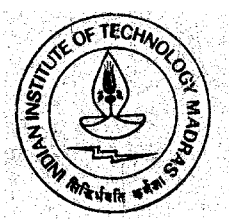
TWENTY SIXTH
ANNUAL REPORT

1984-85



INDIAN INSTITUTE OF TECHNOLOGY
MADRAS

TWENTY SIXTH
ANNUAL REPORT

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INDIAN INSTITUTE OF TECHNOLOGY
MADRAS

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Member (Education)
Planning Commission
New Delhi

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(Two from Lok Sabha and One from Rajya Sabha)

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Sri. Pratap Bhanu Sharma

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Prof. Yash Pal

Sri V. Krishnamurthy
Dr. V. S. Arunachalam
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Ministry of Education and Culture
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Prof. L. S. Srinath (from 25-7-1984)
Director
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Government of Karnataka, Bangalore

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Sri V. Srinivasan (from December 84)
Director of Technical Education
Government of Tamil Nadu, Madras.

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Director of Technical Education
Government of Kerala
Trivandrum.

Sri K. Rami Reddy
Director of Technical Education
Government of Andhra Pradesh
Hyderabad.

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Vice-Chancellor
Anna University of Technology
Madras.

Dr. V. S. Arunachalam
Scientific Advisor to Defence Minister.
Ministry of Defence
New Delhi.

Dr. L. S. Chandrakant (upto 28-2-85)
No. 292, Second Main Road
VIII Block, Jayanagar
Bangalore.

Dr. K. Gopalan (upto 28-2-85)
Vice-Chancellor,
University of Cochin
Hill palace, Tripunithura
Cochin.

Dr. M. Santappa (from 1-3-85)
INSA Senior Scientist
Anna University
Madras.

Sri. Mantosh Sondhi (from 1-3-85)
Chairman, Board of Directors,
M/s Ashok Leyland
E-3/6 Gangaram Hospital Marg
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Department of Physics
I. I. T., Madras

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Department of Civil Engineering
I. I. T., Madras

Prof. V. G. K. Murti (from July 84)
Department of Electrical Engineering
I.I.T ., Madras

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Sri S. Santanagopalan
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Madras

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Prof. K. Elango
Chairman
Estate and Works Committee
I.I.T., Madras

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Executive Engineer
I.I.T. Madras

Sri L. Karunakaran
Superintending Engineer
C. P. W. D. Madras

Sri S. Shanmugasundaram
Chief Engineer
P. W. D. Madras

Sri V. N. Murty
Estate Officer
I.I.T. Madras

Secretary

Sri S. Santanagopalan
Registrar
I.I.T. Madras

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Y. Narayana Rao
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N. R. Rajappa
V. S. Raju
E. G. Ramachandran
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V. Ramakrishnan
A. Ramamohana Rao
L. N. Ramamurthy
V. Ramamurti
H. Raman
S. Ramani
M. Ramanujam
K. V. S. Rama Rao
B. Ramaswami
G. Rangarajan
G. V. N. Rayudu
K. S. Sankaran
L. V. K. V. Sarma
C. A. Sastry
V. V. Sastry
M. Satyanarayana
K. N. Seetharamu
V. Seshadri
R. S. Sirohi
V. Sivaramakrishnan
J. Sobhanadri

A. K. Sreekanth
P. S. Srinivasan
R. Srinivasan
R. S. Srinivasan
S. K. Srinivasan
T. M. Srinivasan
V. Srinivasan
K. Srinivasaraghavan
P. Srinivasa Rao
V. Sriramulu
G. V. Subba Rao
G. Subramanian
N. Subramanian
R. Subramanian
S. Subramaniam
Surjit Singh
C. S. Swamy
M. R. Udupa
Y. B. G. Varma
R. Vasudevan
M. A. Veluswami
N. Venkatarayulu
M. Venugopal
B. Yegnanarayanan

Three Educationists from outside the Institute Nominated by the Chairman, Board of Governors

P. T. Narasimhan
C. V. Sundaram
N. Krishnaswamy

Members of the Faculty (Nominees)

1. Dr. Megha Singh,
   Dept. of Applied Mechanics.
2. Dr. J. Rajaram,
   Department of Chemistry.
3. Dr. V. Kalyanaraman,
   Department of Civil Engg.,
4. Dr. V. Subba Rao,
   Department of Mathematics.
5. Dr. V. Ganesan,
   Dept. of Mech. Engg.,
6. Dr. M. Mukunda Rao,
   Dept. of Elec. Engg.,

Members of the Faculty (Invitees)

1. Dr. T. K. Varadan,
   Dept. of Aeronautical Engg.,
2. Dr. T. Venkatram,
   Dept. of Chemical Engg.,
3. Dr. D. R. G. Achar,
   Dept. of Metallurgical Engg.,
4. Dr. Ramji Rao,
   Department of Physics.
5. Dr. (Mrs) Kamalakrithivasan,
   Dept. of Computer Science & Engg.,
6. Dr. R. Rajagopalan,
   Dept. of Humanities & Soc. Sciences,

Secretary

S. Santanagopalan (**Registrar**)

REPORT BY THE DIRECTOR

for the period

APRIL 1984 to MARCH 1985

An attempt is made in this report to highlight some of the major activities of the Institute during the year under report.

Silver Jubilee Year

The Silver Jubilee Year commenced on 31st July 1983 and ended on 30th July 1984.

The Institute celebrated its Silver Jubilee Year with great enthusiasm, in a manner appropriate to an Institute of Science and Technology. Many distinguished visitors were invited to come and deliver extra-mural lectures. Several Departments and Centres of the Institute had organized seminars, symposia and conferences to highlight their research activities.

Student Strength

There were 1089 undergraduate students and 970 postgraduate students and research scholars at the Institute.

Awards to Faculty

1. Prof. P. T. Manoharan has been selected Fellow of the Indian National Science Academy.

2. Shri T. S. Chennabasavan, E. D. C. was recipient of the N. R. D. C. awarded for developing Multipurpose Tractor Mounted Agricultural Spray Pump.

3. Dr. B. H. L. Gowda, Asst. Professor, Fluid Mechanics Laboratory, was the recipient of 'Dr. Despande Memorial Prize' for the best paper presented by Research and Academic Institutions during the 13th National Conference of FM & FP held at REC Trichi in December 1984.

4. Dr. B.V.A. Rao, Professor, Machine Dynamics Laboratory, has been conferred Founder fellow of the Institute of Diagnostic Engineers, U.K. He is also on the Editorial Board for the Journal of Condition Monitoring & Fault Diagnosis, published from UK.

5. The Indian Institute of Non-destructive Instruction Engineering awarded the NDT-Man of the Year 1984 to Dr. O. Prabhakar, Dept. of Metallurgical Engineering in recognition of his contribution to non-destructive testing field.

6. A paper on "Normal State Electrical Resistivity of A—15 Superconductor, $T1_3Sb$" presented by V. Sankaranarayanan, G. Rangarajan, R. Srinivasan and K.V.S. Rama Rao, Physics Department at the International Conference on Low Temperature Physics - LT 17 at Karlsruhe, West Germany, was selected for the award of a prize as one of the best six papers presented at the Conference.

7. Dr. O. Prabhakar, Associate Professor, Metallurgical Engineering Department, has been awarded the National Metallurgists' Day Award, instituted by the Steel Ministry, Government of India, New Delhi, for the year 1984, in the area of Industrial Metallurgy. The award carries a prize amount of Rs. 4,500/-.

8. Prof. C. A. Sastry, Dept. of Chemical Engineering, was awarded scroll of Honour by the Governor, Tamil Nadu, on behalf of Society of Texicology India, in recognition of his contributions to the field of Environmental Bio-technology.

9. Prof. V. Balakrishnan has been elected as Fellow of Indian Academy of Sciences, Bangalore,

10. Prof. V. M. Radhakrishnan of the Dept. of Met. Engineering received the Binani Gold Medal for publishing the paper of the highest merit in the Non-ferrous field in the Transactions of the Indian Institute of Metals in the year 1983.

11. Dr. D.R.G. Achar, Associate Professor, Dept. of Metallurgical Engineering, received the I.T' Memorial Research Award, instituted by M/s Advani Oerlikon Ltd., for the best Research Paper presented during the I I.W. National Welding Seminar 1983. The award carries a certificate and a cash prize of Rs.5000/-.

Awards to students

1. Sri P. Shyam Prasad, final year Mechanical Engineering student was awarded the Rotary Foundations Graduate Scholarship for the year 1985-86. The award amounts to $15000.

2. Kum. Hemalatha, a former student of Chemistry Department was awarded the prestigious Herold Stirling Vanderbilt Fellowship of the value of $2000 in addition to her regular fellowship of $9800 per annum as she scored the highest marks in GRE among foreign, nationals who applied to the Unit for the year 1983-84.

3. Six papers were presented by the B.Tech. students of this Institute in the All India IEEE Students' Symposium on Recent Trends in CAD/BIO/PAS/Automation held at Regional Engineering College, Trichy in Sept. 1984. The First Prize was awarded for the paper "Simulation of MOS Circuits by Waveform Relaxation Method" by V. Chandramouli S. Mohan, T.V. Varghese (Electronics) and the Consolation prize for the paper "Sensory feed back in programmable Automation" by R. Srikanth, R.S. Srinivas (Power).

4. Dr. T.S. Ramu (formerly Research Scholar of Electrical Engineering Department) was awarded the IAEC Golden Jubilee Award for his outstanding work on Insulating Materials, done during his stay in the Dept. of Elect. Engg.

5. Amalgamations 1985 Rolling Trophy for the Best Cultural Department was bagged by the Department of Elect. Engg, in the very first year in an overwhelmingly convincing manner.

Prof. P. V. Indiresan lays down office

Prof. P.V. Indiresan, on completion of his term as the Director of this Institute, laid down his office on 30th June 1984. Prof. Indiresan has contributed in many ways to the growth and development of this Institute and it is a pleasure to place on record our deep appreciation and gratitude to Prof. Indiresan for his services.

New Director

Prof. L. S. Srinath, Professor, Mechanical Engineering Department, Indian Institute of Science Bangalore, took over as Director on 25th July 1984.

Consultancy Assignments and Sponsored Research

The consultancy activity of the Institute has shown a significant growth in the year 1984-85. A shift in the nature and type of consultancy work has taken place, in the sense that a number of time-bound developmental projects have been assigned to the Institute by agencies like Vikram Sarabhai Space Centre,

Defence Research and Development Laboratory, W.S. Insulators Limited, T.I.&.M. Sales Ltd., etc. The amount of consultancy earnings, has, as a consequence, increased from Rs.45.00 lakhs in 1983-84 to Rs. 63.40 lakhs in the year 1984-85. In contrast, the sponsored research projects have been showing a downward trend. From Rs. 88.00 lakhs in 1983-84, it has come down to Rs. 69.00 lakhs for the year 1984-85.

21st Convocation

The 21st Convocation of the Institute was held on 31st July 1984, when Swami Ranganathananda delivered the Convocation Address. At this Convocation, 261 B. Tech., 234 M.Tech. 40 M SC 44 M.S. and 64 Ph.D. degrees were awarded.

Seminars and Conferences

1. 11th All India Machine Tool Design and Research Conference held during 20-22 December 1984-350 delegates attended.
2. An International Conference on the Physics and Technology of Compensated Semiconductors was held during 20 - 22 February 1985.
3. The High Frequency Technology Lab., Electrical Engineering Department, held a National, Symposium on Microwave Communication Systems on 6th and 7th December 1984 in the Central Lecture Theatre.
4. The IIT Madras Chapter, Indian Institute of Metals and the Department of Metallurgical Engineering organised a seminar on "Frontiers in Metallurgical Science, Engineering and Technology" on 6th and 7th April 1985 in the Central Lecture Theatre. At the end of the Seminar, a programme was arranged to felicitate Prof. E. G. Ramachandran, Senior Professor, Metallurgical Engineering Department, who completed 60 years on 7th April 1985

C.R.I. I.I.T. Collaboration

The Cement Research Institute of India, New Delhi and Indian Institute of Technology, Madras, have signed an agreement to establish a Joint Collaboration Unit devoted to undertake studies on topics connected with quality control and R & D problems pertainin to cement and cement products. The Joint Collaboration Unit has started functioning with effect from 1st october 1984 and is located in the Structural Engineering Laboratory of the Department of Civil Engineering. Prof. P. S. Rao, Department of Civil Engineering, is th Professor-in-charge of the Unit.

NEW FACILITIES

The Institute is trying to get a new computer to the Institute through the assistance of the Federal Republic of Germany. The configuration that is being thought of is Siemens 7570-C, with 100 terminals, two graphic stations consisting of processor, displays, plotter, tablet and digitiser. etc. This system today costs about 6.5 million D.M., and this has to be shared in some proportion between the Federal Republic of Germany as aid and the Government of India as grant. In anticipation of this, the Institute has started the construction of a building to house the computer. The construction cost of this building is more than Rs. 70. 00 lakhs including the cost of A. C. Plant, standy-by power system and other facilities.

A Sophisticated Mass Spectrometer with high resolution capability and costing Rs. 40.00 lakhs, is being installed in the Regional Sophisticated Instrumentation Centre. Plans are also under way to enlarge substantially the Cryogenic Laboratory facilities and the materials testing facilities through the West German aid. The Institute is indeed very thankful to the Government of Federal Republic of Germany and the various experts in Germany, for their continued interest in the growth and development of our Institute.

Publications

1. Book entitled Unit Operations Data published by Chemical Engineering Education Development Centre.
2. Vol I and II of "Chemistry in Engineering and Technology", written by prof. J C. Kuriacose and Dr. J Rajaram of the Chemistry Department, has been published by Tata McGraw-Hill Publishing Company Ltd., New Delhi. This book has been subsidised by the Government of India through the National Book Trust (NBT) India, for the benefit of students.
3. The Mechanical Engineering Education Development Centre has brought out the following monographs:
   i) Bibliography on Microprocessors and their Applications
   ii) Computational Fluid Dynamics

Coaching programme for SC/ST students

A Preparatory Course (one academic year duration) for SC/ST students who failed to get admission through JEE, 1983 was started during the year 1983-84. The course is being run for the 2nd year in succession for the students who failed to get admission in JEE 1984. After the Preparatory Course at IIT, they will be eligible to join B.Tech. degree from the session 1985-86 if they secure minimum 40% of the marks in the examination conducted exclusively for these students.

Another Special Coaching programme for about 180 SC/ST students at present studying in 12th standard is also being conducted during the year 1984-85. This course is being conducted for the 2nd year in succession. The students who are undergoing the above course will write JEE during May, 1985. So far, their personal contact programmes were held. Entire expenditure, including the travel, boarding and lodging are met by IIT, Madras. A faculty member is appointed as Adviser to look after the needs of the Weaker Section and Foreign Students.

HINDI COACHING CLASS - PRABODH STANDARD

In compliance with the Government of India instructions, Hindi coaching classes for Prabodh standard for 83 staff members is being conducted at the Central Workshops on Mondays, Wednesdays and Fridays from 30-1-1985 in 2 batches.

An Hindi Pradyabhak provided by the Deputy Director (South) Hindi Teaching Scheme is conducting the classes.

73 staff members have submitted their applications for appearing for Prabodh examination scheduled for May 1985.

M. S. Programme in Entrepreneurship

As in the previous year, the Centre for IC&SR organised an orientation programme for candidates to be admitted to M. S. in Entrepreneurship course of the Institute, with the financial support from Industrial Development Bank of India. A number of agencies like Industrial Development Bank of India, State Bank of India, State level organisations like ITCOT, SIPCOT, TIIC had extended their support by lending their faculty for organisation of the course. Eight candidates have been admitted to this programme in this year. The DST has come forward to fund the organisation of the programme in the next year.

Conclusion

We live in an environment, where persons belonging to an institution or a system like ours, keep asking for more and more every day from the system and making it become weaker until it becomes completely ineffective. A time has come, when we have to ask ourselves, what we can offer back to the institution and make it become better than what it was to start with. In this regard, the Alumni Association of IIT Madras has been an excellent example. This community of people, spread all over the world, have started discussion among themselves to find ways and means of contributing something back to the Institute, to make it become stronger and serve the future generations better. It is amongst our past students and associates that we can seek a lot of goodwill and respect. The fact that the number of goodwill ambassadors keeps growing larger and stronger every year should give us enough strength and hope to make this Institute reach loftier heights. We are all partners in this.

DETAILS OF THE REPORT

Admissions, Award of Degrees and Prizes

Student Admission 1984-85

The number of students and scholars admitted to various courses (1984-85) is given in Table-1

Table-1

ADMISSION 1984-85

Sl. No.	Department	B. Tech.	M. Tech.	M.Sc.	MS	Ph.D.	Total
1.	Aeronautical Engineering	18	10	...	2	3	33
2.	Applied Mechanics	...	17	...	2	6	25
3.	Chemical Engineering	33	24	...	...	5	62
4.	Chemistry	...	...	22	...	27	49
5.	Civil Engineering	33	58	...	7	1	99
6.	Computer Science & Engg.	26	33	...	5	...	64
7.	Electrical Engineering	60	84	...	3	8	155
8.	Humanities & Soc. Sciences	...	33	...	2	5	40
9.	Mathematics	...	...	18	...	2	20
10.	Mechanical Engineering	65	74	...	11	12	162
11.	Metallurgical Engineering	23	12	...	7	10	52
12.	Naval Architecture	14	...	....	...	...	14
13.	Ocean Engineering	...	9	...	1	3	13
14.	Physics (Solid State Tech.)*	...	7*	15	...	14	36
	Total	272	361	55	40	96	824

The total 824 includes the following :

Foreign Nationals	14	Sponsored Candidates	38
Scheduled Castes	29	External Registration	32
Scheduled Tribes	7	Project Staff	36
Women	82	Part-time (Staff)	8
QIP Scholars	27		

Degrees Awarded

The number of degrees awarded at the Twenty-first Convocation of the Institute on 31st July 1984 is given below in Table 2 Swami Ranganathananda delivered the Convocation address.

Table-2

NUMBER OF DEGREES AWARDED

Sl. No.	Discipline	B Sc. (TA)	B. Tech.	M. Tech.	M.Sc.	M.S.	Ph D.	Total
1.	Aeronautical Engineering	...	10	4	...	4	1	19
2.	Applied Mechanics	...	...	6	...	3	3	12
3.	Chemical Engineering	...	32	18	...	2	4	56
4.	Chemistry	...	...	...	20	...	16	36
5.	Civil Engineering	...	41	31	...	4	2	78
6.	Computer Science & Engg.	...	...	28	...	5	...	33
7.	Electrical Engineering	...	73	48	...	8	8	137
8.	Humanities & Soc. Sciences	...	...	24	...	8	3	35
9.	Mathematics	...	...	...	7	...	2	9
10.	Mechanical Engineering	...	73	49	...	4	5	131
11.	Metallurgical Engineering	...	25	15	...	5	4	49
12.	Naval Architecture	...	7	...	...	...	...	7
13.	Ocean Engineering	...	...	8	...	1	1	10
14.	Physics	...	...	3	13	...	15	31
		7	...	...	...	...	...	7
	Total	7	261	234	40	44	64	650

With this Convocation in July 1984 the number of degrees awarded so far by the Institute is :

B.Sc. (TA)	17	DIIT	245
B.Tech.	4983	M.S.	415
M.Tech.	2983	Ph.D.	818
M Sc.	726		

Grand Total : 10187

PRIZES

The names of academic Prize Winners of the year are given below:

1. **PRESIDENT OF INDIA PRIZE:**

(For the student of the B.Tech. degree course with the best Academic Record)	Shri P. VENKATARANGAN B.Tech. (Electrical Engg. Electronics)

2. **GOVERNOR'S PRIZE:**

(For all round proficiency in B.Tech. degree courses/Curricular and Extra Curricular)	Shri MALCOLM J. PANTHAKI B.Tech. (Civil Engineering)

3. **MERIT PRIZES** (For the students with the best academic record in each discipline of each course)

B.TECH. COURSE:

Chemical Engineering	Shri Ravi R.
Civil Engineering	Shri Venkata Ramana Murthy Challa
Metallurgical Engineering	Shri Vijay Jaganathan
Naval Architecture	Shri Padmaraj V.
Electrical Engineering (Electronics) (Philips India Prize)	Shri Venkatarangan P.
Electrical Engineering (Power) (Siemens Prize)	Shri Abraham Varghese
Mechanical Engineering (Banco Foundation Prize)	Shri Ravi Shankar T.
Chemical Engineering (Reliance Heat Transfer (P) Limited Prize)	Shri Murali V.
Aeronautical Engineering (HAL Prize)	Shri Gopal Vasudevan
Electrical Engineering (T.V. Engg.) (Prof. Achim Bopp Prize)	Shri Vasudevan N.

M.TECH COURSE:

Civil Engineering	Shri Subramania Prasad C. K.
Engineering Mechanics	Shri Chandrakanth S.
Maintenance Engineering and Management	Shri Venkatesh R.
Industrial Metallurgy	Shri Narasimhan K.
Industrial Tribology	Shri Rajendran P.
Ocean Engineering	Shri Naser M.
Solid State Technology	Shri Rajendra Singh Arora
Electrical Engineering (Siemens Prize)	Shri Chandra Sekaran V. V.
Mechanical Engineering (Prof. B.Sengupto Prize)	Shri Satish Kesav Joshi

Industrial Metallurgy (Metal Casting Option) (S. Anantharamakrishna Memorial Prize)	Shri Mohamed Rizwan Khaleel
Mechanical Engineering (Machine Tools Option) (Dr. S. Vaidyanathan Memorial Prize)	Shri Shende Prafulla Shankar
Aeronautical Engineering (Air India Prize)	Shri Raj Kanwar Jolly
Chemical Engineering (Dr. K. Subbaraju Memorial Prize)	Shri Anand A. S.
Industrial Management (K. V. Arunkumar Memorial Prize)	Shri Udaiyappan M.
Computer Science & Engineering (CMC Prize)	Shri Ganesan K.

M.Sc. COURSES

Chemistry (V. Ratna Rao Memorial prize)	Miss Prabha Varadarajan
Mathematics	Miss Mini Mary Thomas
Physics	Shri Unnikrishnan C. S.

RESEARCH CENTRES

Centre for Bioscience & Biotechnology

Centre for Systems and Devices

Energy Research Centre

Fibre Reinforced Plastics Research Centre

Materials Science Research Centre

Ocean Engineering Centre

CENTRE FOR BIOSCIENCES AND BIOTECHNOLOGY

1. Courses Offered

1.	Biochemical Engineering	B.Tech. Chem. Engg.
2.	Environmental Engineering	B.Tech. Chem. Engg.
3.	Energy Technology	B.Tech. Chem. Engg.
4.	Environmental microbiology and biology	M.Tech. Chem. Engg.
5.	Biochemistry	M.Sc.
6.	Microbial Chemistry and Genetic Engineering	M.Sc./Ph.D.
7.	Medical Physics I and II	M.S./Ph.D.
8.	Medical Instrumentation I and II	M.S./Ph.D.
9.	Quantitative Physiology	B.Tech.
10.	Applied microbiology and biochemistry	M.Tech.
11.	Biomedical Laser Instrumentation	M.S./Ph.D.
12.	Biofluid Mechanics	M.S./Ph.D.
13.	Biochemical mechanisms & methodology	M.Sc./Ph.D.
14.	Advance Biochemistry & Biotechnology	M.Sc./Ph.D.

2. Distinguished Visitors to the Centre

Dr. M. Swaminathan
Director - General
International Rice
Research Institute
Manila, Phillipines.

3. Research Work is Undertaken on the following projects

1.	Biomethanation Process	Dr. K. Lalitha
2.	Bioreactors for fermentation studies	Dr. A. Baratharajan
3.	Lignocellulose bioconversion to useful products	Dr. T. S. Chandra
4.	Structural studies on proteins and Viruses	Dr. Mahaseshasayee & Dr. T. S. Chandra
5.	Enzyme kinetics and immobilized biocatalytic systems	Dr. A. Baratharajan Dr K. Lalitha & Prof.C. A. Sastry.
6.	Biorheology	Dr. Megha Singh
7.	Biomedical laser technology	Dr. Megha Singh
8.	Biological waste Treatment	Prof. C. A. Sastry

Studies on immobilization of different enzymes like Urease, amyloglucosidase using sodium alginate, alumina, Chitosan, Chitin etc. using adsorption, entrapment, covalent cross linking and binding techniques and their use in fixed bed, fluidized bed and trickle bed reactors for bioconversion are in progress.

Work is in progress for the detection of abnormal tissues in human beings by lasers and ultrasonics. Fermentation of waste agro industrial raw materials to products like ranthane gum, an extracellular microbial polysaccharide used in food and oil industry is under study.

The biotransformation of hydrocortisone to prodnisolane and side chain clevage of cholesterol and 16 DFA Conversions and heterosteroids are under study.

ASSISTANCE TO INDUSTRY

Retainer Consultancy:

a) M/S. Lakshmi Starch Bombay — Dr. C. A. Sastry
b) M/S. Harihar Polyfibres, Kumarapatnam — Dr. C. A. Sastry
c) M/S. Seshasayee Paper and Board Ltd., Erode. — Dr. C. A. Sastry

Consultancy:

1. Biological waste treatment — Dr. C. A. Sastry

a) Tenfed. Tiruvannamalai
b) Nav Bharat Solvent extraction Ltd., Guntur
c) Malladi Drugs & Pharmaceutical Ltd., Ranipet
d) Polytech. Organics, Anantapur
e) M/S. Lakshmi Starch Ltd., Hyderabad.

Sponsored Projects:-

Completed Projects:-

1. DST — Lasers in Medicine
2. CSIR — Fluid dynamic aspects of blood flow and arterial disease.
3. DST — Decentralized energy systems
4. PONDS — Two phase digester for large scale biogas generation
5. CSIR — Hemorheology.

On-Going Projects:

1. ICAR — Microbial technology studies on lignocellulose utilization for chemical feed. ICAR project — Dr. T. S. Chandra
2. CSIR — Influence of magnetic field on erythrocyte mobility
3. CSIR — Microcirculation

Additional Space for the Centre:

The research work in microbiology, biochemistry and biomedical laser technology is being organised. Additional facilities and space are required for research work in these areas.

Library:

Some books have been purchased for this purpose.

Major equipment purchased :

a) Thermadyne Laminar flow chamber
b) Fraction collector
c) Remmodel C24 table-top centrifuge
d) Volatile acid determination apparatus
e) Remi model R-23 Revolutionary Research centrifuge.
f) Electric automatic antoclaing
g) Digital micro single pan balance
h) Metro incubator

Lectures:

1. Keynote address in CLRI Tanner Get-Together, Feb 85. — Dr. C. A. Sastry
2. Keynote address at Stella Maries College, Madras. — Dr. C. A. Sastry
3. Keynote address at the Conference on Environmental problems of Chemical Industries, Madras. — Dr. C. A. Sastry

Membership of Committees

1. Steering committee of Tamil Nadu Leather Development Corporation — Dr. C. A. Sastry
2. Committee on safety and hazards in chemical industries in Tamil Nadu — do
3. Committee on safety and Chemical Hazards, ISRO, Trivandrum — do

Chairing the sessions :

1. International seminar on "Aquatic weed control" UNESCO, Jakarta Dr. C. A. Sastry
2. International seminar on "Environmental Problems in Asia" COSTED, AIT, Bangkok. Dr. C. A. Sastry

BRIEF INDICATIONS OF DEVELOPMENTAL PROGRAMMES LIKELY TO COME UP IN THE NEAR FUTURE :

1. Bioconversion using different techniques.

a) Production of enzymes of industrial and commercial importance.
b) Immobilisation of commercially useful enzymes.
c) Developing bioreactors for optimizing bioconversions like starch to glucose, glucose to fructose, steorids etc., arriving at design criteria using computer aided design processes.

2. Laser Applications in Medicine and Biology.

a) Cardiac monitoring by laser speckle.
b) Tissue characterization for tumor detection and therapy.
c) Determination of erythrocyte sedimentation profiles in various diseases for diagnosis.
d) Characterization and separation of disease-infected erythrocytes.

Honours : Scroll of honour was awarded to Dr. C. A. Sastry by the governor, Tamil Nadu on behalf of Indian society of toxicology for contribution in Env. Bio-Technology.

PUBLICATIONS

1. C.A. Sastry and B.V.S. Gurunatha Rao, "Sampling and Analysis of Refuse from a typical Indian city—A case study". Journal "Conservation and Recycling", Vol. 7, 1984.

2. S. Sundaramoorthy, B.V.S. Gurunatha Rao and C.A. Sastry. "Environmental Impact Assessment as a decision making tool in the evolution of a control & echmology for weeds in water supply abstraction system", presented at workshop on Aquatic Weed Control, University of Indonesia, Jakarta, 1985.

3. C.A. Sastry, Editor, "Environmental Issues in Asia", A report based on a study in Asian Countries, published by Committee for Science and Technology in Developing Countries, Madras, 1985.

4. S. Sundaramoorthy and C.A. Sastry, "Dairy waste water treatment—A case study, "Symposium on Environmental Pollution, Sri Venkateswara University, Tirupati, 1985.

5. C.A. Sastry and S. Sundaramoorthy, "Impact of standards on pollution control", Seminar on Pollution and control, Institution of Plant Engineers, Madras, 1984.

6. K. Lalitha, N. Vasanthy, K. Shankar and K. Narayana Rao., Methanogenesis from Leucolena leucocephala and the Energy farm concept., In.Proc. VII. International Biotechnology Symp. P. 263, 1984.

7. R. Padma Bai, Mary Babu, K. Lalitha and K. Shyamala, Effect of selenium deficiency on tissue glantathiane peroxidase activity in chicks", Leather Science 31, 42, 1984.

8. Mary Babu, R. Padma Bai, N. Vasanthy and K. Lalitha, Effect of Selenium deficiency on Collagen metabolism in Japanese Quails". In. Prcc. Annual meet. Soc. Biol. P. 24, 1984.

9. N.Vasanthy and K.Lalitha, Biochemical studies related to selerium status in Corcyra Cephalenica"., I bid. P. 67, 1984.

10. Megha Singh and A. Periasamy, Determination of safe exposure levels of He-Ne laser light to the human body by means of erythrocyte irradiation studies", Med. Biol. Eng. and Comput. 22, 147, 1984.

11. A. William E. Muralidharan and Megha Singh, "Hemorheology in cardiovascular diseases", in. Proc. X Nat. Conf. on FMFP, Tiruchirapalli, 1984.

12. Megha Singh and P. Kanakaraj "Influence of hypercholesterolemia and onion extract on the rheological properties of blood", In. Prcc. Caribean cong. Angiol. and Vascular Surg., Havana, Cuba, 1984.

13. Megha Singh and E.Muralidharan, "Influence of myocardial infarction and diabetes mellitus on the erythrocyte sedimentation profiles as determined by He-Ne laser light profile scanner", In. Proc. Euromech 186, Nancy, France, 1984.

14. E. Muralidharan, A. William and Megha Singh, "He-Ne laser transmittance characteristics of blood in health and disease". In. Proc. X All India BME Conf. Tirupati, 1984.

15. Megha Singh and A. Periasamy, "Laser speckle cardiograph", In. Proc. III World Inst. Symp. New Delhi - 1984.

16. T. M. Vatsala and Megha Singh, "Effects of onion in atheroselerosis in rabbits. III. Reduction of nucleic acids and proteins in aorta", Curr. Sci. 54, 18, 1985.

CENTRE FOR SYSTEMS AND DEVICES

The Centre for Systems and Devices is one of the Research Centres of the Institute specializing in Electrophysics and Electronics Engineering. The faculty and scientists of the Centre have active participation in a number of major on-going sponsored research and consultancy project of the Institute. The financial outlay of the sponsored projects in which the staff members of this Centre are the Chief Investigators is approximately Rs. 100 lakhs. The faculty and scientists of the Centre also take part in guiding students in the Ph.D. and M. S. thesis work and M. Tech., M. Sc., and B. Tech. project work.

The area of specialization in which the staff of the Centre carry out sponsored research and consultancy projects and guide students in the academic research programmes of the Institute are the following :-

(i) Acoustical and Radar Imaging

(ii) Applied Electromagnetics and Antennas

(iii) Digital Signal Processing

(iv) Microprocessor Based System Design

(v) Semiconductor Devices

Some of the staff members of the Centre serve as retainer consultants to a few leading organizations in the country.

Several sponsored research and consultancy projects have been completed successfully by the staff members of the Centre.

A number of students have been guided to the successful completion of M.S and Ph.D Degrees of the Institute by the faculty of the Centre. Further, a good number of papers have been published by the staff of the centre refereed national and international journals.

For carrying out research and development work the following facilities have been established by the staff of the Centre:-

1. Indoor facilities for antenna pattern measurements (far field and fresnel zone at C and X-Bands)
2. Low power Microwave Measurements (upto power levels of - 85dBm or greater) from 2-12 GHz.
3. Swept Frequency Measurements with scalar network analyser at. J and X-Bands.
4. Phase measurements at X-Bands.
5. Semiconductor device fabrication facilities including diffusion, photolithography and metalization. Facilities for an emerging sophitsticated technology, i.e. molecular beam Epitaxy Hot Wall Epitaxy and chemical vapour deposition are also established.
6. A 32-point radix-2 Fast Fourier-transform processor that displays the spectrum of the input data.
7. A digital filter that can be used to detect moving targets in heavy clutter environments.
8. A printed making machine that does not require chemical processing.
9. Microprocessor Development Systems.

ENERGY RESEARCH CENTRE

This Centre coordinates the research activities of various departments in the area of energy, mainly with reference to alternate and nonconventional energy sources and energy conservation. The specific areas include solar energy, wind energy, ocean thermal, wave energy, biogas and hydrogen energy.

In the area of solar energy, optimally designed sand wich type and tube - in - sheet MS water heating collectors have been developed. Experiments on the performance of two large collector fields have been carried out. Advanced vapour absorption refrigeration systems have been analysed. The concept of hybridisation and cascading to generate cold and heat has been forwarded and a Vapour jet refrigeration - Vapour compression heat pump cascaded system has been developed and tested. Simulation of latent heat thermal energy storage systems has been completed.

Vapour compression and vapour absorption heat pumps and heat transformers have been analysed to identify suitable working fluids and to develop design procedures.

Use of alternate fuelds such as alcohols and hydrogen for I.C. Engines have been investigated. Surface ignition engine, adiabatic diesel engine, modifications in port design, etc., new techniques have been studied with conservation of conventional fuels and improvement in performance as the main criteria.

Among the various potential biomass sources studied, *L. leucocephala* still remained the single sources with highest biomethanation. Kinetics of degradation were evaluated in batch and continuous operation *L. leucocephala* was found to be degraded almost completely to the extent of 80 percent and yielding 0.87 L/g volatile solid input. Optimisation and separation of acidogenic and methanogenic phases were achieved in multistage digestion. Optimstion of loading rate and Hydraulic Retention Time has been decided. Based on the studies, modified two-phase digesters have been constructed using FRP and are being evaluated. One of the designs successfully tested has been scaled up to 150 M^3 size in CRD, for demonstration purposes.

FIBRE REINFORCED PLASTICS RESEARCH CENTRE

Courses offered :

The following elective courses were offered by the Centre staff during the first semester, 1984-85.

1. Composite Materials	—	Under graduate Elective
2. Composite Technology	—	Post graduate Elective
3. Composite Structures	—	Post graduate Elective

Continuing Education Programme :

The Centre offered the following Short term courses during the year 84-85 :

No.	Title of Course	Duration	No. of Participants
1.	Workshop on FRP Technology	21-5-84 to 2-6-84.	28
2.	Workshop on FRP Technology	4-2-85 to 15-2-85	26

In addition, the faculty members of the Centre participated in three other courses and seminars held within IIT and outside.

Academic Research Programme :

(In collaboration with other Departments of the Institute)

B. Tech Projects completed	—	2
B. Tech Projects ongoing	—	6
M. Tech Projects completed	—	2
M. Tech Projects ongoing	—	1
M. S. Projects ongoing	—	2
Ph. D. Projects ongoing	—	1

Important Seminars and Lectures :

A one day seminar cum workshop on Testing Standardisation and Quality Evaluation of Composites For Industrial Applications was organised jointly with Department of Science and Technology, New Delhi on 16th February, 1985.

Research and Development :

The following R & D projects were taken up during the year :

1. Analysis and Design of Heated Structures for Defence applications.
2. Process development of Reinforced Reaction Injection Moulding.
3. Development of prepre grovings.
4. Evaluation of the dynamic modulus and damping of composites.
5. Design and Development of FRP aircraft landing gear components.
6. Development of FRP leaf spring for automobiles.

7. Studies on metal matrix composites by powder metallurgy technique
8. Development of FRP high voltage disc insulators
9. Development of glass-epoxy moulds for hot press moulding of FRP
10. Design of inflated large span structures and gas holders using plastic coated glass fibre cloths.

Sponsored Projects:

The following sponsored project has been completed during the year. Development of Glass-Epoxy Mould for FRP Press Moulding and sheet metal forming. An ICSR project.

The following two sponsored projects were continued during the year

(i) Development of Metal-lined Filament Wound Pressure Vessels. A DRDO Project.

(ii) Development of Regional Test Facility for testing Resins, Fibres and Composites. A DST Project.

Consultancy Project:

The Centre has taken up Rs. 4.698 lakhs worth consultancy projects during the year. This includes a project from DRDL, Hyderabad for Rs.3.96 lakhs. and another project for Rs.55,000 from ISRO.

Assistance to Industry:

With the financial assistance of DST, New Delhi, the Centre has set up a Regional Test Facility during the year for testing fibres, resins, composites and products. The Centre will provide testing services and advice and guidance to the FRP and user industries on quality control in composite production. The Centre has also continued its assistance to industry by offering technical advice and design consultancy.

Research Publications:

Two.

Visitors to the Centre:

Prof. M.R. Piggot from University of Toronto has visited and delivered two lectures.

Invited Lectures - Delivered by the Staff:

Dr. N.G. Nair and Dr. R. Palaninathan delivered five lectures at various seminars and Institutions.

MATERIALS SCIENCE RESEARCH CENTRE

Research and Development :

(a) Papers and Review articles published : 5

(b) Papers presented at National and International Conferences : 5

(c) Faculty added : One SSO-II

(d) Ph.Ds produced One.

Thesis Title : "Studies Related to the Process Modelling of Diffusions in Silicon Device Technology". - October, 1984.

Invited Lectures delivered by the Faculty:- 15

Additional Space Provided :

900 sq. ft. of additional space has been provided for the PEC Laboratory and Workshop and for Staff.

Seminars Conducted :

1. A short-term QIP Course on "Recent Developments in Materials Science" has been conducted during April-May 1984.

Other achievements :

One Faculty Member had been to West Germany as a Humboldt Fellow and returned. One Staff Member has spent nine months in West Germany in two laboratories under DAAD programme.

Visitors to the Centre :

The following Scientists have visited the Centre and delivered lectures.

(1) Dr. R. Suryanarayana of Laboratoire Physique des Solids, France - Lecture delivered on 'Material Plasma Spray Technique, on 20th July 1984.

(2) Prof. R.W Siegel. Materials Science 'Technical Division' Argonne National Laboratory, Argonne, liluinois, USA - Lecture delivered on "Positron annhilation in Solids" on 18th January, 1985.

(3) Prof. Peter Day, Dept. of Inorganic Chemistry, Univ. of Oxford, United Kingdom — Lecture delivered on 12th February, 1985.

(4) Prof. J.M. Pawlikowski, Institute of Physics, Poland - Lectures delivered on "Solar Cells Based on Zn_3P_2" and Methods of Determination of Absorbtion Coefficient of Solar Materials", on 26th February, 1985.

OCEAN ENGINEERING CENTRE IIT MADRAS

Education Programme : Continuing Education Programme

Serving Teachers Programme Ph.D.

No. on rolls : 3

Serving Officers Programme M.S.

No. on rolls (Sponsored) : 2

Serving Officers Programme M.Tech.

No. on rolls : 1

Under the user oriented M.Tech. Programmes a course for the Engineers from Port Trusts, is likely to be started from July 1985.

RESEARCH AND DEVELOPMENT :

Publications :

Total number published in journal/Conference : 40

Technical Reports : 7

Assistance to Industry--ICC

Industrial Consultancy work has been carried out for various organisation from all over the country. The value of the projects is Rs.13.5 lakhs.

Sponsored Project :

Completed

1. Analysis of ship structures — Department of Science & Technology NewDelhi
2. Analysis and Design of buoys — Defence Research & Development Organisation' New Delhi

On-going :

1. Pile foundation in weak rocks — Engineers India Limited New Delhi
2. Formulae for stress cocentration in tubular Joints — Engineers India Limited New Delhi
3. Wave Regulator System — Department of Ocean Development New Delhi
4. Ocean Thermal Energy System — Department of Non-conventional Energy Sources, New Delhi
5. Design of underwater towed bodies — Electronics Commission New Delhi
6. Articulated towers for offshore structures — Indo—German Project

Consultancy Services :

Expertise available in the following areas :

1. Testing of offshore and other structures
2. Analysis and Design of marine offshore and other structures
3. Foundation analysis and Design

4. Hydrodynamic testing and calculation
5. Ship resistance and propulsion tests
6. Design of ships, crafts, vessels
7. Materials for ocean construction

Major projects completed :

1. Model testing of Load-out, Launching and upending of jackets for Mazagon Docks Ltd., Bombay.
2. Design of Oil jetty and Coal jetty for Port of Tuticorin.
3. Dynamic Analysis of steel tower for MES Visakhapatnam.
4. Analysis of a tower mounted on a boat.
5. Mud slide studies with reference to Godavari Besin for ONGC.
6. Design of Research Vessel for NIO, Goa
7. Test on twin screw hull for Goa Shipyard
8. Analysis and Design of Dolphins at Madras Port
9. Complete design of fertilizer berth at Paradip Port
10. Marine corrosion for Madras Port

Computer Software Developed :

1. OSAP - Static & Dynamic Analysis of pile supported offshore structures
2. Non-liner analysis for installation stresses in submarine pipelines
3. FE analysis for tubular joints
4. FE analysis of inter-stiffener buckling of stiffened cylindrical hulls
5. Overall buckling analysis of stiffened cylindrical hulls
6. Pile drivability analysis
7. Analysis of offshore framed structures
8. Stability and buoyancy of ships
9. Longitudinal strength of ships
10. Launching of offshore steel jackets

Assistance from FRG to Ocean Engineering Centre

The Federal Republic of Germany has kindly agreed to extend the aid programme to Ocean Engineering Centre, under as extension of the agreement between India and FRG for assistance to IIT Madras. This include the supply of instruments in the field of hydrodynamics, geotechnology and marine technology upto a value of DM 325,875, training upto three scientists from OEC for a total of 36 man months and visit of 3 German Scientists to OEC for 36 man months and 3 short term visits of Indian and German Experts for total of three man months.

Mr. Wolfgang Faller, Scientist from the Institute of Naval Architecture and Ocean Engineering of Technical Univ. Berlin is with the Ocean Engineering Centre, under this programme from middle of February 1985 for a period of 12 months.

Expert Assistance from Unido

Dr. P Bogdanov, Director, Bulgarian Ship Hydrodynamic Centre, Varna and honoured Scientist, Bulgaria visited the Centre from 30th September to 9th November 1983 and from 4th March 1985 for 4 weeks under the UNIDO programme to work out the detailed requirements for commissioning and utilisation of the seakeeping tank. The terminal Report has been submitted for the consideration of UNIDO.

Distinguised Visitors to the Centre

1. Dr. S Z Qasim, Secretary, Department of Ocean Development, Govt. of India on 14th and 15th February 1984 and gave Extramural lectures at the Institute.
2. Dipl. Ing. M. Beier of Institut fuer Wasserbau III Universitat Karlsruhe, FRG and gave seminar talk on 12. 1. 84.
3. Prof. Dr. C L Kirk, Editor of Journal of Applied Ocean Research and Head, Offshore Structures and Reader in Structural Dynamics, Cranfield Insitute of Technology, England, UK and gave a lecture on 'Dynamic Analysis of Single Anchor Leg Storage System' on 6. 2. 1984.
4. Sri M. M. Kamath, Executive Engineer, New Mangalore Port on 13th and 14th March 1984 and gave lecture on 'Dreding and Harbour Constructions'.
5. Dr. Hiralal Kaul, Oceanographic Institute, Hawaii on 3. 2. 1984 and gave a lecture on 'Surf Zone Characteristics and a model for a turbulent bore'.
6. Dr. Dharmavasan, Department of Mechanical Engineering University College, London on 20. 12. 1984 and gave a lecture on 'Large Scale Fatigue Testing and Frachore Mechanics Analysis of Tubular welded Joints'.
7. Prof. S. Sethuraman, Department of Marine, Earth and Atmospheric Sciences, North Carolina State University, Raleigh, N C visited on 16. 4.1984 and gave e lecture on 'Ocean Atmosphere Interaction on Coastal Zones'.
8. Dr. A. Daniel, Joint Director, Zoological Survey of India, Madras on 12. 11. 84 and gave a seminar talk on 'Marine Organisms impeding the coolent sea water and aquaculture'.
9. Vice Admiral J. G. Nadkarni, Flag Officer Commanding in Chief, Eastern Naval Command, Visakhapatnam on 5. 9. 1984.
10. Sri. B. M. C. Nair, Indian Consulate General Designate for West Berlin on May 31, 1984.

SHORT TERM COURSES COMPLETED :

Analysis and Design of Offshore Structures :

This short-term course was conducted during 4-16, June 1984, under the Quality Improvement Programme of the Ministry of Education. 29 participants from Educational Institutions and from Industry participated in this Course.

Orientation Course on Offshore Structures for engineers of OWGC :

A specialised course under the Inter Institutional Programme between OEC and ONGC was conducted from 26th November to 22nd December 1984. 16 Senior Engineers from ONGC participated in the Programme.

Ports and Beach Engineering :

A short-term Course on Ports and Harbour Engineering was conducted during December 1984 for Engineers from Ports. Under the Continuing Education Programme, 19 Engineers from various Port Trusts, Major Ports, Ministry of Shipping and Transport and other construction organisations participated in this course.

SCHOOLS FOR EDUCATIONAL DEVELOPMENT

Chemical Engineering Education Development Centre

Mechanical Engineering Education Development Centre

SCHOOLS FOR EDUCATIONAL DEVELOPMENT

Chemical Engineering Education Development Centre

Mechanical Engineering Education Development Centre

CHEMICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

Teacher's Manual

Regarding preparation of Teachers Manual for the core subjects based on the syllabus approved by the Ministry in November 1981 for 4 year B.Tech. degree course in Chemical Engineering, faculty members of various chemical engineering departments in India have been consulted. To finalise this "Workshop on Lecture Briefs in Chemical Engineering Subjects" were held by the Department of Chemical Engineering, Indian Institute of Technology, Kharagpur on February 18, 1985. Similarly "Seminar on Teachers Manual for the core subjects in Chemical Engineering" was held at Indian Institute of Technology, Madras on March 26, 1985. The recommendations are being incorporated.

Teaching Aids - Video

The centre staff have assisted in 240 minutes video coverage of various departments and centres for Institute Open House 1984 to have first hand experience for preparation of video lessons in future.

A 25 minutes video lesson on "Gears" has been prepared with the assistance of the centre by the Department of Mechanical Engineering and Mechanical Engineering Education Development Centre.

The preparation of a 46 minutes video programme on the "International Foundry Trade Fair'. GIFA 84" prepared by Prof. H Md. Roshan, for Institute of Indian Foundrymen was directed by one of our staff.

Books Published

1. Transport properties of liquid mixtures
2. Unit Operations Data

Manuscripts preparation encouraged/ supported by the Centre.

1. Momentum, heat and mass transfer
2. Non-ferrous metallurgical industries
3. Principles of air pollution control
4. Process plant Design: References and Exercises
5 Literature resources in chemical engineering
6. Literature resources in chemical and process industries
7. Coal conversion processes

MECHANICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

This Centre, sponsored by the Ministry of Education and Culture, commenced its activities in January 1971 by organising, a one-week workshop in Mechanical Engineering Curriculum Development. Subsequently twenty-five study group meetings and seminars have been held to evaluate and update the undergraduate mechanical engineering curricula. The study groups, have formulated the sequence and contents of the various courses after thorough discussions. The outcome of these discussion has been published in the form of the following-curriculum Booklets.

1) Design and Engineering Graphics, 2) Fluid Mechanics and Solid Mechanics, 3) Production Engineering, 4) Material Science, 5) Thermodynamics and Heat Transfer, 6) Power Plants and I.C. Engines, 7) Mechanical Engineering Laboratory, 8) Industrial Management and Economics, 9) Electives, 10) Electrical Technology, 11) English, 12) Mathematics, 13) Chemistry, 14) Physics, 15) Analysis and Design of Engineering Curricula and 16) M.Tech. Degree Programme-curriculum and Course contents.

In addition, seminars have been conducted to discuss several important issues relevant to Engineering Education in general, and Mechanical Engineering Education in particular. These discussions have been published in the form of proceedings. The themes of the seminars have been; 1) Assessment of Student performance, 2) Role of Social Sciences in Engineering Education, 3) Four-year programme in Mechanical Engineering, 4) Energy Technology Curriculum, 5) Creative Design in Engineering Curriculum, 6) Practical Content (Laboratories, Workshops and Engineering Graphics) of the Undergraduate Degree programme, 7) Recent Advances in Humanities and Social Sciences : their impact of Engineering Education 8) Interaction between Rural Technology and Engineering Curricula, 9) A workshop - cum-seminar on Microprocessors and their applications, 10) Working Group Meeting for the designs of teaching plan and assessment procedure for workshop practice I and 11) Workshop on Laboratory Programme in Thermal Engineering. 12) Workshop on Air Pollution Control Technology and Seminar on Educational Technology, 13) Workshop on Standardisation of Nomenclature. 14) Workshop on Computer Applications in Mechanical Engineering, 15) Workshop on New Standards in Engineering Drawings (Revised Code of practice) and 16) Course on Data Dependent Systems.

The MEEDC has been actively engaged in the preparation of teaching resource materials. The following monographs have been published and made available to the engineering colleges in the country: 1) Utilisation of Solar Energy, 2) Units and Conversion Factors, 3) Principles of Engineering Design, 4) Problems in Thermodynamics, Vol-I, 5) Problems in Thermodynamics, Vol-II 6) An Introduction to Tribology, Vol-I 7) An Introduction to Tribology, Vol-II, 8) Machine Dynamics, Vol-I, 9) Machine Dynamics, Vol-II, 10) Handbook of Mechanical Design, Vol-I, 11) Handbook of Mechanical Design, Vol-II, 12) Aerodynamic Noise, 13) Mechanical Measurements, 14) Mechanical Handling Equipment, 15) Theory of Elasticity, 16) Mechanical Engineering Laboratory Manual, 17) Mechanical Engineering Education-A Bibliography of Selected Topics, 18) Plasticity Theory and its Application in Metal Forming, 19) Production Processes-Vol-I, 20) Production processes-Vol-II, 21) Steam Tables and Mollier Chart in SI Units 22) On Thermodynamics of Solar Collectors, 23) Bibliography on Microprocessors and their Applications, and 24) Computational Fluid Dynamics.

Also, the Centre has collaborated with the Mechanical Engineering Department and TV Laboratory in producing a Video program on 'Gears' and is also working on audio-visual (tape-slide) program on Gears.

The activities planned for the near future include preparation of audiovisual aids, teaching resource materials in Combustion Numerical Methods in Heat Transfer and Fluid Mechanics, Production Engineering and Question Banks in selected topics.

SPECIAL FACILITIES FOR INTERACTION WITH OTHER INSTITUTIONS

Central Electronics Centre

Centre for Industrial Consultancy & Sponsored Research

Engineering Design Centre

Regional Sophisticated Instrumentation Centre

CENTRAL ELECTRONICS CENTRE

I. Research and Development :

1. Displacement measurement system for a Centreless Grinding Unit—-Ph.D. Project for Machine Tools Laboratory, Department of Mechanical Engineering.
2. Force– cum—Torque Transducer for Friction Welding Ph.D Project for Machine Tools Laboratory, Department of Mechanical Engineering.
3. Two component Grinding Wheel Dynamometer — M.Tech. Project for Machine Tools Laboratory, Department of Mechanical Engineering.

II. Assistance to Industry :

1. Transient measurement for M/s. Kunal Machinery Manufacturers Ltd., Madras,- Work completd and earned Rs. 4,000/- .
2. Electronic Thickness measurement system — DIGIGAGE—for Heavy Vehicles Factory, Avadi, Madras, —work completed and earned Rs. 3,000/-
3. Fabrication of Control and Firing boards for Float Chargers for Madras Telephones — work completed and earned Rs.10,500/-
4. Servicing and repair of ECHO Sounding equipment for Madras Base of Fisheries, Government of India, Madras-13 — work completed and earned Rs.6.000/-
5. Servicing of Spectrophotometer for Geological Survey of India, Guindy Industrial Estate, Guindy, Madras—work under progress.

III. New Major Equipment Added :

1. Dual Trace Oscilloscope—Philips 15 MHz— ONE
2. Single Trace Oscilloscope —APLAB 15 MHz— ONE
3. 12 Channel —Mixer Equalizer -CUTEC make —ONE
4. Digital Multimeters —SIXTEEN Nos.
5. Video Cassette Recorder —National —ONE
6. Function Generators — FOUR
7. Multi functions Power supply — HIL make — ONE
8. Portable Generator — YAMAHA — ONE
9. Micro Computer PR—100— CASIO—ONE
10. Microprocessor Kit —Microprocessor—ONE

CENTRE FOR INDUSTRIAL CONSULTANCY AND SPONSORED RESEARCH

In the year 1984-85 the Centre for Industrial Consultancy and Sponsored Research has organised Seminars, meetings with representatives from Industry and Open-house for Industry.

The following seminars were organised during 1984-85

i) Southern Regional Workshop on 'National Technical Manpower Information System'

ii) Seminar on 'Technology information-Operation Catch up'

In these programmes, the Association of Indian Engineering Industry and its member companies took active part. Arrangements were made for three faculty members to spend their summer vacation in Industry.

The Centre is also coordinating the activities of the Nodal Centre for National Technical Manpower Information System for uptodate information regarding the Diploma holders and Engineering Graduates.

In the year 1984-85 Consultancy earnings of the Institute was Rs. 63.38 lakhs and the number of Consultancy assignments taken up 461.

SPONSORED PROJECTS 1984-85

The following projects were sanctioned during the year under report

Aeronautical Engineering			
AE/26/IRDF/84-85/KAV	Development of Energy conservation procedure for academic and R and D institutions with special emphasis on IIT Madras.	Prof. K.A.V. Pandalai	—
Applied Mechanics			
AM/29/EC/84-85/TMS	Digital averager for Neuromuscular diagnosis	Prof. T.M. Srinivasan	3,67,440
AM/30/CSIR/84-85/MS	Influence of magnetic field on erythrocyte mobility and its application to separate disease infected blood cells, and Analysis of Blood flow in micro-vessels, Clinical, Experimental and theoretical studies	Dr. Megha singh	2,11,800
Chemical Engineering			
ChE/17/IRDF/84-85/MSA	Process Development for DPTU and DPG	Dr. M.S. Ananth Dr. K. Krishnaiah and Prof. C.N. Pillai	—
Chemistry			
Chy/66/CSIR/84-85/BV	Studies of metal support interactions and its consequence in catalysis	Dr. B. Viswanathan	62,200
Chy/67/CSIR/84-85/VSR and JCK	Influence of Ionizing radiation on perovskite type catalysts and their role in catalysis	Dr. V. R. S. Rao and Prof. J. C. Kuriacose	27,000
Chy/68-CSIR/84-85/SRSI	Studies on Electrochemical Phenomena at Textile fibre acqueous solution interfaces and in acqueous dye dispersions.	Prof. S. R. Sivaraja Iyer	37,200
Civil Engineering			
CE/17/IRDF/84-85/VP	Investigation of Geodesic Dome Structure made of Fibre Reinforced Plastic	Dr. V. Paramasivam Dr. N. G. Nair and Sri G. Santhanakrishnan	—
Electrical Engineering			
EE/23/DNES/84-85/RR	Amorphous silicon solar cells-Development and evaluation studies	Mr. R. Ramachandran	9,11,000

Mechanical Engineering

ME 47 ARDB 84-85 HCR and SK	LPR Turbopump cavitation Prediction	Prof. H.C. Radhakrishnan and Mr. S. Kumaraswamy	5,31,000
ME 48 DNES 84-85 KVG	Use of non-edible oils as an alternative fuel to diesel use in I. C. Engines	Prof. K.V. Gopalakrishnan	6,90,000
ME 49 IRDF 84-85 KR	Design and Development of equipment to produce continuous screw flights (ribbons)	Dr. K. Ramakoteswara Rao Dr. P. Venugopal Prof. M. A. Parameswaran and Prof. K. A. Padmanabhan	—

Physics

Phy 45 DNES/84-85/SR	Development of non-tracking luminescent concentrators for conversion of solar energy	Prof. S. Radhakrishnan Dr. S. Srinivasan and Dr. K Srinivasan	8,00,000
Phy 46 IRDF 84-85 YVGS	Investigations on Laser dressing of grinding wheels	Prof. Y. V. G. S. Murti and Dr. V. Radhakrishnan	—

Centre for Systems and Devices

CSD 17 DRDO 84-85 KMM	High resolution spectral estimation Techniques for Radar	Dr. K. M.M. Prabhu	4,25,000
CSD 18 DOE 84-85 MSN	Analytical techniques for off-frequency and off-beam characterisation of Radar and communication antennas above I GHZ	Prof. M. S. Narasimhan	2,28,200

Engineering Design Centre

19 07 DST 84-85 RSS	Holography interferometry and speckle photographic techniques in non-destructive testing	Prof. R. S. Sirohi	19,25,000

PATENTS:

The following patents were taken by the Institute during the year 1984-85.

1. New Design concept for enhancing surface durability and addendum modification of Gears
2. Draughtsman's drawing Board

Patent applications were made for the following

1. A method of and an apparatus for, heating metals including their alloys
2. A method of preparing a foundry sand composition and a mould or Core therefrom.
3. Al 6CU-O-5Zr alloy super Plastic
4. Special purpose oil Hydraulic Press for Cotton Baling
5. Spiral Grooving of grinding wheel sides for corner wear reduction in plunge grinding applications

6. Monitoring of Corner wear in cylindrical plunge grinding applications
7. Circular Fluid Energy Mill

Publication :

The Annual report of the Centre for 1983-84 was published in May 1984. The reprinted edition of the directory on Research and Consultancy Expertise and Facilities was published in January 1985.

The quarterly 'RESEARCH AND CONSULTANCY AT IIT MADRAS' was continued and is being sent to a large number of Industries, Research Laboratories.

Collaborative Research Projects :

The Centre is extending administrative support for the Indo-German joint research projects taken up during 1983 and also co-ordinates other activities relating to research projects sponsored by NSF etc .

MS In Entrepreneurship Programme

The Centre coordinates the programme in MS in Entrepreneurship and special lectures on various aspects relating to Entrepreneural development were organised by this Centre.

The Centre has taken steps to arrange for the visit of faculty to industry during the coming summer vacation.

Know-How Transfer

The know-how for the following two items have been transferred to industry.

1. Manufacture of Carbondioxide
2. Manufacture of Alphanumeric Display processor with Graphic facilities.

ENGINEERING DESIGN CENTRE

Consultancy Services to Industries and R & D Organisations :

The centre interacts with industries and R&D organisations through time bound projects. A few of the industries and R & D organisations for whom the consultancy services were extended are:

i) M/s. Appaswamy and Associates, Madras.

ii) M/s. General Optics (Asia) Ltd. Pondichery.

iii) Tamilnadu Poultry Development Corporation, Madras.

iv) M/s. Brakes India Ltd. Padi, Madras.

v) High School, Pachaperumalpatty, Tamil Nadu.

vi) BHEL Hyderabad,

vii) Design and Development of a discreteiy switchable FOV(TV) optical system, ADE Bangalore

Teaching and Research :

The centre assists the other departments of the Institute in teaching and laboratory. It has its own research program.

Sponsored Research :

A number of sponsored projects are currently in progress :

i) Development of decentralised energy system.

ii) Development of a low cost launcher.

iii) Investigations on holographic optical elements.

iv) Investigations on image subtractions technique.

v) Holography interferometry and speakle techniques in NDT.

Development Projects :

The following projects are in progress :

i) Development of a Nd : glass laser.

ii) Fabrication methods for making off-axis aspherical optical elements.

iii) Development of a Belt-tension meter.

iv) Development of a wheel chair for handicapped.

v) Design and development of a centering microscope for CNC milling machine.

Projects Under Negotiation :

i) Design and Development of an optical system for interfacing with a GE Television light valve projector- ADE

Retainer Consultancy	**1**
Research Papers Published :	**8**
Papers Presented :	**7**
PH. D. Completed	**2**

NRDC AWARD :

An award for developing "Multi purpose tractor mounted agriculture spray pump" was awarded by NRDC to Mr. T. S. Chennabasavan.

REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

Courses:

The faculty of RSIC take part in the teaching and research activities of Chemistry and Mechanical Engineering Departments and such activities are included under these Departments.

Research and Development:

Faculty members of RSIC are guiding research work in Molecular Spectroscopy and Instrumentation leading to Master's and Ph.D, degrees. A total of 19 students are registered under the faculty members for Ph.D. and 4 for M.Sc./M.Tech., M.S. degrees. In addition to these the centre has 3 Post Doctoral fellows and one Pool Officer. Three students got their Ph.D. degrees last year.

Assistance to Industry and other Academic Institutions:

Routine service of providing spectroscopic analysis on various equipments available, to academic institutions and industrial laboratories was done, which is one of the main aims of setting up this centre. The breakup of services rendered to internal and external users is given below:

Sl. No.	*Instrument*	*Int.*	*Ext.*
1.	Varian Techtron Atomic Absorption Spectrometer - AA6	59	130
2.	UV - Vis - IR(Varian 2390)	380	346
3.	Perkin Elmer PE - 781	180	...
4.	PE 983 IR	1289	361
5.	EM 390 NMR	1739	528
6.	Varian XL - 100 - NMR	86	6
7.	Varian E-4-EPR	1055	167
8	Cary-82 Laser Raman	587	34
9.	Polytech FIR-30-FAR IR	49	115
10.	Single Crystal X-Ray Diffractometer	1180 hrs.	526 hrs.
11.	Aminco Bowman Spectrofluorometer	243	53
12.	Scanning Electron Microscope	236	47
13.	Varian E-112 EPR spectrometer	1350	57
14.	ESCA - AUGER	203	30

Sponsored Projects :

1. NMR Investigations of structure and dynamics of molecules
2. Electron Donor Acceptor Complexes.
3. Vibrational spectral studies of aqueous solutions
4. Vibrational spectral studies using matrix isolation.
5. Transient heat transfer in turbine rotors and castings.

New Major Equipments:

A Finnigan Mat high resolution Mass Spectrometer has been procured which will be installed shortly.

Invited Lectures delivered by the staff

	Title	*Speaker*
(i)	Raman spectra of aqueous solutions.	Dr. Surjit Singh
(ii)	IR B and intensities and dipole moment derivatives.	Dr. Surjit Singh
(iii)	L F E R for spectroscopic parameters and molecular structure.	Dr. Surjit Singh
(iv)	Second derivative analysis in IR and Raman spectroscopy for molecular interaction studies.	Dr. Surjit Singh
(v)	Low-Dimensional Dithiolene Systems By EPR.	Dr. P. T. Manoharan
(vi)	Reconstituted Hemoglobin and modulation of Heme environment.	Dr. P. T. Manoharan
(vii)	Spin-labelled studies on hemoglobins and conformational charge.	Dr. P. T. Manoharan
(viii)	Interaction of Fe-Bleomycin by ESR/Mossbauer studies.	Dr. P. T. Manoharan
(ix)	Electron Spin Resonance studies in solids.	Dr. S. Subramanian
(x)	Ligand Field Theory.	Dr. S. Subramanian
(xi)	High Resolution NMR in solids.	Dr. S. Subramanian
(xii)	Theory and applications of Laser Raman Spectroscopy-Pulse transitions.	Dr. T. K. K. Srinivasan
(xiii)	Rotational relaxation in free jet expansions.	Dr. S. P. Venkateshan
(xiv)	Measurement of thermal diffusivity of liquids by a transient technique.	Dr. S. P. Venkateshan

Lectures from Visiting Scientists:

1. Dr. M. Sundaralingam, Dept. of Biochemistry, Univ. of Wisconsin, Madision, Wisconsin, U. S. A.
2. Dr. Elliot Charney, National Institute of Health, Bethesda (MD), U. S.A.
3. Dr. K. Balasubramanian, Dept. of Chemistry, Arizona State University, U. S. A.
4. Dr. M. S. Hegde; Solid State and Structural Chemistry Unit., Indian Institute of Science, Bangalore.
5. Dr. R. H. Schuler, Radiation, Research Laboratory, Chemistry Dept., University of Notredam, U. S. A.

Brief Indication of Developmental Programme Likely to come up in the Near Future:

1. Second Derivative spectroscopy in IR and Raman spectra for molecular interaction studies.
2. Matrix Isolation studies in molecular interactions.
3. Vibrational correlation functions and effect of intermolecular forces.
4. Development of Electron Nuclear Double Resonance method.
5. Biradical studies using spin labels on model systems and possibly membranes.
6. Development of EXAFES and Mossbauer methods for the study of metal containing proteins and model systems.
7. Development of Electron spin Echo Envelope modulation spectroscopy.
8. Study of chemically induced Dynamic nuclear polarisation (CIDNP) Involving organo metallic compounds using peroxide initiated thermal periodical reactions and ultraviolet induced free radical reactions.

9. Study of 2D NMR spectroscopy in solids and liquids using tailored pulse sequences in biological systems.
10. Development of *ab initio* and Many Body perturbation methods to evaluate Magnetic parameters of small molecules.
11. Study of pulse and CW methods of Paramagnetic molecules with respect to Molecular dynamics and relaxation processes.
12. Vibrational spectra of phase transition in organic molecular and inorganic complexes.
13. Time resolved Raman spectral studies.
14. Spectroscopic (Electronic and Vibrational) studies of Excited molecules.
15. Development of infrared spectrometer.
16. Measurement of thermo physical properties for solids, liquids and gases.

CENTRAL SERVICES, FACILITIES

Central Glass Blowing Section

Central Photographic Section

CENTRAL GLASS BLOWING SECTION

Since its inception in 1972, the Central Glass Blowing Section has been catering services to all Research, Science and Engineering Departments of this Institute. The Section is well equipped with sophisticated glass blowing equipment such as Horizontal-cum-Vertical lathe, Forming lathe, Universal lathe, Grinding and Polishing machines. Quite recently Central lathe (Indian make) with taper turning attachment has been acquired by the Section.

The unit is capable of making Cryogenic and High vacuum Glass systems, Quartz apparatus and Instruments fabrication. Quite often the section has been guiding the scientists and technicians coming from the educational and research institutions for Quartz instruments fabrication, Glass to metal seals, Liquid nitrogen dewars (Cylindrical, spherical and tail) with slit silvering etc.

The section gives basis glass blowing training to the Science post graduate students. One of our Senior Technical Assistants was given permission by IIT to construct a 'Helium-Neon Laser' and vacuum set up at the University of Malasia, Kulalumpur.

SEMINAR

The CGBS had sponsored a one day work shod on 'Recent trends in the scientific and industrial glass blowing' at IIT., Madras on 20.6.1982, with Indian Society of Scientific Glass Blowers. A technical note was presented by our Section. Fabrication Techniques such as spherical dewars and a pot dewar making were demonstrated.

Some staff members of this section participated in the Second Annual Seminar of I S S G organised by the Indian Institute of Science, Bangalore 22-23 July 1983 and presented a paper 'Some aspects of manufacture of dewars for spectroscopic studies at very low temperatures' by Sri N.T. Kumarasamy and Sri A.G. Venugopal.

Three staff members were deputed to attend the third annual seminar on Scientific Glass Blowing in Research and Development Institution and Industries organised by ISSG and Bhabha Atomic Research Centre, Bombay, 15th to 17th November, 1984.

CENTRAL PHOTOGRAPHIC SECTION

Since the inception of the Section in 1967, it has been catering to the different photographic needs of the various faculties in the institute (both staff and students) such as Photo-taking, Movie Taking and processing of Black and White Films, Microphotography, Photomicrography, Slide Preparation Documentation, Circuit diagrams (printed circuits) developing. Enlarging and printing. It also helps in making audio visual programmes (in Black and White and also in Colour) highlighting the various research activities of the Institute.

Apart from the above, it also undertakes and helps various ICC sponsored research work in the areas of research photography, such as traffic survey, highspeed photography, documentation, etc.

During the Silver Jubilee year (1983-84), the CPS took charge of photo recopying of vintage photographs as also photo-taking and provided several blow-ups for the exhibitions organised in September 1983 and then during the Indo-German Seminar in December-January 1984. For the Open House conducted, during 1984, severel colour blow-ups for the exhibition were also made by the CPS.

DEPARTMENTS

Aeronautical Engineering

Applied Mechanics

Chemical Engineering

Chemistry

Civil Engineering

Computer Science and Engineering

Electrical Engineering

Humanities and Social Sciences

Mathematics

Mechanical Engineering

Metallurgical Engineering

Physics

AERONAUTICAL ENGINEERING

Research Publications	—	Total upto 1984	175
	—	Added 1984-85	17
Monographs	—	Upto 1984	6
	—	New Addition	nil
Departmental Projects	—	B.Tech.	10
	—	M.Tech.	4
	—	M.S.	4
	—	Ph.D.	1

Sponsored Projects :

	Title	*Sponsor*	*Amount*
1.	Hot Cascade Test Rig	ARDB	21.18 lakhs
2.	Slotted Tube Grain Design Analysis	ISRO	3.96 lakhs
3.	Erosive Burning Studies of Solid Propellants	ARDB	6.95 lakhs
4.	Theoretical and Experimental Investigations of Rarefied Gas Flows	ARDB	6.70 lakhs
5.	Theoretical and Experimental Investigation of Wake Boundary Layer Interaction of an Airfoil	ARDB	5.8 lakhs
6.	Nozzle Deposition problem	ARDB	2.436 lakhs

Important Lectures and Seminars

S. No.	*Date*	*Speaker*	*Topic*
1.	30. 10. 1984	B. Hardonk DANTEC, Denmark	Laser Doppler Anemometer Systems
2.	17. 12. 1984	Prof. G. K. Bachelor Cambridge, U. K.	Selected Topics in Fluid Mechanics
3.	18. 2. 1985	Dr. Ing. A. E. Beylich	Cooling of Gas Mixtures in Rapid Expansion
4.	19. 2. 1985	Dr.-Ing. A. E. Beylich	Some Topics in Two Phase Flow

Research Publications

S. No. (1)	*Author* (2)	*Title* (3)	*Publications* (4)
1.	T. K. Bose and R. V. Seeniraj	Laminar stagnation point heat transfer for a two temperature argon plasma	A. I. A. A. J., pp 1080-86, vol. 22, 1984.
2.	T. K. Bose and R. V. Seeniraj	On electrostatic probes for dense flowing plasma	Physics of Fluids, pp 1561-62, vol. 27, 1984
3.	T. K. Bose and R. V. Seeniraj	Two-Temperature Elenbaas-Heller problem for a two-dimensional one	Plasma Physics and Controlled Fusion. pp 1163-76, vol.26, 1984.
4.	T. K. Bose and R. V. Seeniraj	On reactive conductivity coefficient of multiple ionised two temperature argon plasma	Waerme-Und Stoffuebertragung, pp 3-8, vol. 19, 1985

5.	Manohar, D. R. and Krishnan, S.	Trajectory reconstruction during Thrusting Phase of Rockets using Differential Corrections,	Jl. of Guidance, Control and Dynamics, March/April 1985
6.	G. Subramanian and S. Krishnakumar	An image-shearing moire' method to record slopes in flexed plates	Strain, pp 69-73, 20(2), 1984
7.	C. Ramesh Babu and G. Subramanian	Universal Matrices to obtain thermal load vectors for the family of anisotropic plane triangular finite elements	J.Aero.Soc.of India pp 137-140, 36 (2), 1984
8.	G. Subramanian	On certain moire methods and their applications	Analysis of Structures SP 8401,NAL,Bangalore Dec.1984
9.	G. Subramanian	Significance of universal matrices and higher order finite elements in structural applications	Presented at the Commonwealth Aeronautical Advisory Research Council Meeting,Bangalore, Nov.1984.
10.	B.S. Sarma and T.K. Varadan	Ritz finite element approach to nonlinear vibration of beams	Int.J.for Num.Methods in Engg., Vol. 20, No. 2, Feb. 1984.
11.	B.S. Sarma, G. Prathap, and T. K. Varadan	Influence of the order of Polynomial on the Convergence in Ritz finite element formulation to nonlinear vibration of beams	Jl.of Computers and Structures, pp 667-671,vol.18, No.4, 1984.
12.	T.K. Varadan, V.R. Dulip, and G. Prathap	Nonlinear analysis of a thermally constrained beam	Mechanics Research Communications Journal, pp 61-66, Vol. II No. 1, 1984.
13.	T.K. Varadan and K.A V. Pandalai	Nonlinear Analysis of Structures	Analysis of Structures, S.R. Valluri 60th Anniversary Volume,Dec.1984.
14.	G. Prathap, T.K. Varadan, and B. S. Sarma	Reply to Comments on the Lagrange type formulation for finite element analysis of nonlinear beam vibrations	J. of Sound and Vibration, pp 449-552, 1984.
15.	B. S. Sarma and T. K. Varadan	Ritz finite element approach to nonlinear vibrations of a Timoshenko beam	Commn. in App. Num. Methods Journal, pp 23-32, vol. 1, 1985.
16.	V. Ramamurti and T. K. Varadan	Plate and Shell Analysis	Invited Review paper in Golden Jubilee Volume of Indian Science Academy, 1984.
17.	S. N. Mishra, E. G. Tulapurkara and A. K. Kundu	Smoothing of cubic splines and bi-cubic surfaces	Presented at the Aero. Soc. of India, AGM in Dec. 1984.

APPLIED MECHANICS

Quality Improvement Programme

	M.Tech	M.S.	Ph.D.
No. of Trainees so far	4	0	16
No. on rolls in Ph.D.	1	0	7

Short-term courses conducted **One.**

Important Lectures and Seminars:

1. Dr. A. S. Paintal FRS Director, Patel Chest Institute, New Delhi, on (i) Volume receptors (ii) mechanism of stimulation of arterial chemoreceptors and (iii) breathlessness and its control
2. Dr. G. Ravichandran, FRCS, UK on Rehabilitation Techniques for spinal injury Patients.
3. Dr. Ved Ram Singh N.P.L. New Delhi, on Ultrasonics applied tomedicine.
4. Dr. Vladimir Blazek, Aachen, W. Germany, on Laser tissue transillumination
5. Prof. H. Kesteloot from Belgium, on Mechanocardiography
6. Dr. Parathap C. Reddy, Appollo Hospital, Madras on Recent Trends in Medical Diagnostics
7. Dr. Suresh from General Hospital, Madras on Ultrasonic imaging
8. Prof. J. M. F. Landsmeer, Leiden, Netherlands on Mechanics of Biarticular Joints.
9. Dr. Mano Tubrikar, New York, USA on heart valve prosthesis.
10. Prof. A. Krishnamurthi and Dr. Kalyani Nityanandan, Madras on Human Physiology.

Research Publication :

No. of Papers Published : 61

Departmental Projects :

Sponsored :

1. Electronics Commission Project on 'Evoked potential monitoring Rs. 3.8 lakhs for 3 years.
2. CSIR PROJECTS :
   (i) Influence of magnetic field on the mobility of erythrocytes
   (ii) Analysis of blood flow in microvessels - its clinical experimental and theoretical studies. Total Rs. 3 lakhs - duration 3 years.
3. Development of Computer Software for 3 dimensional problems in Fracture Mechanics BHEL Hyderabad
4. Studies on Flow Around Three Dimensional Bluff Bodies Relevant to building and environmental aerodynamics under DST Project.

Assistance to Industry :

Hospital consultancy

Improvement in the design of tricycles used for handicapped for Andhra Pradesh Handicapped Persons Association

Improvement in the above knee prosthesis for Artificial limb centre, K. K. Nagar, Madras.

Computer analysis of double decker chassis- Ashok Leyland, Madras.

Experimental Stress Analysis of the Radiator under Vibratory loading-India Radiators Madras

Thermal Stress Analysis of the Steam Turbines BHEL, Hyderabad.

Aerodynamic Drag Study of Ashok Leyland Lorry

Torque and power computation of pneumatic cement separator of KCP Ltd.

Development and testing of cup anemometers of Pricol

Seismic test on control panels-Electronics Corporation of India Hyderabad

Rajrajan Electrical Equipments, Madras-Seismic test on busduct.

Pressure Vessel Design, Bharat Heavy Plates and Vessels Vishakapatnam

Plunger Stress Analysis Kalyani-Brakes Pune

Shock test on LM 100 MCCB-The English Elec. Co. (I) Ltd.

Sesmic test on 55 KVA-Kirloskar Electric Co. Bangalore

Seismic testing on Surge Arrester - W.S.Insulators of India Ltd., Madras.

Evaluation of torsional dampers - M/s Vibromech Engrs. (P) Ltd. Madras.

Seismic testing on 400 KV CT and CVT - M/s Hindustan Brown Boveri Ltd. Baroda

Seismic testing on 400 KV CVT - W.S. Isulators of India Ltd., Madras.

qualification test on solar panels ISRO Satelite Centre Bangalore.

Seismic Testing on 400 KV Insolators - S & S Power Switchgears Ltd. Madras.

Analysis of the Winch on ORV Sagar Kanya-National Institute of Oceonography, Goa.

Seismic testing on Gate Valves - M/s Audco India Ltd. Madras.

Harmonic Analysis on 5000 KVA Autotransformer

Analysis and performance evaluation of stockbridge dampers - M/s Indo Asiatic Corporation Calcutta.

Retainer Consultancy - Lucas TVS - Dr. V. Ramamurti

New Major Equipment :

A microcomputer based dedicated system for analysis of medical images along with required software, entirely fabricated in the laboratory.

An Universal Testing Machine of 20 T capacity has been installed and commissioned

A (2 channel) DISA Hotwire Anemometer is imported from Denmark at a cost of Rs.2/- lakhs under an Aero/Applied Mechanics Project.

Design and Fabrication of 5 ton Jib Crane by Dr. V. Ramamurti Tracking Filter, B & K Denmark

12 channel Oscillograph, Kyowa, Japan

Vibration Analyser, Vibrometer 8a, Switzerland

Turn Tables, B & K Denmark

Microphone Boom, B & K, Denmark

Visitors to the Department

Dr. A. S. Paintal, New Delhi

Dr. Ravichandran, U. K.

Dr. Ved Ram Singh, New Delhi

Dr. Vladimir Blazek, W.Germany

Prof. H. Kesteloot, Belgium

Dr. Prathap C.Reddy, Madras.

Dr. Suresh, Madras

Dr. Mano. Tubrikar, USA

Prof. J. M. F. Landsmeer, Netherlands

Dr. Ing. F. G. Buchholz, Technical University of Paderborn Federal Republic of Germany

Prof. S. Sankar, Visiting Professor Jan-April 1984.

Invited Lectures Delivered by the Staff :

Prof. T.M. Srinivasan, visited Electrical Engg. Department, Benaras Hindu University and gave series of 4 Lectures on Ultrasonic imaging

Delivered Lectures on 'Fracture' to the Engineers of Brakes India, Madras: by Prof. R. S. Alwar, Mr. P. Krishna Iyer and Mr. G. Thomas.

A course of six lectures on 'Turbulent Shear Flows' to the Dipl. Ing. (8th Semester) and doctoral students of the University of Karlsruhe, West Germany by Prof N. V. C. Swamy

Invited Seminar Talk on 'Flow around Chimneys, Model Studies' on 4th Feb. 85 under the auspices of the Sonderforschungsbereich 210 at the University of Karlsruhe by Prof. N.V.C. Swamy

4 Lectures delivered by Prof. P.S. Srinivasan on Wind Energy and Utilization at National Productivity Council, Madras.

Lectures on Vibration for vibcons consultants by Prof. B. V. A. Rao, Prof. V. Ramamurti and Dr. N. Ganasan.

Lecture at National Productivity Council Madras by Dr. N. Ganesan.

Other Information :

Proposed to hold an International symposium on Bio-mechanics and Clinical Kinesiology of Hands and Feet in Dec. 1985.

Co-ordinated an one day short course on 'Introduction to the Boundary Element Method for Engineers, sponsored by Indian Concrete Institute, July 1, 1984, by Dr.J. Ramachandran

Dr. S. Radhakrishnan presented a paper at the International Conference on 'Spinal Injuries'at Vigyan Bhavan, New Delhi,

Prof. T. M. Srinivasan rejoined in September 1984 after his stay in McMaster University

Prof. N. V. C. Swamy rejoined the department after 1 year assignment at the West Germany University of Karlsruhe.

Prof. B. V. A. Rao rejoined in August 1984 after completing his assignment at National University of Singapore.

Dr. S. Narayanan, Asst. Professor, left on Humboldt Fellowship to Berlin

Dr. B. S. Prabhu, Assoc. Professor has Proceeded to Concordia University on Sabbatical Leave

Sri S. Swarnamani has rejoined in June 1984 after training in West Germany

Dr. B H. L. Gowda, Asst. Professor, Fluid Mechanics Lab of this Department got award Dr. Despande Memorial Prize, for the best paper presented by Research and Academic Institutions during the 13th National Conference of FM & FP held at REC Tiruchi in December, 1984.

Dr. B. V. A. Rao, Professor, Machine Dynamics Lab of this Department has been conferred Founder Fellow of the Institution of Diagnostic Engineers, UK. He is also on the editorial for the Journal of Condition Monitoring & Fault Diagnosis published from UK

Dr. K. M. Patil, Dr. Megha Singh, and Dr. B. S. Prabhu have become Associate Professors and Sri S. Swarnamani Senior Scientific Officer, Gr. II.

Mrs. C. Sujatha, has joined the Department as Senior Scientific Officer, Grade II.

Sri C. R. Subramanian who retired at the end of February, 1985 has been reemployed till the end of Semester ending June, 85

A conference on Aerodynamics is scheduled to be organised in October 1985 under the auspices of the Aeronautical society of India, Madras Chapter

Development Programme in the near future.

Project on 'Air supported bed for prevention of Bed sores is being submitted to DST New Delhi.

Ultrasonic tomography for imaging soft tissue for diagnosis.

Ultrasonic cardiac image processing. Online monitoring of cardiavascular system model flows and pressures using microcomputer for design of cardiac assist device.

CHEMICAL ENGINEERING

Specialization in M. Tech. (3 semesters) :

i. Biochemical Engineering
ii. Catalysts and Reactors
iii. Computer - Aided process Systems and Equipment Design
iv. Environmental Engineering
v. High Polymer Engineering
vi. Instrumentation and Process Control
vii. Mineral Process Engineering

Quality Improvement Programmes :

(Serving Teachers Programme)

	M. Tech.	*M. S.*	*Ph. D.*
Number of Trainees so far	5	3	4
Presently working	—	—	5

Important Lectures and Seminars :

		Speaker
1	Accoustic emissions in Reinforced Plastics	JORG WOLTERS, Deutsches Kunststoff Institut, Darmstadt, West Germany.

Research :

a) Research Publications

i. Papers Published	6
ii. Papers Presented	8

b) M. S./Ph. D.

	M. S.	*Ph. D.*
Completed	1	3
Ongoing	15	23

ICC-Including Retainer Consultancy

Consultancy

1. Reactor Research Centre, Kalpakkam
2. Thermox Pvt. Ltd, Pune
3. Dunlop India Ltd, Madras
4. Lime Chemicals Pvt. Ltd, Bombay
5. Beardshells Insulation, Madras
6. G.S.D. Chemicals, Arkonam
7. Toshnival Instruments, Madras
8. The Mica Trading Corpn. Ltd, Patna
9. Pioneer Rubber Industries, Madras 14
10. Saas Ind. Chemicals Pvt. Ltd, Madras

11. Tamilnadu Carbondioxide Industries, Madras 42
12. Laxmi Starch, Hyderabad
13. Acetylene and Industrial gas cylinders, Madras
14. BHEL, Hyderabad

Retainer Consultancy :

1. Dr. C. S. Sastry	M/s. Lakshmi Starch, Bombay M/s. Harihar Polyfibres, Harihar, M/s. Seshasayee Paper and Paper products, Erode
2. Dr. Y. B. G. Varma	M/s. Mothi Chemicals Ltd, Trivandrum M/s. Tamil Nadu Carbondioxide Ltd, Madras.

Visit to the Department :

1. Prof. SLAVOV, Bulgaria

Invited Lectures delivered by the Staff :

1. Dr. T. Gopichand

   Dr. M. G. Krishna Memorial Endowment lecture on "ENERGY: WHENCE IT COMES AND WHERE IT GOES" at Andhra University, Waltair.

2. Dr. M. Ramanujam
   Professor & Head

   1. Vibratory, Planetary and jet mills, Cement Research Institute,Hyderabad
   2. Size reduction principles and selection of equipments, Pesticide development programme of India, Gurgaon, Haryana.

3. Prof. C.A, Sastry :

   1. Keynote address in CLRI Tanners get together Feb. 1985
   2. Keynote address, Stella Maries College, Madras
   3. Keynote address, Conf. on Environmental Chemistro Industries, Madras

Chairing the sessions :

1. International seminar on 'Aquatic weed control' UNESCO. Jakarta
2. International Seminar on Environmental Problems in Asia, COSTED, AIT, Bangkok.

Lectures in courses :

1. Air Pollution monitoring and control
2. Industrial safety and hygiene
3. Water Treatment Plant design. Waste Stabilization pond.

Prof. M. S. Ananth :

1. 'Mathematical modelling in Chemical Engg.', Seminar arranged by Maths. Dept. IIT, Madras
2. 'Modelling of Inred process', Seminar arranged by Metallurgy Dept. IIT Madras.
3. 'Granulation —Mathematical modelling — KREC, Surathkal, Karnataka,
4. 'Thermodynamic in Nitrogen fixation', KREC, Surathkal Karnataka.

Short Term course/Symposium :

1. High polymer Engineering Laboratory, Chem. Engg. Dept. has procured a Torsiograph from FRG- Measurements possible during extension of molten polymer.
2. Organised a '2-day seminar on "Measurement and characterisation of Polymers as a tool for better processing" on 22nd and 23rd October 1984
3. Hoppers and Silos for strength and flow conducted between 28th-30th November 1984
4. Recent Advances in Solid-fluid separation conducted between 3rd-14th December 1984

Any other item of special interest :

1. A separate course for Fertilizer Association of India for M.Tech. degree is going on
2. Under Institutes Collaboration scheme :

i. Regional Engg. College, Warangal
ii. Karnataka Regional Engg. College, Surathkal
iii. Regional Engg. College, Trichy

CHEMISTRY

Research and Development

Research work undertaken by the faculty of the Department covers a variety of areas in Chemistry and includes both basic and applied, the specific areas being electrochemistry, polymer chemistry, catalysis synthetic organic chemistry, organic reaction mechanism, structural and theoretical chemistry solid state and coordination Chemistry, analytical and nuclear chemistry. Major portion of these activities are supported by Government agencies like DAE DST, ISRO, CSIR,,Defence and other organisation.

Publications

About 90 papers have been published in national and international journals during the year.

Sponsored Projects

There are currently 22 ongoing projects sponsored by the various organisation. A number of new proposals have been submitted to these organisations by the faculty. In addition a project on Catalysis for support by the MRL, Madras has also been proposed.

Indo-German Project

Two Indo-German projects are also in progress.

visitors

A total of 23 scientists visited the Department from abroad during the year and gave seminar talks in the Department. The visitors were from USA, USSR, England, Australia, and Bulgaria.

visits abroad

12 of the faculty members also went abroad to participate in various international symposium and seminars at Japan, USA, USSR England and West Germany and for DAAD reinvitation Programme.

Seminars & Symposia

A two day Annual Symposium in Chemistry was held on March 9-10, 1985 and was co-sponsored this time by the Drug Standardisation Research Institute (Unani). It was attended by about 400 people and a total of 68 papers were presented in the two days.

New Major equipment added :

1. An ESCA spectrometer by VG. Scientific was installed and commissioned during the year.
2. A new Finnigam MAT double beam mass spectrometer has been acquired and is awaiting installation.

Assistance to outside organisation

Analytical assistance for characterization of the R & D product chemicals, industrial products, catalyst samples (of various Industrial organisations) are being provided to educational and industrial institutions through IR,UV NMR, mass, X-ray SEM, atomic absorption etc.

Research collaboration

Collaborative research work on inter-departmental and interinstitutional level is also being conducted by the faculty members of this Department. The outside institution include MRL, Madras, University of Madras, May & Baker (P) Ltd., England.

CIVIL ENGINEERING

New Courses Introduced :

A number of elective courses were offered at the B.Tech and M.Tech levels.

Changes Made in Curriculum :

Core courses for the 4 years B.Tech program have been finalised.

Important Lectures and Seminars :

Weekly seminars were held in all the five divisions of the Department and the M.Tech. M.S., Ph.D. Scholars gave talks on various research topics. In addition, special lectures were arranged when the following Professors visited the Department.

Topic of Lecture	*Speaker.*
Hydrologic Modelling - Does it have a future.	Dr. M. J. Hamlin, Professor Department of Civil Engg., Birmingham University, U.K.
A general view of Architecture for the Civil Engineering students and staff; supported by slides.	Prof. A. N. Sengupta, Prof. of Architecture, Anna University, Madras.
A general overview of lamps and luminaires.	Prof. Dr. - Ing. J. Krochman, Professor of Lighting. Technical University, Berlin.
Role of Civil Engineer in Modern Society.	Mr. Mohan Ramanathan, Director. Piling Division,, Venkatraman and Co., Madras.
Important aspects of airport planning and design.	Prof.Dr. - Ing.Peter Wolf, Technical University, Aachen, West Germany.
A overview of Appropriate technology	Dr. Bernhard Glaeser, International Institute of Environment and Society, Berlin.

Research and Development :

A number of M.Tech. M.S., and Ph.D. Scholars and the Faculty have been actively engaged in research activities.

Departmental Projects :

M.Tech, M.S. and Ph.D. Projects were taken up as part of research and training programmes.

Assistance to Industry - ICC

A number of Projects referred by various industries have been undertaken and the Department leads in the industrial consultancy activities at Institute.

Sponsored Projects :

Five research projects were in progress during the year.

Proposed Development Programmes :

In addition to the on going research work in various disciplines the Department plans to expand a d strengthen the activities in a number of areas of Civil Engineering as given below :

1. Construction Materials and Techniques.
2. Planning and Design for Housing and Studies on Building comfort.
3. Enviromental Engineering.
4. Groundwater Modelling.
5. Cyclonic Storm Surge Modelling.
6. Simulation of River Basins and Reservoir Operations.
7. Shell and Special Foundations.
8. Foundation on Clays.
9. Machine Foundations.
10. Wind Engineering.
11. Timber Structures.
12. Optimization in Structuctural Design.
13. Integrated Transportation Planning.
14. Bridge Engg. and Transportation Structures.
15. Traffic Studies
16. Computer Aided Design and Civil Engg. Systems
17. Development and use of Cold formed Sections in Structural Engg.

COMPUTER SCIENCE & ENGINEERING

The Department of Computer Science and Engineering has completed two years after attaining the status of a separate department in the Institute. Our first batch of B. Tech students will be coming to the final year of the program in the next academic year. We are continuing our M. Tech program with a normal intake of about 35. The strength of our research scholars is also growing from year to year.

In addition to the academic program the department supports both sponsored and industrial research activities. Currently the sponsored work involves development of display control for kannada language and new algorithms for applications in Acoustic Imaging. The industrially oriented work consists of organizing short courses on system support, data processing and computer applications.

The department is engaged in the following specially funded activities.

I. Information Sciences : The goal is to create infrastructural facilities for work in information processing. In particular, the scheme aims at developing distributed information systems using LAN (Local Area Network), graphics for DSS (Decision Support Systems) and capabilities for interaction in regional languages.

II. CLASS Project : The aim of the project is to make even school children aware of the capabilities of computers. As a part of this project IIT is required to train school teachers and interact with them on hardware/softwars problems.

III. Microprocessor Training Programme: This programme is intended to train teachers of engineering colleges in microprocessor techniques.

We have good financial support from Government of India for the above activities including procurement of computer systems. There is also a handsome subsidy from the government to strenthen our undergraduate programme in terms of providing adequate laboratory facilities.

With nine faculty and several research scholars, the department is actively engaged in research in the frontier areas of computer science like Artificial Intelligence, Distributed Data Processing,Advanced Theoretical Computer Science,Simulation involving Performance Evaluation Studies, Speech Recognition, CAD for VISI and Algorithms. The department is going to play a major role in the V Generation Computer Project of Department of Electronics, Government of India. Our department has been identified as a focal centre for activities connected with 'Expert Systems' in this project and Prof. H. N. Mahabala has been identified as the coordinator for this activity. Work has already been initiated to develop man-machine interface through speech and picture modes.

We also share a major responsibility in managing the Central computer systems to provide service to all departments of the Institute. Our dedicated operations staff keep the central systems IBM 370/155 and IPL 4443 running almost 24 hours a day. Our system staff provide software support to various activities in the institute.

A new computer centre building is coming up to house a new central computer system which would operate in a time-shared mode with terminals distributed all over the Institute. We plan to step up our research, development and service activities by next year when the new building will be ready for occuption.

LIST OF PUBLICATIONS (In Reviewed Journals)

1. B Yegnanarayana, Sarat Chandran, Anant Agarwal, 'On Improvement of performance of Isolated word Recognition for Degraded Speech, ,Signal Processing (North-Holland), Vol. 7, No.2, PP. 175-183, October 1984.
2. B. Yegnanarayana and T. Sree Kumar, 'Signal-Dependent Matching for Isolated word Speech Recognition System, Signal Processing, (North Holland), Vol. 7, No.2, pp. 161-173. October 1984.

3. B. Yegnanarayana, D. K. Saikia and T. R. Krishnan, Significance of Group Delay Functions in Signal Reconstruction from Spectral Magnitude or Phase, 'IEEE Trans. On Acoustics, Speech and Signal Processing, Vol.ASSP-32, No 3, pp. 610-623, June 1984.
4. K. Krithivasan and A. Das, 'Terminal Weighted Grammars and Picture Description,'Computer Vision Graphics and Image Processing, 1985.
5. B. Ravikumar and K. B. Lakshmanan, 'Coping with known patterns of Lies in a Search Game,' Theoretical Computer Science, Vol.33, pp. 85-95, 1984.

LIST OF PUBLICATIONS (IN CONFERENCE PROCEEDINGS)

1. A. S. Ananth, D. G. Childers, and B. Yegnanarayana, 'Measuring Source-Tract Interaction From Speech, 'Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing. Tampa, Florida, ICASSP--85, March 1985.
2. D.G. Childers, B. Yegnanarayana, and Ke Wu, Voice conversion Factors Responsible for Quality, 'Proceedings of International Conference of Acoustics Speech and Signal Processing, Tampa, Florida, ICASSP—85, March 1985.
3. Joy Thomas, B, Yegnanarayana, Reghuram Karinthi, and V. Venkateswar, 'Processing of Noisy Speech using Group Delay Functions, 'Proceedings of International Conference of Acoustics Speech, and Signal Processing. Tampa, Florida ICASSP-- 85, PP1—4 March 1985.
4. B. Yegnanarayana, 'Representation and Processing of Signals in the Group Delay Domain, 'Proceedings of MICCASSP—84, Osmania University, Hyderabad, PP. A.1-A.10, 1984.
5. S Raman, B. Yegnanarayana R. Sundar. and V.V. Chandrasekaran, 'Knowledge Based signal Proceessings for Recognition of Hindi Stop Consonants', Proceedings of International Conference on Computers, Systems and Signal Processing Indian Institute of Science, Bangalore, India, PP.896-890 December 1984.
6. B. Yegnanarayana, J. Sreekanth and Anand Rangarajan, 'Group Delay Processing of Signals, 'Proceedings of International Conference on Computers Systems and Signal Processing, Indian Institute of Science, Bangalore, India, PP.349—353, December 1984.
7. B.Yegnanarayana, Joy Thomas, Raghuram Karinthi, and Rajesh Gupta, 'New Methods of Processing Noisy Speech, 'Proceedings of All Indian Symposium on Communication, Indian Institute of Science, Bangalore, India, pp. 66-71, August 1984.
8. B. yeganarayana, D. G. Childers, J. M. Naik, 'Voice Simulation : Factors Affecting Quality and Naturalness', Proceedings of the Conference of the Association for Computational Linguistics, Stanford, California, COLING 84, July 1984.
9. B.Yegnanarayana, 'Significance of Group Delay Function in Signal Processing', Proceedings of IEEE Symposium on Circuits and Systems, Montreal Canada, ISCAS-84 May 1984.
10. H. N. Mahabala, 'Intelligent File Transfer Protocol', Presented at Networks 84, 1984. Madras
11. H N. Mahabala, 'Computers in Less Developed Countries', presented at SEARCC 84, Hong Kong.
12. C. Pandurangan, 'Comparison of Graph Grammars', presented at the workshop on Graph Theoretic Concepts in computer Science, 1984, Berlin, FRG.
13. K. Krithivasan and A Das, 'Treating Terminals as Function Values of Time,' presented at the 4th FST & TCS conference, 1984, Bangalore, LNCS 181, pp. 188-201.
14. S. Jayaprakash and K.B. Lakshmanan, 'Effect of Structuring Transformations on Control Flow Complexity Measures, Proc. of CSI-85, Delhi pp. III. 73-78
15. S. Jayaprakash and M K. Ramanujam, 'CIBM 3270 BMS Facilities in High Level Languages without CICS,' Presented at CSI-85, Delhi, Proc. of pp.II. 55-67.

16. V. Sirohi, 'Numerical Treatment of Powell-Eyring Fluid Flow past a 90° Wedge', Reg J energy heat mass transfer, 6, 1984.
17. V. Sirohi, 'National Convection Flows of Non-Newltonian Fluids with High Schmidt Number', presented at the 29th Congress of the Indian Society of Theoretical and Applied Machanics, 1984, Surathkal.

TECHNICAL REPORTS

1. B. Yegnanarayana, D. G. Childers, and Wu KE, 'Factors Responsible For Quality of A Voice', Department of Electrical Engineering, University of Florida, Gainesville, June 1984.
2. B. Yegnanarayana, and D. G. Childers, 'Signal-Department Analysis-Synthesis of Speech', Department of Electrical Engineering. University of Florida, Gainesville, June 1984.
3. B. Yegnanarayana and D. G. Childers, 'A Modification to Adaptive Nonlinear Edge Preserving Filter', Department of Electrical Engineering, University of Florida. Gainesville, June 1964.

2. SPONSORED PROJECTS

	Project	*Agency*	*Coordinator*
1.	Computerised Hospital Information System	DOE Govt. of India	Prof. H. N. Mahabala
2.	Development of Bit Slice Based Display Controller for Kannada Script	DOE Govt. of India	Prof. H. N. Mahabala
3.	Laser Link	Indo-Germen Project	Prof. H. N Mahabala
4.	Signal Processing in Acoustic Imaging	DOE Govt. of India	Prof. B. Yegnanarayana

3. CONTINUING EDUCATION PROGRAMS

The following courses were organised and conducted by the faculty and Staff of Computer Science and Engineering Department.

1. Microprocessors Training Program — July 1984
2. School Teachers' Training Program — June-July 1984
3. Microprocessors Training Program — November-December 1984
4. QIP short term course on Theoretical Computer Science — December 1984

COURSES CONDUCTED FOR INDUSTRY

1. IBM 43xx Assembler/IDMS-DBMS for ITI/Lucknow
2. IBM 33xx features for CMC/Madras
3. IBM 370 O.S/JCL for TCS/Madras
4. CICS for M/S Computility (P) Ltd/Madras.

4. PROFESSIONAL ACTIVITIES

1. Prof. H. N. Mahabala was elected as the Vice President of Computer Society of India.
2. Prof. H. N. Mahabala organised the International Conference 'Networks 84' on Data Communications in October 1984.
3. Dr. K. B. Lakshmanan served as a Program Committee Member.
4. Dr. K. B. Lakshmanan served as an expert in a 4 member expert committee set up by the Government of India (Ministry of Education) to draft a model undergraduate curriculam in Computer Science and Engineering.
5. Dr. (Mrs) Kamala Krithivasan served as a Member of the Board of Studies in Mathematics in Madras University.

5. VISITS ABROAD

1. Dr. C. Pandurangan Visited West Germany to participate in a Workshop on Graph Theoretic Concepts in Computer Science.
2. Prof. H. N. Mahabala visited Japan as a Member of the Indian Delegation of Computers in Education.
3. Prof. H. N. Mahabala participated in the ICCC Conference on Data Communications held in Australia.
4. Prof. B. Yegnanarayana visited University of Florida, U.S.A.
5. Prof. C. R. Muthukrishnan visited Aachen University, FRG for Computer System Selection/ Confrigruation for IIT, Madras.

6. SEMINARS/TALKS/VISITS BY DISTINGUISHED SCHOLARS

1. Prof. R. M. McKeag, Queens Univesity, Belfast,
   'Design of Software for Children'
2. Dr.M. Beynon, University of Warwick, England,
   'Monotone Boolean Functions Computable by Planner Circuits'
3. Prof. M. Atkinson, University of Glassgow, U.K.,
   'Progress with Persistent Programming'
4. Prof. R. Morrison, University of St. Andrews, U.K.,
   'A Persistent Graphics Facility for the ICL Perq'
5. Dr. M Satyanarayana, CMU, Pittsburg, U.S.A.,
   'An Overview of the Information Systems Technology Project-A Joint Venture of the Carnegie - Mellon University and IBM'

7. CHANGES IN STAFF POSITION

1. Dr. N. Parameswaran Joined as Assistant Professor
2. Prof. B. Yegnanarayana took over as the Head of the Department from Prof. R. Kalyanakrishnan
3. Mrs. V. Sirohi has been promoted to Programmer Grade I
4. Mr. N. Rajagopalan has been promoted to Programmer Grade II
5. Mr. V. Mohankumar joined as Programmer Grade II
6. Mr. S. Sridharan Programmer Grade I, resigned his post.

8. CONSULTANTY

Consultancy was offered to the following institutions.

1. Road Traffic Survey - data analysis for MMDA, Madras.
2. Analysis of Infant Mortality for Gandhigram Institute of Rural Health.
3. Statistical Computing for ICSSR Sponsored Project on Predicting Managerial Effectiveness
4. Data Analysis of clinical data on 'Victrectomy for Diabetic Retinopathy, for Sankar Netralaya
5. For CMC, Hyderabad on Systems evaluation, design, appraisal for transaction Processing applications.

ELECTRICAL ENGINEERING

INVITED LECTURES BY STAFF:

1. Frontiers of Technology and their Industrial Applications — Dr. M.K. Achuthan, Center for Studies on Science and Technology and Rotary Club, Madras.
2. GaAs Solar Cells — Dr. K.N. Bhat, International Training Program, COSTED, IIT, Madras.
3. Amorphous Silicon — Sri R. Ramachandran, Short Term Course on Opto Electronic Materials and International Program on Photo Voltic Energy Systems, IIT, Madras
4. Signal Processing — Dr. V. V. Rao, Short Term Course on Precision Instruments.
5. Lasers — Dr. M. Mukunda Rao, at NSTL, Visakapatnam.
6. Challenges of Engineering Education, Modern Control Theory and Applications, Electronics in Industry — Dr. R. Parthasarathy at Institution of Engineers, Best & Crompton, Indian Institute of Plant Engineers.
7. Delivered lectures at Anna University by Dr. R. Parimelalagan and Dr. B. Ramaswami.
8. Switchgear and Control gear — Dr. S. S. Yegnanarayanan and Sri M. Krishnamurthi at Export Inspection Agency, Madras.
9. Electric and Magnetic Levitation—Dr. S. S. Yegnanarayanan at IEEE, Madras Chapter.
10. Electric and Magnetic Field Computation-applied to Design of EHV Power Transformers shunt reactors and HT Motors-Dr. S. S. Yegnanarayanan at M/s. Crompton and Greaves Ltd., Bombay.
11. Power Electronic Circuits Simulation using PICE-Dr. V.V. Sastry at Anna University.
12. General Aspects of Synchronous Motor Drives - Dr. Vedam Subrahmanyam at College of Engineering, Anantapur.
13. General Aspects of DC Drives and AC Drives - Dr. Vedam Subrahmanyam at Best and Crompton, Madras.
14. Analysis of SCR controlled Induction Motor - Dr. Vedam Subrahmanyam
15. Pollution performance of Electrical Equipments and Modern Insulating Materials-Dr. Y. Narayana Rao at Jadavpur University, Calcutta.
16. Multi-dimensional Signal Processing-Dr. C. Eswaran at International Conference on Computers, Systems and Signal Processing.
17. Digital Hardware Design Architecture Algorithm and Software Aids, Image Processing-Dr. J. P. Raina at IIT, New Delhi.
18. Detectors for Optical Communications-Dr. J. P. Raina at IIT, Madras.

EDUCATIONAL PROGRAMS (QIP)

1. Short-term QIP course on Semi Conductor Devices Modelling and Technology May-June 1984.
2. Integrated Circuits for Engineers from Industry through IC & SR, May 1984.
3. Short-term Course on Line of Sight Communication Systems, December 1984.
4. Short-term Course on Microprocessors for faculty from Engineering Colleges.
5. Development of the Power Electronics and Drives Laboratory of Anantapur Engineering College, UGC scheme.

NEW EQUIPMENTS PROCURED

Communications:
1. Tectronix 10 MHz Storage Oscilloscope
2. H. P. Function Generators
3. Microprocessor Kit.

Microwaves:
4. NIAC SYM 350 Data Acquisition System, 32 Channels, MAC BASIC, 256 K

Laser:
5. High Power Nd : YAG Laser

Microprocessor:
6. 48 channel Logic State Analyser
7. ICE-85 In Circuit Emulator
8. SDK 57 System Design Kit

Control:
9. RLC Bridge

Guidance
10. 8085, Z-80 Kits

Machines:
11. Zeta Microprocessor System

TV:
12. Mag Tape System
13. Expander System for PDP 11/23
14. Floppy Disc Drive

D) LABORATORY EQUIPMENTS/FACILITIES CREATED

Circuits & Drives:
1. An inexpensive C-V plotter for MOS studies.
2. Halogen Oxidation of Silicon for Gate Oxide MOSFET'S for LSI & VLSI
3. Glow Plasma deposition Systems for Thin Amorphous Silicon Films.

Microprocessors:
4. EPROM Programmer and personality cards for 2716, 2732, 8755, 8748.
5. Add in Subsystem for Bit-slice development work.
6. Write up for self learning Z 8000 SDK 57, AIM 65.

Control:
7. Induction Motor Controller using Thyristor Chopper.
8. Induction Motor Controller using Stator SCR Converter.
9. DC Motor Speed Control using 8 bit microprocessor

Guidance:
10. Intel 236 microprocessor development system.
11. Through hole electroplating equipments.

Machines:
12. Single phase MC Murray Inverter
13. Single phase Variable AC Supply.

SEMINARS ATTENDED

1. International Conference on Physics of Compensated Semi Conductors—Dr. M. K. Achuthan and Dr. K. N. Bhat, Feb. 1985.
2. Spread Spectrum Communications — Dr. V. V. Rao.
3. European Conference on Optical Communications, West Germany — Dr. M. Mukunda Rao.
4. (a) IEEE Conference on Computers, Systems and Signal Processing, Bangalore.
   (b) IEEE Conference on Man, Cybernetics, Bombay.
   (c) IEEE Conference on Acoustics, Speed and Signal Processing (USA) 1984 — Mr. S. Raman.

5. IEEE Conference on Trends in Electronics TENCON '84, Singapore, April 1984 — Dr. V. G. K. Murti.
6. Microprocessors and Their Applications, IIT, Madras — Mr. M. Krishnamurthi.
7. International Conference on Electrical Machines, Lausanne, Switzerland,, Dec. 1984, — Vedam Subrahmanyam.
8. (a) Workshop to promote the use of National Standards in Technical Education — Anna University.
   (b) Assessment of Effects of Power Supply Disturbances on Large Induction Motors, Conference on System Disturbances and Over voltages in Power Distribution Networks, organised by Electrical Research and Development Association — Dr. S. S. Yegnanarayanan.

SEMINARS CONDUCTED

1. Amorphous Silicon — Fundamental understanding and Applications.
2. National Symposium on Microwave Communication Systems.
3. Unidirectional Coding and Cryptology.
4. Workshop on Microprocessor Applications.
5. Switch gear and Control gear.
6. Intensive Exposition Seminar on Multiphase High Voltage Transmission.
7. Intensive Short term Course on Fibre Optic Communication Technology.
8. National Symposium on Image Signal Processing and Workshop on Microprocessor Applications.

DISTINGUISHED VISITORS

1. Dr. A. Ganesham, Bell Labs., USA
2. Prof. Dr. W. Fuhs, University of Marburg, W. Germany.
3. Mr. V. Mitra, Deputy Director, TRC, New Delhi.
4. Mr. S. Muthuswamy, Addl, Director, TRC, New Delhi
5. Prof. Ladislay Dolansky, UNESCO
6. Dr. Klas Gralen, Sweden
7. Prof. T. R. N. Rao, USA
8. Prof. N. Sridhar
9. Prof. Dr. S. S. Venkata, Univ. of Washington, USA
10. Dr. L. Basthold, USA
11. Prof. K. R. Rao, University of Texas,USA
12. Prof. M. Madan Gupta, University of Saskatchewan, USA
13. Dr. Prasad Subramaniam, Bell Telephones, USA
14. Prof. S. Pasupathy, University of Toronto Canada
15. Prof. D. Kind, West Germany.
16. Dr. Nagarajan, M/s. Erikson, Sweden
17. Dr. Volkar Hahn, Univ. of Bochum, West Germany
18. Prof. Tulasiraman, Concordia Univ, Montreal, Canada.

LECTURES BY INVITED SPEAKERS

1. CMOS-VLSI Technology - Dr. A. Ganesan.
2. Digital Microwave Communication - Mr. V. Mitra
3. Over view of Microwave Communication Systems in India - Mr. S. Muthuswamy, TRC New Delhi.
4. Planning, Installation, Maintenance of LOS links - Mr. K. Ramanathan, P & T.
5. Can Machines Think? - Dr B. Yegnanarayana, IIT, Madras.
6. Digital Signal Processing and its applications - Prof. M. Sridhar, Univ. of Windsor, Canada.
7. Multiphase High Voltage Transmission - Prof. S.S. Venkata and Dr. L. Basthold
8. Robatic Vision by Dr. Klas Gralen, National Univ., Singapore.
9. The Second Generation MOTIS - tuning Simulator - Dr. Prasad Subramanyam.
10. Pulse Shape in Data Transmission - Prof. S. Pasupathy
11. a) Partial discharges, measurements and interpretation.
    b) Research and Testing in Metrology - Prof. D. Kind.
12. High Speed Optical Data links Dr. Nagarajan.
13. a) Stability Problems in Adaptive Control Systems.
    b) Multivariable Adaptive Controller for Distillation Columns - Dr. Volkar Hahn
14. Some Recent Results in Algorithmic Graph Theory – Prof. K. Tulasiraman.
15. a) Cardiogram Signal Processing
    b) Knowledge based Expert System – Prof. M. Madan Gupta
16. Certain Problems of Speech Communication - Prof. Dolansky, North Eastern Univ., USA
17. Data Compression - Prof. K. R. Rao.

R & D IN PROGRESS

1. Optimization of Solar Cell Performance.
2. Halogen Oxidation for MOS Gate in LSI/VLSI
3. Life time control in Silicon for High speed switching Devices.
4. Studies on the Effects of Platinum Diffusion Condition on the Characteristics of Power Devices.
5. Effects of Lateral Radius of Curvature on the Break-down of HV devices in Power IC's.
6. Studies on Thin Oxides for LSI/VLSI circuits using MOSFET logic.
7. Photo PIN diodes for detection of U.V. visible and IR signals.
8. Characterization of Narrow Base Bipolar Transistors in LSI circuits
9. Development of Amorphous Silicon Cells
10. VHF/UHF Propagation Studies.
11. Underwater Lasers.
12. Microprocessor Based Stencil Cutter for Computer Output.
13. Studies on (i) Current-fed Induction Motors, (ii) HPO Induction Motor
14. Signal Processing Techniques for Missile Guidance Systems
15. Computer Tomography
16. Robotics
17. Transient Over voltage Studies on Orissa State Electricity System.

18. Fibre Optic Communication System for Vijayanta Tank
19. Study and Analysis of Dispersion Impulse Response Characteristics of Fibres and Development of Automatic Measurement Unit.
20. Development of Compatible Digital FOC System for Aircraft.
21. Development of Optical Couplers.
22. Low Bit Rate Colour TV Signal Codec.

INDO - GERMAN COLLABORATION

1. Development of Amorphous Silicon Solar Cells
2. Infra-red Light Beam Link for Two Distant Computers.
3. Speed Control of Squirrel Cage Induction Motor.

INDUSTRIAL TESTING

1. Calibration of Electric Measuring Instruments.
2. Testing of Instrument Transformers.

ASSISTANCE TO INDUSTRY

1. Development of Space Quality Power Transistors—for KELTRON, VSSC.
2. Photovoltic System for Water Lift Irrigation—for Udayakrishna Engineering Works.
3. Fibre Optic Laser Current Transformers—for W.S. Insulators.
4. A Programmable Controller—for PTDC, Madras.
5. Microprocessor based design of Control Systems for Technolab Ltd. and Universal Engineering Co.
6. Rewinding of 3 Slip-ring motors—for Madras Rubber Factory.
7. Duty Cycle Motor selection for Derusting Plant for TI Cycles.
8. Study of Steady State and Switching Over voltages in Orissa State Electricity Board.
9. Investigations carried out for NGEF.

PUBLICATIONS

1. a) An LSI Chip for Linearization Application — by Karmalkar, S., Apte, P. R., Achuthan, M. K.
   b) Three Terminal Measurement of N-base parameters in Thyristors — by Karmalkar, S., Bhat, K. N. and Achuthan, M. K. — in International Conference on Compensated Semi Conductors, IIT, Madras, Feb. 1985.
2. Diffused Junction P^+n Solar Cells in Bulk GaAs-I by K. N. Bhat, I. Bhat, G. Mathur and others — Solid State Electronics, VOL. 27, No. 2, 1984.
3. Computer Aided Thermal Analysis of Reverse Biased PIN-diodes — by V. Ramamurthi, K. N. Bhat, D. Kakati, IEESSED, Vol. 31, June 1984.
4. Preparation of Thin Films by Glow Plasma Deposition by R. Ramachandran — Symposium on Photovoltic Materials and Devices, May 1984.
5. Large Signal Instability in the Switched Capacitor Double integrator Biq — M. Sasikumar, K. Radhakrishna Rao and M. A. Reddy — IEEE International Symposium on Circuits and, Systems, Vol. 3, May 1984.
6. On the Computation of Auto correlation using Polynomial Transforms by S. Prakash and V. V. Rao, IEEE Trans. on ASSP, April 1984.

7. Finite Word Length Effects on MESA, Proc. of the International Conference on Computers Systems and Signal Processing -- Bangalore, Dec. 1984.

8. VHF/UHF LOS-link between Madras and Tiruporur, A theoretical study Tech. Report No. 3, by V. Subrahmanyam.

9. A study of Equatorial Electrojet Reversal during severe magnetic storms — by M. Mukunda Rao, Indian Journal of Radio and Space Physics, Vol. 13, 1984.

10. Performance Index as a Measure of Performance Evaluation of a Speech Recognition System — S. Raman, V. R. Algazi, Univ. of California, USA, Report No. SIPL-84-7, June 1984.

11. Micro Processor based Stencil Cutter for computer output in Indian Languages — by S. Raman and others, Special Issue of Journal of IETE, Nov. 1984

12. a) Bilinear Transformation of Multi-variable Polynomials — IEEE Trans. ASSP, Vol. 32, Feb. 1984.

    b) Bilinear Transformation by Synthetic Division — IEEE Trans on Automatic Control — by R. Parthasarathy.

13. A Syntactic Approach for Identification of Non-linearities in SISO Systems — by S. K. Pramanik, V. Seshadri, IEEE Symposium, Bombay 1984.

14. A new approach to Flat Gain Kalman Filtering in Clutter Reduction in Missile Tracking and Guidance — by S. K. Pramanik and V. Seshadri — All India Symposium on Communications, IISC, Bangalore, Oct. 1984.

15. Design of a Stable Signal Synthesis Adaptive Lateral Autopilot for Missile under Atmospheric Disturbances — S. K. Pramanik and V. Seshadri — IEEE Conference on Computers, Systems and Signal Processing, IISc, Bangalore, Dec. 1984.

16. Design of Microprocessor based Digital Manuever Policies, S. K. Pramanik and V. Seshadri — ISSM Symposium on Mini and Micro Computers in Control, Los Vegas, USA, 1984.

17. Failure Detection, Isolation, Reconfiguration for Inertial Reference units for Spacecraft, V. Seshadri and others, National System Conference, Bombay, 1985.

18. Phase Equivalent Reduction of Discrete data Feed Back Control Systems via Bilinear Transformation — by G. Pavithran, V. Seshadri, National Systems Conference, Bombay, Jan. 1985.

19. A practical Thyristor Model for Computer Aided Power Electronic Circuit Design by V. V. Sastry and others, TENCON, Singapore, April 1984.

20. Steady- state performance of Chopper-fed DC Series Motors with Magnetic saturation — C. Chellamuthu and V. V. Sastry, Annual Paper Meeting, Institution of Engineers, India, Sept. 1984.

21. Current Source Inverter-fed Induction Motor Analysis — by V. V. Sastry and Ranganatha Rao, Third National Power Systems Conference, Warangal, Sept. 1984.

22. A New Algorithm for Non-linear Multi Criteria Decision Making Problem — V. V. Sastry, P. V. Rao and T. C. Kong, Proc. IEE, London.

23. Wave Digital Biquads derived from R. C. Filter Configurations by C. Eswaran and others, IEEE Trans. on Circuits and Systems, Sept. 1984.

24. Wave Digital Biquads, free of Limit Cycles under constant Input Conditions by C. Eswaran, and others — Proc. IEEE Symp. on Circuits and Systems, May 1984.

25. Determination of a Driving Point Function from its specified Real Part — VGK Murti, International Journal of Electrical Engg. Education, Vol.21, Jan. 1984.

26. Determination of a Digital Transfer Function from its Real part on the Unit Circle by VGK Murti, Proc. of IEEE, Vol. 72, Feb. 1984.
27. Application of Generalised Impedance Converter in Electrical Instrumentation by VGK Murti, TENCON 84 (IEEE), Singapore.
28. Unity Gain Frequency dependent Quadrature Phase Shifter — VGK Murti and E. W. Tay, Electronics Letters, May 1984.
29. A New Method for Incircuit Measurement — Rehman and VGK Murti, Journal of Physics, E. Scientific Instruments, Vol. 17, 1984.
30. Graph Theory and Social Systems, Engineer, NUS, Singapore, July 1984.
31. Active Circuits for Flux Wave form Compensation in Ferromagnetic Cores by P. Sankara, Jagdeeshkumar and VGK Murti.
32. A TRA Technique for Incircuit Impedance Measurement by Rehman, M., Ahmed, M.T., VGK Murti, IEEE Trans. on Instrumentation and Measurement, Dec 1984.
33. a) On the Performance Characteristics of a Synchronous Motor, fed from a Voltage Source Converter — Archiv fur Electrotech., 67, 1984.
    b) On the Analysis of an Induction Motor with Square Wave Currents in the Rotor via State Transition Signal flow Graph Technique, Ibid 361-368.
    c) A method for the Analysis and Design of CSI Induction Motor Drive — ibid.
    d) Steady State Analysis of Voltage Controlled Induction Motor using Park's Vector Journal IE 1984.
    e) Analysis of an Induction Motor with Square Currents in the Rotor — Canadian Elec-Engg. Journal, Jan. 1985. Papers : 33 a, b, c, d, e, by Vedam Subrahmanyam.
34. Equivalent Circuits for Skewed Rotor Induction Motor, G. Sridhara Rao. VSRK Mouli, Vedam Subrahmanyam, Electric Machines and Power Systems, Vol.8, 1984.
35. Representation and Processing of Images in Phase Domain by J. P. Raina, CVPR-85 San Francisco 1985.

FUTURE PLANS

1. VLSI Technology Project proposed to Electronics Commission.
2. Center for VLSI Technology, proposal to UNDP through Education Ministry.
3. Development of MODEM's, Encoders, Decoders for Error Correction.
4. Propagation Studies between Madras and Trivallore, Sriharikota and Kancheepuram.
5. Voice Terminal for Indian Languages.
6. Model Reduction by Continued Fractions.
7. Analytical Studies for Strap down Inertial Navigation System for VSSC.
8. Electric and Hybrid Vehicles, Heat Transfer and Noise Problems in Elec. Machines, Parity Simulation of Power Electronic Circuits, Setting up of Powet Electronics Lab.
9. Microprocessor controlled Dynamometer for 50 KW Wind Turbine Simulator.
10. HT Motor Damages in Thermal Power Plants.
11. Fibre Optic Communications, Image Processing.

STAFF MATTERS

1. Dr. Madan Lal Sethia joined the Department.

2. Sri N. Ramasubramanian, Sr. Project Officer, Gr. II and Sri R. Hariharan, Technician, were taken in for UHF and VHF Projects.

3. Sri N. Alwar stood first and Smt. R. Sumathy stood second in the NIIT Course held in New Delhi.

4. Sri M. Krishnamurthi has been made a member of the Committee, 'Energy from Wastes', Corporation of Madras.

5. Dr. Y. Narayana Rao has been invited to serve as a member in the Experts Panel appointed by the Govt. of India, for the accreditation of Electrical Testing Labs.

6. Dr. S. S. Yegnanarayanan has been invited to be a Member of the Experts Panel on EMTP Modelling, NTPC, New Delhi.

AWARDS ETC

Dr. T. S. Ramu (Guide Dr. Y. Narayana Rao) who was a Research Scholar in High Voltage at IIT Madras, was presented the IAEC Golden Jubilee Award for his outstanding work on Behaviour of Insulating Materials and their Applications.

HUMANITIES AND SOCIAL SCIENCES

Changes made in Curriculum

Evening Course for beginners in German is now based on Audiovisual materials like films and slides.

Serving Teacher's programme

M. Tech.	*Ph. D.*
3	*3*

Research Publications :

Books

1. Political Economy and Monetary Management by Prof. S. Ambirajan.
2. Perspectives on Anita Desai, "Voices in the City " by Dr. A. V. Krishna Rao.
3. 'Continuity and Change in the novels of Kamala Markandaya' Chapter in the Book' perspectives on Kamala Markandaya'.
4. 'The Steam Intellect and the Raj' in a book entitled the 'Steam Intellect Societies' published by Nottingham University Press, 1985 - Book by Prof. S. Ambirajan.
5. Contribution of a chapter entitled "Training Managers for Corporate Planning " to a book " Education and Training of public Enterprise Personnel" published by Oxford and IBM publishing Co. 1984. (By Dr. LVLN Sarma)

Papers: 10

Seminars Conducted

1. Dr. T. K. Gopalan "Statistical Methods on Hypothesis Formation"
2. Prof. S. R. Mehrotra "Nationalism in India"
3. Prof. Jean Esther Flond "On Karl Mannheim"
4. Sri. B. K. Nehru, Governor of Gujarat, Silver Jubilee Visiting professor, "Morality in public Life"
5. "Problems of Translation" by Dr. Paul Kussmaul (Maine Univ)
6. Prof. Leonard Neufeldt (Munich) on "Methodology of Contextual Analysis".

Invited Lectures by the Faculty

1. At IFMR Madras as "Recent Developments in Utility Theory" by Dr. S. Ambirajan.
2. Three Lectures "The State of Economic Science in India" at Sri. Venkateswara University by Dr. S. Ambirajan.
3. "Environment Pollution and Society" at Indian Institute of Plant Engineers, Madras, by Dr. S. Ambirajan.
4. "Technological roots of Indian Poverty" Madras Christian College. Madras by Dr. S. Ambirajan.
5. "Maintenance Management" at Madras University by Dr. T. T. Narendran
6. "Motivation and Leadership" at Regional Labour Institute by Dr. R. N. Anantharaman.
7. "Achievement Motivation" at Small Industries Service Institute" by Dr. R. N. Anantharaman.
8. "Written and Oral Communication to Senior Managers", Ennore Foundries by Dr. A. V. Krishna Rao and Sri. V. S. Kumar

9. Application of Reliability Engineering in Industry by Dr. Dipak Chaudhuri in Kirloskar Electric Co Ltd, Bangalore
10. "Report Writing" by V.S. Kumar and S. Mohan in National Productivity Council
11. "Cost of Capital and Capital Structure" at Kodaikanal to the executives of SPIC, Madras at their "IN COMPANY PROGRAMME ON FINANCIAL MANAGEMENT" by Dr. LVLN Sarma.
12. Planning Forum of the Post Graduate Students of Economics of Meenakshi College, Madras in December 1984. Topic: Corporate Long Range Planning, by Dr LVLN Sarma.
13. Programme Director for the Executive Development Programme on "Corporate Financial Strategies" (for senior and middle Level executives of the Indian Corporate Sector for 4 days) at IFMR, Madras. Dr. L. V. N. Sarma.

Placement:

No. of contacts: 100

No. of candidate placed: 16

MATHEMATICS

SYMPOSIA/CONFERENCES ORGANISED IN THE DEPARTMENT

A Symposium on Mathematical Analysis, sponsored by the I.I.T., Madras, The National Board for Higher Mathematics and the C.S.I.R, was held in the Department from 19-12-1984 to 21-12-1984; Dr. P. V. Subrahmanyam was the convenor. The topics covered in the Symposium were Ergodic Theory, Functional Analysis, Operator Theory, Modern and Classical Function Theory and Non-Archimedean Analysis.

A Seminar on 'SOME TOPICS IN THEORETICAL PHYSICS' was organized by the Department of Mathematics from 25-2-1985 to 28-2-1985. In this seminar Prof. A. Krasinsky of Copernicus Astronomical Center, Polish Academy of Sciences, delivered lectures on 'GENERALISED COSMOLOGICAL MODELS' and 'ALGEBRAIC COMPUTER PROGRAMMES AND THEIR USE IN GENERAL RELATIVITY'. In addition there were several others from the Institute and outside IIT who participated/delivered lectures in the seminar.

SUMMER TERM COURSE ORGANIZED IN THE DEPARTMENT

A Summer Term course on 'Finite Difference and Finite Element Methods and Their Applications was conducted from 28-5-1984 to 9-6-1984 under Q I.P. Dr. C. V. Raghava Rao was the coordinator.

SYMPOSIA/CONFERENCES ATTENDED BY THE FACULTY/RESEARCH SCHOLARS

Dr. P. V. Subrahmanyam gave a talk entitled 'Some Fixed Point Theorems and Nonlinear Functional Equations' in the International Symposium on Functional Equations and Their Applications held at Trivandrum on 9-3-1984.

Dr. C. V. Raghava Rao and Miss K. Pramadavalli (Research Scholar) attended and presented two papers in the Third International Conference on Boundary and Interior Layers — Computational and Asymptotic methods (BAIL-III)' held between 20-22 June, 1984 at Trinity College, University of Dubline Ireland. They also attended the International Short Course on 'Advances in Computational methods for boundary and Interior Layers' held between 18-19 June, 1984 which was held in association with BAIL-III Conference.

Dr. K. Swaminathan attended and presented a paper at the 25th Conference of polish Academy of Sciences at Jachranka, Warsaw. Poland during 26-8-1984. 31-8-1984.

Dr. P. Achuthan presented two papers in the 72nd session of the Indian Sciences Congress held at the Lucknow University from 3-8- Jan. 1985.

INTERNATIONAL JOURNAL

The Journal of Mathematical and physical Sciences brought out by the Department continued to publish research papers from India and abroad. The Journal was started in 1967. A special number of the Journal Vol, 18 S (1983-84) containing 179 pages and dedicated to Professor W. Hahn was brought out as Silver Jubilee issue.

Research: Work in the following fields are in progress.

Analysis, Continuum Mechanics, Operations Research, Applied probability and Stochastic processes, Graph Theory, Theoretical physics, Cosmology and Relativity.

SEMINAR

Regular Seminars have been arranged in the Department as usual.

FACULTY NEWS

Dr. P.R. Parthasarathy, Assistant Professor has gone to the University of Tubingen, FRG, on a Humboldt Scholarship in July, 1984.

Dr. U. N. Srivastava, Associate Professor and Dr. S. N. Majhi, Assistant Professor visited Germany under the DAAD short term fellowship programme.

Dr. P. Achuthan, Associate Professor, has been awarded the DAAD short-term visiting fellowship for 1985.

Professor K. R. Parthasarathy and Dr. P. Bhattacharyya have rejoined the Department on return from abroad

Professor S. D. Nigam has retired from service on 30-6-1984.

Dr. T. S. Shankara has resigned with affect from 8-3-1985.

Professor R. Subramanian assumed charge as Head of the Department from 1-7-1984.

GENERAL

Some faculty members are serving as referees and several as reviewers for some research journals.

MECHANICAL ENGINEERING

Faculty :

Professors	Assoc. Profs.	Asst. Profs.	Lecturers	Design Engineers
17	4	19	12	2

Deputation Assignments Abroad :

The following faculty member retired from the Department :
Prof. M.C. Gupta

The following faculty members have been sanctioned leave to go abroad/accept assignments with other organisations :

1. Prof. K. Lakshminarayana on reinvitation to West Germany
2. Prof. K. N. Seetharamu on reinvitation to West Germany
3. Prof. V. M. Krishnasastri
4. Prof. G. V. N Rayudu

Mechanical Engineering Association :

Following special lectures were arranged :

1. Industrial Energy Management —
   Mr. S. Padmanabhan, Deputy Director, NPC, Madras
2. Special Type of Computers used in Process Control —
   Mr. A. Brahmayya, Applications Engineer; DCM Data Products
3. Computer Numerical Control in Machine Tools and Their Applications in India —
   Mr. Ashok Mathai
4. Computer Aided Design —
   Mr. T. Raja Rao, Manager, OMC Computers Ltd., Secunderabad

Other activities :

1. Mech. Engg. Sports
2. Mechanical Engineering Quiz
3. Visit to Industry

Educational Tour :

Prefinal Year B. Tech students accompanied by Dr. N. Sivaprasad and Mr. S. Krishnamurthy went on industrial-educational study tour lasting for about 15 days.

HEAT TRANSFER AND THERMAL POWER LABORATORY

a) New Courses introduced : Fluidized Bed Combustion Technology 3 ME 687.

b) Sponsored Projects :

1. Indo German Project : Development of Fluidized Bed Cooling Tower

2. BHEL Projects
   Design and Model testing of Horizontal Feed Water Heaters
3. Heat Transfer in the casing of Steam Turbines
4. Heat Transfer studies using Finite Element methods in Brake systems, Continuous Casting, ingot Casting etc.

C) Research and Development :

1. Direct contact Heat Transfer Between Immisible liquids
2. Subcooled Boiling
3. Simulation of Casting Processes using FEM.
4. Measurement of Thermal diffusivity of metals and liquids.
5. Asymptotic solution to radiating fin problem.
6. Development of a thermal infrared detector
7. Heat Transfer at low densities from strips and wires.
8. Fluidized Bed cooling Towers.
9. Bed dynamics and Heat Transfer in Fluidized Bed Coal Combustors.
10. Thermal Energy Storage using a PCM
11. Thermal conductivity of disperse media.
12. Compact Heat Exchangers with evaporation/ condensation
13. Heat Transfer augmentation in single phase and multi phase System.
14. Second law analysis of heat exchangers.
15. Analysis of fouling on finned surfaces
16. Thermal performance of Deaerators
17. Cooling of Electrical Machines.

d) Research publication : 15

e) Staff : Dr. Ajit Kumar Kolar has joined the department as Assistant Professor

f) Invited Lectures delivered by the Staff : 'Applications of FEM to Heat Transfer problems' delivered at Technical University, Berlin during October '84 by Professor K. N. Seetharamu.

HYDROTURBOMACHINES LABORATORY

a) Sponsored Project :

i) BHEL Project on 'Bulb Turbines'

Microhydel power plants located close to the consumer have a future and they do no harm to the environment. In its efforts to develop indigeneous knowhow for the design of suitable turbines for such low head applications, the Hydroturbomachines Laboratory, in collaboration with BHEL, Bhopal has successfully developed a design for a high specific speed model Bulb Turbine. This project has now been concluded and the model turbine has now been developed and this gives a maximum efficiency of 90 percent. The prototype of this turbine will give a higher efficiency than the above. The development of indigeneous design knowhow for these turbines will greatly help in tapping the mini and micro hydel potentials of our country.

ii) ARDB Project :

A Project entitled "LPR Turbopump Cavitation prediction" has been started.

b) Research and Development:

i) A model Bulb Turbine developed in this laboratory has been successfully tested for efficiency.

ii) Inverse design of Aerofoils using surface vorticity distribution method has been initiated

iii) Studies on cavitation, noise and vibration aspects in centrifugal pumps are in progress.

iv) Studies on the influence of number of blades on the performance of the Bulb Turbine has been started.

v) Studies on profiles for self rectifying Air Turbines are in progress.

c) Assistance to Industry-ICC :

The testing of the Bulb Turbine model developed for BHEL, Bhopal has been successfully completed.

d) QIP UGC Fellowship Programme :

A Ph.D. thesis entitled 'Studies on the Mixing characteristics of flow in a Jet Pump', has been submitted under the above programme.

(e) New Major equipment added :

i) 16 35 B Negative Processor

ii) Dual Channel signal Analyser and accessories

f) Research Publications :

1) S. Mahadaven, and S. Kumaraswamy, 'High speed motion picture studies of cavitation in a radial flow pump impeller', 13th National Conference on FMFP, REC, Trichy, 1984.

2) S Kumaraswamy and H. C. Radha Krishna, 'Studies on variation due to cavitation in a radial flow pump, 6th ISME, Conference, New Delhi, 1985.

3) Sunil S. R. Gangolli and V. Balabaskaran, 'Calculation of flow past thick and highly cambered aerofoils in cascades using surface vorticity theory', 6th ISME Conference New Delhi, 1985.

g) Brief indication of developmental programme :

1) Studies on ducted propellers and Pump Jets
2) Studies on wave energy Turbines
3) Cavitation, noise and vibration studies in Hydroturbomachines
4) Studies on Jet Pumps
5) Developmental studies on Bulb Turbines and special purpose Pumps
6) Developmental studies on alternative sources of energy

h) Invited lectures delivered by the staff :

1) Dr. V. Balabaskaran, Asst. Professor delivered a few lectures on 'Surface Vorticity Technique and its application to Ducted Propellers' to the participants of the intensive course on 'Marine Propellers' on the invitation of Indian Institute of Science, Bangalore and Polish Academy of Sciences, Gdansk, Poland, during 12th and 13th Feb. 1985 at I. I. Sc., Bangalore.

2) Mr. S. Kumaraswamy, Lecturer delivered a lecture on 'Modernisation of Jet Pump/Airlift Pump Industry' at Pandyan Hotel, Madurai on the invitation of Small Industries Service Institute, Madras. The participants were the Small Scale Industrialists having their unit around Madurai and the lecture was in the regional language ie. Tamil. The lecture was part of a session on Modernisation of Small Scale Industry' and was held on 19-3-85.

i) Deputation :

Sri S. Kumaraswamy, Lecturer attended the National Session on 'Pump Maintenance' organised by National Centre for Technical Development' at Hostel Searock, Bombay on 11th and 12th March '85 on deputation.

INTERNAL COMBUSTION ENGINES LABORATORY

a) **Sponsored projects :**

1. Indo-German Project : 'Development of Alternative Fuels for I. C. Engines'.
2. DNES Project : 'Use of Non-edible oils as an alternative fuel to diesel for use in I. C. Engines'.
3. NSF Project : Combustion of alcohol and biogas'.

b) **Research Publications** : International : 4
National : 8

c) **Important Lectures & Seminars.** : Conducted a Summer School on 'Hydrogen Energy' in May 7-18,1984

MACHINE ELEMENTS LABORATORY

a) New Courses Introduced :

Vehicular Mechanisms and dynamics. B.Tech

b) Sponsored Project :

Superplastic forming of A 1 & Ti Alloys AR & DB (co-investigator with Metallurgy Dept).
Superplastic forming of Ti alloy for fuel bottles of PSLV DRDL Project (co-investigator with Metallurgy Dept).

c) Research & Development :

1. Surface durability studies on treated Low Strength gears
2. Improvement in the life of sleeve bearings
3. Studies on sintered iron based friction materials
4. Impact wear studies on Armour plates
5. Optimal linkages for uniform Transmission
6. Optimal Designs of Dwell Mechanisms

d) Assistance to Industry - ICC :

1. Failure analysis of girth gears in Fertilizer Plants MFL Madras
2. Software development for the design Ammonia Converter BHPV, Visakhapatnam

e) Research Publications :

1. A. Ramamohana Rao, 'Failure Analysis of Liquid nitrided Low carbon steel gears 'Wear Vol.95, 1984, p 131-141.
2. A. Ramamohana Rao, 'Cumulative damage under Rolling contact Fatigue', ICF6, Delhi Dec. 1984, p 120-122
3. A. Ramamohana Rao, 'Fatigue Design of helical gear blanks' Fatigue and Fracture Research in India. 1984 p 167-174.
4. A. Ramamohana Rao, 'Improvement in contact fatigue properties of low strength steels by recent surface treatment techniques', Fatigue and Fracture Research in India 1984 p 175 - 178
5. A. Ramamohana Rao, 'A comparative study of the performance of Tufftrided and Sursulf, treated low carbon steel gears, National conference on Machines and Mechanisms, 1985 P, 279-282.
6. K. Gopinath & J. Subrahmanyam, 'Wear studies on Boronized mild steel' wear 95 (1984) P 287-292.
7. K. Lakshminarayana & K. Ch. Butchi Raju, 'Function Cognate Mechanisms, General Theory and Applications; Mechanism and Machine Theory 1985
8. K. Lakshminarayana & K. Ch. Butchi Raju, Cognate connections and their Application to Function Cogonates and over-constrained Linkages ; Mechanism and Machine Theory, 1985.
9. K.Ch. Butchi Raju & K. Lakshminarayana: Function Cognates of the RSRC Mechanism National Conference on Machines and Mechanisms, Bangalore, 1984.

f) Important Lectures/ Seminar/ (by outside experts)

Lectures by Prof. Dr. Ing. Gert Bechtloff, Hochschule der Bundeswehr, Hamburg, West Germany.

g) Visitors to the Departments :

Prof. Dr. Ing. Gert Bechtloff, Hochschule der Bundeswehr, Hamburg, West Germany.

h) Brief Indication of Developmental Programmes:

Improvement if the fatigue properties of low strength materials

i.) Staff:

1. Dr. N. Sivaprasad, Joined IIT, Madras as Lecturer.

j.) Invited Lectures Delivered by the Staff:

1. Dr. K. Gopinath "Wear Mechanisms and combating techniques NPC, Dec. 1984.
2. Dr. K. Gopinath "Friction and Wear in Machinery" Engg. College, Guindy, 1984.
3. Dr. K. Gopinath "Surface treatments to combat wear" Engg. college Guindy, 1984.

k) Any other Information:

Test equipment for investigating the effect of slip phenomenon on the performance of rollers fabricated and studies have been initiated.

MECHANICAL HANDLING LABORATORY

a) Sponsored Projects:

DST Project on pneumatic conveyance of powdered materials at high concentrations —has been successfully completed and it is being commercialised by NRDC

b) Research and Development:

Research in the field of Vibratory conveying, pneumatic conveying, Air slide and dynamics of cranes is continuing.

c) Assistance to Industry—ICC:

M/s IGP, M/s KCP Ltd, M/s Metalloys and M/S Mettur Beardsell.

d) QIP/UGC Fellowship Programme:

Two research scholars under QIP are in the final stages of their Ph.D work.

e) Research Publications:

Published two papers

f) Important Lectures & Seminars:

Took active participation in Seminar on Materials Handling conducted by Institution of Engneers (India) 3 papers have been presented. Prof. Funk of TU Hannover delivered one lecture in summer.

g) Invited Lectures delivered by the staff:

NIL

h) Fabrication:

Proto type internal roll clamps. Air slide and Bucket elevator have been fabricated.

PRECISION ENGINEERING AND INSTRUMENTATION LABORATORY

a) Sponsored Projects :

1. Gyro Modelling - ARDB
2. Hydraulic Feed and Positioning Servodrives-Indo-German

b) Research and Development :

1. Optimization problem in micro-hydraulics
2. Electrohydraulic servo system for engine gimbal control
3. Dynamic analysis of fluid power systems
4. Hydraulic quill feed unit for Drilling purposes
5. Experimental studies on partially oil filled sintered bearings
6. Dynamic load study on gear drives
7. Manufacturing error effect on the performance of oil-pump used in agricultural machinery.
8. Noises in Precision gears
9. Roundness error of precision shafts
10. Inspection of certain parameters in Vikas Engine Trust Chamber
11. Identification of a rotor on magnetic bearings
12. Ball bearing with plastic cages
13. High acceleration motor for antenna control
14. Modelling and simulation of turbine governing system
15. Pole assignment in multivarible systems
16. Microprocessor Based system design
17. Microprocessor Controlled Job Drilling.

c) Assistance to Industry—ICC :

Design of a 250 Ton Cotton Baling Press.

d) QIP/UGC Fellowship Programme :

One QIP Ph.D. Scholar (Joint Guidance).

e) Research Publications :

Book - 1

Papers - 5

f) Brief indication and developmental programme :

It is proposed to strengthen the activities in the following area :

1. Plastic materials in Mechanical Engineering
2. Application of Microprocessors in Mechanical Engineering
3. Robotics
4. High pressure pneumatics.

PRODUCTION ENGINEERING AND MACHINE TOOLS LABORATORY

a) Sponsored Project:

1. DAE Project on Study of Wear of Engineering Surfaces by Radio Active Techniques
2. DST Project on Electro-chemical Machining, Electro-chemical studies and surface production.

b) Research and Development:

Ph.D.	4
M.S.	9
M.Tech.	18

c) Assistance to Industry

ICC work to VSSC Trivandrum in machining

ICC work to TANSI, Madras in machining

d) Research Publications: 20

e) QIP/UGC Fellowship Programme:

Ph.D.	—	7
M.Tech.	—	2

f) Visitors to the Department:

1. Dr. Klas Gralen
   Linkoping Institute of Technology, Sweden.
2. Prof. Dr.-Ing. Wolfgang Massberg,
   Director
   Automation Res. Institute,
   Ruhr-Universitat Bochum, West Germany.
3. Prof. M. C. Shaw
   Arizona State University, Tempe, USA.
4. Prof. J. Peters
   Katholieke Universiteit Leuvan, Belgium.
5. Prof. Bertile Aronsson
   Director,
   Hardmaterials Research,
   Sandvik AB, Sweden.
6. Prof. S. M. Pandit
   Michigan Technology University
   Houghton, Michigan, U.S.A.

g) Brief indication and development programme:

Research and development on Metal cutting, Surface characterisation, Surface integrit, Unconventional machining, Gear Tribology, Group Technology, EDM, ECM, CAD/CAM, etc.

h) Invited lectures delivered by the staff :

1. College of Engineering, Guindy.
2. A. T. I. Guindy
3. HVF Avadi
4. Metal Cutting Seminar of the Madras Mettallurgical Society
5. Seminar on Metal Cutting organised in connection with the Silver Jubilee of REC, Warangal.

i) Patents : 5

j) Educational Programme/Continuing Education Programme :

1. HAL Management Trainee Programme
2. HAL Process Engineers Course
3. ISTE Short Term Course on 'Hydraulics and Pneumatics in Manufacturing'

k) Major Equipment added :

1. Hydraulic Power Pack
2. Electric Typewriter
3. Plain paper copier (Xerox machine)

1) Any other information :
Organised XIth All India Machine Tool Design and Research Conference at IIT. Madras Over 400 Indian delegates and 10 delegates from abroad attended the above conference.

REFRIGERATION AND AIRCONDITIONING LABORATORY

A) New Courses Introduced :

1. Vacuum Engineering

B) Sponsored Projects :

1. Study of thermal problems in ground based navigational equipment (Department of Electronics)
2. Design and development of optimal continuous solar refrigeration and air-conditioning systems (Department of Non-conventional Energy sources)
3. Utilization of solar energy for preservation of food products (Indo-German Project)
4. Development of solar boosted heat pump systems for drying of forest and agricultural products (Indo-German project).

C) Research and Development :

1. Dual effect dual stage and hybrid vapour absorption refrigeration systems for low-potential energy sources.
2. Vapour absorption and vapour compression heat pumps and heat transformers.
3. Thermal energy storage

4. Recooling of food products
5. Thermophysical properties of refrigerants and cryogenic liquids
6. Combined convection in enclosures
7. Cooling of electronic equipment
8. Saturated solar ponds
9. Concentrating solar collectors
10. Regenerative heat and mass exchangers

d) Assistance to Industry:

Consultancy services were provided in the area of solar energy to M/s. Southern Power Systems.

e) New Major Equipment added :

1. Heat Pump drier
2. Cascaded heat pump — refrigeration system
3. Vapour jet refrigeration — vapour compression heat pump hybrid system.

f) Research Publications :

1. V. M. Kripalani, S. Srinivasa Murthy and M. V. Krishna Murthy, Performance analysis of vapour absorption heat transformers with different working fluid combinations, Journal of Heat Recovery Systems, Vol.4, (1984) 129 - 140.
2. D. Krishna Kumar, S. Srinivasa Murthy and M. V. Krishna Murthy, Studies on air-to-air heat pump for drying applications, Ibid, 209—217.
3. S. Srinivasa Murthy, M. V. Krishna Murthy and M. V. C. Sastri, An assessment of heat pump options for energy recovery upgradation, Hydrogen Energy Progress V, Vol.4, (1984), 151—161.
4. K. Srinivasan and M. V. Krishna Murthy, A corresponding states treatment of saturated liquid viscosities of halogenated hydrocarbon refrigerants International Journal of Refrigeration, Vol.8, (1985), 13—16.

g) Visitors:

1. Dig. Ing. A. Haug visited the laboratory during Jan-Mar 1985 under an Indo-Germen project.
2. Dr. R. Bugarel, a visiting French Scientist delivered a lecture on Vapour absorption heat transformers.

j) Invited Lectures by faculty :

Dr. M. V. Krishna Murthy delivered a lecture on 'Solar Refrigeration—Trends, Prospects and Possibilities' at Sri Venkateswara University, Tirupathi in Feb., 1985.

THERMAL TURBOMACHINES LABORATORY

(A) SPONSORED PROJECTS :

(1) The laboratory has completed the two CSIR Projects

(i) Three dimensional flow studies in annular turdine cascades

(ii) Effects of skewed entry boundary layers on secondary losses in turbines.

(2) Currently the laboratory is carrying out an Indo-German Project on 'Energy-Centrifugal Compressors' in collaboration with Aachen Technical University, West Germany.

(B) RESEARCH AND DEVELOPMENT :

The laboratory is co-ordination with the Regional Engineering College, Trichy under the Institute network scheme of the ministry of Education, New Delhi to establish a Turbo machinery Lab at REC, Trichy. This scheme is in progress from 1983, February onwards.

(C) ASSISTANCE TO INDUSTRIES :

The laboratory has offered assistance to industries in the following areas.

1) 'Two dimensional cascade testing of axial fan blades for its performance characteristics' for BHEL R&D Hyderabad-in progress
2) 'Design, manufacture and calibration of two dimensional and three dimensional pneumatic probes' for BHEL R&D Hyderabad - in progress
3) 'Cablibration characteristics of orifice meters and flow nozzles' for Elgi Equipments Limited Coimbatore - in progress
4) 'Design and development of axial flow fans for naval frigates' for Bharat Bijlee Limited, Bombay-in progress
5) 'Performance testing of axial flow fan model for the given specification's for Bharat Bijlee Limited, Bombay—in progress
6) 'Two dimensional cascade testing of axial fan blade' for Bharat Bijlee Limited, Bombay—in progress
7) Prof N. Venkatrayulu is the Retainer Consultant for the firm 'The National Agricultural and Diesel Industries, Madras—1'

D) RESEARCH PUBLICATIONS :

The laboratory has published during the year under review, the following research papers.

1) 'Loss estimation through an annular turbine cascade' - (M. Govardhan & N. Venkatrayulu) proceedings '35 years of Turbo institut - Conference on Fluid Flow Machinery and Flow Measurements, Turboinstitut, LJUBLJAMA, Yugoslavia, April 1984
2) 'The effect of wake diffusion on secondary losses in an annular turbine rotor cascade'—(M. Govardhan & N. Venkatrayulu) paper accepted for the ASME Gas Turbine Conference to be held in Peking, June 1985

E) VISITORS TO THE LABORATORY FROM ABROAD :

1) Dr. Ing Rudolf Kirmse and Dipl Ing V H Teschendorff from the Company Gesellschaft fur Reaktorsicherheit (GRS) West Germany visited the laboratoay for five days from 2nd to 9th February 1985 and delivered special lectures on

i) Design basic accidents for light water pressurised reactors

ii) An overview of the light water pressurised reactors

iii) Small leak loss of coolant accidents (LOCA) phenomenon, experiments and computer codes

iv) Measurements in Turbulent pulsating pipe flow—use of Laser deppler velocimeter measurement techniques

2) Prof. Dr. Ing H E Gallus, Director, Institute for Jet Propulsion and Turbomachinery, Technical University, Aachen, West Germany Visited the laboratory for two weeks from 10th to 26th February 1985 in connection with the Indo-German Project 'Energy - Centrifugal Compressors, and delivered a special lecture on 'Unsteady flow in Turbomachinery'

3) Prof. Krzyzanowski, Director of the Institute for Fluid Flow Machinery Polish Academy of Science visited the laboratory for tow days from 9th to 11th March 1985 and delivered a special lecture on 'Effects of wet steam flow in steam turbines'

(F) VISIT OF THE LABORATORY FACULTY ABROAD :

1) Prof. N. Venkatrayulu visited the Institute for Jet Propulsion and Turbomachinery, Aachen West Germany for a period from 24th July 1984 to 28th August 1984 in connection with the Indo-German Project being investigated by the laboratory.

(G) NEW FACULTY APPOINTED :

The following two faculty members have joined the laboratory during the year.

1) Dr. M. Govardhan—Senior Scientific Officer II - from October 1984

2) Dr. N. Sitaram Lecturer—from January 1985

THERMODYNAMICS AND COMBUSTION ENGINEERING LABORATORY

Sponsored Projects :

i)	ARDB Project	:	Combustion Phenomena in a Solid Propellant Rocket Ramjet Engine.
ii)	Indo-Australian Project	:	Design and Development of Two-stage intermittent NH_3-H_2O refrigeration system (completed)
iii)	Consultancy Project for Ponds' (India) Ltd	:	Development of Burners for their Clinical Thermometers Manufacturing Plant (completed)

Research and Development :

R and D work in the following areas of combustion and energy are in progress, through, student projects and sponsored projects : Reaction kinetics, turbulent combustion spray combustion, combustion in swirling flows, thermal applications of solar energy, and energy analysis.

Assistance to Industry-ICC

Calibration of thermocouples, testing of fuels, domestic LPG stoves.

Research Publications :

Total number of publications in journals, both national and international, presentation at conferences: approx. 30 this year.

Invited Lectures delivered by the Staff:

METALLURGICAL ENGINEERING

Research and Development Activities:

Number of Research papers published in journals and in press				39
Number of students awarded Ph.D. degrees of the convocation held in 1984				3
Number of students completed their requirements for the award of Ph.D.				1
Number of students completed their requirements for the award of M.S.				3
Number of Research students registered				
i) For *Ph.D.*	Regular	6	*M.S.* Regular	1
	External	15	External	17

Number of *Q.I.P.* Scholars: 4

Assistance to Industry:

Department continued to offer consultancy services on several industrial problems.

Sponsored projects:

1) Hot corrosion of high temperature alloys-Ministry of Defence
2) Technology of casting of Magnesium alloys-AR & DB Project
3) Superplastic forming of some aluminium and titanium alloys-AR & DB project

Long term Developmental consultancy projects:

1) Welding of Al - Zn - Mg alloys - VSSC, Trivandrum.
2) Development of technology for four Superplastically formed hemisphers of Ti- 6Al-4V alloy for potential applications in the formation of air bottles for flight vehicle applications- D.R.D.L. Hyderabad.
3) Development of superplastic forming technologies for liquid tanks - VSSC Trivandrum.
4) Evaluation of forming limit diagram of EDD grades of steel made at Bokaro Steel Plant— R & D Centre of Iron and steel, SAIL, Ranchi.
5) Evaluation of performance of solar water heators. —ICIC, Calcutta.

Awards:

— Prof. E.G. Ramachandran was made an Honorary member of madras Metallurgical society in 1984.

— Prof. K. A. Padmanaban was awarded the Alexander von Humboldt Foundation International Fellowship in July 1984. (He is availing the Fellowship from March 1985 to April 1986)

— Dr O. Prabhakar was awarded the National Metallurgist Day Award by the Ministry of steel Mines, Govt. of India in November 1984 and was named NDT man of the year for 1984, by the Indian Institute of Non -Destructive Inspection Engineering.

— Dr. DRG, Achar was presented the I.T. Mirchandani award for the best research paper (presented during 1983, New Delhi) at the National Welding Seminar 1984, held at Trichy.

Other Staff matters:

- Prof. V M. Radhakrishnan has taken over as Head of the Department from 15th February 1985.
- Prof K.S. Raghavan returned from USA after serving at IBM lab, East Fishkill, Newyork for one year and rejoined the Department in January 1985.
- Dr. DRG Achar was nominated as Chairman of the Welding Education sub-committee of the Indian Institute of welding
- was nominated as Chairman, Technical Committee XIV, on welding Instructions of the Indian Institute of welding by the National Council.
- was elected the vice-chairman of the Madras branch of the Indian Institute of welding for 1984-85.
- Dr DGR Sharma was elected secretary of Indian Institute of Metals — Madras Chapter for the year 1984.

Seminars Courses Conducted :

1) 'Metallurgical Failure Analysis' - Course organised by Dept. of Metallurgical Engg and IIT, Madras Chapter of IIM. During 28th June to 1st July 1984.

2) '6Th International Conference on Fracture' was organised at New Delhi in the First Week of Dec. 1984. Prof.V. M. Radhakrishnan was one of the coordinators.

3) 'State of the art in welding Technology' — seminar during 19th — 20th Oct. 1984. Dr. DRG. Achar was Chairman.

Lecturers delivered by Distinguished Visitors :

1) Dr V. Ramaswamy, R & D Centre, SAIL Ranchi, on present and future research programmes in Iron and Steel Industry.

2) Dr. TKG. Namboodri, Dept of Met. Engg, BHU, Varanasi, on Hydrogen embrittlement in Metallic materials.

3) Prof. R. W. Chan, U. K. on some exotic developments in Metallurgy.

4) Mr. B. K. Biswas, Deputy Director, NCML, Bombay, on Failure of Metallurgical Components, — Environmental effects.

5) Dr. M. R. V. Raghavan, Exxon Research and Engg, New Jersey, USA, on Modern trends in Electron Microscopy.

6) Prof. K. Tanaka of Technological Univ. of Nagaoka, Japan, on Indentation Techniques to measure fracture toughness of britle materials.

7) Dr. Y. Mutch of Technological Univ. of Nagaoka, Japan, on Fatigue propagation of 304 weldments.

8) Prof. Osterstock, France, on quantitative fractography.

9) Dr. S. A. David, of Oakridge lab, USA, on Solidification behaviour of Stainless Steel Welds.

10) Prof. T. R. Anantharaman, BHU, Varanasi, on New Generation of Aluminum Alloys.

Invited Lectures delivered by staff:

— Prof R. Vasudevan	— 'Desirable Senescence' to Madras Metallurgical Society.
— Dr D.R.G. Achar	— 'Process Techniques for Non-ferrous Welding' at SISI, Madras.
— Dr P. Venugopal	— 'Fluid power in Metal Forming' at ISTE Summer school, Madras.
	— Cold extrusion and its potential' at IINDIE, IIM(M) Chapter.
— Prof. K. A. Padmanabhan	— 'Metallurgy to-day' A radio talk in English.
— Prof. E. G. Ramachandran	— 'Orientation dependence fracture induced Magnetism' - Metallurgical Society, IISc, Bangalore.

PHYSICS

New Projects approved :

1. Development of non-tracking luminescent concentrators for conversion of solar energy-DNES
   Investigators : Prof. S. Radhakrishna, Dr. S. Srinivasan and Dr. K. Srinivasan.
   Total grant Rs. 8 lakhs.

2. Amorphous silicon solar cells-Development and evalution studies- DST
   Investigators : Dr. R. Ramachandran (E.E.Dept.), Dr. J. Majhi (Phys)
   Dr. G. Aravamudan (Chem) and Dr. G. V. Subba Rao
   (MSRC) Total grant Rs. 9.11 lakhs

3. Development of high power laser sources - DOE
   Investigator : Dr. T. A. Prasada Rao (and Dr. D.V.G.L.N Rao,
   University of Massachusetts, Massachusetts,
   USA). Total grant Rs. 15.41 lakhs

Short term courses held :

1. 'Physics of materials' in collaboration with Asian Physical Society (Sep. 3-22, 1984).
2. Recent Developments in Materials Science and Technology -QIP Programme.
3. Opto-electronic materials -QIP programme.
4. 'Precision-Instruments,— in collaboration with Instrumentation Society of India.
5. 'Electrical conduction in Oxide Semiconductors' to M/s, W. S.Insulators Ltd., Porur.
6. 'Photovoltaic Energy Systems' conducted by COSTED.

Conferences held :

1. International Conference on Physics and Technology of Compensated Semiconductors.
2. International Conference on Teaching Aids in Physics Education.
3. One-day Symposium on Magnetic Resonance.
4. Integrated Energy Systems for Rural Applications.

OTHER REPORTS

Quality Improvement Programme

Indo German Programme

Central Library

Central Workshop

Institute Hospital

Placement Office

Weaker Section Students & Foreign Students

Institute Gymkhana

National Cadet Corps

National Service Scheme

Hostel Management

Central Supplies Unit

Construction of Buildings

Names of Faculty Members

Administration

Budget Proposals

Statement of Accounts 1983-84

QUALITY IMPROVEMENT PROGRMME

Serving Teachers Programme

		M. Tech.	*Ph.D*
No. admitted during 1984-85		20	14
No. on rolls in each of these courses		27	51
Short term course conducted 1984-85	8		

INDO-GERMAN PROGRAMME

Number of Staff Members Permitted to visit the Federal Republic of Germany.

Faculty :	Short term :	15
	Long term :	8
Technical Staff :	Short term :	—
	Long term	2

CENTRAL LIBRARY

Following are the significant activities of the Central Library during the period April 1984 to March 1985.

Administration, Reprography And Bindery (ARB) Division:

The following staff members have attended seminars/conferences mentioned below:

Shri V.S.Nazir Ahmed, Librarian attended the NIIT Seminar/Workshop on Micro processors and their Applications at Madras from 7—11 February 1984.

Snri C. Deenadayalu, Deputy Librarian attended the International Seminar on Developing Library and Information Studies at London from 22-7-84. to 3-8-84. and on DAAD Fellowship he was in West Germany from 5-8-84 to 20-10-84. He attended the International Frankfurt Book Fair held from 3.10.84. to 5.10.84. and attended the Annual Conference of German Library Association in Mainz from 15.10.84 to 17.10.84.

The Reprographic Services continued to be made available to all members of the Institute as well as the external members of the Library. The second edition of the "Handbook of Library Administration', has been printed using the newly acquired Network Electronic Typewriter and Rotaprint machine in the Library. Also the publication "Catalogue of Periodical Holding of the Central Library" has been printed and bound within Central Library for the use of the students and the faculty of the Institute.

Spot binding of 3791 publications have been done in the stacks besides regular binding work by Internal and External binders.

Acquisition & Processing (A & P) Division:

1. 52 publications from the Deutsche Forshungsgemeinschaft, FRG was received through the chairman, Library Advisory Committee as part of the Silver Jubilee Celebration.
2. 74 titles was donated to Centre for Systems & Devices by Dr. B.P.Agarwal, Director of VLSI Products, M/A - com DCC German Town, MD USA.
3. In addition to the book grant of Rs.3.55 lakhs a sum of Rs.2 lakhs was received in December 1984. In February/March Rs. 90,000 was transferred from the various departments recurring grants towards the procurement of books and these have been fully utilised.

Circulation, Reference and Maintenance (CRM) Division :

In deference to the wishes of students, the timings for loan transactions have been revised to as 8.00 A. M. to 8.00 P. M. as practised in other Indian Institutes of Technology / Indian Institute of Science, Bangalore from July 1984.

The Book Bank (General) and Weaker Section continue to be actively used by the students particularly of Weaker Section community.

A Vedio Cassette Recorder and Colour Television have been acquired for promoting the User Education Programmes of the Library.

Periodical & Serials (P & S) Division:

By the effective steps taken, the entire amount allotted viz. Rs. 23 lakhs for the subscription on periodicals and Rs. 45,000 for the procurement of Serials was fully utiilised. As an aid to readers to easily locate the current issues of periodicals the journal titles were fixed on the periodical filing folders, which inicidentally made the folders attractive Two window Airconditioners were provided in the combined study room adjacent to periodicals reading hall for the comfort of students.

The Library arranged translation of a few thousand documents received from M/S Bharat Dynamics Limited, Hyderabad from German to English during the period under review.

STATISTICS ON OTHER LIBRARY ACTIVITIES

Library Membership :

1.	Institute Members (Staff & Students)	...	6,006
2.	Outside Members– Individual	...	54
	Corporate	....	52
3.	Consultation Permit	...	245

Circulation :

1.	Number of Readers Visited	...	1,14,633
2.	Number of Volumes issued	...	1,98,156
3.	Number of Reservation for Books:		
	(a) Registered	...	20,614
	(b) Fulfilled	...	5,590
4.	Amount of Over Due charges and other charges realised	...	Rs. 1,54,879
5.	Inter-Library Loans :		
	(a) Borrowed for Institute Members	...	42
	(d) Lent out from the Institute Library	...	123

Acquisition :

1.	Books	...	4,074
2.	Bound Volumes of Periodicals	...	1,671
3.	Pamphlets and Reports	...	539
4.	Microfilms and Microfiche	...	7
5.	Institute Ph.D Thesis	...	119
6.	Total Intake during the year	...	6,403
7.	Total Accessions	...	2,14,926

Current Periodicals :

1. By Subscription	...	1,243
2. By Exchange/Gift	...	195
3. Translations Arranged	...	2

Reprographic Services :

1. Xerox Copies made	...	1,36,182 Pages
2. Korestat Copies made	...	390
3. Gestafax (Electronic Stencils)	...	321
4. Rotamasters Prepared and Printed	...	1,882

Binding :

1. Number of Books and Journals Bound from the Library	...	883
2. Number of Publications (Reports, Lecture Notes etc.)	...	1,675
3. Number of Back Volumes of Books and Journals bound through External Binders	...	2,881

CENTRAL WORKSHOP

In the year 1984-1985, Workshop has undertaken the fabrication of parts and assembly required for the B.Tech., M.Tech., and Ph.D research work from the different departments in addition to the regular training programme for the students of B.Tech.

No. of work orders completed during 84-85 : 1238. No. of students trained in the Advance Workshop Training during Summer Term Course : 44.

Some of the IC & SR work undertaken and completed.

1. Components and assembly of Design of under water Tower bodies for NAL Bangalore.
2. Fabrication of Thoriated Tungsten Electrodes for Madras Atomic Power Project, Kalpakkam
3. Spur gears for SHAR CENTRE, Department of Space Sriharikota, A.P.
4. Pressure gauge Calibration & Calibration & reconditioning of Calibration Unit of M/s Beacon Weir, Madras.
5. Bevel Gear cutting for M/s Kural Engg., Co. Madras.

INSTITUTE HOSPITAL

The Institute Hospital is a 30 bedded hospital rendering medical aid to a population of nearly 10,000 - on an average of 400 patients are daily treated in the Out-Patient Department. The Hospital offers Out-Patient and In-Patient services for Medical, Surgical, Obstetrics, Gynaecological and Paediatric treatment.

Dr. A. Ganesan, M.D. is the Chief Medical Officer.

The following Medical Officers are rendering their services in their respective lines:

1.	Dr. N A. Jayavelan, M.B.B.S.	— Medical Officer/Resident Medical Officer — assisting the Physician
2.	Dr. Sumati Khangaonkar, M.B.B.S., D.A.	— Anaesthetist
3.	Dr. Lalithakumari, M.B.B.S., D.G.O.	— Gynaecologist
4.	Dr. P. Subramaniyan, M.B.B.S.	— Medical Officer
5.	Dr. Girija Krishnan, M.D., D.C.H	— Paediatrician
6.	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)
7.	Dr. S. Devaji Rao, M.S., M.N.A.M.S.	— Consultant Surgeon (Part-time)
8.	Dr. R. Sathyanathan, M.D., D.P.M.	— Consultant Psychiatrists (Part-time)
9.	Dr. R. Thara, M.D., D.P.M	

Sri L. Palaniappan is the Lay Secretary and is assisting the Chief Medical Officer in administration work of the Hospital to which "Medical Reimbursement Unit" is also attached.

Ambulance service is available round the clock and one Medical Officer is posted for call-duty and is avilable for all the 24 hours of a day to attend to emergency cases in the Hospital.

Laboratory tests are undertaken for Urine, Blood and Motion. 2 ECG machines are available with the Hospital. Some major operations for condition like Hernia and peptic Ulcer and minor operations are undertaken with the modernised operation Theatre.

From April 1984 to March 1985, 1620 doses (comprising of 5 doses to each child getting primary doses) against Polio, and 1620 doses of Triple Antigen (against Diphtheria, Pertusis and Tetanus) as 3 primary doses a month apart and a single booster does at appropriate intervals were given.

Regarding incentive scheme for promotion of small family norms introduced by Government of India, Family Planning Operations are conducted at this Institute Hospital.

Statistics:

APRIL 1984 TO MARCH 1985

i)	Total number of Out-Patients	—	2,28,864
ii)	Total number of In-Patients	—	700
iii)	Emergencies attended	—	8,900
iv)	Dressing	—	68,404
v)	Injections	—	35,592
vi)	Delivery	—	22
vii)	Pathology		
	a) Urine	—	2,645
	b) Motion	—	1,569
	c) Blood	—	3,079
viii)	Bio-Chemistry		
	a) Blood Sugar	—	408
	Urea	—	47

PLACEMENT OFFICE

The Placement office, designated with the responsibility to procure placements and arrange inplant training in various industrial establishments for students of this Institute, was very active during the academic year 1984-85. Towards this end this Office maintained a very close interaction with industrial establishments in private as well as public sectors. It liaised with as many as over 210 companies during the year. As a result, over 105 companies visited this office to hold campus interviews. From those who chose to use the Placement Office for making their career, these companies selected as many as 400 students.

During the year that passed, a number of steps were taken to serve the student community more effectively:--

1. Each of the student was provided with complete details relating to career opportunities available in the country in difierent disciplines much before the placement session began so that they could plan their future programme of action with knowledge and fore-thought.

2. All the final year students were given complete brief about the modus operandi adopted by various companies in recruiting their personnel.

The academic year 1984-85 posed an unprecendented challenge to the placement Office because of the simultaneous graduation of two batches of students belonging to five year and four year streams. In order to find placements for the increased output of engineers, this Office staggered the placement programmes suitably so that students of five year stream could have their interviews between August, 1984 and February, 1985 and the rest between November, 1984 and May/June, 1985 providing a common period for both the streams during November, 1984 to January, 1985. Besides, industries were advised to visit the Institute separately for two different batches. Certain leading companies which could not make two trips for campus recruitments were, however, categorised as 'common-companies, for which students of both the streams were allowed to apply. Further, in consultation with the students' representatives, the placement Office restricted the number of jobs to one per person so that the available opportunities could be evenly farmed out among larger number of students. As a result, the placement Office without any difficulty could place all those who wanted jobs through us.

In so tar as the training was concerned, this Office continued to make energetic efforts to get training facilities for our students who made a request to this effect. The Office also wrote letters to as many as over 100 companies and the response from them was as good as was in previous years.

WEAKER SECTION & FOREIGN STUDENTS

$22\frac{1}{2}$% of the seats are reserved for the students belonging to SC/ST Community. At present 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 18 SC/ST students joined the B.Tech. programme during the academic year 1984-85. Students admitted against this quota are given :

1. Free messing with pocket allowance of Rs.70/- depending upon the means criteria as stipulated by the Government of India.
2. Free Lodging.
3. Exclusive use of a Weaker Section Book Bank.
4. Drawing instruments free of cost.
5. Help in getting placements.
6. Financial help for needy students through part-time jobs.

Preparatory Course (one academic year duration) for SC/ST students who failed to get admission through JEE is being run for the 2nd year in succession. 5 students have joined this course during the year 1984-85. After the Preparatory Course at IIT, they will be eligible to join B.Tech. degree from the session 1985-86 if they secure minimum 40% of the marks in the examination conducted exclusively for these students. They are treated on par with the regular B.Tech. students as far as the above financial supports are concerned.

During the year 1984-85, seven students joined the B.Tech. degree course after successfully ompleting the preparatory course in the academic year 1983-84.

Another Special Coaching Programme for about 180 SC/ST students at present studying in 12th Std (in Tamilnadu, Andhra Pradesh, Karnataka & Kerala) is also being conducted during the year 1984-85. This course is being conducted for the 2nd year in succession. The students who are undergoing the above course will write JEE during May,1985. So far, two personal contact programmes were held. One more personal contact programme is scheduled to be held during the last week of April, 1985. Entire expenditure, including the travel, boarding and lodging are met by IIT, Madras. A faculty member is apointed as Adviser to look after the needs of the Weaker Section and Foreign Students.

INSTITUTE GYMKHANA

SPORTS

1. The Inter IIT Sports Meet took place in Indian Institute of Technology, Kanpur in December 1984 as part of its Silver Jubilee Celebrations. It may be recalled that the I.I.T., Madras had won the General Championship 12 times out of the previous 14 consecutive meets. But this time the prospects were bleak due to a sizeable drop out in the contingent owing to completion of course, examinations, job interviews, sickness, etc. Expectedly the team finished fourth in the over all placings. An added factor was the poor showing in aquatics and Waterpolo where a deputed Madras contingent secured just 4 points out of 20 considered for the General Championship. However the women's contingent did creditably and won the Second place in the over all championhisp.

2. The Sportfest was organised by the I.I.T., Madras this year too in August. The response from the City colleges was overwhelming. The host teams had mixed fortunes in various disciplines, special mention should be made of the Cricket team which performed excellently and came on top. On the positive side this tournament has come to stay as an important event in the Madras Inter-Collegiate Sports Calendar.

3. The Gerhard Fischer and Kokila Rajaiah Basket ball tournament was held this year to coincide with Cultural festival Mardigras and provided a week of festivites on the Campus. The competition was as keen as ever. R.V. College of Engineering, Bangalore finished second to the winner the Loyola College, Madras in the men's section. The Kokila Rajaiah trophy for women was won by Mount Carmal College of Bangalore with Ethiraj College Madras as the runner up.

4. The Institute staff team won the prestigious Macphail trophy for inter collegiate supremacy in tennis this year too makings it the 7th win since the institution of the trophy in 1972.

5. The Police-Public tournaments were conducted again this year by the Indian Institute of Technology, Madras in four disciplines viz., Basket Ball, Volley Ball, Foot Ball and Hockey. The Institute team finished Second in the last two disciplines.

6. A major event of the year was the All India Open bridge tournment in which 45 teams from various parts of the country participated. Like the Sportsfest, Gerhard Fischer tournaments etc. this event also has found a permanent place in the sports scene. For the students of Indian Institute of Technology, Madras who are the mainstay in organising these tournaments, they provide valuable experience and an opportunity to interact with other sportsmen.

7. The students activities centre was put to use at every possible opportunity. Some of the events held in the sports complex during the year were:

   (a) Sportfest Volley ball
   (b) All India Kendriya Vidyalaya Girl's basket ball
   (c) Police Public Volley ball Tournment
   (d) Exhibition matches in Tennis and Volley ball
   (e) Inter Hostel 3-a-side basket ball tournament
   (f) All India Bridge Tournament

8. To ensure a wider base for sports activities on the Campus the following tournaments were conducted with enthusiastic participation.

   (a) Annual road race — 200 participants
   (b) Open Cycle race — 100 Participants

(c) Tournament for Mess Employees.

(d) Institute Open badminton

(e) 3-a-side basket ball — 44 teams

(f) 4-a-side hockey — 40 teams

(g) six-a-side foot ball — 45 teams

(h) 3-a-side volley ball — 45 teams

(i) Skating Hockey

(j) Institute Chess meet

(k) Institute Open Bridge, etc.

9. The Swimming Pool conducted several coaching camps for the Campus residents as well as outsiders during the summer holidays.

10. Other additions were made to the recreation and sports facilites on the Campus which include turfing the Stadium track, preparing a new foot ball court in the hostel zone and erecting a diving deck at the Swimming Pool. Plans are being drawn up to mass base sports in the Campus with atleast 50% of the student body taking up some active game or other.

11. The Inter Hostel competitions is one of the important programmes of the Gymkhana to ensure the widest possible participation of the student body in sports and games. These competitions in about 15 disciplines are held throughout the year and is characterised by mass participation and keep competition. Narmada retainted the Schroeter Cup for the third successive year.

12. As an experiment this year Institute Sports Day was held at Sarayu along with the finals of the six-a-side foot ball. The Institute honoured one of its finest faculty sportsmen Dr. E.G. Ramachandran by inviting him to be the Chief Guest.

CULTURAL ACTIVITIES

1. Inter Hostel & Institute Open Events

A large number of events were held over both the odd and the even semesters, at the inter hostel and individual levels. Participation from the students has improved both in participation and audience and the general trend of enthusiasm for cultural events is very encouraging. In the inter hostel events, Narmada hostel won the Literary trophy and Tapti hostel won the Arts trophy. For the 1st time, fine arts competitions were held at the inter hostel level and drew about fifty participants each. Most of the competitions were held at Quark resulting in large crowds.

2. Inter Collegiate Festival 1984

For the first time an inter collegiate competition was held for JAM, Debate, Indian Classical Music, street plays, and Indian light Music. The response from the city colleges was very good and the standard of participation was high.

3. Amalgamations, 85

Another first for the year was the Amalgamations with departmental cultural competition for both staff and students. This was brilliantly organised by Umesh Despande and was greeted with great enthusiasm from both the students as well as the staff. The overall Amalgamation's trophy was won by the Department of Electrical Engineering.

4. MARDI GRAS '85

Mardi Gras '85 was held between the 15th and 20th January along with Gerhard Fisher and Kokila Rajaiah Basket ball tournament for the first time. The first two days being the preliminary rounds of the Basket ball tournament, the next three days were combined with Mardi Gras and Gerhard Fischer and Kokila Rajaiah Basket ball tournament the last two days exclusively for Mardi Gras A number of new events were introduced in this Mardi Gras. As usual a large number of participants (both local and outstation) took part. Ustad Amjad Alikhan on the Sarod and Dr. Chittibabu on the Veena were the professional performances. The overall trophy was won by Loyola College, Madras.

5. A number of concerts (Indian Classical) was held by SPIC MCKAY during February– March 1985. The festival of plays was once again a big success. Our dramatic group conducts its workshop 'Stage Coach" regularly. Our music teams especially the Indian Light Music team were in great demand and have played all over the city for various functions. Our yearly prize distribution was held at Quark The staff student quiz conducted at Quark and featuring three students and three staff teams were won by the students.

6. Our Institute Cultural teams have participated in many cultural festivals both local and outstation. They have consistently won prizes in most of the local college festivals and have done very well in the out station ones.

NATIONAL CADET CORPS

The National Cadet Corps is an organisation aiming at development of leadership, character comradeship and spirit of adventurism among the educating youth.

The Institute has sponsored an Air Wing NCC unit namely: 4(TN) Air Sqn (Tech) NCC which is located in the NCC Building inside the campus. About 200 students are admitted into NCC every year to enable the students to fulfill the partial requirement of the B. Tech. Degree course. Students who choose NCC are to undergo a minimum of one year NCC consisting of 20 parades conducted on Saturdays/holidays.

The training in NCC comprises of drill with and without arms, weapon training, general service knowledge principles of flight, aeromodelling, aero engines, air craft instruments and tele-communication and radar. Further the cadets are given air experience through gliders. Technical/Industrial visits to service and industrial establishments in and around Madras are also organised. As a part of weapon training the cadets are given firing practice in rifles, revolvers and air guns. Aeromodelling opportunities exist in the Unit to build various types of models with the assistance of a qualified aeromodelling instructor.

The cadets are sponsored for various types of camps such as Annual Training camp, Attachment camp (with regular Air Force Technical Establishments), basic and advanced leadership and mountaineering courses.

'B' and 'C' Certificate Examinations are conducted at the end of every year for cadets who have successfully completed two years and three years training respectively in NCC.

4(TN) Air Sqn (Tech) NCC is Commanded by wing Commander G Kandaswami and the Administrative Officer is Flying Officer TPT Pillai, IAF. The NCC part Time officers are sqn Ldr V Subrahmanyam and Flt Lt KV Chalapathy Rao who are the faculty members of the Institute. The NCC training is imparted by the NCC part time officers and permanent instructional staff from IAF.

NATIONAL SERVICE SCHEME

The National Service Scheme, Indian Institute of Technology, Madras conducted the following programmes for the populace in its adopted villages and to the Campus residents in general.

1. A special Camp at the Taramani School during which time a playground was constructed and handed over to the School.
2. The National Service Scheme Tailoring Wing situated in the premises of the Velacheri Welfare Association Buildings conducted classes in Tailoring, Needlework and Embroidery for 40 women selected on the basis of their family income, during the year under review. After the completion of the course the women were awarded certificates of proficiency appropriate to their performance during the course. Most of them have obtained placement since their completion of the course.
3. Old clothes and materials were collected and distributed to the needy in some of the villages adopted by IIT and poor homes. Leprosy patients, Avvai Home students benefitted by this.
4. NSS conducted special Practical Classes in Physics, Chemistry and Biology to the students of Avvai Home and Rani Meyyammai School.
5. Tree plantation was done at various places inside the Campus.
6. Six Blood Donation Camps were held during the year under review.
7. 2000 covers were made and handed over to the IIT Hospital.
8. Production of Teaching Aids started under the leadership of Dr V.S. Murthy was extended and some of the schools near IIT benefitted by them. Subjects under Physics, Chemistry and Biology have been selected for such a venture.
9. Regular classes were conducted in Kendriya Vidyalaya, Vanavani High School, Avvai Home and Rani Meyyammai schools.
10. Various films were screened for the people in the adopted villages of IIT, with the help of the various Consulates in Madras.
11. The NSS students took up a statistical review of the people residing in the Servant's quarters of IIT and completed the programme.
12. Addresses of the Alumni Members of the Institute were updated.
13. A book bank has been started, mainly for the school going children, and so far about 1000 books have been collected and is made available on loan or for reaoy reference for the school children in and around the Campus.
14. Informative slide shows were conducted in the subjects of Physics, Chemistry and Biology, to the students in the various schools.

HOSTEL MANAGEMENT

The Indian Institute of Technology is a residential institution and all students shall reside in the Hostels. At present there are 11 men's hostels and 1 women's hostel. In addition there is a Central Supplies Unit (CSU) for the procurement and distribution of milk and the other provisions centrally for the hostels. This unit also undertakes the supply of milk to the staff residing in the Campus.

Each hostel and CSU is administered by a warden appointed by the Director from among the senior faculty members of the Institute. Hostel Management is the appointing authority of the mess staff and is the centrally administered body that manages the work and affairs of the hostels and CSU. The Chairman Council Wardens is the Chairman of the Hostel Management. Dr. R. RADHAKRISHNAN, Professor, Department of Civil Engineering is presently the Chairman of the Hostel Management.

12 Flats have been constructed for allotment to the hostel staff during the year 1983-1984, The facility of the Co-operative credit and Thrift Society of I I T., Madras have been extended to the employees of the Hostel Management also during the year. (Dr. R. NATARAJAN, Professor Dept. of Mechanical Engineering succeeded Prof. J. C. Kuriacose, as Dean of Students with effect from 1 - 5 - 1985.)

CENTRAL SUPPLIES UNIT

The Unit procures under the milk supply scheme milk from the nearby villages, Centre for Rural Development at Narayanapuram and from the Tamil Nadu Co-operative Milk producers Federation Limited and distributes to the student hostels, to the residents of the campus and to the staff of the Institute residing around the campus.

Under the provision supply scheme, the Unit procures items of major consumption like Rice, Wheat, Dhalls, Sugar, Edible Oils, coffee, Tea, Bournvita, Drinking chocolate, Butter etc. at the wholsale rate and distributes to the individual hostels.

This year the Unit introduced the Vegetable supply scheme also. Under this scheme the Unit procures items like Cocoanut, potato and Onion at the wholesale rate and distributes to the individual hostels.

CONSTRUCTION OF BUILDINGS

During the period April 84 to March 85 the following major works have been taken up/completed.

1. Eye and Dental wing over Hospital Building-completed and handed over.
2. Modifications to High Pressure lab. — Completed.
3. Diving Unit at Swiming pool—Completed.
4. Additional Class rooms for Kendriya Vidyalaya—Completed.
5. Extension to FRP Centre. — Completed.

Besides the above, the following works have been taken up for execution.

1. Building for New Computer Centre—Rs. 44.00 Lakhs.
2. Construction of Quarters for Hostel employees - Rs 4.36 Lakhs.
3. Construction of Chemical kinetics and Catalysis lab for Chemistry Department — Rs. 7.50 lakhs.
4. Construction of Godown for Indane Gas cylinders. Rs. 0.75 lakhs.
5. Construction of 'D' type quarters (Faculty type) Rs. 10.60 lakhs.
6. Providing Civil works for accommodating CVD system at CSD Building. Rs. 0.20 lakhs
7. Providing Internal Fixtures for CRI IITM collaboration project at Civil Engg. Dept. Rs.0.57 lakhs.
8. Extension to Community Centre Rs. 1.03 lakhs.

In addition to the above works, many minor works pertaining to various Departments have been under taken and executed.

NAMES OF FACULTY MEMBERS, DEPARTMENT-WISE

AERONAUTICAL ENGINEERING

Professors

1. Dr. K. A. V. Pandalai
2. " A. K. Sreekanth
3. " T. K. Bose
4. " N. R. Rajappa
5. Sri K. Balaraman
6. Dr. K. A Damodaran *(Head)*
7. Dr. G. Subramanian

Associate Professor

Dr. T. K. Varadan

Assistant Professors

1. Dr R. M. Siddaveere Gowda
2. ,, S. Krishnan
3. Dr. E. G. Tulapurkara
4. " S. G. Gokhale

Lecturers

1. Sri A. Krishnan
2. " S. Santhakumar
3. Sri S. C. Rajan

Senior Scientific Officer Grade-I

Sri Job Kurian

Technical Officer

Sri. G. A. Venceslas

APPLIED MECHANICS

Professors

1. Dr. N. V. Chandrasekharaswamy
2. " B. V. Aswathanarayana Rao
3. " R. S. Alwar
4. " V. Ramamurthi
5. Dr. P. S. Srinivasan (*Head*)
6. " R. S. Srinivasan
7. " T. M. Srinivasan

Associate Professors

1. Dr. K. M. Patil
2. " B. Srinivasa Prabhu
3. Dr. Megha Singh

Assistant Professors

1. Dr. V. Ramjee
2. " S. Venkatesan
3. " M. Balakrishnan
4. " B. H. Lakshmana Gowda
5. Dr. N. Ganesan
6. " P. A. Aswathanarayana
7. " S. Narayanan
8. " J. Ramachandran
9. " S. Radhakrishnan

Scientific Officer Grade-I

Sri C.R. Subramanian

Lecturers

1. Sri P. Krishna Iyer
2. Sri J. Lakshminarasimhan

Lecturer Grade-II

Sri G. Thomas

Senior Scientific Officer Grade-II

Sri S. Swarnamani

Smt. Sujatha Chandramohan

CHEMICAL ENGINEERING

Professors

1. Dr. T. Gopichand
2. " M. Satyanarayana
3. " Y. B. G. Varma
4. Dr. M. Ramanujam *(Head)*
5. " N. Subramanian
6. " C. A. Sastry
7. " M. S. Ananth

Assistant Professors

1. Dr. K. Remananda Rao
2. " T. Venkatram
3. " G. S. Davies
4. " Ch. Durgaprasada Rao
5. " R. Subramaniam
6. " A. Baradarajan
7. " S. Subba Rao
8. Dr. C. Chandraprasad
9. " N. R. Neelakantan
10. " R. Vedaraman
11. " D. V. Seetharamamurthy
12. " T. K. Ramanujam
13. " K. Krishnaiah
14. " V. Ravichandran

Lecturer

Dr. V. Sriramachandra Rao

Technical Officers

1. Sri S. Shanmugam
2. " V. Raman
3. Sri B. V. Sreeramulu

CHMISTRY

Professors

1. Dr. J. C. Kuriacose
2. " V. Srinivasan
3. " G. Aravamudhan
4. " C. Narayana Pillai *(Head)*
5. " P. T. Manoharan
6. " C. Kalidas
7. Dr. S. R. Ramadas
8. " V.Ramakrishnan
9. " T. V. Ramakrishnan
10. " M. Ramakrishna Udupa
11. " C. S. Swamy

Associate Professors

1. Dr. J. Rajaram
2. ,, V. Mahadeva Iyer
3. Dr. R. Narayan.

Assistant Professors

1. Dr. K. Narayanan
2. ,, M. S. Gopinathan
3. ,, M. Srinivasan
4. ,, K. K. Balasubramanian
5. ,, B. Viswanathan
6. ,, V. R. Satyanarayana Rao
7. Dr. D. V. Ramana
8. ,, (Kumari) T. S. Chandra
9. ,, R. Ramaswamy
10. ,, C. S. Venkatachalam
11. ,, S. Vancheesan

Lecturers

1. Dr. T. K. Varadarajan
2. ,, N. Balasubramanian
3. ,, R. P. Viswanath
4. Dr. N. Sundram
5. ,, (Smt.) K. Lalitha
6. Dr. M. N. Suhdeendra Rao

Lecturer Grade II

Sri T. Subrahmaniam

Senior Scientific Officer Grade II

Dr. M. S. Subramaniam

CIVIL ENGINEERING

Professors

1. Dr. K. S. Sankaran
2. ,, P. Srinivasa Rao
3. ,, D. Johnson Victor
4. ,, L. N. Ramamurthy *(Head)*
5. ,, H. Raman
6. ,, T. P. Ganesan
7. Dr. C. S. Krishnamurthy
8. ,, R. Radhakrishnan
9. ,, N. Rajagopalan
10. ,, K. Elango
11. ,, Nainan P. Kurian

Associate Professors

1. Dr. V. Kalyanaraman
2. ,, P. Kalyanasundaram
3. ,, V. Paramasivam
4. Dr. H. Suresh Rao
5. ,, P. K. Aravindan

Assistant Professors

1. Dr. H. Acyutha
2. ,, N. R. Krishnaswamy
3. ,, V. R. Rangaraju
4. Dr. B. S. Thandaveswara
5. ,, M. S. Mathews

Lecturer

Sri K. Gopalakrishna

Senior Scientific Officer Grade II

1. Sri M. Subbi Reddy
2. ,, R. Ambalavanan
3. A. Ramachandriah
4. Sri K. Anantha narayanan
5. Sri V. Thamizharasan
6. ,, K. Srinivasan

Technical Officers

1. Sri V. Raman
2. Sri M. Innaci
3. ,, P. R. Kothandaraman

ELECTRICAL ENGINEERING

Professors

1. Dr. M. Venugopal
2. ,, V. G. K. Murti
3. ,, M. K. Achuthan
4. ,, D. K. Banerjee
5. ,, B. Ramaswamy
6. ,, V. Seshadri
7. Dr. A. Kuppurajulu
8. ,, Y. Narayana Rao (*Head*)
9. ,, J. P. Raina
10. ,, V. V. Sastry
11. ,, K. Radhakrishna Rao

Associate Professors

1. Dr. V. V. Bapeswara Rao
2. Dr. P. Sankaran

Assistant Professors

1. Dr. C. Dattatreyan
2. ,, M. Mukunda Rao
3. ,, G. Sridhara Rao
4. ,, Vedam Subrahmanyam
5. ,, A. Chandrasekharan
6. ,, P. Subbarami Reddy
7. ,, C. Narayana Reddy
8. ,, T. A. Ramalinga Bhat
9. ,, T. J. Vitto
10. ,, S. Srinivasan
11. ,, M. Antony Reddy
12. ,, S S. Yegnanarayanan
13. ,, C. Eswaran
14. Dr. R. Parthasarathy
15. ,, M. V. Chalapathy Rao
16. ,, V. Venkata Rao
17. ,, R. Parimelazagan
18. ,, K. N. Bhat
19. ,, P. A. Janakiraman
20. ,, B. S. Bhanumurthy
21. ,, Ashok Jhun Jhunwala
22. ,, C. Venkataseshaiah
23. ,, P. Sashidhara Rao
24. ,, S. Yuvarajan
25. ,, K. Ramar

Lecturers

1. Sri Varadharajan Subrahmanian
2. ,, M. Krishnamurthi
3. ,, P. C. Majhee
4. Sri G. T. Manohar
5. Sri G. Govardhanagiri Rao
6. ,, K. Palaniswami
7. ,, Madan Lal Sethia

Senior Design Engineers

1. Sri R. Ramachandran
2. Sri S. Raman
3. Sri P. Rama Seshagari Rao

Senior Scientific Officer Grade II

1. Sri S. Gopal
2. ,, S. Karmalkar
3. Sri. V. Jagadesh kumar

Technical Officers

1. Sri C. Srikumara Menon
2. ,, A. S. Satheesan
3. ,, P. S. Kalyanasundaram
4. Sri R. Balasubramanian
5. ,, T. V. Gopal
6. ,, M. Nijmin Hariffin

HUMANITIES & SOCIAL SCIENCES

Professors

1. Dr. S. Ramani (on deputation to NITIE)
2. ,, S. Ambirajan
3. Dr. A. V. Krishna Rao *(Head)*
4. ,, Dipak Chaudhuri

Associate Professors

1. Dr. L. V. L. N. Sarma
2. Dr. R. Rajagopalan

Assistant Professors

1. Dr. C. Ramachandran
2. Dr. R. N. Anantharaman

Lecturers

1. Sri V. S. Kumar
2. Dr. T. T. Narendran
3. (Smt.) Elizabeth Nainan Kurian
4. Sri. M. Durgaprasada Rao
5. Dr. (Kumari) Rita Ghatak
6. Sri Raj Gopal
7. (Kumari) Evangline Manickam
8. Sri S. Mohan
9. Dr. B. Subramanian
10. Dr. (Kumari) R. Malathy

Senior Scientific Officer Grade II

Sri. Jayachandran

Mathematics

Professors

1. Dr. S. K. Srinivasan
2. ,, L. V. K. V. Sarma
3. ,, H. S. Paul
4. Dr. K. R. Parthasarathy
5. ,, R. Subramanian *(Head)*

Associate Professors

1. Dr. V. B. Johri
2. ,, U. N. Srivastava
3. Dr. P. Achuthan

Assistant Professors

1. Dr. V. Subba Rao
2. ,, D. S. Subramanyam
3. ,, Y. Nagendra
4. ,, P. Bhattacharyya
5. ,, C. M. Purushotham
6. ,, (Smt.) S. Kalpagam
7. Dr. A. Avudainayagam
8. ,, Surendranath Majhi
9. ,, P. R. Parthasarathy
10. ,, S. N. Venkatarangan
11. ,, C. V. Raghava Rao

Lecturers

1. Dr. P. V. Subrahmanyam
2. ,, A. Rangan
3. Dr. S. G. Kamath
4. ,, S. H. Kulkarni

Senior Scientific Officer Grade II

1. Dr. K. Swaminathan

MECHANICAL ENGINEERING

Professors

1. ,, H. C. Radhakrishna
2. ,, D. Prithviraj
3. ,, G. V. N. Rayudu
4. ,, M. A. Parameswaran (*Head*)
5. ,, V. M. Krishna Sastry
6. ,, M. V. Krishnamurthy
7. ,, V. Radhakrishnan
8. ,, R. Natarajan
9. Dr. K. Lakshminarayana
10. ,, K. A. Bhaskaran
11. ,, K. V. Gopalakrishnan
12. ,, K. N. Seetharamu
13. ,, V. Sriramulu
14. ,, A. Rammohana Rao
15. ,, N. Venkatarayulu
16. ,, P. K. Philip

Associate Professors

1. Dr. V. Ganesan
2. ,, S. Srinivasamurthy
3. Dr. T. Rajagopalan
4. ,, R. Raman

Assistant Professors

1. Dr. P. Srinivasa Rao
2. ,, M. Madhusudana Rao
3. ,, R. Krishnamurthy
4. Dr. M. S. Shanmugam
5. ,, A. Venkatesh
6. ,, Vijay R. Raghavan

7. Dr. B. Nagalingam
8. ,, U. S. P. Shet
9. ,, K. Gopinath
10. ,, K. Srinivasan
11. ,, O. V. Krishnaniah Chetty
12. ,, S. Rajesham
13. ,, K. R. Govinda Mallan
14. Dr. K. Narayanaswamy
15. ,, K. V. Chalapathi Rao
16. ,, T. Nagarajan
17. ,, K. N. Gopalan
18. ,, V.Balabaskaran
19. ,, K. Kolar

Lecturers

1. Sri K. S. Padiyar
2. ,, V. N. Rajan
3. ,, D. V. Ramalingeswara Rao
4. ,, K. V. Thyagarajan
5. ,, K. Ramakoteswara Rao
6. ,, S. Kumaraswamy
7. Dr. Y. G. Srinivasa
8. Sri G.Muthuveerappan
9. ,, V. Jayaprakash
10. ,, S. Krishnamurthy
11. Dr. N. Sivaprasad
12. Dr. N. Sitaram

Design Engineers

1. Sri M. Singaperumal
2. Sri A. Arun

Senior Scientific Officer Grade II

Sri B. Ramamoorthy
Dr. L. Vijayaraghavan
Sri. M. Govardhan

Technical Officers

1. Sri M. Velayudhan
2. ,, S. Krishnaswamy
3. ,, B. N. Somasekhara
4. ,, U. P. Das
5. Sri V. M. Swamy
6. ,, V. Sankaran
7. ,, A. K. Madhavakrishnan
8. ,, R. Srinivasan

METALLURGICAL ENGINEERING

Professors

1. Dr. E. G. Ramachandran
2. ,, K. Srinivasa Raghavan
3. ,, R. Vasudevan
4. Dr. H. M. Roshan
5. ,, K. Ananthapadmanabhan *(Head)*
6. ,, V. M. Radhakrishnan

Associate Professors

1. Dr. O. Prabhakar
2. Dr. D. R. Gopalakrishna Achar

Assistant Professors

1. Sri R. K. Srikantakumaraswamy
2. Dr. K. J. Lakshminarayana Iyer
3. ,, C. V. Gokulrathnam
4. Dr. S. K. Seshadri
5. ,, P. Venugopal

Lecturers

1. Sri. S. Ramakrishna Iyer
2. Dr. S. Raghavan
3. Sri. V. Jagasivamani
4. ,, S. D. Pathak
5. Sri. P. Kesavan Nair
6. Dr. K. Prasada Rao
7. Dr. Ganpath Ram Sharma
8. Dr. J. Mukhopadhyay

Senior Scientific Officer Grade II

Sri. S. Annamalai
Sri S. Kumaran

Technical Officers

1. Sri B. Raghunatha Rao
2. Sri V. K. Vidyasagar

PHYSICS

Professors

1. Dr. R. Srinivasan
2. ,, S. Radhakrishna
3. ,, Y. V. G. S. Murti
4. ,, J. Sobhanadri
5. Dr. V. Balakrishnan
6. ,, K. V. S. Rama Rao
7. ,, V. Sivaramakrishnan (*Head*)
8. ,, G. Rangarajan

Associate Professor

Dr R. Ramji Rao

Assistant Professors

1. Dr. C. K. Narayanaswamy
2. ,, S. Swaminathan
3. ,, S. Bhimasankara Sastri
4. ,, B. M. Sivaram
5. ,, A. V. Narasimham
6. ,, K. Viswanatha Reddi
7. ,, (Smt.) Maha Seshasayee
8. ,, T. A. Prasada Rao
9. Dr. B. S. V. S. Ramachandra Charyulu
10. ,, V. Damodara Das
11. ,, V. Ramachandran
12. ,, S. Srinivasan
13. ,, S. Srinivasan
14. ,, B. S. Venugopalan
15. ,, V. Ramakrishnamurthy

Lecturers

1. Sri V. Ramabhadran
2. ,, B. Subramanyam
3. Dr. G. Sreenivasamurthy
4. ,, Jagabandhu Majhee
5. Dr. Sriraman Srinivasan
6. ,, V. Subrahmanya Murthy
7. ,, K. Hariharan
8. ,, A. Subrahmanyam

Senior Scientific Officer Grade I

Dr. Y. Syamasundar Rao

Senior Scientific Officer Grade II

Sri K. Sarangapani
Dr. V. Sankaranarayanan

Lecturer Grade II

1. Kumari T. M. Vimala
2. Dr. T. S. Natarajan

Technical Officers

1. Sri A. P. Venugopal
2. Sri U. D. Venkatarangaiah

COMPUTER SCIENCE AND ENGINEERING

Professors

1. Dr. H. N. Mahabala
2. Dr. C. R. Muthukrishnan
3. Dr. R. Kalyana Krishnan (*Head*)
4. Dr. R. Nagarajan
5. Dr. B. Yegnanarayana

Associate Professor

Dr. K. B. Lakshmanan

Assistant Professors

Dr. (Smt.) Kamala Krithivasan
Dr. N. Parameswaran

Lecturer

Sri C. Pandurangan

COMPUTER

Manager Systems

Sri S. Srinivasan

Assistant Manager (Operations)

Sri P. Seshasayi

Senior Systems Programmers

1. Sri M. Kothanda Ramanujam
2. Sri V. Aravamudhan

Systems Engineers (Operations)

1. Sri R. Dheenadayalu
2. Sri S. V. Raghavan

Shift Engineer

Sri K. G. Sundararajan

Programmers Grade I

1. Sri G. Kannan
2. Smt. Vatsala Krishnan
3. Smt. Vijayalaxmi Sirohi

OCEAN ENGINEERING CENTRE

Professors

1. Dr. V. Satyanarayana Raju
2. Dr. C.Ganapathy Chettiar *(Head)*
3. Dr. P. V. Indiresan

Associate Professors

1. Dr. M. Ravindran
2. Dr. K. Muthukrishnaiah
3. Dr. S. Narasimha Rao

Principal Scientific Officer

Dr. M. R. Pranesh

Assistant Professors

1. Dr. C. P. Vendhan
2. Dr. K. Ganesh Babu
3. Dr. S. P. Subramanian
4. Sri R. L. Roy Chaudhury
5. Sri. P. Sambandam
6. Dr R. Mahadevan

Senior Scientific Officers Grade I

1. Sri S. Meenakshisundaram
2. Sri. V. G. Idichandy
3. Sri. K. Rajagopalan
4. Sri. R. Natarjan
5. Dr. V. Sundar

Senior Scientific Officers Grade II

1. Sri. S. K. Bhattacharya
2. Sri. R. Sundara vadivelu
3. Sri. V. Ananthasubramanian
4. Sri. S. R. Gandhi
5. Sri. Sajjan Thomas
6. Sri. C. K. Vijayan
7. Sri. J. S. Mani

REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

Professors

1. Dr. Surjit Singh *(Head)*
2. Dr. S. Subramanian

Assistant Professors

1. Dr. S. P. Venkateshan
2. Dr. T. K. K. Srinivasan

Senior Scientific Officers Grade II

1. Sri. M. S. Moni
2. Sri. G. Palaniswamy

CENTRAL ELECTRONIC CENTRE

Scientific Officer Grade I

Sri T. N. Ranganathan

Scientific Officers Grade II

1. Sri R. Rangachari
2. Sri K. R. Venkatachalam

Technical Officers

1. Sri K. Raman
2. Sri M. Kumaravel

MATERIAL SCIENCE RESEARCH CENTRE

Professor

Dr. G. V. Subba Rao

ENGINEERING DESIGN CENTRE

Professors

1. Dr. R. S. Sirohi
2. Dr. M. A. Veluswami

Assistant Professor

Dr. M. P. Kothiyal

Lecturers

1. Sri G. Anjaneyalu
2. Sri V. Venkateswara Rao

Chief Design Engineer

Sri T. S. Chennabasavan

Senior Design Engineers

1. Sri Dev Kishore Sharma
2. Sri S. D. Kalandar Sahib

Design Engineer

Sri H. V. Bhasin

FIBRE-REINFORCED PLASTICS RESEARCH CENTRE

Chief Design Engineer

Dr. N Gopalakrishnan Nair

Assistant Professor

Dr. R. Palaninathan

Senior Design Engineer

Sri S. K. Malhotra

Design Engineer

Sri B. Jagadish Chandra Babu

CENTRE FOR INDUSTRIAL CONSULTANCY AND SPONSORED RESEARCH

Chief Techno Economic Officer

Dr. D. Balakrishnan

Senior Techno Economic Officers

1. Sri C. Sivaprasada Rao
2. Sri Y.G. Narasimha

CENTRAL WORKSHOP

Senior Workshop Superintendent

Sri S. Jambunathan

Assistant Workshop Superintendent

Sri N. V. L. N. N. Kumar

TECHNICAL OFFICERS

1. Sri K.S. Venugopal
2. ,, K.S. Veeraraghavalu
3. Sri G. S. Ramachandran
4. ,, A. V. Sundaram

CENTRE FOR RURAL DEVELOPMENT

Chief Techno Economic Officer

Dr. T. Karunakaran

Senior Techno Economic Officer

Dr. P. C. Chowdhury

CENTRAL GLASS BLOWING SECTION

Technical Officer

Sri N.T. Kumaraswamy

MECHANICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

Senior Scientific Officers Grade I

Dr. G. Kuppuswamy

Dr. J. Rammohan Rao

CHEMICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

Senior Seientific Officer Grade I

Sri K. D. Chandrasekharan

Senior Scientific Officer Grade II

Dr. Sriman Narayanan

GYMKHANA

Senior Physical Training Instructors

1. Sri V. Srinivasan
2. Sri H. Shaukatali
3. ,, S. Joga Rao

LIBRARY

1. Librarian	...	Sri V. S Nazir Ahmed
2. Deputy Librarian	...	,, C. Deenadayalu
3. Assistant Librarians	...	,, P. Venkatesan
		Smt. J. Durairaj
		,, N. Satyamurti
4. S. T. A (S. G.)	...	,, K. Sankaran

DEANS

Academic Courses	...	Dr. D. Prithviraj
Academic Research	...	Dr. M. Venugopal
Industrial Consultancy and Sponsored Research	...	Dr. H. N. Mahabala
Staff Affairs	...	Dr. V. Srinivasan
Students	...	Dr. J. C. Kuriacose

ADVISERS

Foreign and Weaker Section Students	....	Dr. P. K. Aravindan
Sports Activities	...	Dr. P. K. Philip
Cultural Activities	...	Dr. M. S. Ananth
Training and Placement	...	Dr. V. Radhakrishnan

Director

Dr. L. S. Srinath

DEANS

Prof. M. Venugopal, Dean, Academic Research
Prof. D. Prithviraj, Dean, Acadamic Courses
Prof. V. Srinivasan, Dean, Staff Affairs
Prof. J. C. Kuriacose, Dean, Students
Prof. H. N. Mahabala, Dean, IC & SR

Heads of Departments

Prof. K. A. Damodaran	...	Aeronautical Engineering
Prof. P. S. Srinivasan	...	Applied Mechanics
Prof. M. Ramanujam	...	Chemical Engineering
Prof. C. N. Pillai	...	Chemistry
Prof. L. N. Ramamurthy	...	Civil Engineering
Prof. R. Kalyanakrishnan	...	Computer Science and Engineering
Prof. Y. Narayana Rao	...	Electrical Engineering
Prof. A. V. Krishna Rao	...	Humanities & Social Sciences
Prof. R. Subramaniam	...	Mathematics
Prof. M. A. Parameswaran	...	Mechanical Engineering
Prof. K. A. Padmanabhan	...	Metallurgical Engineering
Prof. Y. V. G. S. Murti	...	Physics

CENTRAL ADMINISTRATION

Registrar

Sri. S. Santanagopalan

Deputy Registrars

Sri W. Hanumesi Rao (General Administration)

Sri M. Gopalan (Academic)

Sri V. Shanmugam (Administration)

Finance and Accounts Officer

Sri A. V. Karunakaran Nambiar

Stores and Purchase Officer

Sri A. Thirunavukarasu

Internal Audit Officer

Sri. S. R. Radhakrishnan

Chief Security Officer

Sri T. N. Venkataraman

Assistant Registrars

Sri D. Thiagarajan
(Administration)

Sri G. R. Raghunatha Rao
(Academic)

Kum. G. Saroja
(Academic)
Sri. K. Sekar
(Administration)

Assistant Finance & Accounts Officer

Sri R. Kannan

Sri Mohamed Yacoob
(on leave)

Sri R. N. Subramanian

Assistant Stores and Purchase Officers

Sri M. C. JAMES

Sri M. Manickam

ENGINEERING UNIT

Executive Engineer

Sri N. Malayalam

Estate Officer

Sri V. N. Murty

Assistant Engineers

Sri D. Ramanathan
,, D. R. Patel
,, Abraham Varghese
,, M. Doorvasulu Reddy

Sri S. Swaminathan
,, S. K. Pathi
,, J. C. Jinadoss
,, A. Angamuthu
,, C. Ganesan
,, A. Sardar Jhan
,, T. Seshan

Horticultural Superintendent

Sri P. Manickavasagam

BUDGET PROPOSALS
(1984-85 & 1985-86)

(Figures in lakhs of Rupees)

Description	Budget Estimates for 1984-85		Revised Estimates. 1984-85	Budget Estimates 1985-86
	as per Finance Committee	as allocated by Board of Governors	as per Finance Committee	
(1)	(2)	(3)	(4)	(5)
		Non—Plan		
Recurring	748.68	745.32	847.40	860.75
Non-Recurring	70.00	70.00	70.00	80.00
Total (Non-plan)	818.68	815.32	917.40	940.75
		Plan		
Recurring	32.50	32.50	40.90	46.76
Non-Recurring	107.50	105.87	180.87	374.48
Total (Plan)	140.00	138.37	221.77	421.24
Modernisation of Laboratories and Workshops equipment including updating of computer system.	100.00			
	240.00			
Income	103.07	103.07	133.97	124.80

Finance & Accounts Officer,
INDIAN INSTITUTE OF TECHNOLOGY
MADRAS-600 036.

Statement of Accounts
1983-84

RECEIPTS

	Rs.
Opening Balance	1,94,05,594
Receipts on Capital Accounts	
Grant from Government of India on Capital Account	1,97,45,000
Other Capital Receipts	
Refund of Customs Duty	58,68,764
Capital Receipts others (H. A. L.)	7,91,296
Capital Receipts Microprocessor Lab.	40,000
C/o	4,58,50,654

TECHNOLOGY, MADRAS-600 036

ACCOUNTS FOR THE YEAR 1983-84

PAYMENTS

	Rs.	Rs.
On Capital Accounts		
(i) Building and Works		51,73,158
(ii) (a) **Equipment Furniture and Fittings**		
(1) Chemistry	2,10,828	
(2) Physics	1,59,051	
(3) Mathematics	9,623	
(4) Humanities and Social Sciences	20,140	
(5) Civil Engineering	2,07,460	
(6) Mechanical Engineering	2,55,672	
(7) Electrical Engineering	3,22,747	
(8) Chemical Engineering	45,060	
(9) Mettallurgy	1,81,599	
(10) Applied Mechanics	1,75,364	
(11) Aeronautical Engineering	1,21,852	
(12) Computer Science and Engg.	2,31,561	
		19,40,957
(b) Capital Equipment for New Labs		345
(c) Central Services Units		2,03,150
C/o		73,17,610

RECEIPTS (Contd.)

		Rs	Rs.
	B/f		4,58,50,654
Grant from Government of India:-			
On Revenue Account			5,63,74,000
Receipts from Academic Section :-			
Tuition Fees		4,66,767	
Hostel Seat Rent		2,58,572	
Gymkhana Management		49,160	
Medical Fees		17,198	
Fines		7,981	
Examination Fees		49,650	
Degree in Absentia		1,736	
			8,51,064
	C/o		10,30,75,718

PAYMENTS (Contd.)

		Rs.	Rs.
	B/f		73,17,610
d) Research Centre :-			
Engineering Design Centre		28,142	
Regional Sophisticated Instrumentation Centre		10,812	
Composite Structure F.R.P. Research Centre		19,793	
Material Science Research Centre		1,12,421	
Energy Research Centre		49,124	
Inter University Partnership Projects		54	
Television Laboratory		1,10,527	
			3,30,873
(e) Central Workshop			80,644
(f) Ocean Engineering Centre			6,71,551
(g) Centre for Rural Development			1,07,986
(h) Replacement of Obsolete Equipment			39,55,106
(i) Indo-French Colloboration Programme			11,114
(j) Sub-Centre Cryogenic Engineering			52,829
(k) Bio-Science and Bio-Technology			1,31,370
(l) Naval Architecture			19,011
(m) Capital Equipment for Department by Rotation			7,75,686
	C/o		1,34,53,780

RECEIPTS (Contd.)

		Rs.	Rs.
	B/f		10,30,75,718
Other Receipts			
Application fees from Students		8,66,290	
Application fees for Posts in Institute		30	
Admission Fees		17,266	
Grade Card		4,626	
Gymkhana Receipts		—	
Institute Bus Collection		4,33,741	
Hire Charges on Instt. Vehicle		29,889	
Library Over due collection		60,190	
Institute Day and Association fees		4,095	
Library Membership fee		31,769	
Outstanding Dues Gymkhana Management		33,207	
Short Term and other Courses		—	
	C/o	14,81,103	10,30,75,718

PAYMENTS (Contd.)

		Rs.	Rs.
	B/f		1,34,53,780
(iii)	**Customs Duty on West German Equipment**		
	Customs Duty and Clearance Charges		76,02,757
(iv)	**Furniture and Fittings**		
	Office and Library etc.	4,13,826	
	Utensils of Hostels	84,976	4,98,802
(v)	**Library**		
	a) Books	3,66,089	
	b) Journals and Back volumes	18,70,764	
	c) Equipment	48,555	
	d) Film Media Resources	—	22,85,408
(vi)	**Others**		
	Motor Vehicles	2,14,534	
	Cycles	6,675	
	Typewriters and Duplicators	1,11,592	
	Hospital Equipments	1,10,052	
	Fire Fighting Equipment	—	
	Telephones	—	4,42,853
(vii)	Silver Jubilee Celebrations		9,09,468
	C/o		2,51,93,068

RECEIPTS (Contd.)

		Rs.	Rs.
	B f.	14,81,103	10,30,75,718
Other Receipts Contd.			
Sale of Question Papers, Tender Forms etc.,		6,66,433	
Miscellaneous Recoveries		24,000	
Breakage from Students		546	
Hire Charges for Gowns		1,130	
Guest House Boarding Charges		15,424	
Subscription to Journal of Mathematical and Physical Sciences and sale proceeds of Institute Publications		1,14,304	
Hostel Establishment Charges Receipts from Students		25,242	
			23,28,182
Interest on Conveyance Advance		10,396	
Interest on Deposit from T. N. E. B		8,170	
Interest on Call Deposits with S. B. I. and Endowments		7,79,451	
Interest on P. F. Investments		23,50,383	
Interest on House Building Advance		279	
			31,48,679
	C/o.		10,85,52,579

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1983-84

PAYMENTS (Contd.)

		Rs.	Rs.
	B/f.		2,51,93,068
Revenue Account:			
Academic Section—Pay and Allowances of Teaching Staff			
1) Chemistry		12,99,659	
2) Physics		12,88,992	
3) Mathematics		7,96,175	
4) Humanities and Social Sciences		6,79,828	
5) Civil Engineering		12,00,551	
6) Mechanical Engineering		21,48,188	
7) Electrical Engineering		19,57,058	
8) Chemical Engineering		9,08,983	
9) Metallurgical Engineering		7,60,340	
10) Applied Mechanics		8,41,820	
11) Aeronautical Engineering		7,07,471	
12) Computer Science and Engg.		7,07,779	1,32,96,844
	C/o.		3,84,89,912

RECEIPTS (Contd)

		Rs.	Rs.
	B/f		10,85,52,579
Receipts from Building :			
Licence Fees		11,73,955	
Electricity, Water and Service Charges		5,46,167	17,20,122
Lawns and Gardens :-			
Usufructs and Receipts from Sewage Farms			26,147
Receipts from Computer Earnings			23,53,580
Accumulated P.F. Contribution due to change over to G.P.F. Scheme			26,90,666
	C/o.		11,53,43,094

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1983-84

PAYMENTS (Contd.)

		Rs.	Rs.
	B/f		3,84,89,912
(ii) Pay and Allowances of Non-Teaching Staff:-			
1. Chemistry		4,41,573	
2. Physics		8,02,746	
3. Mathematics		71,178	
4. Humanities and Social Sciences		1,61,446	
5. Civil Engineering		8,65,064	
6. Mechanical Engineering		13,52,388	
7. Chemical Engineering		5,24,004	
8. Electrical Engineering		10,17,747	
9. Metallurgical Engineering		5,66,955	
10. Applied Mechanics		4,40,608	
11. Aeronautical Engineering		3,43,415	
12. Computer Science & Engineering		3,62,889	
			69,50,013
(iii) Departmental Expenses :			
1. Chemistry		4,10,355	
2. Physics		4,49,607	
3. Mathematics		32,929	
4. Humanities and Social Sciences		73,158	
5. Civil Engineering		3,49,095	
6. Mechanical Engineering		7,75,753	
7. Electrical Engineering		6,16,166	
	C/o.	27,07,063	4,54,39,925

RECEIPTS (Contd)

		Rs.	Rs.
	B/f		11,53,43,094
Recovery of Advance:-			
Motor Car and Other Conveyance		2,20,161	
Festival Advance		2,16,232	
Customs Duty on Equipment from West Germany		75,79,553	
Customs Duty on Personal Effect of German Experts		--	
On Account of UNESCO Cupons		--	
Miscellaneous Advances		3,77,251	
Flood Advance/Drought Relief		2,91,558	
House Building Advance		3,35,594	
			90,20,349
Deposits:-			
From Contractors Deposits (works)		7,85,703	
From Suppliers Deposits (Institute)		2,15,745	
External Scholarship		6,49,577	
C. S. I. R.		3,82,728	
Students Caution Deposits		34,684	
Centres etc.,		1,15,84,769	
Miscellaneous Deposits		58,81,224	
	C/o	1,95,34,430	12,43,63,443

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1983-84

PAYMENTS (Contd)

	Rs.	Rs.
B/f	27,07,063	4,54,39,925
8. Chemical Engineering	3,19,102	
9. Mettallurgical Engineering	4,24,539	
10. Applied Mechanics	3,10,669	
11. Aeronautical Engineering	2,23,678	
12. Computer Science & Engineering	24,42,586	64,27,637
Indo—German Projects (Pay and Allowances)		26,597
Library :		
Pay and Allowances (Officers)	1,92,772	
Pay and Allowances (Est.)	9,24,840	
Journal of General Interest	14,808	
Contingencies—Operating Cost	50,886	
Binding Charges	28,336	12,11,642
Ocean Engineering :		
Pay and Allowance (Officers)	4,86,579	
Pay and Allowance (Others)	2,31,395	
Others Charges	4,33,935	11,51,909
Research Centres :		
Pay and Allowances (Officers)	5,03,575	
Pay and Allowances (Others)	7,53,561	12,57,136
Central Services :		
Central Workshop :		
Pay and Allowances (Officers)	81,765	
Pay and Allowances (Estt.)	17,39,561	
Working Expenses (Departmental Tools and other Consumables)	2,14,316	20,35,642
C/o		5,75,50,488

RECEIPTS (Contd.)

		Rs.	Rs.
	B/f.	1,95,34,430	12,43,63,443
Q. I. P. and C.S.D. Schemes		12,81,329	
Industrial Consultancy and Sponsored Research Projects		2,12,71,842	
R. S. I. C. Receipts		3,54,202	
Gymkhana Management Students and Amenities Fund		36,414	
Library Deposits		90,000	
Students Aid and Welfare Fund Receipts from Students		4,211	4,25,72,428
	C/o.		16,69,35,871

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1983-84

PAYMENTS (Contd.)

		Rs.	Rs.
	B/f.		5,75,50,488
Central Electronic Centre			
Pay and Allowances			1,49,153
Air-Conditioning Unit			
Pay and Allowances			1,73,814
Stipend for Apprentices			74,329
Centres Etc.,			
Regional Sophisticated Instrumentation Centre		2,17,737	
Electron Microscope Lab.		50,465	
Instruments Servicing and Development Centre		1,62,199	
Central Photographic Section		53,287	
Central Glass Blowing Section		33,623	
Air Conditioning Unit		2,00,729	
X-Ray Diffraction Lab.		62,161	
Energy Research Centre		19,404	
Centre for Rural Development		2,33,725	
Fibre Reinforced Plastic Research Centre		1,59,484	
Centre for Futurology		5,000	
Naval Architecture		45,535	
	C/o.	12,43,349	5,79,47,784

RECEIPTS (Contd.)

		Rs.
	B/f.	16,69,35,871
	C/o.	16,69,35,871

PAYMENTS (Contd.)

		Rs.	Rs.
	B/f.	12,43,349	5,79,47,784
Sub-Centre in Cryogenic Engg.		34,118	
Television Engg. Laboratory		1,00,610	
Engineering Design Centre		76,826	
Material Science Research Centre		2,24,491	
Indo-German Project		48,665	
Cultural Exchange between IIT Madras and other Nations		56,036	17,84,095
Institute Scholarships :-			
Post Graduate and Research		39,93,524	
Under Graduate		5,45,898	45,39,422
N.C.C. :-			
Pay and Allowances		50,316	
Other Expenditure		69,084	1,19,400
Athletic and Gymkhana :-			
Transfer of Funds to Gymkhana Management and other Gymkhana items			5,27,733
Other items :-			
Part-time Lectures		14,432	
Visiting Professors		21,834	
Technical Bulletins & Journals		92,334	
	C/o.	1,28,600	6,49,18,434

RECEIPTS (Contd)

		Rs.
	B/f.	16,69,35,871
	C/o	16,69,35,871

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1983-84

PAYMENTS (contd)

	Rs.	Rs.
B/f	1,28,600	6,49,18,434
Guidance and Counselling Unit	12,169	
Symposia and Seminars	27,194	
Inplant Training/Course/Visits	1,95,276	
Continuing Education Programme organised by the Institute	20,978	
Quality Improvement Programme	15,830	
Director's Laboratory	—	
H. A. L. Trainees	1,00,000	
Director's Discretionary Fund	28,455	
Membership to Outside Bodies	39,161	
Remuneration to External Examiners	48,545	
Convocation	1,30,785	
Prizes for Academic Distinction	11,129	
Joint Entrance Examination	7,20,578	
Common Examination for Post Graduate Admission (CEPA/Graduate Aptitude Test for Engineers (GATE)	10,22,236	
Contribution towards Institute Participation of Programme of National Conference	47,000	
J. E. E. Special Coaching Programme for SC/ST Students (83-84)	2,32,119	
		27,80,055
Hostels		
Allowance to Wardens	6,881	
Sudsidy to Hostels	16,73,480	
		16,80,361
C/o		6,93,78,850

RECEIPTS (Contd.)

		Rs.
	B/f.	16,69,35,871
	C/o.	16,69,35,871

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1983-84

PAYMENTS (Contd.)

		Rs.	Rs.
	B/f.		6,93,78,850
Other Sections			
a) **Central Administration**			
Pay and Allowances—Officers		10,23,806	
Pay and Allowances—Otherstaff		45,39,859	55,63,665
b) **Contingencies**			
Postage		2,94,228	
Entertainment		33,053	
Telephones		7,36,734	
Liveries		4,36,855	
Stationery		5,56,869	
Printing		2,07,936	
Advertisement		3,88,534	
Miscellaneous Expenses		3,83,465	30,37,674
c) **Other Items**			
Director's Discretionery Fund-Payments		8,074	
Less: Recoveries		495	7,579
d) **Stores**			
Pay and Allowances - Officers		78,682	
Pay and Allowances - Others		4,04,611	4,83,293
General Stores			
Purchase		47,808	
LESS: Issues		39,796	8,012
	C/o.		7,84,79,073

RECEIPTS (Contd.)

		Rs.
	B/f.	16,69,35,871
	C/o.	16,69,35,871

PAYMENTS (Contd)

		Rs.	Rs.
	B/f.		7,84,79,073
Security—Other Charges			11,234
Special Security Guards			2,46,384
Police			119
Lawns and Gardens			
Pap and Allowances of Horticulture Superintendent		28,491	
Pay and Allowances (Others)		1,28,424	
			1,56,915
Power			25,86,076
Mosquito Control			3,563
Water			4 41,727
Oil and Petrol			1,92,318
Repairs and Maintenance			
Vehicles		2,24,730	
Furniture		3,48,431	
Typewriter/Duplicator		1,10,522	
			6,83,683
Duty Insurance and Road Taxes			80,524
Fire Fighting—Operating cost			—
Works and Maintenance			
Pay and Allowances—officers		1,13,304	
Pay and Allowances—Otherstaff		38,01,948	
Other Expenditure on Maintenance		37,32,316	
			76,47,568
Property Tax			2,63,004
	C/o.		9,07,92,188

RECEIPTS (Contd.)

		Rs.
	B/f.	16,69,35,871
	C/o.	16,69,35,871

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1983-84

PAYMENTS (Contd)

	Rs.	Rs.
B/f.		9,07,92,188
Hospital		
Pay and Allowances-Medical Officer	1,92,892	
Pay and Allowances-Other Staff	3,19,094	
Purchase of Medicines etc.,	8,01,039	13,13,025
Subsidy to Vana Vani School	1,70,478	
Subsidy to Central School	———	
Audit Charges	45,230	
Legal Expenses	28,312	
Honararium to Part Time Legal Adviser	1,800	2,45,820
Travelling Expenses:		
Board of Governors	9,280	
Staff Committee, Selection Committee etc.,	83,121	
Candidates called for Interview for appointment etc.,	52,588	
Joint Enterance Examination	62,417	
External Examiners	67,389	
Common Examination for Post Graduate Admission/ Graduate Apptitute Test for Engineers (GATE)	33,536	3,08,331
C/o		9,26,59,364

RECEIPTS (Contd.)

		Rs.
	B/f.	16,69,35,871
	C/o.	16,69,35,871

PAYMENTS (Contd.)

		Rs.	Rs.
	B/f.		9,26,59,364
Commitment under Indo-German Agreement			
Customs Duty on Personal Effects of West German Experts			—
Contribution to Societies			—
Leave Salary and Pension Contribution on account of Personal on Foreign Services			33,434
Contribution to employees Welfare scheme			1,855
Training and Welfare activities of staff members			2,395
Central Gas Supply Unit			
Purchase		1 09,700	
Issues		70,584	39,116
Campus Amenities			14,391
Provident Fund/Gratuity/Pension			
C.P.F. (Contribution and Interest)		2,50,000	
C P.F. (Cum—Gratuity (Contribution and Interest)		17,84,134	
C.P.F. Cum—Pension—cum—Gratuity		7,49,361	
Gratuity and Pension		6,95,432	
Deposit linked Insurance		4,775	34,83,702
Silver Jubilee Celebrations			7,09,229
	C/o.		9,69,43,486

RECEIPTS (Contd.)

		Rs.
	B/f.	16,69,35,871
	C/o	16,69,35,871

PAYMENTS (Contd)

	Rs.	Rs.
B/f.		9,69,43,486
Advance		
Motor Car and Other Conveyance	2,92,500	
Customs Duty on Equipment from WEST GERMANY	80,00,000	
Festival Advance	2,10,200	
Customs Duty on Personal effect of German experts	——	
UNESCO Coupons	——	
Other Miscellaneous Advance	8,64,368	
Drought Advance	7,78,500	
House Building Advance	8,52,771	1,09,98,339
Refund of Deposits		
Suppliers Deposit (Institute)	1,91,765	
Contractors Deposit (works)	4,42,034	
External Scholarship	6,83,135	
C.S.I.R.	4,84,111	
Student Caution Deposit	16,125	
Miscellaneous Deposit	64,06,329	
Micro Processor Laboratory	35.022	
Centres etc.,	44,12,973	
QIP Programme organised by Govt. of India, CSD (Defence)	23,71,983	
Industrial Consultancy work and Projects	2,45,53,667	3,95,97,144
C/o		14,75,38,969

RECEIPTS (Contd.)

		Rs.
	B/f.	16,69,35,871
	Total Rs.	16,69,35,871

(Sd) A. V. KARUNAKARAN NAMBIAR
Finance & Accounts Officer
Indian Institute of Technology
Madras-600 036

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1983-84

PAYMENTS (Contd)

		Rs.	Rs.
	B/f.		14,75,38,969
Closing Balance			
Cash in Hand		4,39,907	
With State Bank of India		1,88,93,908	
I. I. T. Post Office Savings Bank Account		63,787	1,93,96,902
	Total Rs.		16,69,35,871

S. SANTHANAGOPALAN
Registrar
Indian Institute of Technology
Madras-600 036

L. S. SRINATH
Director
Indian Institute of Technology
Madras-600 036

EXPENDITURE

	Rs.	Rs.
Educational Expenses		
Pay of Teaching Staff		
Department of Chemistry	13,14,308	
Physics	12,96,428	
Mathematics	8,03,855	
Humanities & Social Sciences	6,78,067	
Civil Engineering	12,10,980	
Mechanical Engineering	21,55,106	
Electrical Engineering	19,65,921	
Chemical Engineering	9,12,874	
Metallurgy	7,72,437	
Applied Mechanics	8,46,868	
Aeronautical Engineering	7,07,263	
Computer Science & Engineering	7,07,281	
		1,33,71,388
	C/o	1,33,71,388

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31st MARCH 1984

INCOME

	Rs.	Rs.
Grant From Government of India		
(On Revenue Account)		5,77,46,000
General Income		
Tutition Fees	4,66,479	
Hostel Seat Rent	2,59,082	
Gymkhana Management	49,160	
Medical Fees	17,225	
Fines	7,981	
Examination Fees	49,650	
Degree in Absentia	1,736	
Application Fees from Students	8,66,290	
Application Fees for Appointments	30	
Admission Fees	17,266	
Grade Card	4,626	
		17,39,525
C/o		5,94,85,525

EXPENDITURE (Contd.)

	Rs.	Rs.
B/f.		1,33,71,388
Pay of Non-Teaching Staff		
Department of Chemistry	4,47,580	
Physics	8,09,816	
Mathematics	72,262	
Humanities & Social sciences	1,63,153	
Civil Engineering	8,73,762	
Mechanical Engineering	13,67,728	
Electrical Engineering	10,33,136	
Chemical Engineering	5,28,426	
Metallurgy	5,73,517	
Applied Mechanics	4,45,860	
Aeronautical Engineering	3,46,785	
Computer Science and Engineering	3,70,081	
		70,32,106
Pay and Allowances		
Centres — Officers	5,10,405	
Centres – Others	7,63,437	12,73,842
Pay and Allowances		
Indo German Projects		37,667
C/o		2,17,15,003

TECHNOLOGY, MADRAS-600 036

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.	Rs.
	B/f.		5,94,85,525
Miscellaneous Receipts			
Institute Bus Collections		4,34,794	
Hire Charges on Institute vehicles		30,377	
Licence Fee		13,46,331	
Electricity, Water and Service Charges		5,28,601	
Lawns & Gardens (Auction sales of trees Usufructs)		26,147	
Due to change over to GPF Scheme		26,91,755	
Other Receipts		39,89,505	
Income from Computer Centre		21,46,330	
			1,11,93,840
Excess of Expenditure over Income			18,24,586
	C/o.		7,25,03,951

EXPENDITURE (Contd)

		Rs.	Rs.
	B/f.		2,17,15,003
Departmental Expenses			
Chemistry		4,19,405	
Physics		4,01,409	
Mathematics		32,929	
Humanities & Social Sciences		75,221	
Civil Engineering		3,79,994	
Mechanical Engineering		6,37,643	
Electrical Engineering		5,86,248	
Chemical Engineering		3,36,785	
Metallurgy		4,05,229	
Applied Mechanics		2,09,674	
Aeronautical Engineering		2,62,252	
Computer Science & Engineering		22,09,950	
			59,56,739
Library:			
Pay & Allowances: -			
Officers		1,94,296	
Establishment		9,34,386	
Contingencies - Operating Cost and Binding Charges		79,571	
Journals of General Interest		14,808	
			12,23,061
	C/o.		2,88,94,803

TECHNOLOGY, MADRAS-600 036

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
	C/o	7,25,03,951

EXPENDITURE (Contd.)

	Rs.	Rs.
B/f		2,88,94,803
Workshops		
Pay and Allowances of Workshop Superintendent	82,270	
Pay and Allowances of Other Staff	17,63,761	
Working expenses (Instruments, Tools, other Consumables)	3,69,793	
Stipend to Apprentices	69,730	
		22,85,554
Sub-Centre in Cryogenics Engineering		34,418
Ocean Engineering Centre		
Pay and Allowances—Officers	4,90,703	
Pay and Allowances—Others	2,35,625	
Working Expenses (Instruments and Other Consumables)	3,79,148	
		11.05,476
C/o.		3,23,20,251

TECHNOLOGY, MADRAS-600 036

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
	C/o.	7,25,03,951

EXPENDITURE (Contd.)

	Rs.	Rs.
B/f		3,23,20,251
Central Electronics Centre Pay & Allowances		1,54,979
Air-Conditioning Unit-Pay and Allowances		1,76,050
R. S. I. C	2,06,332	
Electron Microscope Lab	49,608	
Electronic Instruments Servicing & Development Centre (C. E. C)	1,73,269	
Central Photographic Section	63,033	
Central Glass Blowing Section	33,623	
Air-Conditioning Unit	1,86,757	
X-Ray Diffraction Laboratory	58,629	
Energy Research Centre	19,403	
Centre for Rural Development	2,32,081	
Fibre Reinforced Plastic Research Centre	18,220	
Television Engineering Lab.	38,298	
Engineering Design Centre	64,051	
Material Science Research Centre	1,99,004	
Indo-German Project	48,665	
Colloboration and Cultural Exchanges between IIT, Madras & other Nations	56,036	
Microprocessor Lab.	2,39,326	
Centre for Futurology	5,000	
Naval Architecture	7,990	
Central Gas Supply Unit	38,906	
		17,38,231
C/o.		3,43,89,511

TECHNOLOGY, MADRAS-600 036

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
	C/o.	7,25,03,951

EXPENDITURE (Contd.)

	Rs.	Rs.
B/f.		3,43,89,511
Institute Scholarships		
Post Graduate and Research	40,34,391	
Under Graduate	5,29,774	45,64,165
N.C.C		
Pay and Allowance	49,881	
Other Expenditure	69,084	1,18,965
Contribution to Gymkhana Management (Athletic and Gymkhana)		5,60,940
Part-time Lectures	14,432	
Visiting Professors	21,834	
Technical Bulletin and Journals	94,756	
Symposia and Seminars	27,194	
Inplant Training Courses/Visits	1,95,276	
Continuing Education Programme Organised by the Institute	20,978	
Guidance and Counselling Unit	12,169	
J. E. E. Special Coaching Programme for SC/ST Students	2,32,119	
	6,18,758	
C/o.		3,96,33,581

TECHNOLOGY, MADRAS-600 036

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
	C/o	7,25,03,951

EXPENDITURE (Contd.)

		Rs.	Rs.
	B/f.	6,18,758	3,96,33,581
Quality Improvement Programme Initiated by the Ministry of Education		15,830	
Director's Discretionery Fund for Research		28,455	
Membership fees to outside Bodies		39,161	
Remuneration to External Examiners		48,545	
Joint Entrance Examination		7,21,738	
Convocation		1,20,785	
Prizes for Academic Distinction		11,129	
Common Examination for P. G. Admission Graduate Apptitute Test in Engg.		10,16,573	
Contribution towards Institute Participation In programme of National Conference		47,000	
H.A.L. Trainee		1,00,000	
			27,67,974
Hostels:			
Allowance to Wardens		7,530	
Subsidy to Hostels		16,73,480	
			16,81,010
Central Administration:			
Pay & Allowances - Officers		10,30,619	
Pay & Allowances - Establishment		45,88,836	
			56,19,455
	C/o		4,97,02,020

TECHNOLOGY, MADRAS-600 036

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
	C/o.	7,25,03,951

EXPENDITURE (Contd.)

		Rs.	Rs.
	B/f		4,97,02,020
Contingencies			
Postage		2,84,593	
Entertainment		32,946	
Telephones		7,36,734	
Liveries		2,42,706	
Stationery		5,22,815	
Printing		2,08,276	
Advertisement		4,04,051	
Sundries (Misc. Expenses)		4,12,070	
			28,44,191
Other Items			
Director's Discretionery Fund			7,580
Stores			
General Stores		6,159	
Pay & Allowances—Officers		79,402	
Pay & Allowances—Establishment		4,09,725	
			4,95,286
Security			
Other Charges		10,610	
Special Security Guards		2,46,383	
Police		119	
			2,57,112
Lawns and Gardens			
Pay & Allowances of Horticultural Supdt.		28,681	
Pay & Allowances of Others		1,28,424	
			1,57,105
	C/o.		5,34,63,294

TECHNOLOGY, MADRAS-600 036

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
	C/o	7,25,03,951

EXPENDITURE (Contd.)

		Rs.	Rs.
	B/f.		5,34,63,294
Power			25,86,076
Mosquito Control			3,563
Water			4,41,727
Oil and Petrol			1,96,012
Repairs and Maintenance:			
(i) Furniture		3,48,432	
(ii) Typewriters and Duplicators		53,633	
(iii) Motor Vehicles		2,23,826	
			6,25,891
Duty Insurance and Road Taxes			73,639
Works and Maintenance:			
Pay and Allowances - Officers		1,16,414	
Pay and Allowances - Establishments		38,12,440	
Other Charges		37,33,872	
			76,62,726
Property Tax			2,63,004
Hospital :			
Pay and Allowance of Medical Officers		1,92,201	
Pay and Allowance of Establishment		3,22,895	
Purchase of Medicines		8,07,018	
			13,22,114
	C/o.		6,66,38,046

TECHNOLOGY, MADRAS-600 036

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
	C/o.	7,25,03,951

EXPENDITURE (Contd.)

		Rs.	Rs
	B/f.		6,66,38,046
Subsidy to Vana Vani School			1,70,478
Audit Charges			65,230
Legal Expenses			28,312
Honorarium to Part time Legal Adviser			1,800
Travelling Allowances			
Board of Governors		9,280	
Staff Selection Committee and other Committee		83,121	
Candidates called for Interview for appointments		52,588	
External Examiners		67,389	
Joint Entrance Examination		62,417	
Common Examination for P. G. Admission/Graduate apptitude test in Engg.		33,536	3,08,331
	C/o.		6,72,12,197

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
	C/o.	7,25,03,951

EXPENDITURE (Contd.)

	Rs.	Rs.
	B/f.	6,72,12,197
Lave Salary and Pension Contribution on account of Personnel on Foreign Services		33,434
Training and Welfare Activities of Staff Member		2,395
Employees welfare Scheme		1,855
Campus Amenities		13,391
G. P. F. Contribution etc.,		45,61,450
Silver Jubilee Celebration		6,79,229
TOTAL	Rs.	7,25,03,951

(Sd) A. V. KARUNAKARAN NAMBIAR
Finance & Accounts Officer
Indian Institute of Technology
Madras-600 036

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31st MARCH 1984

INCOME (Contd.)

		Rs.
	B/f.	7,25,03,951
TOTAL	Rs.	7,25,03,951

S. SANTHANAGOPALAN
Registrar
Indian Institute of Technology
Madras-600 036.

L. S. SRINATH
Director
Indian Institute of Technology
Madras-600 036.

CAPITAL FUND AND LIABILITIES

	Rs.	Rs.
Capital Fund		1,12,17,262
Value of Land per contra		
Block value of German aid per contra equipment	9,79,74,098	
Technical Books and Journals per contra	15,41,113	
		9,95,15,211
Value of Aid Alexander Van Humbold Foundation		10,83,000
Computer Systems Per Contra		
As per last Balance Sheet		1,54,50,458
Capital Grants and Balance of income and expenditure a/c. as on 31.3.83	22,88,68,895	
Less :— Adj for 82-83	81,925	
	22,87,86,970	
Add :—Govt. Grant for 82-83 received in 83-84	74,23,000	
Add :—Capital Grant during 83-84	1,97,45,000	
Add :—Capital Receipts	8,31.297	
	25,67,86,267	
Less : Excess of expenditure over Income for 83-84	18,24,586	
		25,49,61,681
C/o.		38,22,27,612

TECHNOLOGY, MADRAS

AS ON 31—3—1984.

PROPERTY AND ASSETS

	Rs.	Rs.	Rs.
LAND :			
Value of land gifted by the Govt. of Tamil Nadu.			1,12,17,262
Buildings :-			
Cost of completed buildings as on 31.3.83	10,98,09,714		
Add : Buildings completed during the year	42,17,858	11,40,27,572	
Building under construction on 31.3.83	33,98,293		
Add : Expenditure for the year	62,11,042		
	96,09,335		
Less : Transferred to completed buildings a/c.	42,17,858	53,91,477	
			11,94,19,049
Diesel Generator equipments			2,14,232
	C/o		13,08,50,543

CAPITAL FUND AND LIABILITIES (Contd.)

		Rs.	Rs.	Rs.
	B/f.		38,22,27,612	
Less: Value of Equipment written off			25,331	38,22,02,281
Cost of Projector etc. (Gymkhana) per contra				49,811
Endownment Fund (Governors Prize etc)				2,65,350
Deposits:				
EMD/ICC and other deposits		2,15,54.010		
Add: Adjustment of Library Deposits for 82-83		81,925	2,16,35,935	
NEW PLAN SCHEMES				
Emerging Tech. approved by G. O. I-Opening Balance		9,53,969		
Add: Received in 83-84		68,00,000		
		77,53,969		
Less: Payment in 83-84		3,86,354	73,67,615	2,90,03,550
SUNDRY CREDITORS				
On works Account		29,77,000		
For Supplies made for service rendered department/section		6,95,666		36,72,666
	C/o.			41,51,93,658

PROPERTY AND ASSETS (Contd.)

	Rs.	Rs.	Rs.
B/f.			13,08,50,543
Furniture and fittings at cost as per balance sheet as at 31.3.83.	6,38,61,820		
Add: Additions during the year	94,49,836	7,33,11,656	
Less: Cost of equipments written off during the year		25,082	7,32,86,574
Computer acquired thro' German food aid funds under the Indo-German **Agreement.**			
At cost as per Balance sheet as on 31.3.83.			1,54,50,458
Block value of Equip. from Alexander Van Humbold Foundation on 31.3.84			10,83,000
Block value of Equip. from West Germany as per balance sheet as on 31.3.83.	9,61,74,098		
Add: Additions during the year	18,00,000	9,79,74,098	
Customs duty and clearence charges on Equip. from W. Germany as per Bal. sheet on 31.3.83.	2,67,62,655		
Add: Customs Duty paid during the year	76.14,085		
	3,43,76,740		
Less: Refund of C. D	58,68,764	2,85,07,976	
			12,64,82,074
C/o.			34,71,52,649

CAPITAL FUND AND LIABILITIES (Contd.)

		Rs.	Rs.
	B/f.		41,51,93,658
Outstanding Expenses Payable			
a. Pay and Allowances		25,96,358	
b. Scholarships		3,73,105	
c. Other Allowances Medical		83,642	
d. Wages to N. M. R. labourers-departments etc.,		17,368	
e. Audit fees		50,000	
f. Stipend to Apprentices		2,100	
g. Computer Centre Rem., to staff		20,900	
			31,43,473
P. F. Contribution and Interest payable			10,61,243
Computer Receipts received in advance			33,280
Grant-in-aid from American Chemical Society : (per Contra)			
Balance as per last year Balance Sheet.			1,10,934
	C/o.		41,95,42,588

PROPERTY AND ASSETS (Contd.)

		Rs.	Rs.
	B/f.		34,71,52,649
Motor Vehicles at cost as per Balance Sheet as at 31. 3. 1983		13,82,873	
Add : Additions during the year		2,53,760	16,36,633
Library book and scientific Journals at cost as on 31. 3. 1983		1,64,45,080	
Add : Additions during the year		23,13,293	1,87,58,373
Back volumes of Technical books Journals from West Germany as per Balance sheet as at 31. 3. 1983.		15,41,113	
Add : Additions during the year		—	15,41,113
Typewriters and Duplicators at cost as per Balance Sheet as at 31. 3. 1983.		7,57,365	
Add : Additions during the year		1,23,609	8,80,974
	C/o.		36,99,69,742

CAPITAL FUND AND LIABILITIES (Contd.)

	Rs.
B/f.	41,95,42,588
Unpaid items as on 31.3.1984 as per Undisbursed pay Register	34,931
C/o.	41,95,77,519

TECHNOLOGY, MADRAS

AS ON 31–3–84

PROPERTY AND ASSETS

	Rs.	Rs.
B/f.		36,99,69,742
Tools and Plants works as at 31.3.1983	3,77,128	
Add : Additions during the year	14,835	3,91,963
Cycles at cost as per Balance Sheet as at 31.3.1983	53,417	
Less : Cost of cycles written off during the year	250	
	53,167	
Add : Additions during the year	6,675	59,842
Investment Account Endownment Fund Governor's prize etc., as on 31.3.1984		2,65,350
STOCK AS ON 31.3.1984.		
Consumable stores with departments		43,93,677
Construction Materials with Engineering Unit work account		23,13,266
Guest House provisions		857
Stationery Articles		2,52,648
Consumable stores with Central stores, Tyres and tubes spare parts, liveries etc.		1,10,867
UNESCO COUPONS		65,510
C/o.		37,78,23,722

CAPITAL FUND AND LIABILITIES (Contd.)

		Rs.	Rs.
	B/f.		41,95,77,519
Industrial Research and Development Fund Account			
Balance as on 1.4.83. (as per separate statement of accounts)		8,26,568	
Add: Receipts of the year		9,79,229	
		18,05,797	
Less: Payments during the year		10,47,920	
			7,57,877
Gymkhana Management			
Opening Balance 1.4.1983 as per separate statement of accounts		90,697	
Add: Receipts of the year		5,90,902	
		6,81,599	
Less: Payments during the year		6,65,346	
			16,253
	C/o.		42,03,51,649

TECHNOLOGY, MADRAS

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PROPERTY AND ASSETS (Contd.)

	Rs.
B/f.	37,78,23,722
Projector and Tape recorders (Gymkhana Assets) at cost as per last year Balance sheet	49,811
Grant receivable from Government	87,95,000
Fees recoverable	46,393
Licence Fees etc. recoverable	2,36,119
Income receivable for the computer centre	8,05,690
Institute over heads receivable from consultancy	2,40,417
Hire charges of Institute vehicles etc. recoverable	5,463
Pre paid taxes etc.	28,088
Stamps on hand	30,052
C.P.F. contribution recoverable due to change over to pension scheme.	1,089
C.P.F. Interest on investments recoverable	1,51,009
Equipments procured from grant-in-aid received from the American Chemical Society:	
Balance carried over from last year	1,10,934
C/o.	38,83,23,787

CAPITAL FUND AND LIABILITIES (Contd.)

		Rs.
	B f.	42,03,51,649
	C/o.	42,03,51,649

TECHNOLOGY, MADRAS

AT 31st MARCH 1984

PROPERTY AND ASSETS (Contd.)

		Rs.	Rs.	Rs.
	B/f.			38,83,23,787
Advances And Deposits				
Works Advance				27,37,772
Other (General)				81,52,431
Deposit With :				
Tamil Nadu Electricity Board				3,78,380
Collector of Customs Air Cargo Complex		5,11,527		
Collector of Customs Account No.I		38,461		
Collector of Customs Account No.II		2,828		5,52,816
Unpaid Balance Per contra with State Bank of India 'C' A/c.				
Cash on hand U.P.D.		34,931		
Imprest		500		
Cash on hand (other than 'C' account)		4,39,207		
			4,74,638	
With State Bank of India (other than IRD Fund account)		1,88,93,908		
With IIT P.O. Savings account		63,787		
			1,89,57,695	
With SBI IRD Fund			7,57,877	
With SBI Gymkhana Management			16,253	
				2,02,06,463
	C/o.			42,03,51,649

CAPITAL FUND AND LIABILITIES (Contd.)

		Rs.
	B/f.	42,03,51,649
	TOTAL	42,03,51,649

(Sd) A. V. KARUNAKARAN NAMBIAR
Finance & *Accounts Officer*
Indian Institute of Technology
Madras-600 036

TECHNOLOGY, MADRAS

AT 31st MARCH 1984

PROPERTY AND ASSETS (Contd.)

		Rs.	Rs.
	B/f.		42,03,51,649
Earnest Money Caution and other Deposits		1,43,08,212	
Industrial Consultancy and Projects		1,46,95,338	
		2,90,03,550	
Less : Drawn from refundable Deposits		96,06,648	
		1,93,96,902	
	TOTAL		42,03,51,649

S. SANTHANAGOPALAN
Registrar
Indian Institute of Technology
Madras-600 036.

L. S. SRINATH
Director
Indian Institute of Technology
Madras-600 036.