemical and Clinical Magnetic Resonance Unit, Oxford, UK.	Seminar Talk on 26-12-90
Dr.K.C. Molloy	University of Bath, UK	Seminar Talk
Dr.B.Kalyanaraman	National Biomedical ESR Centre, Medical College of Winconsin, USA	Seminar Talk on 28-2-91

Scientists from various Indian Universities and National Institutions participated and delivered lectures in the Workshop on Bioinorganic Chemistry.

5. Visit of Faculty Members to other Institutions

Name of Faculty	Institution visited	Purpose of Visit and duration
Prof P T Manoharan	The University of Western Australia, Australia	As Visiting Faculty on Sabbatical leave for one year from 21.1.91 to 21.1.92

Name of Faculty	Institution visited	Purpose of Visit and duration
Prof Surjit Singh	Universitat-GH-Siegen Germany	As visiting Prof. on Sabbatical leave from 24.9.90 to 23.9.91

6. Seminars/Symposium/Short-term courses organised

1. Academy Discussions Meeting on Trends in Theoretical Chemistry
Sept.30- Oct.1990.
2. Workshop on Bioinorganic Chemistry, 9 - 15 December, 1990.
3. Workshop on Pulsed EPR Spectroscopy Instrumentation and Applications,
18-2-1991.

7. Participation in Seminars/symposia/Conferences, etc.

Staff Member	Particulars of Participation Conf./seminar/symposia/short- term course - Name, Date and Venue	Nature of participation
Dr S Subramanian	Indo Soviet Symposium on Magnetic Resonance Jan.14 - 16, 1991. IISc. Bangalore	Lecture Talk
Dr S Subramanian	Workshop on future Directions of Research in Magnetic Resonance Jan.-17 - 18, 1991 IISc. Bangalore	Lecture Talk

Staff Member	Particulars of Participation Conf./seminar/symposia/short- term course - Name, Date and Venue	Nature of participation
Dr P T Manoharan	Indo Soviet Symposium on Magnetic Resonance Jan. 14-16, 1991. IISc. Bangalore	Lecture Talk
Dr P T Manoharan	Workshop on Future Directions of Research in Magnetic Resonance Jan. -17 -18, 1991 IISc., Bangalore	Lecture Talk

4.16 CENTRE FOR SYSTEMS AND DEVICES

1. New Course Introduced

S.No.	Course No	Title	Structure	Faculty
1.	EE 630	Semiconductor Epi-Technology	3 credit	Dr.P.R.VAYA

2. Instruments/Equipment Designed and Developed

1. PC based DLTS system
2. Current Pulse power supply for semiconductor laser operation.
3. Authoring system software developed

3. New facilities added and major equipment procured

Boonton Capacitance meter Model 72BD

4. Sponsored Projects

Investigations on the Effect of γ -Irradiation and other Higher Energy Particles on SiN Passivated GaAs surfaces and Interfaces - 1990-92 Sponsored by DAE Rs.1.67 Lakhs Co-ordinator(s) - DR.P.R.VAYA

Feasibility Study of Growth of Diamond Like Carbon (DLC) Films by PECVD Technique (1990-91), Sponsored by IIT, Madras under IRDF Scheme, Co-ordinator(s) - DR.P.R.VAYA, DR.K.PONNURAJU and DR.J.MAJHI

Applicability of Modern Spectral Estimation Algorithms to Improve the Performance of MTI Surveillance Systems (4 years), Sponsored by DT&SR,DRDO, New Delhi, Rs.12.97 lakhs Co-ordinator - Dr. K.M.M.PRABHU

Computer Assisted Language Learning/Teaching (3 years) sponsored by DOE, Rs.6.0 lakhs Co-ordinator(s) V.N.SHUKLA and MRS.RANJANA SHUKLA

5. Major Consultancy Assignments

Title of Assignment	Organisation	Amount	Co-ordinator(s)
1. To evaluate the Semiconductor Devices	Hindustan Teleprinters	Rs.48,000/-	DR.P.R.VAYA
2. i) Retainer consultancy for advising for setting up factory for LEDs	M/s.Litton Displays Pvt. Ltd, Madras-14.	Rs.24,000/-	DR.P.R.VAYA
ii) To characterize and evaluate LEEDs Displays	M/s.Litton Pvt. Ltd., Madras-14.	Rs.12,000/-	DR.P.R.VAYA
iii) Intelligent BarCode Reader/decoder Division	M/s.Srinidhi Forms Pvt.Ltd Electronics	Rs.800/- per day	MRS.RANJANA SHUKLA

6. Visit of Faculty Members to other Institutions

Name of Faculty	Institution visited and duration of visit	Purpose of visit
DR.P.R.VAYA	1. University of Salford, U.K (June 27-July 10)	To work on Low energy ion beam Technology.
	2. University of Laughton, U.K (July 10-15)	To work on DC Magnetron Sputtering Technique.

Name of Faculty	Institution visited and duration of visit	Purpose of visit
MRS.RANJANA SHUKLA	C.E.D.T, CALICUT (4 days)	Preparing Course Module for their M.Tech/Short Term Course

7. Seminars/Symposium/Conferences/Short-Term Courses organised

1. ISTE Summer School on Introduction to Semiconductor Lasers (May 1990) - Organized by DR.P.R.VAYA.
2. IX International Course on Physics of Materials (Feb.1991) Sponsored by UNESCO and APSO - Organized by DR.P.R.VAYA &DR.K.SRINIVASAN.
3. CALL/CALT Computer Assisted Learning/Computer Assisted q|Ä +L 30 Augus

8. Participation in seminars/symposia/conferences, etc.

Staff Member	Particulars of Participation Conf./seminar/symposia/short-term course - Name, Date and Venue	Nature of participation
DR.P.R.VAYA	Prof.S.K.Mitra Memorial Symposium on Materials and Devices for Optoelectronics Sept.3-4, 1990, University College of Science, Calcutta.	To deliver invited talk on GaAs laser diode activities at IIT, Madras
MRS.RANJANA SHUKLA	Electronics & Society July 12, 1990, - Organised by Dept. of Electronics	Presented a paper

8. Research Publications

1. V. Suresh Babu and P.R. Vaya, "Photoluminescence Properties of Doped and Unintentionally Doped Hot Wall Deposited Polycrystalline Zn₃P₂ Films" *Microelectronics Journal*, 21 No.1, 35-40 (1990).
2. P.R. Vaya, J. Majhi and S. Neela, "Effect of Grain Boundaries on the Barrier Height of P - Polysilicon/Aluminium Schottky Structures", *Ind. J. Pure and Appl. Phys.*, 28, 555- 56 (1990).
3. V.Jayan, L.P.Lailamoni, K.J.Thomas, J.Majhi and P.R.Vaya, 'Thickness Dependent Photofield Effect Studies on a-Si:H Thin Films', *Thin Solid Films* 198, 1-3 (1991).
4. M.S.Narasimhan and B.Preethamkumar., 'A Technique of Synthesizing Excitation Currents of Planar Arrays or Apertures', *IEEE Transactions on Antennas and Propagation*, Vol.38, No.9, Sept.1990, pp.1326-1332.
5. N.Anipindi, S.B.Narayanan and K.M.M.Prabhu, 'New Radix-3 FHT Algorithm', *Electron. Lett.*, Vol.26, No.18, pp.1537-1538, 30 August, 1990.
6. N.Anupindi and K.M.M.Prabhu, 'Split-Radix FHT Algorithm for Real Symmetric Data', *Electron. Lett.*, Vol.26, No.23, pp.1973-1975, 8 November 1990.
7. S.B.Narayanan and K.M.M.Prabhu, 'Fast Hartley Transform Pruning', *IEEE Trans. Signal Processing*, Vol.39, No.1, pp.230-233, Jan.1991.

10. PAPERS PRESENTED

1. P.R.Vaya, 'GaAs Laser diode activities at I.I.T., Madras' (invited paper). Prof.S.K.Mitra Memorial Symposium on Materials and Devices for Optoelectronics', University College of Science, Calcutta, Sept.3-4, 1990.
2. Aniruddha Weling, K.K.Kamath and P.R.Vaya, 'Chemical Surface Passivation of GaAs', Prof.S.K.Mitra Memorial Symposium on Materials and Devices for Optoelectronics, University of College of Science, Calcutta, Sept.3-4, 1990.
3. K.K.Kamath and P.R.Vaya, 'Electroluminescence in AlGaAs/GaAs Double Heterostructures' Prof.S.K.Mitra Memorial Symposium on Materials and Devices for Optoelectronics, University of College of Science, Calcutta, Sept.3-4, 1990.

4. V.Jayan and P.R.Vaya, 'Design Study of Distributed Feed back lasers using Symmetric Triangular Periodic Structures' Prof.S.K.Mitra Memorial Symposium on Materials and Devices for Optoelectronics, University of College of Science, Calcutta, Sept.3-4, 1990.
5. K.M.M.Prabhu, S.Ram and M.Senthil, 'Applicability of MEM for Adaptive Clutter Suppression Schemes in Radar Signal Processing', Proc. of Radar Con - 90, Adelaide, Australia, pp.521-527, April 18-20,1990.
6. K.M.M.Prabhu and K.Bhoopathy Bagan, 'Nonlinear Spectral Analysis of an Experimental Radar Clutter Model', Proc. of Radar Con-90, Adelaide, Australia, pp.529-535, April 18-20, 1990.

4.17 MATERIALS SCIENCE RESEARCH CENTRE

1. New Facilities added and major equipment procured

- (i) Computer
- (ii) High Vacuum Unit
- (iii) DC Sputter Coater (Balzers, Germany)
- (iv) Closed Cycle He-refrigerator (CTI, USA & Hareaus, Germany)

2. Sponsored Projects

Title	Period	Funding Agency	Amount	Co-ordinator
Studies on the feasibility of immobilization of radioactive wastes in crystalline ceramic phases	1991-93	BRNS, (DAE) Bombay	Rs.6 lakhs	Dr.U.V.Varadaraju

3. Honours and Awards

Name	Designation	Honours/Awards
1. G.V. Subba Rao	Professor	MRSI Medal
2. G.V. Subba Rao	Professor	Superconductivity Prize

4. Distinguished Visitors to the Department

Visitor's Name & affiliation	Date of visit	Purpose of visit
1. Dr. C.K. Mathews Radiochemistry Program IGCAR, Kalpakkam	April 90	Hold discussions & give talk

	Visitor's Name & affiliation	Date of visit	Purpose of visit
2.	Prof. L.C. Gupta Supercond. Mat. Group TIFR BOMBAY.	April 90	Hold discussion and give talk
3.	Dr. M. Paranthaman Univ. of Texas at Austin, USA	June 90	- do -
4.	Dr. U. Balachandran Argonne National Lab. Illinois, USA	Sep. 90	- do -
5.	Dr. Jiri Hejimanek Physical Inst. of Czech. Acad. of Sci. Czechoslovak.	Nov. 90	- do -
6.	Prof. C. Schlenker CNRS-Lepes 25, Avenue des Martyrs 38042 Grenoble, Cedex France	Dec. 90	- do -
7.	Prof. D. Chakravorty Indian Association for the Cultivation of Science Calcutta	Dec. 90	- do -
8.	Dr. R. Suryanarayanan CNRS Labs Bellevue, Paris France	Jan-Feb., 91	- do -
9.	Dr. S. Gregoli Commission of the European Communities Brussels Belgium	Jan. 91	- do -

	Visitor's Name & affiliation	Date of visit	Purpose of visit
10.	Prof. B. Raveau Director CRISMAT-SMRA Caen, France	Feb. 91	Hold discussion and give talk
11.	Prof. C. Edward Gough Director School of Phys. & Space Research, Birmingham University UK	Feb. 91	- do -
12.	Dr. S.N. Sanu Inst. of Physics Bhubaneswar	Feb. 91	- do -
13.	Dr. A.M. Umarji & Dr. Radhakrishna Mat. Res. Centre IISc., Bangalore	Feb. 91	- do -
14.	Dr. E. Grantscharova Inst. of Phys. Chemistry Bulgaria Academy of Sciences Sofia, Bulgaria	Mar. 91	- do -
15.	Dr. C.K. Mathews Head Radiochemistry Programme IGCAR, Kalpakkam	Mar. 91	- do -

5. Research Publications

1. 'Superconductivity studies on the M-TiSr-Ca-Cu-O (M = Rare earth, Sc, Y, Pb, Th) system', K.A. Thomas, U.V. Varadaraju, G.V. Subba Rao, C.V. Tomy and S.K. Malik, Mat.Res. Bull 25, 465-476 (1990).

2. 'Superconductivity studies on TI-M-Ba-Cu-O (M = Ce,Th,Pr,Tb, Te) system', K.A. Thomas, U.V. Varadaraju, G.V. Subba Rao, C.V. Tomy and S.K. Malik, J. Solid State Chem. 88, 177-182 (1990).
3. 'Studies on Li-doped $\text{Ca}_{0.85}\text{Sr}_{0.15}\text{CuO}_2$: The prototype of cuprate family of oxide superconductors', B. Lakshmi Brinda, U.V. Varadaraju and G.V. Subba Rao, Bull. Mat. Sci. (India) in press (1990).
4. 'Strategies for search for new oxide superconductors and studies on $\text{Ba}_{1-x}\text{K}_x\text{MoO}_3$ ', G.V. Subba Rao, J. Kesavayya and U.V. Varadaraju, Proc. of Intl. Conf. Transp.Prop. of Super cond. Ed., R. Nicolsky, World Sci. Singapore, pp 520-535 (1990).
5. 'Superconductivity studies on TI-Th-Sr-Ca-Cu-O System', K.A. Thomas, U.V. Varadaraju, G.V. Subba Rao, C.V. Tomy and S.K. Malik, Bull, Mat.Sci. in press (1990).
6. 'Fluctuation induced excess conductivity in the compounds, $\text{CaREBaCu}_3\text{O}_7$ (RE = La,Sm)', H. Krishnan, V. Sankaranarayanan, C.K. Subramanian and G.V. Subba Rao, Bull. Mat.Sci.(India) in Press (1990).

4.18 FIBRE REINFORCED PLASTICS RESEARCH CENTRE

1. New Facilities added and major equipment procured

A facility for research on fibre reinforced thermoplastics has been created. For this purpose, a bench model thermoplastic extruder Axon make with facility for fibre filling has been procured.

2. Sponsored Projects On-Going Projects

S. No.	Title	Funding Agency	Period	Co-ordinator
1.	Dev. of rehabilitation aids with composites for the mobility of paraplegics	DST, New Delhi Rs.1.43 Lakhs	2 years (upto 92)	Dr.N.G.Nair Dr.BJC Babu
2.	Adv. Composite Dev. Fibre reinforced metal, ceramic and plastic matrix composites	MHRD Rs.35.0 Lakhs	upto 1992	Dr.Palaninathan Dr.N.G.Nair Dr.SK Malhotra
3.	Reinforced Plastics product design for bicycle components	DST, New Delh	4 years Dec. 91	Dr.BJC Babu Dr.SK Malhotra
4.	Computer Aided Design Aerodynamically heated structures	RDEE	3 years (upto 92)	Dr.Palaninathan

New Projects

S. No.	Title	Funding Agency	Period	Co-ordinator
1.	Development of evaluation of FRP splints for cerebral palsy	DST, New Delhi Rs.1.81 Lakhs	3 years 23-1-91- 22-1-94	Dr.BJC Babu Dr.N G Nair

3. Major Consultancy Assignment

S. No.	Title	Organisation	Amount	Coordinator
1.	Design and Dev. of vibration test	ISRO, Shar Centre Sriharikota	Rs.2.10 Lakhs	Dr.SK Malhotra
2.	Design Development & Testing of FRP Axial Flow fan blades	BHEL, Ranipet	Rs.0.40 Lakhs	Dr.NG Nair Dr.V.Ramamurti Dept. of App. Mechanics
3.	Design and Development of FRP Tension element	RDE (Engrs) Pune	Rs.0.25 Lakhs	Dr.SK Malhotra

4. Distinguished Visitors to the Centre

	Visitor's Name	Affiliation	Purpose of visit
1.	Prof.V.Smyslov Dr.L.Karasik Dr.V.Karasik Dr.I.Dasht'ev	Central Scientific Inst. for Special Machines (TSNII SM) USSR.	To discuss Ino-USSR Programme of co-operation
2.	Dr.M.K.Rama-subramaniam	Scientist James River Corporation, Wiscoustin, USA.	To deliver lecture on 'Micromechanics of Composites'.
3.	R.N. Agarwal	Director, (AGNI Project) DRDL Hyderabad.	To deliver lecture on 'AGNI' Project

5. Short Term Courses Organised

S.No.	Topic	Date
1.	Workshop on FRP Technology	4-3-91 to 16-3-91

S.No.	Topic	Date
2.	Design of FRP Building and Building components	14-6-90

6. Participation in Seminars/Symposia/Conferences, etc.

Staff Member	Particulars of participation Conf./Seminars/Short Term course - Name, Date & Venue	Nature of participation
1. Dr.S.K. Malhotra	Int. Conf. on 'Developments in Forming Technology', Sept. 12-14, 1990, Lisbon, Portugal.	Paper presentation

7. Research Publications

1. S.K. Malhotra, Some studies of drilling of Fibrous Composites, paper presented at Int. Conf. on Developments in Forming Technology, Lisbon, Portugal, Sept. 12-14, 1990, JI. of Materials Processing Technology, V.24, Dec. 1990, pp.291- 300.
2. Roy Jacob, N.G. Nair and P.K. Philip, Computer Aided Mould Design for SMC compression moulding technology for competitive manufacturing, Proc. 14th All India Machine Tool Design and Research Conf., 19-21 Dec. 1990, IIT, Bombay.
3. Ramakrishnan, Sibi Chacko, N.G. Nair and P.K. Philip, Design of Pulforming machine and dies for manufacturing FRP Car Leaf Springs, Proc. 14th All India Machine Tool Design and Research Conf., 19-21 Dec. 1990, IIT, Bombay.

8. Any other Relevant Data

A Composite Test Facility is being operated by FRP Research Centre for conducting quality evaluation tests on Samples brought by Industries. Sixty two assignments for a total of Rs.85,000/- was taken up during the financial year.

4.19 CENTRAL ELECTRONICS CENTRE

1. New Course Introduced

S.No.	Course No.	Title
1.	CY	Electronics for I M.Sc (Chemistry)

2. New facilities added and major equipment procured.

a)	Tong measuring Instrument	April 1990	One	DM	333.00
b)	Oscillograf	April 1990	One set	DM	3,000.00
c)	Curve Tracer	May 1990	One set	DM	31,200.00
d)	A.C.Voltage standard	July 1990	One	DM	5,570.00
e)	DC Voltage standard	July 1990	One	DM	8,355.00
f)	Trainer kits	March 1991	Five	DM	27,000.00
g)	Service case	April 1990	Five sets	DM	3,700.00

3. Major Consultancy Assignments

Title of Assignment	Organisation	Amount	Co-ordinator(s)
a) Power Supply	Eastern Medicals	3,500	M.V.Srinivasan
b) Tranducer repair	-do-	2,500	-do-
c) UPS	Trinity Hospital	2,000	-do-
d) Microline Printer	Madras Telephones	2,500	K.R.Venkatachalam
e) Thyristor control	Padmavati Metal & Alloys (P) Ltd.	4,900	M.Kumaravel
f) Microprocessor based programme controller	Madras Industrial Linings	9,500	-do-

4. Visit of Faculty/Staff Members to other Institutions

Name of staff member	Institution visited and duration of visit	Purpose of visit
M.Kumaravel	University of Mainz)	For advanced training in Germany under Indo-German Project
M.V.Srinivasan	Tektronix, Koln)	
V.K.Ranganathan	-do-)	
C.Kuppuswamy	Hewlett Packard, Boeblingen)	
N.Karthiyayini	--do--)	

5. Short Term Course Organised

"Industrial Electronics and Instrumentation"

(10.12.1990 to 22.12.1990)

4.20 CENTRE FOR INDUSTRIAL CONSULTANCY AND SPONSORED RESEARCH

The Centre for IC & SR is charged with the responsibility of coordinating the industrial liaison activity of the Institute. It serves primarily as a link between the Institute and the industry. It aims to encourage and promote consultancy work by the faculty and serves as a catalyst in the discharge of these tasks. Furthermore, the Centre makes the industries aware of the total competence and expertise available at the Institute in terms of staff, equipment, facilities for fabrication, inter-disciplinary collaboration, etc., and to feedback technical problems faced by industry to interested faculty members. Since its inception, the Centre has helped the Institute to take up a large number of assignments covering a wide range of activities like design and development, measurement and evaluation, trouble shooting, planning and project preparation in nearly all fields of engineering and science where facilities in the existing laboratories at IITM could be relevant. The value of the consultancy assignments taken up during 1990-91 was Rs.94.57 lakhs.

The Centre has established well defined procedures for seeking the support from outside agencies for running the projects funded by various user agencies and government departments. The sponsored research projects awarded to the Institute during 1990-91 was Rs.284-98 lakhs. A number of industries from private sector also have sponsored projects to the Institute.

The Centre also coordinates the activities relating to Indo- German Joint research projects and other collaborative programmes with countries like USA, Italy and Australia. In addition, the Centre has organised the M.S. in Entrepreneurship Programme. Four candidates were awarded the M.S. degree.

The new Programme of Industrial Associateship launched in collaboration with the Confederation of Engineering Industries (Southern Region) has established closer links with individual industries. Nearly 200 industries have become members of this scheme. A number of facilities are offered to the member industries and special Technology Appreciation Programmes were arranged for their benefit.

5. CENTRAL SERVICES

5.1 Central Workshop

It undertook the fabrication of parts and assembly required for B.Tech, M.Tech and Ph.D research programmes from the Departments of the Institute in addition to the regular training programme for the students of B.Tech and M.Sc. programmes.

Advanced workshop course was conducted during the Summer April - May 1990 to the B.Tech students. The following are the details of works during the period under report:

No. of Work Orders completed during the period 1990-91	:	594
No. of students trained in the Advanced Workshop Training during Summer Term Course	:	28

During the above period several works of I.C. & S.R. works were also undertaken and completed.

5.2 Central Glass Blowing Section

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

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

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

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

Development activities: The service regarding glass apparatus repair work and fabrication of precision glass instruments, sophisticated glass systems of this section is fully utilized by the departments. This centre also procuring new tools to help in the fabrication of most sophisticated equipments for R and D of the departments.

Profession activities: Sri N.T. Kumarasamy, Technical Officer, Treasurer of Indian Society of Scientific Glass Blower's Sri A.G. Venugopal, S.T.A. and Sri A. Jayaramn Sr. Mechanic are members of I.S.S.G.

5.3 Central Photographic Section

The Section with the staff strength of five experienced technical personnel caters to the need of various departments/ centres of the Institute. It is mainly involved in Slide Preparations, Photo-taking of research activities of the faculty members and research workers. It also undertakes development, enlarging and printing and helps various IC and SR activities. It covers the different Institute functions such as Convocation, Sports- meet, Seminars, Symposia, etc.

5.4 Central Gas Supplies Unit

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

Industrial gases

1. Oxygen
2. Nitrogen
3. Dissolved Acetylene
4. Argon
5. Hydrogen

Special gases

1. High Pure Argon Gr.I
2. High Pure Oxygen
3. High Pure Nitrogen Gr.I
4. Zero Air

5.5 Central Supplies Unit

The Central Supplies Unit is administered by a Warden. It procures under

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

5.6 Centre for Continuing Education

The Centre for Continuing Education was established in June 1986, by merging together the different units connected with Continuing Education activities, Quality Improvement Programmes and Curriculum Development work at the Institute, so that all these activities might be organised in an optimal manner under a single agency. As Continuing Education has been given considerable importance in the National Policy on Education 1986, the Institute is seeking to emphasize this aspect of engineering education.

The principal activities include organization of Short-Term Programmes for personnel from Industries and R&D Establishments, in response to identified needs; preparation of resource materials in the form of modules for use by working professionals under sponsorship from the Continuing Education Project, MHRD; and the publication of "reader-friendly" books on topics in Science and Engineering by eminent scientists and technologists in the country for the benefit of students and the public.

IIT Madras Series in Science and Engineering

Under this series the following three books were published:

- * 'Understanding Combustion' by Prof.H.S. Mukunda, Indian Institute of Science, Bangalore.
- * 'The Frontier Between Physics and Astronomy', by Prof. J.V.Narlikar, Inter University Centre for Astronomy and Astrophysics, Pune.
- * 'Catalysis' by Prof. J.C. Kuriacose, Indian Institute of Technology, Madras.

Continuing Education Programmes

A total of 15 Continuing Education Programmes were conducted, and 350 participants attended these programmes, during 1990-91. The scheme is proving quite successful as many industries come forward to make use of the expertise of the IIT Madras faculty.

Continuing Education Modules

During 1990-91, 19 modules were completed; 73 more modules are under

various stages of preparation. On the basis of the completed modules, it is intended to organize Continuing Education Programmes for working professionals. These modules are in great demand by the industries.

Quality Improvement Programmes

During 1990-91, 16 Ph.D Scholars and 19 M.Tech scholars were admitted to QIP programme. 29 Ph.D Scholars and 47 M.Tech scholars were on rolls under QIP. Over the past 21 years, 240 teachers completed their M.Tech courses and 193 teachers completed their Ph.D programmes. Under QIP, 5 Summer/Winter Schools were conducted during 1990-91, mainly for teachers of Engineering Institutions, but also involving a few participants from Industry. IIT, Madras is shouldering the responsibility of the Principal Coordinatorship for the QIP for the second year in succession.

Curriculum Development Cells

There are two Curriculum Development Cells in our Institute; one in Aerospace Engineering and the other in Electrical Engineering.

Recently the Ministry proposed the establishment of an Overall Curriculum Development Cell and steps are under way to do so.

Book Writing Scheme

This scheme was started with a view to encourage faculty members of this Institute to write books. A total of 7 books were published under this scheme.

Educational Technology Cell

This cell was started in 1987 for the production of print and non-print forms of resource materials, to be used for improving the quality of engineering education in the country. A grant of Rs.65 lakhs from the Department of Education, Ministry of HRD, Government of India was used to create the necessary infrastructure (video equipment, a studio and a class room) to facilitate the production of Educational Video films in-house. The ET Cell recently conducted an ISTE Summer School on 'Awareness Programme for Utilisation of Educational Television Facilities' for the benefit of Teachers of Engineering Colleges and Polytechnics. The Cell commenced its activities last year by setting up a studio and a class room with all the necessary equipment to facilitate the production of educational video films in-house. A few faculty members came forward to prepare instructional packages using the ETC facilities. Already 7 video programmes were completed utilising the ETC facilities.

5.7 Central Library

The Library modernization programme, which was taken up as a separate

project during 1989-90, is being continued in this year also. The progress of work done during 1990-91 is detailed below:-

Central Library Automation :

Circulation :

A computer based circulation system was developed and successfully commissioned.

Acquisition :

A computerized database for document procurement was created and put to use.

Open Public Access Catalogue (OPAC) :

A database of all new books added to the Library from 1st January 1990 onwards was created and would be maintained on a regular and continuous basis.

From this database, catalogue cards as per ACCR2 are being produced and printed using DTP facilities available in the Library. Laser-printed labels are also produced and affixed to the spines of books for proper arrangement in the shelves. "New Additions to the Library" is being brought out by the library as one of the products of this database.

Serials Control :

Comprehensive programme modules for serials control were developed including periodicals subscriptions, renewal and reminders, current periodical registration, etc.

A database of all Periodicals subscribed by the Library including periodical holdings of back volumes was created and these files would be hooked on to the proposed I.I.T. Libraries Network for resources sharing. In the initial face of Central Library Automation Project all computerization work was carried out using PC/XTs, PC/ATs with MS-DOS and dBASE Software packages. During the year all the above computerized modules were intergrated into a single Unix-based package based on two central PC/ATs (386). The hardware has been installed and supported by %an UPS system.

On Line Access to International Databases :

It is proposed to set up a high speed telecommunication link in the Central Library permitting online access to international databases afforded by information Systems such as DIALOG, Palo Alto, California, USA and the European Space

Agency, Frascati, Italy. Madras Telecom was requested to set up this link at an annual recurring cost of Rs.30,000/-. Necessary hardware (a PC/XT) and a modem (2400 bps) were procured. The facilities expected to be operational during August 1991.

Improvements to Physical Facilities :

Two new cycle stands were constructed for the users to park their vehicles

New Library Services :

Several new services such as "Reprint Supply Service", "Literature Search Service" and "Translation Service", were introduced besides the usual Circulation, Reference, Document Procurement and Reprographic Services. A contract to provide quick and continuous copying xerox service was awarded to an outside agency to cope up with the increasing demands from the users.

The resources and services of the Library are being extended to more than 300 Industrial Associate Members, Corporate Members, Alumni & Retired Staff Members of the Institute.

In addition to these regular users, a large number of Graduate and Post Graduate scholars, faculty and others from Universities and R&D institutions in Karnataka, Andhra Pradesh, Tamilnadu and Kerala were allowed to make use of the library resources on request.

Reprographic Facilities :

The Reprographic facilities were augmented with addition of a fulfilled D.T.P. system. The system is also being used for the computerized production and laser-printing of catalogue card sets, book spine-labels, a fortnightly bulletin of "New Additions to the Library", User tickets, book cards, etc.

Staff Matters :

Shri M.N. Seetharaman, Special Officer (Library) was redesignated as Librarian.

Shri R. Vengan joined the Central Library as Deputy Librarian on 27-3-1991.

Shri K. Sankaran, STA (SG) and Shri M. Murugan (Sr. Prof. Asst.) were promoted as Assistant Librarians with effect from 22-1-1991.

Ms. D. Sobhaa Rao, Sr. Prof. Asst. and Mr. P.N. Swamy, Sr. Prof. Asst., attended the ISTE Summer School on "Awareness Programme for Utilization of

Educational Television Facilities and Programmes", held at IIT Madras during May 1990.

Mr. K. Sankaran, Sr. Prof. Asst. (AG) gave a guest lecture at Kendraya Vidyalaya, IIT Madras for the participants of "In- Service Course for Librarians" conducted at Kendriya Vidyalaya, IIT during May 1990 and he also attended the Seminar on "Acquisition and Library Materials" at M.I.T. Madras during August, 1990.

Dr. C.N. Pillai, Chairman, Library Advisory Committee and Mr.K. Sanakran, SR. Prof. Asst. (SG) participated in the "Net- working of IIT Libraries Meet" held at IIT Kanpur during Sept. 1990.

Mr. Gnanasekaran, Sr. Prof. Asst. attended the Seminar on "Acquisition and Library Materials", held at MIT Madras, during August 1990.

Ms. Usha Krishnan, SR. Prof. Asst. (SG) and Ms. D.Sobhaa Rao Sr. Prof. Asst. attended Seminar on "Informatory Systems and Servicing: Emerging Trends" held at RRL, Trivandrum during January, 1991.

On invitation from the International Development Centre, Regional Office, Nairobi, Kenya, Sri M.N. Seetharaman undertook a consultancy mission to Dar es Salaam, Tanzania, from 28 Aug 90 to 18 Sep 90 to advise the Tranzanian Government on setting up a National Information System for Science and Technology.

Library Statistics :

The following statistics reflects the overall performance of the Library during the year under report.

1. Membership

Institute Members (Staff & Students)	4,690
Outside Members	
Individual	60
Corporate	5
Industrial Associateship	298
Consultation Permits	570

2. Collection Development

Acquisition of Publications

Books	6,391
Pamphlets and Reports	62
Microfilms/Fische	58
Institute Ph.D Theses	89
Book-bank General	1,905
Book-bank (Weaker Section)	5,480

Current Periodicals by subscriptions	1,528
Current Periodicals by Exchange/Gift	111
Back volumes of Periodicals	3,890
Total Accessions as at the end of March 1991	2,56,805

3. Library and Information Services

Circulation	
Number of Readers visited	1,07,050
Number of volumes issued	1,47,550
Number of volumes issued through Book Bank (General)	2,100
Number of volumes issued through Book Bank (Weaker Section)	1,480
Overdue & other charges collected	Rs.1,84,866

Reservation for Books	
Registered	7150
Fulfilled	5410

Department Loans	
Department Loan	7405
Permanent Loan	2355

Inter-Library Loans	
Borrowed from other Libraries	410
Loaned to other Libraries	195

Literature Search	
Computer-based literature searches through Dialogue International online information Retrieval System	2

Reprint Service	
From International Sources, i.e., British Library, Canadian Institute of Scientific Information, INSDOC, etc.	50

Translation Services	10
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4. Audio-Visual Service

Number of Audio-Visual Cassettes	69
Number of Video Cassettes	120
Number of Motion Films	194

Number of Audio-Visual programme conducted 41
Number of persons attended 366

5. Reprographic Service

Number of Xerox copies supplied 2,67,073
DTP output 3,500
Number of Rotamaster
prepared and Printed 1,501
Number of stencils duplicated 580

6. Binding

Number of Books and Journals
bound (internal) 1,308
Number of Departmental
Publications bound 2,865
Number of Books and Journals
bound through external binders 5,476

7. Visitors to the Library

Students from Library Schools
(about 30 students per group) 5 groups
Other visitors 10 VIPS

6 STUDENT AMENITIES AND ACTIVITIES

6.1 Hostel

Being a residential institution, all the students admitted to IIT Madras, are required to reside in the campus. There are about 2378 single room accommodation, distributed in 11 men's hostels and 1 ladies' hostel.

Each hostel is administered by a Warden and an Assistant Warden. The Warden is assisted by a Hostel Council constituting student Secretaries and Assistant Warden in day-to-day functioning of the hostel. The Hostel Management is centrally administered body and is overall in-charge of functioning of all the Hostels and Central Supplies Unit. There are 294 hostel staff and they are responsible to the 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.

Chairman, Council of Wardens and Hostel Management

Name of the Hostel	Warden
Chairman, Council of Wardens and Hostel Management	Dr. M.R. Udupa Professor of Chemistry
Alakananda	Dr.O.V. Krishnaiah Chetty Professor of Mechanical Engg.
Brahmaputra	Dr. Vijay R. Raghavan Professor of Mechanical Engg
Cauvery	Dr. K.N. Bhat Professor of Electrical Engg.
Ganga	Dr. T.T. Narendran Associate Professor of Humanities and Social Sciences
Godavari	Dr. N. Sivaprasad Assistant Professor of Civil Engineering
Jamuna	Dr. M.R. Pranesh Professor of Ocean Engg.
Krishna	Dr. B. Nagalingam Professor of Mechanical Engg.

Mandakini	Dr. V.G. Idichandy Associate Professor of Ocean Engineering
Narmada	Dr. M. Singaperumal Assistant Professor of Mechanical Engg.
Saraswathi	Dr. S.B.S. Sastry Professor of Physics
Sarayu	Mrs. Ranjana Shukla Senior Design Engineer
Tapti	Dr. K. Ramakoteswara Rao Assistant Professor of Mechanical Engineering
C.S.U.	Dr. M.R. Udupa Professor, Dept. of Chemistry

6.2 Medical Facilities

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

6.3. Gymkhana

The National Sports Organisation is a classification in the scheme of Education formulated in furtherance of setting a climate of Sports consciousness and build-up among the educated youth.

Every year students are admitted into the NSO by virtue of their aptitude and abilities in various events. The games and events that are included under the NSO Programme are as follows:

Athletics	Chess	Table Tennis
Badminton	Cricket	Tennis
Ball Badminton	Football	Volley ball
Basketball	Hockey	Weight Lifting

Ten days of annual coaching programme is held under this scheme to consolidate the training in their respective events. 75% of attendance is essential for successful completion of the N.S.O. Programme.

Accordingly 137 I B.Tech students (131 men and 6 women) were enrolled in N.S.O. this year. Coaching classes in all the disciplines were held throughout the academic year on Tuesdays and Fridays from 5.00 P.M. to 6.30 P.M. Forty regular classes and 10 Special Coaching sessions were held and thus a total of 75 hours of coaching was given and coaching was done by all the Sports Officers of the Gymkhana and expert coaches from outside.

On the whole students benefit a lot in their respective games and reach the standards of Institute B Team's performance. N.S.O. serves as the main feeder for the Institute teams in all games and Sports every year.

The Inter IIT Sports Meet

The 27th All-India Inter IIT Sports Meet was held at Delhi from 16-20 December 1990 and this Institute students secured SECOND place in the overall championship.

The Sportsmanship exhibited by the IIT Madras throughout the Championship and particularly in their last match was appreciated by one and all. Prof. N.V.C. Swamy, Director, IIT, Madras commended this at the Institute Day 1990-91.

They won gold medal in Tennis, Badminton and Table Tennis, and won Silver medal in Athletics, and weight lifting besides bronze medal in Basketball and Hockey.

Sportsfest 1990-91

The Sportsfest 1990 Inter-Collegiate level Tournaments were organised and conducted by the Institute Gymkhana successfully. The Institute team performed creditably and gained rich experience for the Inter IIT Tournaments. Nearly 30 (Thirty) institutions participated and there was no protest in these tournaments.

All India Philips and Trinity InterCollegiate Floodlight Volley Ball Tournaments

The All India Philips and Trinity Inter Collegiate Floodlight Volleyball Tournaments were conducted from 20-24 January 91. All the matches were held at the Students Activities Centre (SAC) under floodlights. It gave the spectators a panoramic view of the game. 11 men teams and 10 women teams comprising both outstation and local teams were invited to participate. P.S.G. Arts College, Coimbatore won the men's event and the Aditanar College, Trichendur was the runner-up. Sri Sarada College, Salem won the Championship and Ethiraj College, Madras claimed the runner-up position in the women's section. All teams enjoyed their participation and SAC proved to be an excellent venue from the spectators and the participants point of view.

All India Gerhard Fisher and Kokila Rajaiah Inter-Collegiate Flood Light Basket Ball Tournaments

The Gerhard Fisher and Kokila Rajaiah Basket ball Tournaments for men and women attracted 18 and 9 teams respectively. Loyola College, Madras won the trophy and Annamalai University was the runner-up in the men section. P.S.G.R. Krishnammal College, Coimbatore was the winner and Stella Mery's College, Madras was the runner-up in the women section. The matches were keenly contested. These tournaments lasted for five days from 26-30th of January 91.

SAC Building

The student activities centre, a multipurpose flood light auditorium with wooden flooring is being put to use to the maximum by the students. Some of the events that were held are given below:

Inter-Collegiate Table Tennis Tournaments
All India Philips and Trinity Volleyball Tournaments
3-a-side Volleyball Tournaments
Institute Basket ball, Volleyball, T.T., Chess and weight lifting teams' practice.
Erection of multi-gym.

Sports Star-IIT Inter Collegiate Cricket Tournament

The above tournament was sponsored by the 'Sports Star' in which 20 colleges participated. Vivakananda College annexed the trophy and Loyola the runner-up.

Mr. V.V. Kumar, the former Cricket Test Player presided over the final function and distributed the prizes and certificates.

Open Bridge Tournament

In the Open Bridge Tournament conducted by the Gymkhana between 15-17 March 91, 22 teams in team events and 30 teams in pair events participated. T.I. Cycles mainly comprising Alumni of the Institute the team of four events.

Tournaments Among Students and Campus Members

In order to secure maximum participation from the students, staff and their wards, and to improve skills and techniques in all sports events, the following competitions were also conducted by the Institute Gymkhana.

Annual Road Race
Open Cycle Race

3-a-side Volleyball
6-a-side Hockey
6-a-side Football (86 teams)
Institute Chess Competition

More than 1000 students and 300 staff and their wards participated in the above non-media tournaments.

Tournaments among Staff and Students

In order to have better inter-action among staff and students the following matches were conducted.

Badminton
Ball Badminton
Tennis
Bridge
Cricket
Volleyball

Inter Hostel Competitions

The Inter-Hostel competitions serve as one of the important programmes of the Gymkhana to ensure larger participation from the student body in sports and games. Competitions were held in all the disciplines. Matches were keenly contested in all the games and events and the Schroeter Trophy for the Inter Hostel Championship was annexed by the Godavari Hostel.

N.S.O.

The National Sports Organisation Programme for the 1st year B.Tech students was effectively organised by the sports officers of the Gymkhana.

The following successful Trekking expeditions were undertaken by the Hiking and Mountaineering Club of the Institute Gymkhana.

HIMALAYAN TREK - 90
Gangotri - Bhoj Bas - Tapovan - Nandavan
Date: 10th June 1990.

HIMALAYAN TREK - 90
Ani - Kharag - Jalaori Pass - Bathad - Bashled Pass - Saravan
Date: 4th to 17 May 1990

GHARWAL HIMALAYAN TREK - 90
Kalyani - Ageda - Dodital - Uttarkasi - Sangam Chatti - Channi pla
Date: 11th Dec. 1990

OOTY TREK

Ooty - Mudumalai - Poothimund - Niligiri

Date: 15th Feb. to 19th Feb. 1990

ANAI MODI TREK

Teni - Munnar - Rajamallay - Kumuli

Date: 11th Jan to 16th Jan. 1991.

Voluntary Help to the Campus Community

Sports Officers of the Gymkhana organised summer Coaching Classes in Basketball, Football, Volleyball, Tennis and Physical fitness for the benefit of campus boys and girls below 15 years. About 150 boys and girls received the benefit.

6.4 4 (TN) AIR SQN (TECH)

The Air Wing NCC unit is functioning at IIT Madras from 16 Sept. 1965, to provide NCC Training, exclusively to the student population of the Institute. Regular IAF Officers and airmen are posted to this unit and the strength is augmented by part time officers and others supporting staff drawn from the Institute. NCC syllabus includes drill, weapon training, civil defence, health/hygiene, leadership training, history of airport, principles of flight, air armaments, Radio/Radar aids, Avionics and instrumentation. The training is imparted by a team comprising of the Air Force elements and the Institute part time officers.

The organisation of the unit are as follows:

Commanding Officer)	:	Wing Commander M. Murugesan
Administrative Officer	:	Squadron Leader S.Veeraraghavan
Part Time NCC Officers	:	Flight Lieutenant KV Chalapathi Rao (on supernumerary list) Plt Officer A. Mani

During the year after report 138 Cadets from the first year B.Tech and one cadet from II year B.Tech were enrolled. In addition to the regular NCC training, the following activities were carried out.

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

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

6.5 National Service Activities

1. Six N.S.S. volunteers went to Advanced Training Institute, Guindy on 15-4-90 for conducting a cultural programme for the blind in connection with World Disabled Day.
2. During a one-week-programme in the 2nd week of May, 6, sweepers of IIT Madras were taught to put their signatures. Out of the above 6, four persons learnt to sign their names.
3. N.S.S. supported the Health Educational Club, IIT, Madras arranged the following talks:

"Healthy Diet for all". By Prof. Mrs. Malathy Mohan, W.C.C. Madras on 14-7-90.

"The Heat and Heart Attack" by Dr. N.A. Jayavelan and Dr.S.Thanickachalam during 16-8-90 to 18-8-90.

"Blood Pressure - know it" by Dr.N.A. Jayavelan on 8-9-90.
4. Basic course in First Aid by St. John Ambulance Association was arranged during 6-8-90 to 12-8-90. 25 students and staff took part in the course, and 21 of them successfully passed the oral examination.
5. In connection with International Literacy Day (8-9-90) an essay competition on the topic "Illiteracy in India - Causes and Remedies" was conducted among the IIT students. 5 students submitted the essays. Two essays were selected as First Prize and Second Prize and books worth of RS.100/- were presented to the two students.
6. Spoken Tamil classes were started on 10-9-90 for the benefit of Non-Hindi IIT students. 65 students attended the classes.
7. Spoken Hindi classes were started on 11-9-90 for the benefit of Non-Hindi IIT students. 30 students attended the classes.
8. About 20 N.S.S. volunteers were regularly going to St. Louis School for the deaf and blind in Adyar. They read to the blind, wrote examinations for the blind, and wrote letters to the relatives of the blind students.
9. About 20 poor children of Taramani Village were given regular coaching by N.S.S. volunteers in the hostels.
10. To Udavum Karangal (Centre for Human Services), Madras, lot of old clothes were delivered.

11. A visit to German Leprosy Relief Association, Shenoyanagar, Madras-30 was arranged on 6-10-90. About 12 students and faculty took part in the above visit.
12. A Blood Donation Camp was arranged by Voluntary Blood Donors Club, IIT, Madras on 26-1-91. NSS volunteers took part in the above camp. About 30 people donated blood.
13. A talk on 'Management of mind-key to Success' by Dr. Hans Georg Turstig of Gurudev Siddha Peeth, Ganespuri, Maharashtra, was arranged on 22-3-91 at CLT. About 300 people attended the above talk.
14. Sport articles of Rs.1000/- were donated to St. Antony's Middle School, Velachery, on 15-3-91.
15. An Eye Exercise Camp was arranged during 9-2-91 to 18-2-91. Experts from School for Perfect Eye Sight, Sri Aurobindo Ashram, Pondicherry conducted the above camp. About 640 people were benefitted by the above camp.
16. National Youth Day was celebrated by IIT on 18-1-91 by arranging a talk on "Science and Religion", by Swamy Ranganathanandaji, Vice President, Ramakrishna Mission and arranging a book exhibition by Sri Ramakrishna Math, Madras- during 17th and 18th January, 1991.
17. As part of National Youth Week, Competitive Sports were conducted in St. Antony Middle School for all the children in 4 different schools in Velacheri. About Rs.1000/- worth of prize items were distributed on 11-1-91 for the winners of different events.

6.6 Student Welfare Fund

During the year 1990-91, a sum of Rs.4000/- and Rs.2500/- were given to Shri M.S. Nagesh, Ph.D, Mechanical Engineering and Shri Udayachandran, Ph.D, Chemical Engineering respectively as loan to help to solve their finance problems. Two of the alumni refunded the loan of Rs.1,450/- during the year.

6.7 Guidance & Counselling Unit

1. A Campus information booklet was prepared for all the fresh students and were made available to all of them.
2. The first year B.Tech students were distributed to various student counsellors and faculty counsellors for individual attention.

3. The first year students with their parents or guardians were received by the student counsellors at the railway station and helped to settle down in their stay quickly.
4. A get-together of all the counsellors and the parents and guardians was arranged to make the first year students feel at home.
5. Student problems were solved by the counsellors by applying individual attention.
6. The unit attended very few emotional counselling since such problem more during this year.
7. The unit arranged for instruction by senior students to the needy first year students who wanted guidance in subjects like Mathematics, Physics and Chemistry.
8. It helped the Medical Officers and the first year students to get the blood grouping.
9. The unit had a get-together with the outgoing student counsellors incoming ones, faculty counsellors, the Dean (Students) and the Medical Officer at the farewell day of the year and discussed the possibilities of improving the service.

Cultural Events

SPIC MACAY

SPIC MACAY Cultural Programme was conducted from 9-8-90, 17-8-90, 19-2-91 and 22-2-91 at C.L.T. Mr. Budhadev Das Gupta, Pt. Birju Maharaj, Smt. Prabha Atre's on Hindustani Classical Music and Mrs. Chitra Visveswaran gave a Dance recital.

Out-Station Festival: The students of this Institute participated in the following out-station cultural festivals during the year 90-91 and won several prizes.

- * Cultural Festival at JIPMER Pondicherry during the month of September 1990.
- * VIBRATION '90 of I.I.Sc., Bangalore during the month of October, 1990.
- * OASIS'90 at the Birla Institute of Technology and Science at Pilani.

A Cultural programme of music JAN EXTACY was successfully conducted by the students of IIT and "SHRADHA" a youth organisation of the campus during January, 1991.

Apart from this various Intra Murual Competitions such as Classical Music, Quiz, Jam, Pot pourri, Skit, Extempore, Elucution, Dump Charades, Debate, Crossword were conducted this year. A large number of students participated in all the events.

Staff-Students 'Debate' was also conducted this year and a large number of staff and students participated resulting in keen competition.

MARDI GRAS '91 an inter collegiate cultural festival this year was held from 12th January to 16th January 1991. Around 200 out- station students participated. The following Professional Shows were conducted apart from regular competitions

Mrs. Vani Jairam	-	Light Music
Mr. U. Srinivas	-	Mandolin
13 AD Rock Show		
Mr. Anup Jalota	-	Gazzal

Competitions were held in Indian Light Music, Elocution, Dumb Charades, Pot Pourri, Extempore, Dramatics, Western Music, Debate, Movie, Quiz, Jam, Audio Visual Quiz, Festival of Dresses, Creative writing, Skits, Nostalgia, Triplex and Crossword.

6.8 Weaker Section & Foreign Students

As per the GOI orders 22.5% of the seats are reserved for SC and ST students. For B.Tech. programme they are admitted through the Joint Entrance Examination with a relaxation. These students have to get only 2/3 of the marks obtained by the last student of the general category to get qualified for admission. 17 SC/ST students joined the B.Tech degree course during the academic year 1990-91. These students were given the following benefits

1. Travelling allowance (IInd Class train fare/ordinary bus fare) from the place of residence to Madras to join the B.Tech degree course.
2. Free tuition.
3. Free lodging and free messing (basic menu) and pocket allowane of Rs.70/- p.m. were given irrespective of their parent's/guardian's income till 31st December, 1990.

As per Govt. of India revised regulation, with effect from 1st January, 1991, free lodging, free messing (basic menu) and pocket allowance of Rs.70/- p.m. was limited to the students whose parent's/guardian's gross income does not exceed Rs.24,000/- per annum.

4. Exclusive use of Weaker Section (SC/ST) Book bank.
5. Drawing instrument (Mini-drafter) free of cost.
6. Help in getting placement.
7. Financial help for needy students through part-time job through Guidance and Counselling Unit, if available.

Preparatory Course of B.Tech

A preparatory course of one academic year was started during the year 1983-84 exclusively for SC/ST Students. Selection for this course is made from the SC/ST students who did not get admission through Joint Entrance Examination. After successfully completing the preparatory course at IIT, they will be eligible to join B.Tech degree course and they are not required to write JEE again. 12 SC/ST students selected by IIT, Madras joined the Preparatory Course at IIT, Bombay during the academic year 1990- 91.

In the M.Tech. programme 44 SC/ST students were admitted through GATE. They were given the following benefits

1. EXclusive use of Weaker Section (SC/ST) Book bank.
2. Help in getting placements.
3. Financial help for needy students through part-time jobs through Guidance and Counselling unit.
4. Scholarship as given to all students.

Foreign Students

During the period under report 31 foreign students were on roll.

Adviser

A faculty member was appointed as Adviser to look after the needs of Weaker Section (SC/ST) and Foreign students.

6.9 Placements of Students

During the period under report the Placement and Training Centre arranged job for 281 students of this Institute who were successfully completed their courses. The branch-wise details of placement made are given below:

Branch	Number approa- ched	No. got			Total	No. got more than one job
		OC	SC	ST		
i. B.Tech						
Aerospace Engineering	14	4	-	1	5	1
Chemical Engineering	29	17	3	3	23	1
Civil Engineering	23	15	-	-	15	4
Computer Science	30	14	-	2	16	1
Electrical & Electronics Electronics &	31	27	1	1	29	6
Communication	39	15	3	5	23	2
Mechanical Engineering	69	47	3	3	54	11
Metallurgy	22	16	-	-	16	1
Naval Architecture	11	3	-	-	3	2
Total i	268	158	10	15	268	29
ii. M.Tech						
Aeronautics	3	-	-	-	-	-
Applied Mechanics	6	2	-	-	2	-
Chemical Engineering	10	5	-	-	5	-
Civil Engineering	32	1	-	-	1	-
Computer Science	13	9	2	2	13	3
Electrical Engineering	26	19	-	-	19	2
Industrial Management	16	8	1	3	12	2
Industrial Metallurgy	24	7	2	2	11	1
Mechanical Engineering	26	13	-	1	14	6
Ocean Engineering	7	1	2	-	3	1
Solid State Technology	6	5	-	-	6	-
Total ii	160	144	7	9	160	15
iii. M.S.						
Computer Science	8	8	-	-	8	-
Mechanical Engineering	2	2	-	-	2	-
Aerospace Engineering	1	1	-	-	1	-
Total iii	11	11	-	-	11	-
iv. Ph.D						
Civil Engineering	1	1	-	-	1	-

7. FINANCIAL ASSISTANCE TO STUDENTS

Financial Assistance is extended to the meritorious students who are pursuing Engineering, Technology and Science Education in this Institute in the form of Scholarship and Fellowships. The details of Scholarship and Fellowship sanctioned to the students of different programmes during 1990-91 are as follows:

B.Tech.

The SC/ST students admitted in B.Tech. programme upto the academic year 1990-91 were sanctioned the concession of free messing plus Rs.70/- p.m. out of pocket expenses irrespective of their parent income besides the exemption from payment of tuition fees and hostel rent. As on 31.3.91, 74 students were benefitted. The year-wise details of such students are given in Table 7.1.

The Merit-cum-means scholarship of Rs.300/- p.m. were sanctioned to the 25% of the students admitted in B.Tech. programme besides the exemption from payment of tuition fees. During the period under report 60 students got benefitted. The year-wise details of such students are given in Table 7.1.

In addition to the above the Institute sanctioned a notional prize of Rs.100/- to the top ranking 20 B.Tech. students in JEE.

Table 7.1

Year	Merit-cum-means scholarship	Free messing (basic menu) and pocket allowance concession to SC/ST students
I	11	16
II	18	25
III	16	14
IV	15	19
Total	60	74

M.Tech.

The students who joined M.Tech. programme admitted through GATE were awarded Rs.1800/- per month scholarship. During the period under report 144 fresh scholarships and 146 renewed scholarships were given, the department-wise details of which are given below:

Table 7.2

Department	No. of scholarships awarded	
	Fresh	Renewed
Applied Mechanics	7	5
Aerospace Engineering	2	5
Chemical Engineering	7	9
Civil Engineering	24	31
Computer Science and Engg.	21	14
Electrical Engineering	18	25
Industrial Management	21	15
Mechanical Engineering	33	28
Metallurgy	4	14
Ocean Engineering	5	6
Solid State Technology	2	6
Total	144	146

M.Sc.**Table 7.3**

The students admitted in M.Sc. programme were sanctioned Rs.300/- p.m. merit scholarship. Exemption from payment of tuition fee of Rs.200/- per session were also given to certain students. During the period under report 31 students got benefitted. The department-wise details of such awards are given below:

Course	Year	No. of merit scholarships awarded	No. of freships of Rs.200/- per session awarded
Chemistry	I	6	3
	II	5	2
Mathematics	I	5	2
	II	5	2
Physics	I	5	2
	II	5	2
Total		31	13

M.S.

The scholars admitted in M.S. programme through GATE or equivalent examination are given Rs.1800/- p.m. for the first two years and Rs.2100/- for the 3rd year. During the period under report 100 students received this scholarship. The department-wise details of such scholarship awarded and renewed are given below:

Table 7.4

Department	No. of scholarships awarded	
	Fresh	Renewed
Aerospace Engineering	1	2
Applied Mechanics	8	4
Chemical Engineering	3	1
Civil Engineering	7	8
Computer Science and Engg.	10	10
Electrical Engineering	7	2
Humanities and Social Sciences	2	6
Mechanical Engineering	14	11
Metallurgical Engineering	1	2
Ocean Engineering	2	4
Total	55	50

Ph.D

The scholars who are admitted for Ph.D. full-time programme are sanctioned Rs.2400/- for the first two years and thereafter Rs.2500/- per month based on progress. During the period under report 237 students obtained scholarship. The department-wise details of such scholarships awarded and renewed are given below :

Table 7.5

Department	No. of scholarships awarded	
	Fresh	Renewed
Aerospace Engineering	3	1
Applied Mechanics	5	9
Chemical Engineering	6	19
Chemistry	14	29
Civil Engineering	11	18
Computer Science and Engg.	1	8
Electrical Engineering	6	3
Humanities and Social Sciences	5	8
Mathematics	7	9
Mechanical Engineering	10	22
Metallurgical Engineering	4	8
Ocean Engineering	2	6
Physics	6	17
Total	80	157

8. CAMPUS AMENITIES

8.1 Staff Quarters

The Institute as on 31-03-91 had 895 quarters of which 12 quarters (flats) were constructed during the period under report.

8.2 Guest House

There are two Guest Houses in the Campus viz. VIP Guest House and Taramani Guest House which are having six suites and 30 rooms respectively.

8.3 Hospital

The Institute Hospital consisting of 30 Beds, renders medical facilities to students and staff. Hospital offers out- patient and in-patient services for Medical, Surgical, Obstetric, Gynaecological, Pediatric, ENT and Ophthalmic treatment.

The following are the Officers in the Hospital:

Dr. A. Ganesan, M.D.	Chief Medical Officer
Dr. N.A. Jayavelan, M.B.B.S.	Resident Medical Officer
Dr. Sumathi Khangaonkar, M.B.B.S.D.A.	Medical Officer
Dr. Lalithakumari, M.B.B.S., D.G.O.	Medical Officer
Dr. S.Aruna, B.Sc., M.B.B.S.	Medical Officer
Dr. C.Sridevi, M.D., D.ch.	Medical Officer
Dr. R. Shyamala, M.B.B.S.	Jr. Medical Officer
Dr. S. Kameswaran, M.S., Ph.D., F.R.C.S.(ED), F.R.C.S. (Glax), F.R.C.S. (D.L.O.)	ENT Consultant (Part-time)
Dr. S. Devaji Rao, M.S. MNAMS, FICS	Consultant Surgeon (Part-time)
Dr. S. Rathanamala, M.B.B.S., D.O.	Eye Specialist (Part-time)
Sri L. Palaniappan	Lay Secretary

Two ambulances are available at Hospital and are being used round the clock. One Medical Officer is posted for call duty and is available for all the 24 hours of a day to attend the emergency cases in the Hospital.

Laboratory tests are undertaken for Bacteriological and a few Bio-chemical investigations. Two ECG machines are available with the Hospital. Some major operations for conditions like Hernia and Peptic Ulcer were undertaken in the modernised Operation Theatre.

Immunization for children is being carried out against Polio, diphtheria.

tetanus and whooping cough. Family Planning Operations were also conducted at this Hospital besides counselling.

The Statistics on the activities of the Hospital between 1.4.90 and 31.3.91 are as follows:

1.	Total No.of outpatients	89430
2.	Total No.of inpatients	558
3.	Emergencies attended	2697
4.	Dressings	20488
5.	Injections	21711
6.	Deliveries	2
7.	Pathology	
	Urine	4216
	Motion	3420
	Blood	5618
8.	Bio-Chemistry	
	Blood Sugar	2765
	Urea	212
9.	Operations	
	General surgery	79
	ENT operations	47
	Eye operations	40
	Gynaec operations (MTP 2)	3
	Obstetric Procedures	
	I.U.D.	12
	O.P. Cycles	24
	Vaginal Dauches	30

8.4 State Bank of India

State Bank of India main Branch is functioning in the campus with two extention counters - one at shopping centre and the other near Narmada Hostel.

8.5 Post Office

There is a post office in the campus opposite to State Bank of India to cater to the needs of the staff, students and residents of the campus.

8.6 Schools

Vanavani Matriculation Higher Secondary School administered by IIT employees Educational Society is functioning in the campus besides a Central School. These schools are offering courses from L.K.G. to XII Standards.

8.7 Open Air Theatre

The Open-Air Theatre is utilised for screening Films by Film Club during week end.

8.8 Student Activities Centre

This building is utilised for indoor games of the students as well as for conduct of important functions such as Convocation etc.

8.9 Cafeteria

There are two Canteens - namely Akshaya and Modern Cafe, in the campus to cater to the needs of staff and students.

8.10 Bus Services

The Institute is having 6 Omni Buses which provides transport facility to the staff, students and residents of the campus.

8.11 Campus News

The Campus News is published every Friday highlighting the important events of the Institute.

9. FINANCE AND ACCOUNTS

The financial year of the Institute corresponds with that of Government of India i.e. 1st April to 31st March of the subsequent year. The accounts of the Institute are annually audited by the 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 8-11-90 recommended the non-plan revised estimate 1990-91 and budget estimate 1991-92 for Rs.1,994.00 lakhs and Rs.2,223.01 lakhs respectively.

The general view of the revised estimate approved for 1990- 91 and budget estimate 1991-92 presented to the Finance Committee is given below:

Description	Rs. in Lakhs			
	Budget Estimates for 1990-91 as proposed	Budget Estimates for 1990-91 as allocated by the Board of Governors	Revised Estimates 1990-91 as per Fin. Committee	Budget Estimates 1991-92 as proposed
Non-Plan				
Recurring	1,897.01	1,810.00	1,979.00	2,173.01
Non-Recurring	20.00	15.00	15.00	50.00
Total Non-Plan	1,917.01	1,825.00	1,994.00	2,223.01
Plan				
Recurring	53.34	22.50	22.50	29.00
Non-Recurring	527.10	277.50 + 53.31*	277.50 + 53.31*	479.97
Total Plan	580.44	300.00 + 53.31*	300.00 + 53.31*	508.97
Income	215.43	223.41	244.70	238.50

* Letter of Credit established as on 31.3.90.

The details of actual expenditure for the year 1989-90 and balance sheet as on 31-3-90 are given in Appendix IV.

Audit

The accounts of the Institute for the year 1989-90 was audited by the the Accountant General between July 90 to Sept. 1990.

List of Members of Council of IITS

Name of the Representing Organisation	Name and Address
1. Ex-officio - Chairman of Technical Education in the Central Government	The Minister-in-Charge
2. Chairman of each Institute Ex-officio	
IIT, Kharagpur	Shri Russi H.Mody Managing Director Tata Iron & Steel Co., Jamshedpur, Bihar-831 001.
IIT, Bombay	Dr. D.V. Kapur 405, Aradhana Apartments Sector-XVIII, R.K.Puram New Delhi-110 066.
IIT, Madras	Dr. M.S. Swaminathan Chairman, M.S.Swaminathan Research Foundation 14, II Main Road, Kotturpuram, Madras-600 085.
IIT, Kanpur	Dr. Subrate Ganguly Executive Vice Chairman & Managing Director The Associated Cement Co. Ltd., Cement House, 121, Maharshi Karve Road Bombay-400 020.
IIT, Delhi	Shri V. Krishnamurthy (Ex-Chairman, Steel Authority of India Ltd.,) AB-12, Pandora Road New Delhi-110 003.

3. Director of each Institute
Ex-officio
- | | |
|-----------|--------------------|
| Kharagpur | Prof. K.L. Chopra |
| Bombay | Prof. B. Nag |
| Madras | Prof. N.V.C. Swamy |
| Kanpur | Prof. M.P. Kapoor |
| Delhi | Prof. N.C. Nigam |
4. Chairman, University Grants Commission, Ex-officio
- Prof. Rama Reddy
Chairman, University Grants Commission, Bahadur Shah Zafar Marg, New Delhi-110002
5. Director-General, Council of Scientific and Industrial Research, Ex-officio
- Dr. A.P. Mitra
Director-General, CSIR, Rafi Marg, New Delhi-110 001.
6. Chairman, Indian Institute of Science, Bangalore, Ex-officio
- Dr. Raja Ramanna
Chairman
Indian Institute of Science Bangalore - 560 012.
7. Director, Indian Institute of Science, Bangalore, Ex-officio
- Prof. C.N.R. Rao
Director
Indian Institute of Science Bangalore - 560 012.
8. Three Nominees of the Central Government
- | | |
|--|---|
| To represent the Ministry concerned with Education | Prof. S.K. Shrivastava
Joint Educational Adviser(T)
Min. of Human Resource Dev.
Dept. of Education
New Delhi - 110 001. |
| To represent the Ministry of Finance | Shri S.K. Ray
Dy. Financial Adviser
in the absence of Financial Adviser, Min. of Human Res. Dev., New Delhi-110 001. |

To represent any other
Ministry

9. Nominee of the All India Council for Tech. Education
Shri Anil Bordia
Education Secretary
Min. of Human Res. Dev.,
New Delhi-110 001.
10. Nominees of the visitor
(Minimum - Three)
(Maximum - Five)
Dr.V.S. Arunachalam
Scientific Adviser to the
Minister of Defence
South Block,
New Delhi-110011.
Shri Ajit Singh
Director
Sci. Tech Centre
131, Kandivli Industrial
Estate, Bombay-400 067.
Dr.V.R. Gowariker
Secretary
Min. of Science & Tech.
New Mehrauli Road
New Delhi.
11. Three Members of Parliament
(Two from Lok Sabha and
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7. DEPARTMENT OF ELECTRICAL ENGINEERING

Professors

Dr.D.K. Banerjee, Ph.D. (Benaras) [Head]
Dr.M.K. Achuthan, Ph.D.(IIT Kharagpur)
Dr.Ashok Jhunjhunwala, Ph.D.(Mine)
Dr.M.V. Chalapathi Rao, Ph.D. (IIT Madras)
Dr.C. Eswaran, Ph.D.(IIT Madras)
Dr.P.A. Janakiraman, Ph.D. (IIT Madras)
Dr.A. Kuppurajulu Ph.D.(Moscow)
Dr.M. Mukunda Rao, Ph.D. (Andhra)
Dr.V.G.K. Murti, Ph.D. (Illinois)
Dr.K. Narayana Bhat, Ph.D. (IIT Madras)
Dr.Y. Narayana Rao, Dr.Ing. (Braunschweig)
Dr.K. Radhakrishna Rao, Ph.D. (IIT Kanpur)
Dr.J.P. Raina, D.Sc (Louvain)
Dr.K. Ramar, Ph.D. (IIT Madras)
Dr.B. Ramaswami, Ph.D. (IIT Madras)
Dr.P. Sankaran, Ph.D. (IIT Madras)
Dr.V.V. Sastry, Ph.D. (IIT Kharagpur)
Dr.V. Seshadri, Ph.D. (IIT Madras)
Dr.G. Sridhara Rao, Ph.D. (IIT Madras)
Dr.Vedam Subrahmanyam, Ph.D. (IIT Madras)
Dr.V. Venkata Rao, Ph.D. (Iowa)
Dr.S.S. Yegnanarayanan, Ph.D. (IIT Madras)

Associate Professors

Dr.C. Dattatreyan, Ph.D. (Sheffield)
Dr.R. Parimelalagan, Ph.D.(Madras U.)
Dr.C. Venkateshaiah, Ph.D. (IIT Madras)

Assistant Professors

Dr.M. Antony Reddy, Ph.D. (IIT Madras)
Dr.Bhaskar Ramamurthy, Ph.D. (California)
Dr.V. Jagdeesh Kumar, Ph.D. (IIT Madras)
Sri G.T. Manohar, M.Tech. (IIT Madras)
Dr.T.A. Ramalinga Bhat, Ph.D. (IIT Madras)
Dr.P. Sasidhara Rao, Ph.D. (IIT Madras)
Dr.T.J. Vitto, Ph.D. (IIT Madras)

Lecturers

Sri G. Govardhanagiri Rao, M.Tech.(IIT Madras)
Sri M. Krishnamurthy, M.Tech.(IIT Madras)
Sri P.C. Majhee, M.Tech. (IIT Madras)
Sri Varadarajan Subrahmanyam, M.E.(IISc.)

Senior Design Engineer

Sri P. Rama Seshagiri Rao, M.S. (IIT Madras)

Senior Scientific Officers Gr.II

Sri T.V. Gopal, M.S. (IIT Madras)

Dr.S. Karmalkar, Ph.D. (IIT Madras)

Sri M. Kumaravel, M.E. (Anna U.)

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

Sri H. Renganathan, M.S. (I.I.T. Madras).

Technical Officers (S.G.)

Sri R. Balasubramanian

Sri P.S. Kalyanasundaram

Sri A.S. Satheesan

Technical Officers

Sri K.N. Jothi

Sri M. Nejmin Hariffin

Sri P. Prabhakara Rao

Sri C.R. Ramaswami

Sri D. Sadasivaiah

Sri B. Sankaran

Sri J. Srinivasan

8. DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES**Professors**

Dr.A.V. Krishna Rao, Ph.D. (Andhra) [Head]

Dr.S. Ambirajan, Ph.D. (Andhra), Ph.D. (Manchester)

Dr. Dipak Chaudhuri, Ph.D. (IIT Kharagpur)

Dr.R. Rajagopalan, Ph.D. (IIT Kanpur)

Dr.L.V.L.N. Sarma, Ph.D. (IISc)

Associate Professors

Dr.T.T. Narendran, Ph.D. (IIT Madras)

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

Assistant Professors

Dr.R.N. Anantharaman, Ph.D. (Bangalore)

Dr. (Mrs.) Elizabeth Nainan Kurian, Ph.D. (IIT, Madras)

Dr.L.S. Ganesh, Ph.D. (IIT Madras)

Sri V.S. Kumar, M.A. (Andhra)

Dr.S.C. Chaudhary, Ph.D. (CIEFL Hyderabad)

Dr. (Miss) Evangeline Manickam, Ph.D. (Madras)

Dr. (Miss) R. Malathy, Ph.D. (Madras)

Dr.V.R. Muraleedharan, Ph.D. (IIT Madras)

Dr.B. Subramanian, Ph.D. (Karnataka)

Lecturers

Sri M. Durgaprasada Rao, M.B.A(Andhra)
Sri S. Mohan, M.A.(Madras)
Sri C. Rajendran, M.E.(Anna)
Sri G. Srinivasan, Ph.D.(IIT Madras)
Dr. D. Veeraraghavan, Ph.D.(IIT Madras)

Visiting Faculty

(Mrs.) Birgit Schindler
(Mrs.) Victoria Tatarinova

Senior Scientific Officer Gr.II

Sri S. Jayachandran, M.B.A.(Madras)

9. DEPARTMENT OF MATHEMATICS

Professors

Dr.U.N. Srivastava, Ph.D.(IIT Madras) [**Head**]
Dr.P. Achuthan, Ph.D.(IIT Madras)
Dr.A. Avudainayagam, Ph.D.(IIT Madras)
Dr.P. Bhattacharyya, Ph.D.(London)
Dr.V.B. Johri, Ph.D.(Gorakhpur)
Dr.(Mrs) S. Kalpakam, Ph.D.(IIT Madras)
Dr.K.R. Parthasarathy, Ph.D.(IIT Kharagpur)
Dr.P.R. Parthasarathy, Ph.D.(Annamalai)
Dr.H.S. Paul, Ph.D.(IIT Kharagpur)
Dr.L.V.K.V. Sarma, Ph.D.(IIT Kharagpur)
Dr.S.K. Srinivasan, Ph.D.(Madras)
Dr.R. Subramanian, Ph.D.(IIT Madras)
Dr.V. Subba Rao, Ph.D.(IIT Kharagpur)
Dr.Surendranath Majhi, Ph.D.(IIT Madras)

Associate Professors

Dr.C.M. Purushotham, Ph.D.(IIT Kharagpur)
Dr.S.N. Venkatarangan, Ph.D.(IIT Madras)

Assistant Professors

Dr.S.G. Kamath, Ph.D.(Delhi)
Dr.S.H. Kulkarni, Ph.D.(IIT Bombay)
Dr.Y. Nagendra, Ph.D.(IIT Kharagpur)
Dr.C.V. Raghava Rao, Ph.D.(IIT Madras)
Dr.A. Rangan, Ph.D.(IIT Madras)
Dr.D.S. Subramanyam, Ph.D.(IIT Madras)
Dr.P.V. Subrahmanyam, Ph.D.(IIT Madras)
Dr.W.B. Vasantha, Ph.D.(Madras)
Dr.P. Veeramani, Ph.D.(IIT Bombay)

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

10. DEPARTMENT OF MECHANICAL ENGINEERING

Professors

Dr.V. Radhakrishnan, Ph.D. (IIT Madras) [Head]
Dr.K.A. Bhaskaran, Ph.D. (IIT Madras)
Dr.V. Ganesan, Ph.D. (IIT Madras)
Dr.K.V. Gopalakrishnan, Ph.D.(IIT Madras)
Dr.K. Gopinath, Ph.D., (IIT Madras)
Dr.O.V. Krishnaiah Chetty, Ph.D. (IIT Dalaware)
Dr.R. Krishnamurthy, Ph.D. (IIT Madras)
Dr.V.M. Krishna Sastri, Ph.D. (Delaware, USA)
Dr.K. Lakshminarayana, Ph.D. (IIT Madras)
Dr.M. Madhusudana Rao, Ph.D.(IIT Madras)
Dr.B. Nagalingam, Ph.D. (IIT Madras)
Dr.T. Nagarajan, Ph.D. (IIT Madras)
Dr.R. Natarajan, Ph.D. (Waterloo)
Dr.M.A. Parameswaran, Ph.D. (IIT Madras)
Dr.P.K. Philip, Ph.D., (IIT Madras)
Dr.D. Prithvi Raj, Ph.D. (Liverpool)
Dr.H.C. Radhakrishna, Ph.D. (IIT Kanpur)
Dr.R. Raman, Ph.D. (IIT Madras)
Dr.G.V.N. Rayudu, Ph.D. (IIT Madras)
Dr.A. Rama Mohana Rao, Ph.D. (IIT Madras)
Dr.K.N. Seetharamu, Ph.D. (IIT Madras)
Dr.M.S. Shunmugam, Ph.D. (IIT Madras)
Dr.V. Sriramulu, Ph.D. (IIT Madras)
Dr.S. Srinivasamurthy, Ph.D. (IIT Madras)
Dr.M.A. Veluswami, Ph.D. (MIT-USA)
Dr.N. Venkatrayulu, Ph.D. (IIT Madras)
Dr.A. Venkatesh, Ph.D. (IIT Madras)
Dr.S.P. Venkateshan, Ph.D. (IISc., Bangalore)
Dr.Vijay R Raghavan, Ph.D. (IIT Madras)

Associate Professors

Dr.Ajit Kumar Kolar, Ph.D. (IIT Madras)
Dr.K.V. Chalapathy Rao, Ph.D.(IIT Madras)
Dr.S. Kumarasamy, Ph.D. (IIT Madras)
Dr.U.S. Premananda Shet, Ph.D. (IIT Madras)
Dr.P. Srinivasa Rao, Ph.D. (IIT Madras)
Dr.Y.G. Srinivasa, Ph.D. (IIT Madras)

Assistant Professors

Dr.V. Balabaskaran, Ph.D., (IIT Madras)
Dr.K.N. Gopalan, Ph.D. (IIT Madras)
Dr.K.R. Govindamallan, Ph.D. (IIT Madras)
Dr.M. Govardhan, Ph.D. (IIT Madras)
Dr.V. Jayaprakash, Ph.D. (IIT Madras)
Dr.R. Krishnakumar, Ph.D. (IIT Madras)
Dr.S. Krishnamurthy, Ph.D. (IIT Madras)
Dr.G. Kuppuswamy, Ph.D. (IIT Madras)
Dr.M.M. Mayuram, Ph.D. (IIT Madras)
Dr.A. Mani, Ph.D. (IIT Madras)
Dr. G. Muthuveerappan, Ph.D (IIT Madras)
Dr.K. Narayanasamy, Ph.D. (IIT Madras)
Dr.K. Ramakoteswara Rao, Ph.D. (IIT Madras)
Dr.B. Ramamoorthy, Ph.D. (IIT Madras)
Dr.N. Ramesh Babu, Ph.D. (IIT Madras)
Dr.M. Singaperumal, Ph.D. (IIT Madras)
Dr.N. Sivaprasad, Ph.D. (IIT Madras)
Dr.N. Sitaram, Ph.D. (Pennsylvania State)
Dr.K.V. Thyagarajan, Ph.D. (IIT Madras)
Dr.L. Vijayaraghavan, Ph.D. (IIT Madras)

Lecturers

Sri K.S. Padiyar, M.Tech. (IIT Kharagpur)
Dr.Prakash M. Maiya, Ph.D. (IIT Bombay)
Sri V.N. Rajan, M.S. (IIT Madras)
Sri D.V. Ramalingeswara Rao, M.Tech. (IIT Madras)

Chief Design Engineer

Sri T.S. Chennabasavan, M.Sc. (Engg.) (Aston)

Senior Design Engineer

Sri S.D. Kalander Saheb, M.Tech. (IIT Madras)

Senior Maintenance Engineer

Sri A. Arun, B.E. (Madras)

Senior Scientific Officer Grade-II

Sri S. Boopathy, M.E. (Bharatiar)

Technical Officers

Sri A.K. Madhavakrishnan
Sri V. Sankaran
Sri R. Sreenivasan

11. DEPARTMENT OF METALLURGICAL ENGINEERING

Professors

Dr.O. Prabhakar, (IIT Madras), [Head]
Dr.K. Anantha Padmanabhan, Ph.D. (Cantab)
Dr.D.R. Gopalakrishna Achar, Ph.D. (IIT Madras)
Dr.K.J. Lakshminarayana Iyer, Ph.D. (IIT Madras)
Dr.V.M. Radhakrishnan, Ph.D. (IIT Madras)
Dr.H.MD. Roshan, Ph.D. (IIT Madras)
Dr.K. Srinivasa Raghavan, Ph.D. (Pennsylvania)
Dr.R. Vasudevan, Dr.-Ing. (Aachen)

Associate Professors

Dr.S.D. Pathak, Ph.D. (IIT Madras)
Dr.S.K. Seshadri, Ph.D. (London)
Dr.P. Venugopal, Ph.D. (IIT Madras)

Assistant Professors

Dr.D. Ganapat Ram Sharma, Ph.D. (IIT Madras)
Dr.C.V. Gokularathnam, Ph.D. (Florida)
Dr.Paramanand Singh, Ph.D. (IIT Bombay)
Dr.K. Prasad Rao, Ph.D. (IIT Madras)
Dr.S. Raghavan, Ph.D. (IIT Sc.)
Dr.S. Ramakrishna Iyer, Ph.D. (IIT Madras)
Dr.P. Kesavan Nair, Ph.D. (IIT Madras)

Lecturers

Dr.V. Sampath, Ph.D. (IIT Sc.)
Dr.K. Swaminathan, Ph.D. (IIT Madras)

Senior Scientific Officers Gr.II

Sri S. Annamalai, M.S. (IIT Madras)
Sri S.S. Bhattacharyya, B.Tech. (IIT Madras)
Sri B. Guha, Ph.D. (IIT Madras)
Sri G. Jothinathan, M.Tech. (IIT Madras)
Sri S. Kumaran, M.Sc. (Madras)

Technical Officers (SG)

Sri B. Raghunatha Rao, Ph.D. (IIT Madras)

12. DEPARTMENT OF PHYSICS

Professors

Dr.V. Sivaramakrishnan, Ph.D. (Bombay) [Head]
Dr.V. Balakrishnan, Ph.D. (Brandeis)

Dr.M.P. Kothiyal, Ph.D. (IIT Madras) Dr. (Mrs.)
Mahasheshasayee, Ph.D. (RPI, New York)
Dr.Y.V.G.S. Murti, Ph.D. (IIT Madras)
Dr.C.K. Narayanaswamy, Ph.D. (Madras)
Dr.S. Radhakrishna, Ph.D. (IIT Delhi)
Dr.K.V.S. Rama Rao, Ph.D. (Andhra)
Dr.R. Ramji Rao, Ph.D. (IIT Madras)
Dr.G. Rangarajan, Ph.D. (IISc.)
Dr.S.B.S. Sastry, Ph.D. (IIT Madras)
Dr.R.S. Sirohi, Ph.D. (IIT Delhi)
Dr.B.M. Sivaram, D.Phil. (Sussex)
Dr.J. Sobhanadri, D.Sc. (Andhra)
Dr.K. Viswanatha Reddy, Ph.D. (IIT Madras)

Associate Professors

Dr.V. Damodara Das, Ph.D. (S.P.U. Vidyanagar)
Dr.V.R.K. Murthy, Ph.D. (IIT Madras)
Dr.A.V. Narasimham, Ph.D. (IIT Madras)
Dr.Pranawa C. Deshmukh, Ph.D. (Nagpur)
Dr.S. Srinivasan, Ph.D. (IIT Madras)

Assistant Professors

Dr.B.S.V.S.R. Acharyulu, Ph.D. (IIT Madras)
Dr.B.S.V. Gopalam, Ph.D. (IIT Madras)
Dr.K. Hariharan, Ph.D. (IIT Madras)
Dr.J. Majhi, Ph.D. (IIT Madras)
Dr.V.S. Murty, Ph.D. (IIT Madras)
Dr.T.S. Natarajan, Ph.D. (IIT Madras)
Dr.T.A. Prasada Rao, Ph.D. (Andhra)
Dr.V. Ramachandran, Ph.D. (IIT Madras)
Dr.G. Sreenivasa Murthy, Ph.D. (IIT Madras)
Dr.K. Srinivasan, Ph.D. (IIT Madras)
Dr.Sriraman Srinivasan, Ph.D. (IIT Madras)
Dr.A. Subrahmanyam, Ph.D. (IIT Kharagpur)
Dr.B. Subrahmanyam, Ph.D. (Andhra)
Dr.V. Venkateswara Rao, Ph.D. (IIT Madras)
Dr.(Ms.) T.M. Vimala, Ph.D. (IIT Madras)

Lecturer

Dr. K. Muraleedharan

Chief Design Engineer

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

Senior Scientific Officer Grade-I

Dr.V. Sankaranarayanan, Ph.D. (IIT Madras)
Dr.Y. Syamasundara Rao, Ph.D. (IIT Madras)

Senior Scientific Officer Grade-II
Sri K. Sarangapani, M.Sc. (Madras)

Technical Officer (SG)
Sri U.D.V. Rangaiah

Technical Officers
Sri A.P. Venugopal
Dr.N. Krishna Mohan, Ph.D. (IIT Madras)

13. OCEAN ENGINEERING CENTRE

Professors

Dr.M. Ravindran, Ph.D.(IIT Madras) [Head]
Dr.C. Ganapathy Chettiar, Ph.D.(IIT Madras)
Dr.K. Muthukrishnaiah, Ph.D.(IIT Madras)
Dr.S. Narasimha Rao, Ph.D.(IIT Madras)
Dr.M.R. Pranesh, Ph.D.(IISc.)
Dr.V. Satyanarayana Raju, Dr.-Ing. (Karlsruhe)
Dr.C.P. Vendan, Ph.D.(IIT Kanpur)

Associate Professor

Dr.K. Ganesh Babu, Ph.D.(IIT Madras)
Dr.V.G. Idichandy, Ph.D.(IIT Madras)
Dr.R. Mahadevan, Ph.D.(IISc)
Dr.R.L. Roy Choudhury, Ph.D.(IIT Madras)
Dr.K. Rajagopalan, Ph.D.(IIT Madras)
Dr.V. Sundar, Ph.D (IIT Madras)

Assistant Professors

Sri P. Sambandam, M.S. (IIT Madras)
Dr.SP. Subramanian, Ph.D.(IIT Madras)
Dr.R. Sundaravadivelu, Ph.D.(IIT Madras),

Lecturers

Dr.S.K. Bhattacharyya, Ph.D.(IIT Madras)
Dr.J.S. Mani, Ph.D.(IIT Madras)
Dr.S Neelamani, Ph.D.(IIT Madras)

Senior Scientific Officers Gr.I

Dr.S. Meenakshisundaram, Ph.D.(IIT Madras)
Sri R. Natarajan, M.S. (IIT Madras)

Senior Scientific Officers Gr.II

Sri V. Anantha Subramanian, M.S. (IIT Madras)

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

14. CENTRE FOR BIO-SCIENCES AND BIO-TECHNOLOGY

Professors

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

Dr.R. Nagarajan, Ph.D. (IIT Madras)

Dr.C.A. Sastri, Ph.D.(Bombay)

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

Dr.Megha Singh, Ph.D.(Corolina)

Dr.(Mrs.) Mahasheshasayee, Ph.D.(RPI, New York)

Assistant Professors

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

Sri K. Gopalakrishna, M.Tech (IIT Kanpur)

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

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

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

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

15. REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

Professors

Dr.S. Subramanian, Ph.D. (Leicester) [Head]

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

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

Professors (Adjunct)

Dr.V. Ramakrishnan, Ph.D. (Annamalai)

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

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

Dr.(Mrs.) Maha Seshasayee, Ph.D. (RPI, New York)

Senior Scientific Officer Gr. II

Sri M.S. Moni, M.Sc., (Kerala)

Sri G. Palaniswamy, M.E. (MIT, Madras)

Dr.Babu Varghese, Ph.D. (IIT Madras)

16. CENTRE FOR SYSTEMS & DEVICES

Professors

Dr.D.K.Banerjee [Head]

Dr.M.S.Narasimhan, Ph.D. (IIT, Bombay)

Senior Scientific Officer Grade-I

Dr.K.M.Muralidhara Prabhu, Ph.D. (IIT, Madras)

Senior Design Engineers

Sri V.N.Shukla, B.Tech. (IIT, Kanpur)

(Mrs) Ranjana Shukla, M.S. (IIT, Madras)

Senior Scientific Officer Grade-II

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

Principal Scientific Officer

Dr.P.R.Vaya, Ph.D. (IIT, Madras)

17. MATERIALS SCIENCE RESEARCH CENTRE

Professors

Dr.G.V. Subba Rao, Ph.D. (IIT Kanpur),

FRSC (Lond.), FAIC (USA), FIAsc. (Ind.) [Head]

Assistant Professor

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

Technical Officers

Sri K. Chandrasekaran

Sri Y.S. Subramanian

18. FIBRE REINFORCED PLASTICS RESEARCH CENTRE

Senior Design Engineer

Dr.B.Jagdish Chandra Babu, Ph.D. (IIT Madras)

Chief Design Engineers

Dr.N.Gopalakrishnan Nair, Ph.D. (IIT Kanpur) [Head]

Dr.S.K. Malhotra, Ph.D. (IIT Madras)

Technical Officer

Dr.G.Santhanakrishnan, Ph.D. (IIT Madras).

19. CENTRAL ELECTRONICS CENTRE

Chief Instrument Engineer

Sri T.N. Ranganathan, B.E. (Hons)

M.I.E., F.I.E.T.E. (Officer incharge)

Technical Officer

Sri K. Raman

20. INDUSTRIAL CONSULTANY & SPONSORED RESEARCH

Dean

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

Senior Techno-Economic Officer

Sri Y.G. Narasimha, B.E. (Mysore), D.IIsc.

Chief Techno-Economic Officer

Dr.D. Balakrishnan, Ph.D. (IIT Bombay)

CENTRAL SERVICES, FACILITIES AND SECTIONS

21. CENTRAL WORKSHOP

Senior Workshop Superintendent

Sri S. Jambunathan, B.E. (Madras)

Assistant Workshop Superintendent (SG)

Sri N.L.N.N. Kumar, M.S. (IIT Madras)

Technical Officer (SG)

Sri G.S. Ramachandran

Sri A.V. Sundaram

Sri K.S. Veeraraghavalu

Technical Officer

Sri P.K. Sali

22. CENTRE FOR CONTINUING EDUCATION

Chairman

Dr.R. Natarajan, Ph.D.(Waterloo)

23. CENTRAL GLASS BLOWING SECTION

Dr.D.V. Ramana [Head]

24. CENTRAL PHOTOGRAPHIC SECTION

Convenor

Dr.M.R. Udupa

Technical Officer

Sri N.T. Kumaraswamy

25. CENTRAL GAS SUPPLIES UNIT

Head Dr.C.S. Swamy

26. AIR-CONDITIONING UNIT

Head Dr.V. Sriramulu

Senior Maintenance Engineer Sri K. Parthasarathy, B.E.

Technical Officer Sri S. Krishna Samy

27. SPORTS ACTIVITIES

Adviser Dr.S.D. Pathak

28. CULTURAL ACTIVITIES

Adviser Dr.B. Viswanathan

29. NATIONAL CADET CROPS

Officer Commanding-4(TN)AIR SQN (TECH) N.C.C.

Wg. Cdr. M. Murugesan

30. TRAINING AND PLACEMENT

Adviser Dr.M.A. Parameswaran

31. FOREIGN & WEAKER SECTION STUDENTS

Adviser Dr.P.A. Aswathanarayana

32. VIGILANCE

Vigilance Officer Sri C. Ganapathy

33. GUIDANCE & COUNSELLING

Head Dr.M.A. Veluswami

INDIAN INSTITUTE OF TECHNOLOGY, MADRAS - 36.

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH 1990.

EXPENDITURE		INCOME	
	Rs.		Rs.
Educational Expenses:-		Grant from Govt. of India	
Teaching Staff Pay & Allowances		(on Revenue account)	12,51,30,000
Department of		LESS: 1988-89 Transfer	56,86,000
Chemistry	27,33,894		-----
Physics	29,60,051		11,94,44,000
Mathematics	16,98,369	ADD: 1989-90 o/s Adjt.	1,99,07,000
Humanities & Social Sciences	13,40,344	General Income	-----
Civil Engineering	28,35,925		13,93,51,000
Mechanical Engineering	45,76,919		
Electrical Engineering	40,39,751	Tuition Fees	5,84,365
Chemical Engineering	18,77,137	Hostel Seat Rent	3,22,124
Metallurgical Engineering	14,77,502	Gymkhana Fees	55,800
Applied Mechanics	16,66,957	Medical Fees	18,212
Aeronautical Engineering	11,26,291	Students Amenities Fund	74,543
Ocean Engineering	12,72,770	Fine	2,949
Computer Science & Engg.	17,29,938	Examination Fees	Rs.35,700
	-----	Thesis fees	Rs.42,300
	2,93,35,848	Degree in absentia	4,891
	-----		-----
C/O	2,93,35,848		11,40,884
	-----		-----
	2,93,35,848	C/O	14,04,91,884

EXPENDITURE

INCOME

	Rs.	Rs.		Rs.	Rs.
B/F			B/F		14,04,91,884
Non-Teaching Staff Pay & Allowances	2,93,35,848		Appln. Fees from Students	52,33,109	
Department of			Appln. Fees for Appointments	34,587	
Chemistry	9,58,881		Admission Fees	38,295	
Physics	19,77,083		Grade Card	4,007	
Mathematics	1,63,868				53,09,998
Humanities & Social Sciences	3,04,457		<u>Miscellaneous Receipts</u>		
Civil Engineering	19,14,316		Institute Bus Collections	7,40,515	
Mechanical Engineering	32,20,109		Hire charges on		
Electrical Engineering	22,85,203		Institute vehicles	53,781	
Chemical Engineering	10,25,777				7,94,296
Metallurgical Engineering	12,74,503		Licence Fee	13,84,921	
Applied Mechanics	9,94,808		Electricity, Water &		
Aeronautical Engineering	6,94,976		service Charges	11,17,898	
Ocean Engineering	6,65,105				25,02,819
Computer Science & Engg.	6,47,800		Lawns & Gardens		
		1,61,26,886	(Auction sale of Trees & Usufructs)	11,745	13,605
Research Centres -			Income from Computer Centre	2,11,638	
Pay and Allowances			Income from VAX II Computer		2,23,383
Centres - Officers	8,46,403				
Centres - others	13,41,751		Sale of Motor Vehicles	97,086	
			Centre Sale of IBM 370/IPL	6,25,000	
Central Electronic		21,88,154			7,22,086
(Pay and Allowances)		4,33,053			
Air Conditioning Unit		2,93,300			
(Pay & Allowances)					
Indo - German Projects		27,052			
(Pay & Allowances)					
C/O		4,84,04,293	C/O		15,00,58,071

EXPENDITURE

INCOME

	Rs.	Rs.	Rs.	Rs.
B/F		4,84,04,293		15,00,58,071
<u>Departmental Expenses</u>				
Chemistry	5,29,526			1,05,936
Physics	5,53,117			5,205
Mathematics	(-) 24,075			150
Humanities & Social Sciences	64,105			(-) 8369
Civil Engineering	4,63,737			11,312
Mechanical Engineering	8,05,790			4,186
Electrical Engineering	8,34,161			4,000
Chemical Engineering	4,01,808			5,59,418
Metallurgical Engineering	7,34,017			303
Applied Mechanics	4,16,999			3,570
Aeronautical Engineering	2,99,087			1,73,123
Ocean Engineering	2,75,555			70,795
Computer Science & Engg.	52,95,892	1,06,49,719		25,839
				34,07,699
Library:				65,42,016
Pay and Allowances:				1,33,096
Officers	3,47,464			5,74,425
Establishment	20,77,995			12,87,160
Contingencies - operating cost	13,886			47,400
Binding Charges	79,958			20,400
Journal of General Interest	19,145			95,365
NMR wages	31,707			
		25,70,155		
C/O		6,16,24,167	C/O	1,30,63,029
				1,631,21,100

EXPENDITURE		INCOME	
B/F	Rs.	B/F	Rs.
	6,16,24,167		16,31,21,100
<u>CENTRAL WORKSHOPS:</u>			
(Pay and Allowances)			
Officers	3,83,995		
Others	37,77,507		
Working Expenses (Instruments, Tools & Other Consumables)	2,78,821		

Stipend to Apprentices	44,40,323		
<u>Centres/Central Services</u>	1,99,252		
<u>Working Expenses:</u>			
Fibre Reinforced Plastic			
Research Centre	1,91,121		
Material Science Res. Centre	3,80,421		
Bio-Science & Bio-Technology	1,56,362		
Central Electronic Centre	1,53,022		
Regional Sophisticated			
Instrumentation Centre	1,74,949		
Central Glass Blowing Section	7,320		
Central Photographic Section	12,773		
Air Conditioning Unit	2,51,565		
Central Gas Supply Unit	(-)7,548		
Rural Development Research			
Activities	1,21,309		

	14,41,294		
Indo - German Project	56,641		

C/O	6,77,61,677	C/O	16,31,21,100

EXPENDITURE		INCOME	
	Rs.	Rs.	Rs.
B/F			
Institute Scholarships		6,77,61,677	
Post Graduate and Research	1,59,60,592		
Under Graduate	4,98,201		16,31,21,100

N.C.C./N. S. S.		1,64,58,793	
Pay & Allowances	1,69,564		
Other Expenditure	66,195		
	-----	2,35,759	
Athletic and Gymkhana:			
Pay and Allowances	3,65,565		
Contribution to Gymkhana	7,50,000		
Management	-----	11,15,565	
Other Items:			
Part-Time Lectures &			
Visiting Professors	4,312		
Technical Bulletins and			
Journals	1,60,318		
Symposia and Seminars	10,086		
Inplant Training/Courses/Visits	96,280		
Quality Improvement Programme	16,491		
Continuing Education Programme			
organised by the Institute	(-)35,988		
Guidance and counselling Unit	5,372		
Special Coaching Programme for			
SC/ST students	1,619		
Training and Welfare activities			
including special Training to SC/ST			
staff (EWS)	-----	2,58,540	

C/O		8,58,30,334	C/O
		-----	-----
			16,31,21,100

EXPENDITURE

INCOME

	Rs.	Rs.	B/F	Rs.
B/F				
Director's Discretionary fund for Research				16,31,21,100
H.A.L Trainees			3,223	
Membership Fees to outside bodies			1,00,000	
Remuneration To External Examiners			60,702	
Joint Entrance Examination			81,083	
Graduate Aptitude Test in Engineering			10,24,890	
ISRO -IITM Cell			13,07,379	
Convocation			1,00,000	
Prizes for Academic Distinction			1,02,497	
Contribution towards Institute participation in Programme of National Conference			35,827	
			39,932	
<u>Hostels</u>				
Allowances to Wardens	42,351			
Subsidy to Hostels	44,71,138			
Security to Hostels	1,62,160			
			46,75,650	
<u>Central Administration-</u> (Pay and Allowances)- Officers - Estt.	28,74,340			
	85,40,488			
			1,14,14,828	
			10,47,76,345	
C/O		C/O		16,31,21,100

EXPENDITURE INCOME

B/F	Rs.	Rs.	B/F	Rs.
<u>Contingencies:</u>				
Postage	5,21,482			
Entertainment	1,40,090			
Telephones	14,21,275			
Liveries	39,797			
Stationary	9,04,274			
Printing	2,58,828			
Advertisement	11,49,539			
Sundries (Misc Expenses)	3,75,440			
Guest House Provisions	1,01,526			
	-----	49,12,251		
Director's Discretionary Fund		12,750		
<u>Stores:</u>				
General Stores	19,273			
Pay and Allowances - Officers	2,66,528			
Pay and Allowances - Estt.	7,39,608			
	-----	10,25,409		
Security				
Other charges	3,69,378			
Fire fighting operating cost	2,836			
	-----	3,72,214		
<u>Lawns and Gardens:</u>				
Pay and Allowances of Horticultural Superintendent	55,395			
Other Expenses	1,87,532			
	-----	2,42,927		
Power		55,83,682		
Mosquito control		14,779		
Water		6,33,445		
Oil and Petrol		2,67,496		
	-----	11,78,41,298	C/O	
		-----		16,31,21,100

EXPENDITURE		INCOME	
B/F	Rs.	B/F	Rs.
	11,78,41,298		Rs.
			16,31,21,100
<u>Repairs and Maintenance:</u>			
a) Furniture	3,12,867		
b) Typewriters & Duplicators	34,406		
c) Motor Vehicles	1,12,298		
Duty Insurance and Road Taxes	-----		
	4,59,571		
	1,40,554		
<u>Works and Maintenance:</u>			
(Pay and Allowances)-Officers	4,12,704		
-Estt.	97,53,065		
Other Charges	50,92,926		
Property Tax	-----		
	1,52,58,695		
	3,04,808		
<u>Hospital:</u>			
(Pay and Allowances)-Officers	4,38,650		
-Estt.	9,50,786		
Purchase of Medicines	8,52,323		
Subsidy to Vanavani School	-----		
Central School	22,41,759		
Audit charges	5,49,969		
Legal Expenses	1,35,998		
Reimbursement of Stamp Duty	37,029		
	1,65,274		
C/O	-----	C/O	-----
	13,71,34,955		16,31,21,100

EXPENDITURE		INCOME	
	Rs.	B/F	Rs.
B/F			Rs.
			16,31,21,100
<u>TRAVELLING EXPENSES</u>			
Board of Governors	15,461		
Staff Selection Committee and other committees	81,678		
Candidates called for Interview for appointments	1,03,079		
External Examiners	2,08,571		

	4,08,789		
Leave Salary and Pension Contribution on account of personnel on foreign services			
Campus Amenities	20,815		
G.P.F. Contribution	1,57,57,873		
Hostel contingencies	999		
Excess of income over Expenditure	97,97,669		

TOTAL	16,31,21,100	TOTAL	16,31,21,100
	-----		-----

Sd/...
DIRECTOR

Sd/...
REGISTRAR

Sd/...
FINANCE & ACCOUNTS OFFICER

INDIAN INSTITUTE OF TECHNOLOGY, MADRAS
RECEIPTS AND PAYMENTS ACCOUNT FOR THE PERIOD ENDING 1989-90

	Rs.	Rs.	Rs.	Rs.
RECEIPTS				
Opening Balance				130,91,790
<u>RECEIPTS ON CAPITAL ACCOUNT</u>				
Grant from Government of India on Capital Account		1519,40,117		
<u>OTHER CAPITAL RECEIPTS</u>				
Customs Duty on West German Equipments (per contra)	568			
Sale proceeds of Motor Vehicles Bus : Rs.65,300 Jeep : Rs.31,786	97,086			
Proceeds by way of Disposal of IBM 370/IPL system	6,25,000			
	-----	7,22,654		
				207,42,347
PAYMENTS				
<u>ON CAPITAL ACCOUNT</u>				
i. Building and works Furniture, Equipments and Fittings				
ii. <u>DEPARTMENTS</u>				
1. Chemistry			8,76,478	
2. Physics			10,41,615	
3. Mathematics			1,74,570	
4. Humanities & Soc. Sciences			1,05,017	
5. Civil Engineering			14,48,205	
6. Electrical Engineering			16,95,438	
7. Mechanical Engineering			27,41,768	
8. Chemical Engineering			14,26,995	
9. Metallurgical Engg.			14,20,530	
10. Applied Mechanics			8,86,185	
11. Aero Space Engg.			11,31,282	
12. Ocean Engineering			24,00,329	
13. Computer Science & Engg			53,93,935	

b. <u>RESEARCH CENTRES</u> <u>CENTRAL SERVICES</u>				
1. F.R.P.R. C.			99,866	
2. Bio-Science & Bio-Tech			3,71,426	
3. M.S.R.C.			3,85,897	
4. Central Electronics Centre			1,62,684	

			10,19,873	

				338,34,137
C/O		2016,11,771	C/O	

RECEIPTS		PAYMENTS	
	Rs.		Rs.
B/F	2016,11,771	B/F	10,19,873
<u>GRANT FROM GOVERNMENT OF INDIA</u>			
On revenue account	1251,30,000	6. R. S.I.C.	2,00,872
		7. Air Conditioning Unit	4,15,735
		8. Central X-Ray Diff. Lab	1,10,025
		10. C.G.B. Section	4,860
<u>RECEIPTS FROM ACADEMIC SECTION</u>			
Tuition Fees	5,88,682	c. Central Workshops	17,51,365
Hostel Seat Rent	3,25,945	d. Indo-German collaboration	50,292
Gymkhana Fee	55,060	programme(Equipment etc.)	
Students Amenities Fund	74,603	e. Replacement of	8,91,118
Medical Fees	19,264	Obsolete Equipment	9,80,886
Fines	2,949	f. Rural Development Research	2,134
Examination Fees	35,700	Activities	
Degree in Absentia	4,891	<u>LIBRARY</u>	
Admission Fees	38,295	a. Books	11,53,066
Thesis Fees	42,300	b. Journals & Back Vols.	62,28,497
Grade Card	4,007	c. Equipments	6,94,082
		d. Film Media Resources	5,500
Application Fees from Students	7,38,839		
Institute Bus Collection		<u>CUSTOMS DUTY ON WEST-</u>	
Hire charges on Instt. vehicles		<u>GERMAN EQUIPMENTS</u>	
Bus: Rs.24,152.50		Payments	---
Other Vehicles: Rs.22,561.50		LESS Refunds	(-)568
		Per contra	(-)568
<u>RECEIPTS FROM BUILDINGS</u>			
Licence Fees	13,70,783	Clearance Charges on	
Electricity, Water and		West German Equipments	1,77,746
service charges	10,70,576		
		<u>FURNITURE AND FITTINGS</u>	
		Office, Library, etc.	16,12,892
		Utencils of Hostels	1,00,653
C/O	3363.93,488	C/O	474,82,368

RECEIPTS

	Rs.
B/F	3363,93,488
Usefructs and Receipts from sewage farm	13,605
Receipts from Computer Centre	42,300
Over Head charges from Consultancy Services	5,74,425
<u>OTHER RECEIPTS</u>	
Application Fee for Posts in Institute	34,587
Library overdue Collection	1,05,937
Institute day & Assn. Fees	5,205
Migration Certificate	150
Industr. Associate Membership	4,000
Short term & other courses	(-)18,369
Hire charges for Gowns	3,570
Subscription of Journal of Mathematical & Physical Sciences	1,73,123
Interest on Conveyance Adv.	70,795
Int. on call deposit with SBI.	34,07,698
Int. on P.F. Investments	65,42,016
Int. on Electricity Board Deposits	25,839
Maintenance of Fans	47,370
VAX II/750; Computer earnings	2,11,638
Dept. dues / Breakages	303
Guest House Lodging charges	---
Penalty amount for bonds Executed	20,400
Recovery of previous years	18,01,580

	124,45,842

C/O

3494,69,660

PAYMENTS

	Rs.	Rs.
B/F		474,82,368
OTHERS		1,45,696
a. Hospital Equipment		9,755
b. Motor Vehicles		---
c. Cycles		---
d. Office Equipment		11,30,895
e. Telephones		1,70,338
f. NCC Design, Models Etc.		9,850
g. Fire fighting Eqpt.		---

REVENUE ACCOUNT		14,66,534
Pay & Allowances of Teaching Staff		
Chemistry	27,32,691	
Physics	29,45,656	
Mathematics	16,93,780	
Humanities & Soc. Sci.	13,27,755	
Civil Engineering	28,19,548	
Mechanical Engineering	45,40,605	
Electrical Engineering	40,29,495	
Chemical Engineering	18,67,567	
Metallurgical Engg.	14,58,938	
Applied Mechanics	16,57,959	
Aero Space & Engg.	11,21,226	
Ocean Engg.	12,62,428	
Computer Science & Engg.	17,10,603	

		291,68,251

C/O

781,17,153

RECEIPTS

PAYMENTS

	Rs.	Rs.	B/F	Rs.
B/F		3494,69,660		781,17,153
Int. on House Building Advance	1,33,096			
Furniture Hire charges	11,757			
Central Photographic Section	4,186			
Miscellaneous Receipts	5,59,418			
<u>RECOVERY OF ADVANCE</u>				
Motor Car and other Conveyance	4,78,073			
Festival Advance	4,57,817			
Miscellaneous Advance	17,24,067			
Flood/Drought Advance	1,318			
House Building Advance	11,52,393			
Customs duty	10,49,035			
		48,62,703		
				159,91,990
<u>DEPARTMENTAL EXPENSES</u>				
Chemistry			5,16,103	
Physics			6,18,054	
Mathematics			(-)3,135	
Civil Engineering			4,57,134	
Humanities & Social Sciences			40,472	
				16,28,628
C/O		3550,40,820		941,09,143

RECEIPTS

PAYMENTS

	Rs.	Rs.		Rs.	Rs.
B/F		3550,40,820	B/F	16,28,628	941,09,143
DEPOSITS			Mechanical Engineering	7,91,441	
Contractors Deposit	18,54,260		Electrical Engineering	6,54,621	
Suppliers Deposit (Instt.)	8,36,291		Chemical Engineering	3,53,068	
External Scholarship	5,91,171		Metallurgical Engg.	6,30,376	
C.S.I.R.	14,78,806		Applied Mechanics	4,20,211	
Students Caution Deposit	32,500		Aero.Space-Engineering	2,90,414	
New Plan Schemes etc. H a/c	205,08,691		Ocean Engineering	3,18,803	
Miscellaneous Deposits	61,69,790		Computer Science & Engg.	50,72,068	101,59,630
Q.I.P & C.S.D Scheme	8,03,464				
I.C.S.R. Projects	579,91,873		<u>LIBRARY</u>		
R.S.I.C. Receipts	99,981		Pay & Allowances-Officers	3,61,631	
Library Deposits	86,600		Pay & Allowances-others	20,55,260	
Students aid and welfare fund receipts from students	23,810		Journal of Genl.Interest	19,145	
Interest on Endowments	54,952		Contingencies Oper.Cost	78,717	
Alumni Association	51,000		Binding Charges	79,958	
			NMR Charges	31,707	
			<u>CENTRAL WORKSHOPS</u>		
		905,83,189	Pay & Allowances-Officers	3,80,114	
			Pay & Allowances-Estt.	37,56,197	
			Working Expenses-Tools and other Consumables	2,46,166	
			Indo-German Projects (Pay & Allowances)		43,82,477
C/O		4456,24,009			24,988
					1113,02,656

RECEIPTS

Rs. 4456,24,009

Rs. 1113,02,656

B/F

1113,02,656

4456,24,009

B/F

RESEARCH CENTRES
Pay & Allowances-Officers 8,40,349
Pay & Allowances -Estt 13,28,872

21,69,221

Central Electronics Centre
Pay & Allowances 4,24,376
Air Conditioning Unit
Pay & Allowances 2,89,622

CENTRES, CENTRAL SERVICES
WORKING EXPENSES

F.R.P.R.C. 2,00,528
M.S.R.C. 3,34,433
Bio-Science & Bio-Tech 1,56,582
Central Electronics Centre 1,17,318
R.S.I.C. 1,85,020
Central Glass Blowing Sec. 3,973
Central Photographic Sec. 26,475
Air Conditioning Unit 3,69,778
Central Gas Supplies Unit (-)7,548
Central X-Ray Diff. Lab 55,326

14,41,885

RURAL DEVELOPMENT RESEARCH ACTIVITIES

Working Expenses 1,04,653
Indo German Project 56,641

INSTITUTE SCHOLARSHIPS

Post Graduate & Research 157,75,714
UnderGraduate 5,57,611

163,33,325

C/O

4456,24,009

1321,22,379

RECEIPTS		PAYMENTS	
	Rs.		Rs.
B/F	4456,24,009	B/F	1356,67,205
		<u>CENTRAL ADMINISTRATION</u>	
		Pay & Allowances-Officers	28,65,040
		Pay & Allowances-Others	84,69,292
		-----	-----
		HOSTELS	
		Security (Hostels)	1,62,160
		Allowance to Wardens	42,351
		Subsidy to Hostels	44,71,139
		-----	-----
		STORES	
		Pay & Allowances - Officers	2,68,311
		Pay & Allowances - others	7,38,775
		General Stores	(-)9,464
		-----	-----
		Security - other charges	9,97,622
		Fire Fighting Operating Cost	3,48,780
			2,836
		<u>LAWNS & GARDENS</u>	
		Pay & Allowances of	54,965
		Horticultural Supdt.	1,87,532
		Other expenses	-----
		<u>SERVICE & MAINTENANCE</u>	
		Telephones	14,21,275
		Power	55,83,682
		Water	6,33,445
		Furniture Repair & Maintenance	3,10,770
		-----	-----
		C/O	1612,18,094

RECEIPTS

PAYMENTS

	Rs.		Rs.	Rs.
B/F	4456,24,009	B/F	1612,18,094	
		Oil and Petrol	2,90,451	
		Duty Insurance & Taxes	1,18,066	
		Repair & Maintenance to Motor Vehicles & Cycles	3,50,630	
		Property Tax	3,04,808	
		<u>MEDICAL DISPENSARY</u>		
		Pay & Allowances Medical Officers	4,27,938	
		Pay & Allowances-Estt.	9,39,956	
		Purchase of Medicines	9,57,572	23,25,466
		<u>ATHLETIC & GYMKHANA</u>		
		Pay & Allowances	3,62,696	
		Contribution to Gymkhana Management Account	7,50,000	
		Mosquito Control	11,12,696	
		Subsidy to Vanavani School	14,779	
		Campus Amenities	5,49,969	
		Spl. Coaching courses to SC\ST staff	20,815	
		Guidance & Counselling	1,619	
		Central School	5,372	
		Director's Discretionary Fund	---	
			12,750	

			1663,25,515	
		C/O		

			4456,24,009	
		C/O		

RECEIPTS

B/F
Rs. 4456,24,009

PAYMENTS

B/F
Rs. 1663,25,515

WORKS & MAINTENANCE
Pay & Allowances-Officers 3,94,424
Pay & Allowances-Others 92,01,606
Other Expenditure on Maintenance 44,99,138

143,95,168

ADMINISTRATION-GENERAL EXPENSES

Postage 4,89,305
Entertainment 1,40,090
Liveries 3,66,204
Stationary 8,53,673
Printing 2,56,623
Guest House & Taramani House 1,01,557
Advertisement 12,38,816
Repairs to Office Equipment 1,32,943
Audit Charges 1,20,000
Legal Expenses 37,029

37,36,240

TRAVELLING EXPENSES

Board of Governors 15,461
Staff Committee, Selection Committees etc. 81,678
Candidates called for Interview 1,03,079
External Examiners 2,08,571

4,08,789

4456,24,009 C/O

1848,65,712

RECEIPTS

PAYMENTS

	Rs.	Rs.	Rs.
B/F	4456,24,009		1848,65,712
		B/F	
		Leave salary & Pension contribution on account of Personnel of foreign services	1,65,274
		Reimbursement of Stamp duty	3,94,635
		Sundries	999
		Hostel Contingencies	
		<u>PROVIDENT FUND/GRATUITY/PENSION</u>	
		Pension/Commutation of Pension	40,51,939
		Family Pension	5,69,703
		Instt. share of contribution	76,00,000
		Gratuity	19,58,950
		Deposit linked insurance	
			141,80,592
		<u>ADVANCES</u>	
		Motor car & other conveyance	6,61,995
		Customs duty Non-Plan	9,00,000
		Festival Advance	4,15,200
		Other Miscellaneous Advance	17,70,469
		House Building Advance	33,55,460
			71,03,124
C/O	4456,24,009	C/O	2067,10,336

RECEIPTS		PAYMENTS	
	Rs.		Rs.
B/F	4456,24,009	B/F	2067,10,336
<u>REFUND OF DEPOSITS</u>			
		Suppliers Deposit (Instt.)	2,53,890
		Contractors Deposit (works)	21,99,806
		External scholarships	5,61,433
		C.S.I.R.	12,37,283
		Miscellaneous Deposit	75,17,952
		Students Caution Deposit	17,125
		Library Deposit	53,146
		Microprocessor Lab, Centres Etc.	
		GOI / CSD	373,49,228
		QIP Programme organised by	
		GOI / CSD	24,89,126
		Industrial Consultancy Works & Projects	642,83,405
		Endowments towards Prizes etc.	8,009
		Allumini Association	65,800
		Students Welfare fund	---
		R.S.I.C. Payments	---
			1163,36,203
<u>CLOSING BALANCE</u>			
		Cash in hand	99,229
		With State Bank of India	1224,77,842
		Savings bank account	399
			1225,77,470
TOTAL	4456,24,009	TOTAL	4456,24,009

Sd/...
Finance and Accounts Officer

Sd/...
Registrar

Sd/...
Director

INDIAN INSTITUTE OF TECHNOLOGY, MADRAS - 600 036

BALANCE SHEET AS AT 31-3-90

CAPITAL FUND AND LIABILITIES		PROPERTY AND ASSETS	
	Rs.		Rs.
CAPITAL		LAND	
Value of Land per contra	1,12,17,262	Value of land gifted by the Tamil Nadu Government	1,12,17,262
Block Value of German Aid per contra	16,98,48,332		
Equipment, Technical Books & Journals per contra	16,56,230	BUILDING	
OTHER AID	17,15,04,562	Cost of completed buildings as on 31-3-89	15,59,99,886
Value of aid Alexander Van Humboldt Foundation	10,83,000	ADD Buildings completed during the year	89,92,343
Value of aid From German Volks Wagon Foundation	2,99,860	Building under construction as 31-3-89	1,06,27,508
Computer System per contra	1,54,50,458	ADD Expenditure during the year	1,45,85,693
As per last Balance sheet	(-)6,25,000		16,49,92,229
	1,48,25,458		
Value of Siemens Computer per contraon {German Contribution}	3,09,97,578		
Capital Fund & Balance of Income & Expenditure a/c as on 31-3-89	45,89,51,132		
		LESS transferred to completed buildings a/c	1,62,20,858
ADD Capital grant during 1989-90	4,89,49,000		
ADD Excess of Income over Expenditure during 89-90	97,97,669	DIESEL GENERATORS	
			18,12,13,087
LESS Value of Equipments written off	51,76,97,801		2,14,231
	-1,84,127		
	51,75,13,674		
C/O	74,74,41,394		
			19,26,44,580

CAPITAL FUND AND LIABILITIES

Rs.

Rs.

B/F
SUNDRY CREDITORS

86,25,77,004

Rs.

Rs.

43,56,41,622

- i. On works account 14,22,156
- ii. On Supplies made/service rendered to Dept./sections 12,43,049

14,15,88,604

2,96,06,182

OUTSTANDING EXPENSES

26,65,205

17,11,94,786

PAYABLE

16,98,48,331

- a. Pay & Allowances 61,19,803
- b. Scholarships 3,54,394
- c. Other Allowances(Medical) 1,07,500
- d. Wages to NMR labourers Departments/Section 488
- e. Audit Fees 1,35,998
- f. Stipend to Apprentices 9,000
- g. Computer Centre remuneration to staff ***
- h. L.S. and P.C. payable 11,000
- i. GPF Contribution etc. payable 15,77,280

2,98,92,107

2,98,92,107

83,15,463

Grant in aid from American Chemical Society per contra (Balance as per last year balance sheet)

1,10,934

1,85,343

3,00,77,450

568

3,00,76,882

C O

87,36,68,606

C/O

63,55,66,835

CAPITAL FUND AND LIABILITIES

	Rs.	Rs.
B/F	87,36,68,606	
Unpaid items as on 31-3-90 As per undisbursed pay Register	35,956	
New plan schemes engineering Technology approved by Government of India [per contra] as on 31.3.90	6,77,83,636	
Quality improvement programme per contra as 31-3-90	1,06,256	

PROPERTY AND ASSETS

	Rs.	Rs.	Rs.
B/F			63,55,66,835
Motor vehicles Balance sheet at as per 31-3-89		23,70,471	
ADD Additions during the year		7,720	
		23,78,191	
LESS Value of Vehicles written off		97,086	
Library bookd and scientific Journals at cost as on 31-3-89		4,18,53,606	
ADD Additions during the year		73,81,563	
			4,92,35,169
Block value as per technical books from W.G. as per B/S as at 31-3-89		16,56,231	
ADD additions during the year		---	
			16,56,231
Typewriters & duplicators Cost as per B/S as at 31-3-89		22,82,125	
ADD additions during the year		3,06,133	
		25,88,258	
LESS written off during the year		31,792	
			25,56,466
Tools & plants Cost as at 31-3-89		6,12,817	
ADD additions during the year		4,17,950	
Cycles at cost as per B/s as at 31-3-89		85,964	
ADD Additions during the year		---	
		85,964	
LESS Cost of cycles written off during the year		---	
			85,964
			69,24,12,537

C/O

94,15,94,454

C/O

69,24,12,537

85,964

CAPITAL FUND AND LIABILITIES

PROPERTY AND ASSETS

	Rs.	Rs.	B/F	Rs.
B/F				
		94,15,94,454		69,24,12,537
INDUATRIAL RESEARCH AND DEVELOPMENT A/C				
Balance as on 1-4-89	1,03,01,019			
{ as per separate statement of account }				
ADD Receipts for the year	27,42,690			5,50,350
LESS payments during the year	1,30,43,709			
	7,85,026			1,000
		1,22,58,683		70,41,297
GYMKHANA MANAGEMENT				
Opening Balance as on 1-4-89 as per separate statement of account	1,68,342			29,70,691
ADD Receipts of the year	10,92,706			95,365
	12,61,048			4,18,847
LESS payments during the year	12,07,082			35,928
				19,574
Centre for continuing Education Receipts	5,25,474			29,999
LESS Payments	2,49,006			51,857
		2,76,467		
C/O		95,41,83,570	C/O	72,38,46,813

INVESTMENT ACCOUNT

Endowment fund (Governor's prize etc.) as on 31-3-89
 Endowment pertaining to Gymkhana management a/c Per contra
 Stock as on 31-3-90
 Consumable stores with depts.
 Construction materials with Engineering unit works a/c
 Storage charges (adjustable)
 Stationery articles
 Stock of tyres & tubes & Spare parts
 Liveries etc.
 UNESCO Coupons
 Diesel oil
 cost of projector & tape recorders {gymkhana assets} as per last year b/s
 Grant receivable from government
 Furniture hire charges recoverable
 Licence fees & ew's recoverable
 Tuition fees, seat rent etc. recoverable
 Leave salary recoverable from parent departments

CAPITAL FUND AND LIABILITIES

	Rs.	Rs.
B/F GUEST HOUSES' ACCOUNT		95,41,83,570
Opening balance as on 1-4-89 as per separate statement of account	19,047	
ADD Receipts	4,75,077	

	4,94,124	
LESS Payments	4,45,254	

		48,870

PROPERTY AND ASSETS

	Rs.	Rs.
B/F income receivable		72,38,46,813
computer centre dues		2,16,346
Hire charges of institute	12,628	
Vehicles etc. recoverable	16,021	
Pre-paid taxes and insurance	30,983	
Stamps in hand		
Equipments procured from Grant-in-aid received from the American Chemical Society		1,10,934
Balance brought forward from last year		

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TARAMANI GUEST HOUSE
LIABILITIES

Gratuity payable to erstwhile Taramani House presently serving employees as on the date of take over	6,707		
Advances received for parties	5,044		
Bills payable for provisions	42,968		
Accumulated assets over Liabilities	1,12,405		

		1,67,124	

C/O		95,43,99,564	

		81,71,68,477	

Equipment procured out of Grant-in-aid received from Government of India		4,71,20,800	
NEW PLAN SCHEME Opening Balance		2,06,62,835	
ADD Adjustment		-----	
QIP ASSETS		6,77,83,635	
Deposits with telephones		1,06,256	
Deposits with firms		10,800	
Works advance		46,007	
Central supplies unit		4,06,965	
Permanent Imprest]		5,00,000	
Advances [Recoverable]		2,33,78,063	
Deposits with Tamil Nadu Electricity Board		7,03,026	

C/O		81,71,68,477	

CAPITAL FUND AND LIABILITIES

PROPERTY AND ASSETS

	Rs.		Rs.
B/F	95,43,99,564	B/F	81,71,68,477
		DEPOSIT WITH National Insurance Co. LTD.	20,000
		Collector of customs	
		Account No.I and Air Cargo Complex O/B	7,09,570
		Advance paid	9,00,000
		LESS Transferred to Customs Duty {Projects}	16,09,570
			8,90,096
		Collector of Customs Account No.II	7,19,475
		Opening Balance	6,790
		LESS recoveries	
		Advance recoverable from 'H' & 'F' a/c	6,790
		Opening Balance	12,23,198
		ADD payment during the year	8,90,096
		LESS Recoveries	21,13,294
			10,49,035
C/O	95,43,99,564	C/O	10,64,259
			81,89,79,001

CAPITAL FUND AND LIABILITIES

Rs.

95,43,99,564

B/F

Rs.

81,89,79,001

B/F			
T.H. (G.H. a/c) Assets			
Equipments on the date of take over	2,176		
Deposit with suppliers as on 31-3-90	1,725		
Stock of provisions	7,258		
Mess dues outstanding	1,55,965		
Stock of guest house provisions			1,67,124
CLOSING BALANCE			127
UNPAID BALANCE PER CONTRA			
With S.B.I.	35,956		
Imprest {instt.}	500		
Imprest {Engg. Unit}	1,400		
Cash on hand {other than 'C' a/c}	99,229		37,856
With S.B.I. {other than IRDF a/c}	12,24,77,842		
With IIT PO	399		
With S.B.I. IRDF a/c			12,25,77,470
With S.B.I. gym. management a/c			1,22,58,682
With S.B.I. guest houses a/c			53,966
C.C.E.			48,870
EMD/Caution & other Deposits	710,32,347		2,76,468
New Plan Schemes	434,68,733		
IRDF Deposits Adjustments	33,369		
ADD Drawn from Refundable Deposit	11,45,34,449		
	80,43,021		
TOTAL	95,43,99,564		95,43,99,564

TOTAL

TOTAL

95,43,99,564

95,43,99,564

Sd/..

FINANCE & ACCOUNTS OFFICER

Sd/..

REGISTRAR

Sd/..

DIRECTOR