INDIAN INSTITUTE OF TECHNOLOGY

MADRAS

Annual Report

1974-75

SIXTEENTH ANNUAL REPORT

1974 - 75

INDIAN INSTITUTE OF TECHNOLOGY

CONTENTS

VISITOR : THE PRESIDENT OF INDIA

The Council of the Indian Institutes of Technology

Chairman:

Union Minister for Education and Social Welfare,
Government of India, New Delhi.

Members:

Sri A. N. Haksar, Chairman,
Board of Governors, I.I.T., Kharagpur.

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

Sri K. T. Chandy, Chairman,
Board of Governors, I.I.T., Madras.

Dr. M. L. Dhar, Chairman,
Board of Governors, I.I.T., Kanpur.

Dr. B. D. Nag Chaudhuri, Chairman,
Board of Governors, I.I.T., Delhi.

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

Chairman,
University Grants Commission, New Delhi.

Dr. Y. Nayudamma, Director-General,
Council of Scientific and Industrial Research, New Delhi.

Dr. C. S. Jha, Director.
I.I.T., Kharagpur.

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

Dr. K. A. V. Pandalai, Director,
I.I.T., Madras.

Dr. Jagadish Lal, Director,
I.I.T., Kanpur.

Dr. N. M. Swani, Director,
I.I.T., Delhi.

Dr. S. Dhawan, Director,
Indian Institute of Science, Bangalore.

Representatives of the Central Government:

Secretary, Ministry of Education & Social Welfare, Govt. of India,
New Delhi.

Sri. S. D. Nargolwala,
Financial Adviser,
Ministry of Finance, Govt. of India,
New Delhi.

Prof. M. G. K. Menon,
Secretary, Dept. of Electronics, Govt. of India,
New Delhi.

Representatives of Parliament:

Sri Bhaoo Sahaib Dhamankar, M.P.,
113, Vithalbhai Patel House,
New Delhi.

Sri Sarjoo Pandey, M.P.,
201, North Avenue,
New De'hi.

Sri. U. N. Mahida,
Member, Rajya Sabha,
401, Vithalbhai Patel House,
New Delhi.

Representative of the All-India Council for Technical Education:

Prof. S. Chakravarthy,
Member , Planning Commission,
New Delhi.

Nominees of the Visitor:

Prof. G. Tripathi,
Vice-Chancellor,
Lucknow University,
Lucknow.

Shri R. P. Billimoria,
Director,
Hindustan Steel Ltd.,
Ranchi.

Shri M.M. Suri,
B. 14, Greater Kailash,
New Delhi.

Sri S. K. Mukherjee,
Director, Fertiliser Corporation of India,
F—44, NDSE Pt. 1,
New Delhi.

Secretary:

Sri S. Vedantham,
Deputy Educational Adviser (Tech.),
Ministry of Education & Social Welfare,
New Delhi.

The Board of Governors

Chairman:

Sri K. T. Chandy,
Chairman, Kerala State Industrial Development Corporation Ltd.,
P.B. No. 105.
Trivandrum.

Nominees of the State Government:

Shri K. S. Ballal
Director of Technical Education,
Government of Karnataka,
Bangalore.

Sri T. R. Doss,
Vice Chancellor,
J. N. Technological University,
Hyderabad.

Dr. S. Vasudeva,
Director of Technical Education,
Government of Kerala,
Trivandrum.

Dr. V. C. Kulandaiswamy,
Director of Technical Education,
Government of Tamilnadu,
Madras - 25.

Nominees of the Council:

Dr. A. S. Adke,
Ex. Vice-Chancellor,
Karnataka University,
Dharwar.

Dr. H. V. K. Udupa,
Director,
Central, Electrochemical Research Institute,
Karaikudi.

Sri B. K. Khanna,
Managing Director,
Fertilizers & Chemicals Travancore Ltd.,
Udyogmandal P.O.,
(Via) Alwaye.

Sri A. S. Rao,
Managing Director,
Electronics Corporation of India Ltd.,
Hyderabad-40

Director:

Dr. K. A. V. Pandalai,
Indian Institute of Technology, Madras.

Nominees of the Senate

Dr. S. D. Nigam,
Head of the Department of Mathematics,
I.I.T., Madras.

Prof. R. G. Narayanamurthy,
Professor,
Department of Mechanical Engineering,
I.I.T., Madras.

Secretary:

Sri. C. V. Sethunathan,
Registrar,
Indian Institute of Technology, Madras.

The Finance Committee

Chairman:

Sri K. T. Chandy,
Chairman, Kerala State Industrial Development Corporation Ltd.,
P. B. No. 105, Trivandrum.

Members:

Sri S. Vedantham,
Deputy Educational Adviser,
Ministry of Education & Social Welfare,
Govt. of India,
New Delhi.

Sri S. Venkataraman,
Financial Adviser,
Ministry of Finance, Govt. of India,
New Delhi.

Sri T. R. Doss,
Vice-Chancellor,
J. N. Tech. University, Hyderabad.

Dr. V. C. Kulandaiswamy,
Director of Technical Education,
Government of Tamilnadu,
Madras-25.

Dr. K. A. V. Pandalai,
Director, I.I.T., Madras

Secretary:

Sri C. V. Sethunathan (Registrar).

The Buildings and Works Committee

Chairman:

Sri K. T. Chandy,
Chairman,
Kerala Sfate Industrial Development Corporation Ltd.,
P. B. No. 105, Trivandrum.

Members:

Dr. K. A. V. Pandalai,
Director, I.I.T., Madras.

Sri P. Raghavendra Rao,
Superintending Engineer,
C. P. W. D. Madras.

Dr. D. J. Victor,
Professor in charge of Engg. Unit.,
I.I.T., Madras.

Sri D. Ambrose,
Chief Engineer (Buildings),
P.W.D., Madras.

Sri. Y. S. Nagaraja Rao,
Executive Engineer,
I.I.T., Madras.

Secretary:

Sri C. V. Sethunathan (Registrar).

The Senate

The Senate met six times during the year. The following were the members :

Chairman:

Dr. K. A. V. Pandalai

Members:

Prof. S. Sampath
Dr. P. Venkata Rao
Dr. A. K. Sreekanth
Dr. N. R. Rajappa
Dr. N. V. Chandrasekharaswamy
Dr. B. V. Aswathanarayana Rao
Sri Y. T. Thathachari
Dr. D. Venkateswarlu
Dr' M. Sathyanarayana
Dr. J. C. Kuriacose
Dr. V. Srinivasan
Dr. C. N. Pillai
Dr. V. Sethuraman
Dr. K. S. Sankaran
Dr. Johnson Victor
Dr. H. N. Mahabala
Dr. M. Venugopal
Dr. M. K. Achuthan
Dr. D. K. Banerjee
Dr. V. Seshadri
Dr. Y. Narayana Rao
Dr. V. Anantaraman
Dr. F. Guntert
Dr. S. K. Srinivasan
Dr. M. C. Gupta
Dr. H. C. Radhakrishna
Dr. G. V. N. Rayudu
Dr. E. G. Ramachandran
Dr. R. Vasudevan
Dr. R. Srinivasan
Sri V. S. Nazir Ahmed
Dr. Surjit Singh
Prof. R. G. Narayanamurthi
Prof. R. K. Gupta
Dr. T. K. Bose
Dr. Vincent X. Kunukkasseril
Dr. D. N. Ghista
Dr. R. S. Alwar
Dr. T. Gopichand
Dr. P. S. Virk
Dr. Y. B. G. Varma
Dr. M. V. C. Sastri
Dr. G. Aravamudan
Dr. P. T. Manoharan
Dr. P. C. Varghese
Dr. P. Srinivasa Rao
Dr. L. N. Ramamurthy
Dr. K. Thulasiraman
Dr. V. G. K. Murthi
Dr. K. P. Rajappan
Dr. B. Ramaswami
Dr. R. Balasubramanian
Dr. A. Kuppurajulu
Dr. S. Ramani
Dr. S. D. Nigam
Dr. B. S. Murthy
Dr. V. C. Venkatesh
Dr. D. Prithviraj
Dr. V. M. Krishna Sastri
Dr. K. Srinivasaraghavan
Dr. C. Ramasastry
Mr. H. J. Ebert
Dr. P. Ramachandran

Nominees of the Chairman, Board of Governors:

Dr. G. S. Laddha
Director,
A.C. College of Technology,
Madras - 25

Dr. P. L. Bhatnagar,
Himachal Pradesh University,
Summer Hill, Simla,

Dr. K. Kanakasabhapathi Pillai,
Director,
Institute of Traditional Cultures,
University of Madras,
Madras - 5

Secretary:

Sri C. V. Sethunathan (Registrar)

Report by the Director

Sixteenth Annual Report (1974-75)

The Indian Institute of Technology, Madras, is one of the leading educational institutions in the country dedicated to the development of science and technology as an instrument for promoting selfreliant growth, as a major factor for achieving higher standards of living for our people, as a means of social transformation and as a force for preserving the dignity of man and the quality of his environment. Founded in 1959, it has striven hard during the last sixteen years to discharge the tasks assigned to it, and it can claim a fair measure of success in its efforts. Its tasks ahead are far more complex and challenging than those it had in the past. The pace of change, in the body of scientific knowledge and in the development of technology, continues to be fast, opening up vast vistas of possibilities on the one hand and throwing up immense problems of socio-economic transformation on the other. The Institute has to adapt itself to these challenges and continue to provide leadership in absorbing and mastering the developments in science and technology resulting from activities all over the world, in contributing to these developments and in adapting these developments for the development of our country and of other under-developed countries.

The last sixteen years have been a period during which the Institute has endeavoured to establish a high standard for its under-graduate and post-graduate educational programmes, comparable with the standards of leading institutions of the kind anywhere in the world. It has succeeded in doing this thanks to the dedication of its faculty and other staff, the quality of its students, the heavy investments in men and facilities made by the Government of India, and the liberal aid received from the Federal Republic of Germany. During the current Plan period, the Institute will be further developing educational programmes in Control Engineering, Aircraft Production Engineering, Naval Architecture, Television Engineering, Coastal Engineering and Food Processing, most of which are inter-disciplinary in character, involving the collaboration of two or more departments of the Institute.

The Institute cannot rest content with the contributions it has been able to make so far. The country faces many challenges in the area of science and technology. In line with the plans developed by the nation as a whole for the promotion of science and technology in varied fields, the Institute has to develop and diversify its activities in education, research and development, design and consultancy, and liaison with all sectors of economic activities.

There is no substitute for self-reliance or for being innovative, imaginative, and properly motivated and determined to achieve the goals and targets we set for ourselves realistically. We must and shall succeed and deliver the goods. There are miles to go, no time to relax, rest or take it easy, if we are to attain a higher peak of excellence and be a pace-setter, which certainly are our objectives.

II. Students Strength Academic Session (1975-76)

Under graduate		1269
Post-Graduate:		
Research:	D.I.I.T. / M. Tech. / M.Sc.	550
	M. S. / Ph.D.	224
Part-time registration for Postgraduate & Research		133
	Total	2176

III. Research Centres

The Institute has set up the following Research Centres since 1973.

(a) Regional Sophisticated Instrumentation Centre

(b) Centre for Energy Research

(c) Composite Structures (FRP) Research Centre

(d) Materials Science Research Centre

(e) Design Engineering Centre

(f) Industrial Consultancy Centre

Details of the Centres are given below :

(a) Regional Sophisticated Instrumentation Centre :

The first Regional Sophisticated Instrumentation Centre has been established at the Indian Institute of Technology, Madras with the Special Instruments Labratory as the core. This centre is being generously funded by the Department of Science and Technology. Last financial year, the centre received as Irish Grant of Rs. 28 lakhs in freely convertible foreign exchange. The entire amount was utilised for procuring some most sophisticated equipment like Fourier Transform Multinuclei Pulse NMR System, Fourier Far Infra Intared Spectrometer etc. These when added to the existing facilities make this laboratory easily comparable to any in a foreign Institution. The most important objective of this is the maximum utilisation of these equipment in scientific pursuit. Many scientists who could not afford to procure, maintain and operate such facilities are able to use these without having to bother about the upkeep and maintenance of the instrument. Therby this laboratory has started giving a big push to the aspiration of Indian Scientists who want to do a high calibre research even under the most tough conditions. This is exemplified by the fact that more than forty institutions associated with the Universities, a large number of national laboratories, and a host of Industries are already using these facilities. In addition, the faculty members of the various discipline in this Institute have been benefitted

by the service of this Centre. This Centre will interact more and more with other centres such as Materials Research Centre and other RSIC's in the country. Also, this Centre has been responsible for the repair of a few instruments outside this laboratory. This concept of repair service will be given a boost in the future. A Winter / Summer School is proposed to train people in the usage of these instruments and in trouble-shooting operations in similar instruments.

This Centre is being run by a group of dedicated faculty members and is being guided by an Advisory Body consisting of capable scientists from various Institutions, Members of I.I.T. faculty, Representatives from industries, Department of Science and Technology and the Ministry of Finance.

(b) Centre for Energy Research:

In the wake of the recent energy crisis and the consequent need for marshalling energy resources for their optimum use, the Institute has set up a Centre for Energy research as an adjunct to the Department of Electrical Engineering at this Instiute.

The Centre with three sub-divisions is headed by Dr. P. Venkata Rao, Professor of Electrical Engineering and currently Dean of Administration at this Institute. The three sub-divisions deal with:

(1) Problems of Electrical energy

(2) Solar Energy and

(3) Wind Power

The Electrical Energy group is working under the guidance of Dr. P. Venkata Rao whereas that in the area of Solar energy is working under the guidance of Dr. M. C. Gupta, Professor, Department of Mechanical Engineering. The work on Wind Power energy is being guided by Dr. N. V. C. Swamy, Professor and Head of the Department of Applied Mechanics.

(c) Composite Structures (FRP) Research Centre:

Since the early '50s, the use of Fibre Reinforced Plastics (FRP) in the Western countries has been increasing at an extremely high rate in all branches of advanced and sophisticated technologies. This is not only true of modern structural engineering problems but also of a variety of commercial and domestic applications. The R & D activities in this area were started in the Department of Aeronautical Engineering, I.I.T., Madras during 1970, primarily because of the possible and increasing applications of FRP in the Aero Space field in India. Thanks to the Silver Jubilee Award from the C. S. I. R. to Dr. K. A. V. Pandalai in 1972 to initiate and promote R & D activities in this area, it became possible to chalk out definite plans for the teaching, research, development, design and testing programmes in the field of FRP structures. Funds available from this C. S. I. R. grant for a 5 year period have been utilised towards the establishment of the Fibre Reinforced Plastic Research Centre at this Institute.

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The following programmes are in progress in this field.

(1) Full fledged course at the post-graduate level exclusively for the mechanics of Fibre re-inforced Plastic Structures and components.

(2) Product oriented research like design of parabolic Microwave Antenna Dish, Pressure vessels for Process industries, Cylindrical chambers and insulators for electrical equipments and Shell structures for Aero Space applications.

(3) General purpose computer programmes to develop and carry out analytical studies on FRP Products of industrial interest.

(4) Industrial consultations.

Dr. K. A. V. Pandalai, Director is the Head of the Centre

(d) Materials Science Research Centre:

The Materials Science Research Centre at this Institute has been established with a view to promoting and co-ordinating inter-disciplinary research activity on special materials - their development optimization, production and utilisation - on the principle, of "working together." An Inter-departmental Co-ordinating Committee has been constituted to help in the planning and Organization of the Centre, and in the orientation and promotion of research in different areas on materials science.

Materials Research Programmes:

It is proposed to undertake short-term and long-term research projects relating to the following groups of materials, under the auspices of the Centre:

(a) Electronic materials for solid state devices electro-optics and solar energy applications; elemental and compound semi-conductors; ionic, super ionic and super conducting materials; ion-implanted materials.

(b) Magnetic materials, such as magnetic insulators and semi-conductors, thin film and bulk garnets.

(c) Composite materials, such as cermets and reinforced plastic special materials.

Dr, M. V. C. Sastri is the Head of the Centre while Dr. V. Srinivasan, Professor, Department of Chemistry is the Associate Head.

(e) Design Engineering Centre:

The Institute is currently setting up a Design Engineering Centre which has the following functions and objectives:

Design of instruments and equipments of interest and utility to the industry; promotion of pilot plant, developmental and design work of direct utility to industries, including small scale industries; Process development and design development and encouragement and help to deserving and

motivated young engineering graduates for self-employment and entrepreneurship in Industry.

(f) Industrial Consultancy Centre:

The Industrial Consultancy Centre set up in April, 1973 at the Institute is headed by a Dean (at the Professor's level) appointed by the Board of Governors and there is an I. C. C. Committee under the Chairmanship of the Director which meets periodically to iron out problems as and when they arise.

The Industrial Consultancy Centre acts as a link between the I.I.T. and industry to ensure more effective utilisation by industry of the existing expertise and capacity in the different departments/laboratories of the Institute.

Parttime Courses

The following courses have been/are being conducted at the city Centre of the I.C.C.

(1)	Advanced Mechanism Engineering	June	8	to	22,	1974
(2)	Computer Engineering and applications	May June	13 18	to		1974
(3)	Hydroturbomachines	May June	20 15,	to		1974
(5)	Model Analysis of structures	June	1	to	21,	1974
(5)	Quality control and standardisation	May June	20 1,	to		1974
**(6)	'Advanced Programming System/370'	July	15	to	26,	1974
**(7)	'Materials Management Courses' in colloboration with National Association of Materials Management	November June	3 2	to		1974 1975
**(9)	'Short term course on Electronics Instrumentation	March	14	to	29	1975
**(10)	D. I. I. T. course in Mechanical Design - July '75 - 3 semesters 13 weeks for each semester.					
**(11)	Short course on FRP structures from 3-9-1975 - spread over 5 weeks.					

** Evening Courses.

Reference is also invited to para V of the report under "Assistance to Industry".

IV. (a) Sponsored Research Schemes/Projects

The Institute has currently a number of sponsored Research Schemes/ Projects financed by Organisations like Council of Scientific & Industrial Research , Indian Council of Medical Research, Ministry of Defence, Department of Atomic Energy, Space Science and Technology Centre, Research and Development Organisation for Electrical Industry etc. Department-wise details are given below:

(i) Department of Aeronautical Engineering:

A. *CSIR Scheme:*

(Silver Jubilee Award to Dr. K. A. V. Pandalai, Professor Head of the Dept. of Aeronautical Engineering).

Composite Structures with specific reference to Fibre reinforced Plastic Structures.

B. *Space Science & Technology Centre Scheme*

Design and Development of Hypersonic Wind Tunnel.

C. *Ministry of Defence Scheme:*

1. Analytical experimental and Design studies in fibre reinforced plastic structures
2. Aerodynamics of generalised Missile type configuration at supersonic speed
3. Design and Fabrication of a supersonic wing calculator using analogue net work
4. Development of computer programme for evaluation of aerodynamic characteristics of Swept Wing aircraft
5. Design and Development of rarefied gas dynamics facility
6. Design and Development of Ramjet Engine
7. Flutter Analysis of Panels in supersonic flow in the presence of a boundary layer.

(ii) Department of Applied mechanics:

A. *CSIR Scheme:*

Design and Development of a low speed strain rate controlled universal testing machine.

B. *Indian Council of Medical Research:*

1. Structure and sole of melanins in health and in disease
2. Design and development of a system for recording standard 12 lead ECG during exercise and its evaluation.

C. *Ministry of Defence Scheme:*

Corona discharge Photography - A Potential diagnostic tool.

D. *Department of Science & Technology:*

Development of Tri-leaflet Heart valve prosthesis.

(iii) Department of Chemistry:

A. *CSIR Scheme:*

1. Nucleophilic substitution reactions of Halogeneoethers
2. Solid State Chemistry of complex oxides of some transition metals
3. Mechanistic studies on the oxidation of olefins on oxide catalysts

B. *PL - 480 Schemes :*

1. High pressure catalytic transfer reaction.
2. Heat and Light activation of oxide catalysts (NSF. USA)

C. *Department of Science & Technology:*

Studies on the solid state Chemistry and catalytic properties of mixed oxides of some transition Metals.

(iv) Department of Civil Engineering:

A. *CSIR Scheme:*

Studies on water hammer and Surge tanks

B. *Central board of Irrigation and Power Schemes:*

1. Studies on the fluctuating pressures on stilling basin
2. Scour due to swirling jets

(v) Department of Electrical Engineering:

A. *CSIR Scheme:*

Investigations on Eddy Couplings

(vi) Department of Mechanical Engineering:

A. *CSIR Scheme:*

1. Effect of turbulance on the performance of turbine blades in cascades with special reference to the separation Zone on blade surface suction

2. Technology of preservation of fruits, vegetables and Marine Products

3. Porous cylindrical Solar Heater

4. Holographic Techniques for stress analyses

B. *Research and Development Organisation for Electrical Industry Scheme:*

Heat transfer studies in large electrical machines

C. *Ministry of Defence Scheme:*

1. Design and development of an Aerial Camera similar to F - 95

2. High speed compressor and turbine investigations

3. High speed cascade tests

4. Development of Gas supported bearings

D. *PL 480 Scheme:*

Control of exhaust emission from diesel vehicles

E. *Department of Science & Technology:*

Development of 3 ton Solar Air Conditioner

F. *Department of Electronics:*

Development of Printing Units

(vii) Department of Metallurgy:

A. *CSIR Scheme:*

1. Cold Pressure welding of similar and dissimilar metal

2. Fabrication of friction welding Machine

3. Study of the structure of glasses using the warren Mozzi technique

(viii) Department of Physics:

A. *CSIR Scheme:*

1. Development of information storage devices

2. Development of crystals for the study of some properties of materials at low temperature

3. Pseudopotential calculation of the equation of state and harmonic properties of metals

4. Surface state of semi-conductors in high and ultra high vacuum.

B. *Ministry of Defence Scheme:*

1. Fabrication of microwave test bench

2. Development of Infra Red Detectors (To grow single crystals)

C. *Department of Atomic Energy Scheme:*

Surface wave propagation in Crystals

(ix) Quality Improvement Programmes (Q. I. P.):

A. *AICTE and UGC Scheme:*

1. Identification of goals, curriculum Design, needs and aspirations in Engineering Education

2. Curriculum Development Processes

(b) Centre for Systems & Devices:

During the year 1974-75 the Centre for Systems and Devices continued to make progress on eight projects distributed in the three areas namely Signal Processing Techniques, Semiconductor Devices. and Guidance and Control Systems. The first batch of three officers completed the M. Tech degree course on Control and Guidance Systems. Five officers each are being trained in the second and third batches of this course. Four short term courses were also conducted by the Centre during the year 74–75, the titles being Electrical Noise in Devices, Radar Singal Analysis, Semiconductor Device Technology and Laser Applications to Communication and Ranging. 14 technical reports, three completion reports and two half-yearly progress reports were issued by the Centre during the year. The laboratory building for the CSD, built as an Annex to the Electrical Sciences Block of the Institute at a cost of Rs. 10 lakhs with a total floor area of 24,000 Sq. ft., was opened by the Chairman, Sri. K. T. Chandy in June 74. The centre was visited by the Evaluation Committee, also in June 1974, and a report of general approval and encouragement of the work in progress was later issued.

V. Assistance to Industry:

(a) The dialogue between local Industries, Govt. Departments/Organisations and Public Sector Undertakings, etc., and the Institute in regard to Design and Development, Consultancy and Testing facilities has shown marked improvement over the years. Several long term and short term industrial projects have also been taken up for investigation. During the

year 672 consultancies were made with the various departments of the Institute as can be seen from the Statement below:

S.No.	Department	No. of Assignment
1.	Applied Machanics	36
2.	Central Electronics Centre	46
3.	Central Workshops	28
4.	Chemical Engineering	42
5.	Chemistry	51
6.	Civil Engineering	95
7.	Computer Centre	1
8.	Electrical Engineering	106
9.	Humanities & Social Sciences	1
10.	Mechanical Engineering	98
11.	Metallurgy	126
12.	Physics	2
13.	Special Instruments Laboratory	40
	Total	672

(b) The following are the Projects that are continued in the year under report.

Name of the Project	Name of the sponsoring Agency
I. Department of Aeronautical Engineering:	
Pebble Bed Air Heater	ISRO
II. Department of Applied Mechanics:	
Wire Spool unwinding Machine	Bharat Dynamics Ltd., Hyderabad.

Name of the Projects	*Name of the sponsoring Agency*
III. Department of Chemical Engineering:	
1. Consultancy Services on Micronized Mica Powder	Mani Industrial Enterprises, Madras 2
2. Consultancy Services on Alkaline Batteries such as Nickel Cadmium Batteries	Tamil Nadu Alkaline Batteries, Madras - 600 002
3. Development of Structural adhesives for brake shoe lining	Brakes India Ltd., Madras
4. Development of Inhibitor for end projections of solid propellant charge	DRDL, Hyderabad
IV. Department of Civil Engineering:	
1. Use of Torsteel in Prestressed Concrete Sleepers	TOR-ISTEG STEEL CORP.
2. Torsion in Road Bridge Docks	Government of Tamil Nadu Highways Department
3. Education Programme - Naval Arichitecture Degree Course	Cochin Shipyard Limited
4. Industrial Consultancy Services in Valuation Engineering	Indian Bank
5. Load Testing of K. M. Bridge Components	Ministry of Defence
V. Computer Centre:	
1. Consultancy services for Developmental Projects	ECIL, Hyderabad
VI. Department of Electrical Engineering:	
1. Fabrication and supply of 3.3 m dia Antenna	Southern Railway, Madras
2. Development of Optimization Programme	Transformer and Switchgears Limited, Madras

Name of the Projects	*Name of the sponsoring Agency*
3. Squirrel cage Induction Motor-Speed Control Project	NGEF Limited, Bangalore
4. Manufacture of speed changing Induction Motors	Kirloskar Electric Company Ltd., Bangalore
VII. Department of Humanities & Social Sciences:	
Consultancy Services	Easun Group of Companies, Madras
VIII. Department of Mechanical Engineering:	
1. Thermal Design and Research studies in large deaerators used in power plants	BHEL, Hyderabad
2. Study of Scientific and Technical Man Power in R & D Establishment	Institute of Applied Manpower Research, New Delhi
IX. Department of Metallurgy:	
Consultancy Servicas on Various aspects of Foundry Working	Unicorn (P) Ltd., Madras

(c) *The following are the Projects taken up during the Year:*

S.No.	*Name of the sponsoring authority*	*Title of the Project.*	*Dept. undertaking the Project*
1.	Ministry of Defence Directorate of Research and Basic Sciences	Corona Discharge Photography A Potential (Diagnostic) Tool	Applied Machanics
2.	Department of Science and Technology, Government of India	Development of Tri-leaflet Heart valve Prosthesis	Applied Machanics
3.	Department of Science and Technology, Government of India	Studies on the solid state Chemistry and catalytic properties of mixed oxides of some transition Metals	Chemistry

S.No.	Name of the sponsoring authority	Title of the Project	Dept. undertaking the Project
4.	CSIR	Mechanistic studies on the oxidation of olefins on oxide catalysts	Chemistry
5.	CSIR	Investigations on Eddy Couplings	Electrical Engineering
6.	Department of Science and Technology	Development of 3 ton solar Air conditioner	Mechanical Engineering
7.	Department of Electronics, Government of India	Development of Printing Units	Mechanical Engineering
8.	Bharath Heavy Electricals Limited Hyderabad	Thermal Design and Research studies in large Deaerators used in Power Plants	Mechanical Engineering
9.	Institute of Applied Man-power Research, New Delhi	Study of Scientific and Technical Man power in R & D Establishment	Mechanical Engineering
10.	CSIR	Porous Cylindrical Solar Heater	Mechanical Engineering
11.	CSIR	Cold Pressure welding of similar and dissimilar metal	Metallurgy
12.	CSIR	Fabrication of friction welding Machine	Metallurgy
13.	CSIR	Study of the structure of glasses using the warren Mozzi technique	Metallurgy
14.	Aero R & D at Indian Institute of Science. Bangalore	Development of Infra Red Detectors (To grow single crystals)	Physics
15.	AICTE and UGC	Identification of goals, Curriculum Design, needs and aspirations in Engineering Education	Quality Improvement Programmes (Q.I.P)
16.	-do-	Curriculum Development Processes	-do-

(d) *The following are the Projects for which Proposals have been sent for financial support during the Year under report*

Name of the Project (1)	*Name of the sponsoring Agency* (2)
Department of Aeronautical Engineering:	
1. Dynamic Derivatives of Missile Configurations (Theoretical evaluation)	Aeronautics R & D Board, Ministry of Defence
2. Heat Transfer and Arc Jet Studies	-do-
Department of Applied Mechanics:	
1. Development of Artificial Kidney	C.S.I.R.
2. Design and development of a Pulsatile Flow Generating Blood Pump and Its Evaluation	C.S.I.R.
3. Design and Development of Ultralow Frequency Ballistocardiograph and Analysis of Ballistocardiograms	C.S.I.R.
4. Design and development of a system for recording standard 12 lead ECG during exercise and its evaluation.	Indian Council of Medical Research
Department of Chemical Engineering:	
Investigation on development of permanent systems of dripwire condensation.	C.S.I.R.
Department of Chemistry :	
1. *Development of Dye lasers	Indian National Academy of Sciences.
2. Liquid phase catalytic Hydrogenation of glucose and	

Name of the Project (1)	*Name of the sponsoring Agency* (2)
Fluctose by transition metal complexes.	C.S.I.R.

* alongwith one staff member of Department of Physics.

Department of Electrical Engineering :

1. Development of Silcon Capacitor	MOS
or	
MOS Surface Varactor	Electronics Commission
2. Beam Lead Technology	C.S.I.R.

Department of Mechanical Engineering:

1. Design and development of an ultrasonic Burner	C.S.I.R.

Department of Metallurgy :

1. Influence of additives on the scabbing tendency of synthetic moulding sand	C.S.I.R.
2. Development of insulation sleeves for use in foundries	C.S.I.R.
3. Development of breakdown agents for sodium silicate carbendioxide bonded sands	C.S.I.R.

Department of Physics :

1. **Medical Diagnostics using laser speekle	Indian Council of Medical Research

** along with one staff member of Department of Bio Medical Engineering.

(e) *Patents:*

The Institute had applied for 25 patents so far. Nine patents have already been obtained in the name of the Institute. Three processes were sold for commercial exploitation. During the year under report, three patents were obtained and seven applications for patents were filed.

VI. Quality Improvement Programme

I. *Serving teachers programme*

The number of teachers of engineering colleges admitted to M. Tech and Ph.D. are 21 and 11 respectively. This brings the total number of QIP scholars on rolls at the Institute in June '75 to 78.

II. *Short term in-service courses:*

No short term in-service programmes were organised during this period. They were organised either before or after the period specified.

III. *Curriculum Development Centre in Chemical Engineering:*

The Centre published the following books during the period under review.

1. *SI Units in Chemical Engineering and Technology:*

BY K. D. Chandrasekharan and D. Venkateswarlu 250 x 180 mm, 190 pp. inclusive of 150 tables.

Institute of Chemical Engineers, London in its review of this book, has stated that "this interesting book is neatly produced and meticulously edited".

2. *Process Calculations for Chemical Engineers:*

By Dr. D. N. Ghosh (Jadavpur University), R. Jagannadha Rao (Andhra University), T. E. Dagolessan (Madras University), M. Satyanarayana, N. Subramanian, A. Prabhaka a Rao, C. Sivaprasada Rao, D. V. S. Murthy and Ch. Durgaprasada Rao (I.I.T., Madras) 250 x 188 mm, 438 pp, 300 worked examples.

This book is now prescribed as a text book by several Indian Universities.

3. *CHEMTECH (First volume of Manual of Chemical Technology):*

Editor : D. Venkateswarlu, Associate Editors : K. R. Upadrashta and K. D. Chandrasekharan. 250 x 185 mm, 524 pp. Message from Prof. S. Nurul Hasan and Foreward by Dr. A. Ramachandran.

The thirteen chapters in this volume dealing with general aspects of Chemical Technology are written by specialists including Dr. B. D. Tilak, Dr. K. K. Paigal, Dr. C. V. S. Ratnam, Dr. O. P. Kharbanda Dr. T. P. S. Rajan, Dr. B. V. Bhoota and Dr. H. N. Sethna.

Chemical Age of India in its review of the book remarked: "There has been a long felt need for publication of books dealing with the growth of chemical industry and the application of world technology to suit the environment of developing countries like India. CHEMTECH I presents a comprehensive review of the Indian Chemical industry and provides information and valuable data on the production statistics and general information which is normally not easily available to a student, designer and entrepreneur of chemical industry."

IV. *Curriculum Development Centre in Mechanical Engineering:*

During the year 1974–75, the study groups in (i) Chemistry, (ii) Physics and (iii) Humanities, finalised the curricula and syllabi in these subjects.

The monographs published include (i) Mechanical measurements (ii) Machine dynamics, Volume II (iii) Problems in thermodynamics, Volume II (iv) Aerodynamic noise (v) Handbook of mechanical design, Volume II (vi) Mechanical handling equipment.

A seminar on "Evaluation of student performance" was organised on April 4, 1975. This seminar discussed thoroughly the various aspects of evaluation procedures and the proceedings of the seminar have been published.

VII. Continuing Education Programmes:

The Institute conducted on its own the following Programmes:

1. A one day seminar on 'cavitation' was organised during Feb. 1975.

2. A short term course in 'Production Engineering' was conducted from November 18, 1974 to January 25, 1975 for HAL Process Engineers.

3. A summer school for 8 weeks was organised on 'Cryogenics principles and practice' in collaboration with Reactor Research Centre and Indian Institute of Science, Bangalore.

VIII. Fourth Indo-German Agreement:

The Fourth Indo-German Agreement came into force on the 1st December 1974 and will be valid until 30th November 1978. The highlights of the fourth Indo-German Agreement are the following:

(1) Assignment of 10 German Scientists for teaching and research for short periods.

(2) Providing 16 Scholarships for Indian Faculty in West Germany for Short periods.

(3) 16 Indo-German Research Projects to be carried out jointly by the Institute and German universities or research Institute on on average of DM 50,000 for each project to cover the personnel and equipment costs of such projects (i. e. a total of DM 800,000.)

(4) Spare parts for equipment already supplied including servicing for large equipment upto a value of DM 1.13 million.

(5) Technical literature upto a value of DM 150,000 German marks.

(6) Assignment of an Adviser for a period of two years to assist the the Institute work in the field of applied research and development'

(7) Make available funds upto a value of DM 100,000 for Industrial Research Projects carried out by the Institute.

(8) To assist at its expense the implementation of the training programmes in Television Engineering by sending to India one Scientist (project leader) for 3½ years and one Technician for 3 years.

(9) Sending to India six Scientists to carry out teaching and advisory assignments lasting upto four weeks each.

(10) Providing further training for two Indian Scientists in Germany for a period of upto one year each.

(11) Supplying a basic set of television equipment as well as additional technical equipment for ten laboratory places upto a total value of DM 1,850,000.

XI. Convocation:

The Institute has held twelve Convocations so far. At the twelfth Convocation held on the 27th of September 1975, in which Shri P. N. Haksar, Dy. Chairman, Planning Commission delivered the Convocation address, 591 students took their Degrees and Diplomas as detailed below:

Degree	*Branches*	*Number*	
Ph.D.	Aeronautical Engineering	1	
	Engineering Mechanics	5	
	Chemical Engineering	6	
	Chemistry	15	
	Civil Engineering	8	
	Electrical Engineering	10	
	Mathematics	5	
	Machanical Engineering	16	
	Metallurgy	3	
	Physics	3	
	Bio Engineering	1	
	Bio medical Engineering	1	
			74
M.S.	Aeronautical Engineering	1	
	Chemical Engineering	5	
	Civil Engineering	2	
	Electrical Engineering	1	
	Humanities & Social Sciences	–	
	Mechanical Engineering	3	
	Metallurgy	4	
	Biomedical Engineering	3	
			19

Degree	Branches	Number	
M.Tech.	Aeronautical Engineering	8	
	Chemical Engineering	21	
	Civil Engineering	11	
	Electrical Engineering	29	
	Industrial Engineering	20	
	Industrial Management	18	
	Mechanical Engineering	44	
	Metallurgy	15	
	Computer Science	17	
			183
M.Sc.	Chemistry	14	
	Mathematics	22	
	Physics	16	
			52
D.I.I.T.	Aeronautical Engineering	9	
	Technical Analytical Chemistry	2	
	Building Technology	3	
	Mechanical Engineering	5	
			19
B.Tech.	Aeronautical Engineering	13	
	Chemical Engineering	54	
	Civil Engineering	15	
	Electrical Engineering	68	
	Mechanical Engineering	60	
	Metallurgy	34	
			244
		Total	591

X. Research work and allied activities:

The promotion of research work has been one of the major endeavours of all the Departments of the Institute as in the past. Besides full time scholars junior Faculty members are enrolled in the Programmes of work leading to the award of Ph.D. Degree. During the year under report 74 scholars qualified for the Ph.D. bringing the total number of recipients to 273 over the last 11 years.

XI. Library:

The Central Library continued to get Scientific books, periodicals and zerox copies of technical literature from Technical University Library, Berlin under the Indo-German collaboration program. A Gevafax X-10 Copier was received under the German aid and commissioned. Also 110 German

sound films were received from the Institute for Scientific Films, Goettingen, West Germany. The other statistics of the Library are as follows:

Total No. of Books	89529	Vols.
Total No. of pamphlets	45100	Vols.
Total No. of microfilms	1072	
Total No. of periodicals	1329	titles

XII. Progress Under Construction:

1. List of works in progress:
    1. C1 Type quarters
    2. First floor over Guest House
    3. Construction of Married Officers Hostels
    4. Construction of I Floor over Hostels (Rest Block for Mess Staff.)
2. List of Works completed:
    1. Married Officers' Hostel
    2. Residential quarters (D type 12, E1 Type 12)
    3. Construction of Second floor over B.S.B.

XIII. Staff:

The following number of German staff members left for West Germany on completion of their assignments.

1.	Associate Professors	3
2.	Foremen	1

One Professor who joined the Institute last year "under the Indo-Foreign Cultural Exchange Programme" also left during the period.

During the year, I Visiting Associate Professor, I Visiting Assistant Professor, 1 Professor, 1 Senior Workshop Superintendent, 1 Executive Engineer, 2 Associate Professors, 16 Assistant Professors, 14 Lecturers, 3 Associate Lecturers, 4 Senior Technical Assistants and 4 Technical Assistants were appointed. (including promotions as given below).

These include internal promotions of : 2 Technical Assistants as Associate Lecturers, 1 Senior Technical Assistant as Associate Lecturer, 1 Senior Technical Assistant as Lecturer, 8 Associate Lecturers as Lecturers, one

Assistant Engineer as Executive Engineer, 16 Lecturers as Assistant Professors, 2 Assistant Professors as Associate Professors, 1 Associate Professor as Professor.

1 Professor, 1 Assistant Professor, 2 Lecturers, 6 Associate Lecturers, 1 Senior Technical Assistant resigned.

1 Visiting Professor left the Institute after his assignment.

XIV. Budget Proposals:

(i) Approved Budget and the expenditure for the year 1974–75:

Amount released by the Ministry — Rs. 306.60 lakhs

Actual expenditure 1974–75 (Net) — Rs. 306.07 lakhs

(ii) Budget proposals for Revised Estimates 1975–76 and Budget Estimates 1976–77.

(Figures in lakhs of Rs.)

	Actuals for 1974–75	Budget* for 1975–76	Revised Estimates 1975–76 (as recommended by Finance Committee and approved by Board	Budget Estimates 1976–77 (as recommended by Finance Committee and approved by Board
	Rs.	Rs.	Rs.	Rs.
Recurring	258.36	277.69	319.37	363.14
Non-Recurring				
Buildings	17.74	18.00	60.73	76.79
Equipments & Others	50.59	35.72	55.23	57.24
Totals	326.69	331.41	435.33	497.17
Less Income	20.62	19.86	20.47	21.00
Net	306.07	311.55	414.86	476.17
Notional Provision:				
Equipment	49.59	26.00	61.00	58.00

* Allocation approved by Board on the figures intimated by the Ministry.

XV. Welfare measures of S.C./S.T. students:

The Institute admits annually 35 students belonging to Scheduled Castes and Scheduled Tribes into the first year of the B.Tech. Degree course. Students in this category were admitted for the third year in succession.

A Faculty member of the Institute who belongs to the Scheduled Tribe, is the Adviser to the S.C./S.T. students at this Institute. He is in close touch with them and looks after their problems of adjustment, personal difficulties and the like.

The Head of the Department of Chemistry, who has s special interest in this programme is functioning as the coordinator of the Course-Committee that monitors the special arrangements for the course work for these students. The membership of the Committee is made up of Faculty members of the concerned Departments offering instructions in various subjects during the first year of the B. Tech Degree course - Mathematics, Physics, Chemistry, English, Engineering Drawing and Workshop practice.

Since 1974–75 the Institute has organised a unified 10 1/2 months academic programme covering the first year of the course. The 35 students are placed in two sub-groups and individual attention is paid to the students, the objective being to raise them from the incoming level of deficiency to a reasonable standard when they could be injected into the normal stream at the commencement of the Second year.

Except in the case of 3 students who were admitted in July 1973 and who lacked motivation completely, the remaining students of the two successive batches have gone into the Second year and are expected to do well. In the second year, they are again retained as one group to facilitate special attention being paid to them during this year also when the course is run according to the normal Institute pattern.

The students who have been admitted into the First year this year all have a reasonably good Higher Secondary/PUC record. The Institute's special academic programme gives every promise of raising their standards to a point at the end of the year when they will become indistinguishable in scholastic ability from the other students who have been admitted through the Joint Entrance Examination.

The Institute is satisfied with the results of the experiment of the last two years but will continue to pay special attention to this category of students, as a social responsibility of great significance and as a test of its own instructional abilities.

ANNEXURE 'A'

AERONAUTICAL ENGINEERING

The Department continues to offer courses leading towards B. Tech/ M. Tech degrees as well as M.S./Ph.D. by research. In the case of M. Tech/ M.S./Ph.D. students, specialisation is possible in any one of the following areas (i.e.) Aerodynamics/Gas Dynamics/Rockets and Missiles/Structural Mechanics.

Development activities

Aerodynamics/Gas Dynamics Laboratory:

1. Development of a holographic interferometric apparatus for aerodynamic diagnostic purposes.
2. Development of the instrumentation for the low density wind tunnel is in progress.
3. Design and fabrication of a variable speed drive for the smoke tunnel.

Rockets and Missiles Laboratory:

1. Low Pressure Burning Rate Test Rig for Solid Propellants.
2. Pyramid type wind mill.
3. Test Stand for Spinning Solid Propellant Rocket Motors.

Structural Mechanics Laboratory:

1. Bending of Plates by Moire Method.
2. Computer programme to handle cantilever plates.

Research Activities

Aerodynamics/Gas Dynamics Laboratory:

1. Flow around a Downstream Facing step using the Gas Hydraulic Analogy.
2. Flow through tubes at low pressures.
3. Effect of Hard Blowing in Boundary Layers.
4. Study of Turbulence in Wind Tunnel Contractions.
5. Measurements in Axisymmetric transonic-subsonic turbulent mixing flow.
6. Piloted open flames.
7. Stability of Pilot flames behind Bluff bodies.

Rockets and Missiles Laboratory:

1. Performance of Polyvinyl Chloride Plastisol Propellants.
2. Design Procedure for Star Grains of Single and Multicomponent Composition.
3. Shock Boundary Layer Interactions.
4. Non-Similar Solutions of Laminar Heat Transfer.
5. Transonic Flows in Cascades.
6. Rapid De-Pressurization of Solid Propellants.
7. Transport Properties of a Two-Temperature Argon Plasma.

Structural Mechanics Laboratory:

1. Thermal Buckling of Elastically restrained Orthotropic Circular Plates.
2. Effect of an Isotropic Core on the Thermal Buckling of Orthotropic Circular Plates.
3. Analysis of Cantilever Plates of Variable Planform.
4. Stress Concentration in Composite Plates.

Sponsored Research

The following Projects are in Progress under the Aeronautical Research and Development Board:

1. Panel Flutter in Supersonic Flow with Boundary Layer Effects.
2. Analytical, Experimental and Design and Fabrication Studies in FRP Structures.
3. Low Density Wind Tunnel.

APPLIED MECHANICS

The Department continues to offer M. Tech. degree courses in Engineering Mechanics and Machine Dynamics as well as M.S. /Ph.D. by research. The following fields of specialisation are available (i. e.) Solid Mechanics, Machine Dynamics and Fluid Mechanics. There were 11 Research Scholars for Ph.D. during the year 1974–75. The Department maintains its tempo of research activity and industrial liaison work.

Research Work

Solid Mechanics

Structural Vibrations of Bridges — Nonlinear Analysis of Sandwich Structures — Viscoelastic Analysis of Adhesive Joints — Nonlinear Analysis of Circular Cylindrical Shell — Application of Finite — Element Method in Elasto — plasticity Shells with Cut-outs — Three — dimensional stress Analysis of Certain Biomechanical Problems — Vibration and Buckling of Plates — Transient Response of Structures under Thermal and Mechanical Loads — Stress Analysis of Nose-Cone Type Structures — Impulsive Loading of Plates and Shells — Static and Dynamic Response of Filament Wound

Structures — Analysis of Hyperbolic Paraboloidal Shell — Large Deflection of Skew Plates — Vibration and Dynamics of Shells — Analysis of Plates and Shells by Numerical Methods — Application of Finite Element Methods for the Design of High Speed Grinding Wheels — Bending Buckling and Rupture of Noncircular Rings under Creep Conditions Using Numerical Methods — Nonlinear Vibrations of Plates and Shells (Geometric and material nonlinearity) in vacuum and acoustic medium — Nonlinear Vibrations of Multilayered Plates and Shells made of Elastic and Viscoelastic Materials — Creep Deflection of Plates and Shells including Second order effects — Dynamic response of Circular Layered Plate — Nonlinear Vibration of Layered Plate—Nonlinear Analysis of Frames (geometrical and physical) Free Vibration and Buckling of Anisotropic (and Orthotropic) Conical Shells — Thermal Buckling of Plates — Vibration and Buckling of Annular Circular Plates — Transverse Vibration of Rotating Orthotropic Shafts of constant and Varying Thicknesses.

Machine Dynamics:

Rotor Instabilities in Gas Lubricated Bearings — Static and Dynamic Stress Analysis of Cylindrical Shells with Cutouts — Static and Dynamic Behaviour of Machine Structures — Stress Analysis of Rotating Baskets — Rotor Instabilities in MHD Bearings — Instabilities in Rheodynamic (Grase) Lubricated Bearings — Acoustic Response of Structures and Noise Studies — On Synthesis of two Degree Freedom Mechanisms — Development of a Torsional Vibration Exciter — Performance Characteristics of Indigenous Acoustic Materials and Design of Acoustic Horns — Critical Speed and Rotor Instabilities in Oil Lubricated Journal Bearings — Computer Oriented Design of Machine Tools Structures — Scale Model Studies in Random Vibrations of Structures — Structural Response to Random Acoustic Excitation — Some Studies of the Static and Dynamic Behaviour of Hydrostatic Thrust Bearings — Response of Structures to Random Acoustic Excitation, Signature Analysis.

Fluid Mechanics:

Measurement of turbulence structure in a three-dimensional turbulent boundary layer developing on a yewad flat plate. — Investigations of flow through a two-dimensional diffuser with a lifting body. — Turbulent boundary layers in adverse pressure gradient — Experimental investigations of Liquid sheet formation from swirl spray nozzles — Experimental Investigations on conical diffusers with centrally distorted inlet velocity profiles.

Design and Development Work

Solid Mechanics:

1. Commissioning of the Holographic Test Set up.
2. Commissioning of Program-controlled Stress Freezing Oven.
3. Plastic-hinge demonstration set up.
4. Plate Buckling Frame.

Machine Dynamics:

1. Test rig for dynamic strain measurement at high speeds
2. Fatigue test rig.

Fluid Mechanics:

1. The small wind tunnel of the Laboratory has been fitted with a Ward Leonard D.C. drive for variable speed operation. Test section air speeds can now be continuously varied.

2. Preliminary work in connection with the development of suitable wind mill configuration is in progress.

Industrial Liaison Work

Solid Mechanics:

1. Stress Analysis of Tube Expander.
2. Determination of Failure Torque of Aluminium Plugs.
3. Testing of Springs.

Machine Dynamics:

1. Resonant frequency of resiliently mounted isolated bus ducts and their standard enclosures
2. Stress analysis of a tube mill
3. Testing of torsional dampers
4. Stockbridge Damper test
5. Vibration tests on Spacer Assembly

Fluid Mechanics:

1. Calibration and performance tests under various load conditions of Airmax fan prototypes carried out.

2. Calibration of vane type anemometer at different speeds was carried out.

Biomedical Engineering:

Myoelectrically controlled artificial hand prosthesis, Design and development of a pulsatile flow generating blood pump, Design and development of improved prosthetic aortic and mitral leaflet and disc valves, Development of new bioceramic materials for dental and bone implants,Blood pressure monitor based on phone cuff sphygmomanometry, Studies on planar molecules in organic structures, Transport of oxygen to blood and tissue, Mechanisms of development of aneurysm, Analysis of harrington rod device for scoliotic rehabilitation, Blood ultrafiltration, Corona discharge photography- a possible diagnostic tool, Brain trauma due to rotational force fields, Amplitude spectrum analyzer, EEG amplifiers, Ethylene oxide sterilizer,

CHEMICAL ENGINEERING

Teaching and Research

The number of students on rolls during 1974–75 and number graduated are given below :

	No. on rolls	*No. graduated*
B. Tech	146*	51
M. Tech.	57**	31
M. S.	8	4
Ph.D.	15	3

* last three years

** first and second year.

Undergraduate and post graduate courses, with the existing branches of specialisation in the Department, were given a thorough review. This is to ensure effective contact with students, with intensive teaching and tutorial system, to enable them to assimilate the complete background of Chemical Engineering subjects.

New research programmes started in each of the following sections:

1.	Reaction Engineering	Stochastic modelling in tubular flow reactor with motionless mixing elements.
2.	Transfer Operations	Downcomer studies in multistage fluidised bed.
3.	Particle Technology	Rotary bubble generator.
4.	Process Control	Dynamics and control of chemical equipment.
5.	High Polymer Engg.	Development of non-biaefringement acrylic plastics.

The Curriculum Development Centre has completed the preparation of "A manual on Chemical Technology".

The Department has organised lectures on "Mass Transfer with Chemical Reaction" by Prof. G. Narasimhan of I. I. SC., Bangalore, "Transfer Operations" by Prof. Schlunder and "Process Control and Dynamics" by Prof. Unbehaun, from West Germany.

Industrial Liaison

A total of 35 projects are handled for the industry of which some are major.

Services of two staff members of the Department are taken for consultation on Annual basis by Tamilnadu Alkaline Batteries Limited, and Mani Industrial Enterprises, Madras.

A total of 13 papers were published and 16 under processing. Applications have been filed for three patents.

CHEMISTRY

The Department continued the teaching programmes for B. Tech., M. Tech., M.Sc., D. I.I.T., (Technical Analytical Chemistry) and Ph D. Courses of the Institute.

The major areas of research of the faculty members of this department are as follows:

1. Homogeneous and Heterogeneous Catalysis
2. Surface Chemistry
3. Solid State Chemistry
4. Photochemistry
5. Polymer Chemistry
6. Electrochemistry
7. Analytical Chemistry
8. Structural Chemistry
9. Organic Chemistry (Synthetic Aspects and reaction mechanism
10. Coordination Chemistry
11. Nuclear Chemistry

The faculty members published several papers in the journals of repute, and presented their work at the national conferences. Research projects of the department have been supported by outside agencies like C.S.I.R., PL/480 agency, Department of Science and Technology, N. S. F. etc. Fifteen candidates completed the thesis work for Ph.D. in Chemistry. In December 1974 the Department organised a national symposium on "Catalysis - Theory and Practice" and this brought together experts from different parts of the Country. Prof. M. C. Markham (U.S.A.) rendered services as a consultant for the newly sanctioned N.S.F. Scheme on Photocatalysis. With the financial assistance by the Department of Science and Technology, Government of India, the Special Instruments laboratory is currently functioning as Regional Sophisticated Instruments Centre (R. S. I. C.). The R. S. I. C. is rendering assistance to the academic and industrial research institutions in the Country. The Department rendered increased assistance by way of analytical and consultancy services to a number of industrial organisations, government agencies and academic institutions.

CIVIL ENGINEERING

During the year the Civil Engineering Department offered courses leading to the award of B. Tech and M. Tech degrees in various branches of Civil Engineering. In addition one year post graduate diploma courses leading to D. I. I. T. (Building Technology) has also been offered. The department also offers a 5 semester course leading to the B. Tech. degree in Naval

Architecture for Civil and Mechanical graduate candidates sponsored by Cochin Shipyard Ltd.

15 candidates have qualified for the B. Tech and 10 for M. Tech. in the three branches of specialisation, namely, Soil Mechanics and foundation Engg., Structural Engg. and Transportation Engg. Three candidates qualified for the award of post graduate diploma (D. I. I. T.) in Building Technology. One candidate has qualified for the award of M. S. Degree. There are at present 30 research scholars working for Ph.D. degree (including part - time) and 2 for M. S. in the various branches of Civil Engineering.

Curriculum for one year post graduate diploma course in Civil Engineering leading to D.I.I.T. (Coastal Engineering) has been finalised

Research Work

Research activities in the Department maintained growth, variety and volume. During the year nearly 60 research programmes which include faculty research, M.Tech. M.S. and Ph.D. programmes are under investigation. Tor-Isteg Steel Corporation of India, R. D. S. O., Lucknow and Ministry of Transport, New Delhi have sponsored research programmes which are under investigation in the Dept.

In the year under review over 45 technical papers were published in important technical journals in India and abroad, while 13 were accepted for publication later. 10 papers were presented at the National Symposium. 11 papers have been sent for publication.

Liaison with industry has been further strengthened and several projects including testing work has been undertaken by the dept. for various Govt. and Private agencies.

COMPUTER CENTRE

Research Work

1. PLOXY - Plotter Package ((M. Thiyagarajan and H. N. Mahabala) - M. Tech. Project completed.

2. Simulation of Digital Systems on IBM 370/158 (T. S. Varadarajan and H. N. Mahabala) - M.Tech. Project completed.

3. Evaluation of throughput under OS/VS I. (N. Prabhu Basrur and H. N. Mahabala) - M. Tech. Project completed.

4. Project Information System. (A. R. Nagesh and H. N. Mahabala) - M.Tech Project completed.

5. A Simulator for the Microprocessor IMP - 16 (M.S. Badri Narayana and H. N. Mahabala). M. Tech Project completed.

6. A study of Some Graph Theoritical Algorithms. (S. Narayanan and K. Thulasiraman) - M.Tech. Project completed.

7. Some Graph Theoritical Algorithms (K. N. Venkataraman and K. Thulasiraman). M.Tech. Project completed.

8. Logic Synthesis (S. Achutha Rao and K. Thulasiraman). M.Tech. Project completed.

9. A General Purpose Forecast Simulator (B.S. Ramprasad and S. L. Mehndiratta). M.Tech. Project completed.

10. A programming System for Solving Large Scale Integer Linear Programming Problems (R. Vaheesan and S. L. Mehndiratta). M.Tech P.oject completed.

11. Multimodal Optimisation Techniques: A comparative Study (A. Ahmed Sabir and S. Lakshmi Varahan). M.Tech. project completed.

12. Computer Diagnosis of Thyroid Diseases (K. Subramanian and S. Lakshmi Varahan). M.Tech Project completed.

13. Management Information System (K.S. Venkatachalam and R. Nagarajan). M.Tech. Project completed.

14. Graphic Evaluation and Review Technique (GERT) (Vidyasankar, Murti and R. Nagarajan). B. Tech Project completed.

15. Application of Marcov Analysis to Network Systems (Vijay and R. Nagarajan). B.Tech. Project completed.

16. Chemical Plant Simulation (Ben Belani, Edgar and R. Nagarajan). B.Tech. Project completed.

17. Applications of GPSS in Chemical Industry (Srikanth and R. Nagarajan). B. Tech. Project completed.

18. Time Element in Feasibility Studies (PMS) (Frank D. Gnanam and R. Nagarajan). B.Tech. Project completed.

19. M.P.S. Applications in Chemical Industry (Chandrasekar and R. Nagarajan). B.Tech. Project completed.

20. Simulation Strategy in Management (Rajendran Sabhanayagam and R. Nagarajan). B.Tech. Project completed.

21. Applications of Dynamic Programming to Net work Systems and Chemical Reactors (Usman and R. Nagarajan). B. Tech. Project completed.

22. String processing Extension to FORTRAN (C. Sethunathan and C. R. Muthukrishnan). M.Tech. Project completed.

23. General Purpose Macro Processor (S. Kurunanidhi and C. R. Muthukrishnan). M.Tech. Project completed.

24. BCPL Implementation and a Text Editor in BCPL (V. Sivaprakasam and C. R. Muthukrishnan). M. Tech Project completed.

25. Computer Processing of Natural Language (Kishore Padmanabhan and C. R. Muthukrishnan). M.Tech . Project completed.

26. Fortran Program Analyses (S. Ganesh, Ashok Kumar and C. R. Muthukrishnan). B.Tech. Project completed.

27. Representation and embedding of Pictorial Structures in images (P. A. Subramanyam and S. Lakshmi Varahan). M. Tech. Project completed.

28. Computational Methods in the Study of Molecular Packing (P. Subba Reddy and C. T. Thathachari). M.Tech. Project completed.

29. Optimum Bus Scheduling by Computer Simulation (A, N. Ramalingam and S. L. Mehndiratta). B.Tech. Project completed.

Department/Development Work

The following is a list of developmental research work done in the dapartment. It essentially consists a of developing application programs, implementing software packages, system generation and introducing new facilities in the system to meet user's requirements.

(1) Modifications to plotter package for offline plotting (C. R. Muthukrishnan and Mrs. Vatsala Krishnan).

(2) Conversion of LISP system for conversational usage with IBM 2741 terminal (C. R. Muthukrishnan).

(3) Pay-Roll implementation for I.I.T., Madras (M.K. Ramanujam, R. K. Pillai, R. Nagarajan and C. R. Muthukrishnan).

(4) Implementation of SNOBOL - 4 system (C. R. Muthukrishnan).

(5) Implementation of FORMAC-PL/I system (C. R. Muthukrishnan).

(6) Implementation of AD-APT AUTOSPOT numerical control processor package. (R. K. Pillai)

(7) Implementation of Input/Output accounting and output line control routine (M. K. Ramanujam and V. Aravamudhan).

(8) Job separator routine under OS/VSI including CRJE. (C. R. Muthukrishnan).

(9) Planning and installation of OS/VS1 (C. R. Muthukrishnan)

(10) Implementation of Internal Timer facility and overflow/underflow interrupt handling routines. (T. K. Basu).

(11) Implementation of Super Duper : A random number package. (S. Lakshmi Varahan)

(12) Input comparison under OS/MVT and OS/Vsl. (C. R. Muthukrishnan)

(13) Implementation of WATFIV version 1 Level 4 with job separators (C. R. Muthukrishnan).

(14) Implementation of System Management Facility in OS/VS1. (A. P. Thampy)

(15) Automatic allocation and deletion of disk space for users of system 370/155 (V. Aravamudhan and T. Radhakrishna)

(16) Hospital field survey tabulation, analysis and report generation program. (M. K. Ramanujam).

(17) Entrance examination processing program for C. M.C. Vellore (C. R. Muthukrishnan, M. K. Ramanujam and R. K. Pilla).

(18) Multiple regression analysis, soil analysis, fertiliser efficiency determination for agricultural data. (R. Nagarajan, T. K. Basu and N. K. Ramanujam).

(19) Implementation of On-line job validation program (V. Aravamudhan)

Projects in Progress

(1) Non-linear parameter estimation: A software package (T.K.Basu)

(2) Academic record maintenance system. (R. K. Pillai, C. R. Muthukrishnan, M. K. Ramanujam and A. P. Thampy).

(3) Pay-roll package for C.M.C. Vellore. (C. R. Muthukrishnan, M. K. Ramanujam, R. K. Pillai and A. P. Thampy).

(4) Program for multiple integral evaluation by quadrature and stochastic method - Monte Carlo. (T. K. Basu).

(5) WATFIV accounting routine (C. R. Muthukrishnan).

(6) WATFIV mixed mode handling routine (T. K. Basu)

Seminars/Special Programmes

(1) Evening Course on Advanced Programming in Fortran-IV

An Evening Course on Advanced Programming in Fortran-IV was conducted from 15-7-74 to 26-7-74. The Lecture Sessions were held at our I.C.C. City Office and the Laboratory Sessions were held at our Computer Centre. Twenty candidates from different Organisations and Government Departments attended the Course. The areas covered in the Course are: (1) IBM System 370/ Operating System Fundamentals; (2) Conversational Remote JOB Entry Facility; (3)Plotter; and (4) Advanced Features of Fortran-IV

(2) A short term Course on Computerised Information Systems

A short Course on Computerised Information Systems was conducted from 5.5.1975 to 10.5.1975 under the auspices of the Department of Science and Technology. Twenty eight candidates from different organisations like DRTC, INSDOC, CLRI, CMTI, BHEL, CSIO, CFTRI, NAL attended the Course.

The following areas were covered in the Course:

(1) Introduction to System 370/155
(2) Interactive Computing
(3) Tape Disk Utilisation
(4) File Organisation Techniques
(5) Sort/Merge
(6) Decision Tables
(7) TEXT PAC
(8) ATS/STAIRS
(9) Police Information System
(10) Fact Retrieval
(11) Automatic Classification and Indexing
(12) Library Automation and
(13) Survey of Information Systems.

ELECTRICAL ENGINEERING

During the year 1974–75, 68 students of the Department qualified for the B. Tech. Degree, 29 students for the M. Tech, Degree and 10 candidates were awarded Ph.D. degree and one candidate M. S. Degree.

Short term courses were conducted by the Department in the fields of Power Engineering and Electronics & Communication for the benefit of practicing Engineers.

Research Work

Research activities in the Department had been one of applied and pure, broad and intensive in all the five wings of the Department. During the year under review, the following is the statistics pertaining to the research papers of the Department:

no. of research papers published in leading Journals	...	49
no. of research papers accepted for publication	...	35
no. of papers presented in technical conferences	...	21

Applied Research/Industrial Consultancy

1. Development work relating to the Thyristor Controller for wire spool unwinding - sponsored by M/s. Bharat Dynamics Ltd. was completed.

2. Optimization of designs relating to transformers of different ratings - sponsored by M/s. Vikram Engg. Company, Madras - 20.

3. Optimization of designs relating to induction motors - sponsored by M/s. Kirloskar Electric Co., Bangalore.

4. Consultancy services relating to the computer studies to power systems are offered to TNEB, and Tata Consulting Engineers.

5. R and D activities in H. F. and semiconductor devices.

6. Project on Noise measurement facilities for television tubes - sponsored by Tata Electric Company, Bombay.

Statistics pertaining to the Department:

S. No.	*Subject*		*Total Number*
1.	Degrees awarded:		
		B. Tech	702
		M. Tech	244
		M. S.	2
		Ph.D.	29
2.	Publications:		
		Indian Journals	61
		Foreign Journals	297
3.	Patents taken		2
4.	Books written		1
	Laboratory Manuals		3
	Network Analyzer Guide		1
	Technical reports issued		10

HUMANITIES AND SOCIAL SCIENCES

During the year under review research work covered areas of Humanities, Social Sciences, Industrial Engineering and Industrial Management.

The Department further strengthened its liaison with industry. Like the previous year, this year also senior faculty members conducted executive development programme for some of the leading industrial houses and public sector industries under the auspices of the several professional bodies. They also participated as faculty in Management Development programmes in various organisations. Several practising managers from the industry participated in the M. Tech. programmes as faculty and lectured to the post-graduate students of this department.

Faculty members published several papers in leading journals. All the P. G. students numbering 38 in Industrial Engineering/Industrial Management in their final year were deputed to various industries in Madras and outside Madras for doing live-wire industrial problems as part of their project and summer training. Thirty-eight project reports also were submitted to the Dept. by the students at the end of their deputation.

MATHEMATICS

The Department continued to be engaged in teaching and research in the various aspects of pure and applied mathematics. Mathematics is taught for the first nine semesters of the B. Tech. and three semesters of the M. Tech. courses leading to different specializations. The undergraduate curriculum was re-examined and a revision carried out during the year under report. A course on general mathematics is offered during the first two semesters of the M. Sc. (Chemistry) course. Courses on Ship Hydrodynamics, Numerical Methods and Computer Programming as well as Operations Research are offered to the students of the Naval Architecture. The M. S. and Ph.D. scholars from the engineering disciplines are given training in special topics of mathematics depending on their particular needs. The Department has a 4 - semester Master's degree Programme: during this year 18 students have completed their course.

Research work is being carried out in the following areas:

Fluid Mechanics, Magnetohydrodynamics, Solid Mechanics, Stochastic Processes, Differential Equations, Operations Research, Graph Theory, Quantum Mechnics and Fields - Elementary Particle Physics, Numerical Analysis, Theory of Functions, Mathematical Biology and Bio-Engineering, Mathematical Physics, Topological Dynamics.

In the Convocation held in September 1974, 4 scholars were awarded Ph.D. and 13 students the M. Sc degree.

Seven scholars have completed their Ph.D. thesis work and ten scholars are currently working for their degrees.

Collaboration with other Departments of the Institute in promoting research activities continued.

Six issues of the 'Journal of Mathematical and Physical Sciences' (JMPS) have been brought out during the year.

The book on 'Probability and Random Processes' by Prof. S. K. Srinivasan and Dr. K.M. Mehata under the UGC Book Writing Programme has been completed. The work of translating the book 'Praktische Mathematik fur Ingenieur und Physiker' (576 pages) by Zurmuhl, Berlin into English has been successfully completed by Drs. R, Subramainan, P. Achuthan and K. Venkatesan. Dr. K. Venkatesan has completed a translation of the book 'Neuere Methoden und Ergebnisse in der Hydrodynamik' by Oseen.

Weekly seminar lectures and discussions on topics of current interest were continued to be held. Some guest speakers, in addition to the members of the Department, participated in the same.

Some of the faculty members are regularly reviewing research papers for the Review Journals and a few are serving as referees for some technical journals.

MECHANICAL ENGINEERING

The Department executed its major task of imparting instructions to the students of the B. Tech and post-graduate courses, promoting research and development activities sponsored by outside agencies in addition to

their own. The Department engaged itself also by organising quality improvement programme and continuing education activities.

Two new courses at the post-graduate level (D. I. I. T. in Production Engineering and D. I. I. T. in Aircraft Production) were introduced during the year. The number of candidates admitted to the different courses during the year under review is given below:

B. Tech	64	
M. Tech	59	
M. S.	3	
Ph.D.	6	(including two faculty members)

The number of candidates qualified for the award of various degrees is as follows:

B. Tech	61
M. Tech	59
M.S.	5
Ph.D.	2

93 papers have been published/presented and 16 have been accepted for publication/presentation in Journals/conferences all over the world.

The Curriculum Deve'opment Centre in Mechanical Engineering conducted a one day seminar on "The Assessment of Student Performance" in April 1975. The Centre also brought out 3 monographs.

Research Work

The areas of research and developmental activities of the laboratories of the Department are as follows:

Fine Technics:

Resonant magnetic suspension; Optical systems, controllers, mechanisms, holography, surface roughness, spherical sintered bearings, photographic objectives, optical transfer function measurements.

Heat Transfer and Thermal Power:

Heat transfer in gas fluidized beds, free convection heat transfer, cooling of electrical machines, solar water heater and collector, cooling of electronic components.

Hydro Turbomachines:

Aerial flow fully reversible pump - turbines, axial flow turbomachines, cavitation, multiple nozzle jet pump, Kaplan turbine runner and propellar pump.

I. C. Engines:

Pre-combustion in dual fuel engines, heat release in diesel engines, benzo-pyrene concentration in diesel engine exhaust, vehicle emission control, smoke meter, gas turbine combustion chambers.

Machine Elements and Mechanical Handling:

Sintered friction material, surface failure in internal gearing, Heavily loaded pairs, railway wheels, spring loaded mechanisms, vibration of shells, electrodynamic shaken, liquid air prime movers for transportation, spur gears and shafts, replacement of cams by linkages, linkages for function generation, spatial mechanims, electric lifts, portal jib crane, pneumatic convergance, EOT Cranes.

Production Engineering and Machine Tools:

Ultrasonic machining, surface roughness, surface integrity of gears, tool entry, grinding wheels, wear resistant waiting for cutting tools, ECG air supported bearings, processing of plastics.

Refrigeration and Air-conditioning:

Vacuum cooling, thermal properties of porous materials, freezing of marine products, boiling of refrigerants, finned air coolers, cryogenic transfer lines, solar de-humidification, freeze drying of whole eggs freeze-desalination, low temperature heat pipe.

Thermal Turbomachines:

Secondary flow losses in cascades, effect of turbulance on turbulance on turbine blades, tandem vanes for centrifugal impellers, axial flow fan, flow in radial diffusers.

Thermodynamics and Combustion Engineering:

Combustion in swirling jets, high temperature kinetics, solid propellant ignition, solar refrigerator, solar regenerator, flame quenching in S. I. Engines, heterogeneous combustion, turbulent flames.

Seminars, Winter and Summer Schools:

The following seminars, winter and summer schools were arranged during the year:

1. A one day seminar on cavitation was organized during Feb. 1975.

2. A short term course in Production Engineering was conducted from November 18, 1974 to Jan. 25, 1975 for H. A. L. Process Engineers.

3. A one day seminar on The Assessment of Students Performance' was organised by the CDC in Mechanical Engineering in April 1975.

Sponsored Projects:

The following sponsored projects are currently in progress:

1. Design and Development of an Aerial Camera (Defence).

2. Development of a printing unit for Electronics Commission of India.

3. Heat Transfer studies in large electrical machines (RDOEI).

4. Design, fabrication and testing of a deaerator (BHEL).

5. Detection, measurement and control of carcinogenic polycyclic aromatic hydrocarbons in the diesel engine exhaust (NSF, USA).

6. Alternative fuels for diesel engines (Ganapathi Trust).

7. Testing the suitability of Gober Gas for I. C. Engines (Tamil Nadu Khadi and Village Industries Board).

8. Gas supported bearings (Defence).

9. A text Book on Experimental Methods in Material Processing (UGC).

10. Measurement of the total and point load on human feet during walking (Directorate of Artificial Limb Fitting Services, Delhi C. L. R. and T. I., Chingleput).

11. Technology of Preservation of Fruits, Vegetables and Marine Products (CSIR).

12. Tests on high speed centrifugal compressors (ARD BOARD)

13. Tests on high speed cascades (ARD Board).

14. Development of a 3 Ton solar Air-conditioner (DST).

Industrial Liaison :

The Department had industrial liaison with as many as 32 industries during the year. Of these design and development work was done for the following industries:

1. M/s. International Instruments Ltd., Bangalore.
2. Technolab Instruments Co., Madras.
3. Artificial Limb Centre, Pune.
4. M/s. Lakshmi Industries, Kandivli, Bombay.
5. Dunlop India Ltd., Ambattur.
6. MERADO, Madras.
7. Indian Oil Corporation, Faridabad.
8. VSSC, Thumba, Trivandrum.
9. Acure Industries.

The work done for the remaining industries was generally of testing and calibration type.

Inventions Patents and Awards:

The following patents were secured by the Department during the year under review:

1. Patent No. 134087 - Sintered Thrust Bearing with Wedges.

2. Patent No. 134088 - Sintered Thrust Bearing with rectangular impressions.

CENTRAL WORKSHOPS

Outstanding Jobs done in the Central Workshops

Sl. No.	*Description of job*	*Department/Lab/outside Industries*
1.	Fabrication of different parts for Aerial Camera Project.	Aerial Camera Project - Mech. Engg. Dept., I.I.T.
2.	Dynamic balancing of variable speed pulleys.	M/s. South Indian Export Co. (P) Ltd., Madras.
3.	Pipe cutting machine.	Central Worshop, I. I. T.
4.	Fabrication of Bevel Gears.	Bharat Electronics, Bangalore.
5.	Fabrication of Instrument Gears.	Aeronautical Development Establishment, Bangalore.
6.	Fabrication & assembly of Force-Transducer for Magnetic suspension.	Fine Technics Lab., I. I. T.
7.	Manufacture of parts for Strain rate testing machine.	Applied Mechanics Dept., C.S.I.R. project.
8.	Fabrication & assembly of XY Platform for CV measurements.	Electrical Engg. Dept., I.I.T.
9.	Fabrication of ground gears for B.D.L. Project.	Applied Mechanics Dept., I.I.T.
10.	Fabrication of Bevel Gears for Hoists.	M/s. K. C. P. Ltd., Madras.
11.	Gears for Electrical adding Machine Project.	Fine Technics Lab., I.I.T.

WORK ORDERS COMPLETED DURING 1974—75. 1,130 nos.

METALLURGY

The Department continued to offer B.Tech., M.Tech., M. S. and Ph.D. courses. During the period under review the number of degrees awarded are as follows:

Ph.D.	: 2
M.S.	: 5
M.Tech.	: 10
B.Tech.	: 29

Currently the following number of students and research scholars are working in the Department:

Ph.D.	: 21	(10 full-time, 1 under Quality Improvement Programme,9 part-time and 1 part-time (external)
M.S.	: 8	(5 full-time, 2 part-time and 1 part-time (external)
M.Tech.	: 33	(I and II M. Tech.)

During the year under review, an "OPEN WEEK" from 11-10-74 to 14-10-74 was organised in collaboration with the Indian Institute of Welding, Madras Branch, to exhibit welding equipment consumables and various welding fabrica ion in order to focus attention on the advances in welding technology and the indigenous potential available in the field.

Prof. R. Vasudevan was invited to deliver a technical lecture at the Silver Jubilee celebrations of the Madras Institute of Technology, Chromepet. A series of lectures was delivered on various metallurgical topics to the HAL Process Engineers. Some of the departmental staff visited Bharat Heavy Electricals Limited, Hyderabad and Tiruchirapalli to deliver special lectures on Metallurgy. A new Post-graduate course "Iron and Steel Technology" was approved to be offered from July 1975.

The departmental staff were actively engaged in extending the consultancy services to the various industries in Madras. A new scholarship of the value of Rs. 650/- per month has been offered by Messrs. Larsen and Toubro for a Ph.D. scholar working in the field of Metal Joining.

PHYSICS

Teaching

The Department continued teaching physics to the B.Tech., M.Tech., M.Sc. and Ph.D. courses/programmes of he Institute.During the year under review 14 students qualified for the award of M.Sc. degree in Physics.

Research

Research work in the Department is mainly concentrated in the different areas in solid state Physics and Technology. Experimental and theoretical studies are being carried out in the following major fields.

Colour centres in ionic crystals - Electrical conductivity of ionic crystals - Dielectric properties of solids and liquids, Thermoluminescence in crystals- Surface states in semiconductors Electron spin resonance of defects in crystals, Nuclear Quadrupole resonance in solids, nuclear magnetic resonance in alloys, Optical and magneto-optical studies in crystals and solid solutions, stress optic and thermooptic behaviour of solids, Mossbauer spectra of intermetallic compounds, Laser Physics, Crystal growth, Electrical and magnetic properties of thin films. Low Temperature Physics, Ultrasonic studies in liquids, X-rays and crystal structure analysis.

Theoretical work is being carried out on third order elastic constants of crystals, thermal expansion, propagation of surface waves in crystals and cohesive energies of crystals.

8 Scholars have submitted their thesis for the award of Ph.D. Degree in Physics. More than 40 papers have been published in various foreign and Indian Journals.

Seminars and Summer Schools

A summer school for 8 weeks was organised in the Department on 'Cryogenics principles and Practice' in colloboration with Reactor Research Centre and Indian Institute of Science,Bangalore during the year.

Dr. S. Radhakrishna, Assistant Professor attended the International Conference in Colour Centres in Sendai (Japan) in August '74 and visited University of Western Ontorio, London, Canada as visiting scientist in the International Centre of Chemical Physics during November - December '74 and May - July '75. Dr. R. Ramji Rao returned in January '75 from Switzerland after working for a year in the Institute of Condensed Matters in the University of Geneva and Mr. Sriraman Srinivasan returned in May '75 after training in the University of Uhlich, West Germany. Dr. B. S. V S. Acharyulu returned from Sweden after participating in the International Seminar at Uppsala under Unesco scheme. Dr. J. Sobhanadri returned from Germany after completing his assignment as an Alexander von Humbolt fellow.

Dr. B. V. R. Chowdari, Lecturer is working in Stuttgart University on Humbolt Foundation Fellowship.

Sponsored research projects

No.	*Title or short description of work.*	*Sponsoring Authority*
1.	Development of Information Storage Devices	C. S. I. R.
2.	Development of Cryostats for the study of some properties of materials at low temperature.	C. S. I. R.
3.	Pseudopotential calculation of the equation of state and anharmonic properties of metals.	C. S. I. R.
4.	Surface state of Semi-conductor in high and ultra high vacuum.	C. S. I. R.
5.	Development of Optical modulators.	Ministry of Defence
6.	Growth of Semi-conductor single crystals	Ministry of Defence.

CENTRAL LIBRARY

General

The Library continued to face the space problem - both for housing its books and seating its readers during the year under review. Hence, it is reiterated that the extension of the library building as envisaged in the origi-

nal scheme may have to be taken up without any further delay for proper maintenance of the library stacks and standards of readers' services.

Also, during the period under review, the library grant has not shown any increase though the cost of publications, especially the rates of subscriptions to foreign periodicals have enormously gone up with the result, the library could not go in for any new journals inspite of pressing demands from the different departments.

The significant activities of the various divisions of the Library are as follows:

Circulation, Reference & Maintenance Division

The Central Library has become the partial Archives in India for scientific and technical films of the Encyclopaedia Cinematographica at Goettingen, West Germany. The films supplied are housed at the Central Library and made available for loan and for screening not only to the faculty and students of I.I.T., Madras but also to other institutions in the country. With this beginning the non-media resources of the library is being developed for serving the clientele better.

Due to increase in stock addition of new racks had to be made to shelve the volumes added.

Acquisition of an Agfa Gaevert X 10 reproducing machine has greatly increased the efficiency of our reprographic services.

Due to paucity of staff the Liasion unit which did good service had to be disbanded. It is hoped that it would be possible to revive it later.

Periodicals & Documentation Division

During the year under review the subscriptions to a major portion of foreign journals were transferred to State Trading Corporation of India Ltd. The remaining journals - both foreign and Indian were continued to be obtained directly from the publishers.

As in the previous year the SDI Service continued to be favourably received both by the internal users and external subscribers to the Service. Mr. S. Kasiviswanadham, Tech. Asst., has compiled the Thesaurus-cum-Index to the Chemistry: Chemical Engineering and Metallurgy research projects in progress at the Institute with a view to render Individualised SDI Service to these Departments on an experimental basis.

Also, the Division has embarked on a new bibliographic service of bringing out a series of 'Guide Books' to highlight the Selective documents and their utility with brief notes on their range and scope. The first in this *Information Sources Guide Series,* on Chemistry and Chemical Engineering, has been compiled by Sri V. A. Subhan, Technical Assistant.

The supply of translations of article literature were continued to be made to both the internal and external members of the Library. The Roster of subject - Specialist Translators has been updated and brought out as a booklet.

Acquisition, Processing & Systems Division

The number of books added to the Library during the year has further dwindled due to the non-increase in book grants as averred earlier. A total of 4571 books only could be acquired. The one gladdening feature, however, is we continued to receive important and useful technical books and xerox copies of article literature from Technical University Library, Berlin. Also, 110 German sound films were received from the Institute for Scientific Films, Goettingen, West Germany. The number of staff reprints received during the year also rose to 106. The British Council Division of the British High Commission, Madras, has offered under the ODM Books Presentation Programme a sum of $2000 for procurement of British Books and back volumes of Periodicals and a list has been sent to the British Council Library for processing.

The titles of German Dissertations received from various German Universities continued to be translated in the Division itself.

The compilation and printing of data for the Union Catalogue of Serials by computer aided method are under progress. Also, the testing of the INSPEC and ISI tapes was taken up in connection with the setting up at I.I.T. Madras, the operational base for the Computerised Information Service to the Scientists in India under the NISSAT/UNISIST programme.

Administration, Reprography and Bindery Division

The long awaited Gevafax X-10 Copier was received in the library under the German aid towards the end of the academic year and commissioned for use. Due to its operational ease and the fast rate of reproduction the Gevafax Copier has not only become handy but also accelerated the supply of document copies required by the readers. Copies of the publication "Chemistry and Chemical Engineering - a guide to publications and Sources of Information available in the Central Library and the revised edition of'Know Your Library" were printed at the Reprographic Section. The Reprographic Services rendered during the year fetched an income of Rs. 21,372 to the Library.

Due to irregular supply of Bindery materials coupled with their high cost, the output of the Bindery has not shown any marked improvement, not to speak of the backlog of journals to be bound.

The Administration continued to handle the sale of the Library's own publications as well as of those brought out by the QIP and those transferred from the Central Administration.

During the year under review Sarvashri S. Kasiviswanadham, V.A. Subhan and N. K. Gopalakrishnan Empranthiry have underwent the P.G. Course in Librarianship and Documentation at Insdoc, University of Mysore and DRTC respectively. Sri P. Venkatesan,Asst.Librarian was deputed to SENDOC SIET Institute, Hyderabad to attend a two week training course in"Information Storage & Retrieval Systems". Mrs. J. Durairaj, Asst Librarian took the M.A. Degree in Publ c Administration from the Utkal University by private study and underwent a three-week training course in "Information Storage and Retrieval Systems" at SIET, Hyderabad. Sri N. Rajagopalan Programmer took an active part in the lecture assignments in the short term course on "Computerised Information Systems" held at the Institute.

Statistics on the other Library activities are as follows:

Opening Hours:

Week days	8 a.m. — 10-30 p.m.
Saturdays , Sundays and Holidays	9 a.m. — 5-00 p.m.

Membership:

1.	Institute members (Staff & Students)	5,297
2.	Outside Members:	
	Individual	35
	Corporate	33
3.	Consultation Permits	70

Circulation:

1.	No. of readers visited		1,02,172
2.	No. of volumes issued		1,17,769
3.	No. of reservations for Books	Registered	6,544
	-do-	fulfilled	5,279
4.	Amount of overdue & other charges realised		Rs. 25,692

Inter-Library-Loan:

Borrowed for Institute members	262
Lent out from Institute Library	110

Acquisition:

Books & Bound volumes of periodicals	3,420
Pamphlets and reports	2,136
Microfilms and Microfiches	115
Total intake during the year	5,671
Total accessions up-to-date	1,38,507

Current Periodicals:

By subscriptions	1,073
From Technical University Berlin (under Aid)	104
By exchange or Gift	152

Documentation Services:

SDI	Recipients	
	Internal	101
	External	45
LDN	Recipients	
	Internal	40
	External	26

Reprographic Section:

Microfilms made	2086 frames
Photocopies made	3901 pages
Korestat Copies made	43,183 copies
Gavafax copies made	2,844 pages

Bindery:

No. of books & journals bound for Library	1,768
No. of photocopy articles and form books bound	622
No. of books and journals repaired	255
No. of publications bound for other departments	230

ANNEXURE 'B'

ADMISSIONS TO THE COURSES OF STUDY

(for the 1974–75 sessions)

The number of students admitted to the various Under Graduate and Post Graduate Courses for 1974–75 session is given below:

Courses	*Number admitted*
B. Tech.	255
M. Tech.	222
D.I.I.T.	11
M.Sc.	43
M.S.	20
Ph.D.	40

Student Population of the Institute 1974-75 Session

For the Academic Session 1974-75 the strength of the students in the different courses and Research Scholars are as follows:

Course/Programme	*Full-time*	*Part-time*
B. Tech	1270	—
M. Tech	402	—
D.I.I.T.	23	—
M.Sc.	88	—
M.S.	72	14
Ph.D.	252	109
Post Doctoral Fellows	3	—
	2110	123

ANNEXURE 'C'

ELEVENTH CONVOCATION OF THE INSTITUTE

9th September, 1974.

The Eleventh Convocation of the Institute was held at 5.30p.m. on Monday the 9th September 1974, in the Special Pandal installed in the Central School Quadrangle of the Institute, Shri K. T. Chandy, Chairman of the Board of Governors of the Institute presided over the Convocation. Shrimati Indira Gandhi, Prime Minister of India, was the Chief Speaker, the first time that the Institute getting the privilege of the Prime Minister as the Chief Speaker. Shri K. K. Shah, Governor of Tamil Nadu, and Shri V. R. Nedunchezian,

Education Minister of Tamil Nadu, as also Shri C. Subramaniam, the then Minister of Industrial Development and Science and Technology in the Government of India, also participated in the function.

The Director conferred the Degrees and Diplomas on candidates who attended the Convocation and in-absentia on candidates who could not be present. The numbers of the graduates in the various categories are given below:

Ph.D. Degree	*In person*	*In absentia*	*Total*
Engineering Mechanics	4	–	4
Chemical Engineering	–	3	3
Chemistry	11	2	13
Civil Engineering	3	3	6
Electrical Engineering	1	2	3
Mathematics	3	–	3
Mechanical Engineering	1	1	2
Metallurgy	1	1	2
Physics	8	1	9
	32	13	45

	In person	*In absentia*	*Total*
M. S. Degree:			
Aeronautical Engineering	4	6	10
Engineering Mechanics	1	–	1
Chemical Engineering	1	1	2
Civil Engineering	1	–	1
Electrical Engineering	–	1	1
Industrial Management	1	–	1
Mechanical Engineering	3	2	5
Metallurgy	4	1	5
	15	11	26
M. Tech Degree			
Aeronautical Engineering	6	2	8
Engineering Mechanics	2	2	4
Chemical Engineering	15	9	24
Civil Engineering	3	7	10
Electrical Engineering	13	22	35
Industrial Engineering	9	7	16
Industrial Management	7	9	16
Mechanical Engineering	23	36	59
Metallurgy	4	6	10
	82	100	182

in person		*In absentia*	*Total*
M.Sc. Degree.			
Chemistry	7	6	13
Mathematics	7	6	13
Physics	4	9	13
	18	21	39
D.I.I.T. (Diploma)			
Aeronautical Engineering	2	15	17
Technical Analytical Chemistry	2	1	3
Building Technology	2	1	3
	6	17	23
B. Tech.			
Aeronautical Engineering	3	12	15
Chemical Engineering	12	37	49
Civil Engineering	1	9	10
Electrical Engineering	31	40	71
Mechanical Engineering	11	51	62
Metallurgy	8	21	29
	66	170	236

After the conferment of Degrees/Diplomas the Chief Speaker distributed the prizes to prize winners.

The graduates of the year who were present took the pledge, led by Shri Gangan Prathap, winner of the President of India prize.

After Shri K. T. Chandy's introductory speech, Srimathi Indira Gandhi delivered the Convocation Address.

LIST OF PRIZE WINNERS

Prizes awarded at the Eleventh Convocation of the Institute held on 9th September 1974.

President of India Prize

(for the student of the B. Tech. Degree Course with the best academic record)

Shri Gangan Prathap (Aeronautical Engineering-B.Tech).

Governor's Prize

(for all-round proficiency in the B. Tech Degree Course)
Shri Iyer Chandrasekar Balakrishnan (Metallurgy-B. Tech)

Merit Prizes

(for the student with the best academic record in each discipline of each course)

M.Sc. Degree Course

Shri M. Seshachala Kumar (Chemistry)
Shri V. Chandrasekar (Mathematics)
Shri Pratap Chandra Patnaik (Physics)

M. Tech Degree Course

Shri T. S. Balasubramanian (Aeronautical Engineering)
Shri Mohammed Fazlullah Sharief (Civil Engineering)
Shri Krishna Kumar (Mechanical Engineering)
Shri D. C. Wilson (Engineering Mechanics)
Shri S. Ganapthy Subramanian (Industrial Engineering)
Shri V. Madhusudan Rao (Industrial Management)

B. Tech. Degree Course

Shri Gangan Prathap (Aeronautical Engineering)
Shri V. Mohan (Chemical Engineering)
Shri M. Guruswamy (Civil Engineering)
Shri J. Gowri Shankar (Metallurgy)

Siemens Prizes

(Presented by M/s. Siemens Engineering & Manufacturing Company of India Limited to the students with the best academic record in Electrical Engineering of the M. Tech. and B. Tech Degree Courses - Power)

M.Tech Degree Course

Shri M. S. Ravichandran

B. Tech. Degree Course

Shri K. Natarajan

Philips India Prize

Presented by M/s. Philips India Limited to the student with the best academic record in Electrical Engineering (Electronics) of the B. Tech. Degree Course).

Shri Raghavendra Ramachandra Gejji

Banco Foundation Prize

(Presented by M/s. Banco Foundation, Baroda to the student with the best academic record in Mechanical Engineering of the B. Tech Degree Course).

Shri S. Sankaran

Prof. B. Sengupto Prize

(Presented by Dr. A. L. Mudaliar, First Chairman of the Board of Governors to the student with the best academic record in M. Tech Degree course in Chem.cal Engineering).

M. Tech Degree Course

Shri S. Krishnan

Sri. S. Anantharamakrishnan Memorial Prize

M.Tech Degree Course

Shri G. Neelakantan (Metallurgy)

ANNEXURE 'D'

NUMBER QUALIFIED FOR THE DEGREES/DIPLOMAS AT THE END OF 1974-75

Degree	Number			
	I Class with distinction	I Class	II Class	Total
B. Tech	32	177	35	244
M.Sc.	3	27	22	52
M.S.	—	—	—	19
M. Tech.	13	156	14	183
D.I.I.T.	—	15	4	19
Ph.D.				
Aeronautical Engineering				1
Bio-Engineering				1
Bio-Medical Engineering				1
Engineering Mechanics				5
Chemical Engineering				6
Chemistry				15
Civil Engineering				8
Electrical Engineering				10
Mathematics				5
Mechanical Engineering				16
Metallurgy				3
Physics				3

ANNEXURE ' E '

PATTERN OF GRADUATION

(1964 75)

The number of candidates who were awarded Degrees/Diplomas at the first Eleven Convocations and the number awarded at the Twelfth Convocation (held on 27th September 1975) are as follows:

Degree	Awarded at the first Eleven Convocations 1964–74	Awarded at the Twelfth Convocations (1975)	Total
B. Tech	2537	244	2781
M.Sc.	344	52	396
M. Tech	995	183	1178
D.I.I.T.	105	19	124
M.S.	62	19	81
Ph.D.	199	74	273
Total	4242	591	4833

ANNEXURE ' F '

PLACEMENT OFFICE

The Placement Office was established in 1964 the year in which the first batch of students graduated. Since then this office has been successfully serving as a liaison between the graduating students and employers. Year after year, an increasing number of employers contact the Placement Office for recruitment of young graduates and post-graduates. The Placement Office arranges for campus interviews which yield better results than by advertisement method. Students from graduating classes are sponsored for tests and/or interview; this also facilitates exchange of views between visiting representatives of companies and the Institute faculty with regard to expectations of Industry from graduating engineers in general, and the areas of specific requirements of a particular company. The representatives get a first-hand appreciation of the training imparted in the Institute.

During the year 1974–75, this Office made contacts with nearly five hundred companies, out of which 175 companies/establishments from both public sector and private sector responded and representatives from many organisations visited this Office and interviewed students.

In recent years, there has been an increase in the demand for employment of post-graduates and it is gratifying to note that an increased percentage of our post-graduate students have secured employment through the Placement Office.

The Placement Office continues to keep in touch with as many industries and organisations as may require technically qualified personnel, and furnishes them with information about the courses offered, with specialisations in the various branches, to enable them to have detailed information about the talents available from among the graduates of the Institute. Since the Institute has on its rolls students from foreign countries also, Placement Office sponsors these students to employing organisations in their home countries. An effort to prepare a list of directory of firms in neighbouring countries is underway.

This Office has also been handling an increasing number of applications from students of the B. Tech. and M. Tech. degree courses for practical training during the summer and winter vacations. While enabling the students to acquire practical experience, this training also serves to help the industries in making use of their services and assessing their potential.

The Placement Office also looks after the work pertaining to the Alumni Association of the Institute and in addition handles the work relating to the Office of the Foreign Students' Adviser.

A statement showing the placement position of the alumni of the Institute is annexed.

PLACEMENT OFFICE

Consolidated statement showing the Placement position of students belonging to 1964–1974 Batches

Year	Total passed out (graduates and post-graduates)	Engaged in further studies		Employed Abroad	Employed in India		Position not known	Remarks
		In India	Abroad		Private Sector	Public Sector		
1964	107	1	13	12	49	32		
1965	161	–	19	35	46	61		
1966	265	5	28	31	65	135		1**
1967	323	8	45	17	104	148		1**
1968	388	13	46	35	152	140		2**
1969	470	15	49	14	129	177	86	
1970	560	34	112	20	160	155	78	1**
1971	437	89	35	15	95	105	98	
1972	489	91	25	8	181	162	20	
1973	491	74	41	3	162	152	59	
1974	551	48	68	5	182	152	96	
	4242	380	481	195	1325	1419	437*	5**

* Continued efforts are made to Collect full particulars and the statements updated. Though the full details in these cases are not available, it has been the pattern that 60% of those who had passed out get fixed up either within the country, or outside within 6 months of their getting their degrees, and 90% within one year.

** Deceased.

ANNEXURE 'G'

INSTITUTE GYMKHANA

The Institute teams in Hockey, Football, Basket Ball, Volley Ball, Swimming and Athletics participated in the Madras Collegiate Athletic Associa.ion Tournament and have qualified for zonal finals. The Tennis team won the runner up in the Inter Collegiate Championship.

External Tournaments

The Institute Hockey and Shuttle Badminton teams have won the championship in the Buck Memorial Tournament conducted by the Y.M.C.A. College of Physical Education Madras. In the Loyola College Bettram Tournament our Basket Ball team qualified for the last four.

IX Inter I.I.T. Meet at Delhi

Our Institute retained the General Championship Trophy for the fourth year in succession; we were winners in Tennis, Table Tennis, Football, Basket Ball, Weight Lifting and Athletics.

The Individual championship Trophy for track and field events was won by Sri Indiesa Rajasingham of our Institute.

Inter University Tournament

The Institute Cricket, Shuttle Badminton and Chess teams have participated in the Inter University Tourney. I.I.T. Madras organised successfully the all India Inter University Chess Tournament (Men) in December 1974.

Institute Sports Day

The Annual Sports day was held on 30th March 1975 with Brig. V. K. Nair the Commander Sub-Area 9 as Chief Guest.

Nationals

Our students Sri J. Krishnan, Sri Frank Gananam and Sri Srikanth were selected to represent Tamil Nadu in Basket Ball, Badminton and weightlifting respectively.

Cultural and Literary Activities

Above activities of the Gymkhana reached their high mark during January 1975 when the Cultural Festival was organised. There was a good response from out station colleges from far-off places like Delhi, Bombay, Jamshedpur etc. An exhibition of photographs and paintings was also organised.

The Institute Gymkhana also made its mark in the field of Literary and Cultural Competitions in the City by winning the following Trophies and Shields.

Stella Mary's Inter Cellegiate	Quiz
Cultural Academy Inter Collegiage	Debate
Queen Mary's College	Debate

ANNEXURE 'H'

NATIONAL CADET CORPS

(A) 2 (TN) COMP TECH COY NCC (IIT)

1. To develop character, comradeship, the ideal of service and capacity for leadership in young men and women.

2. To provide service training to young men and women so as to stimulate interest in the defence of the country.

3. To build up a reserve of manpower to enable the Armed Forces to expand rapidly in a national emergency.

Training

Keeping the aims in view the NCC training was imparted to the 1st, 2nd and 3rd year B.Tech students of the IIT in accordance with the prescribed syllabus.

The training was divided broadly into two parts.

Part I. Basic Military training

Part II. Advance Military training which also included specialised training confined to the three corps i. e. Engineers, Signals and Electrical and Mechanical Engineers.

Part I. Basic Military Training

Basic Military training were imparted to cadets of 1st, 2nd and 3rd year B. Tech which embraced the following:

(a) Drill (b) Weapon Trading (c) Rifle firing (d) Field craft (e) Battle craft (f) Map Reading (g) First aid (h) Civil defence

Part II. Advance Military Training

Advanced Military training were also given by stages to all the three year cadets which included specialised training in all the three respective corps. The broad subjects were more or less the same as that of Basic Military Training, except that they were dealt with in more greater detail and the periods were more practical oriented.

Annual Training Camp

A combined annual training camp was held for the first time under tentage. The cadets experienced for the first time the living under tentage for a duration of 12 days which they enjoyed thoroughly. The camp was very well organised. The cadets were encouraged to partake in the administration of the camp and thereby gained tremendous self-confidence. During the camp the cadets were taken out on conducted visits to six industrial establishments and two Military installations in and around Madras. They also carried out the annual range classification in Rifle firing during the latter part of the camp.

For the first time the cadets were introduced to the elementary out of unarmed combat.

The following dignitaries visited the camp and appreciated the layout and conduct of the camp.

(a) Sri K. T. Chandy, Chairman Board of Governors, I.I.T. Madras.

(b) Dr. K.A.V. Pandalai, Director I.I.T., Madras.

(c) Prof. S. Sampath, Dy. Director I.I.T., Madras

(d) Commodore Kunnenkeril, Director NCC (TN & P)

Though camp schedule was very tight and exacting the cadets took it with a smile.

Attachment to Regular Army/Advance Leadership Course

One cadet from this unit was detailed on All India Combined Camp at Coimbatore which he completed successfully.

One NCC Part time Officer Lt. K. Ramakoteeswara Rao was deputed for a EME course and attachment with the EME school Baroda. Lt. C. K. Narayanaswamy stood first in the Refresher signals 3, conducted at kamptee and Jabbalpur.

These attachments and attending of All India Camps are of immense value to the cadets and officers as they give them a first hand knowledge of the organisation and functioning, living and working conditions in the Army and corporate living in a camp. As cadets attend from all states, such camps give oppurtunity to boys to mix freely and understand the habits, culture of the boys from other states.

Refresher Training Course for NCC Officer And Regular Army Personnel

One Regular Army personnel was sent on a unarmed cambat course which he completed with credit. This regular Army personnel will impart training to cadets in unarmed cambat during subsequent camps.

Rifle Firing

Rifle firing was conducted both at the short range within I.I.T., campus, as well as at the long range at Meenambakkam. Last year the team from

this unit had the unique distinction of standing Second in the Earl Robert and Burdwan Trophies for the second year in succession;

Barring 7 cadets all the boys who fired passed the annual range classification held at Meenambakkam range.

Certificate Examination

The details of certificate examinations held and their results are given as under:

Type of certificate	*No. eligible*	*No appeared*	*No passed*
'B' certificate	18	16	15
'C' certificate	8	4	3

From the above it is very clear that the results are extremely satisfactory and encouraging.

Ceremonial Parade

A guard of honour parade was arranged for the Prime Minister Smt. Indira Gandhi who came to this Institute for the last Convocation day. The parade was a thumping success and brought applause from all sections who attended the convocation. The total strength of the parade were 100 cadets. The CRP band from Avadi was in attendance.

Employment, Information & Guidance Bureau

A new feature during the last accademic session was the opening of a new cell within the NCC building called the Employment and Information Bureau.

The bureau provides information and guidance for prospective cadidates of NCC seeking employment either on part-time or whole time basis.

The OC of this unit is the Officer incharge of the bureau.

A number of cadets have registered their names and the informations passed on to the cadets as and when we receive details regarding employment.

Conclusion:

In the last academic session the training of the cadets has been satisfactory but not to the extent desirable. The major factor attributable to this shortfall is due to the poor attendance on paradesly cadets. We propose to fill this gap by making the enrolment obligatory. Also in view of the new training syllabus that has been drafted the training will be more interesting and therefore might yield better response in the coming years.

(B) 4 (TN) AIR SQUADRON (TECH.) NCC, (IIT)

The aims of the NCC Training in the Air Wing are two fold, on the one hand it aims at making the yough Defence conscious with emphasis on the

development of their individual qualities like character, comradeship and leadership and on the other hand it endeavours (a) to make them airminded (b) to train and prepare students interested for careers in aviation and Naviation Engineering.

2. There are two types of Air Wing Units in the NCC. They are the Flying Air Squadrons and Technical Air Squadrons. This Unit belongs to the later class and caters for the cadets of the Indian Institute of Technology, only. The Training in this Unit has two additional objectives in view, (i) creating a nucleus of partially trained Technical personnel from which the country can draw its requirement of technical Officers in the event of Emergency (ii) stimulating an interest amongst potential Engineering Graduates for careers in the I.A.F.

3. Besides two Regular Officers from the I.A.F., a compliment of Air Force Staff and I.I.T. Civilian staff, this Unit has an authorised strength of two NCC Part-time Officers and 200 Cadets. Previously the Training was confined to I and II year students of B. Tech only; but from 1973–'74 Training has been spread over a period of three years covering a total of 360 Training periods, besides Annual Training Camp of 12 days duration each.

4. The NCC was set up in 1948 with the purpose of giving a large element of youth of the country, a chance to benifit from the NCC which among others, aims at initiating them into Regimental Training, incultating in them qualities of leadership, self confidence and discipline and imparting basic Military Training and to give them some knowledge of the Armed Forces. This is to help them in case they want to join the Armed Forces. Even otherwise the Training imparted to the cadets is such that they would find themselves well set for life in civil services, Industries or business.

5. This Unit provides Technical Training to the cadets and all aspects of Technical nature are covered in the Training syllabus. This Unit has also been providing adequate Training in the Aeromodelling thus enabling the cadets to put theory into practice. New dimensions have been added with introduction of Glinding Training to the cadets from 1973–74 onwards, as cadets of Technical Air Wing were not eligible for Gliding earlier. Quite a few cadets have already had the thrill of soaring in the Air and others will follow suit. For the year 1975–76 regular Gliding Training will be imparted to the cadets of II and III year.

6. The most enjoyable part of the NCC Training is the Annual Training Camp which is normally held at Bangalore, so that the cadets can see for themselves the actual construction of AirCraft at the H.A.L. Besides HAL, instructional visits to the various defence and Industrial Organisations form part of the Annual Training Camp. However on grounds of economy the Camp for 1974–'75 was conducted in the I.I.T. Campus itself. The main purpose of of the Annual Training camp is to consolidate the Training imparted throughout the year and to impart collective training to the cadets and to give them an opportunity to live and train together and cultivate the spirit of comradeship among the cadets from the different parts of the country. The camp life also provides the cadets an experience in team work, adventure and personal hardship which will bring to their mind the value of self discipline and integrity.

7. During the year, the cadets have been taken on visits to the various defence installations. They have definitely stood benefitted with these visits, specially from the one to the Air Force Station, Tambaram. All cadets on roll of this Unit also went for Rifle and 12 bore Gun (Skeet) firing.

8. This Unit has also achieved exemplary results in the NCC 'B' and 'C' Certificate Examinations conducted during March 1975, in which 18 and 5 cadets appeared respectively and all of them passed with high gradings and thus achieving 100% success.

9. This Unit combined with 2(TN) Comp. Tech. Coy NCC (I.I.T.) presented a Guard of Honour to the Prime Minister of India Mrs. Indira Gandhi during the XI Convocation of the IIT., Madras. The parade was commanded by Flt. Lt. V. Subrahmanyam of this Unit.

10. Five cadets from this unit participated in the All India Vayu Sena Camp held at Air Force Station, YELHANKA during May-June 1975. Also Cadet Under Officer R. Jayakar of this unit underwent an Advernture Course (23rd) at the Himalayan Mountaineering Institute, DARJEELING during June, 1975, and obtained FIRST position in the Indoor Games. He was one of the two cadets selected for this course from the whole of Tamil Nadu.

11. This Unit combined with No. 2 (TN) Comp. (Tech) Coy NCC has started the NCC Employment Information and Guidance Bureau for the benefit of the students of the I.I.T. in general and NCC Cadets in particular. At present 46 cadets are registered with the Bureau and are being given guidance on their employment opportunities after they pass out from the I.I.T. Madras.

12. The NCC Training at this Unit has defenitely helped to credit air-mindedness in the cadets and will keep on doing so for times to come.

ANNEXURE 'I'

INSTITUTE HOSPITAL

The Institute Hospital has shown progressive growth in many spheres during the year 1974–75 under review.

Staff: Dr. Urmila Maghi, worked as a Honorary Medical Officer from 16–12–74 to 31–1–75. Dr. P. C. Soundararajan, Medical Officer, left for U.K. for higher studies on 25-1-75. Dr. V. Ramkumar, M.D. has been selected for appointment as Medical Officer in the Place of Dr. P.C. Soundararajan.

Statistics: The hospital has attended to 60,706 out patients during the year 1974–75. There is considerable amount of increase in out patients and inpatients in the Hospital. The break up is as follows :

Men	...	23,185
Female & Children	...	28,311
Students	...	9,210
Total	...	60,706

Medical cases	...	56,372
Surgical cases	...	3,628
Cynaec & Obstetrics	...	706
		60,706

Total number of In-patients		274
Jaundice	...	32
Chicken pox	...	23
Mumps	...	5
Enteric Fever	...	7
Miscellaneous	...	207
		274

Most of the In-patients were cases of infective diseases.

Major Operations	...	72
Minor Surgery	...	374
Total number of operations	...	446

Last year only 20 major operations were done due to the lack of an Aneasthetist. This year 72 major operations like Appendesectomy, Hernia Hydrocele and D & C., were done. Rest of the operation cases were minor surgery like abcesses and removal of cysts, setting up of Fractures etc.

Obstetric & Cynacological regular check up of pregnant women were done. Blood grouping was also done and routine Gynacological examination was carried out.

The total number of Ante-natal cases attended	...	114
Gynaec	...	706
Deliveries	...	20
Family Planning (Male & Female)	...	262

Family planning advice is given to almost all the eligible mothers and fathers. Child Welfare clinic was conducted and a health record is maintained for children in which the rate of growth weight of the child and all the immunisation are entered.

Immunisation

Routine immunisation programme was under-taken. It was very encouraging to note that there is not even a single case of whooping cough, Cholera, small pox or Tetanus in Children or in adults noticed in the Campus because of the proper immunisation. There was no case of "Whopping Cough" in the Campus for the 5th year in succession.

Immunisation Work

Small pox	...	512
Triple Antigen	...	659
Polio-Oral	...	659
T.A.P.	...	643
Cholera	...	576
Total number of immunisation work	...	3,049

The following are the statistics of Laboratory Investigations:

Urine Examination	...	2,024
Motion Examination	...	459
Blood Examination	...	3,170
Blood Group	...	150
Sputum & Smear	...	26
Total		5,849

There are about 29 cases of primary complex in children who were investigated and treated.

Building & Equipment

Operation Theatre was provided with Air-Conditioning which prevents sweating of the patients and Doctors. The loss of water to the patients had to be replaced by transfusions prior to Air-conditioning. This is a saving in the long run. The hospital has one electronically operated Thermometer, which is hygienic and time saving. Two more have been promised by the Electronics Department.

In addition to the staff and their families, students of the Institute, the Hospital also attended to the participants of summer school of various Departments, H. A. L., Trainees, Q.I.P. Students, the Vanavani High School Staff, Central School Staff, Mess Staff of all the Hostels, State Bank and Post Office Staff Members, C. R. P., S. D. B., etc., We have undertaken the medical check up of Central School Students, nearly 850 in number.

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Administration

Director	Dr. K. A. V. Pandalai
Deputy Director	Prof. S. Sampath
Dean, Industrial Liaison	Prof. R. G. Narayanamurthi
Dean, Administration	Dr. P. Venkata Rao
Dean, Students	Prof. R. K. Gupta
Registrar	Sri. C. V. Sethunathan
Dy. Registrar	Sri. T. S. Rajagopalan
Asst. Registrar-I	Sri. W. Hanumesi Rao
Asst. Registrar-II	Sri V. Shanmugam
Asst. Registrar-III	Sri. M. Gopalan
Asst. Registrar-IV	Sri. D. Thiagarajan
Audit Officer	Sri. R. Venkataraman
Stores and Purchase Officer	Sri. S. Pattabiraman
Finance & Accounts Officer	Sri. A. V. Karunakaran Nambiar
Executive Engineer	Sri. Y. S. Nagaraja Rao
Hony. Consulting Physician	Dr. P. M. Palani
Medical Officers	Dr. D. Harirajan Dr. (Smt.) Shanta Krishnamurthi Dr. P. C. Soundara Rajan
Anaesthetist cum General Duty Medical Officer	Dr. V. Ramamurthi
Security Officer	Sri. T. N. Venkataraman
Officer Commanding, 2 (Tamil Nadu) Comp. (Tech.) Eng./EME/Sig.Coy. N. C. C.	Maj. B. K. D. Gupta
Officer Commanding, 4 (Tamil Nadu) Air Sqn. Tech. Coy. N. C. C.	Flt. Lt. K. Ramakrishnan

Heads of the Departments

Aeronautical Engineering	Dr. N. R. Subramanian
Applied Mechanics	Dr. N. V. Chandrasekhara Swamy
Chemical Engineering	Dr. T. Gopichand
Civil Engineering	Dr. V. Sethuraman
Electrical Engineering	Dr. M. Venugopal
Mechanical Engineering	Dr. B. S. Murthy
Metallurgy	Dr. R. Vasudevan
Chemistry	Dr. J. C. Kuriacose
Mathematics	Dr. S. D. Nigam
Physics	Dr. C. Ramasastry
Humanities & Social Sciences	Dr. V. Anantaraman
Librarian	Sri V. S. Nazir Ahmed