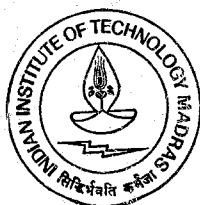


**TWENTY FIFTH
ANNUAL REPORT**

1983-84



**INDIAN INSTITUTE OF TECHNOLOGY
MADRAS**

**TWENTY FIFTH
ANNUAL REPORT**

1983-84



**INDIAN INSTITUTE OF TECHNOLOGY
MADRAS**



CONTENTS

	Page No.
The Council of the I.I.T.'s ...	i
The Board of Governors of the Institute ...	iii
The Finance Committee ...	iv
The Buildings and Works Committee ...	v
The Senate ...	v
Reports by the Director for the Period from April 1983 to March 1984 ...	1
RESEARCH CENTRES	
Centre for Biosciences and Biotechnology ...	11
Centre for Systems and Devices ...	17
Energy Research Centre ...	17
Fibre Reinforced Plastics Research Centre ...	20
Materials Science Research Centre ...	22
Ocean Engineering Centre ...	23
SCHOOLS FOR EDUCATIONAL DEVELOPMENT	
Chemical Engineering Education Development Centre ...	31
Mechanical Engineering Education Development Centre ...	32
SPECIAL FACILITIES	
Centre for Industrial Consultancy and Sponsored Research ...	35
Central Electronics Centre ...	39
Engineering Design Centre ...	40
Regional Sophisticated Instrumentation Centre ...	41
CENTRAL SERVICES FACILITIES	
Central Glass Blowing Section ...	45
Central Photographic Section ...	46
DEPARTMENTS	
Aeronautical Engineering ...	49
Applied Mechanics (Including Bio-Engineering) ...	51
Chemical Engineering ...	55
Chemistry ...	59
Civil Engineering ...	63
Computer Science and Engineering ...	65
Electrical Engineering ...	67
Humanities and Social Sciences ...	73

	Page No.
Mathematics	75
Mechanical Engineering	77
Metallurgical Engineering	90
Physics	94
OTHER REPORTS	
Quality Improvement Programme	99
Indo-German Programme	99
Central Library	100
Central Workshop	102
Centre for Rural Development	102
Institute Hospital	104
Placement Office	105
Weaker Section Students and Foreign Students	105
Institute Gymkhana (Cultural activities/sports)	106
National Caded Corps	109
National Service Scheme	110
Hostel Management	111
Central Supplies Unit	111
Construction of Buildings	112
Names of Faculty Members	113
Administration	126
Budget Proposals	128
Statement of Accounts 1982-83	129

VISITOR OF THE INSTITUTE

GIANI ZAIL SINGH

The President of India

THE COUNCIL OF THE INDIAN INSTITUTES OF TECHNOLOGY

Chairman

Smt. SHEILA KAUL

Union Minister for Education and Culture
Government of India, New Delhi

Members

Sri Russi H. Mody
Chairman
Board of Governors
I. I. T., Kharagpur

Dr. G. S. Sidhu
Director General
Council of Scientific and Industrial Research
New Delhi

Sri A. Sivasailam
Chairman
Board of Governors
I. I. T., Madras

Prof. G. S. Sanyal
Director
I. I. T., Kharagpur

Sri G. K. Chandiramani
Chairman
Board of Governors
I. I. T., Delhi

Prof. A. K. De
Director
I. I. T., Bombay

Prof. R. N. Dogra
Chairman
Board of Governors
I. I. T., Kanpur

Prof. P. V. Indiresan
Director
I. I. T., Madras

Dr. R. Ramanna
Chairman
Board of Governors
I. I. T., Bombay

Prof. N.M. Swami
Director
I. I. T., Delhi

Dr. Mrs. Madhuri Shah
Chairman
University Grants Commission
New Delhi

Prof. S. Sampath
Director
I. I. T., Kanpur

Sri G. K. Chandiramani
Chairman
Council of the Indian Institute of Science
Bangalore

Prof. S. Ramaseshan
Director
Indian Institute of Science
Bangalore

Representatives of the Central Government

Prof. C. S. Jha
Educational Adviser (Tech.)
Ministry of Education and Culture
New Delhi - 110 001

Sri Man Mohan Singh
Financial Adviser
Ministry of Education and Culture
New Delhi - 110 001

Prof. M. G. K. Menon
Member (Education)
Planning Commission
New Delhi - 110 001

Members of Parliament

(Two from Lok Sabha and One from Rajya Sabha)

Sri. Anand Singh

Sri. Narayan Choubey
Prof. B. Ramachandra Rao

Representative of the All India Council for Technical Education

Smt. Serla Grewal
Secretary
Ministry of Education and Culture
New Delhi - 110 001

Nominees of the Visitor

Dr. M. Santappa
Prof. C. N. R. Rao

Sri V. Krishnamurthy
Dr. S. Varadarajan
Sri Ajit Singh

Secretary

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

The Board of Governors

Chairman

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

Ex. Officio

Prof. P. V. Indiresan
Director
Indian Institute of Technology, Madras-600 036

Nominees of State Governments

Sri D. K. Satyanarayana Setty
Director of Technical Education
Government of Karnataka, Bangalore

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

Sri S. Vaiyapuri (Upto March 1984)
Sri P. S. Pandyan (from March 1984)
Director of Technical Education
Government of Tamil Nadu, Madras.
Sri. K. Rami Reddy
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. V. S. Arunachalam
Scientific Advisor to Defence Minister
Ministry of Defence
New Delhi-110 111.

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

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

Nominees of the Senate

Prof. R. Srinivasan
Department of Physics
I. I. T., Madras-600 036.

Prof. K. S. Sankaran
Department of Civil Engineering
I. I. T., Madras-600 036.

Secretary

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

The Finance Committee

Chairman

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

Members

Sri S. D. Awale
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

Dr. V. C. Kulandaisamy
Vice-Chancellor
Anna University of Technology
Madras-600 025.

Prof. P. V. Indiresan
Director
Indian Institute of Technology
Madras-600 036.

Secretary

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

The Buildings and Works Committee

Chairman

Sri A. Sivasailam
Chairman
Amalgamations Limited
Madras-600 002

Members

Prof. P. V. Indiresan
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

Shri V. N. Murthy
Estate Officer
I. I. T. Madras

Secretary

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

The Senate

Chairman

P. V. Indiresan (Director)

Members

M. K. Achuthan
R. S. Alwar
S. Ambirajan
M. S. Ananth
K. Anantha Padmanabhan
G. Aravamudan
B. V. Aswathanarayana Rao
V. Balakrishnan
K. Balaraman
C. S. Ballal
D. K. Banerjee
K. A. Bhaskaran
T. K. Bose

N. V. Chandrasekhara Swamy
K. A. Damodaran
Dipak Chouduri
K. Elango
C. Ganapathy
T. P. Ganesan
K. V. Gopalakrishnan
T. Gopichand
M. C. Gupta
R. K. Gupta
S. Jambunathan
D. Johnson Victor
D. Kakati

C. Kalidas
R. Kalyanakrishnan
Klaus Schleusener
C. S. Krishnamoorthy
M. V. Krishnamurthy
A. V. Krishna Rao
V. M. Krishna Sastri
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
Nainan P. Kurian
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
P. K. Philip
C. N. Pillai
D. Prithviraj
H. C. Radhakrishna
S. Radhakrishna
R. Radhakrishnan
V. Radhakrishnan
V. M. Radhakrishnan
K. Radhakrishna Rao
J. P. Raina
N. Rajagopalan
N. R. Rajappa
K. P. Rajappan
V. S. Raju
E. G. Ramachandran
S. R. Ramadas
T. V. Ramakrishna
V. Ramakrishnan

A. Ramamohana Rao
L. N. Ramamurthy
V. Ramamurti
H. Raman
B. V. Ramanamurthi
S. Ramani
M. Ramanujam
K. V. S. Rama Rao
B. Ramaswami
G. Rangarajan
G. V. N. Rayudu
K. S. Sankaran
L. V. K. V. Sarma
C. A. Sastry
V. V. Sastry
M. Satyanarayana
K. N. Seetharamu
V. Seshadri
R. S. Sirohi
V. Sivaramakrishnan
J. Sobhanadri
A. K. Srikanth
P. S. Srinivasan
R. Srinivasan
R. S. Srinivasan
S. K. Srinivasan
T. M. Srinivasan
V. Srinivasan
K. Srinivasaraghavan
P. Srinivasa Rao
V. Sriramulu
G. V. Subba Rao
N. Subramaniam
R. Subramaniam
G. Subramanian
S. Subramanian
Surjit Singh
C. S. Swamy
M. R. Udupa
Y. B. G. Varma
R. Vasudevan
M. A. Veluswami
N. Venkatarayulu
M. Venugopal
V. Yegnanarayana

Senior Warden (Vacant)

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

K. N. Raj
S. C. Dutta Roy
C. N. R. Rao

Members of the faculty (Nominees)

K. B. Lakshmanan
C. K. Narayanaswamy
O. Prabhakar
L. V. L. N. Sarma
R. M. Siddaveere Gowda

Members of the faculty (Invitees)

Ashok Jhunjunwala
Megha Singh
M. Mukunda Rao
V. Subba Rao

Secretary

S. Santanagopalan, Registrar



REPORT BY THE DIRECTOR

for the period

April 1983 to March 1984

A brief account of the activities of the Institute during the year is given below :

Silver Jubilee Year

The Institute is celebrating its Silver Jubilee Year which commenced on 31st July 1983 and ending on 30th June 1984. Some of the highlights of the Silver Jubilee Year are given below.

Silver Jubilee Convocation was held on 18th September 1983 which was addressed by the President of India and was also attended by the Minister for Education and Culture, Government of India, New Delhi. Dr. Raja Ramanna was awarded the Honorary Degree of Doctor of Science (Honoris Causa). At the Convocation 216 were awarded the B.Tech., 178 the M.Tech., 52 the M.Sc., 60 the M.S. and 72 the Ph.D. degree of the Institute.

The major activity of the Jubilee year was the Indo-German Seminar on International Co-operation in Higher Technical Education, which was held from 2nd to 6th January 1984. 24 German Professors (12 of them with their spouses) who were associated with the early planning of the IIT Madras spent periods ranging from 10 to 15 days. The Seminar was sponsored by the German Agency for Technical Cooperation (GTZ), the German Academic Exchange Service (DAAD) and Alexander von Humboldt Foundation. Two groups of student from FRG, one a sports team consisting of 6 members and the second consisting of 10 students and one leader visited the Institute during January-February 1984. In addition the Departments arranged one day Workshop-Cum-Seminars on topics, of relevance to their major areas of activities. Leading Industrialists were also invited for the Seminars which was followed by a Departmental Open House.

Directors, Deputy Directors, Deans of the other four IITs were invited as guests of the Institute and taking advantage of their visits a two day discussion was arranged on 23rd and 24th March, on topics of mutual interest relating to administration, Academic, Staff/Student Affairs and Hostel Sector.

An Open House was also organised at the Institute on the 24th and 25th of March 1984 as part of the Silver Jubilee Celebrations with the objective of providing the public an insight into the excellent facilities and opportunities for technical education, research and development work available at the Institute. More than 20,000 people visited the Institute during the Open House.

Student Strength

There were 1244 undergraduate students and 1090 postgraduate students and research scholars in the Institute.

Honours- Faculty/Students

Prof. S. Ramani was appointed as Director of NITIE.

Prof. K. A. Padmanabhan was chosen for a National Metallurgist Day Award for 1983 by the Ministry of Steel and Mines, Government of India, for his contribution in the area of Metal Science and Metallurgical Education.

Dr. D. R. G. Achar was elected for the conferment of the prestigious IAEC Golden Jubilee Award for the year 1982 for his contribution in the field of Welding Technology.

Prof. M. Satyanarayana was elected as Editor, Indian Chemical Engineer and also a Fellow of Andhra Pradesh Academic of Science and nominated as Member AICTE and Expert Member for ISI.

Prof. J. C. Kuriacose was nominated on the Commission on Colloid and Surface Chemistry including Catalysis of the International Union of Pure and Applied Chemistry by the IUPAC.

Dr. G. V. Subba Rao, Head, MSRC, was invited to serve on Editorial Board of the Journal & Bulletin of Materials Science published by the Indian Academy of Science, Bangalore.

Dr. V. Subramanian, part-time N. C. C. Officer, was promoted as Sq. Ldr. from the rank of Sq. Lft.

Dr. D. R. G. Achar received the KCP Award for the Fabrication Paper sharing this award with two other authors from V S S C, Trivandrum. He also received ITM Memorial Research Award from the Indian Institute of Welding for the best research paper presented during the National Welding Seminar 1983 at Cochin, sharing this award with his student Sri Murali Manohar.

Prof. K. A. V. Pandalai was nominated as a member of the Council of the Aeronautical Society of India. He has also been nominated as a member of Editorial and Journal Committee of the Aeronautical Society of India.

Prof. D. J. Victor was elected as Fellow of the American Society of Civil Engineers which grade is the most prestigious regular grade of Membership in the society.

Sri Joy Aloysius Thomas, student of 5/5 B. Tech. Electronics, has been awarded the \$ 10,000 Charles LeGeyt Fortescue Fellowship for 1984-85. He is the second Indian and first from IIT Madras to receive the Fellowship. Obtained highest scores possible in GRE, TOEFL and AGRE (Engg) Examinations.

BOOKS AND MONOGRAPHS PUBLISHED

Chemical Engineering Education Development Centre

1. Process Control - A laboratory Manual

Under publication

1. Unit Operations Data
2. Transport Properties of Liquids

Mechanical Engineering Education Development Centre

Monographs on Thermodynamics of Solar Collectors and Bibliography on Microprocessors and their applications.

A book entitled "Elements of Precision Engineering" written by Dr. R. Raman, Assistant Professor, Department of Mechanical Engineering, was published as a low cost university edition subsidised by the Government of India through the National Book Trust of India.

CONSULTANCY ASSIGNMENTS AND SPONSORED PROJECTS

Earnings from Consultancy for the year 1983-84 of Rs. 4.9 millions compared to Rs. 4.27 millions in 1982-83. 24 sponsored projects valued of Rs. 86.29 lakhs were also taken up.

Two patent applications were made.

A NODAL Centre for data collection for Applied Man Power and Research was started during the year 1984.

GRADUATE APTITUDE TEST IN ENGINEERING (GATE)

IIT Madras has organised for the second time GATE along with other IITs and IISc., Bangalore. At the examination held on 3rd December 1983, 12776 candidates appeared and 6084 were declared eligible for admission to postgraduate programmes in Engineering and Technology. And out of 772 SC/ST candidates appeared 460 candidates were successful in the examination. The overall percentage of success is 47.62 and for SC/ST candidates the percentage of success is 59.58

NEW FACILITIES INSTALLED

Dept. of Electrical Engg.

1. Bit slice processors for Kannada language script display.
2. Through hole plating equipment.
3. A versatile system of depositing various amorphous thin films by the Glow Discharge plasma reaction constituent pulse gases/vapours.

Dept. of Physics

Thin film deposition facility using refrigerator cooled cryopump.

R. S. I. C.

ESCA/AUGER instrument

M. S. R. C.

Triarc furnace, closed cycle Helim Refrigerator and R. F. Sputtering Unit.

Dept. of Applied Mechanics

An Universal Testing Machine of 20 tons capacity.

Dept. of Chemical Engg.

1. Latest model RHEOGRAPH 2001, a high pressure Capillary Rheometer with attached micro-processor to measure the flow characteristics of polymer melts.
2. Hewlett Packard BASIC computer HP 98165 with a flexible disc drive and a printer.
3. EXTRUSIOMETER for measuring and optimizing parameters relevant to the extrusion process or to injection moulding.

Seminars and Conferences

A Commonwealth Workshop on 'Coastal, Estuarine and Offshore Exploration and Exploitation' was organised on behalf of Commonwealth Science Council, London, from 14th to 23rd June 1983 by the Ocean Engineering Centre.

The Department of Electrical Engineering organised an International Symposium on Pollution Performance of Insulators and Surge Diverters in December 1983.

The Department of Physics organised an International Conference on Teaching Aids in physics Education.

The Department of Applied Mechanics organised an International Conference on Physiological Fluid Dynamics during September 1983.

Extramural Lectures

The following distinguished persons gave Extramural Lectures as part of the Silver Jubilee Celebrations:

1. Prof. A. M. Khusro
2. Dr. G. N. Ramachandran
3. Dr. Juergon Warnke
4. Sri S. Samarpungavan
5. Sri L. K. Jha
6. Dr. R. Narasimhan
7. Dr. V. K. Narayana Menon
8. Dr. Y. Nayudamma
9. Dr. V. S. Arunachalam
10. Dr. M. N. Srinivas

Student Activities Centre

The Student Activities Centre was inaugurated by the President of India on 18th September 1983. The SAC is a multipurpose auditorium cum indoor stadium. The building is unique in structural design. The roof system is of precast channel type shell suspended between prestressed beams. The largest span of the beam is 51 metres and depth 2.9 metres. The dimension of the building is 80 metres x 55 metres. The total cost of the building is Rs. 90 lakhs.

The building consists of central bowl, stage, spectator gallery including a projector room, entrance lounge, mezanine floor, two conference rooms, cafeteria and store room.

This building is intended for indoor functions, Convocation, sports events, cultural activities exhibitions, seminars, screening of films, etc.

In the bowl, play area has been provided with timber flooring (450 m²) for playing basket ball tennis, volley ball, table tennis and shuttle badminton. During other functions, the bowl can accommodate about 900 people. The spectator gallery can accommodate 1600 persons. Thus the total capacity of the auditorium is 2500.

Reviewing Committee for IITs

The President of India, the Visitor appointed a Committee under the Chairmanship of Prof. Y. Nayudamma to review the work and progress of IITs and to recommend lines along which the Institute should be further developed for advance studies and research.

General

It was revealed that the success ratio of candidates who appeared for the Civil Services Examination 1981 in respect of IIT Madras was 1 : 5, the highest of all IITs put together. The Microprocessor System Laboratory of the C.S.D. has developed a Dual Script Word Processor.

The Tamil English Word Processor developed in the Microprocessor Laboratory displayed in the SIPCOT pavilion on the All India Tourist Trade Fair 1984 was adjudged as the best in interaction between industry and technical education.

Conclusion

The Institute so far has had four Phases of development—undergraduate education, postgraduate consider the education, research and lately development of industrial consultancy. The time has now come to relevance of what the Institute is doing and what manner it should contribute to the growth of the country. The Institute has excelled itself in physical growth; its next concern should be to search for a value system. It is hoped that the Reviewing Committee for the IITs will address it self to this task.

DETAILS OF THE REPORT
Admissions, Award of Degrees and Prizes
Student Admission 1983 - 84

The number of student and scholars admitted to various courses (1983 - 84) is given in Table-1

Table-1
ADMISSION 1983-84

Sl. No.	Department	B. Tech.	M. Tech.	M.Sc.	MS	Ph.D.	Total
1.	Aeronautical Engg.	17	4	...	2	3	26
2.	Applied Mechanics	...	6	...	5	3	14
3.	Chemical Engg.	38	21	...	3	4	66
4.	Chemistry	...	...	15	...	28	43
5.	Civil Engg.	38	28	...	7	5	78
6.	Computer Science & Engg.	25	30	...	3	1	59
7.	Electrical Engg.	74	55	...	8	16	153
8.	Humanities & S.S.	...	21	...	3	8	32
9.	Mathematics	...	...	13	...	7	20
10.	Mechanical Engg.	74	50	...	10	15	149
11.	Metallurgical Engg.	22	7	...	3	3	35
12.	Naval Architecture	14	...	...	...	...	14
13.	Ocean Engineering	...	6	...	10	6	22
14.	Physics (Solid State Tech.)	...	4	18	...	20	42
Total		302	232	46	54	119	753

The total 753 includes the following :

Foreign Nationals	8	Sponsored Candidates	19
Scheduled Castes	26	External Registration	28
Scheduled Tribes	4	Project Staff	34
Women	71	Part-time (Staff)	11
OIP Scholars	24		

Degrees Awarded

The number of degrees awarded at the Twentieth Convocation of the Institute on 18th September 1983 is given below in Table 2. Rashtrapati Giani Zail Singh delivered the Convocation address.

Table - 2
NUMBER OF DEGREES AWARDED

Sl. No.	Discipline	B.Sc. (TA)	B. Tech.	M. Tech.	M. Sc.	MS	Ph.D.	Total
1.	Aeronautical Engg.	...	11	1	...	3	...	15
2.	Applied Mechanics	...	...	4	...	7	4	15
3.	Chemical Engg.	...	27	19	...	2	3	51
4.	Chemistry	...	...	...	19	...	12	31
5.	Civil Engg.	...	30	21	...	5	9	55
6.	Computer Science & Engg.	...	...	29	...	5	...	34
7.	Electrical Engg.	...	56	38	...	9	6	109
8.	Humanities & S.S.	...	...	20	...	8	3	31
9.	Mathematics	...	...	...	14	...	6	20
10.	Mechanical Engg.	...	63	33	...	11	11	118
11.	Metallurgical Engg.	...	19	8	...	9	8	44
12.	Naval Architecture	...	10	...	...	...	...	10
13.	Ocean Engineering	...	...	5	...	1	...	6
14.	Physics	...	...	...	19	...	10	29
		2	...	...	...	...	...	2
	Total	2	216	178	52	60	72	580

With this Convocation in September 1983 the number of degrees awarded so far by the Institute is:

B Sc. (TA)	10	DIIT	245
B.Tech.	4722	M.S.	371
M.Tech.	2749	Ph.D.	754
M.Sc.	686		

Grand Total: 9537

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 N. SUNDAR
B.Tech. (Mechanical Engg.)

2. GOVERNOR'S PRIZE :

(For all round proficiency in B.Tech. degree courses/Curricular and Extra Curricular) Shri S. SARAT CHANDRAN
B.Tech. Electrical Engg.
(POWER)

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

B.TECH. COURSE :

Civil Engineering	Shri Venkatesan R.
Metallurgical Engineering	Shri Venkatasubramanian R.
Naval Architecture	Shri Doraising Ebenezer Diamond
Electrical Engineering (Electronics) (Philips India Prize)	Shri Rajamoney Shankar Anand S.
Electrical Engineering (Power) (Siemens Prize)	Shri Vemulapati V. S. Udaya Bhaskar
Mechanical Engineering (Banco Foundation Prize)	Shri N. Sundar
Chemical Engineering (Reliance Heat Transfer (P) Limited Prize)	Shri Sanjay Patnaik
Aeronautical Engineering (HAL Prize)	Shri Uday J. Shankar

M.TECH COURSE :

Civil Engineering	Kum, Letha J. Shri Balasubramanian K. V.
Engineering Mechanics	Shri Chellapandi P.
Industrial Metallurgy	Shri Nageswara Rao Dronavalli
Industrial Tribology	Shri Sankara Subramani S. Shri Sambamurthy V. R.
Ocean Engineering	Khaja Zameeruddin Khan
Electrical Engineering (Siemens Prize)	Shri Udpikar Vishwas Ramakrishna
Mechanical Engineering (Prof. B. Sengupto Prize)	Shri S. Swaminatha Babu

Industrial Metallurgy (Metal Casting Option) (S. Anantharamakrishna Memorial Prize)	Shri Dronavalli Nageswara Rao
Mechanical Engineering (Machine Tools Option) (Dr. S. Vaidyanathan Memorial Prize)	Shri M. Udaya Kumar
Aeronautical Engineering (Air India Prize)	Shri V. Subramanian
Electrical Engineering (Television Engineering) (Prof. Achim Bopp Prize)	Shri K. Ravishankar
Chemical Engineering (Dr. K. Subbaraju Memorial Prize)	Shri Sourirajan Sundararajan
Industrial Management (K. V. Arunkumar Memorial Prize)	Shri Praveen Prakash Arya
Computer Science & Engineering (CMC Prize)	Shri S. Nandakumar

M.Sc. COURSES

Chemistry	Shri Sridhar V.
Mathematics	Miss Rajalakshmi S.
Physics	Shri Mohan Ram N.

RESEARCH CENTRES

Centre for Bioscience & Biotechnology

Centre for Systems and Devices

Energy Research Centre

Fibre Reinforced Plastics Research Centre

Materials Science Research Centre

Ocean Engineering Centre



CENTRE FOR BIOSCIENCES AND BIOTECHNOLOGY

1. Courses Offered

- | | |
|--|----------------------|
| 1. Biochemical Engineering | B. Tech. Chem. Engg. |
| 2. Environmental Engineering | B. Tech. Chem. Engg. |
| 3. Energy technology | B. Tech. Chem. Engg. |
| 4. Environmental microbiology and biology | M. Tech. Chem. Engg. |
| 5. Biochemistry | M. Sc. |
| 6. Microbial Chemistry and Genetic Engineering | M. Sc./Ph.D. |
| 7. Medical Physics I and II | M.S./Ph.D. |
| 8. Biomechanics I and II | M.S./Ph.D. |
| 9. Medical Instrumentation I and II | M.S./Ph.D. |
| 10. Quantitative Physiology | B. Tech. |

2. Important Lectures and Seminars

A weekly seminar group for Centre for Biosciences and Biotechnology has been organised and convened by Dr. Chandra. Weekly seminars are continued during this year also.

3. Distinguished Visitors to the Centre

- a) Dr. Pohland and Dr. Wunsche,
Institute of Applied Chemistry,
Liepzing, G. D. R.
- b) Dr. K. Venkatasubramaniam,
Visiting Professor,
Rutgers University,
U. S. A.
- c) Shri D. B. Bhatt,
Member-Secretary,
Gujarat Water and Air Pollution
Control Board.
- d) Prof. S. Krishnaswamy,
Director,
School of Biological Sciences,
Madurai Kamaraj University.
- e) Dr. N. B. Raju,
Department of Biology,
Stanford University, U. S. A.

Research Work is Undertaken on the Following Projects

- | | |
|--|---------------------|
| 1. Biogas generation using different substrates | Dr. K. Lalitha |
| 2. Biogas generation using different bioreactors | Dr. A. Baratharajan |
| 3. Lignocellulose bioconversion to useful products | Dr. T. S. Chandra |

- | | |
|--|---|
| 4. Mechanisim of biodegradation of lignin | Dr. T. S. Chandra |
| 5. Production of cellulolytic enzymes | Dr. T. S. Chandra |
| 6. Riotransformation of steroids to Pharmacologically active compounds | Dr. T. S. Chandra & Prof. S. R. Ramdas |
| 7. Fermentation for anti-tumor antibiotic Biomycin | Dr. T. S. Chandra |
| 8. Bacteriophage and Seleneoenzymes | Dr. Mahasheshasayee & Dr. T. S. Chandra |
| 9. Structural Studies on proteins and Viruses | Dr. Mahasheshasayee |
| 10. Tapered reactor studies for formentation | Dr. A. Baratharajan |
| 11. Immobilization of enzymes | Dr. A. Baratharajan
Prof. M. Satyanarayana
& Prof. C. A. Sastry |
| 12. Fermentation of molasses tor B ₁₂ and B ₁₂ | Dr. A Baratharajan |
| 13. Biorheology | Dr. Meghasingh |
| 14. Radiation interaction in biological materials | Dr. Meghasingh |
| 15. Sea weed utilization | Prof. M. Satyanarayana
& Dr. Rajeswari |
| 16. Biological Waste treatment | Prof. C. A. Sastry |
| 17. Loop reactor and air jet aerator for waste water treatment | Prof. C. A. Sastry
& Mr. Vijayaraghavan |

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

Studies on the biological treatment using mixed culture bacteria and different types of reactors like Rotating biological disc contractor, anaerobic contact filter, loop reactor, activated slud process of different industrial wastes like pharmaceutical wastes, sago wastes etc. are completed. Work on colour removal using chitin and chitoson are in progress.

Work is in progress to study the possibility of utilising lasers and ultrasonic energy for detection of abnormal tissues in human beings.

A tapered reactor was constructed and studies were carried out for production of single cell protein using this reactor.

Permontation of waste agro industrial raw materials to products like ranthane gum, an extracellular microbial polysaceharide used in food and oil industry is under study.

The biotransformation of hydro cortisone to prodnisolane and side chain elevage of cholesterol and 16 DFA Conversions and heterosteroids are under study.

ASSISTANCY TO INDUSTRY :

Retainer Consultancy :

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

Consultancy :

1. Biological waste treatment

Dr. C. A. Sastry

a) Tenfed. Tiruvannamalai

b) Nav Bharat Solvent extraction Ltd., Guntur.

c) Malladi drugs & Pharmaceutical Ltd., Ranipet.

d) Polytech Organics, Anantapur.

e) M/S Lakshmi Starch Ltd., Hyderabad.

Completed Projects :

1. DST Project — Lasers in Medicine

2. CSIR Fluid dynamic aspects of blood flow and arterial disease.

On-Going Projects :

1. Microbial technology studies on lignocellulose utilization for chemical Feed. ICAR Project

Dr. T. S. Chandra.

Sponsored Projects :

Proposals Sent :

1. Polymeric encapsulation of hazardous wastes

Dr. R. Subramanian and Dr. C. A. Sastry

2. Cryogenic grinding of polymers

Dr. T. K. Ramanujam and Dr. C. A. Sastry

Additional Space for the Centre :

Laboratories suitable for work in microbiology, biochemistry and bio-chemical engineering have been set-up. Now facilities are available for culturing micro-organism and carrying out studies relating to applied microbiology and biotechnology.

Library

1. Books worth Rs. 50,000/- are purchased for the centre and the centre's library is being maintained by Dr. Mahasheesayee. The departmental library facilities are being made use of by the staff associated with the centre.

Major equipment purchased

(a) Thermadyne Laminar and flow chamber

(b) Fraction collector

(c) Remmodel C24 table top centrifuge

(d) Volatile acid determination apparatus

(e) Remi model R-23 Revolutionary Research centrifuge.

(f) Electric automatic autoclaving

(g) Digital micro single pan balance

(h) Metro incubator

Equipment are being looked after by Dr. Megasingh and Dr. A. Baratharajan.

Invited Lectures Delivered by Staff

1. Prof. M. Satyanarayana was invited to give lectures by NCL Pune, RRL, Jorhat, ISRO, Trivandrum, A C. College, Madras.
2. Prof. C. A. Sastry was invited to give lectures by A. C. College, College of Engineering Guindy, Regional Labour Institute, Madras, Mechanical Engineering curriculum Development Centre, NPC, MPC etc.
3. Dr. T. V. Ramakrishna and Dr. C. A. Sastry conducted a course on "Air quality monitoring" for staff of Department of Envir., Govt. of India.
4. Dr. Mahaseshasayee, Dr. Megha Singh and Dr. C. A. Sastry attended the international seminar on Biotechnology at National University of Singapore at Singapore, during Nov. 1983.
5. Dr. C. A. Sastry gave a plenary lecture in the symposium at Hongkong on "Ecological aspects of solid waste disposal" in December 1983.
6. Dr. C. A. Sastry visited England and France during May '83 as a delegate of HNTB (DST) and submitted a report to National Biotechnology Board.
7. Dr. T. S. Chandra visited Kulalumpur and presented a paper in an international seminar

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

1. Bioconversion using different techniques.

- a) Production of enzymes of industrial and commercial importance.
- b) Immobilisation of commercially useful enzymes.
- c) Developing bioreactors for optimizing bioconversions like starch to glucose, glucose to fructose, steroids etc., arriving at design criteria using computer aided design processes.
- d) Steroid bioconversion using free and immobilized microbial systems.
- e) Microbial degradation of pollutants like phenols, lignin, pesticides etc.
- f) Energy production using biomass and industrial wastes.
- g) Fermentative production of single cell protein, Chemicals like citric acid, alcohol etc.
- h) Techniques for separation of product from fermentation broth.
- i) Rheological studies in fermentation systems.
- j) Pilot plant studies.

2. Laser Applications in Medicine and Biology.

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

PUBLICATIONS

1. Promodkumar, Venkateswararao P. V., Sastry C. A., and Ramanujam M. "Charging of aerosol particles by unipolar ions in an applied electric field" Fine Particle Society, U.S.A. Pacific region meeting, Honolulu—Hawaii USA from 1st to 5th August '83.
2. Gurunadharao B. V. S., Promodkumar, Sastry C. A. and Ganeshbabu K. "On the theory of orthokinetic flocculation", power Bulk Solids conference Illinois, U.S.A. July 1984.
3. Promodkumar, Sastry C. A., Ramanujam M. "A Mathematical model for wire duct type precipitator" National Seminar on Assessment & Management of Pollution, JMU, New Delhi, January 1984.
4. Promod Kumar, Sastry C.A. and Ramanujam M. "Charging of aerosol particles by bipolar ions" 15th Fine Particle Society meeting, U.S.A. Florida, July '84.
5. Promod Kumar, Sastry C. A. and Ramanujam M. "Mathematic model for cyclone separator" 15th Fine Particle Society meeting, U.S.A. Florida, July '84
6. Sastry C. A., "Solid Waste Management in India" International seminar on Ecological aspects of solid waste management, Chinese University, Hongkong, Dec. 1983.
7. Sastry C. A., Gurunadharao B. V. S., "Sampling and analysis of refuse from an Indian city—A case study" 1 bid, Chinese University, Hongkong, Dec. '83.
8. Sastry C. A., Tatkar V. and Rapti M. "Immobilisation of a myoglucoside" International seminar on Biotechnology, National University of Singapore, Nov. '83.
9. Sastry C. A. and Gurunadharao B. V. S. "Biological treatment of waste water from a sodium alginate manufacturing plant" International Seminar on Biotechnology, National University of Singapore, Singapore Nov. '83.
10. Kothandaraman, Muraharirao V., Srinivasan P., and C. A. Sastry. "Studies on the characteristics and treatment of waste water from a soap and detergent manufacturing unit A case study" *Jour. Indian Pub. Hlth Engineers* Vol 1983, No. 1 33 (1983).
11. Gurunadharao B. V. S. and Sastry C. A. "Operation and maintenance of waste water treatment plant" *Industrial safety chronicle*, Vol XIV, No. 3 OCT, DEC. 1983.
12. Megha Singh and S. Swarnamani "Erythrocyte sedimentation profiles under gravitational field as determined by He-Ne laser : VIII. Effect of inhomogeneous magnetic field" *IEEE Trans Biomedical Engineering*, 30-10-1983.
13. K. Nityanandan, R. S. Rajagopalan. Megha and A. Periasamy, Identification of cardiac dykinesia through laser speckle pattern. A new non-invasive method. VIII Asian Pacific Congress of Cordiology, Teipai, Taiwan, 1983.
14. Megha Singh and A. Periasamy, "Time average laser speckle interferometry to monitor the cardiac movement, International Symposuim-cum-Workshop on Bioengineering Jadavpur University, Calcutta. 1983.
15. Megha Singh and P. Kanakaraj "Influence of hypercholesterolemia and onion extract on the structure and functioning of erythrocytes" Symposuim on Research in Biology and Biotechnology in Developing countries' NUS, Singapore, 1983.

16. Megha Singh, "Determination of influence of various plasma and cellular constituents on erythrocyte sedimentation" International Symposium on New Methods in Biorheology Nancy, France. 1983.
17. E. Muralidharan, A. William, S. Kandan and Megha Singh "Measurement of the blood cellular and hemoglobin contents by laser reflection method" IX All India Symposium on Biomedical Engineering, Poona' 1983.
18. S. Kandan, P. Kanakaraj and Megha Singh "Influence of erythrocyte cholesterol uptake of the rheological properties of blood" V International Congress Biorheology, Baden-Baden 1983.
19. Megha Singh and K. Paul Joseph "Influence of inhomogeneous magnetic field on the sedimentation properties of normal and malaria infected erythrocytes" V International Congress of Biorheology, Baden-Baden, 1983.

CENTRE FOR SYSTEMS AND DEVICES

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

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

- i) Acoustical and Radar Imaging
- ii) Electromagnetics and Antennas
- iii) Microprocessor Based Systems
- iv) Radar Signal Processing
- v) Semiconductor Devices

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

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

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

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

1. Indoor facilities for antenna pattern measurements (farfield 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—Bands.
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 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.

In the area of solar energy utilisation, the three aspects being studied are: heating, cooling and energy storage.

Optimised designs of sandwich type water heating solar collector have been made and prototypes have been tested. A 100 m² area water heating collector field with selective coating has been installed. Solar assisted heat pump systems have been analysed and vapour compression type systems have been fabricated and tested.

Vapour Absorption Refrigeration Systems (VARS) working on advanced thermodynamic cycles such as dual-stage and dual-effect are being studied. Ammonia -- water and R 22 -- DMF systems are being tested. A Vapour Jet Refrigeration System (VJRS) with R 11 as working fluid has been developed and tested. The above systems which operate with solar heated water at about 90 °C can also be adapted for other low potential energy sources.

Open cycle refrigeration systems, solid desiccant VARS and dehumidification -- cooling systems have been analysed for solar energy utilisation for airconditioning application.

Thermal Energy Storage is an important aspect of solar energy utilisation. Here, the two aspects being studied are, stratified hot water storage and phase change material (PCM) storage. Three large stratified storage tanks (one of 33,000 litres capacity and two of 16,000 litres capacity) have been fabricated and are being tested for performance characteristics. Encapsulation technique and direct contact heat exchange for PCM storage are being studied.

In order to improve the performance of solar operated cooling systems to make them economically viable, hybridisation of cooling and heating systems has been taken up.

For energy conservation and recovery vapour absorption and vapour compression type heat pumps heat transformers are being studied. Vapour compression prototypes operating with R 11 and R 114 have been tested with encouraging results for drying and distillation application. Use of metal hydrides for heat pumping has been studied.

Energy conservation in buildings in the form of reduction of solar heat gain, optimum design of insulation, air circulation etc. is being studied.

In the area of biogas generation, experiments on dry leaves have shown encouragement on the yield of biogas. Perhaps this is the first time some data on dry leaves on the yield of biogas have been obtained. Experiments also have been done to optimise the loading rates of raw materials for the best yield. Two phase digesters for optimal utilisation of feed have also been tried in the laboratory. Some more studies are being performed in this direction. Thermophilic digestion of dry leaves yields better results compared to Mesophilic condition. Studies have been performed on mixed feed stock on biogas yield and also through enriched cultures. The forest leafy residue yields about 35 L/kg dry weight. Electrophoretic studies on protein and enzymes have been done on the cultures. It has been found that anaerobic degradation in multiphase digesters gives negligible gas generation during the first four hours, due to a function in glucose concentration. Further kinetic parameters are being studied so as to modify the design aspects of the digester for more effective degradation and augmentation of gas yield.

An earthen cooking stove has been developed and tests have been made to compare the functioning of the same with metallic stoves. Experiments on different throat diameters of nozzles have been tried to obtain the optimised throat diameter for the best efficiency. It has been observed that the reduction in throat diameter of the nozzle improves the efficiency. Further investigations are being taken up. A theoretical study taking into account of all the parameters for obtaining the best efficiency is being made on the clay stove.

Continuing the studies on bioenergy, the work carried out related to the following objective.

- a) Screening of various sources of potential feed substrates for gas generation.
- b) Catalytic augmentation of gas yield.
- c) Improving CH_4 content of biogas.
- d) Studies on mixed feed substrates.
- e) Enzymatic studies on complete breakdown on organic substrates.
- f) Intermediates in fermentation processes.
- g) Bye product of fermentations.
- h) Separation of phases of anaerobic digestion of complex feeds.
- i) Modified designs to suit the results of above studies.

Different materials screened included variety of agro water, forest leaves etc. Detailed Kinetic Analysis were restricted to *L. leucocephala* as the major substrate.

Mixed feed formulations incorporating *L. leucocephala* identified as the best for sustained high yield of gas, while combinations with cow dung and water hyacinths were not yielding appreciable gas yield.

Added mineral nutrients were shown to enhance gas yield. *L. leucocuphala* has emerged the single best economical source for gas generation potential with almost complete breakdown in a shorter time. The kinetics of its breakdown has been studied in single phase and multiphase digester. The kinetic analyses carried out on different solids loading rate at different HRT indicated an optimal loading rate of 2.5 g VS on a 5 day HRT. The by intermediates of digestion process were characterised to be CH_3OH and acetic acid. Amino acids have also been identified in the medium. The by — products of anaerobic digestion are being evaluated for feed and growing SCP.

Scale—up studies are being done at the Centre for Rural and Development including a two phase digester which has recently been built.

In the area alternate fuels for combustion engines. A new type of engine called the Surface Ignition Engine, is being developed and tested. This engine can use a wide variety of fuels including Alcohols, Gasoline, etc. The Cetane number of the fuel is not critical for this engine.

Alcohol is being sprayed after the Turbo charger to produce charge cooling. This has also the advantages of improved volumetric efficiency and increased power output.

An adiabatic diesel engine is being developed. In this work, the critical engine components like Piston top, cylinder head the cylinder liner are being insulated by ceramic coating or air gap to reduce heat losses. The benefits are increased thermal efficiency and smoother combustion.

Hydrogen is mixed with the air going into the diesel engine. Substitution upto 50 per cent on energy basis has been achieved so far. The problems connected with this engine are being studied.

The scavenging efficiency of small, 2-stroke engines of 2-wheelers is being improved by modified port design and other measures. Hot wire Anemometer is being used to study the scavenging pattern.

FIBRE REINFORCED PLASTICS RESEARCH CENTRE

Courses Offered

The following elective courses were offered by the Centre staff during the first Semester, 1983-1984

- | | |
|--------------------------|---------------------------------|
| 1. Composite Materials | Undergraduate Elective |
| 2. Composite Technology | Post-graduate Elective |
| 3. Composite Structures | Post-graduate Elective |
| 4. Engineering Drawing I | Undergraduate First year Course |

Continuing Education Programme

The Centre offered the Short Term Workshop on FRP Technology during 19th September to 1st October, 1983 and there were 27 participants. In addition, the faculty members of the Centre participated in four short term courses held within IIT and outside.

Academic Research Programme

(In collaboration with other Departments of the Institute)

- | | |
|------------------------------------|---|
| 1. No. of on going M.Tech Projects | 1 |
| 2. No. of M.S. Projects completed | 2 |
| 3. No. of Ph.D. Projects completed | 1 |
| 4. No. of Ph.D. Projects on going. | 2 |

Important Seminars and Lectures

A one day Open House for industry was held on 17th February, 1984 with the theme quality control and testing of composites. A total of five seminar lecture were given by the staff and students of the Centre during the year.

Research And Development

The following R & D Projects were taken up during the year.

1. Studies on Jute Polyester Composites.
2. Development of Coated Fabrics using glass fibre fabrics coated with PVC, Polyurethane and PTFE.
3. Development of prepreg tapes and rovings.
4. Process development of Reinforced Reaction Injection Moulding.
5. Development of glass epoxy moulds for metal forming, deep drawing and SMC hot pressing.
6. Development of Computer Programme for finite element analysis of bus body.

In addition to these projects, the Centre has helped students of various other departments by fabricating their testing models in FRP.

Sponsored Projects

The following projects have been completed during the year.

- i) "Critical Analysis of Bus coaches for Drag and weight reduction" Sponsored by Thiruvalluvar Transport Corporation, Madras. (In collaboration with Department of Aeronautical Engineering and Applied Mechanics).
- ii) "Study of Degradation of Mechanical Properties of Filament Wound Fibreglass Reinforced Plastic Pipes due to nuclear radiation" Sponsored by Department of Atomic Energy.
- iii) "Studies on Jute Polyester Composites" Sponsored by Indian Jute Industries Research Association, Calcutta.

The following sponsored projects were continued during the year.

- i) Development of Metal—lined Filament Wound pressure Vessels. A DRDO Project.
- ii) Development of Regional Test Facility for testing Resins, Fibres and Composites. A DST Project.
- iii) Development of Glass—Epoxy Mould for FRP Press Moulding and Sheet Metal Forming. An ICSR Project. (In collaboration with Department of Mechanical Engineering).

Assistance to Industry

The Centre has maintained its service to industries by offering technical services, giving testing and quality control services, giving product designs through industrial consultancy etc. Specifications have been drawn in collaboration with RDSO, Lucknow for developing FRP components for Railway coaches. The structural analysis of PSLV Second Stage using finite element method was taken up from ISRO as a consultancy Project. The Centre had taken up about Rs. 1.0 lakh worth consultancy projects during the year.

Research Publications

Six.

Dr. N.G. Nair has taken up the honorary editorship of the Composite Section of Popular Plastics.

No. of Visitors to the Centre

Nil.

Invited Lectures Delivered by the Staff

Dr. N. G. Nair and Dr. R. Palaninathan delivered a total of seven invited lectures at various seminars and institutions.

MATERIALS SCIENCE RESEARCH CENTRE

Research and Development

- a) Papers published : 1
- b) Papers presented at National and International Conferences : 4
- c) One Ph. D. has been Produced:

Thesis Title : "Chemical Durability Studies of E-Glass and the Effect of Ion Removal on it's Properties", July, 1983.

Major Equipments added

1. R. F. Sputtering Unit
2. Closed Cycle Helium Refrigerator
3. Tirarc Furnace
4. D. C. Nanovoltmeter
5. Lock-in-Amplifier
6. Mettler Electronic Balances.

Invited Lectures delivered by the Faculty

1. Lecture delivered at the A. C. College of Technology on "Production of Hydrogen" by Prof. G. Aravamudan, Dec. 1983.

Seminars Conducted.

1. A one day Symposium on "Ternary Superconducting Materials" was held on 22 June, 1983.
2. An Open House for Industry and for the Public was conducted during March, 1984.

OCEAN ENGINEERING CENTRE

Education Programme : Continuing Education Programme

Serving Teachers Programme	: Ph.D.
No. on rolls	: 3
Serving Officers Programme	: M. S.
No. on rolls(Sponsored)	: 2
Serving Officers Programme	: M. Tech.
No. on rolls	: 1

Important Lectures Delivered

1. Dredging and Harbour Constructions : Sri M. M. Kamath
Executive Engineer
New Mangalore Port Trust
2. Hydromechanics design of articulated towers Mr. A Mitzlaff
Ocean Engineering Division
Technical University, Aachen
3. Extramural lecture on Antartica
The Mysterious and Challenging
Continent Dr. S. Z. Qasim
Secretary
Department of Ocean Development
4. Resources of the Indian Ocean -do-
5. Dynamic Analysis of Single
Anchor Leg Storage System Prof. Dr. C. L.Kirk
Editor of Journal of
Applied Ocean Research &
Offshore Structures,
Cranfield Instt. of Tech.
England, U K.
6. Surf Zone characteristics and a
Model for a Turbulent Bore Dr. Hiralal Kaul
Oceanographic Instt. Hawaii
7. Some aspects of electronic
measuring techniques applied to
Ocean Engineering Dipl. Ing. M. Beier
Institut fur Wasserbau
Universitat Karlsruhe
8. Some major tendencies in the
development of ship building
and marine industry, Methods
and means for investigation
and seakeeping model tests
of ships & Offshore structures
and Development of Experi-
mental methods and techni-
ques and automation of Engg.
activities in BSHC. Dr. P. Bogdanov
Director
Bulgarian Ship Hydrodynamic
Centre, Varna.

RESEARCH AND DEVELOPMENT

Publications

Total number published in journal Conference	: 30
Technical Reports	: 7

Assistance to Industry ICC

Industrial Consultancy work has been carried out for various organisation from all over the country. The value of the projects is, Rs. 5.7 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)

As a part of OTEC activities, a project for conducting bio-fouling test at Lakshadweep islands for 1MW OTEC with Heat Exchanger being supplied free of cost by M/s. Alfa-Laval, Sweden, has been sanctioned by the Department of Non-Conventional Energy Sources, New Delhi at a total cost of Rs. 2.48 lakhs for two years.

A Project for techno-economic study for 1MW OTEC pilot plant at Lakshadweep for scientific interaction between University of Manchester, NIO, Goa and IIT Madras has been sanctioned by the Department of Non-Conventional Energy Sources.

Sponsored Projects in Progress

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

Scientific Collaboration

A joint scientific collaboration between the Institut fur wasserbau III of the University of Karlsruhe West Germany and the OEC with financial support from Stiftung Volkswagenwerk has been sanctioned for a total amount of DM 63,000 -

Assistance from FRG Under Indo—German Co-operation Programme:

The Proposal for assistance from FRG for Ocean Engineering Centre has been approved by the Govt. of India and recommended to the FRG. Prof. C Kruppa, Institute for Ship and Ocean Engineering, Technical University of Berlin visited the Centre from 11th to 29th July 1983 to evaluate our requirements and proposal and at the conclusion of his visit, a Memorandum of Understanding has been signed and as a follow-up he has submitted the Evaluation Report. It is expected that the formal agreement will be signed and the implementation of the programme will start by middle of 1984 which includes equipments for laboratories upto a value of DM 325,875, training upto three experts as lecturers for a total of 36 man/months and training of 3 scientific officers in FRG for a period of 12 months each.

Expert Assistance from UNIDO:

Dr. P. Bogdanov, Director, Bulgarian Ship Hydrodynamic Centre, Varna visited the Centre from 30th September to 9th November 1983 as a part of the two split—missions for a total duration of 12 weeks assignment to the Ocean Engineering Centre under UNIDO programme to work out the detailed requirements for commissioning and utilisation of the seakeeping tank and to train staff in upto date technology. The final report from the expert is expected for setting out the findings of the mission and recommendations to the Govt. on further action which might be taken.

Assistance From British Council:

The British Council has offered two fellowship of 3 months duration each for training on wave energy related aspects in UK. Two project officers of the Wave Regulator System project have completed their training of 3 months each at Belfast University and Edinborough University.

In addition, the British Council has also offered to send a specialist to visit the Centre from UK. Under this programme, Mr. Jamie Taylor of Edinborough University is now at the Centre for 6 weeks from 22-3-1984.

Further, the British Council has offered books and literature worth 2000 pounds for the OEC Library.

Visitors to the Centre

1. Mr. A. Mitslaff
Ocean Engineering Division
Technical University, Aachen,
West Germany.
2. Dr. S. Z. Qasim
Secretary to Government
Department of Ocean Development
New Delhi
3. Prof. Dr. C. L. Kirk
Editor of Journal of Applied Ocean Research & Head
Offshore Structures & Reader in Structural Dynamics
Cranfield Institute of Technology
England, UK
4. Dr. Hiralal Kaul
Oceanographic Institute
Hawaii

5. Dipl. Ing. Manfred Beier
Institute für Wasserbau III
University of Karlsruhe
West Germany
6. Dr. K. C. Rogers
President
Stevenson Institute of Tech.
USA
7. Dr. Klaus Rose
West German Parliament
8. Dr. P. Bogdanov
Director
Bulgarian Ship Hydrodynamic Centre
Varna
9. Dr. Brian Lavercombe
British Council
UK
10. Dr. Jürgen Warnke
Federal Minister for Economic Cooperation
West Germany
11. Sri K. C. Pant
Chairman
Advisory Board for Energy
Govt. of India
New Delhi
12. B. M. Z. Delegation from FRG

Invited Lectures Delivered by the Staff

1. Lecture at the Seminar on Energy Policy in Vigyan Bhavan, New Delhi on 22.3.84
-- Prof. V. S. Raju
2. Lecture on 'Ocean Engineering aspects with particular reference to Indian Programmes and activities' in REC, Calicut.-- Prof. V. S. Raju
3. Lecture on 'Computer Applications to Offshore Structures' delivered at ISTE Summer School Civil Engineering Department in REC, Trichy from 14th June 83—15th June 83 (2 days)
—Prof. C. Ganapathy

Visits Abroad by the Faculty

Dr. V. Sundar—Canada: As a participant for an International Training programme on Exclusive Economic Zone at Dalhousie University between June 13-Aug.19,1983.

Other Information

- a) Short Term course on 'Analysis and Design of Offshore Structures' is to be held in June 4–16,1984 under the Quality Improvement Programme of Ministry of Education, Government of India.

- b) Indian Geotechnical Conference 1983 (IGC) was held during 21-24, December 1983. More than 230 delegates participated in the Conference and 84 technical papers were discussed.
- c) Under the National Training programme for Ocean Engineers, by NIO Goa, 3 project Officers/1 M. S. Scholar have been deputed on 6 weeks cruises each in the Indian Ocean in connection with the survey of Manganese nodules.
- d) The Open House for Industry in connection with the Silver Jubilee Celebrations of the IIT was held at OEC on 12.3.84. The programme consisted of a Symposium on 'Ocean Technology Development' in the forenoon session, and demonstration of various facilities to the participants in the afternoon session.

35 participants took part in the Open House, represented by 27 industries.

Special Course

The Commonwealth Workshop on 'Coastal, Estuarine and Offshore Exploration and Exploitation' has been organised on behalf of Commonwealth Science Council, London from 14-23, June 1983. The workshop participants from Singapore, Malaysia, Sri Lanka, Tonga and Vanautu. There were other participants from ONGC and NIO, Goa.



SCHOOLS FOR EDUCATIONAL DEVELOPMENT

Chemical Engineering Education Development Centre

Mechanical Engineering Education Development Centre



CHEMICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

Laboratory Cost

Tentative equipment and laboratory cost of each laboratory in Chemical engineering has been suggested as required by the Ministry of Education.

Books Published

1. Laboratory Manual of Experiments in Process Control

Books Under Publication

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

Manuscripts ready for publication

1. Momentum, heat and mass transfer
2. Non-ferrous metallurgical industries
3. Principles of air pollution control
4. Process Plant Design References and exercises
5. Literature resources in chemical engineering and technology
6. Packed bed reactors
7. Coal conversion processes

MECHANICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE

This Centre, sponsored by the Ministry of Education and Culture, commenced its activities in January 1971 by organising a one-week workshop in Mechanical Engineering Curriculum Development. Subsequently twenty-five study group meetings and seminars have been held to evaluate and update the undergraduate mechanical engineering curricula. The study groups, have formulated the sequence and contents of the various courses after thorough discussions. The outcome of these discussions 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. 12) Workshop on Air Pollution Control Technology and Seminar on Educational Technology, 13) Workshop on Standardisation of Nomenclature.

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. 1, 20) Production processes-Vol. II, 21) Steam Tables and Mollier Chart in SI Units and 22) On Thermodynamics of Solar Collectors. 23) Bibliography on Microprocessors and their Applications.

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

SPECIAL FACILITIES

Centre for Industrial Consultancy and Sponsored Research

Central Electronics Centre

Engineering Design Centre

Regional Sophisticated Instrumentation Centre



CENTRE FOR INDUSTRIAL CONSULTANCY & SPONSORED RESEARCH

In the year 1983-84 the Centre for Industrial Consultancy and Sponsored Research has organised Seminars, meetings with representatives from Industry and Open-house for Industry.

The following seminars were organised during 1983-84.

- i) 6.8.83 — Efficient Energy management
- ii) 1.10.83 — Acoustic Emission
- iii) 7.11.83 — Industrial Tribology and Maintenance Engineers.

In all these programmes the Association of Indian Engineering Industry and its member companies took active part. Arrangements were made for two faculty members to spend their Winter Vacation in Industry.

The Centre organised Open-house for Industry during the months of Feb-March '84 and also exhibitions during the International Seminars on Technical Co-operation.

In the year 1983-84 Consultancy earnings of the Institute was Rs. 49.07 lakhs and the number of Consultancy assignments taken up was 438.

SPONSORED PROJECTS (1983—1984)

Sponsored Research Schemes/Projects

The following 25 projects, for a total value of Rs. 89 lakhs were sanctioned during the year under report :

<i>Sl. No.</i>	<i>Project No.</i>	<i>Title of Project</i>	<i>Project Co-ordinators</i>	<i>Total value in Rupees</i>
1	2	3	4	5
Aeronautical Engg.				
1.	01:22:ARDB:83—84	Nozzle deposition problem for Air breathing composite Engines.	Dr. S. S. Gokhale Prof. T. K. Bose & Dr. S. Krishnan	2,43,600
2.	01:23:ARDB:83—84	Experimental & Theoretical analysis of wake and Boundary Layer Interaction on an AIRFOIL.	Dr. E. G. Tulapurkara Dr. V. Ramjee	5,79,000
3.	01:24:ARDB:83—84	Theoretical & Experimental investigation in rarefied gas flows	Dr. A. K. Sreekanth	6,76,000
Chemical Engineering				
4.	03:16:CSIR:83—84:TV	Design & Analysis of heat transfer Systems in presence of Non-condensable Gases	Dr. T.Venkatram	34,515
Chemistry				
5.	04:56:DST:83—84:CSV	Electrochemical investigations on Organometallic Acetylides	Dr. C. S. Venkatachalam	6,95,000
6.	04:57.DST:83—84:SS	Vibrational Spectroscopic studies on structure of water and Aqueous solutions of simple Electrolytes, Nonelectrolytes and Complex Biological Molecules	Prof. Surjit Singh	6,44,280
7.	04:58:DST:83—84:KKB	Studies in Organic photochemistry investigations on the scope and applications of Heteroatom directed photodrylation and related photo — electricyclic Ring closure Reactions.	Dr. K. K. Balasubramanian	4,73,080
8.	04:59:DST:83—84:JCK	Studies in the selection of materials for photoelectrochemical cells photocatalytic reactions.	Prof. J. C. Kuriacose Prof. V. Ramakrishnan & Dr. B. Viswanathan	8,47,220

1	2	3	4
9. 04:60:CSIR:83—84:CK	Investigations on Ion-solvation solvation behaviour of group IB and IIB Metal salts in mixed solvents.	Prof. C. Kalidas	49,400
10. 04:61:CSIR:83—84:RPV	Investigations on photocatalytic process on Microcells	Dr. R. P. Viswanath	52,200
11. 04:62:DRDO:83—84:KKB	Synthesis and Reactions of Acetylenic and Olefinicstriazinyl potential monomers for s-triazinyl polymers	Dr. K. K. Balasubramanian Dr. K. Narayanan	3,07,500
12. 04:63:DST:83—84:SRR&DVR	A new technology for control of Human fertility: Synthesis of novel potential spermicidal heterocycles as male contraceptives.	Dr. S. R. Ramadas & Dr. D. V. Ramana	4,09,335
13. 04:64:ICAR:83—84:ISC	Microbial Technology studies on Lignocellulose utilization for Chemical Feedstocks production	Dr. (Miss) T. S. Chandra	3,93,600
14. 04:65:DST 83—84:JCK	Studies of oxide catalysts for hydrocarbon synthesis and conversion reactions.	Dr. J. C. Kuriacose	8,49,000
Civil Engineering			
15. 05:16:ARDB:83-84:VK	Strength and Computer aided optimum design of stiffened plates.	Dr. V.Kalyanaraman	3,74,500
Mechanical Engg.			
16. 10:45:DST:83-84:OVK&RN	Electrochemical machining Electrochemical Studies & surface production.	Dr. O. V. K. Chetty & Dr. R. Narayanan	2,74,600
17. 10:46:DAE:83-84:RK	Study of wear of Engineering surfaces by radioactive techniques	Dr. R. Krishnamurthy	1,19,900
Physics			
18. 12:40:ISRO:83-84:RS	Determination of optimum pressurant requirements and stratification depths in cryogenics	Prof. R. Srinivasan	2,07,000
19. 12:41:DAE:83-84:VR	Mechanical and Thermal properties of materials at low temperatures	Dr. V. Ramachandran	2,09,600
20. 12:42:DAE:83-84:KVR	Diffusion and electromigration in their films	Dr. K. V. Reddy	1,00,000

	1	2	3	4
21.	12:43:DST:83-84:KS	Development of Semi-conducting Electro-optic devices	Dr. K. Srinivasan	4,80,300
22.	12:44:CSIR:83-84:KVSR	Nuclear magnetic Resonance studies of metal hydrides	Dr. K. V. S. Ramarao	15,385
CSD				
23.	13:16:DRDO:83-84:MSN	Analytical and Experimental studies on the Radiation characteristics of Prime focus and off set paraboloids	Prof. M. S. Narasimhan	2,74,400
Engineering Design Centre				
24.	19:06:ARDB:83-84:RSS	Investigation on image subtraction Techniques	Prof. R. S. Sirohi	4,50,000
CRD				
25.	22:02:Pond's:83-84:PVI	Two-phase Large scale Bio-gas digester for mixed feed	Prof. P. V. Indiresan	1,50,000

The following patent was taken by the Institute during the year 1983-84.

Deposition of Tic Tin coating on cement titanium carbide by CVD Process.

Patent application was made for the following :

New Dredging Device.

Publication :

The Annual report of the Centre for 82-83 was published in April '83. The directory on Technology Education Capabilities at IIT Madras was released in May '83.

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

Collaborative Research projects :

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

M. S. In Entrepreneurship.

The Institute has started a new programme in M.S. Entrepreneurship as part of the Silver Jubilee activities. The Centre for IC&SR co-ordinate this programme and special lectures on various aspects relating to Entrepreneurial development is being organised by this Centre.

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

CENTRAL ELECTRONICS CENTRE

Educational Programme—Continuing Education Programme :

1. Apprentice Training Programme—Fourth Apprentice Training Programme—commenced on 1-12-1982 and completed on 30-11-1983. Number of candidates admitted—Eleven.
2. Short Term Course on 'ELECTRONIC IN INDUSTRY' from 13-2-1984 to 25-2-1984; Number of candidates—Fourteen.

Research and Development :

1. Grinding Wheel Dynamometer Ph. D Project for (Straingauge type) Machine Tools Lab., Dept. of Mechanical Engg.
2. Crank Degree Marker Unit —Ph. D Project for IC Engines Lab., Dept. of Mechanical Engg.
3. Torque measurement by Telemetry—Ph. D. Project for ME&MH Lab., Dept. of Mechanical Engg.

Assistance to Industry :

The following consultancy jobs were undertaken during the above period.

1. Power measurement at India Cements for M/s. Best and Crompton Engg., Madras,— completed and earned Rs. 19,000/—.
2. Electronic control unit for eight Gun Rotary Spray Machine for Prototype Development and Training Centre, Madras—work completed for Rs.30,000/—.
3. HBM Load Cells (50 Ton capacity) — Four numbers for M/s. Calico, Bombay — work completed and earned Rs. 12,000/—.
4. Power measurements on a Lift for M/s. Best and Crompton, Madras — work completed Rs. 5,000/—.
5. Repair of Storage Oscilloscope (Tektronix) for M/s. Chitram and Co., Madras earned Rs. 7,500/—.
6. Repair of Firing Boards for Automatic Battery charging Unit for Madras Telephones, Madras — work completed for Rs. 8,600/—.
7. Repair of Printed Circuit Board for M/s. Goetze India Ltd., Bangalore — work completed for Rs. 600/—.
8. Repair of Charge amplifier for Anna University, College of Engg., Guindy, Madras — completed and earned Rs. 1,800/—.
9. Electronic Control Unit for M/s. Prototype Development and Training Centre, Madras — work under progress for Rs. 50,000/—.

New Major Equipment Added :

1. Tektronix 2213, 60 MHz Dual Trace Oscilloscope — ONE No.
2. Dual Trace Oscilloscope 15 MHz Meltron make — Six Nos.
3. Digital Multimeters HIL make — TWO Nos.

ENGINEERING DESIGN CENTRE

Consultancy Services to Industries and R&D Organisations :

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

- i) M s. Appaswamy and Associates, Madras.
- ii) M s. General Optics (Asia) Ltd. Pondichery.
- iii) Tamilnadu Poultry Development Corporation, Madras.
- iv) M s. Brakes India Ltd. Padi, Madras.
- v) Institute of Road Transport, Madras.
- vi) High School, Pachaperumalpatty, Tamil Nadu.

Teaching and Research :

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

Sponsored Research :

A number of sponsored projects are currently in progress :

- i) Development of decentralised energy system.
- ii) Design and Development of an optical head for T. V. tracker.
- iii) Development of a low cost launcher.
- iv) Investigations on holographic optical elements.
- v) Investigations on image subtraction technique.

Development Projects :

The following projects are in progress :

- i) Development of a CO₂ laser
- ii) Development of a Nd: glass laser
- iii) Fabrication methods for making off-axis aspherical optical elements
- iv) Development of a Belt-tension meter
- v) Development of a wheel chair for handicapped
- vi) Design and development of a centering microscope for CNC milling machine.

Projects Under Negotiation :

- i) Investigations on hologram interferometry and speckle photography-DST
- ii) Design and Development of a discretely switchable FOV (TV) optical system - ADE
- iii) Design and Development of an optical system for interfacing with a GE Television light valve projector-ADE

Research Papers Published: 5

Papers Presented: 5

Silver Jubilee Activities:

A one day 'Open house to Industry' was organised on Feb. 22, 1984. A symposium on 'Design Methodology and Instrumentation' was conducted in the forenoon of Feb. 22, 1984. There was an active participation of the industry in the deliberations. In the afternoon visits were arranged for 'on the spot' discussions on the instruments/equipments developed at the center. The industry evinced keen interest in some of the development work.

REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

Courses:

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

Important Lectures and Seminars:

RSIC organised an entrepreneurs meet on Applications of Analytical Equipment to Chemical Industries. A training workshop was organised by Varian/Hinditron for EM 390 spectrometer under the auspices of our centre.

Research and Development:

Faculty of RSIC have been guiding research in Molecular Spectroscopy for Ph.D. Degree. A total of 17 Ph.D. students are registered under the faculty members of this centre. A Portable IR spectrometer for pollution studies is being designed. High power solid NMR probes are being designed. Number of papers published 15.

Assistance to Industry and other Academic Institutions:

Routine service of providing spectroscopic analysis on various equipments available, to academic institutions and industrial laboratories was done, which is one of the main aims of setting up this centre.

Sponsored Projects

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

New Major Equipments

- (i) VG ESCA/AUGER Spectrometer.
- (ii) Mass Spectrometer (being ordered).

Invited Lectures delivered by the staff

<i>Title</i>	<i>Speaker</i>
(i) Use of spectroscopic equipments for Museum pieces.	Dr. Surjit Singh
(ii) Vibrational Analysis of polyatomic molecules.	Dr. Surjit Singh
(iii) Applications of Raman Spectroscopy.	Dr. Surjit Singh
(iv) Symmetry Selection Rules.	Dr. Surjit Singh
(v) Ligand Field Theory.	Dr. S. Subramanian
(vi) EPR and Radiation Damage.	Dr. S. Subramanian
(vii) NMR of paramagnetic salt hydrates.	Dr. S. Subramanian
(viii) Joint Research Projects.	Dr. S. Subramanian

Lectures from Visiting Scientists

- (1) Professor Werner A. P. Luck,
Univ. of Marburg
Marburg, W. Germany

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

- (1) Derivative Spectroscopy for Charge Transfer Complexes.
- (2) Magnetic Resonance in Liquid Crystals.
- (3) Vibrational spectra of aqueous solutions of biological compounds.
- (4) Pulsed NMR in solids.
- (5) Magnetic Resonance on donor acceptor complexes.
- (6) Vibrational spectra of Low—dimensional conductors and phase transitions.
- (7) Resonance Raman spectra of biomolecules.
- (8) Low density energy transfer.
- (9) Radiation properties of special surfaces and castings.

CENTRAL SERVICES FACILITIES

Central Glass Blowing Section

Central Photographic Section



CENTRAL GLASS BLOWING SECTION

The Central Glass Blowing Section represents the important infrastructural facility for the entire Institute catering to the needs of the various Departments and Centres, besides undertaking industrial jobs. Since its inception in 1972, the section has been engaged in design and fabrication of scientific and technical glass apparatus for research purposes of the various departments.

The major equipments available with the section include Horizontal cum vertical lathe, Forming lathe, Universal lathe, Taper turning machine, cutting grinding and polishing machines, High vacuum system, Drilling machine, Most of which were gifted by the Federal Republic of Germany to the Indian Institute of Technology, Madras as a part of the collaborative programme. The staff structure consists, besides a nominated Chairman who coordinates the activities of the section (usually at the level of a Professor in any one of the Science and Engineering Departments to advise and to attend to the official matters) parting to Central Glass Blowing Section

1. Technical Officer
2. Two Senior Technical Assistants
3. Two machanics
4. A helper
5. A part time office assistant.

The Technical Officer was trained for 14 months in different advanced techniques in Scientific Glass Blowing in Federal Republic of Germany under the collaboration (German).

Besides the fabrication of materials to suit the needs of individual projects the section has also taken up projects in specialised areas like cryogenic glass systems, different types of vacuum system and Complicated microdistillation units.

The Section has also been offering short term course, training programme in fundamentals of glass blowing for post-graduate students in science departments every year.

The programme is a part of the curriculum requirement for the post-graduate students.

The section is also undertaking industrial consultancy work. Notable consultancy programme executed in recent times is listed below : Cryostat, Spherical and Cylindrical deward (window silvering), Luggin, probe, Adiabatic calorimeter, Laser housing tube with water jacket, Mercury container for volueminometer, Reaction kettles, Reactor tube for GBC annual, jet electropolisher, Double walled transfer. tube, vaccum tube collector for solar energy. Quartz wares (cruisible, combustion tube, crystal growing quartz sheets etc.)

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.

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.

During this silver jubilee year (1983—84), the CPS took charge of photo recopying of vintage photographs as also photo-taking and provided several blow-ups for the exhibitions organised in Sep. 1983 and then during the Indo-German Seminar in Dec.-Jan1984. For the Open House 1984 several colour blow ups for the exhibition were also made by the CPS.

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

RESEARCH PUBLICATIONS	—	Total upto 1983	:	165
	—	Added in 1983-84	:	10
MONOGRAPHS	—	Upto 1983	:	6
	—	New Addition 1983-84:		Nil
DEPARTMENTAL PROJECTS	—	B.Tech.	:	10
	—	M.Tech.	:	2
	—	M.S.	:	4

Sponsored Projects

<i>Title</i>	<i>Sponsor</i>	<i>Amount</i>
1. Hot Cascade Test Rig	ARDB	21.18 Lakhs
2. Slotted Tube Grain Design Analysis	ISRO	3.96 Lakhs
3. Erosive Burning Studies of Solid Propellants	ARDB	6.95 Lakhs
4. Theoretical and Experimental Investigations of Rarefied Gas Flows	ARDB	
5. Theoretical and Experimental Investigation of Wake boundary Layer Interaction on An Airfoil	ARDB	5.8 Lakhs

NEW STAFF

Mr. P. Arivayudam, Mechanic A.

Research Publications

Lectures delivered outside by the Staff Members : Professor K. A. Damodaran.

1. 'Aircraft Power Plants—A Comparison'—Delivered at M.I.T. under the auspices of the Aeronautical Association of M.I.T. and Aeronautical Society of India.

Dr. E. G. Tulapurkara.

1. 'Prediction of Thin Shear Layers Using $k-\epsilon$ model of turbulence' at V.S.S.C., Trivandrum, on 19. 1. 84.
2. 'Flow Through Channels Interconnected by Slot (s) at M.I.T., Madras, on 5. 2. 1984.

Important Lectures and Seminars

	<i>Speaker</i>	<i>Topic</i>
1. 7th Oct. 1983	Design Engineer, HAL, Bangalore	Use of Telemetry for A/c. Flight Testing
2. 28th Oct. 1983	R.C. Pani, Senior Design Engineer, HAL Bangalore	Flight Analysis
3. Jan. 1984	Dr. W. Merzkirch, Ruhr University, Bochum, West Germany	Visualisation of Fluid Flows.
4. 23rd March 84	Mr. Arun Prasad, Director, G.T.R.E., Bangalore.	Looking Ahead in Turbine Engine Technology

Research Publications

<i>Author</i>	<i>Title</i>	<i>Publication</i>
1. T. K. Bose and R. V. Seeniraj	Laminar stagnation point heat transfer for a two temperature argon plasma	AIAAJ, 1984, Accepted for publication.
2. T. K. Bose and R. V. Seeniraj	On electrostatic probes for dense flowing plasma	Physics of Fluids 1984. Accepted for publication
3. T. K. Bose and R. V. Seeniraj	Two temperature noble gas plasmas	J. of I.I.Sc., 1984 Accepted for publication
4. T. K. Bose and R. V. Seeniraj	On reactive conductivity coefficient of multiple ionized two temperature argon plasma	Waerme-und Stoiffuebertragung 1984 (Accepted)
5. R. C. Mehta and T. K. Bose	Temperature distribution in a large circular plate heated by a disk source	International J. of Heat and Mass Transfer, Vol. 26, 1983 pp 1159—71.
6. G. Subramanian and D. Selvan	Effect of complementary Gratings in Fringe Sharpening on Fringe orders	Experimental Techniques, 7(6) Sept. 1983 (36—37)
7. G. Subramanian and S. Krishnakumar	On a curvature—based non-destructive moire technique for detecting defects in plates	NDT International, 16(5) Oct, 1983 (271-274).
8. K. Manjunatha Udupa, V. T. Nagaraj and T. K. Varadan	Optimum design of Composite rotor blades	Presented at Sixth World Congress of the International Federation of Theory of Machines and Mechanisms, held at New Delhi, Dec. 1983

- | | | | |
|-----|--|--|---|
| 9. | K. Viswanatha Reddy and
K. A. Damodaran | Calculation of flow fields in
High Speed Inlets using
Finite Volume Method | Proceedings of 12th National
Conference on Fluid
Mechanics and Fluid Power,
December 1983. |
| 10. | E. G. Tulapurkara
(Co-authored) | Comparison of Computation
with Experiment | Stanford Conference on
Complex Turbulent Flows
Vol. III (1983) |

APPLIED MECHANICS

Quality Improvement Programme:

No. of trainees so far
No. on rolls in Ph.D.

<i>M.Tech.</i>	<i>M.S</i>	<i>Ph.D</i>
	—	8
	1	7

Shot-term courses conducted :

NIL

Important Lectures and Seminars:

1. Prof. A. Matis, USA on Compartment modelling of drug kinetics
2. Prof. A. Morecki, Poland, on Biomechanics of orthtic and prosthetic devices
3. Prof. S. C. Schroter England, on Flows in the arterial bifurcations.
4. 3 days International Symposium on Physiological fluid dynamics, September 5-7-1983.
5. The All India Workshop on Intra Cranial pressure, jointly organised by IIT, Madras and Institute of Neurology, Madras February 5-7-1984.
6. Conducted Seminar on 'Experimental Stress Analysis and its application to Industrial Design' for participants from Industries on 16-2-1984 (Co-ordinator Pro. R. S. Alwar)
7. Workshop on Wind Energy Systems conducted in August, 1983
8. Silver jubilee seminar on Sugar Machinery for Industry on August 10, 1983 by Dr. V. Ramamurthi
9. Prof. G. Johannsen, Professor of Theory of Technological Systems and Head of the Laboratory for Man-Machine systems Dept. of Mechanical Engg. University of Kassel has given a talk on 'Planning and Fault Managing in Man-Machine Systems' on 10-1-1984.
10. Prof. M. Heckl, Director, Institute of Acoustics, Technical University of Berlin, has given a talk on 'Research Activities of his Institute and on Industrial Noise Control, on 2-3-1984.
11. Prof. G. Diana of the Polytechnic of Milan has given a talk on 'Two Decades of Research Activities in Transmission line Vibrations', on 21-12-1983.
12. Prof. S. H. Crandall, Ford Professor of Engineering, Department of Mechanical Engineering, Massachusetts Institute of Technology, U.S.A. has given a lecture on 'Rotor Dynamics, on 26-12-1983.
13. Prof. O. Mahrenholtz, Professor of Ocean Engineering, Technische Universitat Hamburg Hamburg, W. Germany, has given a lecture on 'Analytical Behaviour of Cracked Rotors, on 5-1-1984.
14. Dip. Ing. (FH) Rehkop, HBM Corporation, Framingham, Ma. U.S.A. has given a lecture on 'Recent Developments in Load Cells' on 10-1-1984.

Research Publications :

No. of Papers published:

48

Departmental Projects :

Sponsored

1. Assessment of Leprotic feet and individualised footwear design by Dept. of Social Welfare
2. Hemorheology sponsored by CSIR
3. Development of Software for 3—Dimensional Viscoelastic Analysis of Solid Propellant grains for Missiles (ARDB Project)— Investigator Dr. R. S. Alwar.
4. DAE Project on the study of flow through cyclone separators.
5. Flow visualisation studies on bodies with various geometries.
6. Studies on Wall jets.

Assistance to Industry

1. Hospital
2. IC & SR –Biofeedback monitor to Institute of Aviation Medicine Bangalore
3. Improvement in the design of tricycles used for handicapped for Andhra Pradesh Handicapped Persons Association Hyderabad.
4. Measurement of contact pressure between Tyre Moulds for L & T Mcneil Ltd. Madras.
5. Alignment of Optical Components in Ruby Pulse Laser (For Gas Turbine Research Estt. Bangalore)
6. Experimental Stress Analysis of back plate of the Brake Drum Assembly (For Brakes India Ltd.) Madras.
7. Thermal Stresses in Steam Turbines during Transient Operations for BHEL Hyderabad
8. Computer Analysis of the Double Decker Bus Chassis (For Ashok Leyland, Madras).
9. M s Ashok Leyland, Madras.
10. Vibration test on 'EE' type ODS Switch.
11. Testing of Lightning Arresters for Seismic forces
12. Experimental Investigation of Ball Bearings and Performance Prediction.
13. Stress Analysis of the TI Cycle Frames.
14. Stress Investigation of Bogie Frames Using Finite Element Method.
15. Earthquake qualification and response evaluation of MCC Panels.
16. Stress Analysis of Mill and shell girthgear etc. for cement mill.

New Major Equipment added :

1. Developed Laser Equipment for medical diagnosis
2. An Universal Testing Machine of 20 T capacity has been received and it will be installed shortly
3. 40 HP blower with a motor
4. Sound Power Processor with level Recorder and accessories made by Bruel and Kjaer Denmark has been gifted by the Alexandar Von Humboldt Foundation (W. Germany)

Visitors to the Department

1. Prof. A. Matis from USA.
2. Prof. A. Morecki from poland
3. Prof. S.H.Chandall Fort Professor of Engg., Massachusets Institute of Technology, USA
4. Prof. G. Diana of the Polytechnic of Milan, Italy.
5. Prof. G. Johannsen, Prof. of Theory of Technological Systems and Head of the laboratory University of Kassel, W. Germany.
6. Prof. O. Mahrenholtz, Professor of Ocean Engg., Technische Universitat Hamburg Hamburg W. Germany
7. Prof. M. Heckl, Director, Institute of Acoustics.
8. Prof. Hans Wagner, 75, Karlsruhe, Elbinger Strasse 8 a. W. Germany.
9. Prof. Seshadri Sankar was visiting professor in the Dept. during January—April, 1984.
10. Prof. S. C. Schroter from England.
11. Prof. G. Broun from France.
12. Padmashri Dr. H. Srinivasan, CLTRI, Chengalpattu.
13. Foreign Minister of Kenya and his team.

Invited Lectures delivered by the Staff:

1. Delivered a lecture on 'Flow around three dimensional bluff bodies' for the Aero Society of India, Madras Branch.
2. Delivered lecture by Dr. K. M. Patil on 'Biomechanics of Orthotics and Prosthetics' for Participants in the Short term course to P. G. doctors on Orthopaedic mechanics organised by Artificial Limb Centre, K. K. Nagar.
3. One lecture delivered by Dr. S. Radhakrishnan on 'Biomechanical aspects of locomotion' to the participants in the short term course to post graduate doctors on orthopaedic mechanics organised by Artificial Limb Centre, K. K. Nagar.

4. Dr. S. Narayanan, delivered lectures in ISTE sponsored Intensive course on Probabilistic Analysis and Design of Structures against earthquakes, Wind and Ocean Waves, Department of Civil Engg. Thapar Institute of Engineering and Technology Patiala, May 30, 1983 and June 10, 1983 on Wind Response.
5. Dr. S. Narayanan, gave a seminar talk on 'Stochastic stability of Pipes Conveying Fluid' at the Dept. of Mechanical Engineering, IIT, Kanpur on 27th March, 1983.

Other Information:

1. One paper presented at the Symposium on Biology and Biotechnology in developing countries at National University, Singapore, 1983 by Dr. Megha Singh
2. Gift equipment (microcomputer controlled computer) worth DM 24,000 are offered to BME Division (to continue research work done by former Humboldt Fellow Dr. K. M. Patil) by the Alexander Von Humboldt Foundation, Bonn.
3. Prof. T. M. Srinivasan has gone to McMasar University in June 1983 on sabbatical leave for 16 months
4. ARDB Project worth 5.8 lakhs rupees is jointly received by Dr. V. Ramjee and Dr. E. G. Thulapurkara
5. Paper entitled 'S' Blade profile for fully reversible axial machine 'by Rm. Ramachandran H. C. Radhakrishna and P. A. Aswatha Narayana published in Journal of Institution of Engineers (I) 63, Pt. M. E. 4, Jan. 83 has been awarded a Certificate of Merit by Institute of Engineers (India) during Feb. 1984

11. Development Programme in future

1. Microprocessor based system for interface pressure data collection storage and updating the pressure input for treatment and protection of Bedsore patients.
2. Ultrasonic tomography for imaging soft tissue for diagnosis.
3. Ultrasonic cardiac image processing
4. Online monitoring of cardiovascular system model flows and pressures using microcomputer for design of cardiac assist device
5. On line monitoring of foot pressure measurement during standing and walking
6. Applications of Lasers in (a) Cardiac monitoring (b) detection of tissue abnormalities (c) clinical laboratory techniques
7. A Research In understanding (i) role of red cell in atherosclerosis (ii) macro and micro hemorheology
8. It is proposed to hold an International symposium on Biomechanics and Clinical Kinesiology of Hands and Feet in Feb. 1985.
9. A research study on wings is undertaken
10. Development of a cyclone tunnel and fabrication of Electrolytic tank for fluid flow analogy.

CHEMICAL ENGINEERING

Specializations in M.Tech. (3 semesters)

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

Quality Improvement Programmes

(Serving Teachers Programme)

	<i>M.Tech.</i>	<i>M.S.</i>	<i>Ph.D.</i>
Number of Trainees so far	5	3	3 + 1
Presently working	—	—	5

Important Lectures and Seminars

<i>Title</i>	<i>Speaker</i>
1. Homogeneous Catalysis	J. Villadsen, Denmark
2. Modelling of Fluidized bed dryers with steam	O. E. Potter, Australia
3. Chemical Process Engineering	L. T. Fan, USA
4. Modelling of Bubble Reactors	F. Kastanek, Czechoslovakia
5. The Role of adsorbate mobility rates of Chemical Reaction.	S. Sundaresan, USA
6. Molten Salt Technology	R. Neelamegam, USA
7. Dynamics of Dispersed Systems	T. E. Ramabhadran, USA
8. Micro computers in Process Control applications	P. B. Deshpande, USA
9. Branching Problems of Thermally Driven Motions	R. Narayanan USA
10. Manufacturing Operations	H. V. R. Iengar, Madras
11. Application of surfactants in Chemical Engineering	Narayanan, USA
12. Developing Water Pollution Control Objectives	S. C. Srinivasan

Research

a) Research Publications

- i. Papers Published 9
- ii. Papers presented 7

b). M.S. Ph.D.

	<i>M.S.</i>	<i>Ph.D.</i>
Completed	1	3
Ongoing	15	23

Books Monographs

Laboratory Manual of Experiments in Process Control Ch. Durga Prasada Rao and C. Chandra Prasad (Ed)

ICC -Including Retainer Consultancy

Consultancy

- 1. Effluent Treatment M s Nava Bharat Solvent Extraction, Guntur.
- 2. Effluent Treatment M's. Indo-National, Nellore
- 3. Textile Mill Effluent Treatment M's. Tripur Textile Mills, Tripur.
- 4. Effluent Treatment M/s. Tanfed, Thiruvannamalai
- 5. Thermal Profiles in Insulators M s. W. S. Insulators, Madras
- 6. Effluent Treatment M s. Lakshmi Starch, Hyderabad
- 7. Inred Iron making Process FAIR, Bangalore

Retainer Consultancy

- 1. Dr. C. A. Sastry M s. Lakshmi Starch, Bombay M s. Harihar Polyfibres, Harihar
- 2. Dr. Y. B. G. Varma M s. Mothi Chemicals Ltd, Trivandrum
M's. Tamil Nadu Carbondioxide Ltd, Madras.

New Equipment

- 1. Rheograph with data process computer
- 2. Microprocessor for control purpose
- 3. Industry Process Control System for the control of various parameters.

Visits to the Department

- 1. Prof. J. Villadsen, Institut for Kemiteknik, Denmark.
- 2. Prof. O.E. Potter, Monash University, Australia

3. Prof. L. T. Fan, Kansas State University, USA
4. Prof. F. Kastanek, Institute of Chemical Process Fundamentals, Czechoslovakia Academy of Sciences, Prague Czechoslovakia
5. Prof. Porshakov and Siunaiev, Moscow, USSR
6. Prof. Y. Nayudamma, Centre for Development Alternation, CLRI Campus, Madras

Invited Lectures delivered by the Staff

Dr. C. A. Sastry :

1. "Environmental Science"—Dept. of Polymer Science, University of Madras.
2. "Environmental Micro Biology" Centre for Environmental Studies, College of Engg. Guindy, Madras
3. "Air Pollution & Water Pollution" IIT New Delhi
4. "Systems analysis in Environmental Studies"—ISRO, Trivandrum
5. "Industrial Toxicology"—Regional Labour Institute, Madras
6. "Stabilization Ponds" TWAD Board, Madras
7. "Energy Technology & Pollution Control National Productivity Councils, Madras

Dr. M. S. Ananth

1. A one parameter model for self-preserving distributions in Granulation—Bell Laboratories, Murray Hill, NJ, USA.
2. Hydrodynamics of cocurrent two-phase downflow through packed beds" — Drexel University USA
3. "On local composition lattice theories of solution" — Princeton University, USA
4. "A self-consistent local composition theory for activity coefficients in non-polar liquid mixtures" — Cornell University, NJ, USA
5. "Statistical Thermodynamics" — Lehrstuhl für Technische Thermodynamik, RWTH, Aachen, West Germany.

Dr. Ch. Durga Prasada Rao

1. "Use of Mathematical models in Control"—Karnataka Regional Engg. College, Suratkal.

Short term course/Symposium

1. Air pollution Monitory for the staff of DOE in Collaboration with chemistry Dept., IIT Madras
2. Air pollution Control in collaboration with Curriculum Development Centre

3. Computer aided design of Machines & Ores for Polymer Processing, 9&10 May 1983
4. Methods of Plastics Processing for quality products 16 & 17th Jan. 1984.
5. Partnership in Development --- Interaction between Industry and Department of Chemical Engineering, IIT Madras, Symposium held on 24.2.1984 as part of the Industrial Open House.

Any other item of special interest

1. A separate course for Fertilizer Association of India for M. Tech. degree has been started.
2. Under Institutes Collaboration scheme Regional Engg. College, Warangal, and IIT are involved in the Laboratory development

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, analytical and nuclear chemistry. Most of the research programmes are funded by outside agencies such as DST, CSIR, DAE, INSA, ISRO, Defence and other organisations. A few inter-Department development projects supported by IRDF funds of IC & SR and the Centre for Rural Development were initiated. A beginning was made in consultation with the Department of Chemical Engineering to identify certain chemicals and products, to help young entrepreneurs to set up small scale industries.

Research Publications

About 80 papers have been published by the faculty in national and international journals. The total number of papers published by the department exceeds 750.

Books and Monograph

1. Chemistry in Engineering and Technology 'by Prof. J. C. Kuriacose and Prof. J. Rajaram under publication by Tata MC Graw Hill, New Delhi
2. 'Thermodynamics for students of Chemistry' by Prof. J. C. Kuriacose and Prof. J. Rajaram under Publication by Shoban Lal and Nagin Chand & Co., Jullendar City.

Sponsored Projects

More than twenty projects funded by DST, CSIR, DAE, INSA, CASE, Departments of Defence and Environment, Government of India are being investigated. The following new projects were sanctioned during the year.

<i>Title of the Project</i>	<i>Funding Agency</i>	<i>Investigators</i>
1. Factors controlling Human Fertility-synthesis of Novel Heterocycles and their use as potential male contraceptives.	DST	Prof. S. R. Ramadas Dr. D. V. Ramana
2. Microbial Technology studies in hiper-cellulose utilization for chemical feed back production	Indian Society of Agricultural Research	Dr. T. S. Chandra
3. Industrially useful polymer supported catalysts	DST	Dr. V. Mahadevan Dr. M. Srinivasan
4. Studies on the selection of materials for photoelectrochemical cells and photocatalytic reactions	DST	Prof. J. C. Kuriacose Prof. V. Ramakrishnan Dr. B. Viswanathan

5. Studies on oxide catalysts for hydro-carbon synthesis and conversion reactions	DST	Prof. J. C. Kuriacose Dr. B. Viswanathan
6. Investigations on photocatalytic processes on microcells	CSIR	Dr. R. P. Viswanath
7. Electrochemical investigation on organometallic Acetylides	DST	Dr. C. S. Venkatachalam
8. Electrochemical mechanism Electrochemical studies and surface products	DST	Prof. R. Narayan
9. Investigations on ionsolvation— solvation behaviour of Group I B and II B metal salts in mixed solvents	CSIR	Prof. C. Kalidas

Indo- German Projects:

Work has started on the two Indo-German projects one with Prof. R.Narayan as the Investigator in Electrochemistry and another with Profs. J. C. Kuriacose and Prof. C. N. Pillai as the Investigators in Heterogeneous Catalysis.

Seminars Short Term Courses Workshop

A short-term course on "Sampling and Analysis of Heavy Metals in ambient air" sponsored by the Department of Environment, Government of India as part of an integrated heavy metal pollution programme was conducted in October 1983.

Jointly with the Catalysis Society of India (whose office is situated in the Department of Chemistry), the Second National Workshop in Catalysis was held during the period December 8-10, 1983. About 30 Organisations and 120 delegates attended the workshop.

The IX Annual Symposium in Chemistry was conducted on 3rd and 4th March 1984 jointly with A.M.Jain Collage, Madras. Around 320 research workers in different areas of Chemistry Participated. Around 45 papers were presented orally and nearly 30 papers were put up in the poster session.

Silver-Jubilee Activities:

A symposium entitled 'NEW VISTAS in Chemistry' was organised on December 10, 1983. A large number of research workers in and around Madras participated. The lectures were delivered by Dr. Sukh Dev of Multi-chem Research Centre, Baroda, Dr. Balasubramanian of Centre for Cellular and Molecular Biology, Hyderabad. Dr.V. Ramamurthy of Indian Institute of Science, Bangalore and Prof. W.R.Jackson of Monash University, Australia.

A one day Open House for Industry was arranged by the Department in participation with RSIC and MSRC. The topic for discussion was 'Chemistry, Materials and Technology-Key to National Progress'. About 55 participants representing 30 Industries took part in the discussion and the visits to the various laboratories.

Sri T.S. Viswanathan, formerly of Madras Fertilizers, R. Ramani, Chemical Engineering Consultant, Dr. Nadamuni of Dadha Pharmaceuticals and Dr. T.S. Santhanakrishnan of Bush Boke Allen Co. were the main speakers.

Visitors

1. Prof. W. R. Jackson, Monash University, Australia
2. Prof. E. Vogel, University of Cologne, West Germany
3. Prof. Y. Nayudamma, Distinguished Scientist, CSIR India.
4. H. W. Rudy, University of Gottingen, West Germany
5. Dr. G. I. Panov from the Institute of Catalysis, Novosibirsk, USSR spent nearly 4 weeks in the Catalysis laboratories of the Department during March—April 1984.
6. Two Senior Professors from Moscow Gubkin Institute of Petrochemical and Gas Industry USSR

New Major equipments installed:

1. Mass Spectrometer
2. Polarecord VA detector etc. (Electrochemical Instrument)
3. Infrared spectrophotometer
4. Shimadzh UV Spectrophotometer
5. Shmqdzh micropore column
6. Quantum Yield Reactor and TFQ 15 Complete Thin film Reactor

Faculty appointment

Dr. M. N. Sudheendra Rao joined the Department as Lecturer and his area of specialisation is Inorganic Heterocycle compounds. Dr. T. V. Ramakrishna, C. S. Swamy and Dr. M. R. Udupa have been promoted as Professors. Drs. J. Rajaram, V. Mahadevan and R. Narayan have been promoted as Associate Professors. Dr. S. Vancheesan has been appointed as Assistant Professor. Prof. S. R. Ramadas Prof. V. Ramakrishnan, Prof. C. S. Swamy and Dr. B. Viswanathan have been appointed as joint faculty in RSIC.

Participation of Faculty in Conferences/Visits abroad:

Invited Lectures were given by the faculty of the Department at various Universities and Institution in India and abroad. Prof. P. T. Manoharan, Dr. K. K. Balasubramanian and Dr. B. Viswanathan are abroad on research assignments. Prof. C. Kalidas visited West Germany and other European countries for participation in an IUPAC meeting and research discussion. Prof. R. Narayan spent a few weeks in Berlin in connection with his research projects. Dr. T. K. Varadarajan and Sri. R. Balachandran Pillai rejoined the Department after working for more than 15 months in Karlsruhe University, West Germany. Dr. N. Sundaram rejoined the Department after his research assignment in U.S.A. Dr. C. S. Venkatachalam visited Darmstadt, West Germany on a DAAD short term invitation programme. Dr. (Miss) T. S. Chandra participated in a Workshop on Biotechnology at Malaysia.

Any other information

1. Prof. B. Sengupto prize, instituted by contribution made by the faculty of the Department, was awarded for the first time to Miss Radhika Batra and Miss Prabha Varadarajan (M.Sc. Chemistry) students for scoring the highest marks in the first three semesters of the M. Sc. course (1981-83). Prof. B. Sengupto prize for the 1982-84 batch has been awarded jointly to Miss Prabha Varadarajan and Miss Radhika Batra.
2. RESONANCE, an association of the students and faculty of chemistry, RSIC and MSRC arranged a number of popular lectures. Under the auspices of the same organisation, A visit to Sriharikota Rocket Launching Station was also arranged.
3. Miss Radhika Batra M. Sc. student (1982-84) visited West Germany during the summer of 1983 under the Indo-German programme of exchange of students funded by DAAD.
4. The M.Sc. students of the Department gave around 40 seminar talks on topics of general interest to chemists. The number of research seminars given by Ph.D. scholars exceeded 60.
5. Prof. S. R. Ramadas has been nominated as a member of the Editorial Board for the International Journal 'Sulfur Letters'.
6. Prof. C. Kalidas has been nominated as the National Representative for IUPAC Commission on Solubility Data by INSA, New Delhi.

CIVIL ENGINEERING

New Courses Introduced

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

New System/Method Added

3 Semester M.Tech Programme in Building Technology, Hydraulic Engg., Geotechnical Engg. Structural Engineering and Transportation Engineering were introduced in July 1983

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.

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 visited the Department.

Topic of Lecture

Speaker

In Situ Improvement of Soils and Fills

Construction and Slope Protection of Man Made Islands used for Oil Exploration

Instrumentation of a Large Diameter Pier

Engineering Prospects in Canada

Geotechnical Use of Fly Ash

'FEM for Ground Water Modelling'

'Recent Studies at IWW, T. U. Aachen'

'Computer Graphics and Groundwater Modelling'

'Highlights of the Delta Works'

Invited discussion—on Postgraduate Education in water Resources

Dr. Ramesh Joshi Dept. of Civil Engineering
University of Calgary 2500 University Drive
Calgary, Alberta Canada T2N 1N4

Dr.—Ing. W. Pelka Institute for Hydraulics and
Water Resources Development, T. U. Aachen

Prof. Dr. —Ing. G. Rouve Institute for Hydraulics
and Water Resources Development T. U. Aachen

Mr. V. Srinivasan International Groundwater
Modelling Centre Halcomb Research Institute
Butler University U. S. A.

Ir. Bertjan Bosselaar Project Engineer, Rykes
Waterstaat The Hague, The Netherlands.

Prof. S. Rameseshan Professor of Civil Engg.
IIT., Kanpur.

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 15.

Departmental Projects

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

Assistance to Industry---ICC

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

Sponsored Projects

Four research projects were in progress during the year.

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 Engg. and Transportation Structures
15. Traffic Studies
16. Computer Aided Design and Civil Engg. Systems
17. Development and use of Cold formed Sections in Structural Engineering.

COMPUTER SCIENCE AND ENGINEERING

Since the inception of the Computer Centre there has been a phenomenal increase in the work load on the computer and it was decided to go in for a time-sharing system to ensure better services at the Computer Centre. Steps have already been initiated to augment the existing IBM-370/155 with an IPL-80 unit, currently supporting 8 terminals. This expected to obviate congestion to some extent.

Research and Development

1. Research Publications : 13
2. Departmental Projects : 6
 - i. CAD for VLSI.
 - ii. Installation of operating system for the new IPL 4443 system.
 - iii. Implementation of Remote Information Control System on IBM 370/155.
 - iv. Computerisation of JEE examination processing.
 - v. Software development for GATE examination computerisation.
 - vi. Revision of computerised payroll system.
3. Sponsored projects : System analysis data processing and statistical computing for Predicting Management Effectiveness of Middle level production Managers of Indian Industries' Sponsored by ICSSR, Co-ordinator, Dr. (Mrs) Balaraman.

Continuing Education Program

1. Organised and conducted entirely by the faculty and staff of computer centre.
 - i. IBM 4341 system, data, base data communication and Transaction processing.
2. Lectures delivered by the faculty and staff of computer centre.

Prof. C.R. Muthukrishnan	: 1. 'Unix Operating System'—ISRO, Bangalore. 2. 'C—Programming language' - REC, Warangal 3. 'Hypothetical Workstation for Information Retrieval —IETE, IIT. Automatic Programming — CSI'84
Prof. H. N. Mahabala	
Dr. (Mrs.) Kamala Krithivasan	: 'Finite State Automation as Mathematical Model' — IIT, Mathematics Department.
Dr. K. B. Lakshmanan	: A series of lectures on 'Analysis of Algorithms' — MIT, Madras.
Mr. S. Srinivasan	: 'Transaction Processing Systems' — Computer Maintenance Corporation, Hyderabad.
Mr. G. Kannan	: 'Statistical Computing with SPSS' — Dept. of Econometrics, Madras University.
Mr. S. Srinivasan and Mr. S. Sridharan	: 'Transaction Processing and Data Bases' — TELCO, Pune.

Mr. M. K. Ramanujam and Mr. S.Sridharan : 'Operating System VM/370' -- Tata Consultancy Services, Bombay.

Mr. R. Dheenadayalu : 1. 'Computer Applications' -- Officers Training School, TNEB, Madras.
2. 'Computers' -- Science Club of Shrine Velankanni School, Madras.

Assistance to Industry

1. Statistical Analysis of Survey data on PTC bus travel -- M.s. Institute of Road Transport, Madras.
2. Implementation of Operating System for IBM 370/158 - Tata Consultancy Services, Bombay.
3. Implementation and Testing of programme package 'Comprehensive Data Handling System, --National Environmental Engineering Research Institute, Nagpur.
4. Illumination Design Software --Indraprastha Stadium, Delhi.

Professional Activities

- 1 Prof. H. N. Mahabala served as Chairman of Madras Chapter for Computer Society of India,
2. Prof. C. R. Muthukrishnan. Chaired as session on Computers and Academic at the Annual Convention of the Computer Society of India, Hyderabad.
3. Mr. M. K. Ramanujam was an office bearer of the Managing Committee of the Computer Society of India, Madras Chapter.

Seminars talks visits by distinguished scholars

1. Dr. Sharad Seth, University of Nebraska, USA.
2. Dr. V. S. Alager, Concordia University, Canada, 'Efficient Algorithm for Rectangular Partitioning of a Region'.
3. Dr. Anil Jain, Michigan State University, USA.
4. Dr. D. Haupt, University of Aachen, West Germany.
5. Mr. Shankar Natarajan, University of Texas, Austin, 'Logic Theorem Proving'.
6. Dr. C. Mohan, IBM, San Jose Laboratory, 'System R'
7. Dr. Ravi Kannan, Carnegie Mellon University, USA, 'Lattice Algorithms'.
8. Dr. J. E. Hopcroft, Cornell University, Analysis of Algorithms'.
9. Dr. R. Narasimhan, NCSDCT, Bombay, Silver Jubilee visiting professor, Man as an Information Processing System'.

Others

1. I.I.T., Madras has been identified as the resource centre for introducing computers in schools. Prof. H. N. Mahabala accompanied the Minister of Education on a study tour to U.K. in this connection.
2. Dr. K. B. Lakshmanan participated in the ISTE (Indian Society for Technical Education) meetings to formulate a Model Curriculum for Undergraduate Education in Computer Science.

ELECTRICAL ENGINEERING

Invited Lectures by the Staff

- a) 'Role of Computers in Process Industries' by Mr. S. Raman South Indian Sugar Cane and Sugar Technologists Association.
- b) 'Fibre Optic Applications' by Dr. M. Mukunda Rao, BHEL R and D Hyderabad.
- c) Numerical Techniques for Electric and Magnetic Field Computation—by Dr. S. S. Yegnanarayanan, College of Engineering, Guindy, August 1983.
- d) Engineering Aspects of Fields Computations for Electrical Power Equipment—by Dr. S. S. Yegnanarayanan, R and D, Jyoti Limited Vadodhara—May 1983.
- e) 'Field Computations and their relevance for fusion'. by Dr. S. S. Yegnanarayanan, DST Workshop on Plasma Physics Experiments in Universities, Physical Research Lab., Ahmedabad.

Educational Programmes like QIP, Ph.D.

- a) Line of Sight Communication Systems, Winter School, 1984, Coordinations: Dr. D. K. Banerjee and Sri. V. Subramanyam.
- b) Application of Microprocessors in device technology— Workshop on Microprocessors IIT Madras, January 1984.
- c) Entrepreneurship course (M.S) for designing and developing Microwave Components for preparing feasibility reports for the manufacture of these components.
- d) National Symposium on Image signal Processing and Micro—Processor Applications. Convenor Dr. J. P. Raina.
- e) International Symposium on Pollution Performance of Insulators and Surge Diverters December 1983—Organized by High Voltage Lab, Coordinator Dr. Y. Narayana Rao.
- f) Intensive Workshop on High Voltage Testing Techniques—Coordinator— Dr. C. Narayana Reddy.

New Equipments Procured

- a) IOMW He—Ne Laser (Siemens) was received from GTZ.
- b) Tank for underwater propagation studies
- c) NC Table for mask making
- d) Stripline Technique—Equipments.
- e) Intel MDS 226, 287
- f) High Level Software such as PL/M Fortran, Basic, Cobol.
- g) In circuit Emulator
- h) Dot matrix printer
- i) Electronic Stencil Cutter
- j) EPROM Programmers
- k) Function Generators
- l) Siemens Training Kits for Analog and Digital I.C. 's

Lab Equipments and Facilities created

1. Micro processor based substation switching simulator
2. Electrically operated 24 kW Steam Boiler for Pollution Studies

3. Bit Slice Controller for Kannada Language Script Display
4. Through hole plating for Double Sided PCB
5. Amorphous thin film depositing system by the Glow Plasma reaction of constituent pure gases and vapours.

Seminars Attended

- a) Study of Radio Wave Signals of 714 MHz from the Ekram Satellite was presented by Dr. M. Mukunda Rao in the National Space Science Symposium held at Pune, Dec. 1983.
- b) Gallium Arsenide Solar Cells by Dr. K. N. Bhat in the Conference on Compound Semiconductors—Sept. 1983.

Distinguished Visitors:

- a) Prof. A. J. Rogers, Central Electricity Research Laboratories Surrey, Leatherhead, (U.K)
- b) Prof. V. Ramaswamy of University of Florida, (U.S.A)
- c) Prof. F. Gardiol, Lausaune, Institute of Technology, Switzerland and Chairman, Swiss National Committee of URSI.
- d) Dr. M. V. K. Chari, Manager Electromagnetics Program, Corporate R and D, General Electric Schenectady, U. S. A.
- e) Prof. D. Kind, President, PTB Braunschweig, West Germany
- f) Dr. Nagarajan—M S Erikson of Sweden
- g) Dr. Volkar Hahn -University of Bochum, West Germany.
- h) Dr. Sohrob K. Gandhi, Professor, R.P.I. Troy, New York.
- i) Dr. B. J. Baliga, Manager, Corporate R and D General Electric, Schenectady' New York USA.
- (j) Prof. D. Konig and H. Miller from the H. V. Institute of Technische Hochschule Darmstadt, West Germany.
- k) Dr. K. R. C. Mamandur, Middle South Services, Inc., New Orleans, U.S.A.
- l) Prof. Wonham, University Toronto. Canada
- m) Dr. J. Holz, University of Wuppertal, West Germany.

Lectures by Invited Speaker

- a) Fibre Optics in Electrical Industry—Lecture series by Dr. Rogers
- b) Optical Communications—by Prof. V. Ramaswamy
- c) Recent Trends in the Field of Microwaves by Prof. F. Gardiol
- d) Finite Elements and their Applications by Dr. M. V. K. Chari
- e) (i) High Voltage Testing, (ii) Partial Discharges, Measurements and Interpretations, (iii) Research and Testing in Metrology by Prof. D. Kind
- f) High Speed Optical Data Links by Dr. Nagarajan
- g) (i) Stability problems in Adaptive Control Systems
(ii) Multivariable Adaptive Controller for distillation columns by Dr. Volkar Hahn

- h) Organo metallic CVD for Ga As by Dr. S. K. Gandhi
- i) IGT, A new power Transistor by Dr. B. J. Baliga
- j) Modern Electric Drives by Schoenfeld
- k) Reactive power Optimization in Power Systems by Dr. K. R. C. Mamandur
- l) Supervisory Control of Discrete—event systems by Dr. Wonham

R and D in Progress of Sponsored Projects:

(i) Projects:

- a) Development of Field Model Laser—Current Transformer by Dr. P. Sankaran, Dr. M. Mukunda Rao, Dr. C. Narayana Reddy
- b) B. H. Testing for Current Transformer cores for W. S. Insulators — by Dr. P. Sankaran
- c) Application of Blue/Green Lasers for underwater Laser communications — Feasibility Studies—Sponsored by the Electronics Commission—By Dr. Mukunda Rao and Dr. Ashok Jhunjunwala
- d) VHF/UHF propagation Studies project—sponsored by Telecommunications Research Centre P and T Department, New Delhi—Coordinator Shri V. Subrahmanyam and Dr. D. K. Banerjee
- e) Electromagnetic pumps, Flat Linear Induction, pump for Liquid Sodium, under construction at Kalpakkam — sponsored by Department of Atomic Energy, Coordinator Dr. S. S. Yegnanarayanan.
- f) Lifetime control in Silicon using Platinum for high speed rectifiers and thyristors by Dr. M. K. Achuthan and others.

(ii) R and D ACTIVITY:

- a) Computer Tomography
- b) Pollution Flashover mechanism of Insulators
- c) Load Frequency Control of Multi-area Power Systems
- d) Three Dimensional Imaging Techniques
- e) Development of Current Transformers for EHV Lines
- f) Balancing of Supply Across 3-phase—Three Wireloads.
- g) Improvement of Waveform Across a Load
- h) Dynamic compensation of Reactive Power in Energy System
- i) Stability Testing and Stabilization of Multi-Dimensional Recursive Filters
- j) Design of Digital Filters for VLSI implementation
- k) Flashover Characteristics of Spacers in Compressed gases
- l) Studies on A.C. Drives.

Indo-German Collaborations:

- a) Infra-red Light Beam Link Connecting Two Distant Computers: Technical University of Aachen—Dr. M. Mukunda Rao and Dr. Ashok Jhunjunawla
- b) Microwave Communications Systems—University of Braunschweig—Dr. D. K. Banerjee and Prof. H. G. Unger and Prof. K. Schuenemann.

- c) Study and Development of Amorphous Silicon Solar Cells, Mr. R. Ramachandran and University of Marburg, West Germany.
- d) Image Processing, — Technical University of Braunschweig — Dr. J. P. Raina and Dr. Schoenfeld.
- e) Speed Control of Squirrel Cage Induction Motors.

Industrial Testing

- a) Line Equipments for EHV Lines
- b) Current and Voltage Transformers by Dr. P. Sankaran and others.
- c) Recommissioning Tests on Rolling Mill D. C. Motors, 150 H. P. for Triveni Metals and Alloys Pvt. Ltd., Pondicherry by Dr. S. S. Yegnanarayanan.
- d) Microprocessor Controlled 1 HP. D. C. Motor for Dynamic ECG Test set up for Indchem Electronics, Guindy, by Dr. S. S. Yegnanarayanan.
- e) Power Frequency and Impulse tests were carried out on a number of Power Transformers Lightning Arresters, Insulators, Line Hardware etc. by Dr. C. Narayana Reddy and Dr. Y. Narayana Rao.

Assistance to Industry

- a) Additional Losses due to Fittings—Dr. P. Sankaran
- b) Duty Cycle Motor Selection for Automatic Debrassing Plant of T. I. Cycles, Ambattur by Dr. S. S. Yegnanarayanan
- c) Electric Field Analysis of 400 K. V. and 230 KV Lightning Arresters for W. S. Insulators by Dr. S. S. Yegnanarayanan
- d) Fields and Forces on 230 KV Line Traps for W. S. Insulators by Dr. S. S. Yegnanarayanan
- e) Uninterruptible power supply system for Computers, CSIR—Structural Engineering—Research Lab—Adyar by Dr. S. S. Yegnanarayanan
- f) Fibre Optic Laser Current Transformer Development for W. S. Insulators—by Dr. M. Mukunda Rao, Dr. P. Sankaran and Dr. C. Narayana Reddy.
- g) Consultancy on lifetime reduction in silicon, by Dr. K. N. Bhat, and Dr. M. K. Achuthan
- h) Development of a device for measuring B-H Curves of laminations used in CT's for W. S. Insulators Ltd.
- i) Development of Space-hardened Op . amp Chips for VSSC and Bharat Electronics
- j) Digital Computation of High Voltage Transients for Orissa State Electricity Board Dr. C. Narayana Reddy & Dr. G. S. Rao
- k) Design, Software Development, Fabrication and Commissioning of Micro—processor based spray Controller for M/S PTDC, Guindy, Madras—by Dr. R. Parimelalagan
- l) High Accuracy Speed Controller for D. C. Drives for BHEL Bangalore by Dr. R. Parimelalagan

Publications

- a) Use of a Voltage Follower to ensure Sinusoidal flux in a core, IEEE Transaction on Magnetics—Dr. P. Sankaran

- b) Effects of Total Solar Eclipse of 16th February 1980 on the HF. Communications in India—Journal of the Institution of Electronics and Telecommunications Engineers—India, March 1983—by Dr. M. Mukunda Rao
- c) Analysis of Voltage Fed Thick Cylindrical Solenoidal coils, IEEE Intermag, April 1983 by Dr. S. S. Yegnanarayanan.
- d) Wave Digital Biquads derived from R. C. Active Configurations, PROC. IEEE International Symposium on Circuits and Systems May 1983 by Dr. C. Eswaran.
- e) A Universal Multiple output second order digital filter, - Electronics Letters, August 1983.
- f) Very high sensitivity varactors by P.R.S.Rao, K.N.Bhat, K.R.Rao, International Conference on semi-conductor Device Physics, Dec.1983.
- g) Ion Cleaning damage on (100) GaAs and its effects on Schottky diodes by Dr. K. N. Bhat et al Electronics, Vol.26, 1983.
- h) PIN diode for Phased Array Radar Applications — A study on the effect of diode Geometry by K.N.Bhat, Dr. M.K. Achuthan and others — International Radar Symposium, Bangalore, October 1983.
- i) Diffused Junction P + N Solar Cells in Bulk Ga As by K.N.Bhat et al, Electronics, Vol. 27, 1984.
- j) Magneto Optic Transducers Optimization in Laser Current Transformers, Journal of Optics. Vol. 12, 13, 1983 by Dr. C.Narayana Reddy & M.Mukunda Rao.
- k) Surface Flash over characteristics of Epoxy spacers in Compressed Gases, (Accepted) Fourth International Symposium on Gaseous Dielectrics, May, 1983, USA—by Dr. C.Narayana Reddy.
- l) Optimization of Fibre—Optic Laser — Current Transformers (Accepted) Journal of Applied Optics, USA by Dr.C.Narayana Reddy, M. Mukunda Rao.
- m) On the Flash over Mechanism of Polluted Insulators ISPPISD — December 1983 — by Mr. S.Gopal and Dr.Y.Narayana Rao.
- n) Improved Source Characteristics for Artificial Pollution Withstand Tests on Insulators — ISPPISD December 1983 by Mr. S. Gopal and Dr. Y.Narayana Rao.
- o) Flashover Phenomena of Polluted Insulators, (accepted) Proc. IEE, Part C — by Mr. S.Gopal and Dr. Y.Narayana Rao.

FUTURE PLANS

- a) Development of an Instrumentation Lab.
- b) Research and Development work in the area of Integrated Optical Circuits for Optical Communications.
- c) Research and Development of 'SAW devices, Fibre Optics and Integrated Optics.
- d) Satellite Communications.
- e) Fields related R and D work for Fusion Engineering and Technology, Jointly with P.P.P/P.R.L., Ahmedabad.
- f) R and D work on LSI/VLSI Technology and design.
- g) Solar Cells.
- h) Lightning and safety of Monitors and Commercial Aircraft.
- i) HVDC Transmission.

STAFF MATTERS :

- a) Dr.C.Eswaran availed Post—doctoral Fellowship at Concordia University, Montreal Canada.
- b) Dr. M. Mukunda Rao visited the Institute for High Frequency Technology, Technical University of Aachen (Feb-March' 84) Under Indo-German Project.
- c) Mr. N. Segaran joined as a Senior Project Officer Grill on deputation from P and T Department and Mr. G. Ramakrishnan joined as a Project Associate in the VHF/UHF Propagation Studies Project.
- d) Dr. A. Kuppurajulu is on leave and currently on a teaching assignment in the University of Washington, U. S. A.
- e) Dr. S. Srinivasan , is at present in the University of Southern California
- f) Dr. Vedam Subramaniam and Dr. C. Narayana Reddy have returned from Tanzania after completing the teaching assignment at the University of Dar—es—Salaam.
- g) Dr. B. Ramaswamy returned from Nigeria.

Open House

During the Silver Jubilee Year an OPEN HOUSE was organised on 24th and 25th March 1984 for the benefit of the general public; preceding this another OPEN HOUSE programme for the Industry was held on 16th March 1984 and a Seminar was held on the theme 'Does IIT contribute adequately to the growth of Industry' in which the participants gave their views and offered constructive criticism.

Linear Induction motors, Induction pump for Liquid Sodium, IC fabrication Equipments, Microprocessor based equipments, High Voltage Insulator Testing Equipments, Video Game Devices, Measurement Equipments were under demonstration.

Other Data

Mr. Joy Alogsius Thomas 5/5 B. Tech Electronics student won the \$ 10,000 Charles Le Geyt Fortesque Fellowship (1984—85) awarded by the IEEE. He obtained the highest possible scores in GRE, TOEFL, AGRE Examinations.

A hobbyroom was opened to facilitate the students to undertake small interesting projects under the guidance of the faculty. Basic Equipments like Power-packs, Oscilloscopes, Signal Generators and Measuring instruments are provided.

Invited Lectures Delivered by the Staff :

- Dr. A. V. Krishna Rao :**
1. New Bearings in English Litt. Amalapuram.
 2. Nayantara Sehgal. 'Hindu College, Guntur.
 3. Kamala Markandaya' Queen Mary's College, Madras.
 4. 'Indian Writing in English' Loyola College, Madras.

- Dr. S. Ambirajan :**
1. 'On famine' Murugappa Chettiar Institute Madras.
 2. 'Modern Theory of Utility' at IFMR.

- Dr. Dipak Chaudhuri :**
1. 'On Productivity' at National Productivity Council.
 2. 'On Reliability at I.A.Q.R.

- Dr. R. Rajagopalan :**
1. 'On Computers' at the Rotary Club.

- Dr. Rita Ghatak :**
1. 'Customer Relations Skills' at Training College Indian Airlines, Hyderabad
 2. 'Stress Among Executives' at Tamil Nadu Institute of Labour Welfare Madras

- Dr. C. Ramachandran :**
1. 'Issues in History' at Govt. Arts College, Nandanam, Madras.

- Dr. K. Scleusener :**
1. Science and Colloquial German at Bombay.

- Mr. Rajgopal**
1. 'Heinerich Heine' at Max Mueller Bhavan, Madras.

Teaching Aids Developed : Software for teaching of French in the Language Laboratory.

Placement : No. of Contacts : 120

No. of Candidates placed : 20

MATHEMATICS

Symposia/Conference:

CHANDRA DAY"

A one-day symposium "Chandra Day" was arranged on 29—10—1983 to celebrate the award of the physics Nobel Prize for 1983 to Dr. S. Chandrasekhar, the well-known astrophysicist.

IMS CONFERENCE

The 49th Annual Conference of the Indian Mathematical Society was held at our Institute from 27—12—1983 to 29—12—1983 under the joint auspices of the Ramanujam Institute for Advanced Studies in Mathematics, University of Madras and the I.I.T., Madras.

OPEN HOUSE

OPEN HOUSE FOR INDUSTRIES

A one-day conference on "Mathematical Modelling-Its Relevance and Applications in Industries" was arranged by the Department on 2—3—1984 in connection with the Open House for Industries as part of the Institute Silver Jubilee Celebrations.

OPEN HOUSE FOR GENERAL PUBLIC

A programme with Slide-show, Exhibitions and Quiz was arranged for the General Open House on 24, 25 March 1984.

INTERNATIONAL JOURNAL

JMPS

The Journal of Mathematical and Physical Sciences brought out by the Department continued to publish research papers from India and abroad. The journal was started in 1967. A special number of the JMPS is being brought out in connection with the Silver Jubilee of the Institute.

Faculty News

Dr. P. R. Parthasarathy, Asst. Professor has been awarded the Humboldt Scholarship, FRG

Dr. S. N. Majhi, Asst. Professor has been awarded the DAAD short-term visiting fellowship.

Dr. P. Bhattacharya visited Germany under the DAAD short term fellowship programme. He has taken up an assignment in Nigeria on special leave from the Institute.

The department suffered a severe blow due to the sad and untimely demise of Prof. K. M. Das in August '83 in an accident.

Prof. S. K. Srinivasan, Prof. R. Subramanian and Dr. Y. Nagendra have rejoined the Department.

Dr. C. V. Raghava Rao, Dr. S. N. Venkatarangan, Dr. UN. Srivastava, and Dr. P. Achuthan have been Selected to higher posts.

Academic Courses

The post-graduate syllabi have been redone with improvements and additions of several new courses.

Seminar

Regular seminars with invited speakers and special lectures have been arranged. To mention some :

<i>Speaker</i>		<i>Title of Seminar</i>
(i) Prof. Bhanumurthy, T. S.	--	Siegel Modular Forms
(ii) Prof. Nigam, S.D.	—	Zeeman's Catastrophe Machine
(iii) Prof. Sastry, C. A.	—	Pollution and Control
(iv) Prof. Subramanian, G.	—	Finite Element Analysis
(v) Prof. Santhanam, T. S.	--	Quantum Mechanics of Discrete Systems
(vi) Prof. Pal, P.K.	—	Super Unification of Natural Forces

General

Some among 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 conference to preside over and deliver lectures.

A course on finite element methods under QIP programme is planned.

Research

Work in the following fields is in progress :
Analysis, Continuum Mechanics, OR,
Stochastic Processes, Theoretical Physics.

Distinguished Visitor

Professor J. H. Matis, Texas, A and M University, USA, Well-known for his work in different Areas of Mathematics and Statistics spent about two months in the Department. He gave a number of seminar lectures in and outside the Department/Institute.

MECHANICAL ENGINEERING

Faculty :

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

Deputation/Assignments Abroad :

The following faculty member resigned from the Department.

Mr.J. F. Rahman

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

Dr. S. Rajesham

Prof. K. A. Bhaskaran

Prof. V. Radhakrishnan on reinvitation to West Germany

Mechanical Engineering Association :

Following special lectures were arranged.

1. 'The making of a good engineer, especially a mechanical engineer'—
Mr. K. J. Wells
2. 'Commercial Advertising'—
Mr. Nikhil Nehru
3. 'Industrial Venture Abroad'—
Mr. S. Nagarajan
4. 'Challenges in Indian Engineering Industries'—
Mr. M. V. Subbiah
5. 'Technical Manpower Training in India'—
Mr. H. S. N. Murthy Rao
6. 'Engineers and India'—
Mr. H. R. Pandurang
7. 'Hotel Management'—
Mr. Ravi Suri
8. 'Nuclear Reactors'—
Mr. N. K. Murthy
9. 'Experiences of a Railway Engineer in Traction practice'—
Mr. K. P. Ramalingam
10. 'State of Art in Cad—Cam'—
Dr. Seshadri Shankar
11. 'Telecommunications'—
Mr. V.M.Sundaram
12. 'All About Stocks and Shares'—
Mr. S.Narayanaswamy

Following Visits were arranged.

1. Visit to the Advanced Training Institute, Guindy
2. Visit to the Madras Atomic Power Plant, Kalpakkam

Discussions:

A discussion between the students and the Alumni of the Department to get to know their experiences was arranged.

Educational Tour:

Prefinal year B. Tech students accompanied by Dr. M. S. Shanmugam and the M.Tech students accompanied by Sri. M. Singaperumal went on an industrial-- educational study tour lasting for about 15 days.

HEAT TRANSFER AND THERMAL POWER**a. Sponsored Projects:**

1. Indo German Project
Development of Fluidized Bed Cooling Tower
2. DST Project
Optimum Tube bundle layout in Fluidized Bed Borters
3. BHEL Project
Design and Model Testing of Horizontal Feed Water Heaters
4. Heat Transfer Studies using Finite Element methods in Brake Systems, Continuous Casting, Ingot Casting etc.
5. BHEL Project:
Heat Transfer in the Casing of Steam Turbines

b. Research Publications: 10**c. Important Lectures & Seminars:**

Dr. Chalapathy Rao gave a special lecture on Temperature Measurements in rotating systems. Winter school on 'Experimental Techniques in Turbomachines'

d. Invited Lectures delivered by the Staff:

Application of Finite Element Methods to Casting Problems' Delivered at the University College of Engineering Osmania University, Hyderabad, during February 1984.

HYDROTURBOMACHINES LABORATORY

a. Sponsored project:

BHEL Project on 'Bulb Turbine'

The design, manufacturing and assembly of a Bulb Turbine is completed and testing of the turbine is progressing.

b. Research and Development:

- i) More work on the application of the recently developed surface vorticity theory for application of turbomachinery problems has been started
- ii) Studies on the cavitation aspects in centrifugal pumps is in progress
- iii) Experimental and theoretical investigations of Jet Pump flows have been completed

c. Assistance to Industry—ICC :

Development of a Bulb Turbine model for BHEL, Bhopal has been completed. The testing of the same is in progress.

d. QIP/UGC Fellowship Programme:

A candidate has completed his QIP Fellowship Programme as Ph.D. Research Scholar in this Laboratory. His thesis on the investigations of Jet Pump flows is under preparation.

e. Research Publications:

A paper entitled 'Aerodynamic Investigations of a Kort Nozzle Ducted Propeller' has been presented at the Seventh Conference on Fluid Machinery held at Budapest, Hungary during September 1983.

b. Brief Indication of 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

INTERNAL COMBUSTION ENGINES LABORATORY

a) **New Courses introduced :**

Automobile Engineering.

b) **Sponsored Project :**

Proposal has been submitted for the use of vegetable oil as engine fuel to DST under Non Conventional Energy sources.

c) **Research and Development :**

Active research work is pursued in Surface Ignition Engines, air motion and turbulence studies in I.C. Engines and Alcohol Fuel S.I. Engines.

A soft ware purchase has been developed in C.A.D. for the design of cam shafts and valves and valve gears.

d) **Research Publications :**

20 papers.

e) **Important Seminars and Lectures :**

An one day workshop was conducted on alternate energy source for I. C. Engines. Experts from Department of Energy, USA, General Motors USA, and from University of Santa Clara gave lectures which was followed by active discussions. People from Industries and educational Institutions participated in the workshop.

f) **Invited Lectures delivered by the Staff :**

Topics on Direct Energy Conversion and Two stroke engines were delivered in the College of Engineering Guindy in February 1984.

MACHINE ELEMENTS LABORATORY

a) New Courses introduced:

1. Failure Analysis & Design M.Tech.
2. Friction Element Design M.Tech.
3. Transmission Mechanisms M.Tech.

b) Sponsored Project :

Superplastic forming of Al & Ti alloys AR & DB (co-investigator with Metallurgy Department) since 1982.

c) Research and Development :

1. Surface durability studies on sursulf treated rollers/gears.
2. Studies on sintered Aluminium-bronze based friction materials.
3. Studies on sintered iron based friction materials.
4. Studies on Erosion of Hadfield steel.
5. Impact wear studies on armour plate.
6. Extrusion of copper powder preforms (in collaboration with Metallurgical Engg.Dept.,)
7. New methods in Dwell-Cam Follower-Motion synthesis.
8. Generation of Uniform Transmission Linkages.
9. Identification of Function Cognate Mechanisms.

d) Assistance to Industry-ICC :

1. Performance testing of fibre glass distance pieces W.S. Insulators of India Ltd., Bangalore.
2. Stress analysis of a cycle for optimization TI cycles of India Ltd., Madras.
3. Development of procedure for master cam determination for cam grinding for M/S Enfield India Ltd., Madras.
4. Comparative study of Two Helical Gear Box Designs for M/S K. C. P. Ltd., Madras.

e) Research publications :

1. A. Ramamohana Rao, 'Mechanics and Behaviour of Hollow Cylindrical members in Rolling contact', Wear, Vol. 87, No. 3, p 287-296.
2. A. Ramamohana Rao, 'An analysis of the Surface failure of saltbath treated low carbon steel in rolling contact', Journal of the IIM, June '83.
3. A. Ramamohana Rao, 'The effect of tensile pre-straining and salt bath nitriding on the notched fatigue strength of 0.2 percent Carbon steel', Journal of the IIM, June '83.
4. A. Ramamohana Rao, 'Tufftride treatment and its effect on the wear and other properties of steels' Industrial India, July 1983, p 1-6.
5. A. Ramamohana Rao, 'Performance studies on Salt bath treated low carbon steel Gears' Proceedings VI IFToMM Congress of Theory of Machines and Mechanisms, held at Delhi, Dec. 1983.

6. A. Ramamohana Rao, 'Effect of web thickness variation on the performance of spur gears', Antriebs-technik.
7. K. Lakshminarayana and L. V. Balaji Rao : Isometry in Mechanism Design : Mechanism and Machine Theory, 1983.
8. L. V. Balaji Rao and K. Lakshminarayana : Studies on the Synthesis of the spatial RSCR crank-rocker mechanism : Proc. Sixth world congress on Theory of Machines and Mechanisms, 1983.
9. K. Lakshminarayana and L. V. Balaji Rao : Graphical Synthesis of the RSSR Crank-Rocker Mechanism : Mechanism and Machine Theory, 1984.
10. L. V. Balaji Rao and K. Lakshminarayana : Optimal designs of the RSSR Crank-Rocker Mechanism, Part I-General time ratio : Mechanism and machine Theory, 1984.
11. K. Lakshminarayana and L.V.Balaji Rao: Optimal designs of the RSSR crank-rocker mechanism, Part II-Unit time ratio and limits of capacity. Mechanism and Machine Theory, 1984.
12. M. M. Mayuram : ,Performance of sprayed metal surface on sliding contact conditions. Journal of Engineering Design Vol : No.7, April pp 9-14.

f. Important Lectures and Seminars :

Lecture by Prof. K. Luck Dresden, East Germany on Mechanism studies.

g. Visitors to the Department :

1. Prof.Dr.-Ing.Gert Bechtloff, Hochschule der Bundeswehr, Hamburg.
2. Prof.Dr.-Ing.Kurt Luck, Technische Universitat, Dresden, East Germany.

h. 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.

i. Staff :

Shri. N.Sivaprasad has joined IIT Bombay.

j. Invited lectures delivered by the staff :

1. K. Gopinath: Recent Trends in Power Metallurgy, Guindy Engg. College, 1983.
2. A. Ramamohana Rao Panel speaker on 'Gear Education in India' at the VI IFToMM World Congress on Theory of Mechanisms and Machines held in New Delhi, Dec. 1983.

k. Any other information :

The following new programmes have been contemplated for the year 1984-85.

1. Testing of Air Craft brake linings.
2. Effect of lubricant additives in the performance of gears.

MECHANICAL HANDLING LABORATORY

a. Sponsored Projects:

DST Project on Pneumatic Conveyance of Powdered Materials at High Concentrations.

b. Research and Development:

Research in the Field of Vibratory Conveying, Dynamic Cranes and Pneumatic Conveying is Continuing.

c. Assistance to Industry — ICC:

M/s. Electrosteel, M/s. Radiant Engineering and M/s. KCP Ltd.

d. QIP/UGC Fellowship Programme:

Two Research workers are working under QIP Programme.

e. Research Publications:

Published five papers.

f. Important Lectures & Seminars:

Conducted classes for M.Sc (Engg.) students in Guindy Engineering College.

g. Invited Lectures delivered by the staff:

Two lectures on Bulk Handlings were given at Central water Power Commission, New Delhi.

h. Fabrication:

Vibratory Conveyor with Unbalanced Masses and Airslide have been fabricated.

PRECISION ENGINEERING AND INSTRUMENTATION LABORATORY

a. New Courses Introduced:

3ME 670 — Microprocessor in Instruments and Control.

b. Sponsored Projects:

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

c. Research and Development:

1. Optimization problem in Micro—hydraulics
2. Electrohydraulic servo system for engine gimbal 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 multivariable systems.

d. Assistance to Industry — ICC:

Design of a 250 Ton Cotton Baling Press

e. QIP/UGC Fellowship Programme:

One QIP Ph.D. Scholar (Joint Guidance)

f. Research Publications :

Three Papers

g. 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

PRODUCTION ENGINEERING AND MACHINE TOOLS LAB

a. Sponsored Project:

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

b. Research and Development:

Ph. D. 3
M. Tech 15 – 16 = 31

c. **Assistance to Industry — ICC:** ICC works to VSSC Trivandrum

d. **QIP/UGC Fellowship Programme:**

Ph.D. 5

M. Tech. 3

e. **Research Publications:** 15

f. **Visitors to the Department:**

Prof. Adam Morecki

Warsaw Technical University

Poland

g. **Brief indication and Developmental Programme:**

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

h. **Invited Lectures delivered by the Staff:**

1. College of Engineering, Guindy

2. A.T.I. Guindy

3. MPC, Madras

i. **Patents:** 3

j. **Educational Programme/Continuing Education Programme:**

HAL Management Trainee Programme

k. **Major Equipment added:**

3 axis—Co-ordinate Measuring Machine

l. **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 Lab. on 'Automation in manufacture, is being set up with the financial assistance of M/S Sundaram Clayton Ltd., Madras.

THERMAL TURBOMACHINES LAB.

(a) **Short-term/part-time courses conducted:**

The Laboratory has organised Winter School on Experimental Techniques in Turbomachines under the ISTE (Indian Society for Technical Education) during November 21 — December 2, 1983.

(b) Sponsored Project:

- (i) The Laboratory has completed a sponsored Project from the DST (Department of Science and Technology, New Delhi) Advanced Research in Centrifugal Turbomachinery in December 1983.
- (ii) Currently the Laboratory is carrying out an Indo-German Joint Research Project on Energy Centrifugal Compressors in collaboration with Aachen Technical University, West Germany.
- (iii) Two Projects sponsored by CSIR namely.
 - (a) Three dimensional flow studies in Turbine Cascades and
 - (b) Effects of Skewed Entry Boundary Layers on Secondary Losses in Turbines are being investigated.

(c) Research and Development :

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

(d) Assistance to Industry-ICC:

The Laboratory has offered assistance to industries in the following areas and completed successfully the following projects.

- (i) Design of LP Exhausthoods for Steam Turbine for BHEL, R & D Aero Dynamics Division. This Project has been completed during 1983-84.
- (ii) Design of Blade Profiles for an Axial cooling Fan of a large tip diameter to be used in a Hydro Generator for BHEL R & D Hyderabad, ventilation and cooling group.
- (iii) Two dimensional cascade testing of axial fan blades for its performance characteristics. Project is being carried out for the BHEL, R & D Hyderabad.
- (iv) Analysis Flow through LP stages of a Multi Stage Steam Turbine. Project is being taken up for BHEL Ramachandrapuram.
- (v) Calibration characteristics of Orificemeters for ELGI Equipments, Coimbatore: Work in Progress
- (vi) Two Professors of the Laboratory, Dr. N. Venkatrayulu & Dr. D. Pritivi Raj are the Retainer Consultants for BHEL R & D Hyderabad.

(e) New Major Equipments Added:

The Laboratory has procured spare parts for DISA Hotwire Anemometer and LC Smith's Semi-automatic Traversing mechanism.

(f) Research Publications

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

- (i) Two papers have been presented at the Sixth International Symposium on Air Breathing Engines (ISABE) held in Paris, France in June 1983.
- (ii) Two papers were presented at the 12th National Conference on Fluid Mechanics and Fluid Power in December 1983 at IIT New Delhi.

- (iii) One paper has been published in the proceedings of 8th Australasian Conference on Fluid Mechanics in November 1983 held in New South Wales, Sydney, Australia.
- (iv) One paper was published in the proceedings of the International Conference on Fluid Flow Machinery and Flow Measurements held in Turbo Institut, Ljubljana, Yugoslavia, April 1984.

(g) Visitors to the Laboratory from abroad :

During the year under review the following have visited the Laboratory from abroad.

- (i) Prof. Sir William Hawthorne from the Cambridge University, England, visited the Lab for two days in Sept. 1983, and delivered a Special lecture on "The use of Coal for power Generation" .
- (ii) Dr. C. T. Mathews from N. S. W. Institute of Technology, Sydney Australia visited the Lab for five days in Nov. 1983 and delivered a special lecture on " The use of personal Computers in Mechanical Engineering Undergraduate Programme" .
- (iii) Prof. Rishi Raj from the City College, New York, USA has visited the Lab for three days in Feb . 1984 and delivered a special lecture on "Ultra High Temperature Turbines".

h) Visits Abroad:

- (i) Dr. N. Venkatrayulu attended the 6th International Symposium on Air Breathing Engines (ISABE) held in Paris, France in June 1983 and presented two research papers. He also visited different Universities in the United Kingdom under the British Council visitorship Scheme in June 1983.
- (ii) Prof. Pritivi Raj has visited the West Germany along with the group of students of IIT Madras in June — July 1983 for a period of four weeks.

THERMODYNAMICS AND COMBUSTION ENGINEERING LABORATORY

Sponsored Projects:

- i) ARDB Project: Combustion Phenomena in a Solid Propellant Rocket Ramjet Engine.
- ii) Indo-Australian Project: Design and Development of Two-stage intermittent $\text{NH}_3\text{-H}_2\text{O}$ refrigeration system
- iii) Consultancy Project for Ponds' (India) Ltd: Development of Burners for their Clinical Thermometers Manufacturing Plant.

Research and Development:

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

Assistance to Industry-ICC

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

Research Publications:

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

Invited Lectures delivered by the Staff:

- i) Lectures on Thermodynamics at NPC, Madras:
R. Natarajan and K. S. Padiyar
- ii) Lecture on Energy Conservation for Steam and Fuel Users' Association of India, Madras:
R. Natarajan

REFRIGERATION AND AIRCONDITIONING LABORATORY

A. New Courses Introduced:

1. Food Processing preservation and transport
2. Energy conservation and heat recovery techniques
3. Utilization of renewable energy sources
4. Cryogenic Engineering.

B. Sponsored Projects:

1. Study of thermal problems in ground based navigational equipment (Department of Electronics)
2. Design and development of optimal, solar continuous refrigeration and airconditioning systems (Indo-Australian project Department of Non-Conventional Energy Sources)
3. Utilization of solar energy for preservation of food products (Indo-German)
4. Development of solar boosted heat pump systems for drying of forest and agricultural products (Indo-German)
5. Solar boosted heat pump system (Department of Non-Conventional Energy Systems)
Now concluded

C. Research and Development :

1. Dual effect, dual stage and hybrid vapour absorption refrigeration systems for low-potential energy sources
2. Vapour absorption and vapour compression heat pumps and heat transformers.
3. Thermal energy storage
4. Precooling of food products
5. Thermo-physical properties of cryogenic liquids and refrigerants
6. Combined convection in enclosures
7. Cooling of electronic equipment

d. Assistance to Industry-ICC

Consultancy services were provided in the areas of refrigeration and airconditioning and solar energy utilization to :

1. Best and Crompton
2. Southern Power Systems
3. Central Electrochemical Research Institute
4. New major equipment added :
 1. Vapour compression—Vapour absorption hybrid refrigeration' heat pump test set-up.
 2. R22-DMF absorption refrigeration system
 3. Hydrair cooling tunnel for food products
 4. Solar collector field (100m²) for water heating
 5. Stratified thermal energy storage tanks 2 Nos, (16m³ capacity each)

e. Research Publications :

1. Asha Iyer, S. Srinivasa Murthy and M.V.Krishna Murthy 'A comparative study of different working fluids for solar driven dual stage absorption refrigeration systems' Solar world Congress, Perth, Australia, August 1983.
2. S. Srinivasa Murthy, M. V. Krishna Murthy, R. Balasubramaniam, J. C. V. Chinnappa, M. R. Crees, and K. P. Stark comparison of simulated solar performance of two cascaded compression hybrid air-conditioning systems : vapour absorption—vapour compression and vapour jet vapour 'Solar World Congress, Perth, Australia August 1983.
3. V. M. Kripalani, S. Srinivasa Murthy, M. V. Krishna Murthy Performance analysis of vapour absorption heat transformer with different working fluid combination Jr. Heat Recovery Systems, Vol. 4, 1984.
4. T. P. Raphael, S. Srinivasa Murthy, M. V. Krishna Murthy, 'Analysis of Open Cycle water-LiBr Vapour absorption refrigeration system' National Solar Energy, Convention, Vadodara, India, December 1983.
5. K. Srinivasan and J. Altin' A ripple free liquid nitrogen level controller for long term operation, Review of Scientific Instruments. June, 1983.
6. K. Srinivasan and M. V. Krishna Murthy, A corresponding states treatment of saturated liquid viscosities of Grygonic fluids, 'Indo-Soviet Conference on Low-Temperature physics, IISC, Bangalore, January 1984.

i. Important Lectures/Seminars, visitors to the department

1. An Indo-Australian Joint Workshop on Solar Cooling was organised during 13-17 February 1984.

2. Prof. O. G. Martymenko, Chief of Lukov, Institute of Heat and Mass Transfer delivered a lecture on 'Heat and Mass transfer problems associated with high intensity laser beams' on 12th March 1984. He was the leader of the two member delegation on heat and mass transfer from USSR sponsored by Department of Science and Technology, Government of India.
- J. Brief indication of developmental programme
1. New areas of development were started in the fields of
 1. Chemical heat pumps
 2. Metal hydrides for refrigeration applications
 3. Stirling engines
- F. **Invited lectures delivered by faculty :**
1. Dr. M. V. Krishna Murthy, S. Srinivasa Murthy and K. Srinivasan delivered a series of lectures in the summer school on Industrial Refrigeration and Cryogenics, T. K. M. Engineering College, Quilon during May, 1983.
 2. Dr. S. Srinivasa Murthy delivered lectures on Solar absorption refrigeration in the Summer School on Alternate Energy Resources Engineering at PSG College, Coimbatore during May 1983.

METALLURGICAL ENGINEERING

Research and Development Activities

Number of Research papers		30
Published in journals and in press		4
Number of students awarded Ph.D. at the convocation held in 1983		8
M. S. at the convocation in 1983		4
Completed all their requirement for the award of Ph.D.		4
Number of research students registered for Ph.D.		
	Regular	3
	External	13
Registered for M. S.		
	Regular	3
	External	26
Number of QIP scholars		4

Assistance to Industry

Department continued to offer consultancy services on several industrial problems.

Sponsored Projects

1. Hot corrosion of high temperature alloys — Ministry of Defence.
2. Superplastic forming of some aluminium and titanium alloys — ARDB project.
3. Evaluation of solar absorption panels — ICIC project.

Inter-institutional research Projects

1. Development of superplasticity in Al-alloy AFNOR 7020 — in collaboration with VSSC Trivandrum.
2. Welding characteristics of Al-alloy AFNOR 7020 — in collaboration with VSSC, Trivandrum.

Awards:

Prof. E.G. Ramachandran was made an Honorary Member of the Indian Institute of Metal in 1983.

Prof. K. A. Padmanabhan was awarded the National Metallurgist Day Award by the Ministry of Steel Mines. Govt. of India in Nov. 1983.

Dr. DRG Achar was awarded the IAEC Golden Jubilee Award.

Dr. DRG Achar was presented the KCP and Mirchandani awards for the best research and fabrication papers presented at the National Welding Seminar held in 1982.

Other Staff Matters:

1. Prof R. Vasudevan joined the department on his return from West Germany.
2. Prof K. Srinivasa Raghavan has gone on leave to USA.
3. Prof H. Md. Roshan joined the Department.
4. Prof V. M. Radhakrishnan returned to the Department after two years at DMRL, Hydrabad.
5. Dr. V. M. Radhakrishnan has been made Professor while Drs. O. Prabhakar and D. R. G. Achar have become Associate Professors. Dr P. Venugopal is now an Assistant Professor.
6. Dr. S. Balasubramaniam has resigned.
7. Prof K. A. Padmanabhan was appointed as Chairman, GATE for a second time.
8. Prof K. A. Padmanabhan was elected Chairman, IIT Madras Chapter of the Indian Institute of Metals for 1984-85 while Drs. D. G. R. Sharma and J. Mukhopadhyaya were elected Hony Secretary and Hony. Treasurer.
9. Dr. O. Prabhakar is Vice President, IINDIE and a Council Member of IINDIE. He is also the Editor of the Non-Destructive Inspection Journal published by IINDIE
10. Dr. O. Prabhakar is Member, Advisory Council of R & D Centre, Southern Regional Branch, Institute of Indian Foundrymen.

Seminars / Courses Conducted:

1. Workshop on Modern Metallography in Industry was organised by the department with the IIT Madras Chapter of IIM.
2. Computers in Metallurgy. A special course on this topic was organised by the department in Dec. 1983.
3. 'Metal Forming Machine Tools' — A special series of lectures was given by Dr. Ing. Wagner in March — April 1983.
4. 'Advanced Safety concepts in Materials Mechanics' — Special course organised by the department was given by Prof. Dr. Ing. Lothar Issler. Fachhochschule fur Technik, Esslingen between 22, Feb and 17 March 1984.
5. 'Modern Welding Technology' — Workshop organised by the department along with the Madras Chapter of the Indian Institute of Welding.
6. A symposium on the 'Role of the Department of Metallurgical Engineering in the service of Industry' was held on 21st March 1984 on the occasion of the Open House for Industry.

Silver Jubilee Activities :

This department was host to two distinguished Silver Jubilee Visiting professors :

- i) Sri Samarapungavan
Chairman, SAIL
- ii) Dr V. S. Arunachalam
Scientific Adviser to the Defence Minister and Secretary, Dept of Defence R & D, Ministry of Defence.

The department also organised an Open House for Industry on 21st March 1984.

The departmental activities were open to the public during the Silver Jubilee Open House held on 24 and 25 March 1984.

Lectures delivered by distinguished visitors :

1. Prof R. S. Jackson, UNID Expert on High-Chromium Cast Iron.
2. Dr R. Sanjeevi, CLRI on the Stress Relaxation phenomenon in Materials.
3. Prof P. M. Prasad, BHU, on the Production of Metal Sulphides in the presence of a sulphur Acceptor.
4. Dr. Sanak Misra, SAIL, Ranchi on Design of steels for Engineering applications.
5. Dr N. P. Sinha, Executive Director, Bhartia Electric Steel Co., Calcutta on Feeding of S. G. Iron castings.
6. Dr. Steene, Imperial College, London on Applications of Laser Technology in Metallurgy.
7. Dr R. Sridhara on Extraction of Metal values from deep sea nodules.

Invited Lectures delivered by Staff

1. 'GATE : Implications for Postgraduate Training'
K.A. Padmanabhan, National Seminar on Perspectives in Metallurgical Education, Indian Institute of Science, Bangalore, Oct 21—22, 1983.
2. 'On the Unsteady to steady state Transition During Superplastic Flow'
R.K. Yadava and K.A. Padmanabhan, 37th Annual Technical Meeting of the Indian Institute of Metals, Varanasi, Nov.14-17, 1983.
3. 'Effect of Termal Ageing on the Room Temperature Tensile Properties of an AISI 316 Stainless Steel'
K.G. Samuel, S.K. Ray, P. Rodriguez and K.A. Padmanabhan 37th Annual Technical Meeting of the Indian Institute of Metals, Varanasi, Nov. 14-17, 1983.
4. Lecture on 'Education in Industrial Metallurgy' delivered at the Diamond Jubilee Seminar on 'Perspectives in Metallurgical Education' held in Oct. 1983 at IISc, Bangalore to celebrate the Golden Jubilee of the Dept of Mining and Metallurgy, Banaras Hindu University.
5. Lecture on 'Theoretical concepts of the Heat Treatment of Aluminium and its alloys' delivered to the delegates and participants to the 2 day seminar on 'Modern Aluminium Foundry Practices' in Feb 1983 at Madras. organised by the Aluminium Association of India and the Institute of Indian Foundrymen, Southern Regional Branch.

Applications of Xray diffraction

— Workshop on Modern Metallography
Madras

Prof. R. Vasudevan

Modern Welding Technology for structural fabrication

— Binny Ltd, Madras

Dr. DRG Achar

Process techniques for Non-ferrous
materials welding

— SISI, Madras

Dr. DRG Achar

Plasma cutting Technology

— Madras Metallurgical Society

Dr. DRG Achar

Weldability characteristics of alloy steels

— IIM, Hyderabad Chapter

Dr. DRG Achar

a. Welding of casting's

b. Quality control in Welding

— Hindustan Motors Madras

Dr. DRG Achar

a. Cold forging and extrusion

b. Drop forging and hot forging of metals

— National Productivity Councils Madras

Dr. P. Venugopal

Advances in Microscopy

-- Indian Ceramic Society Madras Chapter

Dr. C.V. Gokulratnam

Design Aspects of Metallurgical furnaces.

— Fuel Efficiency and Furnace Design Seminar

Organised by National Productivity Council at Madras Sri S. Ramakrishna Iyer

Metallurgy of Aluminium and
Aluminium alloys

— Seminar on Modern Aluminium

Dr. S. K. Seshadri and

Foundry Practices at Madras

Prof. K. A. Padmanabhan

Iron Ore requirements for good Steelmaking

— NMDC, Donimalai, Karnataka

Sri R. K. S. Kumaraswamy

Advances in Metal Casting — College of Engg. Guindy	Dr. O. Prabhakar
Quality Control -Latest trends in Process and controls --- Seminar on Modern Aluminium	
Foundry Practices at Madras	Dr. O. Prabhakar
Contribution of Academic Institutes to non- destructive evaluation -- ISNDT at IISc, Bangalore	Dr. O. Prabhakar
Ultrasonic Testing Method — IINDIE at Madras	Dr. O. Prabhakar Dr. DGR Achar
Ultrasonic Testing Method -- NFC, Hyderabad	Dr. O. Prabhakar
Microprocessors and Fuel Efficiency — IIF, Madras Chapter	Dr. DGR Sharma
Non-destructive Testing Methods — ATI Guindy	Dr. DGR Sharma
Metallurgical Aspects of Acoustic emission — AIEI at Madras	Dr. O. Prabhakar Dr. DGR Sharma
Ultrasonics and Radiography -- IINDIE, Madras	Sri. V. Jagasivamani

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

- i) PG Course offered by National Productivity Council.
- ii) HAL — BEML Management Courses.

PHYSICS

New Projects approved

1. Nuclear Magnetic Resonance Studies of Metal hydrides from C. S. I. R.— Investigator: Dr. K.V.S. Rama Rao
2. Development of Semiconducting Electrooptic Devices from D. S. T.— Investigator : Dr. K. Srinivasan.
3. Mechanical and thermal properties of materials at low temperatures from DAE— Investigator: Dr. V. Ramachandran
4. Diffusion and electromigration in thin films from D.A.E. --Investigator : Dr. K.V. Reddy.
5. Determination of optimum presurant requirements and stratification depths in cryogenics from I.S.R.O. Investigator : Dr. R. Srinivasan.

Short Term courses held

1. Summer School on 'Laboratory programme in Physics' under QIP Programme.
2. Short term course on Silicon Solar Cells and Technology under QIP programme.

Conferences held

1. National Conference on Compound Semiconductors and related Technology.
2. Second National Conference on Thin films state phenomena.
3. International Conference on Teaching Aids in Physics Education.

Visiting Professors

Two visiting professors Dr. D. V. G. L. Narasimha Rao and Dr B. K. Mukherjee were in the Department during this year. They helped in the development of new experimental Techniques in the Laser, Laboratory and Low Temperature Laboratory respectively.

New facilities available

Thin film deposition facility using refrigerator cooled cryopump is available in the Low Temperature Laboratory.

Fabricated the facilities to estimate the hydrogen absorption in metals and alloys. Acquired the Vibrating Sample Magnetometer for measuring various magnetic properties.



OTHER REPORTS

Quality Improvement Programme

Indo-German Programme

Central Library

Central Workshop

Centre for Rural Development

Institute Hospital

Placement Office

Weaker Section Students and Foreign Students

Institute Gymkhana

N. C. C.

N. S. S.

Hostel Management

Central Supplies Unit

Construction of Buildings



QUALITY IMPROVEMENT PROGRAMME

Serving Teachers Programme

	<i>M.Tech.</i>	<i>Ph.D.</i>
No. admitted during 1983-84	7	18
No. on rolls in each of these courses	16	53
Short-term courses conducted 1983-84	—	2

INDO—GERMAN PROGRAMME

Number of Staff Members permitted to the Federal Republic of Germany

Faculty:	Short Term	9
	Long Term	1
Technical Staff :	Short Term	—
	Long Term	1

CENTRAL LIBRARY

Following are the significant activities of the Central Library during the period April 1983 to March 1984.

Administration, Reprography And Bindery (ARB) Division:

Dr. M. Venugopal, Dean (Academic Research) has taken over charge as Chairman of the Library Advisory Committee.

Shri K. Sethu, Library Asst has been for studying B. L. I. S. Course at the Mudurai Kamaraj University.

The following staff members have attended seminars conferences mentioned below:

Shri V. S. Nazir Ahmed, Librarian attended the Seminar training at UNESCO, Paris on the use of CDS/ISIS Software for application in Library & Information field under UNESCO's fellowship Program of 3 weeks during Nov. Dec. 1983,

Shri C. Deenadayalu-Dy Librarian and Shri C. C. Tom, Prof. Asst. attended the 14th IASLIC seminar at Delhi during Dec. 1983.

The Central Library also actively participated in the Institute OPEN HOUSE 1984. It brought out the publicity leaflet 'A Glance at Central Library' and over 2000 copies of it were distributed to the visitors to the Institute on that occasion.

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 'Proposals for Development Seventh Five Year Plan' was printed and bound within Central Library.

A new Rotaprint Machine model TTR has been acquired for the Library to strengthen the offset printing facilities.

Two Fuji portable microfiche readers (Model REP-2) have been procured to facilitate the users of the library for reading microfiche, jacket film, aperture card & strip microfilm 105 mm width or less. The equipment can be used for desk-top as well as wall projection.

Spot binding of over 1500 publications have been taken up in the stacks besides the regular binding work by internal as well as external binders.

Acquisition & Processing Division A & P Division

A gift of 76 Japanese publications to the value of Rs. 16,000/- on Art, and culture have been received from the Consulate of Japan under their library support programme.

Circulation, Reference and Maintenance (CRM) Division

In order to improve house keeping services the timings for loan transactions have been revised to 8 am to 6.30 pm as practiced in other IITs/IISc Bangalore from July 1983 on experimental basis.

With the help of 37 students engaged for about 3000 man hours spread over the last two vacations, rectification of bookshelves as well as physical verification of stock have been conducted.

The Book Bank (General) and Weaker section continue to be actively used by the student particularly of weaker section community.

Periodicals and Serials (P & S) Division

The preparation of complete catalogue of the Library's periodical holdings has been taken up and is nearing completion.

The translation services is also being continued to both the Library's internal and external members. The translation of documents for BBL, Hyderabad is being continued to be done.

STATISTICS ON OTHER LIBRARY ACTIVITIES

Library Membership

1. Institute Members (Staff and Students)	....	5,860
2. Outside Members — Individual	....	56
Corporate	....	62
3. Consultation Permit	....	172

Circulation

1. Number of Readers visited	....	1,66,980
2. Number of volumes issued	....	1,78,426
3. Number of Reservation for Books :		
a) Registered	...	12,342
b) Fulfilled	....	4,634
4. Amount of over-due charges and other charges realised	Rs.	1,59,251
5. Inter-Library Loans :		
Borrowed for Institute Members	....	57
Lent out from the Institute Library	....	117

Acquisition

1. Books	....	3,518
2. Bound volumes of Periodicals	....	2,259
3. Pamphlets and Reports	....	445
4. Micro films and Microfiche	....	17
5. Institute Ph.D. Thesis	....	4
6. Total intake during the year	....	6,243
7. Total accessions up to 31. 3. 1984	....	2,08,542

Current Periodicals

1. By Subscription	....	1,249
2. By Exchange/Gift	....	156
3. Translations arranged	....	2

Reprographic Services

1. Photo copies made	....	524
2. Korestat copies made	....	1,187
3. Xerox copies made	....	1,63,360
4. Gestafax (Electronic stencils)	....	332 stencils
5. Rotamasters prepared and printed	....	1,226

Binding :

1. No. of Books and Journals bound from the Library	....	779
2. No. of publications (Reports, Lecture notes etc.) to Departments bound	....	889
3. No. of Back volumes of Journals and Books bound through external binders	....	3,072

CENTRAL WORKSHOP

During the period 1983-84, Workshop has undertaken the fabrication of parts and assembly required for the B.Tech M.Tech and Ph.D research work from the different departments.

Number of Work orders completed during 83-84: 1057

Number of Apprentices under Employees training programme trained in Fitting, Machine and Electrical trade : 25

Some of the IC & SR work undertaken and completed:

1. Six component Strain gauge balance for N.A.L, Bangalore.
2. Spur gears for SHAR, Department of space, Sriharikota.
3. Fabrication of Thoriated Tungsten electrodes for Madras Atomic Power Project, Kalpakkam, Madras.
4. Bevel gear cutting for M/S. Easun Engineering Co. Ltd. Madras.
5. Spur gears for CVRDE, Avadi, Madras.
6. Calibration of Dead weight pressure gauge tester for M's. Best & Crompton, Ambattur, Madras.

Also this year we have introduced Advance Workshop training programme during Summer for B.Tech students.

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 productivity. The projects under taken 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 distillation, 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 500 patients are daily treated in the Out-Patient Department. The Hospital offers Out-Patient and In-Patient services for Medical, Surgical, Obstetrics, Gynaecological and Paediatric treatment.

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

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. Jayavelan, M.B.B.S. | --- Medical Officer/Resident
Medical Officer — assisting
the Physician |
| 2. Dr. Sumati Khangaonkar, M.B.B.S, D.A. | --- Anaesthetist |
| 3. Dr. Lalithakumari, M.B.B.S., D.G.O. | --- Gynaecologist |
| 4. Dr. Radha Rajagopalan, M.B.B.S., A.B., PED (USA) | --- Paediatrician |
| 5. Dr. P. Subramaniyan, M.B.B.S. | --- Medical Officer. |

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

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

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

In the year 1983 — from January to December, 101 children were vaccinated against measles and 556 doses (comprising of 5 doses to each child getting primary doses) were given against polio. 478 doses of Triple Antigen (against Diphtheria, Pertusis and Tetanus) as 3 primary doses a month apart and a single booster dose at appropriate intervals were given. Small-Pox vaccination was carried out on 32 persons.

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

Statistics :

APRIL 1983 TO MARCH 1984

I. Total number of Out-Patients	— 1,45,351
II. Total number of In-Patients	— 820
III. Emergencies attended	— 8,541
IV. Dressing	— 24,430
V. Injections	— 35,620
VI. Delivery	— 23
VII. Pathology	
a) Urine	— 2,532
b) Motion	— 1,632

c) Blood	—	3,002
VIII. Bio-Chemistry		
a) Blood Sugar	—	312
Urea	—	35

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 1982-83. Towards this end, this office maintained a very close interaction with industrial establishments in private as well as public sectors. It liaised with as many as over 195 companies during the year. As a result, over 93 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 268 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.

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. The office also wrote letters to as many as over 100 Companies and the response from them was as good as was in previous years.

WEAKER SECTION STUDENTS AND FOREIGN STUDENTS

22½ of the seats are reserved for the students belonging to SC/ST community. At present they are admitted through the Joint Entrance Examination with a relaxation. These students have to get only 2/3 of the marks obtained by the last student of the general category to get qualified for admission. 19 students were joined the B. Tech. programme during the academic year 1983-84. Students admitted against this quota are given:

1. Free messing with pocket allowance of Rs.70/- depending upon the means criteria, as stipulated by the Government of India.
2. Free Lodging.
3. Exclusive use of Book Bank.
4. Drawing instruments at free of cost.
5. Help in getting job on graduation.
6. Financial help for needy students through parttime-jobs.

During the year 1983-84, Preparatory Course for SC/ST students who failed to get admission through JEE 1983, has been started. After the Preparatory Course at IIT, they will be eligible to join B. Tech. degree from the session 1984-85, if they secure minimum 40% of the marks in the examination conducted exclusively for these students by the IIT. They are treated on par with the regular B. Tech. students as far as the above financial supports are concerned. Another Special Coaching Programme for about 170 SC/ST students at present studying 12th Std., is also being conducted during the year 1983-84. The students who are undergoing the above course will write JEE during

May 1984. So far, two contact programmes were held. Entire expenditure, including the travel boarding and lodging are met by IIT, Madras which comes out to Rs.4 lakhs (about). A faculty member is appointed as Adviser to look after the needs of the Weaker Section Students. Currently there are about 100 SC/ST students at the Institute.

There are about 30 Foreign students studying at this Institute. They come from countries like Sri Lanka, Malasiya, Fuji and Iran. The Adviser Foreign students also look after the needs of the Foreign students.

CULTURAL ACTIVITIES

Extra-curricular activities of the Institute Gymkhana like the literary and cultural events play an important role in the day to day activities of the student community. During the year under review viz., 1983-84 following important cultural events were organised.

The annual Cultural Festival Week Mardi Grass '84 was conducted in a bigger scale this year. 20 outstation teams and a number of 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 Grass 1984. The main attraction of this year's Mardi Grass 1984 was the professional show of Shri Hari Prasad Churasia giving a melodious performance of Flute recital and the HRAIAH HEEP Western Music show attracted large audience.

An essay competition was conducted under the auspices of the Ministry of Social Welfare, Government of India on "Drinking Drug abuse" this year.

IIT Teams participated in various cultural festivals conducted in Madras as well as in other part of the country. Some of the note worthy events are listed below.

The IIT Madras won the overall trophy of the "VIBRATIONS" Cultural Festival at IISC Bangalore.

IIT Madras team won the 3rd place in the "RENDEZVOUS" and "FESTEMBER"-Cultural Festival at IIT Delhi and REC, Trichy respectively.

IIT Madras team won the first place in painting, clay Modelling, Tintoretto and Guess Word competitions held in Mardi Grass 1984.

IIT Madras team won the 1st place in the just-A-Minute competitions conducted by stella Marrys and Vivekananda College, Madras.

SPORTS

- 1 The Silver Jubilee year of our Institute offered an excellent opportunity of hosting the twentieth (20th) All-India Inter IIT Sports Meet at our grounds from 19th to 24th December 1983. The programme went off successfully for the first three days. Due to torrential rains from the fourth day, the entire programme could not be completed. Yet the Gymkhana completed Basketball, Shuttle Badminton, Tennis, Volleyball, Gymnastics, Weight lifting and Aquatics with the indoor facility available in the city.

IIT Madras won the gold in Volleyball, the silver in Basketball. Weight lifting and Waterpolo and the Bronze in Gymnastics, Badminton, Tennis, Table Tennis and Swimming. In other games and Athletics, IIT Madras had all the probable chances to win either gold or silver as it reached the semi-finals stage. Thus IIT Madras could have established its supremacy once again in the Sports and Games by regaining the General Championship for the 13th time out of the last 14 consecutive meets.

Another important feature of this year's Inter IIT Sports Meet was the introduction of a separate General Championship for women and the trophy was donated by the IIT Madras.

2. The Institute has fulfilled the long-felt need of having a magnificent, multipurpose flood-lit auditorium with wooden flooring as the Student activities Centre. It was a beautiful piece of workmanship constructed at a cost of 1.4 crores where facilities are readily available to play and to conduct tournaments in Basketball, Badminton, Volleyball, Tennis, Table Tennis, Gymnastics and Weight Lifting. Of course, this is an additional facility for our students to improve the standard in sports and games by using the SAC throughout the year. Seating arrangements are made available for 3000 spectators.

In addition to the above rich facility, a new eight lane athletic track was constructed at the stadium. Also a portion of the skating rink was relaid.

3. Our Volleyball team, in addition to the winning of gold in the Inter IIT continuously for the last three years, was the winner in our institute's Sportfest Inter-Collegiate Volleyball tournament and the runner-up in the Police-Public Volleyball tournament.
4. IIT Madras Cricket team performed extremely well in the Inter-University cricket tournament conducted by the University of Madras and reached the quarter-finals.
5. The Institute Swimming team won the Championship trophy by securing 105 points in the first Tamil Nadu Inter-Collegiate invitation Swimming Meet for the Murray Srinivasan Memorial Rolling Trophy.
6. The Tennis team retained the Zonal Championship of the Madras city Inter-Club league tournament conducted by the Tamil Nadu Tennis Association.

The tennis players had the privilege of playing with the visiting combined Universities Tennis team of the West Germany which was ranked 4th in the world Universide. Several exhibition matches were organised in the third week of January 1984 when Indian Tennis stars Mr. Vasudevan, Mr. Madusoodana Nair, Mr. Somnath, Mr. Vivek Kumar Reddy, Mr. Dinesh, Miss Vidya Priya, Miss. Gowri Krishnan and Miss. Radika participated. Highest standard of Tennis performance was witnessed by the Sports-Loving public of the city and it was a grand treat for the thousands of Tennis Lovers.

7. 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 i.e. 16 teams and 13 teams respectively. The tournament was organised and conducted by our students like professional organisers. The tournament lasted for a week and it was a real feast for all the Sports-loving community of our campus. It attracted crowds of over 4000 everyday.
8. In order to encourage, motivate and attract larger participation in sports and games and to meet the principle of "play grounds nearer to the Hostels" Institute generously allotted the play area opposite the wardens' quarters for use. Here, facilities would be available to play cricket, Football, Hockey, Volleyball. Tennis and Kabaddi. The Inter-IIT matches in cricket and Kabaddi were held here.
9. (a) The Institute deputed Mr. Johnson, Sports Officer, Swimming In-charge of the Gymkhana to the Swimming orientation course that was conducted by the N.I.S. patiala and thus he is ready to coach our students with the latest trends and techniques in Aquatics. He secured first class in the course.
(b) Mr. K.U.N. Rao, Sports Officer of the Institute Gymkhana has been elected to serve as one of the Vice-presidents of the Indian Association of sports medicine. He is nominated as the joint secretary of the Indian Association of Sports psychology for a period of four years.

He is also serving the Tamil Nadu Tennis umpires Association as the Vice-president.

- (c) Mr. H. Shaukatali Senior Sports Officer of the Gymkhana acted as the Coach for the All India CSIR national Volleyball Coaching Camp that was held at the Madras CSIR Campus in February 1984.
- (d) Mr. H. Shaukatali and Mr. Joga Rao Senior Sports officers of the institute Gymkhana served as the Convenors for the Police-Public tournaments in Volleyball and Hockey.
10. The Sportfast has established its reputation and almost all the city Colleges are participating whole-heartedly as we aim at utmost perfection of organisation and Conduct. This serves as a weapon to improve our standards and techniques and equips for the Inter IIT-Sports Meet.
11. In order to popularise Sports and games and with the intention of securing maximum participation from our students and staff the following tournaments and competitions were held.
1. Annual Road Race
 2. Mini Road Race for Staff
 3. Institute Open Cycle Races
 4. Tournaments for Staff Club and Ladies Club
 5. Police-Public Tournaments in Hockey and Volleyball
 6. Tournaments for Mess Employees.
 7. Institute Open Badminton and Table Tennis Tournaments for medalists and Non-medalists.
 8. Non-Medalist Volleyball tournament
 9. Three-A-Side Basketball Tournament
 10. Six-A-Side Football Tournament by the FSA
 11. Skating Hockey
 12. Ganga three-A-Side Volleyball Tournament
 13. Narmada Four-A-Side Hockey Tournament
 14. Institute Bridge Tournament
 15. Institute Chess Tournament
12. The Inter-Hostel programme is the heart of the programme of the Gymkhana activities. Its aim is "A game for each and each for a game."

Competitions were held throughout the year in all the Major games and Athletics. Larger number of students from all the hostels participated Voluntarily and there was a healthy competition prevalent among our students. We are proud to note that they exhibited fine sportsmanship in all the competitions. Mr. BRIJESHWAR SINGH, I.A.S., Director of Sports and youth Services, Government of Tamil Nadu presided over this year's Sports day on 31st March 1984 and gave away the prizes. Narmada hostel secured the overall championship for the SCHROETOR Trophy by scoring 106 points. Hearty congratulations to all the members of the Narmada Hostel and our deep appreciation to all the members of other hostels for having maintained a healthy fighting spirit following the dictum of BARON-DE-COUBERTIN that the important thing in sports and games is not winning but taking part where as the essential thing in sports and games is not conquering but fighting well".

NATIONAL CADET CORPS

1. The National Cadet Corps is an organisation aiming at development of leadership, character comradeship and spirit of adventurism among the educating youth.
2. The Institute has sponsored an Air Wing NCC Unit namely: 4 (TN) Air Sqn (Tech) which is located in the NCC Building inside the Campus. About 100 students are admitted into NCC every year to enable the students to fulfill the partial requirement of the B. Tech. Degree course. Students who choose NCC are to undergo a minimum of two years NCC each year consisting of 20 parades conducted on Saturdays/ holidays.
3. The training in NCC comprises of drill with and without arms, weapon training, general service knowledge principles of flight, aeromodelling, aero engines, air craft instruments and tele-communication and radar further the cadets are given air experience through gliders. Technical/ Industrial visits to service and industrial establishments in and around Madras are also organised. As a part of weapon training the cadets are given firing practice in rifles, revolvers and air guns. Aeromodelling opportunities exist in the unit to build various types of models with the assistance of a qualified aeromodelling instructor.
4. The cadets are sponsored for various types of camps such as Annual Training camp, Attachment camp (with regular Air Force Technical Establishments), basic and advance leadership and mountaineering courses.
5. "B" & "C" Certificates Examinations are conducted every year at the end of the year training programme for cadets who have successfully completed two years and three years training respectively in NCC.
6. 4 (TN Air Sqn (Tech) NCC is at present commanded by Wing Commander P. Rathinam, IAF The NCC training is imparted by the NCC part time Officers and permanent instructional staff from IAF. The NCC part time Officers are Sqn. Ldr. V. Subrahmanyam and Flt. Lt. K. V. Chalapathy Rao who are the faculty members of the Institute.

NATIONAL SERVICE SCHEME

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

1. Special camp for students of Taramani School.
2. The National Service Scheme Tailoring Wing situated in the premises of the Veiacheri Welfare Association Buildings conducted classes in Tailoring, Needle Work and Embroidary for 37 women during the year under review— for the women in the village of Velacheri—and awarded certificates of proficiency to them. All of them have obtained placement since their completion of the course.
3. Old clothes and materials were collected and distributed to the needy in some of the village and poor homes. Leprosy patients, Avvai Home students benefited by this.
4. Conducted special practical classes in Physics for the students of Avvai Home.
5. Conducted an Eye Camp for Taramani Villagers with the Medical Help from Voluntary Health Services, and Medical Aid from Smith, Kline and French a leading Pharmaceutical company. 185 patients were screened and 62 operations were performed at Voluntary Health Services Hospital with the aid of doctors of the Hospital and the Royal Society for the Blind. Spectacles have also been provided for those who were operated upon.
6. Tree plantation was done at various sites inside the Campus.
7. Five Blood Donation Camps were held during the year.
8. 4000 covers were made and handed over to the IIT, Hospital.
9. Production of Teaching Aids have started under the leadership of Dr. V. S. Murthy. Subjects under Physics, Chemistry, and Biology have been selected for such a venture.
10. Regular classes are being conducted in Kendriya Vidyalaya and Vanavani Higher Secondary School.
11. Various films were screened for the people in the adopted villages with the help of various consulates in Madras.

HOSTEL MANAGEMENT

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

Each hostel/CSU is administered by a Warden appointed by the Director from among the senior faculty members of the Institute. Hostel Management is the appointing authority and is the centrally administrative body that manages the work and affairs of the hostels and CSU. The Chairman Council of Wardens is the Chairman of the Hostel Management. Dr. N. VENKATRAYULU, Professor, Department of Mechanical Engineering is presently the Chairman of the Hostel Management.

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

CENTRAL SUPPLIES UNIT

The Unit procures under the Milk Supply Scheme milk from the nearby villagers, Centre for Rural Development, Narayanapuram 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 around the campus.

Under the Provision Supply Scheme the Unit procures major items like Rice, Wheat, Dhalls Sugar, Edible Oils, Coffee, Tea etc at the wholesale rate and distributes to the individual hostels.

CONSTRUCTION OF BUILDINGS

During the period April '83 to March '84 the following major works have been taken up completed.

1. Students Activities Centre — completed at a cost of about Rs. 90 Lakhs — A multipurpose Auditorium — cum — stadium comprising an area of 4,400 Sq.M. provides seating capacity for 2500 persons — provides facilities for indoor games on Timber flooring — suitable for large meetings and functions — Film projection etc.
2. Formation of Track in stadium—completed.
3. Development of playground in Front of warden's Quarters—partially completed.
4. Sub works for student Activity Centre mostly completed.
5. Eye and Dental wing over Hospital Building—Work is in progress.
6. Modifications in high pressure lab--Work taken up.
7. Construction of Security staff qrs--completed.
8. Diving Unit at Swimming pool- Work in Progress.
9. Additional class rooms for Kendriya Vidyalaya—Work sanctioned—To be taken up.
10. Extension to F.R.P. Centre—Work sanctioned--To be taken up.

Besides the above capital works, many minor works have been carried out under maintenance grant and Department grants (both recurring and Non recurring).

**NAMES OF FACULTY MEMBERS, DEPARTMENT-WISE
AERONAUTICAL ENGINEERING**

Professors

- | | |
|------------------------------------|------------------------|
| 1. Dr. K. A. V. Pandalai | 5. Sri K. Balaraman |
| 2. " A. K. Sreekanth | 6. Dr. K. A. Damodaran |
| 3. " T. K. Bose | 7. Sri C. S. Ballal |
| 4. " N. R. Rajappa (<i>Head</i>) | 8. Dr. G. Subramaniam |

Associate Professor

Dr. T. K. Varadan

Assistant Professors

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

Lecturers

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

Technical Officers

Sri Job Kurian
Sri G. A. Venceslas

APPLIED MECHANICS

Professors

- | | |
|----------------------------------|---|
| 1. Dr. N. V. Chandrasekharaswamy | 5. Dr. P. S. Srinivasan (<i>Head</i>) |
| 2. " B. V. Aswathanarayana Rao | 6. " R. S. Srinivasan |
| 3. " R. S. Alwar | 7. " T. M. Srinivasan |
| 4. " V. Ramamurti | |

Associate Professors

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

Assistant Professors

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

Scientific Officer Grade-I

Sri C. R. Subramanian

Lecturers

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

Lecturer Grade-II

Sri G. Thomas

Technical Officer

Sri S. Swarnamani

CHEMICAL ENGINEERING

Professors

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

Assistant Professors

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

Lecturers

Dr. V. Sriramachandra Rao

Technical Officers

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

CHEMISTRY

Professors

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

Associate Professors

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

Assistant Professors

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

Lecturers

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

Lecturer Grade II

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 (*Head*)
5. " H. Raman
6. " T. P. Ganesan
7. Dr. C. S. Krishnamurthy
8. " R. Radhakrishnan
9. " N. Rajagopalan
10. " K. Elango
11. " Nainan P. Kurian

Associate Professors

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

Assistant Professors

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

Lecturers

1. Sri K. Gopalakrishna
2. Dr. A. Ramakrishna Rao

Senior Scientific Officer Grade II

1. Sri M. Subbi Reddy
2. „ R. Ambalavanan
3. A. Ramachandriah
4. Sri K. Ananthanarayanan
5. „ V. Thamizharasan

Technical Officers

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

ELECTRICAL ENGINEERING

Professors

1. Dr. M. Venugopal
2. „ V. G. K. Murti
3. „ M. K. Achuthan
4. „ K. P. Rajappan
5. „ D. K. Banerjee
6. „ B. Ramaswamy
7. Dr. V. Seshadri
8. „ A. Kuppurajulu
9. „ Y. Narayana Rao (*Head*)
10. „ 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. Dr. C. Eswaran
14. „ R. Parthasarathy
15. „ M. V. Chalapathy Rao
16. „ V. Venkata Rao
17. „ R. Parimelazagan
18. „ K. N. Bhat
19. „ P. A. Janakiraman
20. „ B. S. Bhanumurthy
21. „ Ashok Jhun Jhunwala
22. „ C. Venkatasessaiah
23. „ P. Sashidhara Rao
24. „ 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. Palaniswami

Senior Design Engineers

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

Senior Scientific Officer Grade II

- Sri S. Gopal
„ S. Karmalkar

Technical Officers

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

HUMANITIES & SOCIAL SCIENCES

Professors

1. Prof. R. K. Gupta
2. Dr. S. Ramani (On deputation to NITIE)
3. „ S. Ambirajan
4. Dr. A. V. Krishna Rao (*Head*)
5. „ Dipak Chaudhuri

Associate Professors

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

Assistant Professors

1. Sri V. S. N. Sarma
2. Dr. E. Unnikrishnan
3. Dr. 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 (*Head*)
2. „ S. K. Srinivasan
3. „ L. V. K. V. Sarma
4. Dr. H. S. Paul
5. „ K. R. Parthasarathy
6. „ R. Subramaniam

Associate Professors

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

Assistant Professors

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

Lecturers

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

Senior Scientific Officer Grade II

1. Dr. K. Swaminathan

MECHANICAL ENGINEERING

Professors

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

Associate Professors

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

Assistant Professors

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

7. Dr B. Nagalingam
8. " U. S. P. Shet
9. " K. Gopinath
10. " K. Srinivasan
11. " O. V. Krishnaniah Chetty
12. " S. Rajesham

13. Dr. K. R. Govinda Mallan
14. " K. Narayanaswamy
15. " K. V. Chalapathi Rao
16. " T. Nagarajan
17. " K. N. Gopalan
18. " V. Balabaskaran

Lecturers

1. Sri K. S. Padiyar
2. " V. N. Rajan
3. " D. V. Ramalingeswara Rao
4. " K. V. Thyagarajan
5. " K. Ramakoteswara Rao

6. Sri S. Kumaraswamy
7. Dr. Y. G. Srinivasa
8. Sri G. Muthuveerappan
9. " V. Jayaprakash
10. " S. Krishnamurthy

Design Engineers

1. Sri M. Singaperumal

2. Sri A. Arun

Technical Officers

1. Sri M. Velayudhan
2. " S. Krishnaswamy
3. " B. N. Somasekhara
4. " U. P. Das

5. Sri V. M. Swamy
6. " V. Sankaran
7. " A. K. Madhavakrishnan
8. " R. Srinivasan

METALLURGICAL ENGINEERING

Professors

1. Dr. E. G. Ramachandran
2. " K. Srinivasa Raghavan
3. " R. Vasudevan

4. Dr. H. Md. Roshan
5. " K. Ananthapadmanabhan (*Head*)
6. " V. M. Radhakrishnan

Associate Professors

1. Dr. O. Prabhakar

2. Dr. D. R. Gopalakrishna Achar

Assistant Professors

1. Sri R. K. Srikantakumaraswamy
2. Dr. K. J. Lakshminarayana Iyer
3. " C. V. Gokulrathnam

4. Dr. S. K. Seshadri
5. " P. Venugopal

Lecturers

1. Sri S. Ramakrishna Iyer
2. Dr. S. Raghavan
3. Sri V. Jagasivamani
4. " S. D. Pathak

5. Sri P. Kesavan Nair
6. " K. Prasad Rao
7. " Ganpath Ram Sharma
8. " J. Mukhopadhyay

Senior Scientific Officer Grade II

Sri S. Annamalai

Lecturer Grade II

Sri S. Kumaran

Technical Officers

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

PHYSICS

Professors

1. Dr. R. Srinivasan
2. „ B. V. Ramana Murthy
3. „ S. Radhakrishna
4. „ Y. V. G. S. Murthi
5. „ J. Sobhanadri (*Head*)
6. Dr. V. Balakrishnan
7. „ K. V. S. Rama Rao
8. „ V. Sivaramakrishnan
9. „ G. Rangarajan

Associate Professor

Dr. R. Ramji Rao

Assistant Professors

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

Lecturers

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

Senior Scientific Officer Grade I

Dr. Y. Syamasundar Rao

Lecturer Grade II

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

Technical Officers

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

COMPUTER SCIENCE AND ENGINEERING

Professors

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

Associate Professor

Dr. K. B. Lakshmanan

Assistant Professor

Dr. (Smt.) Kamala Krithivasan

Lecturer

Sri C. Pandurangan

COMPUTER

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 (Operations)

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

Associate Professors

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

Principal Scientific Officer

Dr. M. R. Pranesh

Assistant Professors

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

Senior Scientific Officer Grade I

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

Senior Scientific Officer Grade II

1. Sri S. K. Bhattacharya
2. Dr. V. Sundar
3. Sri R. Sundara vadivelu
4. Sri V. Ananthasubramanian
5. ,, S. R. Gandhi
6. ,, Sajjan Thomas

REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

Professors

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

Assistant Professors

1. Dr. S. P. Venkateshan
2. 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

Technical Officer

1. Sri K. Raman

2. Sri M. Kumaravel

MATERIAL SCIENCE RESEARCH CENTRE

Professor

Dr. G. V. Subba Rao

ENGINEERING DESIGN CENTRE

Professors

1. Dr. R. S. Sirohi

2. Dr. M. A. Veluswami

Assistant Professor

Dr. M. P. Kothiyal

Lecturers

1. Sri G. Anjaneyalu

2. Sri V. Venkatesware Rao

Chief Design Engineer

Sri T. S. Chennabasavan

Senior Design Engineer

1. Sri Dev Kishore Sharma

2. Sri S. D. Kalandar Sahib

Design Engineer

Sri H. V. Bhasin

FIBRE-REINFORCED PLASTICS RESEARCH CENTRE

Chief Design Engineer

Dr. N. Gopalakrishnan Nair

Assistant Professor

Dr. R. Palaninathan

Senior Design Engineer

Sri S. K. Malhotra

Design Engineer

Sri B. Jagadish Chandra Babu

CENTRE FOR INDUSTRIAL CONSULTANCY AND SPONSORED RESEARCH

Chief Techno Economic Officer

Dr. D. Balakrishnan

Senior Techno Economic Officers

1. Sri C. Sivaprasada Rao

2. Sri Y. G. Narasimha

CENTRAL WORKSHOP

Senior Workshop Superintendent

Sri S. Jambunathan

Assistant Workshop Superintendent

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

TECHNICAL OFFICERS

1. Sri P. J. George

4. Sri G. S. Ramachandran

2. „ K. S. Venugopal

5. „ M. K. Pani

3. „ K. S. Veeraraghavalu

6. „ A. V. Sundaran

CENTRE FOR RURAL DEVELOPMENT

Chief Techno Economic Officer

Sri D. Hariharan

Assistant Professor

Dr. T. Karunakaran

CENTRAL GLASS BLOWING SECTION

Technical Officer

Sri N. T. Kumaraswamy

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
3. „ S. Joga Rao

2. Sri H. Shaukatali

LIBRARY

1. Librarian
2. Deputy Librarian
3. Assistant Librarian
4. S. T. A (S. G.)

... Sri V. S. Nazir Ahmed
... „ C. Deenadayalu
... „ P. Venkatesan
... „ J. Durairaj
... „ N. Satyamurti
... „ K. Sankaran.

DEANS

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

ADVISERS

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

Director

Dr. P. V. Indiresan

Deputy Director

Dr. R. Srinivasan

DEANS

Prof. M. Venugopal, Dean, Academic Research

Prof. D. Prithviraj, Dean, Academic Courses

Prof. V. Srinivasan, Dean, Staff Affairs

Prof. J. C. Kuriacose, Dean, Students

Prof. H. N. Mahabala, Dean, IC & SR

Heads of Departments

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

CENTRAL ADMINISTRATION

Registrar

Sri S. Santanagopalan

Deputy Registrars

Sri W. Hanumesi Rao
(General Administration)

Sri M. Gopalan
(Academic)

Sri V. Shanmugam
(Administration)

Finance and Accounts Officer

Sri A. V. Karunakaran Nambiar

Stores and Purchase Officer

Sri A. Thirunavukarasu

Internal Audit Officer

Sri. N. R. Kuppuswamy

Chief 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
(on leave)

Sri R. N. Subramanian

Assistant Stores and Purchase Officer

Sri M. C. JAMES

ENGINEERING UNIT

Executive Engineer

Sri N. Malayalam

Estate Officer

Sri V. N. Murty

Assistant Engineers

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

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

Horticultural Superintendent

Sri P. Manickavasagam

BUDGET PROPOSALS

(Figures in lakhs of rupees)

Description	Budget Estimates for 1983-84		Revised Estimates 1983-84	Budget Estimates 1984-85
	as per Finance Committee	as allocated by Board of Governors	as per Finance Committee	
(1)	(2)	(3)	(4)	(5)
Non-Plan				
Recurring	655.30	655.30	693.62	748.68
Non-Recurring	10.00	6.00	50.00	70.00
Total (Non-Plan)	665.30	661.30	743.62	818.68
Plan				
Recurring	50.01	35.00	32.50	32.50
Non-Recurring	189.71	106.82	127.50	107.50
Total (Plan)	239.72	141.82	160.00	140.00
Modernisation of Laboratories and Workshops equipment including updating of Com- puter system.				100.00
				240.00
Income	98.70	98.70	102.29	103.07

Statement of Accounts
1982-83

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS

	Rs.
Opening Balance	1,56,30,173
Receipts on Capital Accounts	
Grant from Government of India on Capital Account	1,37,00,000
Other Capital Receipts	
Refund of Customs Duty	34,86,570
Sale proceeds of Institute Vehicle (Bus)	44,309
Capital Receipts others (HAL)	7,08,710

C/o.

3,35,69,762

TECHNOLOGY, MADRAS-600 036

ACCOUNTS FOR THE YEAR 1982-83

PAYMENTS

	Rs.	Rs.
On Capital Accounts		
(i) Building and Works:		
(a) Others	49,78,710	
(b) Ocean Engg. Centre	92,441	
	<hr/>	50,71,151
(ii) a) Equipment, Furniture and Fittings:		
Departments		
1. Chemistry	1,13,723	
2. Physics	2,62,345	
3. Mathematics	10,001	
4. Humanities and Social Sciences	51,832	
5. Civil Engineering	2,31,251	
6. Mechanical Engineering	3,88,341	
7. Electrical Engineering	2,24,722	
8. Chemical Engineering	1,22,946	
9. Metallurgy	1,88,713	
10. Applied Mechanics	1,92,873	
11. Aeronautical Engineering	89,462	
12. Computer Science & Engineering	4,49,131	
	<hr/>	23,25,340
b) Capital Equipments for New Labs		
c) Central Services Units		3,60,036
		<hr/>
	C/o.	77,56,529

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.	Rs.
B/F		3,35,69,762
Grant from Government of India		
On Revenue Account		4,82,73,000
Receipts from Academic Section		
Tuition Fees	4,60,213	
Hostel Seat Rent	2,49,345	
Gymkhana Management	46,260	
Medical Fees	16,198	
Fines	6,601	
Examination Fees	59,000	
Degree in Absentia	1,009	
	8,38,626	8,38,626

C/o.

8,26,81,388

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	Rs.	Rs.
B/F		77,56,529
(d) Research Centre :		
Engineering Design Centre	21,768	
Regional Sophisticated Instrumentation Centre	81,359	
Composite Structure F. R. P. Research Centre	1,04,682	
Material Sciences Research Centre	1,39,499	
Energy Research Centre	24,205	
Inter University Partnership Projects	362	
Television Lab	1,96,234	
Microprocessor Lab (N.r.)	58,611	
	<hr/>	6,26,720
(e) Central workshop		58,403
(f) Ocean Engineering Centre		8,10,753
(g) Centre for Rural Development		2,21,613
(h) Replacement of Obsolete Equipment		3,79,649
(i) Indo-French Collaboration Programme		6,607
(j) Sub-Centre Cryogenic Engineering		44,289
(k) Bio-Sciences and Bio-Technology		1,31,286
		<hr/>
	C/o	1,00,35,849

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.	Rs.
B/F		8,26,81,388
Other Receipts		
Application fees from Students	8,82,637	
Application fees for Posts in Institute	10	
Admission Fees	17,036	
Grade Card	2,834	
Gymkhana Receipts	—	
Institute Bus Collection	4,04,630	
Hire Charges on Institute Vehicle	31,104	
Library Over due collection	46,279	
Institute Day and Association Fees	4,115	
Library Membership fees	1,16,448	
Short Term and other Courses	1,27,495	
	16,32,588	

C/o

8,43,13,976

TECHNOLOGY MADRAS

ACCOUNTS FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	Rs.	Rs.
B/F		1,00,35,849
(iii) Customs Duty on West Germany Equipment		
Customs Duty and Clearance Charges		41,38,038
(iv) Furniture and Fittings		
Office and Library etc.	7,04,704	
Utensils of Hostels	91,893	
	<u> </u>	7,96,597
(v) Library		
(a) Books	4,58,866	
(b) Journals and Back Volumes	15,88,122	
(c) Equipment	58,021	
(d) Film Media Resources	17,010	
	<u> </u>	21,22,019
(vi) Others		
Motor Vehicles	2,63,552	
Cycles	10,044	
Typewriters and Duplicators	1,44,209	
Hospital Equipment	30,376	
Fire Fighting Equipment	56,320	
Telephones	11,349	
	<u> </u>	5,15,850
Campus Amenities		10,271
	<u> </u>	1,76,18,624
C/o		

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.	Rs.
B F		8,43,13,976
Other Receipts Contd.		
Sale of Question Papers, Tenders Forms etc.	4,51,943	
Miscellaneous Recoveries	2,04,768	
Breakage from Students	1,509	
Hire Charges for Gowns	1,209	
Guest House Boarding Charges	18,347	
Subscription to Journal of Mathematical and Physical) Sciences and sale Proceeds of Institute Publications)	55,143	
Gymkhana Management Students & Amenities Fund	34,747	
Alumini Association Fund	40,229	
Students Aid and Welfare Fund Receipts From Students	4,178	
Hostel estt. charges — Receipts from Students	9,822	
	8,21,895	
INTERESTS		
Interest on Conveyance Advance	9,502	
Interest on Deposit from T.N.E.B.	15,650	
Interest on P.F. Investments	13,86,872	
Interest on Call Deposits with S.B.I. and Endowments	6,98,793	
	21,10,817	
C/o		8,72,46,688

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	Rs.	Rs.
B/F		1,76,18,624
Revenue Account		
Academic Section — Pay and Allowances of Teaching Staff		
1. Chemistry	11,51,651	
2. Physics	10,74,222	
3. Mathematics	7,55,345	
4. Humanities and Social Sciences	6,52,811	
5. Civil Engineering	10,93,978	
6. Mechanical Engineering	17,22,107	
7. Electrical Engineering	18,07,138	
8. Chemical Engineering	8,74,950	
9. Metallurgy	5,97,834	
10. Applied Mechanics	7,76,500	
11. Aeronautical Engg.	6,56,492	
12. Computer Science Engg.	6,11,006	
	<u> </u>	1,17,74,034
	C/o	<u>2,93,92,658</u>

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

		Rs.	Rs.
Receipts from Buildings	B, F		8,72,46,688
Licence Fees		10,93,368	
Electricity, Water and Service Charges		4,57,678	15,51,046
 Lawns and Gardens			
Usufructs and Receipts from Sewage Farms			16,761
Receipts from Computer Earnings			29,48,166
Receipts from Central Photographic Section			8,543
Central Gas Supply Unit			7,151
			9,17,78,355
	C/o		

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	Rs.	Rs.
B/F		2,93,92,658
(ii) Pay and Allowance of Non-Teaching Staff		
1. Chemistry	3,57,373	
2. Physics	7,05,175	
3. Mathematics	53,375	
4. Humanities and Social Science	1,39,228	
5. Civil Engg.	8,10,438	
6. Mechanical Engineering	16,96,250	
7. Chemical Engineering	4,76,920	
8. Electrical Engineering	9,46,198	
9. Metallurgical Engineering	4,94,069	
10. Applied Mechanics	4,26,770	
11. Aeronautical Engineering	2,83,668	
12. Computer Science and Engineering	3,05,377	
	<u> </u>	66,94,841
(iii) Departmental Expenses		
1. Chemistry	4,63,102	
2. Physics	4,61,676	
3. Mathematics	46,500	
4. Humanities and Social Science	45,154	
5. Civil Engineering	4,18,143	
6. Mechanical Engineering	7,41,419	
7. Electrical Engineering	6,30,632	
8. Chemical Engineering	3,49,924	
	<u> </u>	
C/o	31,56,550	3,60,87,499

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.	Rs.
B/F		9,17,78,355
Recovery of Advances		
Motor Car and Other Conveyance	1,92,887	
Festival Advance	2,33,200	
Customs Duty on Equipment from West Germany	63,24,216	
Customs Duty on personal effect of German Expert	28,921	
On account of UNESCO Coupons	932	
Miscellaneous Advances	3,32,789	
Flood Advance	4,79,671	
House Building Advance	1,35,311	
	77,27,927	
Deposits		
From Contractors Deposits (Works)	4,43,438	
From Suppliers Deposits (Institute)	1,89,537	
External Scholarship	7,07,302	
C.S.I.R.	7,03,109	
Students Caution Deposit	28,990	
Miscellaneous Deposit	35,79,905	
Grant for Microprocessors Lab	10,00,000	
QIP & CSD Schemes	35,08,698	
Industrial Consultancy & Sponsored Research Projects	2,32,79,814	
R.S.I.C.—Receipts	72,339	
	3,35,13,132	
	C/o	13,30,19,414

TECHNOLOGY MADRAS

ACCOUNT FOR THE YEAR 1982-83

PAYMENTS (Contd.)

		Rs.
	B/F	3,60,87,499
(iii) Departmental Expenses Contd.		
	B/F	31,56,550
9. Metallurgical Engg.		4,07,735
10. Applied Mechanics		4,18,239
11. Aeronautical Engg.		3,43,559
12. Computer Science and Engg.		<u>19,87,742</u>
		63,13,825
Indo-German Projects (Pay and Allowances)		1,600
Library		
Pay and Allowances (Officers)		1,65,233
Pay and Allowance (Establishment)		8,26,291
Journal of General Interest		12,231
Contingencies-Operating Cost		48,367
Binding Charges		<u>44,252</u>
		10,96,374
Ocean Engg. Centre		
Pay and Allowance—Officers		3,46,172
Pay and Allowances—Others		2,28,430
Other Charges		<u>5,50,662</u>
		11,25,264
Research Centres		
Pay and Allowances—Officers		3,70,403
Pay and Allowances—Establishment		<u>5,55,536</u>
		9,25,939
		<u>4,55,50,501</u>

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.
B/F	13,30,19,414

TOTAL	13,30,19,414
-------	--------------

TECHNOLOGY MADRAS

ACCOUNTS FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	Rs.	Rs.
B/F		4,55,50,501
Central Services Central Workshops		
Pay and allowances (Officers)	74,044	
Pay and allowances (Estt)	16,03,261	
Working Expenses (Departments Tools and other Consumables)	<u>3,27,721</u>	20,05,026
Central Electronic Centre		
Pay and Allowances		1,40,608
Air Conditioning Unit		
Pay and Allowances		1,16,326
Stipend for Apprentices		64,098
Centres Etc.		
Regional Sophisticated Instrumentation Centre	1,12,301	
Electronic Microscope Lab Instruments Servicing and Development Centre	1,19,732	
Electron Microscope Lab	18,777	
Central Photographic Section	44,396	
Central Class Blowing Section	30,956	
Air Conditioning Unit	84,386	
X-Ray Diffraction Laboratory	50,093	
Energy Research Centre	4,835	
Centre for Rural Development	1,62,894	
Fibre Reinforced Plastic Research centre	<u>1,17,490</u>	7,45,860
		<u>4,86,22,419</u>
C/o		

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.
B/F	13,30,19,414

TOTAL	13,30,19,414
-------	--------------

TECHNOLOGY, MADRAS

ACCOUNTS FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	B/F	Rs.
		4,86,22,419
Sub-Centre in Cryogenic Engg.	94,687	
Television Engineering Lab	67,338	
Engineering Design Centre	69,367	
Material Science Research Centre	2,46,439	
Indo-German Project	1,988	
Indo-French Collaboration	470	4,80,289
Micro-processor Laboratory (per Contra) Payment	2,14,681	
Less Recoveries	2,99,907	
Institute Scholarships		
Post Graduate and Research	41,57,670	
Under Graduate	5,95,198	47,52,868
N. C. C.		
Pay and Allowances	42,441	
Other Expenditure	40,828	83,269
Athletic and Gymkhana		
Transfer of funds to Gymkhana		
Management and other Gymkhana items		4,39,281
Other items		
Part-time Lectures	2,260	
Visiting Professors	13,617	
Technical Bulletin and Journals	50,789	
	66,666	
	C/o.	5,43,78,126

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS(Contd.)

	Rs.
B F	13,30,19,414

TOTAL	13,30,19,414
-------	--------------

TECHNOLOGY, MADRAS

ACCOUNTS FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	B/F	Rs.	Rs.
			5,43,78,126
	B/F	66,666	
Symposia and Seminars		29,932	
Implant Training/Courses/Visits		1,69,289	
Continuing Education Programme organised by the Institute		65,039	
Quality Improvement Programme		13,237	
Director's Laboratory		—	
Director's Discretionary Fund for Research		18,728	
Membership to Outside Bodies		35,723	
Remuneration to External Examiners		55,404	
Convocation		55,596	
Prizes for Academic Distinction		9,254	
Joint Entrance Examination		5,00,534	
Common Examination for Post Graduate Admission (CEPA)/			
Graduate Aptitude Test for Engineers (GATE)		8,95,229	
Contribution towards Institutes Participation of			
Programme of National Conferences		<u>27,500</u>	19,42,131
Hostels			
Allowances to Wardens		7,462	
Subsidy to Hostels		<u>11,28,412</u>	11,35,874
Other Sections			
(a) Central Administration			
Pay and Allowances (Officers)		6,65,218	
Pay and Allowances (Other Staff)		<u>37,26,450</u>	<u>43,91,668</u>
	C/o		<u>6,18,47,799</u>

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS(Contd.)

	Rs.
B. F	13,30,19,414

TOTAL	<u>13,30,19,414</u>
-------	---------------------

TECHNOLOGY, MADRAS

ACCOUNTS FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	Rs.	Rs.
B/F		6,18,47,799
(b) Contingencies		
Postage	2,73,007	
Entertainment	29,625	
Telephones	4,10,341	
Liveries	1,40,530	
Stationery	5,97,984	
Printing	1,20,589	
Advertisement	1,65,112	
Miscellaneous Expenses	<u>3,29,269</u>	20,66,457
(c) Other Items		
Director's Discretionary Fund—Payments	6,846	
Less: Recoveries	<u>3,560</u>	3,286
(d) STORES		
Pay and Allowances-Officers	61,479	
Pay and Allowances-Others	<u>3,56,691</u>	4,18,170
General Stores		
Purchases	58,978	
Less: Issues	<u>49,330</u>	9,648
	C/o	<u>6,43,45,360</u>

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.
B. F	13,30,19,414

TOTAL	13,30,19,414
-------	--------------

TECHNOLOGY, MADRAS
ACCOUNT FOR THE YEAR 1982-83

PAYMENTS (Contd)

	B/F	Rs.	Rs.
			6,43,45,360
Security—other charges			48,075
Special Security Guards			1,84,088
Lawns and Gardens			
Pay and Allowances of Horticulture Superintendent		27,385	
Pay and Allowances (Others)		1,63,072	1,90,457
			26,08,695
Power			8,707
Mosquito Control			1,76,984
Oil and petrol			4,79,175
Water			
Repairs and Maintenance			
(i) Vehicles		2,30,229	
(ii) Typewriter and Duplicators		32,824	
(iii) Furnitures		2,97,361	5,60,414
			77,267
Duty Insurance and Road Taxes			...
Fire—Fighting—Operating Cost			
Works and Maintenance			
Pay and Allowances—Officers		61,264	
Pay and Allowances—Other Staff		32,10,582	
Other Expenditure on Maintenance		31,26,635	63,98,481
Property Tax			2,70,807
			<u>7,53,48,510</u>

C/o

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.
B/F	13,30,19,414

TOTAL	13,30,19,414
-------	--------------

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1982-83

PAYMENTS (Contd.)

	B/F	Rs.	Rs.
			7,53,48,510
Hospital			
Pay and Allowances—Medical Officers		2,01,180	
Pay and Allowances—Other Staff		2,19,844	
Purchase of Medicines etc.		5,88,044	10,09,068
		<u> </u>	
Subsidy to Vana Vani School		1,50,000	
Subsidy to Central School		...	
Audit Charges		40,315	
Legal Expenses		5,383	1,95,698
		<u> </u>	
Travelling Expenses			
Board of Governors		5,261	
Staff Committee, Selection Committee etc.		38,803	
Candidates called for interview for appointment etc.,		50,081	
Joint Entrance Examination		50,834	
External Examiners		78,078	
Common Examination for Post Graduate Admission/Graduate Aptitude			
Test for Engineers (GATE)		72,364	2,95,421
		<u> </u>	<u> </u>

C/o

7,68,48,697

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.
B/F	13,30,19,414

TOTAL	13,30,19,414
-------	--------------

TECHNOLOGY, MADRAS

ACCOUNT FOR THE YEAR 1982-83

PAYMENTS (Contd)

	B/F	Rs.
Commitment under Indo-German Agreement		
Customs Duty on Personal effects of West German Experts		29,252
Contribution to Societies		...
Leave Salary and Pension contribution on account of personnel on Foreign Services		32,722
Contribution to Employees Welfare Scheme		1,559
Training and Welfare activities of staff members		...
Central Gas supply unit (per contra)		
Purchases	1,07,832.96	
Issues	1,14,984.30	
		...
Campus Amenities		5,552
Provident Fund/gratuity/pension		
C.P.F (Contribution & Interest)	2,00,000	
C.P.F.-Cum Gratuity (Contribution and interest)	24,91,029	
G.P.F.-Cum- Pension-Cum-gratuity	64,708	
Gratuity and Pension	4,06,819	
Deposit Linked Insurance	...	
		<u>31,62,556</u>
	C/o	<u>8,00,80,338</u>

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS(Contd.)

	Rs.
B/F	13,30,19,414

TOTAL	<u>13,30,19,414</u>
-------	---------------------

INDIAN INSTITUTE OF
RECEIPTS AND PAYMENTS

RECEIPTS (Contd.)

	Rs.
B/F	13,30,19,414

TOTAL

13,30,19,414

A. V. KARUNAKARAN NAMBIAR
Finance & Accounts Officer

TECHNOLOGY, MADRAS

ACCOUNTS FOR THE YEAR 1982-83

PAYMENTS (Contd).

		Rs.	Rs.
	B/F		11,36,13,820
Closing Balance			
Cash in Hand		16,72,474	
With State Bank of India	1,76,75,956		
I I T Post Office Savings Bank Account	57,164		
		<u>1,77,33,120</u>	
			<u>1,94,05,594</u>

TOTAL

13,30,19,414

S. SANTHANAGOPALAN
Registrar

P. V. INDIRESAN
Director

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE

	Rs.	Rs.
EDUCATIONAL EXPENSES		
Pay of Teaching Staff		
Department of		
Chemistry	11,53,569	
Physics	10,94,281	
Mathematics	7,54,897	
Humanities and Social Sciences	6,59,274	
Civil Engineering	11,02,576	
Mechanical Engineering	17,64,425	
Electrical Engineering	18,25,441	
Chemical Engineering	8,81,579	
Metallurgical Engineering	6,14,136	
Applied Mechanics	7,83,154	
Aeronautical Engineering	6,63,616	
Computer Science and Engineering	6,17,616	
	<hr/>	1,19,14,564

C/o

1,19,14,564

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31ST MARCH, 1983.

INCOME

	Rs.	Rs.
Grant From Government of India		
(On Revenue Account)		4,82,73,000
General Income		
Tuition Fees		4,71,575
Hostel Seat Rent		2,52,218
Gymkhana Management	46,320	
Medical Fees	17,002	
	<u>63,322</u>	63,322
Fines		6,601
Examination Fees		59,000
Degree in Absentia		1,009
Application fees from Students		8,82,637
Application fees for Appointments		10
Admission Fees		17,036
Grade Card		2,834
		<u>17,56,242</u>

C/o

5,00,29,242

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	Rs.	Rs.
B/F		1,19,14,564
Pay of Non-Teaching Staff		
Department of Chemistry	3,63,823	
Physics	7,15,146	
Mathematics	53,673	
Humanities and Social Sciences	1,42,205	
Civil Engineering	8,18,543	
Mechanical Engineering	16,73,555	
Electrical Engineering	9,49,358	
Chemical Engineering	4,80,497	
Metallurgical Engineering	5,02,879	
Applied Mechanics	4,28,571	
Aeronautical Engineering	2,88,849	
Computer Science and Engineering	3,09,613	
	67,26,712	
Pay and Allowance		
Centres (Officers)	3,81,854	
Centres (Others)	5,70,084	
	9,51,938	
Pay and Allowances		
Indo—German Projects		1,149
	C/o.	1,95,94,363

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31ST MARCH 1983

INCOME (Contd.)

	Rs.	Rs.
	B/F	5,00,29,242
Misc. Receipts		
Institute Bus Collection	4,04,743	
Hire Charges on Institute Vehicles	29,288	
Licence Fee	10,77,365	
Electricity, Water and Service Charges	4,79,038	
Lawns and Gardens (Auction sales of trees usufructs etc.)	16,760	
Other Receipts	34,54,566	
Income from Computer Centre	29,60,069	
Central Photographic Section	8,543	
Central Gas Supplies Unit	6,941	
	<u> </u>	84,37,313
Excess of Expenditure over income		36,57,837

C/o.

6,21,24 392

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	Rs.	Rs.
B/F		1,95,94,363
Departmental Expenses		
Chemistry	4,53,601	
Physics	3,91,193	
Mathematics	46,030	
Humanities and Social Sciences	45,152	
Civil Engineering	4,33,824	
Mechanical Engineering	5,59,525	
Electrical Engineering	6,04,426	
Chemical Engineering	2,41,290	
Metallurgical Engineering	4,30,049	
Applied Mechanics	2,50,618	
Aeronautical Engineering	3,52,095	
Computer Science and Engineering	21,71,624	59,79,427
LIBRARY		
Pay and Allowances		
Officers	1,68,733	
Establishment	8,36,605	
Contingencies-Operating		
Cost and Binding Charges	11,319	
Journals of General Interest	12,231	10,28,888
	C/o.	2,66,02,678

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31—3—1983

INCOME (Contd)

	Rs.
B/F	6,21,24,392

C/o

6,21,24,392

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	B F	Rs.	Rs.
Workshops			2,66,02,678
Pay and Allowance of Workshop Superintendent		74,620	
Pay and Allowance of Other Staff		16,17,695	
Working expenses (Instruments Tools, other consumables)		1,62,017	18,54,332
Stipend to Apprentices			63,034
Sub-Centre in Cryogenics Engineering			94,687
 Ocean Engineering Centre			
Pay and Allowances		5,83,607	
Working Expenses (Instruments and other consumables)		<u>5,39,425</u>	11,23,032
	C/o.		<u>2,97,37,763</u>

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31 ST MARCH 1983

INCOME (Contd.)

	Rs.
B/F	6,21,24,392

C/o.

6,21,24,392

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	Rs.	Rs.
		2,97,37,763
B/F.		1,41,132
Central Electronic Centre Pay and Allowances		1,41,132
Air-Conditioning Unit — Pay and Allowances		1,21,065
R. S. I. C.	1,50,469	
Electron Microscope Lab.	19,120	
Electronic Instruments Servicing and Development Centre (C. E. C.)	1,68,573	
Central Photographic Section	34,651	
Central Glass Blowing Section	32,391	
Air-Conditioning Unit	95,079	
X-Ray Diffraction Laboratory	49,356	
Energy Research Centre	35,582	
Centre for Rural Development	2,00,895	
Fibre Reinforced Plastic Research Centre	1,59,385	
Television Engineering Lab.	40,137	
Engineering Design Centre	36,300	
Material Science Research Centre	2,24,418	
Indo-German Project	1,988	
Indo-French Colloboration	470	
		12,48,814

C/o.

3,12,48,774

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31—3—1983

INCOME (Contd.)

	Rs.
B/F	6,21,24,392

C/o.

6,21,24,392

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	B/F.	Rs.	Rs.
Institute Scholarship :			3,12,48,774
Post Graduate and Research		41,00,411	
Under Graduate		5,92,671	
		<u> </u>	46,93,082
N. C. C. :			
Pay and Allowances		42,282	
Other Expenditure		40,828	
		<u> </u>	83,110
Athletics and Gymkhana :			
Contribution to Gymkhana Management			4,01,734
Part-time Lectures		2,260	
Visiting Professors		13,617	
Technical Bulletin and Journals		50,789	
Symposia and Seminars		29,932	
Inplant Training Courses/Visits		1,69,289	
Continuing Education Programme Organised by the Institute		65,039	
		<u> </u>	3,30,926
	C/o.		<u>3,67,57,626</u>

TECHNOLOGY MADRAS

FOR THE YEAR ENDED 31 ST MARCH 1983

INCOME (Contd.)

	Rs.
B/F.	6,21,24,392

C/o.

6,21,24,392

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd)

	Rs.	Rs.
		3,67,57,626
B/F		
Quality Improvement Programme initiated by the Ministry of Edu.	13,237	
Director's Discretionary Fund for Research	18,729	
Membership fees to outside bodies	35,723	
Remuneration to External Examiners	55,404	
Joint Entrance Examination	5,00,534	
Convocation	55,596	
Prizes for Academic Distinction	9,254	
Common Examination for P. G. Admission		
Graduate Aptitude Test in Engg.	8,96,151	
Contribution towards Institute		
Participation in programmes of National Conference	<u>27,500</u>	16,12,128
 Hostels		
Allowances to wardens	6,961	
Subsidy to Hostels	<u>11,28,413</u>	11,35,374
 Central Administration		
Pay and Allowances — Officers	6,90,076	
Pay and Allowances — Establishment	<u>37,96,045</u>	44,86,121
	C/o.	<u>4,39,91,249</u>

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31 ST MARCH 1983

INCOME (Contd.)

	Rs.
B/F	6,21,24,392

C/o.

6,21,24,392

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	B.F.	Rs.	Rs.
Contingencies :-			4,39,91,249
Postage		2,79,667	
Entertainment		29,803	
Telephones		4,10,341	
Liveries		4,814	
Stationery		5,25,072	
Printing		1,20,589	
Advertisement		1,65,112	
Sundries (Misc. Expenses)		<u>3,34,569</u>	18,69,967
Other Items :-			
Director's Discretionary Fund			3,286
Stores :			
General Stores			10,232
Pay and Allowance of Officers		63,516	
Pay and Allowance of Establishment		<u>3,61,000</u>	4,24,516
Security :-			
Other Charges		48,850	
Special Security Guards		<u>1,84,088</u>	2,32,938
Lawns and Gardens :-			
Pay and Allowances of Horticultural Supdt.		27,611	
Pay and Allowances Others		<u>1,63,071</u>	1,90,682
	C/o.		<u>4,67,22,870</u>

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31 ST MARCH 1983

INCOME (Contd.)

	Rs.
B/F	6,21,24,392

C/o.

6,21,24,392

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd)

	B/F	Rs.	Rs.
Power			4,67,22,870
Mosquito Control			24,05,629
Water			8,707
Oil and Petrol			4,79,175
			1,76,984
 Repairs and Maintenance			
i) Furniture		2,97,361	
ii) Typewriter and Duplicators		41,539	
iii) Motor Vehicles		2,53,897	
		-----	5,92,797
Duty Insurance and Road Taxes			75,403
Replacement of Utensils to Hostels			1,60,240
 Works and Maintenance			
Pay and Allowance of Officers		60,417	
Pay and Allowance of Establishment		32,22,340	
Other Charges		30,37,116	
		-----	63,19,873
Property Tax			2,70,807
 Hospital			
Pay and Allowance Medical Officers		2,00,942	
Pay and Allowance of Establishment		2,27,332	
Purchase of Medicines		6,04,940	
		-----	10,33,214
		C/o.	-----
			5,82,45,699

TECHNOLOGY MADRAS

FOR THE YEAR ENDED 31 ST MARCH 1983

INCOME (Contd.)

	Rs.
B/F.	6,21,24,392

C/o.

6,21,24,392

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	Rs.	Rs.
Subsidy to Vanavani School	B/F.	5,82,45,99
Audit Charges		1,50,000
Legal Expenses		40,315
		5,383
Travelling Allowances :		
Board of Governors	5,261	
Staff Selection Committee and Other Committees	38,803	
Candidates called for Interview for appointments	50,081	
External Examiners	78,078	
Joint Entrance Examination	50,834	
Common Examination for P. G. Admission/Graduate		
Aptitude Test in Engineering	72,364	
		2,95,421
	C/o.	5,87,36,818

TECHNOLOGY MADRAS

FOR THE YEAR ENDED 31 ST. MARCH 1983

INCOME (Contd.)

	Rs.
B/F.	6,21,24,392

C/o.	6,21,24,392
------	-------------

INDIAN INSTITUTE OF
INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE (Contd.)

	Rs.	Rs.
	B/F.	5,87,36,818
Customs Duty on Personal effects of West Germany		
Experts		29,252
Leave Salary and Pension Contribution on account of Personnel on foreign services		32,722
Employees Welfare Scheme		1,559
Campus Amenities		8,646
G.P.F. Contribution etc.		32,30,250
Cost of Stores etc. in Departments Sections Written off		
Stores	77,722	
Cycles	1,956	
	<u>79,678</u>	79,678
Cost of Institute Vehicle Written off		5,467

	Total	<u>6,21,24,392</u>
--	-------	--------------------

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

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

TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31 ST MARCH 1983

INCOME (Contd.)

	Rs.
B/F	6,21,24,392

Total	6,21,24,392
-------	-------------

P. V. INDIRESAN
Director
Indian Institute of Technology
Madras-600 036

INDIAN INSTITUTE OF
BALANCE SHEET

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	9,61,74,098		
Technical Books and Journals per contra	15,41,113		
	-----	9,77,15,211	
Computer Systems Per Contra			
As per last balance sheet		1,54,50,458	
Capital Grants and balance of Income and Expenditure a/c as on 31-3-82	21,81,18,022		
<i>Add:</i> Capital Grant during 1982-83	1,37,00,000		
<i>Add:</i> Capital Receipts	7,08,710		

	23,25,26,732		
<i>Less:</i> Excess of expenditure over income for the year 1982-83	36,57,837	22,88,68,895	35,32,51,826

C/o.

35,32,51,826

INDIAN INSTITUTE OF

BALANCE SHEET

CAPITAL AND LIABILITIES

	B/F.	35,32,51,826
Cost of Projector etc. (Gymkhana) per contra		49,811
Endowment Fund (Governors prize etc.)		1,78,350
Deposits		
Earnest Money, Caution and other deposits		
Industrial consultancy centres and projects		2,59,46,342
Sundry creditors		
On works Account		6,46,799
For supplies made for services rendered departments/sections		4,24,402
		<u>38,04,97,530</u>
Outstanding Expenses Payable		
(a) Pay and Allowances		22,95,182
(b) Scholarships		3,48,362
(c) Other Allowances Medical		71,116
(d) Wages to N.M.R. labourers-departments etc.		12,088
(e) Audit Fees		30,000
(f) Stipend to Apprentices		6,700
(g) Computer Centre Rem. to staff		31,250
	C/o.	<u>38,32,92,228</u>

TECHNOLOGY, MADRAS

AS AT 31 ST MARCH 1983

PROPERTY AND ASSETS

	Rs.	Rs.	Rs.
B/F.	5,86,38,560		12,46,39,501
<i>Add</i> : Additions during the year	<u>53,00,981</u>	6,39,39,541	
<i>Less</i> : Cost of equipment written off during the year		<u>77,721</u>	6,38,61,820
Computer acquired through German food aid funds under the Indo-German agreement			1,54,50,458
At cost as per balance sheet as on 31.3.1982			<u>20,39,51,779</u>
Block Value of Equipment from West Germany as per balance sheet as on 31.3.1982	9,52,74,098		
<i>Add</i> : Additions during the year	<u>9,00,000</u>	9,61,74,098	
Customs duty and clearance charges on equipment from West Germany as per balance sheet on 31.3.1982.	2,61,11,186		
<i>Add</i> : Customs duty paid during the year	<u>41,38,039</u>		
	3,02,49,225		
<i>Less</i> : Refund of customs duty	<u>34,86,570</u>	2,67,62,655	<u>12,29,36,753</u>

C/o.

32,68,88,532

INDIAN INSTITUTE OF
BALANCE SHEET

CAPITAL FUND AND LIABILITIES

	B/F.	38,32,92,228
Computer Receipts received in advance		24,802
American Chemical Society		
Account with First National City Bank— New York		
Account (A) balance as per last year balance sheet		1,10,934

C'o. 38,34,27,964

TECHNOLOGY, MADRAS

AT 31 ST MARCH 1983

PROPERTY AND ASSETS

	B/F.	Rs.	Rs.
			32,68,88,53
Motor vehicles at cost as per balance sheet as at 31. 3. 1982		13,37,759	
Less : Sale proceeds of Bus	44,309		
Due to disposal of Bus	5,467	49,776	
		<u>12,87,983</u>	
Add : Additions during the Year		94,890	13,82,873
Library Books and scientific journals at cost as on 31.3.82		1,43,98,092	
Add : Additions during the year		<u>20,46,988</u>	1,64,45,080
Block value of technical books journals from West Germany as per balance sheet as at 31. 3. 1982		15,09,088	34,47,16,485
Add : Additions during the year		<u>32,025</u>	15,41,113
Typewriters and Duplicators at cost as per balance as at 31.3.82.		6,28,156	
Add : Additions during the year		<u>1,29,209</u>	7,57,365
			<u>34,70,14,963</u>
	C/o.		

INDIAN INSTITUTE OF
BALANCE SHEET AS

CAPITAL FUND AND LIABILITIES

		Rs.
	B/F	38,34,27,964
Unpaid items as on 31.3.1983 as per undisbursed pay register		25,717

C/o.

38,34,53,681

TECHNOLOGY, MADRAS

AT 31ST MARCH 1983

PROPERTY AND ASSETS

	B/F	Rs.
		34,70,14,963
Tools and plants works as at 31.3.1982	3,77,028	
Add : Additions during the year	100	
	<u>45,329</u>	3,77,128
Cycles at cost as per balance sheet as at 31.3.1982		
Less : Cost of cycles written off during the year	1,956	
	<u>43,373</u>	
Add : Additions during the year	10,044	
	<u>53,417</u>	
Investment Account, Endowment Fund Governor's Prize etc. as on 31.3.1983		1,78,350
		<u>34,76,23,858</u>
Stock as on 31.3.1983.		
Consumables stores with departments		38,83,939
Construction materials with Engineering		
Unit work account		22,13,004
Guest House Provisions		630
Stationery articles		2,28,421
Consumable stores with central stores		34,006
Tyres and Tubes, spare parts etc.		77,524
UNESCO Coupons		65,510
		<u>35,41,26,892</u>
	C/o.	

INDIAN INSTITUTE OF
BALANCE SHEET AS

CAPITAL FUND AND LIABILITIES

	B:F	Rs.
Industrial Research and Development Fund Account :		38,34,53,681
Balance as on 1.4.1982 (as per separate statement of accounts)	55,00,822	
<i>Add :</i> Receipts of the year	4,38,277	
	<hr/> 59,39,099	
<i>Less :</i> Payments during the year	51,12,531	
	<hr/>	8,26,568

C/o.

38,42,80,249

TECHNOLOGY, MADRAS

AT 31 ST MARCH 1983

PROPERTY AND ASSETS

	Rs.
B/F	35,41,26,892
Projector and Tape recorders (Gymkhana Assets) at cost as per last year balance sheet	49,811
Fees Recoverable	46,173
Licence fees etc. recoverable	81,310
Income receivable for the computer centre	10,04,462
Institute over heads receivable from consultancy	2,42,208
Hire charges of Institute vehicles etc. recoverable	3,922
Amount recoverable from Gymkhana A/c.	33,207
Pre paid taxes etc.	21,203
Stamps on hand	20,307
C.P.F. contribution recoverable	16,505
C.P.F. interest on investments recoverable	2,84,702
Equipments procured from grant received from the American Chemical Society	
Balance carried over from last year	1,10,934

C/o.

35,60,41,636

INDIAN INSTITUTE OF
BALANCE SHEET AS

CAPITAL FUND AND LIABILITIES

	Rs.
B/F	38,42,80,249

C/o.	38,42,80,249
------	--------------

INDIAN INSTITUTE OF
BALANCE SHEET AS

CAPITAL FUND AND LIABILITIES

	Rs.
B/F	38,42,80,249

Total	38,42,80,249
-------	--------------

(Sd) A. V. Karunakaran Nambiar
Finance & Accounts Officer
Indian Institute of Technology
Madras 600 036

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

TECHNOLOGY, MADRAS

AT 31 ST MARCH 1983

PROPERTY AND ASSETS

	B/F.	Rs.
		38,42,80,249
*Earnest Money, Caution and other Deposits		81,69,179
Industrial Consultancy and Projects		1,77,77,163
		<u>2,59,46,342</u>
Less: Drawn from refundable deposits		65,40,748
		<u>1,94,05,594</u>

TOTAL

38,42,80,249

P. V. INDIRESAN
Director
Indian Institute of Technology
Madras-600 036

Printed at
C. R. D. PRINTING DIVISION
I. I. T. NARAYANAPURAM, MADRAS-601 302