TWENTY FOURTH

ANNUAL REPORT

1982-83

INDIAN INSTITUTE OF TECHNOLOGY

MADRAS

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MADRAS

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GIANI ZAIL SINGH

The President of India

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Educational Adviser (Tech.)
Ministry of Education and Culture
New Delhi

Sri Man Mohan Singh
Financial Adviser
Ministry of Education and Culture
New Delhi

Prof. M. G. K. Menon
Member (Education)
Planning Commission
New Delhi

Members of Parliament
(Two from Lok Sabha and one from Rajya Sabha)

Dr. Subramaniam Swamy
(upto 24. 3. 83)

Prof. Ajit Kumar Mehta (upto 24. 3. 1983)
Sri Ladli Mohan Nigam

Representatives of the All India Council for Technical Education

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Secretary
Ministry of Education and Culture
New Delhi

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Prof. B. Nag (31. 3. 1983)

Sri Prakash Tandon (upto 31. 1. 83)
Sri B. Ramachandra (upto 31. 3. 1983)
Sri Sarosh J. Ghandy (upto 31. 3. 1983)

Secretary

Sri S. Vedantham
Deputy Educational Adviser (Tech.)
Ministry of Education and Culture
New Delhi

The Board of Governors

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Sri A. Sivasailam
Chairman, Amalgamations Limited, Madras-600 002.

Ex. Officio

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Director
Indian Institute of Technology, Madras-600 036

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Government of Karnataka, Bangalore

Dr. P. J. George
Director of Technical Education
Government of Kerala
Trivandrum

Sri S. Vaiyapuri
Director of Technical Education
Government of Tamil Nadu, Madras

Sri A. Battacharya
Director of Technical Education
Government of Andhra Pradesh
Hyderabad

Nominees of the Council

Dr. V. C. Kulandaisamy
Vice-Chancellor
Anna University of Technology
Madras-25

Dr. L. S. Chandrakant
No. 292, Second Main Road
VIII Block, Jayanagar
Bangalore-560 041

Dr. V. S. Arunachalam
Scientific Advisor to Defence Minister
Ministry of Defence
New Delhi-110 111

Dr. K. Gopalan
Vice-Chancellor, University of Cochin
Hill Palace, Tripunithura
Cochin-682 301

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Department of Electrical Engineering
I. I. T., Madras-600 036

Prof. B. V. Ramanamurthy
Department of Physics
I. I. T., Madras-600 036

Secretary

Sri R. S. Virmani
Registrar
Indian Institute of Technology
Madras-600 036

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Chairman, Amalgamations Limited
Madras-600 002

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Dy. Educational Adviser (Tech.)
Ministry of Education and Culture
Government of India
New Delhi

Dr. K. Gopalan
Vice-Chancellor
University of Cochin
Cochin-682 301
Kerala

Sri Man Mohan Singh
Financial Adviser
Internal Finance Division
Government of India
New Delhi

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Vice-Chancellor
Perarignar Anna University of Technology
Madras-600 025

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Director
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Madras-600 036

Secretary

Sri R. S. Virmani
Registrar
Indian Institute of Technology
Madras-600 036

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Chairman
Amalgamations Limited
Madras-600 002

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Director
I. I. T. Madras

Prof. V. S. Raju
Chairman
Estate and Works Committee
I. I. T. Madras

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

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

Sri N. Malayalam
Executive Engineer
I. I. T. Madras

Secretary

Sri R. S. Virmani
Registrar
I. I. T. Madras

The Senate

Chairman

P. V. Indiresan

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K. Balaraman
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K. A. Damodaran
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K. V. Gopalakrishnan
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M. C. Gupta
R. K. Gupta
S. Jambunathan
D. Johnson Victor
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A. Kuppurajulu

J. C. Kuriacose

K. Lakshminarayana

H. N. Mahabala

P. T. Manoharan

H. Md. Roshan

V. G. K. Murti

Y. V. G. S. Murti

C. R. Muthukrishnan

R. Nagarajan

M. S. Narasimhan

Y. Narayana Rao

R. Natarajan

V. S. Nazir Ahmed

S. D. Nigam

K. A. V. Pandalai

M. A. Parameswaran

K. R. Parthasarathy

H. S. Paul

C. N. Pillai

D. Prithviraj

H. C. Radhakrishna

S. Radhakrishna

R. Radhakrishnan

V. Radhakrishnan

K. Radhakrishna Rao

J. P. Raina

N. Rajagopalan

N. R. Rajappa

K. P. Rajappan

V. S. Raju

E. G. Ramachandran

S. R. Ramadas

V. Ramakrishnan

L. N. Ramamurthy

V. Ramamurti

H. Raman

B. V. Ramanamoorthy

S. Ramani

M. Ramanujam

C. Ramasastry

B. Ramaswami

G. V. N. Rayudu

K. S. Sankaran

L. V. K. V. Sarma

V. V. Sastry

C. A. Sastry

M. Satyanarayana

K. N. Seetharamu

V. Seshadri

R. S. Sirohi

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

S. Subramaniam

N. Subramanian

R. Subramanian

Surjit Singh

Y. B. G. Varma

R. Vasudevan

M. A. Veluswami

P. Venkata Rao

V. C. Venkatesh

M. Venugopal

B. Yegnanarayana

Senior Warden

N. Venkatarayulu

Three educationists from outside the Institute nominated by the Chairman, Board of Governors

G. S. Laddha

M. Santappa

C. T. Kurian

Members of the Faculty (Nominees)

V. M. Radhakrishnan

K. Remananda Rao

V. Sivaramakrishnan

G. Subramanian

V. S. N. Sarma

V. V. Bapeswara Rao

Members of Faculty (Invitees)

K. Mothiram Patil

T. V. Ramakrishna

Nainan P. Kurian

V. B. Johri

Kumar Subramanian

A. Ramamohan Rao

Secretary

R. S. Virmani, Registrar

REPORT BY THE DIRECTOR

for the Period

April 1982 to March 1983

A brief account of the activities of the Institute during the year under report is given in the accompanying pages.

Students Strength

There were 1191 undergraduate students and 1387 postgraduate students during the year.

Convocation

At the last Convocation Prof. M. G. K. Menon was conferred the degree of Doctor of Science (Honoris Causa). 260 students received the B.Tech. Degree, 262 the M.Tech. degree, 36 the M.Sc. degree, 46 the M.S. degree and 68 the Ph.D. degree. Also 8 students received the B.Sc. (Technical Arts) degree.

Honours — Faculty/Students/Alumni

Prof. N. V. C. Swamy was unanimously nominated, President, National Society of Fluid Dynamics and Power for the year 1982.

Prof. J. C. Kuriacose was elected as President of the Catalysis Society of India for the year 1983-84.

Prof. M. Satyanarayana was re-elected as the President of the Institution of Chemical Engineers.

AIMIL Gold Medal was awarded to Shri S. R. Gandhi, Dr. S. L. Agarwal and Prof. V. S. Raju, for their joint paper on 'Field Tests on Instrumented Model Piles in Weathered Rock' published in the Proceedings of Geomech-1981 of the Indian Geotechnical Society.

Prof. S. Ramani has been awarded a Medal for his essay on Materials Management.

Dr. S. Balasubramaniam, SSO, Department of Metallurgical Engineering along with Dr. S. Prasannakumar, until recently an Asst. Professor, were awarded the Advani Oerlikon Research Award for 1981 for the best paper at the National Welding Seminar held at Cochin in December 1982.

Mr. T. S. Natarajan and Dr. S. Srinivasan, Dept. of Physics have been awarded Hari Om Ashram Presit K. R. Ramanathan Prize for Physics Teaching Aids.

Sri Anant Agarwal, B.Tech. (Electronics) student presented a paper on "A Modification over sakos and chibas dynamic time warping algorithm for isolated word recognition" at the International Conference on Speech and Signal Processing organised by I. E. E., ASSP Society in Paris, during May 3-4, 1982. The visit was funded by the Institute.

Sri Shankar Balakrishnan, B.Tech. Mechanical Engineering, set a world record by scoring the maximum possible score $\left(\frac{800}{800}\right)$ in the Graduate Management Aptitude Test (GMAT) conducted for admission into American Universities for the year 1981.

Sri R. M. Vasagam, Project Director, APPLE, ISRO Satellite Centre, Bangalore, an alumnus of the Institute, received the Padma Shri Award from the President on 19-3-1982.

Teacher Course Evaluation

The system of evaluation of teachers by our students continued during the year. The response has been very good and among the outstanding teachers, mention may be made of Dr. P. K. Aravindan, Dr. K. Radhakrishna Rao, Dr. N. V. C. Swamy and Dr. V. Radhakrishnan.

New Programme

An experimental inter-disciplinary M.Tech. programme on Solid State Technology has been started from 1982-83.

Staff Training

An Apprentice Training Programme for Class D employees was organised for imparting training to 16 staff members in the trade of Fitter, 8 in the trade of Machinist and 8 in the trade of Electrician.

New Facilities/Fabrication

The Government of India has given approval for the establishment of a special programme in Information Aided Computer Design in Manufacture.

The Department of Chemistry has installed a Gel permiation liquid chromatography fully computerized at a cost of Rs. 5 lakhs.

Language Laboratory set up in the Department of Humanities and Social Sciences became operational in January 1983 and was formally inaugurated by Dr. Huebner, Consul General of Federal Republic of Germany on 25-2-1983.

A Rs. 53 lakhs worth Random Wave Generator facility as a 2 metre regular wave flume have been commissioned in the Ocean Engineering Centre.

The Mechanical Handling Laboratory of the Department of Mechanical Engineering has, with financial support from the Department of Science and Technology, fabricated a dense phase pneumatic conveyor for the conveyance of powdered particles at high concentration with less energy consumption compared to conventional pneumatic conveyors.

Guidance and Counselling

A Guidance and Counselling Unit was set up to assist students in their day-to-day-problems under the headship of Dr. (Mrs.) S. Balaraman.

Indo-German Partnership Projects

Under the Indo-German Agreement, 16 projects will be taken up for implementation with effect from 1-4-1983. In addition, 4 on-going projects under the previous agreement will also be taken up.

Students Activities

Annual Cultural Festival Week/Mardi Gras 83 was organised from 26-30 January 1983.

IIT Madras team won the overall trophy of the Mood Indigo-Cultural festival at IIT Bombay.

A large number of out-station and local teams participated in the various cultural activities. The visitors were impressed by the high standard of the participating teams.

IIT Madras team also won the first place in Debate conducted by the Bharathiya Vidya Bhavan.

Evening Classes in Indian Languages

Tamil/Kannada/Sanskrit and Hindi were started with good attendance from students. There was good response to music classes also.

Sports

IIT Madras team regained the General Championship in the Inter-IIT Meet held at Bombay.

Industry-IIT Collaboration

The Centre for Industrial Consultancy and Sponsored Research organised an In House Programme for a week at NGEF, Bangalore, where faculty drawn from various departments participated. NGEF has consequently come forward to sponsor projects for undergraduate and postgraduate students in the Departments of Applied Mechanics, Mechanical Engineering and Electrical Engineering.

During 1982 summer a few faculty members spent their vacation in industries and such programme will continue in summer 1983 also.

Consultancy Assignments and Sponsored Projects

357 assignments were taken up by the Institute at a total approved value of Rs. 38 lakhs. In the area of sponsored research 14 projects were taken up for a sanctioned value of Rs. 98.16 lakhs.

As a measure for development of new processes/techniques/technology, the Centre has sanctioned 3 inter disciplinary projects involving the Department of Chemistry, Chemical Engineering, Mechanical Engineering and F.R.P. Research Centre. The financial support for these projects will be met from the Industrial Research Development Fund.

Patents

3 patent applications were made during the year and 10 patents have already been taken by the Institute.

Transfer of Technology

Two agreements for the transfer of technology were entered into : (1) Know-how for manufacture of Thread Whirling Machine, (2) Know-how for manufacture of Depolariser Grade Manganese Dioxide.

Silver Jubilee Celebrations

The exciting exercise this year is the planning for the Silver Jubilee Celebrations to start on 31st July 1983 and to last till 30th July 1984. As part of the Silver Jubilee Celebrations, it is proposed to invite some 20/25 top-ranking scientists and scholars to come and visit us for short periods as Silver Jubilee Visiting Professors. Their presence is expected to inspire an intellectual ferment in our Institute. It is also proposed to persuade various industries to come forward and establish endowments, so that the Institute can increase its contribution to industry, mainly by developing short courses on video tapes. With the already well-equipped T.V. Laboratory and by adding suitable studio facilities, it is hoped to produce really uptodate programmes in cooperation with practising engineers from industry. There are plans to increase the computer facilities for industrial applications. The Institute earnestly hope that the industries will come forward to support generously to establish, in addition, sophisticated analytical facilities which, in turn, could be put to use for the benefit of industry both directly and indirectly.

The Institute is also contacting its alumnii in the U.S., so that they can also make use of this occasion to contribute to the improvement of our student amenities.

In the formative years, the Institute was privileged to have the devoted service of a number of German Experts. A number of them are being invited to visit the Institute during February 1984 to participate in a Seminar on International Co-operation for Developing Higher Technological Education. This should be a nostalgic reunion for a number of our senior staff members.

As part of the Silver Jubilee Celebrations, plans are afoot for starting an experiment from next year in training in entrepreneurship. In consultation with specialists in Industry and in Banking, it is proposed to select a few students who will be given a comprehensive programme of training on the various aspects of establishing an industry. They will also be provided all the experimental facilities that are available with us to finalise their production process. This programme which may last a year or more will make them eligible for the award of M.S. degree also.

GATE (Graduate Aptitude Test in Engineering)

The major event of the year and one which is going to change the complexion of the postgraduate training, not only for this Institute but for all engineering institutions in the country, is the introduction of the Graduate Aptitude Test in Engineering (GATE). The Institute was privileged to be chosen as the organizing institution for this examination, which will be conducted for all engineering graduates in the country and for all disciplines. This examination will henceforth be a prerequisite before any person can seek admission to any postgraduate training programme in Engineering. This examination will be held twice a year and the first one was held in February 1983 and the results were announced by May. It has also been decided that henceforth, the duration of the M. Tech. course will be reduced from four semesters to three semesters. This reduction in duration is expected to make these courses more attractive to bright students.

New offer to SC/ST Students

The Institute as part of its continuing efforts to increase the intake of students of weaker sections will offer financial assistance to about hundred candidates of scheduled castes and scheduled tribes appearing for Joint Entrance Examinations to various IITs in the country. The assistance, first of its kind offered by any IIT will enable them to undergo specialised training in reputed private institutions engaged in coaching candidates for the Joint Entrance Examination. Ninety per cent of the tuition fee will be underwritten by the Institute.

For the third successive year the Institute invited about 125 eleventh standard school students from the weaker sections to visit IIT on 6th and 7th January 1983. The Institute met their travel expenses and provided free boarding and lodging. They were taken round the Institute and were also given full details of the Joint Entrance Examination.

Extramural Lecture

20 Extramural Lectures were organised during the year under review.

German Tour

12 students — each a top ranker in the respective branch belonging to the third year B.Tech. class and from postgraduate classes went on a study tour of three weeks duration during the 1982 summer accompanied by the Dean of Academic Courses at the invitation of DAAD. The students visited several universities, reputed engineering firms and places of academic and other interests.

The DAAD was very much impressed by the group — in fact they went on record to say that this was the best group of students they had so far.

DETAILS OF THE REPORT

Admissions, Award of Degrees and Prizes

Student Admission 1982-83

The number of students and scholars admitted to various courses (1982-83) is given in Table-1.

Table-1

ADMISSION 1982-83.

Sl. No.	Department	B. Tech.	M. Tech.	M.Sc.	MS	Ph.D.	Total
1.	Aeronautical Engg.	16	6	...	9	2	33
2.	Applied Mechanics	...	8	...	13	7	28
3.	Chemical Engg.	29	30	...	9	8	76
4.	Chemistry	...	...	24	...	28	52
5.	Civil Engg.	36	38	...	5	10	89
6.	Computer Science	18	36	...	11	1	66
7.	Electrical Engg.	60	66	...	24	6	156
8.	Humanities & S.S.	...	33	...	4	7	44
9.	Mathematics	...	...	9	...	6	15
10.	Mechanical Engg.	51	68	...	15	20	154
11.	Metallurgical Engg.	21	18	...	8	8	55
12.	Naval Architecture	15	...	...	...	...	15
13.	Ocean Engineering	...	8	...	7	2	17
14.	Physics (Solid State Tech.)	...	3	16	...	16	35
	Total	246	314	49	105	121	835

The total 835 includes the following :

Foreign Nationals	7	Sponsored Candidates	30
Scheduled Castes	13	External Registration	48
Scheduled Tribes	7	Project Staff	33
Women	63	Part-time (Staff)	16
QIP Scholars	28		

Degrees Awarded:

The number of degrees awarded at the Nineteenth Convocation of the Institute on 4th September 1982, is given below in Table 2. Dr. Y. Nayudamma, Vice-Chancellor, Jawaharlal Nehru University delivered the convocation address.

Table - 2

NUMBER OF DEGREES AWARDED

Sl. No.	Discipline	B.Sc. (TA)	B. Tech.	M. Tech.	M. Sc.	DIIT	MS	Ph.D.	Total
1.	Aeronautical Engg.	...	12	9	...	...	4	1	26
2.	Applied Mechanics	...	...	12	...	...	4	3	19
3.	Chemical Engg.	...	39	20	...	...	4	1	64
4.	Chemistry	...	...	...	13	...	...	12	25
5.	Civil Engg.	...	36	33	...	...	6	10	85
6.	Computer Science	...	...	31	...	...	3	...	34
7.	Electrical Engg.	...	74	64	...	...	7	9	154
8.	Humanities & S.S.	...	...	34	...	...	6	2	42
9.	Mathematics	...	...	...	14	...	...	7	21
10.	Mechanical Engg.	...	73	43	...	4	9	11	140
11.	Metallurgical Engg.	...	20	13	...	...	...	4	37
12.	Naval Architecture	...	6	...	...	...	...	...	6
13.	Ocean Engineering	...	...	3	...	...	3	...	6
14.	Physics	...	...	...	9	...	...	8	17
		8	...	...	...	...	...	...	8
	Total	8	260	262	36	4	46	68	684

With this Convocation in September 1982 the number of degrees awarded so far by the Institute is:

B.Sc. (TA)	8	DIIT	245
B.Tech.	4506	M.S.	311
M.Tech.	2571	Ph.D.	682
M.Sc.	634		

Grand Total: 8957

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 Pai Mizar Devdas B.Tech. (Mechanical Engg.)

2. GOVERNOR'S PRIZE :

(For all round proficiency in B.Tech. degree courses/Curricular and Extra Curricular)	Shri Chandra Mohan, T.A. B.Tech. Electrical Engg. (Electronics)

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

B.TECH. COURSE :

Civil Engineering	Shri Mehar Prasad, A.
Metallurgy	Shri Thomas George
Naval Architecture	Shri Prakash, P.V.
Electrical Engineering (Electronics) (Philips India Prize)	Shri Gururaj Singh
Electrical Engineering (Power) (Siemens Prize)	Shri Parthasarathy, P.T.
Mechanical Engineering (Banco Foundation Prize)	Shri Pai Mizar Devdas
Chemical Engineering (Reliance Heat Transfer (P) Limited Prize)	Shri Dharmarajan, N.
Aeronautical Engineering (HAL Prize)	Shri Sriram, P.

M.TECH. COURSE :

Civil Engineering	Shri Shashank M. Vaidya
Computer Science	Shri Ramgopal, S.
Engineering Mechanics	Shri Ranganath, D.
Maintenance Engineering and Management	Shri Anand Madhukar Achwal
Metallurgy	Shri Sudarshan V. Bhat
Industrial Tribology	Shri Uday Gupta
Ocean Engineering	Shri Gowrishankar Bhuyan
Electrical Engineering (Siemens Prize)	Shri Ajoy Raman
Mechanical Engineering (Prof. B. Sengupto Prize)	Shri Ramamurthi, K. } (Bracketed) Shri Nyayadhish, V.H. }

Metallurgy (Metal Casting Option) (S. Anantharamakrishna Memorial Prize)	Shri Pise Sachin Visvambhar
Mechanical Engineering (Machine Tools Option) (Dr. S. Vaidyanathan Memorial Prize)	Shri Srinath, B.V.
Aeronautical Engineering (Air India Prize)	Shri Yash Kumar
Electrical Engineering (Television Engineering) (Prof. Achim Bopp Prize)	Shri Taranath, H.
Chemical Engineering (Dr. K. Subbaraju Memorial Prize)	Shri Rama Govinda Rao, A.
Industrial Management (K. V. Arunkumar Memorial Prize)	Shri Anil K. Gopalan Shri Sankara Rama Subramanyan, S. } (Bracketed)

M.Sc. COURSE :

Chemistry	Shri Radhakrishnan, T.P.
Mathematics	Miss Pushpa, S.
Physics	Miss Darisi Sridevi

D.I.I.T. COURSE :

Mechanical Engineering (Aircraft Production)	Shri Suryanarayana Rao, N. V.R.S.

RESEARCH CENTRES

Centre for Bio-Sciences and Bio Technology

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 :

a)	Biochemical Engineering	B.Tech. Chem. Engg.
b)	Microbial Chemistry and Genetic Engineering	M.Sc./Ph.D.
c)	Bio chemistry	M.Sc.
d)	Medical physics I and II	M.S./Ph.D.
e)	Advance Topics	M.S./Ph.D.
f)	Medical Instrumentation I and II	M.S/Ph.D.
g)	Quantitative Physiology	B.Tech.
h)	Biomechanics I and II	M.S./Ph.D.
i)	Environmental Engineering	B.Tech.

2. Important Lectures and Seminars :

a) A weekly seminar group for centre for biosciences and biotechnology has been organised and convened by Dr. Chandra.

The following lectures were given :

i) Pulp and paper Industry wastes by Dr. C.A. Sastry
ii) Alcohol fermentation from cellulosic materials—Dr.T.S. Chandra
iii) Effluent treatment—Mr.B.V.S. Gurunadha Rao
iv) Liquid fuel production by anaerobic digestion—Mr. B. Venkata Rao
v) Biochemistry and biodegradation of tannins, Mr. Niranjana Babu
vi) Extra cellular proteases production for use in leather industry—Mr. Chandrasekar
vii) Bleomycin—Structure and functions as antitumor antiotic—Miss C. Lakshmi
viii) Biodegradation of cellulose—Miss K. Bhavani
ix) Lectins and their use in immobilised systems for purification of anaylses—Dr. Muthukumar
x) Colleague biosyu thesis—Mr. Mohan

All India Yoga conference was organised at this Institute by Bio-Medical grow and was attended by leading scientists from various countries. One of the staff members of Biomedical centre was offered a NSF (USA) travel grant to present a paper at the 19th Annual meeting of Society of Eng. Science Rolla, USA on a new technique for the cardiac monitoring.

3. Distinguished visitors to the Centre for Bio-Sciences and Bio-technology with whom discussions were held :

1. Prof. T. Ramakrishnan
   Emeritus Professor, Molecular biology,
   Indian Institute of Science,
   Bangalore-560 012

2. Dr. Mangalam Srinivasan,
Visiting Scientist,
National Instt. of Science and Technology,
Seve studies, CSIR Campus,
NEW DELHI.

3. Dr. A. H. A. Moss,
Director,
D Y E Division,
ICI, U.K.

4. **Research and Development:**

Research work is undertaken on the following projects :—

a) Isolation of new cellulolytic microorganisms and characterisation of the cellulase enzyme. system.

Dr. T. S. Chandra and Miss. K. Bhavani.

b) Xanthan—extra-cellular polysaccharide fermentation with waste agricultural residues.

Dr. T.S. Chandra and Dr. S. Dass

c) Biodegradation of linin monomers of the aromatic class.

Dr. T. S. Chandra.

d) Bio-transformation of steriods and intermediates in steriod synthesis.

Dr. S. R. Ramadoss and Dr. T. S. Chandra.

e) Bacteriophage isolation and purification.

Dr. Mrs. Mahaseshasayee and Dr. T.S. Chandra.

f) Single cell protein production from molasses and design of a bioreactor.

Dr. A. Baradarajan and Dr. T. S. Chandra.

g) Bio-transformation of steriods and lignin monomers microbiologically.

Mr. R. Anand and Dr. T.S. Chandra.

h) Biogas generation using different substrates.

Dr. K. Lalitha.

i) Immobilisation of a mycoglucosidase using sodium alguiate, clutosan etc.

Mr. Tatkar and Dr. C. A. Sastry.

j) Bioxidation of phenol using different types of bioreactors.

Dr. B. Venkatarao and Dr. C. A. Sastry.

k) Biological waste treatment using rotating biological disc contractor.

Mr. B. V. S. Gurunadharao and Dr. C. A. Sastry.

l) Biological waste treatment using loop reactor.

Mr. Vijayaraghavan, Dr. T. K. Ramanujam and Dr. C. A. Sastry.

m) Immobilisation of enzymes for bioconversion. Mr. Pramada Rao and Dr. M. Satyanarayana.

Various new techniques have been developed for medical diagnosis. These include application of laser speckle and ultrasonic speckle for diagnostic procedures. Analysis of the erthrocyle sedimentation was performed by laser light transmission through the blood samples which provides a point to point variation of cellular profiles and thus helps to identify the diseased pattern of blood cells. The new rehabilitation techniques, specially for leprosy patients, have been designed. The bio-physical developments have led to the production of a new laser reflectivity instrument for detection of tumour. Further developments may lead to the early detection of breast tumour.

Research work on various aspects of ultrasonic and laser speckle imaging, EEY and EMY biofeed-back system, microprocessor based systolic time monitoring techniques have been carried out.

The interaction of laser radiations with the tissues have been studied and for safe exposures the guidelines are being formed. A therosclerosis, which has been affecting large number of people in developed countries and some in developing countries is being thoroughly investigated by bio-chemical, pathological, mechanical and theoretical techniques. This is in order to determine the growth pattern of this disease so that the study on the regressive aspect could be designed.

The on-line technique for the cardiac and tumour diagnostics are being developed. These methods would be faster and provide data on the onset of various diseases.

Patents are being taken by bio-medical centre for some of the instruments developed.

Assistance to Industry :

Retainer Consultancy :

1. Retainer consultancy by Pharmaceutical concern for setting up a microbiology lab. — Dr. T. S. Chandra
2. Retainer consultancy by Lakshmi Starch Ltd., Bombay — Dr. C. A. Sastry

Consultation :

1. Biological waste treatment — Dr. C. A. Sastry
   a) Indo-National, Nellore.
   b) Tirupur Textiles, Tirupur.
   c) New Horizon Sugar Mills, Pondicherry.
   d) Lakshmi Starch, Kundara.

Completed Projects :

1. DST Project — Lasers in Medicine
2. MFPCSW — Aids to promote functional electrical simulation
3. CSIR — Fluid dynamic aspects of blood flow and arterial diseases.

On-going Projects :

1. CSIR : Hemozheology : Its clinical, experimental and theoretical studies.
2. MFP & SW — Assessment of deprotic foot and individual footwear design.

6. Sponsored Projects :

Proposals sent :

1. Microbial technology studies on liguocellulose utilisation for chemical feedstock production — Dr. T. S. Chandra
2. Polymeric encapsulation hazardous wastes — Dr. R. Subramaniam and Dr. C. A. Sastry
3. Cryogenic grinding of polymers — Dr. T. K. Ramanujam and Dr. C. A. Sastry

7. Additional space for the Centre :

A plan for modification of the ground floor and II floor lavatories in Middle Block of the Mechanical Sciences Building for the centre was drawn up and given to Engineering Division for execution. The plan provides for main equipments and Laboratory Space on the ground floor and for a seminar hall space, Office and stores space, interconvertible to laboratory working space on II floor.

This construction is going to be undertaken soon and will be the common space for centre for biosciences and biotechnology.

8. New Major Equipments :

The following new equipments were procured :

1. 1 on selective electrodes and 1 on analyser
2. Yyroshaker (140.370 rpm; 1/3 H_p motor)
3. Refrigerated centrifuge
4. Electric automatic autoclave
5. Warburg respirometer
6. Automatic fraction collector
7. Microelectric balance
8. Spectronic 20 spectraphotometer

9. Invited lectures delivered by staff :

a) Dr. T. S. Chandra was invited to give lectures in summer course on 'Process Synthesis' Dept. of Chem. Engineering, I. I. T. Madras.

b) Dr. C. A. Sastry was invited to give lectures by ISRO Trivandrum, A. P. Water Pollution Control Board, A. C. College, Madras College of Engg., Guindy, National Productivity Council, Madras, Madras Productivity Council, Madras, Instt. of Tech. and Management, Delhi, National Energy Council etc. on biological waste treatment and pollution control.

c) Dr. M. Satyanarayana was invited to give key-note addresses in various symposia at Hyderabad. Waltair, Calcutta, Bombay and Delhi.

10. Brief indication of developmental programmes likely to come up in the near future :

a) Intensification of research on,

i) Microbial biotechnology and fermentation
ii) Biological waste treatment
iii) Immobilisation of enzymes
iv) Biogas production
v) Biodegradation of cellulose, liguin etc.
vi) Bioconversions—steriods etc.
vii) Biomedical engineering
viii) Biophysics
is anticipated.

b) Taking up consultancy work in different areas of biotechnology and biochemical engineering is anticipated.

c) Taking part on symposium on physiological fluid dynamics, Sept. 5-7, 1983.

PUBLICATIONS :

1. Enythrocyte sedimentation profiles under gravitational field as determined by He-Ne laser. 8. Influence of inhomogeneous magnetic field, Meghasingh *et al*, IEEE Trans. Bio-med. Engg., 30; 70-73, 1983.

2. Enythrocyte sedimentation profiles under gravitational field as determined by He-Ne laser VII. Influence of hematocrif, Meghasingh et al, J. Math. Phys. Sci. 16, 489—498, 1982.

3. _____I. Comparison with suspension of solid spheres, Meghasingh et al, Biorheology, 19; 539-542, 1982.

4. _____II. Influence of erythrocyte shape. Biorheology, 19; 165-173, 1982.

5. Hemorheological characteristics of blood in various diseases: Diabetes mellitus, Hypertension, Acute infection, I schaemic heart disease and attempted suicide, Meghasingh et al, Biorheology, 19; 245-252 1982.

6. Influence of anti-coagulants on erythrocyte sedimentation as determined by He-Ne laser, Meghasingh et, al, Curr. Sci. 51; 1064-1067, 1982.

7. Optical method for haematocrit determination, Meghasingh et al, Med. Biol. Engg. and Comput. 20; 527-528, 1982.

8. Development of an optical fibre technique for He-Ne laser screening of human body and its comparison with the integrating sphere method, Meghasingh et al, Med. Biol. Engg. and Comput. 20; 111-112, 1982.

9. Effects of onion in induced athenselerosis in rabbits; II. Reduction of lipid and levels in the eye, Meghasingh et al, Curr. Sci. 51, 230-232, 1982.

10. _____Meghasingh et al, IV. Maintenance of normal activity of aortic enzymes, Curr. Sci. 51; 276-278, 1982.

11. Variation of erythrocyte sedimentation profiles as determined by He-Ne laser light; In proceedings XII Meghasingh et al, Europ. Conf. on microcirculation, Rehorot, Israel, 1982.

12. Comparative study of the influence of various anticoagulants on the erythrocyte defirmability, Meghasingh et al, In Proc. XII Europ. Conf. on microcirculation, Rehorot, Israel, 1982.

13. Measurement of the cardiac activity on the chest wall by laser speckle, Meghasingh et al, In Proc. V Internat. Conf. Cardiovas. Syst. Dynamics Soc. Oxford, 1982.

14. Comparison of displacement pattern of the different heart regions as observed on the chest wall by laser speckle, Meghasingh et al, In Proc. 19th Annual Meeting SES, Univ. Missouri, Rolla, U.S.A., 1982.

15. 'Rearing of Fish fry of Indian major carps in sewage stabilisation ponds' Bhatia, H.L. and Sastry, C.A., 8th International Conference on Water and Waste Engg. in Asia, College of Engineering, Madras, 1982.

16. 'Low waste treatment for treating methods pharmaceutical wastes' Gurunadha Rao, B. V. S. and Sastry, C. A., 8th International Conference on Water and Waste Engg. in Asia College of Engg. Guindy, Madras, 1982.

17. 'Characteristics and Treatment of waste water from liquid glucose manufacturing unit—A case study' Rao, P.M., Subramaniam, S.P., Gurunadha Rao, B.V.S. and Sastry, C. A. *Indian Jl. Environ. Health*, 24, No.1, 44-57, 1982.

18. 'Studies on the Characterisation and Treatment of waste water from a Rayon Factory—A Case Study' Gurunadha Rao, B.V.S. Murahari Rao, P., Aboo, K.M. and Sastry, C.A., *Jl. Instt. Public Health Engineers, India*, Vol. 1982, No. 1, 65-80, 1982.

19. 'Studies of the Characteristics and Treatment of waste water from Factory Manufacturing Insecticides—A Case study'—Gurunadha Rao, Murahari Rao, P. and Sastry, C.A., *Jl. Inst. Public Health Engineers, India*, Vol. 1982, No. 2, 1-20 (1982).

20. 'Characteristics and Treatment of waste water from Coffee Pulping Units', Gurunadha Rao, B.V.S. Sastry, C.A., Murahari Rao, P. and Kothandaraman, V. International Symposium on Recent Advances in Particulate Science and Technology, Indian Institute of Technology, Madras, 1982.

21. 'Studies on Characteristics and Treatment of Waste Water from an Industry Manufacturing Sodium Alginate—A Case Study', Gurunadha Rao, and Sastry, Communicated to National Conference on River Pollution and Human Health at BHU, Varanasi, 1982.

22. 'Operation and Maintenance of Water Treatment Plants' Gurunadha Rao and Sastry., Communicated to National Seminar on Operation and Maintenance of Water Supply & Waste Water Systems, at Bangalore, 1982.

23. 'Operation and Maintenance of Waste Water Treatment Plants' Gurunadha Rao, and Sastry., Communicated to National Seminar on Operation and Maintenance of Water Supply & Waste Water Treatment Systems, at Bangalore, 1982.

CENTRE FOR SYSTEMS AND DEVICES

The Centre for Systems and Devices is one of the Research Centres of the Institute. The faculty and scientists of the Centre have active participation in a number of major on-going sponsored research and consultancy projects 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. 80 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 carryout sponsored research and consultancy projects and guide students in the academic research programmes of the institute are the following :

(i) Electromagnetics and Antennas

(ii) Microprocessor Based Systems

(iii) Radar Signal Processing

(iv) 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 in referred national and international journals.

For carryingout 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 —85 dBm or greater) from 2-12 GHz.
3. Swept Frequency Measurements with scalar network analyser at J and X-Bands.
4. Phase measurements at X-Band.
5. Semi-conductor device fabrication facilities including diffusion, photolithography and metalization. Facilities for an emerging sophisticated technology, i.e. molecular beam Epitaxy and also chemical vapour deposition are being 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 circuit 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 and wave energy sources, biogas and hydrogen energy.

An inter disciplinary working group was formed during the middle of 1980 at IIT Madras to study the various aspects of Ocean Thermal Energy Conversion (OTEC). The working group of IIT Madras took the initiative to study the various site conditions given by the Tamil Nadu Electricity Board and found the site near Kulasekarapatnam on the East Coast of Tamil Nadu to be the most sutitable, since it is protected by the Sri Lanka island against cyclones. Since a depth of 1000 metre was available at a distance of 40 km from the shore, a floating OTEC plant was proposed. The IIT working group carried out some preliminary design calculations on the various system components for experimental OTEC Plant of I MW capacity for installation at the Kulasekarapatnam site. The report contained the designs of shell and tube heat exchangers, pumps and turbine which are the major components of the OTEC Plant. This report was submitted in November 1981 to the Commission for Additional Sources of Energy (CASE), Government of India.

A Project Cell was then formed at the Ocean Engineering Centre with funding from CASE to look into the various aspects of ocean thermal energy and to coordinate activities on OTEC among a project group consisting of the following industrial/research organisations:

(a) National Institute of Oceanography, Goa

(b) Bharat Heavy Electricals Ltd., Hyderabad

(c) Engineers India Ltd., New Delhi

(d) Mazagon Dock Ltd., Bombay and

(e) Indian Institute of Technology, Madras.

This project team was requested by the CASE during April 1982 to study the possibilities of putting up an experimental I MW OTEC Plant off Lakshadweep islands. Lakshadweep group of islands have many tiny islands in the Arabian Sea at a distance of about 500 km from the West Coast of India. A project team consisting of 8 representatives from the above 5 organisations visited the islands during August 1982 to study the various possibilities. Only two islands namely Kavaratti island (Capital of Lakshadweep) and the Minnicoy island were found to offer possibilities for installing an OTEC Plant. From the available bathmetry and temperature profiles around the islands, it has been found that a depth of 1000 metres will be available within a distance of about 2 kms from the islands and a temperature difference of 20 to 22° between the surface sea water and 1000 m depth will be available throughout the year. Therefore a shore based plant is ideally suited for these island sites. These islands are of coral origin and detailed studies for placing the coldwater pipeline on the sea slope are necessary. The coldwater pipe for this I MW plant is expected to be about 1.5 metre diameter and one of the proposals under consideration is to provide high density poly ethelene (HDPE) pipes which are assembled on shore to be floated out in full length. Then it will be sunk to lie on the bed by filling water.

Wave energy potential for Indian Coast is not as high as in the northern latitude countries. Therefore a wave energy system purely to generate electricity from the waves may not be commercially viable in the near future. However there are many other benefits that may arise by regulating the waves. A multi-purpose wave regulator system has been proposed, with the following objectives:

1. To absorb the energy of the waves by providing a long wave barrier and to convert the energy into electricity.
2. The long barrier results in a calm pool between the barrier and shore and this pool could be used as:
   i) a natural harbour
   ii) space for aqua-culture
   iii) space for coastal transport with lighter crafts.
3. This wave absorber systems also provide shore protection against erosion by the waves.

Because of the multi-functional aspects of the Wave Regulator System (WRS), such a system has to be not very far from the shore. It is being proposed to place the system in a water depth of about 10 metres, which occurs at a distance of about 200 metres from the shore. Such locations exist off Madras and many places along the Indian Coast.

A project entitled 'Scientific Investigation of Wave climate, Wave regulation and power' has been sanctioned by the Department of Ocean Development, Government of India for a period of 3 years from July 1982.

The major aims of this project are :

i) to gather systematic data of the wave climate off the Indian Coast

ii) to study various possible designs of wave energy devices, and

iii) finally to select the most suitable system for Indian conditions and suggest a suitable design for installation at a specific site off the Indian Coast. 10 Scientific Officers are working full time on this project.

After preparing a detailed state-of-art report on the wave energy devices and systems, models of three wave energy devices were fabricated and tested. These are oscillating water column system, single float system and a double float system. Model tests were conducted in the 2 m wide regular wave flume and the 4 m wide random wave flume of the Ocean Engieering Centre. After the preliminary experiments, the wave energy group has decided that Oscillating Water Column (OWC) system is most likely to be the best device for application off Indian Coast. A bottom standing OWC system will also satisfy the multi-functional requirements as proposed.

In the meantime, a workshop on 'Utilisation and Regulation of Waves' was organised at IIT Madras on 14th to 17th March, 1983 with the assistance of the British Council and the Department of Ocean Development. The discussions in the Workshop led to the same conclusion that the bottom standing OWC system is likely to be the most suitable for the Indian Coast. It is still to be decided whether to use the Wells Turbine or Francis type of air turbine for the power take off mechanism. A narrow flume with a random wave ganerator for testing small models in 2 dimensions is being designed. Simultaneously efforts are going on to gather wave data with the assistance of the Central Water and Power Research Station, Pune. It is expected that, at the end of two years, complete design of a module of about 10 metres length will be ready for sea trial. Before that, a 4 m wide model with a complete system of air turbine and generator will be tested for proving the system. Based on the sea trial, decision will be taken on installing a long barrier of 100 m length along the Madras Coast. Various other organisations in the country will be associated with the project as required.

In the area of wind energy utilisation, the fabrication work of the horizontal axis water pumping wind mill is in progress. The shaft support system, the turn table and the eccentric mechanism have been fabricated and the rotor which carries the aluminium blading is being taken up. The water pump is to be taken up next after the rotor is mounted.

The following aspects are being investigated in the area of internal combustion engines:

Hydrogen as Engine Fuel :

Dual Fuel engines, which simultaneously use Hydrogen and diesel oil, are being developed. The Combustion process including rates of pressure rise. Ignition delay and peak pressure is being investigated. Computer programs are being developed to model such combustion.

Surface Ignition Engine :

A new type of engine based on this principle is being developed. This engine can use a wide variety of fuels including Alcohols, Vegetable Oils, and petroleum fuels. Bench tests have been

conducted to determine the basic parameters affecting the Surface Ignition Engine. Single Cylinder and Multi Cylinder engines are being designed, developed and tested on this principle.

Biogas Engines :

Spark Ignited and Dual Fuel biogas engines are being developed and tested.

Air Movements Studies :

The mixing process in four stroke diesel engines and two stroke petrol engines are being studied with the help of Hot Wire Anemometer and also computer models are being developed.

Utilisation of solar energy for heating, cooling and desalination applications is being investigated. Solar collectors to provide hot water for cleaning of utensils are installed in two of the students' hostels. Air heating collectors with Cudappah stone absorber and water heating collector with sand as absorber have been fabricated and tested with encouraging results. Prototype solar assisted vapour compression heat pump systems have been developed to yield water near boiling temperature. Extensive expreiments have been carried out on nocturnal cooling with roof ponds using scaled-down modals to study the effects of colour of surface, pond depth, cover plate properties etc. A roof pond cooling system is installed on an office room and is undergoing performance evaluation. A dual-effect cascaded refrigeration-heat pump system has been developed and tested. Here, all the energy input to the system is returned in useful form as both cold and heat. A vapour jet refrigeration system suitable for operation with solar heated water around 90°C has been fabricated and is undergoing tests. Studies on multistage and hibrid solar operated cooling systems are being carried out in order to develop ecnomically viable systems.

Work on biogas has been divided into biogas generation and biogas utilisation. A project called 'Development of Decentralised Energy System' sanctioned by the Department of Science and Technology, funds such a work on biogas. On the generation side a laboratory has been established with mini digesters to conduct experiments on various ingredients which can yield biogas. Several parametric studies to know the gas yield of the ingredients have been performed. New resources that are not normally existing anywhere have been identified for the production of biogas. Experiments are repeated for reliability with minidigesters of higher capacity compared to the one that are available in the laboratory. Gas yields varying from 70 ml/gm of volatile solids to 530 ml/gm of volatile solids are common. Efforts have been made to mix resources in different proportions with the aim of optimising the proportion and the yield of gas. Attempts were made in isolating strains by enrichment of culture technic for high yield of gas. Both Mesophilic and Thermophilic cultures have been attempted. It was found in general that leafy materials get digested faster with less retention time. Attempts were also made to pretreat the ingredients. Further work is on, to arrive at any conclusion. Seeding inoculum for varying length of periods have also been tried and a meaningful conclusion will have to be arrived at after many more experiments. Usage of strirrer and compartmentalisation of digesters are being tried. Multi-stage digesters have been made to study the yield of the gas and the same will be reported after some more work.

Designing digesters, keeping the cost in mind has been attempted. It is generally felt so far that a closed dome constant volume digester has been more economical than a floating drum type, since the drum itself costs to an extent of about 40% of the cost of the digester. Work is yet to be done in getting the performances of such a digester under various conditions. Based on conclusion of such works design modifications will accordingly be done. A few experiments have been conducted on a closed dome digester of 2 cmt. capacity. It was felt that the closed dome type has several advantages over the floating drum in spite that the former has still some disadvantages. The design of any digester principally depends upon the resources with which the gas to be produced.

Attempts are being made to scientifically study the various parameters that are involved in the Biogas stove including its cost and efficiency. Two earthern stoves at a cost of about Rs. 25/- each have been developed and these stoves are functioning on par with metallic stoves. Further work is being carried out to explore the various parametric studies. It is generally believed by the investnigators here that for lighting and for runing machines it is advisable to use the biogas such that it can be converted into electricity. Attempts are being made to build a small Power House depending on the availability of the biogas.

FIBRE REINFORCED PLASTICS RESEARCH CENTRE

Courses offered :

The undergraduate elective course entitled Composite Materials was offered during both semesters. A total of 70 students have undergone the course. The postgraduate elective course entitled Composite Materials was also offered during both semesters.

Continuing Education Programme :

The following short term courses have been offered during the year :

1. Workshop on FRP Technology 31-1-1983 to 12-2-1983.
2. Short Course on FRF Chemical Equipment Design—Feb. 28 to March 4, 1983.
3. The Centre technical staff have participated in three short term courses and three seminars held within IIT., Madras and outside.

Academic Research Programme :

(in collaboration with other Departments of the Institute)

No. of B.Tech. Projects	:	2 projects (7 students)
No. of M.Tech. Projects	:	1 project
No. of ongoing M. S. projects	:	3
No. of Ph.D. projects	:	2

Important Seminars and Lectures :

A one day seminar on Carbon Fibre Technology was held on July 10, 1982. A total of 8 seminar lectures were held during the year.

Research and Development :

1. Studies on Jute Polyester Composites
2. Studies on fibre reinforced thermoplastics
3. Development of FRP Components for bus body.
4. Development of FRP Contraction cone for supersonic wind tunnel.
5. Vacuum Impregnation of aircraft nose cone.
6. Coating of fabrics with plastics
7. Development of SMC, DMC and Prepregs.

Sponsored Projects :

i) 'Critical Analysis of Bus coaches for Drag and weight Reduction' sponsored by Thiruvalluvar Transport Corporation, Madras. (In collaboration with Departments of Aeronautical Engineering and Applied Mechanics).

ii) 'Study of Degradation of Mechanical Properties of Filament Wound Fibreglass Reinforced Plastic pipes due to nuclear Irradiation' sponsored by Department of Atomic Energy.

iii) Study on Jute Polyester Composites sponsored by Indian Jute Industries Research Association, Calcutta.

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

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

vi) Development of Glass-Epoxy Mould for FRP Press Moulding and Sheet Metal Forming. An ICSR project.

During the year, the Centre has received Rs. 21 lakh worth sponsored projects.

No. of Departmental projectss : Two

Assistance to Industry :

The Centre has maintained its industrial services by offering technical advice, taking up industrial consultancy projects and organising short courses for the engineers working in the industry. Twenty industrial consultancy projects for a total amount of Rs. 79,000/- were taken up during the year.
Research Publications : Three

Invited Lectures delivered by the Staff :

Six lectures on various aspects of Fibre Reinforced Plastics were delivered by Dr.N.G. Nair at various seminars and courses.

MATERIALS SCIENCE RESEARCH CENTRE

Research and Development :

(a) Papers published : 4

(b) Papers presented at National and International Conferences : 9

(c) A comprehensive Progress Report on the activities of MSRC covering the period 1975-82 has been prepared and is available for circulation.

(d) 4 more Research Scholars, one Research Associate, one Project Officer and one Project Associate have joined the Centre.

(e) One Ph.D. has been produced :
Thesis Title : 'Computer-aided study of carrier reflection in silicon MBE p^+-s-n^+ devices and suggestions for improving the forward characteristics'.

Major Equipments added :

1. Voltage scan generator
2. Sieve shaker
3. Two high temperature. heat-treatment furnaces

Visitors to the Departments :

Two distinguished scientists, Dr.M.W. Shafer, IBM, Thomas J. Watson Research Centre, York Town Heights, New York, USA and Professor J.B. Goodenough, Inorganic Chemistry Laboratory, University of Oxford, Oxford, England visited the MSRC and held extensive discussions in the areas pertaining to materials research at MSRC and possible future collaborative efforts.

Invited Lectures delivered by the Faculty :

The following invited lectures have been delivered by Dr. G. V. Subba Rao.

(1) 'Recent results on Chevrel Phases and other Ternary Superconductors', Dept. of Physics, IISc., Bangalore, April, 1982.

(2) 'Ternary Superconducting Materials', BHEL (R&D), Hyderabad, Aug., 1982.

(3) 'Properties of Chevrel Phase and Related Metal Cluster Compounds', School of Chemistry, Hyderabad Central Univ., Hyderabad, Aug., 1982.

(4) 'Coexistence of Magnetism and Superconductivity in Materials', IIT, Bombay Silver Jubilee Symposium, Bombay, Dec., 1982.

(5) 'Workshop Symposium on "Chemical Routes to Solar Energy Conversion", Tata Energy Research Institute and TIFR, Bombay, March, 7—11, 1983.

Developmental Programmes likely to come in the near future:

Efforts are under way to widen the activities of MSRC and bring about more effective collaboration within the Faculty of the Institute.

The following projects are being taken up shortly:

(a) Study and development of materials for acousto optic applications.

(b) Development of crystalline solids as suitable host materials for radioactive waste disposal.

(c) NMR and physicochemical investigations on fast ionic conductors used in solid state battery.

OCEAN ENGINEERING CENTRE

Education Programme: Continuing Education Programme.

Serving Teachers Programme	:	Ph.D.
No. on rolls		2
Serving Officers Programme	:	M.S.
No. on rolls (Sponsored)		2
Serving Officers Programme (Sponsored)	:	M.Tech.
No. on rolls		1

Important Lectures delivered:

1.	Tunel ventilation	Mr. V. S. Vutukuri
2.	Instrumentation of the condeep platforms	Mr. A. Andersen
3.	Instruments for Ocean Engineering studies	Mr. Brainard
4.	The use of wave refract on Calculations in Coastal erosion investigation	Dr. C. L. Abernethy
5.	Unmanned remote controlled vehicles under water Television cameras and lighting, deep sea systems	Mr. J. John Pierre
6.	Research in offshore in structures	Prof. M. Arokiasamy
7.	National ocean policy	Prof. R. S. Ganapathy

Research and Development : Publications :

Total number published in journal/Conference	: 15
Technical Reports	: 3

Assistance to Industry—ICC:

Industrial consultancy work has been carried out for various organisations from all over the country. The value of the projects is Rs. 4 lakhs.

Comprehensive Research Projects:

The Centre in collaboration with other Departments/Centres of the Institute and other organisations in the country is working on the following projects:

1. Ocean Thermal Energy Conversion (OTEC)
2. Wave Regulator System (WRS)

Sponsored Projects :

The following are the projects in progress :

1. Analysis of ship structures (DST, New Delhi)
2. Pile foundations in weak Rocks (EIL, New Delhi)
3. Stress concentration factors in tubular joints (EIL, New Delhi)
4. Analysis and Design of Buoys (DRDO, New Delhi)
5. Design of Underwater towed bodies (EC, New Delhi)
6. Ocean Thermal Energy Conversion (OTEC) (DST/CASE, New Delhi)
7. Wave Regulator System (DOD, New Delhi)

Visitors to the Centre

1. Deputy Minister for Defence
   Govt. of India and his team
2. Mr. John Web, Consultant
   Asian Development Bank
   Manila
3. Mr. R. Ramisch
   German Ambassador
4. Mr. T Brandt
   Alfa - Lavel Lab, Sweden
5. Mr. B. Hildrew
   Managing Director
   Lloyds Register of Shipping
   London
6. 'Vietnamese delegation team
7. Dr. S Z Qasim
   Secretary
   Department of Ocean Development
8. Sri. N. S. Narayanan
   Scientific Adviser
   Chief of Naval Staff, New Delhi
9. Air Vice Marshal N. V. Thomas
   Head, Project Titan
   ONGC, New Delhi
10. Sri S Paramanandhan
    Director General of Naval Designs
    New Delhi
11. Dr. D Srinivasan
    Director, NPOL, Cochin.

Invited lectures delivered by the staff :

Topic	Name of the staff
'Ocean Engineering' Sri Lanka - India Workshop on Development of Marine resources held at Sri Lanka from 18-22 Feb. 83	Prof. V. S. Raju

1. Visits abroad by the faculty :

Name	Country
1. Prof. V. S. Raju	France, West Germany, Bulgaria, Sri Lanka
2. Prof. C. Ganapathy	West Germany
3. Dr. K. Ganesh Babu	West Germany
4. Dr. V. Sundar	West Germany
5. Dr. M. Ravindran	Norway, Sweden, U. K.

2. Other information :

a) A training programme has been conducted for the following organisations :

1. National Institute of Oceanography, Goa
2. Oil and Natural Gas Commission, Dehradun

b) A workshop on 'Utilisation and Regulation of Waves' supported by British Council and Dept. of Ocean Development, Govt. of India has been organised during 14-17 March 1983. Prof. A Long, Dr. S. Salter and Mr. G. Elliot (All from various Universities/Industry from UK) delivered lectures in this workshop.

c) Prof. V. S. Raju, Head, Ocean Engineering Centre attended on invitation from UNESCO, a workshop on Advanced curricular in Ocean Engineering and Related fields at Paris, during October 11-19,1982. He also acted as Vice-Chairman of the above UNESCO/IOC/ECOR workshop.

AIMIL Gold Medal was awarded to Sri S. R. Gandhi, Prof. V. S. Raju of Ocean Engineering Centre and Sri S. L. Agarwal of EIL, for their joint paper on 'Field tests on Instrumented Model piles in weathered Rock' by Indian Geotechnical Society and the publication was in Proceedings of Geomech-1981.

SCHOOLS FOR EDUCATIONAL DEVELOPMENT

Chemical Engineering Education Development Centre

Mechanical Engineering Education Development Centre

CHEMICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

Curriculum Development :

Model syllabi of Physics (lecture and laboratories), a core course, has been revised. Hourly breakup of every chapter in broad based syllabus has been suggested as required by the Ministry of Education.

Books Published :

1. Unit Processes in Organic Chemical Industries.
2. Selected Chemical and Physical data in SI Units.

Books Under Publication :

1. Process Control—A Laboratory Manual
2. Transport Properties of liquid Mixtures
3. Momentum, heat and mass transfer
4. Non-ferrous metallurgical industries
5. Principles of air pollution control
6. Process Plant design—References and exercises
7. Literature resources in chemical engineering and technology
8. Packed bed reactors
9. Unit operations data.

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 worskshop 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 on 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 II, 11) Workshop on Laboratory Programme in Thermal Engineering.

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, Volume-I, 5) Problems in Thermodynamics, Volume-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 and 22) On Thermodynamics of Solar Collectors.

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

SPECIAL FACILITIES

Centre for Industrial Consultancy and Sponsored Research

Central Electronics Centre

Engineering Design Centre

Regional Sophisticated Instrumentation Centre

CENTRE FOR INDUSTRIAL CONSULTANCY AND SPONSORED RESEARCH INDIAN INSTITUTE OF TECHNOLOGY, MADRAS

In the year 1982-83, the Centre for Industrial Consultancy and Sponsored Research has been active in promoting Industry—Institute collaboration by organising Seminars, meetings with representatives from Industry, etc.

The following seminars were organised during 1982-83:

(1) 30.4.82—'Microprocessors in Industry'

(2) 4.5.82—'Recent Developments in Metallurgy'

(3) 27.7.82—'Reducing power losses in distribution System'

In all these programmes the Association of Indian Engineering Industry and its member companies took active part. In addition the meetings of the Committee for Collaboration with Industry was organised in September/October 1982 to identify the areas of interaction. One of the programmes identified was summer training for students. Follow-up action has been taken up with AIEI by Adviser Traning and Placement.

In May 1982 the Centre organised an in-house programme, for about a week at NGEF Limited, Bangalore in which faculty from various Departments participated. As a result of this, NGEF Ltd. has come forward to sponsor projects for B.Tech. and M.Tech. students of the Departments of Applied Mechanics, Mechanical Engineering and Electrical Engineering. During the summer of 1982 a few faculty members from the institute spent their vacation in industries and it is proposed to continue this programme during the summer of 1983 also.

In the year 1982-83 Consultancy earnings of the Institute was Rs. 42.66 lakhs and the number of Consultancy assignments taken up was 396.

SPONSORED PROJECTS (1982-1983)

Sponsored Research Schemes/Projects:

The following 16 projecis, for a total value of Rs. 100 lakhs were sanctioned during the year under report:

Sl. No.	*Name of the Sponsoring Authority*	*Title of the Project*
Applied Mechanics:		
1.	ARDB	"Development of Software for 3 - Dimensional Viscoelastic Analysis of Solid Propellant Grains for Missiles"
Chemical Engineering:		
2.	CSIR	"Design and Development of Mist Eliminator"
Civil Engineering:		
3.	ISI	"Preparation of Handbook on Chimneys"
Electrical Enginering:		
4.	Electronics Commission	"Microprocessor-based stencil cutter for Computer output"
5.	Electronics Commission	"Feasibility studies of the application of Blue/Green Lasers for underwater communication"

Sl. No.	Name of the Sponsoring Authority	Title of the Project
Engineering Design Centre:		
6.	D S T	"Investigations on Holographic Optical Elements"
FRP Research Centre :		
7.	D R D O	"Design, Development and study of filament wound glass-fibre-reinforced plastic pressure vessels with metallic liners"
8.	D S T	"Establishment of Regional test facilities for testing fibre resins and composites"
Humanities and Social Sciences:		
9.	W M O	"Cyclone disaster simulation Model"
Mechanical Engineering:		
10.	D S T	"Utilisation of hydrogen as fuel for Diesel engines"
Physics:		
11.	D A E	"Development of discontinuous thin film strain gauge and characterisation of electro-chemical behaviour of thin film strain gauge materials Au, Cr, Ni-Cu/SiO_2, Al_2O_3 in Strain gauge configuration"
12.	D S T	"Investigation on Ternery Semiconductors for possible application as photovoltaic devices"
13.	DEPARTMENT OF ELECTRONICS	"Development of a Model Underwater Laser Imaging System"
14.	C S I R	"Development of Time Domain Spectroscopy at Microwave frequencies"
15.	DST	"Nuclear Magnetic Resonance Investigations of Structure Molecular Motion and Magnetic Properties of Inorganic, Organo Metallic, Biological and Polymeric Materials"
16.	DST	"Preparation and Optical and Magnetic Properties of Electron Donor Acceptor (EDA) Complexes"

Patents :

The following patents were taken by the Institute during the year 1982-83.

1. Thermocole Cutter
2. A device for Coating foundry sands with resins.
3. A device for determining the workability/mouldability index of foundry sands.
4. Procedure for casting a metallic object and a metallic object cast by the said method.
5. An improved method for and an apparatus for electrolytic grinding.
6. High Speed Muller.

7. An improved cement concrete.
8. A new type of multifuel engine employing surface ignition.
9. A simple Hand machine for producing hollow precast concrete elements.

Patent applications were made for the following :

1. A Device for Picking up and displaying a three dimensional TV image of a three dimensional object.
2. Depolariser Grade Manganese Dioxide.
3. A Microprocessor Based Multipurpose Land Navigator System.

Know-how transfer :

The items for which know-how has been licenced during 82-83 along with the organisations are given below :

1. Manufacture of Thread Whirling Machine : M/s. PGP Industrial Consultants (P) Ltd., Madras.
2. Manufacture of Depolariser Grade Manganese Dioxide : M/s. Mothy Chemicals Ltd., Trivandrum.
3. Manufacture of CRT Terminals. M/s. Measurments and Controls, Bangalore.

Publication :

The Centre complied information on 'Research and Consultancy-Expertise and Facilities' and published the directory in August '82. The Annual Report of the Centre was published in September '82. Information on Technology Education-Capabilities at IIT Madras has been collected and compiled. This will be released in the form of a Directory in April '83.

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

Collaborative Research Projects :

The Centre is also responsible for Collaborative Research Projects taken up not only with West Germany but also with other Foreign Countries. 16 new Indo-German Collaborative Research projects were sanctioned during the year along with 4 Indo-German Collaborative Research Projects which were allowed to countinue from the previous scheme. The list of projects are given below :

LIST OF JOINT INDO-GERMAN RESEARCH PROJECTS

Project No.	*Title of the Project*	*Name of Co-ordinator s)*
ICSR/401/(1)/82	Transport System Management for Indian Cities	Prof. D. J. Victor Dept. of Civil Engg.
ICSR/401(2)/82	Development of fluidized bed cooling Tower	Prof. K. N. Seetharamu, & Dr. Vijay R. Raghavan, Dept. of Mech. Engg.
ICSR/401(3)/82	Study of cluster effects in Eu S Sr S spin glasses by relaxation measurements especially at high frequencies	Dr. G. Rangarajan, Dept. of Physics.
ICSR/401(4)/82	Investigation on articulated towers for off-shore constructions	Prof. C. Ganapathy Chettiar, Ocean Engg. Centre.

ICSR/401(5)/82	Design & Development of high efficiency gas liquid contractor for the treatment of gaseous and liquid pollutants.	Prof. Y. B. G. Varma, Dr. M. S. Ananth & Dr. N. S. Srinivas, Dept. of Chem. Engg.
ICSR/401(6)/82	Electrochemical reaction at semi-conducting crystals with layered structures.	Dr. R. Narayan, Dept. of Chemistry.
ICSR/401(7)/82	Study of the factors affecting the selectivity of oxide catalysts	Prof. J. C. Kuriacose & Prof. C. N. Pillai, Dept. of Chemistry
ICSR/401(8)/82	Water resources evaluation and management model for rural areas with particular reference to Narayanapuram.	Prof. H. Raman, Dept. of Civil Engg.
ICSR/401(9)/82	Infrared light beam link of two distant computers	Prof. H. N. Mahabala Computer Centre & Dr. M. Mukunda Rao, Dept. of Elec. Engg.
ICSR/401(10)/82	Development of Amorphous silicon solar cell	Mr. R. Ramachandran, Dept. of Elec. Engg.
ICSR/401(11)/82	Speed control of squirrel cage induction motor	Prof. B. Ramaswamy & Dr. R. Parimelalagan, Dept. of Elec. Engg.
ICSR/401(12)/82	Design & Development of Hydraulic feed and positioning servo-drives	Mr. M. Singaperumal, Dept. of Mech. Engg.
CSR/401(13)/82	Development of solar boosted heat pumps for drying up forest and agriculatural products.	Dr. S. Srinivasamurthy, Dept. of Mech. Engg.
CSR/401(14)/82	Investigations on the semi conducting properties of ternary chalcopyrites for device applications	Prof. J. Sobhanadri, Dept. of Physics.
ICSR/401(15)/82	Use of Cellulose-based immobilised enzymes for bio-conversions	Prof. M. Satyanarayana & Dr. T. S. Chandra, Dept. of Chem. Engg.
ICSR/401(16)/82	Appropriate technology for rural development	Prof. T. P. Ganesan & Mr. M. S. Mathews, Dept. of Civil Engg.
* ICSR/401(17)/82	Microwave communication systems	Prof. D. K. Banerjee, Dept. of Elec. Engg.
* ICSR/401(18)/82	Solar Energy for cold storage	Prof. M. V. Krishnamurthy, Dept. of Mech. Engg.
* ICSR/401(19)/82	Alternative fuels for IC Engines	Prof. K. V. Gopala krishnan, Dept. of Mech. Engg.
* ICSR/401(20)/82	Energy—centrifugal compressors	Prof. D. Prithivi Raj & Dr. N. Venkatarayulu, Dept. of Mech. Engg.

* Phase I - continuation projects.

CENTRAL ELECTRONICS CENTRE

Educational Programme—Continuing Education Programme :

Apprentice Training Programme—Fourth Apprentice Training Programme—commenced on 1st December 1982 (Duration One Year) Number of candidates admitted—Eleven.

Research and Development :

1. Roll of Surface Noise on friction—M.Tech. Project for Metrology Lab., Dept. of Mechanical Engg.
2. Timer Circuit for Strand Burner—M.Tech. Project for Thermodynamics Laboratory of Mechanical Engg. Dept.
3. Straingauge Dynamometer—M.Tech. Project for Metrology Laboratory, Dept. of Mechanical Engg.
4. Bead Type Thermistor Probe—Ph.D. Project for Process Control Lab., of Chemical Engg. Dept.
5. Control Panel fabrication for the Filament Winding Machine—for FRP Research Centre.
6. Photocell Circuit—Ph.D. Project for Precision Electronic Instrumentation Laboratory, Dept. of Mechanical Engg.

Assistance to Industry :

The following consultancy work was undertaken during the above period :

1. Power Measurements at the new foundry of M/s. Best and Crompton, Madras—work completed and earned Rs. 5,000/=.
2. Torque Measurement by Telemetry for M/s. Dalmia Magnasite Corpn., Salem—work completed and earned Rs. 15,000/=.
3. Fabrication of Electronic Circuits for Driver Simulation Set up—IRT Project in collaboration with Dept. of Humanities, IIT, Madras.
4. Load Cell and Force Recorder—for M/s. Rane Brake Linings, Madras—work completed—earned Rs. 1,500/=.
5. XY-Recorder (Hewlett Packard) for Ennore Thermal Power Station, Madras—work completed— earned Rs. 4,500/=.
6. HBM Loadcells (50 Tons capacity) four numbers—for M/s. Calico, Bombay—
7. Repair of Firing Boards for Automatic Battery Charging Unit of Madras Telephones, Madras —work completed—earned Rs. 4000/=.
8. Electronic Control Unit for eight Gun Rotary Spray Machine for Prototype Development and Training Centre, Madras—work under progress.

New Major Equipment Added :

1. Electronic Wattmeter EW 604—One No. (German)
2. Dual Trace Oscilloscope 0-15 MHz Meltron make—One (Indian)
3. Trainer Kits (a) Analog Experimenter—One No. (German)
   (b) Digital Experimenter—One No. (German)
4. Automatic Slide Projector—Photophone (Indian) One No.
5. One No. Overhead Projector—Photophone (Indian)
6. One No. Mini Drilling Machine for PCB—Punjab Recorder (Indian)

ENGINEERING DESIGN CENTRE

Sponsored Projects :

The following sponsored projects are in progress :

1. Development of Decentralised Energy System
2. Design and Development of an Optical Head for T.V. Tracker
3. Design and Development of a Laser Illuminator for Beam Riding Guidance
4. Bus Driving Simulator
5. Development of a Low Cost Launcher
6. Investigations on Holographic Optical Elements.

Consultancy Services to Industries :

FIE Research Institute, Ichalkaranji
Appaswamy Associates, Madras
Enfield India, Madras
Tamilnadu Poultry Development Corporation, Madras, Government of Tamilnadu.
TI Cycles of India, Madras
Erection of Biogas plant at Pachaperumalpatty (Tamilnadu) for Nutrition Meal Scheme.

Departmental Projects :

The following projects are in progress :
Design and Development of Dish Washer
Development of CO_2 Laser
Lens adjusting Bench Facility
Long Focus Microscope for Opthalmic use
Development of Nd : glass laser.

Number of Papers Published : Six

REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

Courses :

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

Important Lectures and Seminars :

RSIC organised a winter school in Applications of Vibrational Spectroscopy. About 30 Scientists from Universities and National labs from all over India attended the Winter School. Apart from the Institute faculty several Scientists from other Institutions like Bhabha Atomic Research Centre, Bombay and RRC, Kalpakkam also gave lectures.

Research and Development :

Faculty of RSIC have been guiding research in Molecular Spectroscopy for Ph.D. Degree. A total of 14 Ph.D. students are registered under the faculty members of this centre. Number of papers published 12.

Assistance to Industry :

Routine service of providing analysis of Industrial samples was done on various equipment available.

Sponsored Projects 1982-83 : Three

1. NMR Investigations of structure and dynamics of Molecules.
2. Electron Donor Acceptor complexes.
3. Vibrational spectral studies of aqueous solutions.

New Major Equipments :

(i) Cary 2390 UV-Vis-NIR-Spectrometer
(ii) Varian EM-390 NMR Spectrometer
(iii) PE 983 IR Spectrometer
(iv) VG ESCA/AUGER Equipment has been ordered.

Invited Lectures delivered by the Staff :

Title	*Speaker*
(i) Vibrational Spectroscopy; A potential analytical tool	Prof. Surjit Singh
(ii) Symmetry of Normal modes of Vibrations	Prof. Surjit Singh
(iii) Vibrational Spectra of Aqueous solutions	Prof. Surjit Singh
(iv) Applications of Raman Spectroscopy	Prof. Surjit Singh
(v) EPR and ENDOR	Prof. S. Subramanian
(vi) Pulse FT NMR Spectroscopy	Prof. S. Subramanian
(vii) HR/NMR in solids	Prof. S. Subramanian
(viii) Radiation Damage	Prof. S. Subramanian
(ix) One dimensional magnetic materials	Prof. P. T. Manoharan
(x) Electron donor acceptor complexes	Prof. P T. Manoharan

Lectures from Visiting Scientists :

(i) Prof. K. Mobius, Frei Universitat, Berlin
(ii) Prof. W. J. Orville Thomas, Univ. of Salford, U. K.
(iii) Prof. L. Bershov, USSR Academy of Sciences, Moscow
(iv) Prof. C. N. R. Rao, Indian Institute of Science, Bangalore

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

(i) Overtone spectra of aqueous electrolyte solutions and structure of water.
(ii) NMR studies of Lyotropic liquid crystals.
(iii) Vibrational spectra of aqueous solutions of nonelectrolytes.
(iv) Broadline NMR Spectroscopy in inorganic solids.
(v) Magnetic Resonance studies of triplet states.
(vi) Magnetic resonance studies of donor-acceptor complexes.

CENTRAL SERVCIE FACILITIES

Central Glass Blowing Section

Central Photographic Section

CENTRAL GLASS BLOWING SECTION

The section is well equipped with sophisticated glass blowing equipment such as high frequency generator, horizontal-cum-vertical lathe, forming lathe, universal lathe, grinding and polishing machines.

The unit is turning out high vacuum stop-cocks and interchangeable ground glass joints, cryogenic and high vacuum glass system and other types of complicated glass apparatuses. Facilities are also available for quartz blowing. The section also offers training in glass blowing to post graduate students.

CENTRAL PHOTOGRAPHIC SECTION

Since its inception in 1967, the CPS has been catering to the needs of the various faculties in the institute, both staff and students. Different photographic work such as photo taking and movie taking and processing of black and white films, microphotography, photomicrography, slide preparation, documentation, circuit diagrams (printed circuits) developing, enlarging and printing are undertaken by this section.

The CPS is also making audio visual programmes (black and white and colour) highlighting the various research activities of the institute. This section also helps various I.C.C. sponsored research work in the area of research photography, such as traffic survey, highspeed photography, documentation etc.

DEPARTMENTS

Aeronautical Engineering

Applied Mechanics (including Bio-Engineering)

Chemical Engineering

Chemistry

Civil Engineering

Computer Science and Engineering

Electrical Engineering

Humanities and Social Sciences

Mathematics

Mechanical Engineering

Metallurgical Engineering

Physics

AERONAUTICAL ENGINEERING

Changes made in the Curriculum : *New Courses added :*

B.Tech. a) Aerothermodynamics
b) New Syllabus for 4-year B.Tech. programme

M.Tech. New Syllabus for a 3-semester M.Tech. programme.

QIP/UGC Teaching Fellowship — No. on rolls : Ph.D.: 1

Research publications :

Total as of 1982	: 144
Added in 1982-83	: 21
Total	: 165

Monograph : Total as of 1983 : 6

Departmental Projects :

B.Tech.	: 6
M.Tech.	: 4
M.S.	: 2

New Equipments Added :

Hot cascade Test Rig Project :
(i) One PDP-11 Computer for Laser doppler anemometer
(ii) A 250 MHz 3 beam oscilloscope (Japan)

Structural Testing Lab. : 5 mW Aero. Tech. He-Ne LASER

The facilities for Moire-Holography work has been expanded and the bed is housed in a separate AC room in the Structures Lab. Photographic/Dark room facilities are also attached.

A separate AC room for maintenance and servicing of the electrical and electronic instruments of the department is maintained by a mechanic attached to the maintenance unit.

Sponsored Projects :

Title	*Sponsor*	*Amount*
1. Hot Cascade Test Rig	ARDB	21.18 lakhs
2. Critical Analysis of Bus Coaches for Drag and Weight Reduction	Thiruvalluvar Transport Corporation Ltd., Madras	1.57 lakhs
3. Slotted Tube Grain Design Analysis	ISRO	3.96 lakhs
4. Erosive Burning Studies of Solid Propellants	ARDB	6.95 lakhs

New Staff : Mr. V. Balasubramanian, Tech. Asst.
Mr. V. K. Rajagopalan, Jr. Engr. (S. G.)
Miss M. Pushpavalli, Mech. A.
Mr. S. Govindaswamy, Lab. Attdt. Gr. I.

Research Publications

Lectures delivered outside by the Staff Members:

Professor K. Balaraman:

1. Facets of Fatigue Testing—Seminar on Experimental Analysis of Structures—Organised by M. I. T. and ARDB—1-4 Sept. 1982.
2. Technological Forecasting Methods—Seminar on Future Studies—Organised by Centre for Studies on Science and Technology and Industrial Development and Madras Management Association.

Professor G. Subramanian:

1. 'Methods of Fabricating Complimentary Gratings and their use for Fringe Sharpening' by G. Subramanian and D. Selvan.
2. 'A Sensitive Moire Method for Partial Slopes in Flexed Plates' by S. Krishnakumar, P. Sriram and G. Subramanian
3. 'Universal Matrices to obtain Thermal Load Vectors for the Family of Anisotropic Plane Triangular Finite Elements' by C. Ramesh Babu and G. Subramanian

Presented at Conference: 34th Annual General Meeting of the Aeronautical Society of Indla at Madras on 9-11, Dec. 1982.

Prof. K. A. V. Pandalai

1. A lecture on 'Industrial Energy Conservation' was delivered on 24-3-1983 at the invitation of Lion's Club at Hotel Ashoka.
2. Lecture titled 'Kitty Hawk to Cape Canaveral' on July 20, 1982 at the American Centre on the 13th Anniversary of Moon Landing.
3. A lecture on 'Technological Forecasting as a Tool for Decision Making' delivered on October 9, 1982 at the One-day Seminar at IIT/M on 'Futures Studies'.
4. Lecture on 'Relevance of Computer Technology to India' given at the invitation of Rotary Club, Meenambakkam on 9-2-1983 at Taj Coromandel.
5. Two lectures on 'A Perspective on Scientific Civilisation' given at the invitation of the College of Engineering, Guindy, on 9-3-1983 and 16-3-1983.
6. Delivered a Key-note Address on 'Energy Management Strategies for Oil importing Developing Countries' at the joint meeting of the Association of French-Ceylonese Technologists and the Indo-French Technical Association held at Colombo, Sri Lanka on March 26 and 27, 1983.

Important Lectures and Seminars

		Sponsored by
March 27, 1982	Seminar on Prospects and Challenges of the Indian Aerospace Scene of the 1980s and early 1990s	Dept. of Aero. Engg., IIT Madras Dept. of Aero. Engg., MIT Madras Aero. Soc. of India Def. Res. Dev. Orgn.
Dec. 9, 10	34th Annual General Meeting of the Aeronautical Soc. of India.	IIT Madras ARDB Aero. Soc. of India HETC, Madras Indian Airlines HAL and others

	Speaker	*Topic*
28th Feb 1983	Prof. B. Sturtevent California Institute of Technology, USA.	Vapour Explosion and the blast at Mt. St. Helena
2nd Feb. 1983	Major General P.I. Klimuk Pilot Cosmonaut of USSR and Member of the Soviet Parliament	
27th Jan. 1983	Prof. C. F. Hansen, Stanford University, USA and NASA	High Temperature Gas Properties Antique and Military Aircrafts Carbon Fibre Reinforced Polymers for Aircraft Materials
9-11 Jan. 1983	Dr. L. Bernstein, Queen Mary's College, London.	
25th Feb. 1983	Mr. E. B. McMullon Managing Director McMullon Associates, UK.	Design of Bonded and Composite Structures Recent applications of Composites

Research Publications

	Author	*Title*	*Publication*
1.	G. Subramanian and K. Srinivasa Rao	On a semi global finite element method	J. Ae. S. I. 33(3-4) 1981 (69-73)
2.	G. Subramanian and C. J. Bose	Convenient generation of stiffness matrices for the family of plane triangular elements	Computers and Structures 15(I), p. 85-89, 1982.
3.	G. Subramanian, C. J. Bose and A. V. Reddy	Stiffness matrix for a tapered triangular bending element	J. Ae. S.I., 34 (1-2) 1982 (29-32).
4.	G. Subramanian, C. J. Bose and C. R. Balu	A note on universal matrices for triangular finite element for the Quasi-Harmonic equation	Int. J. Num. Meth. Engg. (accepted)
5.	G. Subramanian and C. J. Bose	On stiffness matrices for co-continuous tetrahedra	Computers and Structures 16(5), 1983
6.	G. Subramanian and D. Selvan	Two colour grating aids Moire fringe sharpening	Experimental Techniques (accepted)
7.	G. Subramanian	A note on Moire gratings by a stacked card method	Strain (accepted)
8.	R. V. Seeniraj and T.K. Bose	Planar solidification of a warm flowing liquid under different boundary conditions	Warme and Stoffubert-ragung Vol. 16, 1982 p.105-111
9.	K. Padmanabhan and T.K. Bose	Lift/Drag ratios and sonic boom intensities of a circular wing	J. Acoust. Soc. Amer. Vol. 71, No. 3, March 1982, pp. 612-15

	Author	Title	Publication
10.	T. K. Bose	Thermodynamics of similar particle laden gas flows in convergent divergent nozzles	J. Spacecraft and Rockets Vol. 19, 1982 pp. 376-78.
11.	H. K. Suhas and T. K. Bose	Nonsteady combustion of composite propellants subjected to rapid depressurisation	Combustion Science and Technology Vol. 28, 1982 pp. 55-68.
12.	R. V. Seeniraj and T. K. Bose	One dimensional phase change problems with convection and radiation	J. Heat Transfer Vol. 104, 1982 pp. 811-813.
13.	A. Krishnan and M. Sithu	Influence of Rotary inertia on fundamental frequency of cantilever beam	J. Sound and Vibration, Vol. 85, 1983 (letters to the Editor)
14.	S. S. Gokhale and H. Krier	Modelity of unsteady two phase reactive flow in porous beds of propellants	Progress in Energy and Comb. Science Vol. 8, 1982
15.	A. K. Sreekanth and E. Rathakrishnan	Interval slip flows—Some gasdynamic aspects	Proceedings of the 13th Int. Symposium on Rarefield Gas Flows, USSR, July 1982 (to be published)
16.	T. K. Varadan and VKTP Rajendran	A note on nonlinear analysis of clamped beams	J. Ae. S. I. Vol. 33, No. 3-4, Aug-Nov. 1981 (Published in 1982)
17.	B. S. Sarma and T. K. Varadan	Lagrange type formulation for finite element analysis of nonlinear beam vibration	J. Sound and Vibration 86 (1), 1983.
18.	M. Ganapathi and T. K. Varadan	Dynamic Buckling of Orthotropic shallow spherical shells	Computers and Struct. Vol. 15, No. 5, pp. 517-520, 1982.
19.	B. S. Sarma and T. K. Varadan	Certain discussion in the finite element formulation of nonlinear vibration analysis	Computers and Struct. Vol. 15, No. 6, pp. 643-646, 1982.
20.	P. Ramesh Kumar and E. G. Tulapurkara	Downwash behind a wing with spanwise blowing	J. Ae. S. I., Vol. 32, pp. 105-108 (published in 1982).
21.	M. Balakrishnan A. P. Ellappan and S. Krishnan	Aerodynamic Investigations of two types of Bus Coaches	Proceedings of 11th National Conference on Fluid Mechanics and Fluid Power 82, Vol. 2.

APPLIED MECHANICS

Quality Improvement Programme:

	M.Tech.	*M.S.*	*Ph.D.*
No. on rolls	1	...	4

Short-term Courses Conducted:

(i) Special Courses: One week course on Biomedical Engineering to BULE STAR ENGINEERS from all over INDIA.

(ii) Summer School on 'REHABILITATION ENGINEERING' between May 31 and June 12, 1982.

Important Lectures and Seminars:

1. Prof. Y. SUGIYAMA, Tattori University, Koyama, Japan delivered 4 lectures in the area of STATIC AND DYNAMIC STABILITY OF ELASTIC SYSTEMS SUBJECTED TO CONSERVATIVE AND NONCONSERVATIVE FORCES' on 6th December 1982.
2. Dr. M.G. PRASAD,-Stevens Institute of Technology, New Jersey, USA, delivered a seminar talk on 'ACOUSTICAL MODELLING OF ANTOMOTIVE EXHAUST SYSTEMS' on 19-8-1982.
3. Prof. J.S. RAO, Head of the Department of Mechanical Engineering IIT, NewDelhi delivered two lectures 'CURRENT TECHNIQUES AND KNOWLEDGE IN TURBINE VIBRATION ANALYSIS' and 'ANALYSIS OF BRAKE SQUEEL PROBLEM FOR UNDERGROUND TRAINS' On 14th June, 1982.
4. Prof. M.N. MUNJAL, IISc. Bangalore delivered a seminar talk 'DYNAMICS OF RAIL WHEEL INTERACTION' on 10-6-1982.

Research Publication:

Published: 38 Accepted for Publication: 5

Departmental Projects:

1. Cardiac Monitoring by laser speckle
2. Tumor diagnostics by laser reflectivity
3. Influence of various diseases on the structure and functioning of red blood cell.
4. Critical aerodynamic study of bus coaches for least drag sponsored by TTC Madras.
5. Fluid Flow through cyclone separators — sponsored by DAE
6. Software for 3 dimensional viscoelastic analysis of solid propellent grains for missiles (DRDL) Defence Research and Development Laboratory, Hyderabad.
7. Aids to promote functional electrical stimulation
8. Ultrasonic mobility aid for the blind
9. Assessment of leprotic feet and individualised footwear design.

Assistance to Industry:

1. Experimental Stress Analysis of the Head Stocks of Sugar Mill — KCP Pvt. Ltd., Madras.
2. Experimental Stress Analysis of the Gate DiscValve — Audco Valves Pvt. Ltd.
3. Torque measurement in valve actuators — Best & Crompton Pvt. Ltd., Madras.
4. Development of a test rig for testing the breaking strength of catalyst nodules — Madras Refineries.
5. Computer analysis of the dynamic stresses in the Standard Micro Lorry — Standard Motors Pvt. Ltd. Madras.

6. Computer analysis of Thermal stresses in Steam Turbines during transient operations — BHEL Hyderabad.
7. Modification and evaluation of cup anemometers — M/s Electromech Pune.
8. Velocity measurements on KDK fans for M/s Southern Enterprises, Madras 602 104.
9. Calibration of vane anemometer for M/s Central Electrical Testing Laboratory, Kakkalur, Trivellore 602 003.
10. Seismic testing and evaluation of electrical panels switchgears, relays, transformers, lightning arrestors, Insulator strings, flow control valves for industries like Siemens (India) Bombay, English Electric, Madras, Kirloskar Electric, Bangalore, W. S. Insulators, Madras Nagpur Transformers, Nagpur, Andrew Yule & Co., Calcutta, Instrumentation, Palghat, Controls & Switchgears Ltd., New Delhi.
11. Performance Testing of Stockbridge dampers for EMC, Calcutta, CPRI, Bangalore, Best & Crompton, Madras. Contd: Assistance to Industry – Industrial Consultancy Centre :
12. Dynamic analysis of transmission lines for EMC Calcutta Indo Asiatic Corp. Calcutta, Best and Crompton, Madras, EMI, Bombay.
13. Analysis for stress for mill head & mill shell for walchandnagar Industries, Walchandnagar.
14. Acoustic qualification test on Anuradha Payload—ISRO Bangalore.
15. Vibration Measurements for Madras Telephones : Tiru Arooran Sugars Ltd., Vadapatimangalam; Hindu, Madras.
16. Model Tests on the Chimnay Model for M.P. Electricity Board.

Visitors to the Department :

1. Prof. R. S. Azad, Dept. of Mech. Engg., University of Manitoba, Winnipeg, Manitoba, Canada during Nov./Dec. 82.
2. Prof. Y. Sugiyama Dept. of Mech. Engg., Tattori University Koyama Japan, Dec. 4-13, 1982.
3. Dr. M. G. Prasad, Dept. of Mech. Engg., Stevens Institute of Technology, New Jersey, USA, 19-8-1982
4. Prof. S. Sankar, Dept. of Mech. Engg., Concordia University Montreal, Canada, 24-7-1982.
5. Prof. J. S. Rao, Dept. of Mech., IIT Delhi, 14-6-82.

Invited Lectures Delivered by the Staff :

1. Talk at MIT Aero Society 'Flow past three-dimensional bluff bodies, by Dr. B. H.L. Gowda.
2. Lubrication of Industrial Bearings, BHEL, Trichy, 24-7-82 by Dr. B. S. Prabhu.
3. Recent Developments in the Condition Monitoring of Rolling Bearings, IIPE, Seminar on Bearings, Madras 19-2-83 by Dr. B. S. Prabhu.
4. Influence of Bearings on the vibrations of Rotating Machinery, Seminar on Tribology by IIPE, Cochin, 14-1-83 by Dr. B. S. Prabhu.
5. Sessions in Vibration/'Plant Engg. Programme' NPC Madras June-July '82 (Dr. N. Ganesan' Dr. S. Narayanan and Dr. B. S. Prabhu).
6. Noise Generation, Propagation and Noise Control in Machine tools and Air conditioning Systems, Conference on Vibration & Noise Organised by the Institute of Energy Management Bombay, Oct. 15 & 16 by Dr. S. Narayanan.
7. Stochastic Stability of Pipes Conveying Fluid. DCAMM Seminar No. 275. The Danish Genter for Applied Mathematics and Mechanics, Technical University of Denmark, Lyngby, 8th Nov. 1982 by Dr. S. Narayanan.

8. Free Vibration Characteristics of Thin walled Beams with Applied Damping Treatment. Technical Institute of Acoustics, Technical University of Berlin, 12 Nov. 1982 by Dr. S. Narayanan.

Other Information :

1. Prof. V. Ramamurti, joined the department in Feb. 1983 after a stay of 15 months at NASA Lewis Research Centre, Cleveland, USA on sabuatical Leave from the Institute.
2. Prof. B. V. A. Rao, is working at the National University of Singapore on extraordinary leave from the Institute since August, 1982.
3. Dr. S. Narayanan, Asst. Professor attended IUTAM Symposium on Random Vibration and Reliability, Frankfurt (ODER) GDR and presented an invited paper on Stochastic Stability of Fluid Conveying Tubes and visited the Technical University of Denmark, Technical University of Berlin, National Institute of Applied Sciences, Lyon and the Imperial College, London.

Developmental Programme in the near future :

Development of a tunnel for cyclone testing.

CHEMICAL ENGINEERING

Changes made in Curriculum

3 semester M.Tech. reorganised under six streams

i) Catalysts and Reactors
ii) Computer-aided Process Systems and Equipment Design
iii) Mineral Process Engineering
iv) Instrumentation and Process Control
v) High Polymer Engineering
vi) Environmental Engineering

Quality improvement Programmes/UGC Teacher Fellowship Programme
Serving Teachers Programme

	M.Tech.	M.S.	Ph.D.
Number of trainees so far	5	3	1
Number of Rolls in each of these courses	—	—	5

Important Lectures and Seminars

	Title	*Speaker*
1.	Behaviour of Catalytic reactions	Prof. J. M. Berty
2.	Rotational Viscometry of Non-Newtonian Fluids (Two unconventional methods)	Prof. Pavel Mitschka
3.	Design of Silo Systems	Prof. R. P. Dickenson
	Current Research at Thames Polytechnic in Silo Design	Prof. R. P. Dickenson
4.	Electrostatic and bouncing phenomena in aerosol filtration.	Prof. Dr. Ing. F. Loffler
	Considerations on wet scrubber design	Prof. Dr. Ing. F. Loffler
	Influence of particle concentration on flow field and particle collection in cyclones	Prof. Dr. Ing. F. Loffler

5.	"A method for solving design problem of multi-effect distillation process"	Prof. Ikuho Yamada
6.	Methodology of Metal extraction	Prof. Sawistowski
7.	"Model Reaction of hydro-refining and Hydrocracking of coal and Petroleum derived liquids"	Prof. Hans Schulz
8.	Instrumentation in Chemical Industry	Mr. R. V. S. Mani

Research and Development

Research Publications

a) Papers published 22

b) Paper presented 6

Books/Monographs

"Manual of Experiments in Process Control"	By Dr. Ch. Durga Prasada Rao
"Process Plant Design"	By Dr. T. Venkatram
"Packed bed reactors"	By Mr. K. D. Chandrasekaran and Dr. M. Satyanarayana

Department Projects

M. S. 2

Ph. D. 1

Assistance to Industry (ICC)

1.	To test and standardise the two samples (CD & HD) supplied (expanded polystyrene)	M/s Mettur Beardsell Ltd. Madras
2.	Classification of Wollastonite Powder	M/s. Wolkem (P) Ltd Udaipur
3.	Grindability index of Agucha Ore sample	M/s. Hindustan Zinc Ltd., Udaipur
4.	Magnetic separation of Kyonite-Tourmaline sample	National Metallurgical Laboratory, Madras
5.	Design of effluent Treatment Plant	The Pondicherry Cooperative Milk Producers Union Ltd. Pondicherry
6.	Testing of Neoprene Discs	M/s. Pioneer Rubber Industries, Madras
7.	Standardization and evaluation of Neoprene Discs	M/s. Pioneer Rubber Industries, Madras
8.	Project on Hot Gas High Pressure cleaning system	BHEL, R and D, Hyderabad
9.	Drying test using double drum drier	Shri A. M. M. Murugappa Chettiar Research Centre Madras 600 042
10.	Standardisation and evaluation of rigid polyurethene foams	M/s. Joy Firms, Ranipet

11. Advice	Sri Venkateswara Khandsari Sugar Mills Ltd., Nellore
12. Trouble Shooting Advice	Tirupur Textile Pvt. Ltd, Tirupur
13. Project Work including advice investigation, Design and Development	M/s. Well Brines Chemicals, Madras-17
14. Design of water waste Treatment	Indo National, Madras

Retainer Consultancy

1) Dr. C. A. Sastry	M/s. Laxmi Starch Ltd. Bombay
2) Dr. Y. B. G. Varma	M/s. Mothy Chemicals Ltd. Trivandrum

Staff Members who joined the Department

Dr. Ing. N. S. Rao	GTZ German Expert(Visiting Professor)
Dr. K. R. Sundaresan	Assistant Professor

New Major Equipment
Coulter Counter

Visitors to the Department

1. Prof. J. M. Berty, University of Akron USA
2. Prof. Pavel Mitschka, Institute of Chemical Process fundamentals, Czchoslovak
3. Dr. R. P. Dickenson, School of Mechanical Engg. Thames Polytechnic, London
4. Prof. Loffler, University of Karlsruhe, West Germany
5. Mr. R.V.S. Mani, Combustion Engg. Lumnus, USA
6. Prof. Ikuho Yamada, Nagoya Institute of Technology, Tokyo
7. Prof. H. Schulz, Engler-Bunte-Institute, University of Karlsruhe, West Germany

Invited Lectures delivered by the Staff

a. Dr. T. Gopichand

1. "Modelling fluidization"
   Plenary lecture delivered at 35th Annual session of IICHE Waltair on 2-1-1983
2. "Industry-University Collaboration"
   Seminar at Andhra University,
   Waltair, 29th & 30th March, 1983.

b. Dr. M. Satyanarayana

1. "Fertilisers & Pesticides",
   Delivered at Hyderabad on 19-4-1982
2. "Chemical Engineering Education Development in future years",
   Delivered at Regional Research Laboratory, Jorhat on 26-6-1982.
3. "Model curriculam for Under Graduate course in Chemical Engineering"
   Delivered at Calcutta on 27-12-1982

4. Presidential address entitled "Chemical Engineering in the Service of Society",

   Delivered on 2nd Jan. 1983 at Waltair, 35th Annual Session of IICHE.

5. "Industry-University collaboration—some aspects of R & D Efforts", delivered at Waltair on 29th March 1983.

6. "Pharmaceuticals & Fine Chemicals", delivered at Hyderabad on 19-3-1983.

c. Dr. N. Subramanian

1. "Plastics Moulding" National Productivity Council on 8-4-1982.

2. Polymer Rheology } Society of plastic Technologists,
3. Polymer Processing } University of Cochin, Cochin.

d. Dr. C. A. Sastry

1. Lectures in A. C. College on "Environmental Chemistry and Environmental Biology"
   Physical Chemistry Department, University of Madras December, 1982.

2. "On re-use and recycling of water",
   National Energy Council, Hotel Chola, December, 1982.

3. Lectures on "Energy and Pollution"
   N.P.C. Kovalam, Madras.

4. Keynote address, ISRO Seminar on Safety, Occupational Health & pollution,
   Sri Harikota, December 1982.

5. "Lectures on Air Pollution", Andhra Pradesh Water Pollution Control Board, Vizhakapatnam, December, 1982.

6. Lectures in Vikram Sarabhai Space Centre, Trivandrum on "Pollution Control", ISRO Trivandrum, March 1983.

7. Lectures on "Environmental Pollution Control"
   Institute of Technical and Management,
   Delhi, Hotel Chola, March 1983.

8. Lectures on "Pollution Control", MMDA,
   Hotel Connemara, February 1983.

e. Dr. T. Venkatram

1. Tapioca (Cassava) as a Raw material for alcohols
   Lecture delivered at Rotary Club
   Salem North in Tapioca Starch and Sago Seminar (March 1982)

2. Research activities in the chemical plant design division of IIT/Madras.
   Lecture delivered at Regional Research Laboratory, Jorhat on 15-6-1982.

f. Dr. T. K. Ramanujam

Air Pollution Control
Lecture delivered for the Two-day course on Environmental Pollution Control, organised by Institute of Technology and Management System, New Delhi at Hotel Chola, Madras.

Short Term Course

Process Synthesis and Engineering Design (June 1982) for two weeks.

By. Dr. G. S. Davies

International Symposium on Recent Advances in Particulate Science and Technology held on December 8-10, 1982.

By Prof. M. Ramanujam

CHEMISTRY

Research and Development

Research work undertaken by the faculty of the Department cover several areas such as electrochemistry, polymer chemistry, catalysis, synthetic organic chemistry, organic reaction mechanisms, structural and theoretical chemistry, solid state and coordination chemistry and analytical and nuclear chemistry. Most of the research programmes are funded by outside agencies such as DST, CSIR, DAE, INSA, Defence and other organizations.

Research Publications

About 85 papers have been published in national and international journals.

Books and Monograph

	Title	*Authors*	*Year of Publication*
1.	Solubility of Gr. II sulphates in all solvents.	Dr. C. Kalidas	under preparation
2.	A chapter on "Oxidation" in "unit processes in organic-chemical industries" published by CEEDC, IIT Madras	Dr. C. N. Pillai	1982.

Sponsored Projects

Twenty projects sponsored by DST, CSIR, DAE, INSA, I.R.D.F, Defence, Department of Environment, Government of India etc. are being investigated by the faculty of the Department. Seven other projects have been submitted to various funding agencies.

Indo-German Projects

1. FRP from pulpwaste : This project envisages the use of sulphate spent liquor containing mainly lignins and polyphenols from the paper pulp industry. Attempts are to be made to cross link and polymerise the lignins. The semi-polymerised viscous material would be used as resin for FRP composite.

2. Electrochemical studies with layered dichalco genides. The objective is to develop efficient system for photo-assisted electrolysis of water.

3. Factors affecting the activity and selectivity of oxide catalysts.

Visitors:

Name	*Organisation*
1. Prof. R. Glass	Department of Chemistry, University of Arizona, U. S. A.
2. Dr. C. F. Bell	School of Chemistry, Brunel University, England.
3. Prof. B. G. Ezshov	Institute of physical chemistry, Moscow, U. S. S. R.
4. Prof. J. Goodenough	University of Oxford, England.
5. Dr. D. N. Pachadzhanov	Institute of Chemistry, Tajik Academs of Sciences, U.S.S.R.

Seminars/Symposia

1. A two day symposium in chemistry was organised jointly by the Madras Christian College, Tambaram and the Chemistry Department, Indian Institute of Technology, Madras on March 5 and 6, 1983 at IIT Madras. About 115 papers covering various aspects of chemistry were presented.
2. A four-day symposium on "Interaction at electrode-electrolyte interfaces" was held at IIT Madras between 21 to 24 December 1982. The symposium was jointly organised by DAE and the Chemistry Department, IIT Madras.

Quality Improvement Programme / U. G. C. Teacher fellowship Programme

Serving teacher programme.....Ph.D.

No. of trainees so far.....7

No. on rolls in each.....9

New major equipment added

1. STA — 780 thermal analyser has been installed.
2. Varian GPC/HPLC chromatograph has been commissined.
3. A Hard Disk of 11 Megabites has been added to the Departmental computer.

Assistance to outside organizations

1. Characterisation of materials involving IR, NMR, ESR, U.V., X-Ray, SEM atomic absorption and molecular flurorescence spectrophotometry etc. have been provided through R.S.I.C. to educational institutions, industries and research laboratories.
2. Mass spectra were seen for universities, National Laboratories and industries.
3. Analysis of V, cu, Ti, K, SO_4^{2-} etc. in catalyst samples from various industries.
4. Central Inland Fisheries Institute (ICAR) is being assisted in the determination of heavy metal contend of environmental samples.

Research Collaboration

Research programmes are being investigated by the faculty of the Department jointly with other faculty members of this Institute and with outside organizations like Department of organic chemistry, University of Madras, May and Baker (P) Ltd, England. Consultancy work is also being rendered to the Government of Tamil Nadu.

Invited lectures delivered by staff

About 15 invited lectures were given by the faculty of this department at various Universities, National laboratories and Industries both in India and abroad.

Any other Information

1. Two papers were presented at A. C, S. Symposium on "Thermodynamics of electrolytes in mixed solvents'' held at Las Vegas, U.S.A. during March 28—April 2, 1982. Dr. C. Kalidas
2. Presented a paper at the International Conference in Molten salt chemistry in Kyoto, Japan during April 20–22, 1983. Dr. R. Narayan
3. Nominated to the Board of studies (under graduate) in chemistry of the autonomous College—Sri Parasakthi College Courtallem. Dr. R. Narayan
4. Presented a paper in the Royal Society Symposium on Organo sulphur chemistry at University College of North Wales, U.K. in September 1982. Dr. S. R. Ramadas.
5. Presented a paper at the American Society for Mass spectro meeting held at Honolulu, U. S. A. during June 6-11, 1982. Dr. D. V. Ramana.
6. Elected as Treasurer of the catalysis Society of India. Dr. C. S. Swamy
7. Presented a paper at the International conference on Theoretical chemistry held at Schladwing, Austria in 1982. Dr. M. S. Gopinath
8. A few compounds prepared were found to exhibit contact herbicidalf properties, tested by May and Baker (P) Ltd. England. Dr. S. R. Ramadas

CIVIL ENGINEERING

New Courses Introduced :

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

New System Introduced :

Credit pattern is being followed in all the semesters of B.Tech. and M.Tech. programmes.

Changes made in Curriculum :

A new curriculum following the credit pattern has been drawn up for the 4 year B.Tech. Degree programme and is being fully implemented.

Quality Improvement Programme :

The following short course was conducted under the QIP for teachers in Engineering Colleges. 'Ferrocement — development and potentials' December 13-28, 1982 (13 participants attended the course)

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 and Faculty gave talks on various research topics. In addition, special lectures were arranged when the following Professors from USA visited the Department.

Topic of Lecture	*Speaker*
Dynamics of railway trussed bridges	Dr. V. J. Garg Manager, Dynamics Research Association of American Railroad 3140 South Federal Street, Chicago, Illinois 60616, USA.
Wood mechanics and Timber design	Dr. Vijay K. Gopu Associate Professor Department of Civil Engineering Louisiana State University and Agricultural and Mechanical College, Baton Rouge, Louisiana 70803.
Pollution and Water resources evaluation of river basins.	Prof N. G. Bhowmik Principal Scientist Asst. Head, Surface Water Section State Water Survey Division 605 East Springfield Avenue P.O. Box 5050, Station A CHAMPAIGN, Illinois 61820, USA.

Research and Development :

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

Research Publications, Papers : About 20.

Departmental Projects :

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

Assistance to Industry :

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

Sponsored Projects :

Four research projects were in progress during the year.

Invited Lectures delivered by Staff :

About 20 lectures were delivered by the faculty members in various short term courses and seminars arranged by various organisations outside the Institute.

One of our faculty has been nominated as Chairman of the Preliminary Designs Review Committee for Polaris Satellite Launch Vehicle for ISRO.

Proposed Development Programmes :

In addition to the ongoing research work in various disciplines the Department plans to expand and 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. Environmental Engineering

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

COMPUTER SCIENCE AND ENGINEERING

Until this year, the Department has run only postgraduate level degree programmes—M.Tech., M.S. and Ph.D.—to meet the manpower needs in the vital area of Computer Science. This year the B.Tech. programme in Computer Science was started and the first batch of 18 students were admitted in July 1982. Recognizing the acute shortage of trained computer professionals in this country, and more so of trained teachers to educate others, the Government of India has instituted a Faculty Development Scheme in 1981. So far 7 candidates have been admitted under this programme. The second batch of 3 students were admitted in July 1982.

Continuing Education Programmes

i) Organized and conducted entirely by the faculty and staff of Computer Centre.

a) Training program for professionals of Tata Consultancy Services on Computer Concepts and COBOL Programming.

b) Training program for Data Base Management for Hindustan Computers Ltd., Madras.

c) Microprocessors Training Programme for faculty members of Engineering Colleges.

Invited Lectures delivered

Prof. R. Kalyanakrishnan	Madras University	Computer Applications in the Social Sciences.
Dr. K. B. Lakshmanan	Mathematics Dept. IIT, Madras.	Publickey Cryptosystems and Digital Signatures.
Mr. C. Pandurangan	Institute of Chartered Accountants	Data Processing.

Research and Development

i) Research Publications : 9

ii) Departmental Projects : 4

a) Computerization of GATE examination processing.

b) Computerization of Academic Records.

c) Revision to PAYROLL system

d) Installation of VM/370 -CMS time sharing operating system for IBM 370/155.

Sponsored Project

	Project	*Agency*	*Coordinator*
1.	Computerized Hospital Information System.	Department of Electronics Govt. of India	Prof. H N. Mahabala
2.	Development of Bit-Slice Based Display Controller for Kannada Script.	Department of Electronics Govt. of India	Prof. H. N. Mahabala

Assistance to Industry

	Project	*Agency*
(i)	Regression Study on Demand of Oil Seeds	Tamil Nadu Oil Seeds Growers' Federation.
(ii)	Software Development of Terminal Control	Computer Maintenance Corporation.
(iii)	Computer Configuration Requirements	Tamil Nadu Milk Producers' Federation, Madras, and TNEB
(iv)	Optimum Poultry Feed Mix	Tamil Nadu Poultry Development Corporation.
(v)	Survey Data Processing for Small Scale Industries in Tamil Nadu.	TANSSIA
(vi)	Implementation of Ground Water Simulation Model Program.	Neyveli Lignite Corporation.

Participation in the Activities of Professional Societies

Prof. H. N. Mahabala has been nominated to be a member of TC6—Technical Committee of IFIP.

Prof. H. N. Mahabala continues to be a member of the Board of Directors of Computer Maintenance Corporation.

Mr. M. K. Ramanujam was an office bearer of the Managing Committee of Madras Chapter of Computer Society of India.

Mr. M. K. Ramanujam participated in the conference on Classification Research in Augsberg, West Germany and presented a paper.

Dr (Mrs) Kamala Krithivasan was a member of the Board of Studies in Mathematics in Madras University and a member of the Board of Studies in Physics in Bharathidasan University.

Important Lectures and Seminars by Visiting Scientists

(i) Dr. Mahadevan Ganapathi, Stanford University, Stanford, USA, gave a series of lectures on 'Compiler Compilers'.

(ii) Mr. G. Vijayan, Princeton University, USA, Rectilinear Graphs and their Embeddings.

(iii) Mr. E. D. Radhakrishnan, Phoenix, Arizona, Electronic Switching System and Software Development.

(iv) Dr. Oscar N. Garcia, President IEEE Computer Society—Distributed Computer Architecture and Networks.

(v) Dr. T. Radhakrishna, Concordia University, Montreal, Canada—Concordia University's Local Microprocessor Network.

(vi) Dr. K. S. Raman, Simedarby, Kulalumpur—Modern Trends in Business and Personal Computing.

(vii) Dr. S. Kandaswamy, Bell and Howell, USA, Computer Aided Instruction.

(viii) Dr. S. Ganapathi, Bell Laboratories, Halmdals, New Jersey, USA—Computer Graphic. Techniques in Nondestructive Valuation.

(ix) Dr. Taylor, Computer Laboratory, University of Liverpool—Microprocessors in Process Control.

(x) Dr. M. N. S. Swamy—Concordia University, Canada, Discussion with Faculty.

(xi) Dr. Richard K. Chang, Yale University, USA, Discussion with Faculty.

(xii) Dr. S. C. Seth, IIT, Kanpur—Discussion with Faculty.

Changes in Staff Position

(i) Mr. C. Pandurangan joined as Lecturer.

(ii) Dr. Kumar Subramanian, Assistant Professor, resigned.

(iii) Dr. (Mrs) Kamala Krithivasan was promoted from Lecturer to Assistant Professor.

(iv) Mrs. Vatsala Krishnan was promoted from Programmer Grade. II to Programmer Grade I.

(v) Mr. G. Kannan was promoted from Programmer Grade II to Programmer Grade I.

(vi) Mr. S. Jayaprakash was promoted from Operator to Programmer Grade II.

(vii) Mr. S. K. Ramesh was Promted from Operator to Programmer Gr. II.

Future Plans

The IBM 370/155 system at the Computer Centre will be augmented with additional memory, one additional processor and atleast 8 terminals to permit on-line processing. It is also proposed to enhance microprocessor related activities and conduct short-term courses on microprocessor based system for faculty members in various engineering colleges.

ELECTRICAL ENGINEERING

Invited Lectures by the Staff

HV and Power Systems

1. 'Computer-aided Load Despatch Center', by Dr. A. Kuppurajulu, Keltron, Trivandrum.
2. 'Security Control of Power Systems' by Prof. Dr. A. Kuppurajulu, Computer Maintenance Corporation, Hyderabad.
3. 'Computer Applications to Power Systems', Key-note address by Prof. Dr. A. Kuppurajulu, National Symposium on Power Systems—Annamalai University.
4. 'High voltage Generation and Testing Aspects' Prof. Dr. Y. Narayana Rao, NIE, Mysore.

Television Engineering

5. 'Fibre Optic Communications for Strategic Applications', by Prof. Dr. J. P. Raina, Ministry of Defence, New Delhi.
6. 'Colour Television', Prof. Dr. J. P. Raina, IETE, Madras.
7. CRT displays, Dr. S. Srinivasan, BHEL, Bangalore.

Control

8. 'New Power Devices', NGEF, Bangalore by Dr. R. Parimelalagan.

Machines

9. Computation, Measurement and Evaluation of Fields in Large Power Transformers and Rotating Machines, by Dr. S. S. Yegnanarayanan, NGEF Bangalore.
10. 'Testing of High Energy Efficiency 3 Phase Induction Motors', by Dr. S.S. Yegnanarayanan, AIEI Symbosium on Line Loss Reduction, IIT Madras.

Measurements

11. 'Trends in the use of Analog, Integrated circuits in Electrical Instrumentation by Dr. P. Sankaran, IETE Symposium, Madras.

Circuits and Devices

12. LSI Design Course—jointly offered by IIT Madras and TIFR.

New Equipments Procured

HV and Power

1. Partial Discharge Detection Equipment procured from Biddle and Co. USA.

TV Engneeing

2. Marconi Frequency Convertor 80 kHz to 520 MHz.
3. Insertion Test Signal Generator
4. Dual Beam 400 MHz Sampling Oscilloscopes.
5. Splicing Equipment

Control

6. 2 Oscilloscopes

Measurements

7. A Commodore Model 8032 Computer, Dual Floppy-disc Drive and Printer.

Educational Programmes Like QIP

HV and Power System

1. QIP course on 'Modelling and Analysis of Fields in Electrical Power Equipments'. Lectures delivered by Prof. Y. N. Rao, Dr. C. N. Reddy, Dr. C. Venkat-aseshaiah and Sri S. Gopal.
2. Lectures delivered on Electrical Insulation and High Voltage Engineering.

TV

3. Conference on Image signal processing—to be offered in December 83.

Machines

4. Short term course on 'Modeling and Analysis of Fields in Electrical Power Equipments—Coordinator' Dr. S. S. Yegnanarayanan.

Measurements

5. 'Application of Electronics to Power System Instru-mentation to practising Engineers' 5 days Lecture Course conducted.

Circuits and Devices

6. Heavy Doping Effects in Transistors and Solar Cells. M. S.—Q.I.P.
7. Switched Capacitance Filters Ph.D—Q.I.P.

Distinguished Visitors

1. Dr. T. Subba Rao of General Electric, USA.
2. Dr. Begamudre of Central Power Research Institute, Bangalore.
3. Dr. Arunachalam, Scientific Adviser, Ministry of Defence.
4. Dr. Gupta, Secretary Ministry of Electronics.
5. Prof. Dr. Holtz, University of Wuppertal, West Germany.
6. Prof. Doncho Donchev of Bulgaria.
7. Prof. K. J. Overshott, Wolfsen Center for Magnetics, University of Wales, UK.
8. Mr. R. W. Blower, Marketing Director, Yorkshire, Switchgear Group, U.K.

Lectures by Invited Speakers

HV and Power

1. H. V. Power Transmission—Dr. Begamudre
2. Zinc Oxide Arresters— Dr. T. Subba Rao

Control

3. Fast Response Current Control of D. C. Drives—Prof. Dr. Ing. Holtz.
4. A Predictive Method for Vector Control of AC Machines—Prof. Dr. Ing. Holtz.

R and D in Progress

HV and Power

1. Real-time control of power systems.
2. Flash-over characteristics of synthetic spacers in compressed gases.
3. Pollusion-flash-over Mechanism of Insulators.
4. Load Frequency Control of Multiarea Power Systems.

TV

5. 4 Ph.D. scholars are working on Image Processing.
6. Hybrid Codec Performance Simulation.
7. Studies on different Phase Compensators.
8. Optical Image Intensifier.
9. Dedicated System for Strategic Applications.

Digital

10. Fault-tolerant Computing.
11. Computer Communication.

Machines

12. Flat Linear Induction Pump for Liquid Sodium, for Nuclear reactors, for Kalpakkam, Atomic Energy Project.
13. Auto Induction Pump.
14. Optimization of Three-phase Induction Machines.

15. Computer aided analysis of Thick Core Solenoids.
16. Microprocessor Controlled Single Phase d.c. drive.
17. Dynamic and Switching Over Voltage study.

Circuits and Devices

18. Photovoltaic Characteristics of Diffused Bulk P+N Ga-As Solar Cells.
19. Ion Beam Damage Effects during the Low Energy Cleaning of Ga-As, Schottky Diodes.
20. Fill Factor degradation in Au Ga As Polycrystalline Solar Cells.
21. PIN Diodes for Phased Array Radar Applications.
22. Approximations to Two-step Diffusion Process by Prony's Method.
23. Approximations to Fermi-Dirac Integrals and their use in Device Analysis.

Measurements

24. Instrumentation and Networks.

Controls

25. Identification of Parameters, under extremely noisy conditions—Algorithm successfully developed.

Guidance and Control

26. ARDB Projects in Signal Processing Techniques for Missile Guidance Systems.

INDO GERMAN COLLABORATION :

TV

Image Processing—IFN Braunschweig.

Consultancy Offered :

HV and Power

1. Minimization of Losses of TNEB
2. Power system Network Plot for BHEL
3. Laser Current Transformers—W.S. Insulators
4. Over-Voltage studies—Orissa State EB, W. S. Insulators
5. Artificial Pollution Studies on 25 KV Solid Core Insulators for Railways (under negotiation)

Machines

6. Calculation of Electric Fields on 400 KV gapless Lightning Arresters—W.S. Insulators.
7. Calculation of Magnetic Fields and Forces in Line Traps WS Insulators.

TV

8. Two retainer consultancy assignments—Yeshodaya Electronics Co. and A S.R. Anjaneyalu Company.

Digital

9. Solid State Train Traffic Control Systems for India n Railways.

Control

10. Thyristor Controllers for Cranes—Cochin Shipyard
11. Software for Systems Analysis—SHAR

Circuits & Devices

12. Platinam Diffusion in Silicon for Lifetime Control—BHEL

Control & Guidance

13. Design of Microprocessor based Cosntrol System (TECHNOLAB)

Lab. Equipments and Facilities Created

HV and Power

1. Microprocessor based substation Switching SImulator
2. Electrically operated 24 KV Steam Boiler with remote control facility has been fabricated for artificial pollution studies.
3. A polythene Pollution Chamber has also been fabricated.

TV

4. Marconi Frequency Converter, Insertion Test Signal Generator, 400 MHz sampling scope and splicing Equipments procured.

Digital

5. Z-80 and 8085 based Microprocessor-Kits were procured.

Assistance to Industry

HV and Power

1. Analysis under fault conditions of Generators—Ennore Thermal Power Station.
2. Remedial measures for Industrial and Saline Pollution Problems in Transmission Lines—W.S. Insulators.
3. Impulse testing of 16 MVA transformers for Hackbridge-Hedvittic and Easun Ltd.
4. Partial Discharage and Impulse Tests 30 KV Epoxy cast transformers for P.S. Industrials.
5. Harmonic Analysis in the HV supply of Tranvancore Chemical Industries.
6. Front wave of Impulse Sparkover and Power Frequency Spark over characteristics of Zinc Oxide Arresters for WS Insulators.

TV

7. Video Transfer and Demonstration—ISRO Dept. of Space, National Film Development Ltd., MMA etc.,

Machines

8. Recommissioning of DC Rolling Mill Motors for Triveni Alloys Ltd.
9. Type Tests on Diesel Engine driven Alternators (75KVA)—Southern Power System and Ramsons.

Measurements

10. Testing Line Equipments for EHV Lines for BHEL, TAG Star Iron and EMC.

Future Plans and Developments

TV

1. Expansion of Image Processing activities
2. Development of Fibre Optic Communication Systems

Digital

3. Digital Experiment-Boards Development.
4. Microprocessor Kits Assembly.
5. Development of CRT, Teletypewriter and other interfaces for Microprocessor Kits.

Machines

6. Systems Programme Package for analysing transients in large electrical machines with solid state closed loop control, taking into consideration the mechanical loads and power systems' characteristics.

HV and Power

7. Microprocessor Control of Alternators to Simulate the Synchronization Process.
8. Microprocessor-based Protection Schemes for Power Systems.
9. Switchgear Laboratory Development.

OTHER INFORMATION

Electrical Engineering Association :

1. Seminars and Lectures by outside speakers were arranged. Video Films were presented. and students get-together was arranged. News and problems pertaining to Electrical Engineering Department were displayed on an exclusive Notice Board.
2. A programme was organized by the Department to introduce First Year B. Tech. students to the Department.

HUMANITIES AND SOCIAL SCIENCES

New Programme Introduced

Certificate for the HAL Trainees. (Interdisciplinery)

Changes made in curriculum

(i) The curriculam for 3-Semester M.Tech. in Industrial Management.

(ii) All the B.Tech. Courses have been re-vamped.

New Courses Introduced

(1) HS 837 Introduction to German Literature
(2) HS 336 Great Social Thinkers
(3) HS 851 Current Issues in Economics
(4) HS 836 American Short Story: A Survey
(5) HS 835 A Survey of American Literature

Serving Teachers' Programme

No. on rolls in each of these courses

M.Tech.	Ph.D.
4	2

Research Publications

Papers: 17

Books

(1) A Chapter by A. V. Krishna Rao in the *Perspectives on Kamala Markandaya* ed. by Madhusudan Prasad, 1983.

(2) A Chapter by A.V Krishna Rao and Madhavi Menon in the *Perspectives on K. Markandaya,* ed. by M. Prasad, 1983.

(3) *Learn Scientific and Technical German* by V. S. N. Sarma 1982.

Assistance to Industry

(1) S. Ramani and (Mrs.) S. Balaraman have continued work on the sponsored projects; and S. Ramani has been the retainerconsultant for one organisation. He is also the consultant for the World Meterological Organisation, Geneva.

Seminars Couducted

1) Seminars were held by Dr. Marti G. Subrahmanyam of the New York University, New York; and Professor Brarn of the University of Nigeria, Nigeria; and Lt. Gen. S. Apte, New Delhi.

2) A Seminar on 'the Indian Novel in English', coordinated by A. V. Krishna Rao IIT Madras and Dieter Riemenschneider, University of Frankfurt west Germany.

3) S. Ramani was the Chief Coordinator of an IIT and T. N. Government sponsored Seminar on 'Education 2000'.

Invited Lectures delivered by the Staff

1) Invited to give a talk on the Indian and Australian Fiction', at the A.U.P.G. Centre, Kakinada, A.P.

2) A talk on 'the problems of teaching English as a second Language', at the English Teachers Association, Kakinada.

K. Schleusener

Invited to give a talk on the 'Problems of Foreign Language Teaching in India' at the Max Mueller Bhavan, Bombay.

S.Ramani

Invited to give a talk at an International Conference in Singapore.

S. Ambirajan

A talk on 'Famines in South India' at MCRC, Madras.

Dipak Chaudhuri

Invited to give a series of lectures under the auspices of the National Productivity Council, Madras.

(Mrs.) S. Balaraman

Invited to give a talk at a National Conference on the 'Role of Women in Indian Society', at Chola-Sheraton, Madras.

(Miss) Rita Ghatak

1) A talk on Motivation' at the Tamil Nadu Institute of Labour Management, Madras.

2) A talk on 'Supervision' at the T.N.Institute of Labour Management, Madras.

3) A talk on 'communication' to the Jaycees Group of Industries, Madras.

Raj Gopal

Invited to give a talk on 'Indi and the Germans', at the Max Mueller Bhavan, Madras.

C. Ramachandran

A talk at the Indian History Congress at the Kurushetra University.

Teaching Aids Development

1) A 30-Booth Language Laboratory has been established and commissioned.

2) S. Ramani has written the Script for an audio-visual programme on the Scope and definition of 'Futurology'.

Faculty Additions :

Dr. (Miss) Evangeline Manickam and Shri S. Mohan joined the Department as Lecturers.

Shri S Ramaswamy joined the Department as a Technical Asst.

Placement :

No. of contacts by Industry for the period : about 125

No. of candidates placed : 35

MATHEMATICS

Lectures and Seminars

The department arranges regularly the weekly seminars and occasional special lectures. During 1982-83, 30 seminar talks were given. Some of the invited speakers have been :

Speaker	*Title of lecture*
Prof. J. J. Seidel Technological University Eindhoven (Netherlands)	Icosahedron
Prof. T. E. S. Raghavan University of Chicago Illinois, USA	Stochastic Games
Prof. R. Vasudevan Matscience, Madras	Splines - A New Approach
Prof. D. C. Russell York University Toronto, Canada	Functional Analysis and Approximation Theory

Papers

A number of research papers have been published in Indian as well as foreign journals by members of the department.

Staff

Drs. S. G. Kamath, A. Rangan and S. H. Kulkarni joined the department as lecturers.

Professors S. K. Srinivasan, K. R. Parthasarthy, R. Subramanian and Dr. Y. Nagendra have gone abroad on teaching/research assignments.

A few of the faculty members continue to serve on the Boards of Studies, Selection Committees and Examining Bodies of various national institutions.

Some of the faculty members are on the Boards of referees of research papers for Journals and some serve on panels for review Journals.

Faculty members were invited to several conferences to preside over and deliver lectures.

Any other information :

A two-day symposium on Mathematical Analysis and Applications was held on 12, 13-11.1982. Prof. Michelli, IBM, USA, Prof. M. Venkataraman, Central University, Hyderabad, Prof. P. K. Ghosh, Calcutta University, Prof. J. N. Kapur, IIT, Kanpur among others participated. Dr. P. Bhattacharya and U. N. Srivastava were the coordinators. Drs. S. D. Nigam. S. N. Majhi, P. Achuthan, P. V. Subramanian and V. B. Johri presented papers.

A project for writing a book on 'Pade' Approximants : Theory and Applications' has been taken up under the UGC (New Delhi) programme, sanctioned to Dr. P. Achuthan.

An all-India advanced course on Mathematical Fluid Dynamics supported by DAE, Govt. of India was held in December, 1982. Prof. S. D. Nigam was the coordinator. Several faculty members gave lectures and 30 teachers from various institutions attended.

A summer school for 4 weeks for National Science Talent Scholars under the NCERT Programme was conducted. Dr. C. M. Purushotham was the Director. Many of the faculty members delivered special lectures.

The Journal of Mathematical and Physical Sciences, a research Journal, International in character and published by the Department, continues to attract good quality research papers and review articles. So far 16 volumes have been published. Under the mutual exchange of publication programme initiated by the Department, several international research journals from abroad are received regularly. The journal earns Rs. 72,200/- per year by way of subscriptions, which, includes $ 5100/- earned as foreign exchange in dollars.

Dr. P. R. Parthasarathy attended 'Autumn College on Mathematical Ecology' in November-December, 1982 at ICTP, Trieste, Italy.

A symposium on Applicable Mathematics and Mathematical Modelling during the Silver Jubilee year is being planned.

MECHANICAL ENGINEERING

Faculty:

Professors	*Assoc. Profs.*	*Asst. Profs.*	*Lecturers*	*Design Engineers*
13	2	24	13	2

Dr. S.P. Venkateshan, Asst. Professor has joined the Department as faculty adjunct

On Students:

Programme	*No. Admitted*	*No. on Rolls*	*No. Graduated*
B.Tech.	50	323	71
DIIT	—	—	4
M.Tech.	52	46	42
M. Tech. (sponsored)	8	8	—
M. Tech. (QIP)	2	2	1
M. S. (Including external)	12	45	9
Ph. D (including external)	10	79	6
Ph. D (QIP)	8	12	5

New Courses introduced:

ME 703 Finite Element Analysis

Deputation/Assignments Abroad:

The following faculty members rejoined the Department on completion of their assignments abroad/with other organisations:

Dr. T. Rajagopalan, Asst. Professor

Dr. B. Nagalingam, Asst. Professor

Dr. K. V. Chalapathy Rao, Asst. Professer

The following faculty members retired/resigned from the Department.

1. Prof. B. S. Murthy—Retired
2. Prof. V. C. Venkatesh—Resigned
3. Prof. H. Chandrasekharan—Resigned
4. Dr. V. Seshagiri Rao. Asst. Professor—Resigned

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

Prof. M. C. Gupta

Dr. O. V. Krishnaiah Chetty, Asst. Professor

Dr. T. Nagarajan, Asst. Professor

Dr. K. Narayanasamy, Asst. Professor

Mr. C. S. Subramaniam, Mechanic 'B' rejoined the Department after completing one year Instructor's course at the Central Training Institute, Guindy.

Mechanical Engineering Association :

Following special lectures were arranged :

1. 'Systematic Design & Computer Aided Design'—
   Dr. Ing. Klaus Schlottmann
2. 'Technical Education & Research in USA' —
   Dr. S. M. Pandit
3. 'Modern Trends in Business & Personal Computing'—
   Mr. K. S. Raman
4. Indigenous Production of Educational Films'—
   Prof. C. Ramakrishna Sastri
5. 'Higher Studies in the USA'—
   Mr. J. Rangarajan
6. "The Natural resources of Paraguay and the Role of People in the Development"
   Mr. V. N. Nagaraja (UNESCO expert for UNDP Project)
7. 'Petroleum Conservation in India'—
   Mr. B. M. K. Bhaskara Rao (Co-ordinator, Petroleum Conservation Research Association)
8. 'Trends in Cutting Tool Materials'
   Mr. K. N. Iyengar, Regional Manager, Widia (India) Ltd.,

Following visits were arranged :-

1. Enfield India and Vibromech.
2. Metal Box India Limited
3. Standard Motor Products of India Limited

Following Filmshows were arranged :

1. Research & Techniques Energy; Plastics & Oceanography.
2. Preventive Maintenance of Machine Tools.
3. Advance into Past ; Tomorrow's Energy
4. Gear Wheel & Two Films on Turbomachines
5. Energy problems in Japan
6. The faces of Japan : Mechanical Engineering
7. Industrial Technology in Japan to-day.
8. Research, Industrial Technology and Sports—Technical Films.
9. Garbage—Drawbacks of affluence ; Research and Techniques—Transportation in the 70's ; Contacts and Encounters—Asian version
10. Film on Trends in cutting tool materials.

HEAT TRANSFER AND THERMAL POWER LAB.

Sponsored Projects:

Estimation of Heat Transfer Coefficients in Industrial Steam Turbines—B.H.E.L.

Invited lectures by the Faculty of Lab :

Five Lectures

Research and Development :

1. Basic Studies on Heat Transfer in Immiscible liquids.
2. Development of FEM program for Heat Transfer fluid flow problems.

Research Publications :

Eleven publications.

HYDRO TURBOMACHINES LABORATORY

Sponsored Projects :

BHEL Projects on 'Bulb Turbine' : The design, manufacturing and assembly of a Bulb Turbine is completed and preparations are being made for the testing of the turbine. As soon as power and water are available, testing will be initiated.

Research and Development :

1. A research programme on the Aerodynamic Investigations of a Ducted Propeller has been completed.
2. More work on the application of the recently developed surface vorticity theory for application to turbomachinery problems has been started.
3. Studies on the cavitation aspects in centrifugal pumps is in progress.
4. Experimental and theoretical investigations of Jet Pump flows are nearing completion.

Assistance to Industry-ICC :

Development of a Bulb Turbine model for BHEL, Bhopal has been completed and arrangements are being made for testing of the same.

QIP/UGC Fellowship Programme :

A candidate has completed his QIP Fellowship Programme as Ph.D. research scholar in the laboratory. His thesis on the investigations of Jet Pump flows is under preparation.

Research Publications :

i) A paper entitled 'Aerodynamic Investigations of a Kort Nozzle Ducted Propeller', has been accepted for presentation at the Seventh Conference on Fluid Machinery scheduled to be held at Budapest, Hungary during Sept. 1983.

ii) A paper entitled, 'Some experiments of cavitation noise measurement in radial flow pumps', has been presented at the Workshop on 'Reactor Noise Analysis' held at Reactor Research Centre, Kalpakkam during February 1983.

iii) 'S' blade profile for fully reversible axial flow machine, J. Inst. Eng. (I), Vol. 63, Jan. 83.

Important Lectures and Seminars :

Shri V. N. Nagaraja, U. N. Expert gave a Seminar on February 3rd and 4th 1983 on 'the World's largest Itaipu Hydro-electric Project'.

Visitors to the Department:

Shri V.N. Nagaraja, UNDP Expert.

Brief Indication and Developmental Programme:

1. Studies on Ducted Propellers
2. Cavitation studies in Hydroturbomachines
3. Studies on Jet Pumps
4. Developmental studies on alternative sources of energy
5. Development of special purpose pumps.

Any other information:

Shri V. Balabaskaran, Lecturer has obtained the Ph.D. Degree of IIT, Madras-36.

INTERNAL COMBUSTION ENGINES LABORATORY

Sponsored Projects:

1. Indo-U.S. (N. S. F.) Project on Combustion of Alcohol and Bio-gas.
2. D. S. T. Project on Utilisation of Hydrogen as Fuel in Diesel Engines.

Assistance to Industry-ICC:

Consultancy work on Agro-Engines for I.S.I. type certification.

Important Lectures and Seminars:

Mr. Pawl Dewe of Welworthy Limited, U. K. delivered a lecture on Microprocessor controlled engine testing systems March 1983.

Brief Indication and Developmental Programme:

Surface ignition of alcohol and other fuels was studied. A 5 H.P. 2200 rpm engine was successfully run with surface ignition combustion chamber and its multi-fuel capability is being tested.

MACHINE ELEMENTS LABORATORY

Sponsored Projects:

Superplastic forming of AL & Ti alloys AR & DB (Co-investigator with Metallurgical Engineering Department).

Research and Development:

1. Development of function-–cognate linkages.
2. Synthesis of cam motion curves.
3. Optimization of planatary gear trains.
4. Optimal designs of spatial crank-rocker mechanisms.
5. (a) *Hollow rolling elements*: Rolling contact fatigue life of hollow rolling elements has been investigated. It has been analytically proved that hollow rolling elements exhibit lower contact stresses than similar solid elements.

(b) *Surface durability studies on Gears* : Surface durability studies on low strength tuff-trided gears were undertaken, S.N. curve has been determined and failure mechanism explained.

Assistance to Industry-ICC :

1. Testing and evaluation of distance pieces for M/s. W. S. Insulators of India Ltd., Bangalore.
2. Modification of blade regulating mechanism for BHEL, Tiruchi.
3. Several Industries applying tufftride treatment received technical advise with respect to various matters pertaining to strength and treatment.
4. Evaluation of performance of Brake liner for M/s. Brake and Clutch Systems Limited, Ambatore.

QIP/UGC Fellowship Programme :

One QIP candidate joined the Department for Ph.D. programme.

New Major Equipment Added :

Three body abrasion test stand.

Research Publications :

Total papers published : 11

Visitors to the Department :

1. Dr. Grellet, Research Manager, HEF, France.
2. Prof. M. R. Raghavan, I.I.Sc., Bangalore.

Brief Indication and Developmental Programme :

1. Development of Mechanism Models.
2. Influence of type of abrasive on the properties : Copper and Iron base friction materials.

Invited Lectures Delivered by Staff :

Dr. A. Ramamohana Rao :	Delivered an invited lecture on the application of recent surface treatment techniques at Malnad Engineering College, Hassan.
Dr. K. Gopinath :	Friction and Wear, Tribology and Maintenance for Engineers by NPC, Madras.
Mr. S. Krishnamurthy :	Gave a lecture on Tufftriding as a Surface Treatment Process.

Fabrication :

Fabricated Hydrogen Generator and Ammonia Cracker Unit.

MECHANICAL HANDLING LABORATORY

Sponsored Projects :

Pneumatic conveyance of Powdered Materials at high concentration is under progress.

Changes made in Curriculum :

1½ years Post Graduate course is being introduced from July, 1983.

Research and Development :

Research is under progress on dense phase conveying, Air assisted conveying system, vibratory conveying and dynamic aspects of cranes.

Assistance to Industry-ICC :

1. Designed Drive system and data pack system for antenna for DEAL Dehradun.
2. Designed Vibratory conveyor, buffer springs, EOT crane and drive for Door closing mechanism studied. Failure analysis for a front end loader—Dalmia Magnesite Corporation.

Research Publications :

Total Papers published : 2

QIP/UGC Fellowship Programme :

One QIP Ph.D. Scholar has joined.

Visitors to the Department :

Prof. H. Oehmen, Hannover University.

Fabrication :

A test stand for Dense Phase conveying is completed and is under trial runs.

PRECISION ENGINEERING AND INSTRUMENTATION LAB

Sponsored Projects :

1. Sintered Bearings—CSIR
2. Gyro Modelling—ARDB
3. Optical Head for T. V. Tracker—ARDB
4. Laser Illuminator for Beam Riding Guidance—ARDB
5. Hydraulic Feed and Positioning Servodrives—Indo-German

Research and Development:

1. Optimization problem in micro-hydraulics
2. Electrohydraulic servo system for engine Gimbol control.
3. Experimental studies on partially oil filled sintered bearings.
4. Dynamic load study on gear drives.
5. Manufacturing error effect on the performance of oil-pump used in agricultural machinery.
6. Noises in precision gears.
7. Closed circuit T. V. lens system design incorporating focal length change facility, remote selection of filter and aperture control.
8. Roundness error of precision shafts.
9. Identification of a rotor on magnetic bearings.
10. High acceleration motor for antenna control.
11. Modelling and simulation of turbine governing system.
12. Pole assignment in muitivariable systems.

QIP/UGC Fellowship Programme :

One QIP Ph.D. candidate has joined.

Important Lectures and Seminars :

Lecture on "Current trends in Precision Engineering" by Dr. Ing. K. Schlottman.

Visitors to the Department :

Prof. K. Schlottman, Fach Hochschule, Hamburg, West Germany.

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.

Invited Lectures delivered by the Staff :

Mr. M. Singaperumal delivered a lecture on "Design of Low Cost Automation Systems" at the Winter School conducted at Madras Institute of Technology during December, 1982.

Any other Information :

The transfer of Technical Optics section to Engineering Design Centre has been completed.

PRODUCTION ENGINEERING AND MACHINE TOOL SECTION

Short-term/Part-time Course Conducted :

QIP Short-term course on 'Research Approaches in the Area of Production Engineering'.

Sponsored Project :

Proposal sent to BARC, Bombay, ISRO Trivandrum, BHEL, Hyderabad.

Research and Development :

Ph.D.—8 M.Tech.—8

Assistance to Industry-ICC :

ICC works to Vibromech, Kerry Jost, BHEL Hyderabad and ISRO Trivandrum

QIP/UGC Fellowship Programme :

Ph.D.—3 and M.Tech.—3 have joined.

Research Publications :

Total Papers published : 20

Important Lectures and Seminars :

Staff attended All India Machine Tool Design and Research Conference, Durgapur.

Staff attended CAD/CAM seminar at Madras.

Staff attended a conference in Singapore.

Visitors to the Department :

1. Prof. S. M. Pandit, Professor, Michigan Technological Univ., Houghton, Michigan, U. S. A.
2. Mr. R. R. Mangalvedhe, Deputy Manager (Machine Division), MICO, Bangalore.

Brief Indication and Developmental Programme :

Research and Development work on surface characterisation, Surface Integrity, Unconventional Machining, Group Technology, Gear Tribology, etc.

Invited Lectures delivered by the Staff :

1. College of Engineering, Guindy
2. A. T. I., Guindy
3. MPC, Madras
4. ISRO, Trivandrum
5. Regional Engineering College, Warangal.

Patents :

Total number of Patents—3

Educational Programme/Continuing Education Programme:

HAL Management Trainee Programme.

Any other Information :

Further research work is contemplated in areas of Metal Cutting, Abrasive Machining, Unconventional Machining, Gear Tribology, Surface Topography and Integrity studies.

A new laboratory on 'Automation in Manufacture' is being set up with the financial assistance of M/s. Sundaram Clayton Ltd., Madras.

THERMAL TURBOMACHINES LABORATORY

Sponsored Projects :

1. DST Project on Advanced Research in Centrifugal Turbomachinery in progress.
2. CSIR Project on Effect of Skewed entry boundary layers on secondary flows and losses in turbine cascades.
3. CSIR Project on three dimensional flows through annular turbine cascade.

Research and Development :

Thermal Turbomachines Laboratory is coordinating with the Regional Engineering College, Trichy in establishing the turbomachines laboratory at REC, Trichy on the Institute Network Scheme of the Ministry of Education, New Delhi. The scheme has been sanctioned in February 1983 for a period of two years.

Assistance to Industry-ICC :

1. Design, fabrication and supply of FRP moulded blades for BHEL, R and D Hyderabad.
2. Design and testing of LP exhaust hood for steam turbines for BHEL, R and D Hyderabad.
3. Design, fabrication and calibration of 3-hole wedge for Jyoti Limited, Baroda.
4. Calibration characteristics of Orifice Meters for ELGI Equipments, Coimbatore.

New Major Equipment Added:

Spare parts for the DISA hot wire Anemometer and L. C. Smiths traversing mechanism ordered.

Research Publications:

a) 4 papers were presented at the 11th National Conference on FM and FP held in December 82 at BHEL, R and D, Hyderabad.

b) 2 papers have been accepted for presentation at 6th International Symposium of Air Breathing Engines to be held in Paris in June 83.

c) One paper has been accepted for presentation in the 8th Australian Conference to be held in December 83 in Sidney.

Important Lectures and Seminars:

Special lectures on research work relatad to turbomachines were delivered by Dr. Ing. R. Pitt of Aachen Tech. University, Germany, Prof. J. W. Railly of University of Birmingham, England and Dr. S. L. Dixon of University of Liverpool during December 82 when they visited the laboratory.

Visitors to the Department:

a) Dr. Ing. R. Pitt, Aachen Tech. University, Germany

b) Prof. J. W. Railly, University of Birmingham, England

c) Dr. S. L. Dixon, University of Liverpool.

Additional Space/Laboratory etc. provided:

New extension of turbomachines laboratory has been occupied and erection of test rig has been taken up.

THERMODYNAMICS AND COMBUSTION ENGINEERING LAB.

Short-term Course:

The faculty of the section participated in a short term course conducted for NPC fuel efficiency engineers in their training Institute.

Sponsored Projects:

i) ARDB Project: Combustion Phenomena in a Solid Propellant Rocket Ramjet.

ii) Indo-Australian Project: Design and Development of Two-stage intermittent NH_3—H_2O refrigeration system.

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 Flames, Spray Combustion, Combustion in Swirling flows, Solar Energy.

Assistance to Industry-ICC:

Calibration of thermocouples, testing of fuels, domestic stoves.

New Major Equipment Added:

Magnetic flowmeter, 2 stage reciprocating air compressor, DISA hot wire anemometer.

Research Publications:

Total number of Publications: above 40

Brief Indication and Developmental Programme :

Areas of concentration : Solar Energy, Combustion

Invited Lectures delivered by the Staff :

i) At the NPC Workshop on Second Law Analysis — R. Natarajan; K. S. Padiyar, U. S. P. Shet

ii) At the CESSTID Seminar on Energy Conservation :— R. Natarajan

iii) At the ISTE Workshop in CIT, Coimbatore :— A. Venkatesh

REFRIGERATION AND AIRCONDITIONING LAB.

Sponsored Projects :

The following Indo-German Projects have been approved :

i) Utilisation of Solar Energy for preservation of food products (continuation project) Co-ordinator : Dr. M. V. KRISHNA MURTHY.

ii) Development of Solar Boosted Heat Pump System for drying forest and agricultural produce. Co-ordinator : Dr. S. SRINIVASA MURTHY.

Changes made in Curriculum :

New curticula have been framed for the 3 Semester M.Tech. Programme commencing from July 1983.

Research and Development :

Several R and D Programmes have been completed under the following on-going sponsored research projects.

i) Solar Boosted Heat Pump Systems.

ii) Development of Optimal Solar Refrigeration and Airconditioning System.

iii) Studies on Thermal Problems in Ground based Navigational Equipment.

Assistance to Industry-ICC :

Consultancy services were provided to the following concerns :

i) Best and Crompton

ii) Southern Power Systems

QIP/UGC Fellowship Programme :

One QIP scholar has joined for Ph.D. Programme.

New major Equipment Added :

The Humboldt Foundation has gifted equipment worth approximately DM 90,000. These include:

i) Microprocessor based digital μv meters.

ii) Flow measuring and calibration equipment.

iii) Flow, temperature and pressure measuring devices.

iv) Augmentation of existing data acquisition system.

Research Publications :

i) K. Srinivasan, H. N. Mahabala and M. V. Krishnamurthy : "Computer Applications in Energy Management Instrumentation 82"-Institution of Energy Management Conference held at Madras, April (1982)

ii) M. V. C. Sastri and M. V. Krishna Murthy: "Hydrogen Pathways for Massive Solar Energy Utilisation"—Proceedings of World Hydrogen Energy Conference, Pasadena, U. S. A., 1982.

iii) B. Swamy, V. Seshagiri Rao and M. V. Krishna Murthy: "Effect of Secondary flow on Heat Transfer in Solar Collector Tubes"— Seventh International Heat Transfer Conference, Munich, September 1982.

iv) M. V. Krishna Murthy and S. Srinivasa Murthy: "Refrigeration and Airconditioning through Solar Energy"—Thermal Solar Energy for Developing Countries, International Centre for Heat and Mass Transfer, Dubrovnik, Yugoslavia, September, 1982.

Visitors:

Dr. J. C. V. Chinnappa of James Cook University, Townsville, Australia, visited the Laboratory under the Indo-Australian Project and delivered a lecture on 'Solar Refrigeration Research at James Cook University'.

Brief Indication of Developmental Programme:

i) A Solar Assisted Vapour Jet Refrigeration System

ii) Cascaded Heat Pump System

Invited Lectures delivered by the Staff:

i) Professor M. V. Krishna Murthy delivered a lecture on Refrigeration and Airconditioning through Solar Energy at UNESCO Sponsored International Summer School on Solar Thermal Energy for Developing Countries held in Dubrovnik, Yogoslavia in August, 1982.

ii) Dr. K. Srinivasan delivered invited lectures on Second Law Analysis of Refrigeration Processes at National Productivity Council in March, 1982.

Fabrication:

Heat pump for drying agricultural produce has been fabricated.

Any other Information:

Dr. M. V. Krishna Murthy attended International Heat Transfer Conference held at Munich in September, 1982.

METALLURGICAL ENGINEERING

Research and Development Activities:

Number of research papers and published in journals	29
In press	4
Number of students awarded Ph.D. at the convocation held in Sept. 82	4
Number of students who have completed all their requirements for the award of Ph.D.	7
Number of research students registered for Ph.D.	12
Registered for M. S.	2
Number of QIP scholars registered for Ph.D.	3

Assistance to Industry:

Department offered, as in previous years, consultancy on several industrial problems.

Sponsored Projects :

1) Welding of dissimilar metals and alloys used in nuclear industry—DAE project completed.
2) High temperature corrosion of Nimonic alloys—Defence project.
3) Development of Melting, Fabrication and Surface Protection Technology for magnesium alloys—ARDB Project.
4) Superplastic forming of Aluminium and Titanium alloys—Defence project
5) Evaluation of solar absorption panels—ICIC project.

Inter-Institutional collaboration Projects:

— completed a project in collaboration with Reactor Research Centre (RRC) on 'Warm Rolling of AISI 316 type stainless steel'.

— on-going projects : 1) Sigmatization and sensitization in AISI 316 grade stainless steel.
2) The effect of cold working and welding after cold working on stress corrosion cracking on AISI 316 grade stainless steel in collaboration with RRC.
3) Workability of ESR grade metals in collaboration with NAL and other projects with Sundaram Fasteners, Lucas TVS, Standard Motors Products of India.

Awards :

Dr. S. Balasubramanian, SSO along with Dr. S. Prasannakumar (until recently an Assistant Professor) were awarded the Advani-Oerlikan Research Award for 1982 for the best paper of the National Welding Seminar held at Cochin in December 1982.

Course/Seminar Conducted :

1) Prof H.W. Wagener of University of Cassel, West Germany gave a series of special lectures on Metal Forming Machine Tools from 22-2-83 to 28-3-83.
2) Under the auspices of the IIT Madras Chapter of the Indian Institute of Metals a Seminar on Casting and Forging of Non-ferrous Metals and Alloys was conducted on 31-10-82 and 1-11-82 with Prof. K. A. Padmanabhan, Professor and Head of the Department of Metallurgical Engg. as Coordinator.
3) One day clinic on Industrial Metallurgy—Problems—Diagnosis and Solutions on 24th May 1982 was offered with the Industrial Metallurgy Division of Indian Institute of Metals.
4) One day clinic on Non-destructive Inspection was held on 9th August 82 with Industrial Metallurgy Division of IIM.
5) Seminar on welding in the Eighties', organised by Dr. D. R. G. Achar on 4 and 5 March 83 was sponsored by Indian Institute of Welding, Madras branch and IIT Madras.
6) Dr. D.R.G. Achar was the course director for the special course on Welding and Cladding of dissimilar materials held under the auspecies of the Indian Institute of Welding, Madras Branch on 22nd and 23rd April 1982.

Invited Lectures delivered by Staff :

Lecture Topic and Organisation	*Name of the Staff*
1) Key note paper on 'Superplasticity — Its origins and applications' at International Conference on Metal Sciences'83 called 'Deformation—all aspects'. Also presented 2 contributed papers at this meet	Prof. K. A. Padmanabhan
2) Delivered key note lecture on 'Trends in Sheet Metal Technology' at the National conference on Deep Drawing Steels held at Ranchi in April 82	Prof. K. A. Padmanabhan
3) Delivered a key note lecture on 'Multi Disciplinary approach to superplastic forming' at a National Seminar on Advances in Materials Processing Technology organised by the Hyderabad chapter of IIM in July 82	Prof. K. A. Padmanabhan
4) a. Underwater welding and cutting b. Bimetallic welding of dissimilar materials—Naval Chemical and Metallurgical Lab, Bombay	Dr. D.R.G. Achar
5) a. Gas shielded arc processes b. Welding of cladded parts — Indian Institute of Welding Madras Branch	Dr. D.R.G. Achar
6) Weldability and Welding Metallurgy of Ferrous materials — College of Engineering, AUT Madras	Dr. D.R.G. Achar
7) a. Welding of microalloyed steels b. Dissimilar metals and alloys welding — Welding Research Institute, Trichy	Dr. D.R.G. Achar
8) Weldability of Maraging steels, VSSC, Trivandrum	Dr. D.R.G. Achar
9) a. Mechanical Properties of Aluminium welded joints b. Welding of Aluminium and other metals, Indian Institute of Welding Bangalore Branch	Dr. D.R.G. Achar
10) Recent Developments in Welding Technology and Welding R and D at IIT Madras, D and H Sheraton Electrodes, Indore	Dr. D.R.G. Achar
11) Corrosion failure analysis, College of Engineering, AU Madras	Sri S. Ramakrishna Iyer
12 Hydrostatic Extrusion and Comburation extrusion, College of Engineering, AUT Madras	Dr. P. Venugopal

In addition to the above special lectures, lectures on various topics were delivered by the faculty members to the students of

i) PG course offered by National Productivity Council

ii) HAL Process Planners course

iii) HAL-BEML Management courses.

Other Staff matters/Information :

1) Prof E. G. Ramachandran joined the department after two years in USA as Visiting Professor at San Jose State University, California.

2) Prof. R. Vasudevan has gone to West Germany on leave.

3) Prof. K. Srinivasa Raghavan now holds a joint Professorship with the Department of Physics.

4) Prof. H.Md. Roshan has joined the Tamil Nadu Alloy Foundry Co. Ltd, Hosur as Chief Executive on leave from the Institute.

5) Dr. O. Prabhakar returned to the department after two years in USA with the NASA, Langley Research Centre, Hamden.

6) Following have joined the department. Drs. S. K. Seshadri, D.G R. Sharma, K. Prasad Rao, S. Balasubramanian and J. Mukhopadyaya.

7) Dr. S. Prasannakumar has resigned.

8) Prof. K. A. Padmanabhan, Head of the Department was appointed Organising Chairman of GATE (Graduate Aptitude Test for Engineering) in the year of inception 1982.

9) Prof. K. A. Padmanabhan was elected Chairman, IIT Madras Chapter of the Indian Institute of Metals for the period March 83 to Feb. 84.

10) Dr. O. Prabhakar was elected as Governing Council Member for the Annual Session of the Indian Institute of Non-Destructive Inspection Engineering for the year 1983.

Lectures Delivered by Distinguished Visitors :

1) Dr. H. P. Stuewe, Director, ERICH Schmid Institut fur Festkorpen Physik, Leoben, Austria on Plastic work in Fatigue Fracture.

2) Professor K. Beddow on Powder Metallurgy.

3) Dr. G. C. Kaushal, University of Roorkee. On thermodynamics of dilute solution of Sulphur in Molten alloy systems.

4) Mr. K. L. Rajpal, Indian Lead Zinc Information Centre, New Delhi on Computer aided die casting and die design.

5) Prof. S. Ranganathan, Indian Institute of Science on
   a) Crystallisation of metallic glasses
   b) Spinodal decomposition.

6) Dr. R. Ramanathan, Cornell University, USA on Phase diagram studies on Ni—S system.

7) Sri P. Muthuswamy, Madras Refineries Ltd., on Application of NDT in Process Industries.

8) Dr. Ramanathan, Tube Products of India Ltd., on Fatigue Failure.

PHYSICS

New Projects :

In addition to the various on-going projects, the following projects have been approved/granted by DST/DOE/DAE and other organisations.

a. Development of a model underwater laser imaging system (DOE)

b. Investigations on Ternary Semiconductors for possible application as photo voltaic devices (DST)

c. Development of discontinuous thin films strain gauge and characterisation of electromechanical behaviour of thin films strain gauge metals Au, Cu, Ni-Cu/SiO_2, Al_2O_3 in strain gauge configuration (DAE)

d. Investigations on the semiconducting properties of ternary chalcopyrites for device applications (Indo-German Project)

e. Study of cluster eftects In EuS-SrS spin glasses by relaxation measurements especially at high frequencies (Indo-German Project).

Seminars/Symposium/Schools :

a. Short term course on 'Millimeter wave generation, propagation and application—1st June-14th June '1982.

b. Short term course on Teching aids in Physics Education in Engineering Colleges—2nd June-15th June 1982.

Lectures/Seminars by distinguished visitors :

1. Prof. J. A. Cowen of Michigan University, USA, gave lectures on Superionic conductors and conducting spin glasses.
2. Dr. M. W. Shafler, IBM, USA, gave lectures to the Research Scholars.
3. Dr. T. S. Subramanian of the Radiation Oncology Centre, USA, gave lectures on charged particle spectra.
4. Prof. E. R. Dobbs of University of London, Dr. G. A. Smolensky, Head of the Laboratory for Magnetism and Ferroelectricity, USSR and Dr. Y. I. Koptov, of USSR Academy Sciences visited the Dept. under the auspices of INSA.
5. Dr. D. J. Thompson, of Daresbury Laboratory, U. K., gave lectures in Synchrotron Radiation.
6. Dr. Alfredo Luccio of Brookhaven National Laboratory, USA, visited this department and gave lectures.
7. Prof. J. B. Goodenough, University of Oxford, visited the Dept. and gave lectures on "Superionic conductors"
8. M. Tech. course on Solid State Technology was started from July 1982.
9. Total number of research papers ...
10. Number of candidates who received the Ph. D. degree in Physics ... 8
11. Number of candidates who received the M. Sc. Degree in Physics ... 13
12. Number of students joined for M. Sc. course this year. ... 13
13. Number of research scholars joined for Ph. D. under various programmes ... 10
14. Number of candidates who submitted Ph. D. thesis/synopsis during this year. ... 7

OTHER REPORTS

Quality Improvement Programme

Indo-German Programme

Central Library

Central Workshop

Centre for Rural Development

Institute Hospital

Placement Office

Weaker Section

Institute Gymkhana

N. C. C.

N. S. S.

Hostel Management

Central Supplies Unit

Construction of Buildings

QUALITY IMPROVEMENT PROGRAMME

Serving Teachers Programme	*M.Tech.*	*Ph.D.*
No. admitted during 1982-83	9	17
No. on rolls in each of these courses	21	51
Short term courses conducted 1982-83		5

INDO-GERMAN PROGRAMME

Number of Staff Members permitted to proceed to the Federal Republic of Germany

Faculty :

Short Term	11
Long Term	7

Technical Staff :

Short Term	1
Long Term	3

CENTRAL LIBRARY

Following are the significant activities of the different divisions of the Central Library during the period April 1982 to March 1983.

Administration, Reprography and Bindery (ARB) Division :

With a view to make the readers enclosure in stack-one more comfortable to stay and study it has been airconditioned and provided with specially designed tables affording privacy. It is proposed to extend similar facility to the other two stacks also.

Prof. Dr. N. V. C. Swamy has taken over as Chairman of the newly constituted Library Advisory Committee.

The following staff members have been deputed for undergoing further studies :

1. Mrs. Rekha Asthana—B L. I. S. Course at the University of Madras.
2. Mrs. P. Sundaramma—C. L. I. S. " "

The following staff members have attended seminars/workshop mentioned against their names :

I	i) Mr. C. Deenadayalu —Dy. Librarian ii) Mr. P. Venkatesan —Asst. Librarian iii) Mrs. J. Durairaj —Asst. Librarian	}	Seminar on Management of Libraries and Information services at IIM, Bangalore during May 1982.
II	i) Mr. V. S. Nazir Ahmed—Librarian ii) Mr. P. N. Swamy —Sr. Tech. Asst. (Repro)	}	Seminar on management and use of micrographic and Reprographic and Office equipment at Bangalore during June 1982.
III	i) Mr. C. R. Sekar —Tech. Asst. ii) Mrs. Zahida Basha —Library Asst.	}	10th IASLIC seminar at Kanpur during December 1982.
IV	i) Mr. M. Murugan —Sr. Tech. Asst. ii) Mr. G. Annadurai — -do-	}	DRTC annual seminar at Bangalore during February 1983.

The Librarian attended a 3 week International seminar on use of computers in Libraries and Information Centres at Budapest under the auspices of UNESCO during September/October 1982.

The Reprographic services continued to be made available to all members of the Institute as well as the external members of the Library. The publication 'Wave Atlas' involving enlargement and reduction of drawings was printed at the Reprographic section upon the request of Ocean Engineering Centre.

All the backlog of binding work to the extent of completed volumes of journals has been cleared by judicious distribution of work between the Library Binders and external Binders.

Circulation, Reference and Maintenance (CRM) Division :

The Book Bank (General) and (Weaker section) continued to be actively used by the students particularly of weaker section communities.

Acquisition and Processing (A and P) Division :

Over eight lakhs rupees worth of publications have been taken into stock during the year under review. This includes publications procured for Projects, Book Bank and extra funds procured by some departments.

Periodicals and Serials (P and S) Division :

With the completion of renovation of the Periodical Reading Hall and supply of new display racks and rexine binders all the journals have been put into the binders for ease of handling with their names fixed thereon.

The translation service is also being continued to both the Library's internal as well as external members. The Library has also arranged translation of documents for BDL, Hyderabad.

ANNEXURE

STATISTICS ON OTHER LIBRARY ACTIVITIES

Library Membership

1.	Institute Members (Staff and Students)	...	5,663
2.	Outside Members --Individual	...	80
	Corporate	...	50
3.	Consultation Permit	...	168

Circulation

1.	No. of Readers visited	...	1,78,668
2.	No. of volumes issued	...	1,86,396
3.	No. of Reservation for Books :		
	a) Registered	...	13,752
	b) Fulfilled	...	9,168
4.	Amount of over-due charges and other charges realised	...	Rs. 1,72,753
5.	Inter-Library-Loans :		
	Borrowed for Institute Members	...	105
	Lent out from the Institute Library	...	149

Acquisition

1.	Books	...	4,409
2.	Bound volumes of Periodicals	...	2,024
3.	Pamphlets and Reports	...	399
4.	Microfilms and Microfiche	...	31
5.	Institute Ph.D. Thesis	...	57
6.	Total intake during the year	...	6,920
7.	Total accessions up to 31-3-1982	...	2,02,297

Current Periodicals

1.	By Subscription	...	1,241
2.	By Exchange Gift	...	156
3.	Translations arranged	...	9

Reprographic Services

1.	Microfilms made	...	1,095
2.	Photocopies made	...	335
3.	Korestat copies made	...	2,707
4.	Gevafax copies made	...	1,79,995
5.	Gestafax	...	701 stencils
6.	Rotamasters prepared and printed	...	1,673
7.	Lith films	...	442
8.	Plates	...	390

Binding :

1.	No. of Books and Journals bound from the Library	...	856
2.	No. of Publications (Reports, Lecture notes etc.) to Departments bound	...	703
3.	No. of Back volumes of Journals and Books bound through external binders	...	3,400

CENTRAL WORKSHOP

Central Workshop manufactured/fabricated number of components and assembly required for B. Tech., M. Tech. and Ph. D. projects.

Some of the special work undertaken during the period 1982-83 are as follows :

1. Bio-gas plant — Design and fabrication of the plant.
2. Wind mill assembly — Fabrication, Machining and Assembly for Energy Research Centre.
3. Gear cutting — for SHAR Centre, Sriharikota.

No. of work orders completed during the period 1982-83 : 1038.

CENTRE FOR RURAL DEVELOPMENT

The primary objective is employment generation among the four villages that surround the area. The kind of employment will be such that it will generate substantial resources to pay higher emoluments to the workers. In order to ensure external financial discipline, the resources required are raised from Bank loans. The total loan taken is around Rs. 40 lakhs (Forty lakhs) and I. I. T. provides a budget of about Rs. five lakhs per year. The resources provided by I. I. T. are to be used for research activities which will generate technological products to ensure high produtivity. The projects undertaken from bank loan funds and the Research Activities being pursued from the resources provided by I. I. T. are indicated below:

CRD Research Objectives :

a) Scrubbing of biogas to achieve higher temperature
b) Study growth conditions of water hyacinth
c) Evolve decentralised energy systems
d) Use locally available clayey soil to make quality bricks
e) Design ecologically balanced waste treatment
f) Study feasibility of starting small scale industries, based on biogas utilisation
g) Utilisation of low cost construction materials
h) Assessing socio-economic benefits of Technology Transfer

CRD Projects :

a) Paper Recycling
b) Brick Manufacture
c) Milling Paddy
d) Dairy Farm
e) Fish Culture
f) Bakery
g) Printing Press
h) Electronics Aids
i) Carpentry and Welding

Educational Programme :

In conjunction with the Rural Development Programme which has the primary objective of employment generation, the overall plan also envisages skill oriented educational programmes for village people. These classes are being conducted by I. I. T. students in their spare time. The B.Tech. students of I. I. T. are also involved in the overall work and they have been assisting by undertaking projects like Solar distiliation, Solar pond, Brick making from saline soil, scrubbing of biogas.

Training in Crafts :

A scheme has been drawn up for training village level workers in different utility crafts and provide them practical floor experience in operation of different kinds of machinery. Emphasis will be laid on small scale, replicable, low investment Industries which can be fully functional on alternative, decentralised energy systems. In the initial stages, it is proposed to offer training in the following areas to about 60 (sixty) trainees with each being paid a stipend of Rs. 150/- per month for a maximum period of two years.

a) Biogas applications for Rural Areas

b) Carpentry

c) Smithy and Allied Operations

d) Screen Printing & Poster Printing

e) Welding and Brazing

f) Electrical & Electronic applications

g) Other chosen crafts

The trainees will be picked up from Rural Areas and will hopefully be able to start small scale industries on their own after the training period.

INSTITUTE HOSPITAL

The Institute Hospital is a 30 bedded hospital rendering medical aid to a population of nearly 10,000—on an average of 300 patients are daily treated in the Out-Patient Department. The Hospital offers Out-Patient and In-Patient services for Medical, Surgical, Obstetrics, Gynaecological, Paediatric, ENT and Psychiatric treatment.

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

Dr. T. Ramadass, B.Sc., M.S., F.I.C.S. (USA), D.L.O. is the part-time ENT Surgeon/Consultant.

Dr. S. Rajkumar, M.D. (Psych.) is the Hony. Consultant Psychiatrist (part-time).

Dr. S. Devaji Rao, M.S., MNAMS is the Consultant Surgeon (part-time).

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

1. Dr. N. A. Jayavalan, M.B.B.S. — 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. Radha Rajagopalan, M.B.B S., A.B., PED (USA) — Paediatrician
5. Dr. M. Rajkumar, M.B.B.S. — Medical Officer

One Medical Officer is posted for 'call-duty' and is available for all the 24 hours of a day to attend to emergency cases in the Hospital.

Lay Secretary is attending to the administration work of the Hospital along with "medical reimbursement" of the staff members.

A new Electro-Cardiograph (ECG) Machine has been purchased as a stand by unit to the old machine to attend to emergency cases.

Ambulance service is available round the clock for any emergency.

In the year 1982—from January to December, 36 children were vaccinated against measles and 643 doses (comprising of 4 doses to each child getting primary doses) were given against polio. 535 doses of Triple antigen (against Diphtheria, Pertussis and Tetanus) as 3 primary doses a month apart and a single booster dose at appropriate intervals.

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

Statistics :

I	Total number of Out-Patients	—	1,28,228
II	Total number of In-Patients	—	901
III	Emergencies attended	—	7,920
IV	Dressing	—	22,320
V	Injections	—	33,120
VI	**Operations :**		
	(a) Major	—	107
	(b) Minor	—	5,040
	(c) E. N. T.	—	45
	(d) Gynaec.	—	16
VII	**Pathology :**		
	(a) Urine	—	2,467
	(b) Motion	—	1,254
	(c) Blood	—	2,896
VIII	**Bio-Chemistry :**		
	Blood Sugar	—	253
	Urea	—	25
IX	**Delivery :**	—	42

PLACEMENT OFFICE

The Placement Office, designated with the responsibility to Procure Placements and arrange in-plant training in various industrial establishments for students of this Institute, was very active during the academic year 1981-82. Towards this end, this office maintained a very close interaction with industrial establishments in private as well as public sectors. It liaisoned with as many as over 150 companies during the year. As a result, over 90 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 293 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 different 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.
3. The Placement Office was modernised with comfortable rooms for holding interviews and group discussions. A Seminar Hall where the companies can give pre-placement talks and hold examinations has also been sanctioned. The Placement Office has procured a word Processing System to store information about all the companies interacting with the IIT for placement purposes and the placement positions of each of the student. The office has also been sanctioned audio visual equipment for the benefit of visiting executives.

From the feedback that we get from the companies, it is clear that the improved facilities have been greatly welcomed by the students and the industries. This is evident from the fact that one of the companies has come forward to partly under-write the finances for augmenting these facilities.

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

WEAKER SECTION STUDENTS AND FOREIGN STUDENTS

Weaker Section Students :

Currently there about 87 Scheduled Caste students and about 15 Scheduled Tribe students in the Institute. During 1982-83, 13 SC/ST students joined the Institute, 6 in the B. Tech. programme and 7 in the M. Tech. programme. As in the past, a faculty member was named as the Adviser, Weaker Section and Foreign Students for providing guidance for the SC/ST students.

The Book Bank, specially set up for the weaker section students, continued to expand with the addition of about 336 books during the year. Drawing instruments and mini-drafters were loaned as usual to the I year students. About 46 SC/ST students are expected to take B. Tech. degree and 6 M. Tech. degree in May-June 1983 and special efforts were made to find placement for them. A number of public sector firms were approached with a request to visit the campus and recruit SC/ST students against the reserved quota. The response has been encouraging and a number of students have already been placed. Some public sector companies have also offered scholarships for the B. Tech. students from second year onwards.

For the third successive year, the Institute invited about 125 eleventh standard school students from the weaker sections to visit IIT on 6th and 7th January 1983. These students were chosen on the basis of their school performance in Mathematics, Physics and Chemistry. The Institute met their travel expenses and provided free boarding and lodging. They were taken round the Institute and were also given full details of the Joint Entrance Examination. It is heartening to note that a large number of these students are appearing in the J. E. E. in May 1983.

About 170 Students belonging to SC/ST category from Andhra Pradesh, Karnataka, Kerala, Pondicherry and Tamil Nadu are selected for Contact-cum- Correspondence Programme for J. E. E. 1984 at an estimated cost of Rs. 2.5 lakhs. The programme includes correspondence classes and three contact classes, each of about one week duration, to be held in June 1983, December 1983 and in April 1984. Immediately after the last contact classes, they will be writing JEE 1984 staying in IIT, Madras. For the entire contact programme, travelling, lodging and boarding expenses will be met by the Institute. A nominal course fee of Rs. 75/- alone will be collected from the participating students for the entire coaching programme. With this it is hoped that the Institute will find sufficient number of successful candidates to fill all the reserved quota of seats for SC/ST.

Foreign Students :

There are at present about 31 foreign students in the Institute from countries like Sri Lanka, Malaysia, Fiji, Iran, Jordan and Nepal. Three of them joined the Institute during 1982-83. The Adviser, Weaker Section also acts as Adviser for Foreign students. At the request of the students from Sri Lanka, special efforts were made to find jobs for them in their country.

Special coaching programmes are also organised for the benefit of the foreign students who are found weak in particular subjects.

INSTITUTE GYMKHANA

Sports :

The glorious achievement of this year's Sports activities was our regaining the General Championship in the Inter IIT Meet held at Bombay and thus established our supremacy once again in Sports and Games.

IIT Madras Contingent won the Gold Medal in Athletics, Cricket, Volleyball, Table Tennis and Aquatics and the Silver in Football, Hockey, Kabaddi and Gymnastics and the Bronze in Tennis, Badminton, Basketball and Weight Lifting.

The Basketball team won the Championship trophy in the Inter Collegiate Basketball tournament conducted by the T Nagar Basketball Club, Madras and was the Runner-up in the Madras Veterinary College Basketball tournament.

The Football team was the winner in our Institute's Sportfest '82 Inter-Collegiate Football tournament.

The chess team secured the THIRD place in the All India Inter University Chess tournament conducted by the Mangalore University where 54 Universities had the pleasure of participation.

Shri Praveen Bhatia of 1st year B.Tech. had the privilege of representing the Tamilnadu for the National Junior Chess Championship held at Delhi.

The Hockey team secured the Runner-up trophy in our Sportfest '82.

The Volleyball team won the Runner-up trophy in our Institute's Sportfest and also in the Sportfest conducted by the Stanley Medical College.

The Shuttle Badminton team participated in the Inter University Badminton tournament conducted by the Calicut University.

The Bridge team was placed FIRST in the progressive Duplicate Pairs event in the Tamil Nadu State Championship held at Coimbatore.

This year's All India Gerhard Fischer Basketball Floodlit tournament for boys and Kokila Rajaiah Basketball tournament for Girls had attracted record number of entries and the tournament was organised and conducted by our students like professional organisers. These tourneys have become routine healthy recreation for our campus people and inspiring agency for our students to embrace sports and games. It attracted crowds of over 5000 everyday.

All efforts are being taken to host the 20th Inter IIT Meet at Madras in December 1983.

Cultural Activities:

Extra-curricular activities of the Institute Gymkhana play an important role in the area of human relations among the student community in the campus.

The Annual Cultural Festival Week—Mardi Gras '83 was conducted in a bigger scale this year. 20 outstation teams and 21 teams from local colleges took part in various Cultural activities. Many visitors to the Institute were impressed by the high standard of participating colleges in the Mardi Gras '83. The Main attraction of this year's Mardi Gras '83 were the professional shows of Shri Ananda Shankar giving performance on oriental dance and music and Pandit Ravishankar's traditional Sitar Concert accompanied by Shri Zahir Hussain on the tabala which was enjoyed very well by the audience.

IIT teams participated in various cultural festivals conducted in Madras as well as in other parts of the country. Some of the noteworthy events are listed below:

* The IIT team won the overall trophy of the Mood Indigo—Cultural Festival at IIT Bombay
* The team won the overall 2nd place at the Cultural Festival conducted by St. Xavier's College, Calcutta.
* The team got the overall 3rd place at the Cultural Festival Rendervouz at IIT Delhi. We got prizes for the best Magazine. Best Skits, Best Light Music.
* The Cultural Team got the 1st place in Debate conducted by the Bharathiya Vidya Bhavan, Madras.

* The Cultural team has participated in 15 debates in the City Colleges and obtained 8 first places and 4 second places.
* In the Inter Collegiate Competitions in Skits, the Indian Cultural Team got the 2nd place.
* The Cultural team participated in 7 Quiz contests and won Ist places in 4 contests.

Art Workshop: An art workshop for the benefit of the students was organised in January. 1983. The following artists from Cholamandal Artists Village gave valuable demonstration and instruction.

Sri Gopinath—Painting

Sri Senthipathi—Metal Relief

Sri Gopal and Mr. Raghavan—Batik and

Sri Nandan—Clay Modelling and Sculpture

Extra Curricular Evening Courses: Evening classes in Indian languages viz. Tamil, Kannada, Sanskrit and Hindi were started and enjoyed a great response. These classes have very good attendance especially from among the students. Music classes (Flute, Mridangam, Guitar and Vocal) have also been conducted for our students.

NATIONAL CADET CORPS

4(TN) AIR SQN (TECH) NCC

Enrolment:

NCC Training is spread over three academic years i.e. six semesters. New enrolment is confined to the first year B.Tech. Students. During the academic year of 1982-83, 89 cadets were enrolled. The total strength of the cadets in the Air Wing was 139.

Training:

a) keeping the aims of the NCC in-view, training was imparted to the I, II and III year cadets in accordance with the prescribed syllabus. Basic and advance Military training was also given to the cadets in all the three years of training. The specialised technical training to the cadets covered the two technical branches of the Air Force viz. Mechanical and Electronics. The training was imparted to cadets by qualified Air Force instructors as well as NCC part time officers who are well qualified in their subjects.

b) Glider training could not be given to the cadets during the year, as the gliders at Tambaram were either unserviceable or otherwise engaged on priority basis.

c) i) 7 cadets participated in a Cycle expedition from Unit to POONDI Red Hills and back in Sept. '82 and

ii) 2 cadets participated in a Cycle expedition from Madras to Mysore and back accompanied by cadets of other Units in Dec. '82.

Camps and Special Courses:

i) Four cadets attended the AF Attachment Camp at Chandigarh during June-July 82.

ii) Eight cadets attended the All India Vayu Sainik Camp at Doddaballapur during June 82.

iii) One cadet attended the Basic Leadership course at Bhowali (U.P.) during May-June 82.

Ceremonial Parade:

Cadets took part in the Republic Day parade held at Marina on 26 Jan 83.

Certificate Examination :

13 Cadets appeard for 'B' certificate and seven cadets appeared for 'C' certificates examination in March 82 and all passed out creditably. This year 14 cadets appeared for 'B' and 5 cadets appeared for 'C' certificate Examns.

Blood Donation :

Cadets of this unit could not donate blood on the dates specified by Red Cross Society for Blood donation, since they were inoculated against Cholera and subsequent due to semester examinations.

Promise Day Parade :

Prof. P.V. Indiresan administered the NCC Promise on Promise Day Parade held on 15th Aug. 83. Senior cadets of the unit put up a continutity drill in addition to flight demonstration and static display of aeromodels. The Director also distributed certificates to the successful cadets.

Guard of Honour :

A Guard of Honour was given by the cadets of the unit on 4—9—82 on the occasion of the 19th Convocation of the IIT, to the Chief Guest, Dr. Y. Nayudamma, Vice-Chancellor of Jawaharlal Nehru University.

NATIONAL SERVICE SCHEME

The National Service Scheme, Indian Institute of Techonlogy, Madras ran the following programmes for the populace in its adopted villages.

1. A Children's Educational Camp in which 100 students from Tindivanam, Tirukalikundram, Velacheri and Taramani participated. Prizes and Certificates were distributed by Mrs. Tara Cherian during the Valedictory function.

2. A Special Camp for the students of Taramani School was conducted.

3. The National Service Scheme Tailoring Wing situated in the premises of the Velacheri Welfare Association Buildings conducted classes in Tailoring, Needlework and embroidery for 36 Women belonging to that locality and ceritificates of proficiency were awarded.

4. Old clothes and materials were collected and distributed to the needy in some of the villages specially selected for the purpose.

5. NSS Volunteers participated in teaching of the students in various schools in and around IIT, Madras. Demonstration experiments in Physics and Chemistry were shown to the students and the response was extremely good.

6. The NSS Volunteers participated in tecahing of the students in the Velacheri Tutorial Unit. Prizes were distributed to best students.

7. National Cadet Corps and National Service Scheme combined together and conducted a special saial service camp in Narayanapuram.

8. Various consulates helped the National Service Scheme Volunteers in screening educational films of social relevance in the four adopted villages of Indian Institute of Technology, Madras.

HOSTEL MANAGEMENT

Dr. N. Venkatrayulu, succeeded Prof. B. V. Ramanamurthy as Chairman, Council of Wardens and Hostel Management w.e.f.16-10-82.

Construction of quarters for the Mess Staff is in progress and a block of 12 flats would be ready shortly for allotment to Hostel Staff.

Since the Hostel employees are being provided various kinds of facilities on par with the Institute employees the Central Office of the Hostel Management is being expanded.

The Services of the Central Supplies Unit have been augmented during the year 1983. In addition to supply of milk to the hostels/campus residents, the CSU is now procuring and supplying rice, wheat, oils, dhalls, etc. to the Hostels.

CENTRAL SUPPLIES UNIT

Under the milk supply scheme the unit, procures milk from the nearby villagers and from the Tamil Nadu Co-operative Milk Producers Federation Limited and distributes to the residents of the campus and to the staff of the Institute residing nearby villages. During the year the milk tank which was housed in one of the hostels has been shifted to a separate place away from the hostel. With the co-operation of the TCMPF the Manual Vending Machine was installed, which resulted in the reduction of the milk price to residents. The unit was shifted from Kaveri Hostel Rooms to a spacious locality in Brahmaputra Hostel cellar. The monthly billing of the 900 and odd consumers has been computerised which helped in quick calculation of the milk bills eliminating errors.

With the long term loan of Rs. 5 lakhs sanctioned by the Institute the unit has started procuring and distributing major provision items to all the hostels under provision supply scheme. This has reflected in the slight reduction of the mess bills of the hosteliers.

CONSTRUCTiON OF BUILDINGS

The following are some of the important buildings which are in progress during the course of the year.

List of Works in Progress:

1) Construction of Students Activities Centre.
2) Development of two wells.
3) Construction of Hostel Mess Staff One Block (12 flats).
4) Extension to Kindergarten.
5) First floor over Tribology Block.
6) First floor construction for Materials Science Research Centre, at Humanities and Sciences Block.

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
7. Sri C. S. Ballal

Associate Professor

Dr. G. Subramaniam

Assistant Professors

1. Dr. P. Venkateswarlu
2. ,, R. M. Siddaveere Gowda
3. ,, T. K. Varadan
4. Dr. S. Krishnan
5. ,, E. G. Tulapurkara
6. ,, S. S. Gokhale

Lecturers

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

APPLIED MECHANICS

Professors

1. Dr. N. V. Chandrasekharaswamy
2. ,, B. V. Aswathanarayana Rao
3. ,, R. S. Alwar
4. ,, V. Ramamurti
5. Dr. P. S. Srinivasan
6. ,, R. S. Srinivasan
7. ,, T. M. Srinivasan

Assistant Professors

1. Dr. K Mothiram Patil
2. ,, Megha Singh
3. ,, V. Ramjee
4. ,, S. Venkatesan
5. ,, M. Balakrishnan
6. ,, B. H. Lakshmana Gowda
7. ,, B. Srinivasa Prabhu
8. ,, N. Ganesan
9. ,, P. A. Aswathanarayana
10. ,, S. Narayanan
11. ,, J. Ramachandran
12. ,, S. Radhakrishnan

Scientific Officer Grade-I

Dr. C. R. Subramanian

Lecturers

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

Lecturer Grade-II

Sri G. Thomas

CHEMICAL ENGINEERING

Professors

1. Dr. D. Venkateswarlu
2. ,, T. Gopichand
3. ,, M. Satyanarayana
4. ,, Y. B. G. Varma
5. Dr. M. Ramanujam
6. ,, N. Subramanian
7. ,, C. A. Sastry

Associate Professor

Dr. 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. ,, N. S. Srinivas
8. Dr. S. Subba Rao
9. ,, C. Chandraprasad
10. ,, N. R. Neelakantan
11. ,, R. Vedaraman
12. ,, D. V. Seetharamamurthy
13. ,, T. K. Ramanujam
14. ,, K. R. Sundaresan

Lecturers

1. Dr. V. Sriramachandra Rao
2. Dr. K. Krishnaiah

CHEMISTRY

Professors

1. Dr. J. C. Kuriacose
2. ,, V. Srinivasan
3. ,, G. Aravamudhan
4. ,, C. Narayana Pillai
5. ,, Dr. P. T. Manoharan
6. ,, C. Kalidas
7. ,, S. R. Ramadas
8. ,, V. Ramakrishan

Assistant Professors

1. Dr. T. V. Ramakrishna
2. ,, M. Ramakrishna Udupa
3. ,, J. Rajaram
4. ,, R. Narayan
5. ,, C. S. Swamy
6. ,, V. Mahadeva Iyer
7. ,, K. Narayanan
8. ,, M. S. Gopinathan
9. Dr. M. Srinivasan
10. ,, K. K. Balasubramanian
11. ,, B. Viswanathan
12. ,, V. R. Satyanarayana Rao
13. ,, D. V. Ramana
14. ,, (Kumari) T. S. Chandra
15. ,, R. Ramaswamy
16. ,, C. S. Venkatachalam

Lecturers

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

Lecturer Grade II

1. Sri T. Subrahmaniam

Senior Scientific Officer Grade II

Dr. M. S. Subramanian

CIVIL ENGINEERING

Professors

1. Dr. K. S. Sankaran
2. ,, P. Srinivasa Rao
3. ,, D. Johnson Victor
4. ,, L. N. Ramamurthy
5. ,, H. Raman
6. Dr. T. P. Ganesan
7. ,, C. S. Krishnamurthy
8. ,, R. Radhakrishnan
9. ,, N. Rajagopalan
10. ,, M. K. Ghosh Roy

Associate Professors

1. Dr. Nainan P. Kurian
2. Dr. K. Elango

Assistant Professors

1. Sri R. L. Roy Choudhury
2. Dr. V. Paramasivam
3. ,, P. Sambandam
4. ,, H. Suresh Rao
5. ,, Y. R. Nagaraja
6. ,, P. K. Aravindan
7. ,, H. Acyutha
8. Dr. P. Kalyanasundaram
9. ,, V. Kalyanaraman
10. ,, N. R. Krishnaswamy
11. ,, S. Narasimha Rao
12. ,, V. R. Rangaraju
13. ,, B. S. Thandaveswara

Lecturers

1. Sri K. Gopalakrishna
2. ,, M. S. Mathews
3. Dr. A. Ramakrishna Rao

Senior Scientific Officer Grade I

1. Sri R. Natarajan

Senior Scientific Officer Grade II

1. Sri M. Subbi Reddy
2. ,, R. Ambalavanan
3. ,, A. Ramachandriah
4. Sri K. Ananthanarayanan
5. ,, V. Thamizharasan
6. ,, Sajan Thomas

Visiting Professor

Sri R. Thillainayagam

ELECTRICAL ENGINEERING

Professors

1. Dr. M. Venugopal
2. ,, V. G. K. Murti
3. ,, M. K Achuthan
4. ,, K. P. Rajappan
5. ,, D. K. Banerjee
6. ,, B. Ramaswamy

7. Dr. V. Seshadri
8. ,, A. Kuppurajulu
9. ,, Y. Narayana Rao
10. Dr. J. P. Raina
11. ,, V. V. Sastry
12. ,, 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. ,, V. C. V. Pratapa Reddy
14. Dr. C. Eswaran
15. ,, R. Parthasarathy
16. ,, M. V. Chalapathy Rao
17. ,, V. Venkata Rao
18. ,, R. Parimelazagan
19. ,, K. N. Bhat
20. ,, P. A. Janakiraman
21. ,, B. S. Bhanumurthy
22. ,, Ashok Jhun Jhunwala
23. ,, C. Venkataseshaiah
24. ,, P. Sashidhara Rao
25. ,, S. Yuvarajan

Lecturers

1. Sri Varadarajan Subramanian
2. ,, M. Krishnamurthi
3. ,, P. C. Majhee
4. Sri G. T. Manohar
5. ,, G. Govardhanagiri Rao
6. ,, K. Palaniswamy

Senior Design Engineers

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

Senior Scientific Officer Grade II

Sri S. Gopal

HUMANITIES & SOCIAL SCIENCES

Professors

1. Prof. R. K. Gupta
2. Dr. V. Anantaraman
3. Dr. S. Ramani
4. ,, S. Ambirajan

Associate Professors

1. Dr. A. V. Krishna Rao
2. ,, L. V. L. N. Sarma
3. Dr. Dipak Chaudhuri

Assistant Professors

1. Sri V. S. N. Sarma
2. Dr. E. Unnikrishnan
3. ,, R. Rajagopalan
4. Dr. (Smt.) Shakuntala Balaraman
5. ,, C. Ramachandran

Lecturers

1. Sri V. S. Kumar
2. ,, T. T. Narendran
3. (Smt.) E. N. Kurian
4. Sri M. Durgaprasada Rao
5. Dr. V. Jayasankar
6. Dr. (Kumari) Rita Ghatak
7. Sri Raj Gopal
8. (Kumari) Evangline Manickam
9. Sri. S. Mohan

MATHEMATICS

Professors

1. Dr. S. D. Nigam
2. ,, S. K. Srinivasan
3. ,, L. V. K. V. Sarma
4. ,, K. M. Das
5. Dr. H. S. Paul
6. ,, K. R. Parthasarathy
7. ,, R. Subramaniam

Associate Professor

1. Dr. V. B. Johri

Assistant Professors

1. Dr. V. Subba Rao
2. ,, D. S. Subramanyam
3. ,, Y. Nagendra
4. ,, U. N. Srivastava
5. ,, P. Achuthan
6. ,, P. Bhattacharyya
7. Dr. C. M. Purushotham
8. ,, (Smt.) S. Kalpakam
9. ,, A. Avudainayagam
10. ,, T. S. Sankara
11. ,, Surendranath Majhi
12. ,, P. R. Parthasarathy

Lecturers

1. Dr. C. V. Raghava Rao
2. ,, S. N. Venkatarangam
3. ,, P. V. Subrahmanyam
4. Dr. A. Rangan
5. ,, S. G. Kamath
6. ,, S. H. Kulkarni

Senior Scientific Officer Grade II

1. Dr. K. Swaminathan

MECHANICAL ENGINEERING

Professors

1. Dr. M. C. Gupta
2. ,, H. C. Radhakrishna
3. ,, D. Prithviraj
4. ,, G. V. N. Rayudu
5. ,, M. A. Parameswaran
6. ,, V. M. Krishna Sastry
7. ,, M. V. Krishnamurthy
8. Dr. V. Radhakrishnan
9. ,, R. Natarajan
10. ,, K. Lakshminarayana
11. ,, K. A. Bhaskaran
12. ,, K. V. Gopalakrishnan
13. ,, K. N. Seetharamu

Associate Professors

1. Dr. A. Rammohana Rao
2. Dr. V. Sriramulu

Assistant Professors

1. Dr. T. Rajagopalan
2. ,, P. K. Philip
3. ,, R. Raman
4. ,, M. Ravindran
5. Dr. N. Venkatarayulu
6. ,, V. Ganesan
7. ,, S. Srinivasamurthy
8. ,, P. Srinivasa Rao

9. Dr. M. Madhusudana Rao
10. ,, R. Krishnamurthy
11. ,, M. S. Shanmugam
12. ,, A. Venkatesh
13. ,, Vijay R. Raghavan
14. ,, B. Nagalingam
15. ,, U. S. P. Shet
16. ,, K. Gopinath
17. Dr. K. Srinivasan
18. ,, O. V. Krishnaniah Chetty
19. ,, S. Rajesham
20. ,, K. R. Govinda Mallan
21. ,, K. Narayanaswamy
22. ,, K. V. Chalapathi Rao
23. ,, T. Nagarajan
24. ,, K. N. Gopalan

Lecturers

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

Design Engineers

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

METALLURGICAL ENGINEERING

Professors

1. Dr. E. G. Ramachandran
2. ,, K. Srinivasa Raghavan
3. ,, R. Vasudevan
4. Dr. H. Md. Roshan
5. ,, K. Ananthapadmanabhan

Assistant Professors

1. Sri R. K. Srikantakumaraswamy
2. Dr. V. M. Radhakrishnan
3. ,, O. Prabhakar
4. ,, D. R. Gopalakrishna Achar
5. Dr. K. J. Lakshminarayana Iyer
6. ,, C. V. Gokulrathnam
7. ,, S. K. Seshadri

Lecturers

1. Sri S. Ramakrishna Iyer
2. Dr. S. Raghavan
3. Sri P. Venugopal
4. ,, V. Jagasivamani
5. ,, S. D. Pathak
6. Sri P. Kesavan Nair
7. ,, K. Prasad Rao
8. ,, K. Gandpath Ram Sharma
9. ,, J. Mukhopadthyay

Senior Scientific Officer Grade II

1. Sri S. Annamalai
2. Sri S. Balasubramanian

Lecturer Grade II

Sri S. Kumaran

PHYSICS

Professors

1. Dr. C. Ramasastry
2. ,, R. Srinivasan
3. ,, B. V. Ramana Murthy
4. ,, S. Radhakrishna
5. Dr. Y. V. G. S. Murti
6. ,, J. Sobhanadri
7. ,, V. Balakrishnan

Associate Professor

Dr. V. Sivaramakrishnan

Assistant Professors

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

Lecturers

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

Lecturer Grade II

1. Sri K. Sarangapani
2. Kumari T. M. Vimala
3. Sri T. S. Natarajan

COMPUTER SCIENCE AND ENGINEERING

Professors

1. Dr. H. N. Mahabala
2. ,, C. R. Muthukrishnan
3. ,, R. Kalyana Krishnan
5. Dr. R. Nagarajan
6. ,, B. Yegnanarayana

Assistant Professors

1. Dr. K. B. Lakshmanan
2. Dr. (Smt.) Kamala Krithivasan

Lecturer

Sri C. Pandurangan

Manager Systems

Sri S. Srinivasan

Assistant Manager (Operations)

Sri P. Seshasayi

Senior Systems Programmer

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

Systems Engineer (Opeartions)

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

Shift Engineer

Sri K. G. Sundararajan

Programmer Grade I

1. Sri G. Kannan
2. Smt. Vatsala Krishnan

OCEAN ENGINEERING CENTRE

Professors

1. Dr. V. Satyanarayana Raju
2. Dr. C. Ganapathy Chettiar

Principal Scientific Officer

1. Dr. M. R. Pranesh

Assistant Professors

1. Dr. K. Muthukrishnaiah
2. Dr. C. P. Vendhan
3. Dr. K. Ganesh Babu
4. Dr. C. Ranjan Vepa
5. Dr. S. P. Subramanian

Senior Scientific Officer Grade I

1. Sri S. Meenakshisundaram
2. ,, V. G. Idichandy
3. Sri K. Rajagopalan

Senior Scientific Officer Grade II

1. Sri S. K. Bhattacharya
2. Dr. V. Sundar
3. Sri R. Sundaravadivelu
4. ,, V. Ananthasubramanian

REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

Professors

1. Dr. Surjit Singh
2. Dr. S. Subramanian

Assistant Professor

1. Dr. S. P. Venkateshan

Scientific Officer Grade I

Dr. T. K. K. Srinivasan

CENTRAL ELECTRONIC CENTRE

Scientific Officer Grade I

Sri T. N. Ranganathan

Scientific Officer Grade II

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

MATERIAL SCIENCE RESEARCH CENTRE

Assistant Professor

Dr. G. V. Subba Rao

ENGINEERING DESIGN CENTRE

Professors

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

Asst. 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. Kalander 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. L. N. N. Kumar

CENTRE FOR RURAL DEVELOPMENT

Chief Techno Economic Officers

1. Sri D. Hariharan
2. Dr. K. N. Chinnaswamy
3. Dr. S. Swaminathan

Assistant Professor

Dr. T. Karunakaran

MECHANICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

Senior Scientific Officer Grade I

Dr. G. Kuppuswamy

CHEMICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

Senior Scientific Officer Grade I

Sri K. D. Chandrasekharan

GYMKHANA

Senior Physical Training Instructors

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

DEANS

Academic Courses :	Dr. P. Srinivasa Rao
Academic Research :	Dr. N. V. C. Swamy
Industrial Consultancy and Sponsored Research :	Dr. J. C. Kuriacose
Staff Affairs :	Dr. M. Venugopal
Students :	Dr. R. Srinivasan

ADVISERS

Foreign and Weaker Section Students :	Dr. R. Rajagopalan/Dr. P. K. Aravindan
Sports Activities :	Dr. S. Subramanian
Cultural Activities :	Prof. K. Schleusener
Training and Placement :	Dr. V. Radhakrishnan

ADMINISTRATION

Director

Dr. P. V. Indiresan

Deputy Director

Dr. R. Srinivasan

CENTRAL ADMINISTRATION

Registrar

Sri R. S. Virmani

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 N. R. Kuppuswamy

Chief Security Officer

Sri S. Ramanathan

Security Officer

Sri T. N. Venkataraman

Assistant Registrars

Sri D. Thiagarajan (Administration)

Sri G. R. Raghunatha Rao (Academic)

Kum. G. Saroja (Academic)

Assistant Finance & Accounts Officer

Sri R. Kannan

Sri Mohamed Yacoob

Sri R.N. Subramanian (from November '82)

Assistant Stores and Purchase Officer

Sri M. C. James

ENGINEERING UNIT

Executive Engineer

Sri N. Malayalam

Assistant Engineers

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

Sri S. Swaminathan
,, S. K. Pathi
,, J. C. Jinadoss

Horticultural Superintendent

Sri P. Manickavachakam

STAFF

Total number of staff (Academic)	410
Total number of staff (Non-Academic)	1741

BUDGET PROPOSALS

(Figures in lakhs of rupees)

Description	Budget Estimates for 1982-83		Revised Estimates 1982-83	Budget Estimates 1983-84
	As per Finance Committee	As Allocated by Board of Governors	as per Finance Committee	
(1)	(2)	(3)	(4)	(5)
	Non-Plan			
Recurring	570.50	570.50	629.91	655.30
Non-Recurring	6.00	6.00	6.00	10.00
Total (Non-Plan)	576.50	576.50	635.91	665.30
	Plan			
Recurring	20.25	20.25	25.96	50.01
Non-Recurring	119.75	119.75	134.60	189.71
Total (Plan)	140.00	140.00	160.56	239.72
Income	93.23	93.23	91.41	98.70

Statement of Accounts
1981-82

RECEIPTS

	Rs.	Rs.
Opening Balance		1,27,90,557
Receipts on Capital Account		
Grant from Government of India on Capital Account		1,74,00,000
OTHER CAPITAL RECEIPTS		
Refund of Customs Duty		17,95,891
Sale proceeds of Institute Vehicle		
Bus	41,799	
Cycles	493	
		42,292
C/o.		3,20,28,740

TECHNOLOGY, MADRAS-600 036

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS

	Rs.	Rs.
On Capital Account		
(i) Buildings and Works		39,01,285
(ii) (a) Equipment, Furniture and Fittings-Departments		
1. Chemistry	1,59,245	
2. Physics	1,89,559	
3. Mathematics	35,461	
4. Humanities and Social Sciences	1,29,531	
5. Civil Engineering	2,11,394	
6. Mechanical Engineering	2,47,776	
7. Electrical Engineering	3,63,177	
8. Chemical Engineering	1,51,414	
9. Metallurgical Engineering	1,96,064	
10. Applied Mechanics	1,34,447	
11. Aeronautical Engineering	88,991	19,07,059
(b) **Indigenous Capital Equipment**		—
(c) **Central Services**		2,42,906
C/o.		60,51,250

RECEIPTS (Contd.)

		Rs.	Rs.
	B/F.		3,20,28,740
Grant from Government of India			
On Revenue Account			3,92,44,000
Receipts from Academic Section			
Tuition Fees		4,67,263	
Hostel Seat Rent		2,58,937	
Gymkhana and Medical Fees		63,492	
Fines		4,644	
Examination Fees		49,532	
Degree in Absentia		4,753	
			8,48,621
	C/o.		7,21,21,361

TECHNOLOGY, MADRAS-600 036

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.		60,51,250
(d) **Research Centre**			
Engineering Design Centre		35,674	
Regional Sophisticated Instrumentation Centre		63,161	
Composite Structure F. R. P. Research Centre		2,03,306	
Material Science Research Centre		1,39,479	
Energy Research Centre		73,669	
Inter University Partnership Projects		6,960	
Television Lab.		91,144	
Microprocessor Lab.		11,19,044	
			17,32,437
(e) Central Workshops			47,007
(f) Computer Centre			1,42,142
(g) Centre for Rural Development			5,22,661
(h) Replacement of Obsolete Equipment			5,66,113
(i) Indo-French Colloboration Programme			—
(j) Sub-Centre—Cryogenic Engg.			19,240
	C/o		90,80,850

RECEIPTS (Contd)

		Rs.
	B/F.	7,21,21,361
Other Receipts :		
Application Fees from Students	6,22,427	
Application Fees for Posts in the Institute	3,436	
Admission Fees	8,472	
Grade Card	4,048	
Gymkhana Receipts (Campus times)	—	
Institute Bus Collection	3,89,987	
Hire Charge on Institute Vehicles	30,109	
Library Overdue Collection	60,727	
Institute Day and Association Fees	3,810	
Students Amenities Fund Receipts from Students	35,432	
Alumni Association Fund	2,195	
Students Aid and Welfare Fund Receipts from Students	13,232	
		11,73,875
Interest :		
Interest on Conveyance Advance & Deposits with TNSEB	19,736	
Interest on Call Deposits with SBI and Endowments	2,27,852	
		2,47,588
	C/o.	7,35,42,824

TECHNOLOGY MADRAS-600 036

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.		90,80,850
(iii) **Customs Duty on West German Equipment:**			
Customs Duty and Clearance Charges			67,33,914
(iv) Furniture and Fittings Office and library etc		6,06,473	
Replacement of Utensils of Hostels		1,10,519	7,16,992
(v) **Others**			
Motor Vehicles		1,19,607	
Cycles		7,038	
Typewriters and Duplicators		62,031	
Hospital Equipment		29,044	
Telephone		1,15,187	
Fire Fighting Equipment		—	3,32,907
(vi) **Library**			
(a) Books		4,92,745	
(b) Journals and Back Volumes		14,22,636	
(c) Equipments		78,180	
(d) Film Media Resources		5,676	19,99,237
	C/o.		1,88,63,900

RECEIPTS (Contd.)

		Rs.	Rs.
	B/F.		7,35,42,824
Miscellaneous Receipts			
Sale of Question Papers, Tenders Forms, Iron Scraps and Interest on CPF investments etc.		2 2,55,153	
Miscellaneous Recoveries		19,201	
Breakages from Students		252	
Hire Charges for Gowns		1,345	
Guest House Boarding Charges		19,283	
Subscription to Journal of Mathematical & Physical Sciences & sale proceeds of Institute Publications		82,523	
Migration Certificates		150	
Library Membership Fees		27,857	
Short Term & Other Courses		1,69,547	
			25,75,311
	C/o		7,61,18,135

TECHNOLOGY, MADRAS-600 036

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.		1,88,63,900
Revenue Account			
Academic Sections—Pay and Allowances of Teaching Staff			
1. Chemistry		10,06,435	
2. Physics		9,15,007	
3. Mathematics		6,79,508	
4. Humanities & Social Sciences		6,23,314	
5. Civil Engineering		10,03,800	
6. Mechanical Engineering		14,83,867	
7. Electrical Engineering		16,17,609	
8. Chemical Engineering		7,36,280	
9. Metallurgical Engineering		5,39,382	
10. Applied Mechanics		6,82,476	
11. Aeronautical Engineering		5,29,714	
			98,17,392
	C/o.		2,86,81,292

RECEIPTS (Contd.)

		Rs.	Rs.
	B/F.		7,61,18,135
Receipts from Buildings			
Licence Fee		10,63,937	
Electricity, Water & Service Charges		4,18,527	
			14,82,464
Lawns and Gardens			
Usufructs & Receipts from Sewage farm			51,194
Receipts from Computer Earnings			33,58,220
Receipts from Central Photographic Section			12,365
Central Gas Supply Unit			4,693
	C/o.		8,10,27,071

TECHNOLOGY, MADRAS-600 036

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.		2,86,81,292
(ii) Pay & Allowances of Non-Teaching Staff			
1.	Chemistry	2,79,589	
2.	Physics	5,51,703	
3.	Mathematics	54,993	
4.	Humanities & Social Sciences	1,07,380	
5.	Civil Engineering	5,55,753	
6.	Mechanical Engineering	12,89,085	
7.	Electrical Engineering	8,09,659	
8.	Chemical Engineering	4,12,261	
9.	Metallurgical Engineering	3,66,592	
10.	Applied Mechanics	3,50,662	
11.	Aeronautical Engineering	2,16,708	
			49,94,385
(iii) Departmental Expenses			
1.	Chemistry	3,30,296	
2.	Physics	2,67,786	
3.	Mathematics	44,528	
4.	Humanities & Social Sciences	48,575	
5.	Civil Engineering	3,00,182	
6.	Mechanical Engineering	6,33,015	
7.	Electrical Engineering	4,74,003	
8.	Chemical Engineering	2,66,477	
9.	Metallurgical Engineering	3,76,421	
10.	Applied Mechanics	3,81,773	
11.	Aeronautical Engineering	2,14,114	
			33,37,170
	C/o		3,70,12,847

RECEIPTS (Contd.)

		Rs.
	B/F.	8,10,27,071
	C/o.	8,10,27,071

TECHNOLOGY, MADRAS-600 036

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.		3,70,12,847
Indo-German Projects (Pay & Allowances)			8,413
1. **Library**			
Pay & Allowances (Officers)		1,32,780	
Pay & Allowances (Establishment)		6,04,801	
Journal of General Interest		3,045	
Contingencies-Operating Cost		91,058	
Binding Charges		34,080	
			8,65,764
Computer Science & Engineering			
Pay & Allowances (Officers)		5,16,648	
Pay & Allowances (Others)		2,56,486	
Other Charges		18,28,070	
			26,01,204
2. **Research Centres**			
Pay Allowances (Officers)		2,81,006	
Pay Allowances (Establishment)		4,07,061	
			6,88,067
3. **Central Workshops**			
Pay Allowances (Officers)		62,355	
Pay Allowances (Establishment)		13,07,435	
Working Expenses (Departments-Tools & Other consumables)		1,48,403	
			15,18,193
	C/o.		4,26,94,488

RECEIPTS (Contd.)

		Rs.
	B/F.	8,10,27,071
	C/o.	8,10,27,071

TECHNOLOGY, MADRAS-600 036

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

			Rs.
		B/F.	4,26,94,488
	Stipend for Apprentices		60,497
4. (i)	**Central Electronic Centre** (Pay and Allowances)		1,17,868
(ii)	**Air Conditioning Unit** (Pay and Allowances)		1,22,723
5.	**Centres Etc.**		
	Regional Sophisticated Instrumentation Centre	76,531	
	Electron Microscope Lab.	23,558	
	Electronic Instruments Servicing and Dev. Centre	86,795	
	Central Photographic Section	51,146	
	Central Glass Blowing Section	45,428	
	Air Conditioning Unit	87,207	
	X-ray Diffraction Laboratory	32,864	
	Energy Research Centre	26,619	
	Centre for Rural Development	1,35,385	
	Fibre Reinforced Plastic Research Centre	1,08,403	
		6,73,936	
		C/o.	4,29,95,576

RECEIPTS (Contd.)

		Rs.
	B/F.	8,10,27,071
	C/o.	8,10,27,071

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.	6,73,936	4,29,95,576
Cryogenic Sub-Centre		11,693	
Television Engineering Lab.		1,02,587	
Engineering Design Centre		63,035	
Material Science Research Centre		97,019	
Indo-German Project		16,102	
Indo-French Collaboration		25,073	
Microprocessor Laboratory		2,93,928	12,83,373
6. **Institute Scholarships :**			
Post Graduate and Research		44,66,585	
Under Graduate		7,21,339	51,87,924
7. **N.C.C.**			
Pay and Allowances		53,856	
Other Expenditure		32,261	86,117
8. **Athletic and Gymkhana**			
Pay and Allowances		39,837	
Other Expenditure		3,29,627	3,69,464
9. **Other Items**			
Part time Lectures		11,755	
Visiting Professors		20,190	
Technical Bulletins and Journals		62,110	
Symposium and Seminars		29,218	
Inplant Training/Courses/Visits		28,488	
		1,51,761	
	C/o.		4,99,22,454

RECEIPTS (Contd.)

	Rs.
B/f.	8,10,27,071
C/o.	8,10,27,071

TECHNOLOGY, MADRAS

FOR THE YEAR

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.	1,51,761	4,99,22,454
Continuing Education Programme Organised by the Institute		1,54,692	
Quality Improvement Programme (Initiated by the Ministry of Education)		19,556	
Director's Laboratory		—	
Director's Discretionery Fund for Research		48,374	
Membership Fees to outside bodies		20,754	
Remuneration to External Examiners		47,780	
Convocation		43,273	
Prizes for Academic Distinction		4,632	
Joint Entrance Examination		2,48,838	
Common Examination for Post-Graduate Admission (CEPA)		3,17,582	
Contribution towards Institutes Participation of Programme of National Conference		14,500	10,71,742
10. Hostels			
Allowances to Wardens			10,208
11. Other Sections			
(a) **Central Administration**			
Pay and Allowances of Officers		4,84,092	
Pay and Allowances of Other Staff		27,03,200	31,87,292
	C/o		5,41,91,696

RECEIPTS (Contd.)

		Rs.
	B/F.	8,10,27,071
	C/o.	8,10,27,071

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.		5,41,91,696
b) **Contingencies :**			
Postages		2,11,983	
Entertainment		25,123	
Telephones		5,87,708	
Liveries		1,63,996	
Stationery		4,40,675	
Printing		2,33,751	
Advertisement		1,17,342	
Miscellaneous Expenses		3,87,079	
			21,67,657
(c) **Other Items :**			
Director's Discretionery Fund-Payments		14,020	
Less : Recoveries		535	
			13,485
Stores :			
Pay and Allowances of Officers		44,925	
Pay and Allowances of Other Staff		2,97,646	
			3,42,571
General Stores :			
Purchases		38,126	
Less : Issues		37,260	
			866
	C/o		5,67,16,275

RECEIPTS (Contd.)

	Rs.
B/F.	8,10,27,071
C/o.	8,10,27,071

PAYMENTS (Contd.)

		Rs.	Rs.
	B/F.		5,67,16,275
Security :			1,94,404
Special Security Guards :			2,09,168
Lawns and Gardens :			
Pay & Allowances of Horticultural Superintendent		23,306	
Wages to Labourers, Purchase of Seeds etc.		3,82,100	
			4,05,406
Power			22,53,531
Mosquito Control			15,426
Water			4,98,857
Oil & Petrol			1,23,004
Repairs & Maintenance of Vehicles			2,15,579
Repairs & Maintenance of Furnitures			1,91,497
Duty, Insurance and Road Taxes			69,903
Fire and Fighting-Operating Cost			1,020
Works and Maintenance :			
Pay & Allowances of Officers		83,561	
Pay & Allowances of Other Staff		7,89,818	
Other Expenditure on Maintenance		32,76,258	
			41,49,637
Property Tax			2,70,807
	C/o		6,53,14,514

RECEIPTS (Contd.)

		Rs.
	B/F.	8,10,27,071
	C/o	8,10,27,071

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS

		Rs.	Rs.
	B/F.		6,53,14,514
Hospital :			
Pay and Allowances of Medical Officers		1,73,961	
Pay and Allowances of Other Staff		1,85,364	
Purchases of Medicines Etc.		5,20,102	
			8,79,427
Grant to Central School			122
Repairs and Maintenance of Type Writers and Duplicators			81,110
Grant to Vana Vani High School			1,21,535
Audit Charges			26,570
Legal Expenses			8,955
Travelling Allowances :			
Board of Governors		3,892	
Staff Committee, Selection Committees Etc.		48,242	
Candidates Called for Interview for Appointment Etc.		39,722	
External Examiners		1,05,316	
Joint Entrance Examination		51,051	
Common Examination for Post-Graduate Admission		2,214	
			2,50,439
	Co/.		6,66,82,672

RECEIPTS (Contd.)

		Rs.	Rs.
	B/F.		8,10,27,071
Recovery of Advances:			
Motor Car and other Conveyance		1,37,690	
Festival Advance		2,48,969	
Customs Duty on equipment from West Germany		68,00,970	
Customs Duty on personal effects on West German Experts		1,35,125	
On account of UNESCO Coupons		...	
Miscellaneous Advance		2,51,442	
Flood Advance		6,01,006	
House Building Advance		74,272	
			82,49,474
Deposits:			
From Supplier's Deposits (Institute)		1,53,535	
From Contractor's Deposits (works)		3,29,330	
External Scholarships		6,91,647	
C.S.I.R.		5,49,663	
Student's Caution Deposits		26,775	
Miscellaneous Deposits		17,31,261	
QIP & CSD Schemes		46,67,139	
Industrial Consultancy & Sponsored Projects		1,42,16,669	
			2,23,66,019
	C/o.		11,16,42,564

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

	Rs.	Rs.
B/F.		6,66,82,672
Commitment under Indo-German Agreements :		
Customs Duty on personal effects of West German Experts		1,35,240
Contribution to Societies	1,150	
L.S. & P.C. on account of Personnel on Foreign Services	32,567	
Contribution to Employees Welfare Scheme	3,470	
Training and Welfare Activities to Staff Members	—	
Subsidy to Hostels due to revision of salary for Hostel Employees	9,69,002	
Campus Amenities	15,152	
Central Gas Supply Unit	—	
Repairs to Instruments	1,111	
		10,22,452
Provident Fund/Gratuity/Pension :—		
C. P. F. (Contribution & Interest)	2,27,011	
C. P. F. -cum-Gratuity (Contribution and Interest)	27,91,338	
G. P. F. -cum-Pension-cum-Gratuity (Interest)	46,255	
C/o.	30,64,604	6,78,40,364

RECEIPTS (Contd.)

		Rs.	Rs.
	B/f.		11,16,42,564
Centres :			
Grant from Government of India for Ocean Engg. Centre :			
On Capital Account		8,20,000	
On Revenue Account		16,80,000	
			25,00,000
	C/o.		11,41,42,564

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1981-82

PAYMENT (Contd.)

		Rs.	Rs.
	B/f.	30,64,604	6,78,40,364
Gratuity and Pension		1,47,121	
Deposit linked Insurance		10,000	
			32,21,725
Advance Paid :			
Motor Car and Other Conveyance		1,76,900	
Festival Advance		2,34,800	
Customs Duty on equipment from Wesr Germany		71,00,000	
Customs Duty on personal effect on West Germany Experts		1,50,000	
UNESCO Coupons		—	
Other Miscellaneous Advance		3,77,431	
House Building Advance		5,81,820	
Flood Advance		—	
			86,20,951
Refund of Deposits :			
Supplier's Deposits (Institute)		1,22,197	
Contractor's Deposits (Works)		5,24,677	
External Scholarship		6,56,817	
C. S. I. R.		5,17,398	
		18,21,089	
	C/o.		7,96,83,040

RECEIPTS (Contd.)

		Rs.
	B/F.	11,41,42,564
TOTAL	Rs.	11,41,42,564

(Sd.) A. V. KARUNAKARAN NAMBIAR
Finance & Accounts Officer

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1981-82

PAYMENTS (Contd.)

	Rs.	Rs.	Rs.
	B/F.	18,21,089	7,96,83,040
Student Caution Deposit		14,175	
Miscellaneous Deposit		6,01,566	
Q.I.P. Programme organised by Government of India, Centre for System and Devices (Defence Ministry)		39,57,230	
Industrial Consultancy Work and Projects		1,08,08,595	1,72,02,655
CENTRES			
Ocean Engineering Centre			
Building and Construction		4,99,359	
Equipments		3,13,601	
Pay and Allowances			
Officers	2,52,561		
Others	2,18,122		
		4,70,683	
Departmental Expenses		3,43,053	
Establishment of Sub-Centre at other I. I. Ts.		—	16,26,696
Closing Balance			
Cash on Hand		5,51,354	
With State Bank of India	1,46,47,373		
I. I. T. Post Office Savings Bank Account	4,31,446		
		1,50,78,819	1,56,30,173
		TOTAL Rs.	11,41,42,564

(Sd.) R. S. VIRMANI
Registrar

(Sd.) P. V. INDIRESAN
Director

EXPENDITURE

	Rs.	Rs.
EDUCATIONAL EXPENSES		
Pay of Teaching Staff		
Department of Chemistry	10,12,479	
Physics	9,13,815	
Mathematics	6,88,158	
Humanities and Social Sciences	6,23,025	
Civil Engineering	10,03,570	
Mechanical Engineering	14,93,332	
Electrical Engineering	16,31,797	
Chemical Engineering	7,48,121	
Metallurgical Engineering.	5,38,357	
Applied Mechanics	6,85,785	
Aeronautical Engineering	5,33,329	
Centres	2,82,889	
		1,01,54,657
Pay of Non-Teaching Staff:		
Department of Chemistry	2,82,168	
Physics	5,55,136	
Mathematics	54,541	
Humanities and Social Sciences	1,08,077	
Civil Engineering	5,67,173	
Mechanical Engineering	13,10,103	
Electrical Engineering	8,21,065	
Chemical Engineering	4,16,682	
Metallurgical Engineering	3,70,035	
Applied Mechanics	3,55,306	
Aeronautical Engineering	2,20,083	
Centres	4,13,053	
Indo-German Projects	7,307	
		54,80,729
	C/o.	1,56,35,386

TECHNOLOGY, MADRAS

FOR THE YAER ENDED 31-3-1982

INCOME

	Rs.	Rs.
GRANT FROM GOVERNMENT OF INDIA		
(On Revenue Account)		
Regular Grant	3,92,44,000	
Ocean Engineering Grant	16,80,000	
		4,09,24,000
General Income		
Tuition Fees	4,70,943	
Hostel Seat Rent	2,60,612	
Gymkhana and Medical Fees	63,276	
Fines	4,644	
Examination Fees	49,532	
Degree in Absentia	4,753	
Applications Fees from Students	6,22,427	
Applications Fees for Appointments	3,436	
Admission Fee	8,471	
Grade Card	4,048	
		14,92,142
Miscellaneous Receipts		
Institute Bus Collection	3,90,301	
Hire Charges of Institute Vehicles	26,481	
Licence Fee	10,55,265	
Electricity, Water and Service Charges	4,18,139	
Lawns and Gardens (Auction Sale of Trees, Usufructs, Etc.)	51,194	
Other Receipts	28,45,330	
Income from the Computer Centre	35,81,095	
Central Photographic Section	12,365	
Central Gas Supplies Unit	4,693	
		83,84,863
Excess of Expenditure Over Income		21,61,791
	C/o.	5,29,62,796

EXPENDITURE (Contd.)

	Rs.	Rs.
B/F.		1,56,35,386
Departmental Expenses		
Chemistry	3,41,097	
Physics	2,14,961	
Mathematics	44,998	
Humanities and Social Sciences	45,386	
Civil Engineering	3,27,941	
Mechanical Engineering	5,70,114	
Electrical Engineering	4,53,609	
Chemical Engineering	3,88,608	
Metallurgical Engineering	4,22,530	
Applied Mechanics	3,99,597	
Aeronautical Engineering	2,47,328	
		34,56,169
LIBRARY		
Pay and Allowances		
Officers	1,33,609	
Establishment	6,14,154	
Contingencies—Operating Cost	1,02,055	
Journals of General Interest	3,045	
Binding Charges	34,080	
		8,86,943
COMPUTER CENTRE		
Pay and Allowances—Officers	5,19,374	
Pay and Allowances—Establishment	2,57,745	
Other Charges	19,85,945	
		27,63,064
WORKSHOPS		
Pay and Allowances of Workshop—Superintendent	62,745	
Pay and Allowances of Other Staff	13,22,851	
Working Expenses (Instruments, Tools, other Consumables)	1,64,021	
Stipend to Apprentices	62,562	
		16,12,179
Sub Centre in Cryogenics		11,693
OCEAN ENGINEERING CENTRE		
Pay and Allowances	4,74,923	
Working Expenses (Instruments other consumables etc.)	1,92,942	
		6,67,865
C/o.		2,50,33,299

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31-3-1982

INCOME (Contd.)

		Rs.
	B/F.	5,29,62,796
	C/o.	5,29,62,796

EXPENDITURE (Contd.)

	Rs.	Rs.
B/F.		2,50,33,299
Energy Research Centre	30,519	
Centre for Rural Development	1,15,946	
R. S. I. C.	40,491	
Electron Microscope Laboratory	23,283	
Electronic Instrument Servicing & Development Centre (C. E. C.)	32,311	
Central Photographic Section	50,158	
Central Glass Blowing Section	36,186	
A. C. Unit	54,169	
X-Ray Diffraction Laboratory	34,274	
Fibre Reinforced Plastic Research Centre	28,371	
Television Engineering Laboratory	1,01,667	
Engineering Design Centre	61,984	
Material Sciences Research Centre	1,09,006	
Indo-German Project	16,101	
Indo-French Collaboration	25,072	
Micro-processor Laboratory	81,074	
		8,40,612
Pay and Allowances -- C. R. D.		1,20,105
Pay & Allowances—Central Electronic Centre		1,21,545
Pay & Allowances—Air Conditioning Unit		
INSTITUTE SCHOLARSHIPS		
Post-Graduate and Research	44,32,017	
Undert-Graduate	7,20,984	
		51,53,001
N. C. C.		
Pay and Allowances	52,821	
Other Expenditure	32,261	
		85,082
Athletic and Gymkhana		
Pay and Allowances	44,488	
Other Expenditure	3,28,189	
		3,72,677
Part-time Lectures	11,755	
Visiting Professors	20,190	
Technical Bulletin and Journals	62,110	
Symposia and Seminars	27,934	
Inplant Training Courses Visits	28,488	
Continuing Education Programme Organised by the Institute	1,54,692	
		3,05,169
C/o.		3,20,31,490

TECHNOLOGY, MADRAS

OR THE YEAR ENDED 31-3-1982

INCOME (Contd.)

		Rs.
	B/F.	5,29,62,796
	C/o.	5,29,62,796

EXPENDITURE (Contd.)

		Rs.	Rs.
	B/F.		3,20,31,490
Quality Improvement Programme initiated by the Ministry of Education		19,656	
Director's Laboratory		—	
Director's Discretionery Fund for Research		48,374	
Membership fees to outside bodies		20,754	
Joint Entrance Examination		2,48,838	
Remuneration to External Examiners		47,780	
Convocation		43,273	
Prizes for Academic Distinction		4,232	
Common Examination for P. G. Admissions		3,07,819	
Contribution towards Institute participation in programmes of National Conference		14,500	
			7,55,126
HOSTELS			
Allowance to Wardens			10,208
Central Administration			
(Pay and Allowances)			
Officers		4,91,993	
Establishment		27,37,035	
			32,29,028
Contingencies			
Postage		1,98,648	
Entertainment		25,023	
Telephones		5,87,708	
Liveries		1,58,107	
Stationery		5,25,564	
Printing		2,33,401	
Advertisement		1,14,109	
Sundries (Misc. Expenses)		3,79,318	
			22,21,878
Other Items			
Director's Discretionary Fund			13,485
General Stores			693
Repairs to Instruments			1,111
	C/o.		3,82,63,019

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31-3-1982

INCOME (Contd.)

		Rs.
	B/F.	5,29,62,796
	C/o.	5,29,62,796

INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

		Rs.	Rs.
	B/F.		3,82,63,019
Stores			
Pay and Allowances of Officers		45,077	
Pay and Allowances of Establishment		3,00,600	
Security		1,80,839	3,45,677
Special Security Guards		2,09,167	
			3,90,006
Lawns and Gardens			
Pay and Allowances of the Horticultural Superintendent		23,499	
Wages to Labourers, Purchase of seeds		3,60,992	
Power			3,84,491
Mosquito Control			22,83,365
Water Charges			15,426
Oil and Petrol			4,98,857
Repairs and Maintenance of Furniture			1,22,472
Duty, Insurance and Road Taxes			1,91,497
Repairs and Maintenance-Motor Vechicles			67,629
Fire Fighting-Operating Cost			2,38,501
			1,020
Works and Maintenance			
Pay and Allowances of Officers		81,540	
Pay and Allowances of Establishment		7,91,580	
Other Charges		31,82,229	
Property Tax			40,55,349
			2,70,807
Hospital			
Pay and Allowances of Medical Officers		1,77,088	
Pay and Allowances of Establishment		1,86,896	
Purchases of Medicines		4,46,302	
			8,10,286
	C/o.		4,79,38,402

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31-3-1982

INCOME (Contd.)

		Rs.
	B/F.	5,29,62,796
	C/o.	5,29,62,796

INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	Rs.	Rs.
B/F.		4,79,38,402
Grant to Vanavani High School		1,21,535
Repairs & Maintenance of Typewriter & Duplicators		69,785
Grant to Central School		122
Audit Charges		33,570
Legal Expenses		8,955
Honorarium to Legal Adviser		—
Honorarium to P.T. Liaison Officer		—
Travelling Allowances		
Board of Governors	3,892	
Selection Committee, Senate etc.	48,241	
Candidates Called for Interview	39,722	
External Examiners	1,05,318	
Joint Entrance Examination	50,782	
Common Examination for P.G. Admission	2,214	
		2,50,169
Customs Duty on Personal effects to West German Experts		1,35,240
Lodging Allowances to West German Experts		—
Subsidy to Hostels due to revision of salary to Hostel Employees		9,69,002
Employees Welfare Scheme		3,470
L.S. & P.C. on account of Personnel of Foreign Service		32,567
GPF Contribution etc.		33,10,802
Contribution to Societies		1,150
Campus Amenities		15,152
Cost of Stores etc. in Departments/Sections written off		62,215
Cost of Institute Vehicles written off		10,660
TOTAL		5,29,62,796

(Sd.) A. V. KARUNAKARAN NAMBIAR
Finance & Accounts Officer

TECHNOLOGY, MADRAS

AS AT 31-3-1982

INCOME (Contd.)

		Rs.
	B/F.	5,29,62,796
	C/o.	5,29,62,796

(Sd.) R. S. VIRMANI
Registrar

(Sd) P. V. INDIRESAN
Director

CAPITAL FUND AND LIABILITIES

	Rs.	Rs.	Rs.
Capital Fund			
Value of Land per contra		1,12,17,262	
Block Value of German aid per contra Equipments	9,52,74,098		
Technical Books & Journals per contra	15,09,088		
		9,67,83,186	
Computer Systems Per Contra			
As per last Balance Sheet		1,54,50,458	
Capital Grants and Balance of Income and Expenditure Accounts as on 31-3-1981	20,20,59,813		
Add : Capital Grant during 1981-1982	1,82,20,000		
	22,02,79,813		
Less : Excess of Expenditure over income for the year 1981-1982	21,61,791		
		21,81,18,022	
			34,15,68,928
Gymkhana Fund			49,811
Endowment Fund (Governor's Prize etc.)			1,78,350
Deposits			
Earnest Money, Caution and other Deposits		62,81,343	
Industrial Consultancy Centre & Projects		1,17,41,825	
			1,80,23,168
Sundry Creditors			
On Works Account			7,61,696
For supplies made for services rendered Departments/Sections			5,16,346
Outstanding Expenses Payable			
(a) Pay and Allowances			19,67,586
(b) Scholarships			4,08,147
(c) Other Allowances-Medical			32,741
(d) Wages to N.M.R. Labourers-Departments etc.			10,431
(e) Audit Fees			30,000
(f) Stipend to Apprentices			7,764
(g) Computer Receipts received in advance			18,993
		C/o.	36,35,73,961

TECHNOLOGY, MADRAS

AS AT 31-3-1982

PROPERTY AND ASSETS

	Rs.	Rs.	Rs.
Land			
Value of Land gifted by the Government of Tamil Nadu			1,12,17,262
Buildings			
Cost of Completed Buildings as on 31-3-1981	9,80,37,479		
Add: Buildings completed during the year	72,10,516	10,52,47,995	
Building under construction as on 31-3-1981	66,42,968		
Add: Expenditure for the year	43,23,304		
	1,09,66,272		
Less: Transferred to completed Buildings Account	72,10,516	37,55,756	10,90,03,751
Diesel Generator			2,14,232
Equipments, Furniture and Fittings			
At cost as per Balance Sheet as at 31-3-1981	5,28,28,894		
Add: Additions during the year	58,71,881	5,87,00,775	
Less: Cost of Equipments written off during the year		62,215	5,86,38,560
Computer acquired through German food aid funds under Indo-German Agreement			
As cost as per Balance Sheet as on 31-3-1981			1,54,50,458
Block value of Equipment from West Germany as per Balance Sheet as on 31-3-1981	9,33,54,098		
Add: Additions during the year	19,20,000	9,52,74,098	
Customs duty and clearance charges on equipment from West Germany as per Balanace Sheet on 31-3-81	2,11,74,042		
Add: Customs duty paid during the year	67,33,035		
	2,79,07,077		
Less: Refund of Customs Duty	17,95,891	2,61,11,186	12,13,85,284
			31,59,09,547

CAPITAL FUND AND LIABILITIES (Contd.)

		Rs.
	B/F.	36,35,73,961
Excess Fees Refundable		
Fees refundable on account of Scholarship & freeship as on 31-3-82		6,906
American Chemical Society		
Account with First National City Bank New York Account (A) Balance as per last year Balance Sheet		1,10,934
Unpaid items as on 31-3-82 as per undisbursed pay register		25,064
	C/o.	36,37,16,865

PROPERTY AND ASSETS (Contd.)

	Rs.	Rs.	Rs.
B/F.			31,59,09,547
Motor Vehicles at cost as per balance sheet as at 31-3-81		12,70,612	
Less : Sale proceeds of Motor Cycle, Jeep & Car	41,799		
Due to disposal of Bus	10,660	52,459	
		12,18,153	
Add : Additions during the year		1,19,607	13,37,760
Library Books and Scientific journals at cost as on 31-3-81		1,24,85,463	
Add : Additions during the year		19,12,629	1,43,98,092
Block Value of technical Books journals from West Germany as per Balance Sheet as at 31-3-1981		14,86,088	
Add : Additions during the year		23,000	15,09,088
Typewriters and Duplicators at cost as per Balance Sheet as at 31-3-1981		5,60,631	
Add : Additions during the year		67,524	6,28,155
Tools and Plants works as at 31-3-81		3,24,391	
Add : Additions during the year		52,637	3,77,028
Cycles at cost as per Balance Sheet as at 31-3-81		38,783	
Less : Sale proceeds of cycles		493	
		38,290	
Add : Additions during the year		7,038	45,328
Investment Account, Endowment fund Governor's prize etc. as on 31-3-82			1,78,350
STOCK AS ON 31-3-82			
Consumables Stores with Departments			32,27,576
Construction materials with Engineering Unit Works A/c			17,11,499
Guest House Provisions			587
Stationery Articles			1,48,396
Consumables Stores with Central stores			23,416
Tyres and Tubes, Spare parts etc.			1,03,323
UNESCO Coupons			66,442
C/o.			33,96,64,587

CAPITAL FUND AND LIABILITIES (Contd.)

		Rs.	Rs.
	B/F.		36,37,16,865
Industrial Research and Development Fund Account			
Balance as on 1-4-81 (as per separate statements of accounts)		43,08,737	
Add : Receipts for the year		14,00,659	
		57,09,396	
Less : Payments during the year		2,08,573	
			55,00,823
	C/o.		36,92,17,688

TECHNOLOGY, MADRAS

AS AT 31—3—82

PROPERTY AND ASSETS (Contd.)

		Rs.	Rs.
	B/F		33,96,64,587
Projector and Tape recorders (Gymkhana Assets) at cost as per last year Balance Sheet			49,811
Fees Recoverable			37,545
Licence fees etc. recoverable			75,953
Income receivable for the Computer Centre			9,86,750
Hire charges of Institute Vehicles etc. recoverable			5,625
Pre-paid taxes etc.			19,339
Stamps on hand			26,967
C. P. F. Contribution recoverable			84,200
C. P. F. Interest on investments recoverable			3,26,300
Equipments procurred from grant received from the American Chemical Society Balance carried over from last year			1,10,934
Advance and Deposits			
Works Advance		13,10,158	
Other (General)		44,40,153	57,50,311
Deposit with			
Tamil Nadu Electricity Board			3,37,300
Collector of Customs-Air Cargo complex		5,04,201	
Collector of Customs-Account-I		49,557	
Collector of Customs-Account-II		31,749	5,85,507
Unpaid balance (per contra) with State Bank of India in 'C' Account			
Cash on hand U. P. D.	25,064		
Imprest	500	25,564	
Cash on hand (other than 'C' Account)	5,51,354		
With State Bank of India (other than IRD Fund account)	1,46,47,373		
With IIT PO Savings Bank Account	4,31,446	1,56,30,173	
		1,56,55,737	
With State Bank of India, IRD Fund		55,00,822	2,11,56,559
	C/o.		36,92,17,688

INDIAN INSTITUTE OF

BALANCE SHEET

CAPITAL FUND AND LIABILITIES

		Rs.
B/F		36,92,17,688
TOTAL	Rs.	36,92,17,688

(Sd.) A. V. KARUNAKARAN NAMBIAR
Finance & Accounts Officer

TECHNOLOGY, MADRAS

AS AT 31—3—82

PROPERTY AND ASSETS

	Rs.	Rs.
B/F		36,92,17,688
*Earnest Money, Caution and Other Deposits	62,81,343	
Industrial Consultancy and Projects	1,17,41,825	
	1,80,23,168	
Less : Drawn from refundable deposits	23,67,431	
	1,56,55,737	
TOTAL	Rs.	36,92,17,688

(Sd.) R. S. VIRMANI
Registrar

(Sd.) P V. INDIRESAN
Director

Printed at

C. R. D. PRINTING DIVISION

I. I. T. NARAYANAPURAM, MADRAS 600 036