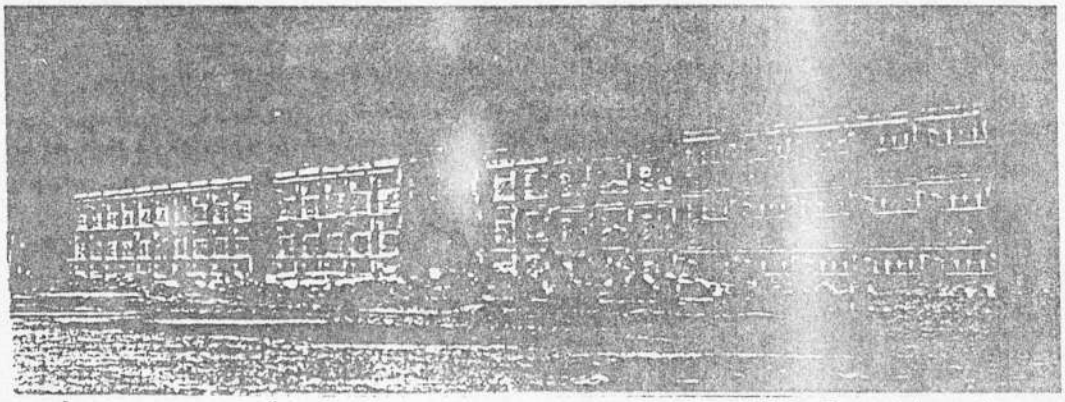
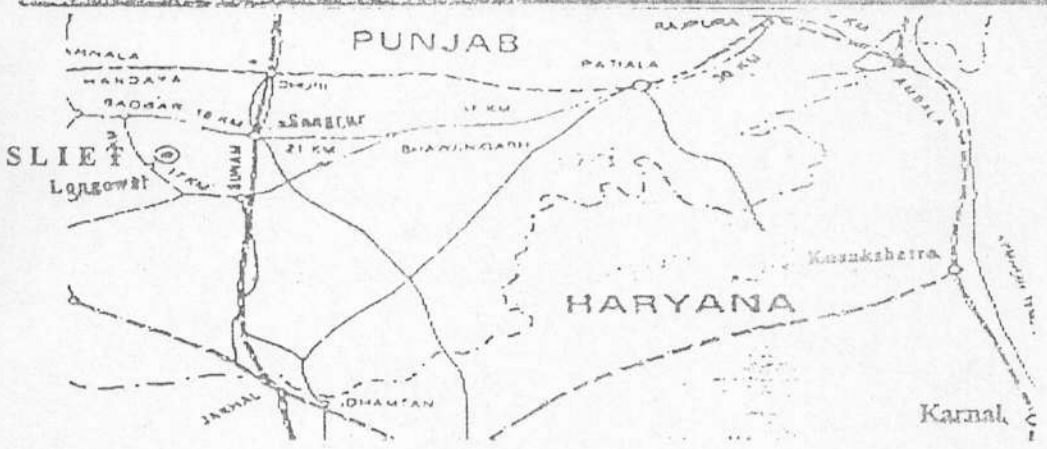
DETAILED PROJECT REPORT FOR PERFORMANCE REVIEW OF SANT LONGOWAL INSTITUTE OF ENGINEERING AND TECHNOLOGY





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Ed. CIL An ISO 9002 Company

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EXECUTIVE SUMMARY

Based on the conceptual framework prepared by Ed.CIL and the specific recommendations made by a National Expert Committee, the Government of India established in 1989 the Sant Longowal Institute of Engineering & Technology (SLIET). The Institute was visualized to impart a unique system of education for harnessing and nourishing the energy and vigor of the youth of Punjab for economic development of the State.

For planning development of the Institute during the 3rd Phase, SLIET engaged Ed.CIL to carry out a performance appraisal of the Institute and identify potential areas for growth. A 5-member Task Force of Ed.CIL, headed by Prof. K.L. Chopra, Ex-Director of IIT Kharagpur, has accomplished the task based on: (i) analysis of primary and secondary data, (ii) discussions with staff, students, alumni and industry representatives, (iii) SWOT analysis, and (iv) visit of its members to the Institute.

The Task Force is of the opinion that SLIET, by utilizing its inherent strengths, could, during its 3rd Phase, embark on a path of further academic growth in the form of postgraduate education and research, but only after implementing certain corrective and reformatory actions. The major recommendations in this regard are:

1. The total number of courses (30) presently conducted is large. The number may be reduced, and only those courses be conducted which have a high market demand and for which adequate infrastructure is available.

2. A pyramid structure of student population at the 3 levels of education should be achieved through a judicious selection of courses at each level and their annual intakes.

3. Curricula of certificate and diploma courses should lay greater emphasis on applied work. These should be reviewed for harmonizing with the respective guidelines of the National Council for Vocational Training (NCVT) and the Punjab State Board of Technical Education.

4. Admission procedures, reservation policy for admission of SLIET alumni to diploma and degree programs, and evaluation methodology are to be dictated by the goal of quality, and consequently need to be reviewed.

5. The systems of bridge courses and credit system should be revived.

6. Short-term formal and non-formal courses in larger number need to be conducted.

7. A Science & Technology Entrepreneurship Park (STEP) should be established to promote self-employment amongst SLIET alumni.

8. All efforts should be made to recruit well-qualified and experienced faculty. This may be achieved through simplification of appointment procedures, offer of financial incentives, and by creating an intellectually stimulating atmosphere.

9. For academic growth, postgraduate diploma/degree programs may be started on a selective basis, especially through collaboration with academic institutions and industry.

A broad action plan has been suggested in this Report for action by SLIET on the above recommendations.

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CHAPTER 1

BACKGROUND AND METHODOLOGY

1.1 BACKGROUND

Sant Longowal Institute of Engineering & Technology was established by the Government of India in 1989 on the basis of a Project Report prepared by Ed.CIL. The Institute admitted the first batch of students in 1991. After completing first phase of development, the second phase of development is presently in full swing.

SLIET has now approached Ed.CIL to evaluate development and performance of the Institute to date and to prepare a vision for the next decade with recommendations to achieve the same.

1.2 SCOPE OF WORK

Based on the above stated purpose of the study, the scope of work includes:

a) Review of objectives of the Institute.

b) Review of Institute's performance related to:

- Academic parameters such as curriculum, strength, quality and ratio of faculty and infrastructure, and
- Non-academic parameters such as management and finance.

c) Introduction of innovative courses in addition to the existing certificate and diploma programs.

d) SWOT analysis of the Institute.

e) Review of infrastructure facilities for conduct of postgraduate programs in various departments.

f) A new vision for the Institute for the next decade, for it to be categorized as an institution of excellence.

g) An implementation plan for (f).

1.3 METHODOLOGY

The following methodology was followed by Ed.CIL for carrying out various activities under the Project:

1. Ed.CIL constituted a Task Force consisting of the following members:

   - Prof. K.L. Chopra, Ex-Director, IIT Kharagpur
   - Prof. D.P. Agarwal, Project Director, IIITM Gwalior
   - Prof. K.B. Raina, Ex-Principal, TTTI Chandigarh
   - Dr. S.A.A. Alvi, Former Additional Secretary, AICTE
   - Dr. Veera Gupta, Project Manager, Ed.CIL

2. An inception meeting of the Task Force was held to detail out the TOR, identify information required and method for collection of the same.

3. Based on the above discussions, formats for collection of information were designed and mailed to SLIET.

4. A second meeting of the TF was held to discuss the following:
   a) The collected information,
   b) The status of institutional development,
   c) Performance of the institute to achieve its objectives, and
   d) Formats for SWOT and visioning exercises.

5. A visit of the Task Force was made to SLIET on 20th May 1999 to collect detailed information and to hold SWOT and visioning exercises with senior faculty members.

6. Meetings were held with students, alumni and industry representatives during the visit on 20th May 1999.

7. Based on the above, a Draft Report has been prepared for discussion at SLIET with the stakeholders.

8. Suggestions made on the Draft Report will be incorporated in the Final Report.

CHAPTER 2

INTRODUCTION

2.1. GENESIS

The Government of India decided to establish an Institute of Engineering and Technology at Longowal as a tribute to the memory of the Late Sant Harchand Singh Longowal. While making the decision, the Government desired that the Institute be designed to harness and nourish the energy and vigor of the youth of the Punjab State for its economic development, and to also help solve the many problems faced by the State.

2.2. CONCEPTUAL FRAMEWORK OF THE INSTITUTE

2.2.1 The Ministry of Human Resource Development, Government of India entrusted the task of preparing a conceptual framework for the Institute and for identifying the requirements and nature of technical courses to be started in the proposed Institute to Educational Consultants India Limited (Ed.CIL) (a Government of India Enterprise).

Based on an analysis of the existing facilities for technical education in the State of Punjab 1989, their scope, the targeted population, the courses offered, the projected industrial scenario, and the employment pattern, the following gaps in Technical Education were identified by Ed.CIL's Project Team:

a) Existing institutions and the types of courses offered satisfy the manpower requirements of large scale enterprises only, and hardly cater to the needs of small and medium scale enterprises in agricultural sector, manufacturing sector, service sector, social development sector, etc.

b) The capacity of the existing technical institution to provide trained technical manpower in emerging areas of technology such as Electronics; Computer Science and Information Science is inadequate and will not be able to meet the demands of the region as these emerging areas of technology pervade all sectors of development and all types of enterprises.

c) In order to develop certain sectors of population to start enterprises, courses in entrepreneurship need to be started. The programs and courses provided in the existing institutions do not have an element of entrepreneurship built into the curriculum and, as a result, the qualified personnel from these programs continue to be job seekers and do not become self-employed.

d) The existing technical institutions do not provide entrepreneurship development programs for training professionals to work in State Industrial Development Corporations, State Consultancy Organizations, Banks, Educational Institutions and other organizations which are responsible for promotion of entrepreneurship.

e) Presently, there is no institution in the State of Punjab, which offers diploma programs in such areas as Printing Technology, Construction Technology, Public Health & Environmental Engineering, Paper Technology, Food Technology, Post Harvest Technology and Textile Technology whereas the State's economy and its development revolve around activities in these areas.

Ed.CIL prepared a project report outlining the feasibility of starting courses at different levels of education on need basis in emerging technologies. The project report recommended starting of 21 Certificate, 21 Diploma and 18-Degree courses (listed in **Annexure-1**) on need-basis besides conducting non-formal and entrepreneurship development programs.

2.2.2. Taking into consideration the shortcomings in the Technical Education System in the State of Punjab, the Government of India constituted a National Expert Committee to consider at length the project report prepared by Ed.CIL and to make recommendations on the infrastructure required for setting up Sant Longowal Institute of Engineering & Technology.

The Committee felt that the following points deserved careful consideration in deciding the programs in the Institute:

i) The Institute should offer education and training programs in modern technology areas like Computer Science, Electronics, Information Science, etc., to meet the specific needs of agriculture and small and medium industries.

ii) There is a need for programs in management specially designed to meet the requirement of small and medium industries, which form the bulk of the industrial ventures in the State.

iii) Entrepreneurship should be built into all the programs to promote a 'self-employment culture' amongst the students.

iv) Sustained efforts for continuing education of the unemployed youth and the working population by updating and upgrading of skills.

v) The need for a strong liaison with the industries in the State, which is so necessary to make the Certificate/Diploma, and later on, the Degree programs a success.

vi) Interaction through extension services with the community, which is predominantly rural. As the vocational courses at Certificate-level are to be based on local conditions and needs, these cannot always be planned at the State-level. Establishment of extension centers of the Institute, spread at District and Block levels, may be considered.

2.2.3. Based on the above considerations, the Committee recommended the following with regard to the nature and types of courses and phasing out of the academic programs:

i) The Institute will offer formal, non-formal and continuing education programs in the areas identified.

ii) During the first phase (7th Plan period), the Institute will offer only certificate and diploma programs in certain selected areas in an integrated manner so as to provide opportunities for occupational upgradation.

iii) During the second phase (the 8th and 9th Plan periods), the certificate and diploma programs will be conducted in all the identified areas of study (**Annexure-1**). Certain degree level programs in identified areas may be initiated at a later stage.

iv) Bridge courses at appropriate levels will be provided to make up the deficiencies in the students when they want to enter higher level programs after certain work experience. Thus, vertical mobility in the profession is ensured.

v) Entrepreneurship will be an-in-built feature in the curriculum of all the courses so as to motivate the pass-outs to become self-employed as far as possible.

vi) Industrial/field training will be incorporated at appropriate levels to expose the students to relevant industrial/field practices. The courses will be run with active collaboration with the industries and potential employers in the region. The Institute will also initiate and conduct co-operative type of education in certain identified areas.

2.3. OBJECTIVES OF SLIET

Based on the conceptual framework, the objectives of the Institute have been defined as:

2.3.1 Education and Training

- To offer flexible, modular, multi-point entry programs in Engineering & Technology.
- To promote "self-employment" in all programs by introducing an element of entrepreneurship and providing guidance and counseling services to help students to take-up self-employment ventures.
- To offer non-formal programs in different areas of technology to strengthen the scope of institutional programs.
- To provide technical education facilities for women through specially designed courses.
- To offer continuing education programs for working personnel from industries at different levels.
- To offer bridge courses for lateral entry in all programs and for moving from one level of course to another level.

2.3.2 Extension Services

To offer extension services to:

- Industries in the neighbourhood and in the region,
- Working personnel,
- Passed out students (alumni),
- ITI's and polytechnics, and
- Research and other institutes of higher learning.

2.3.3 Research & Development

- To conduct exploratory research to assess manpower requirement leading to integrated educational planning, curriculum development & instructional material development in the identified areas of science & technology.

- To conduct research in the inter-disciplinary areas aimed at solving the problems of industry and community.

2.3.4 Linkages

To have Memoranda of Understanding (MOUs) with reputed industries and institutes of higher learning in order to draw upon the expertise available with them for the overall development of the Institute.

2.4. MISSION OF THE INSTITUTE

a) The Institute to offer education and training programs in modern technology areas like Computer Science, Electronics, Mechanical, Polymers, Instrumentation, Paper, etc. to meet the specific needs of agriculture and, small and medium industries.

b) The need for programs in management specially designed to meet the requirements of small and medium industries.

c) Entrepreneurship should be built into all the programs to promote a "self-employment culture" amongst the students.

d) To impart continuing education to unemployed youths and the working population by updating and upgrading of skills.

e) To have strong liaison with the industries in the State.

f) Interaction through extension services with the community which is predominantly rural.

CHAPTER 3

ACADEMIC, PHYSICAL AND FINANCIAL STATUS

This Chapter gives brief details of academic departments and support facilities, staffing position, courses being conducted and their curricula, admission procedures and profile of entrants to each of the 3 levels of courses, Institute's finances and governance.

3.1 ACADEMIC DEPARTMENTS

The Institute has the following 10 teaching Departments:

a) Mechanical Engineering Department
b) Computer Science & Engineering
c) Chemical Technology
d) Electronics & Communication Engineering
e) Electrical & Instrumentation
f) Chemistry Department
g) Food Technology Department
h) Department of Physics
i) Department of Mathematics
j) Department of EDP & Languages

Key activities of the teaching Departments are briefly described below:

3.1.1. Department of Mechanical Engineering

a) The Department of Mechanical Engineering is the largest department of the Institute. It offers the following 5 certificate, 4 diploma and 2 degree courses:

Certificate Courses:

- Tool and Die Technology
- Foundry and Forging
- Auto and Farm Machinery
- Air Conditioning and Refrigeration
- Welding Technology

Diploma Courses :

- Foundry Technology
- Industrial and Production Engineering
- Maintenance and Plant Engineering
- Welding Technology

Degree Courses:

- Mechanical Engineering with specialization in Manufacturing Engineering
- Mechanical Engineering with specialization in Welding Technology

b) Some of the faculty is engaged in research activities. The following 2 sponsored research projects are under implementation:

- Design and development of cryogenic containers for rural applications funded by the AICTE, and
- Force control of a single-axis robotics manipulator system during tool-work piece dynamic interaction funded by the DST.

c) The Department has 1 Professor, 2 Assistant Professors and 23 Lecturers.

3.1.2 Department of Computer Science & Engineering

a) The Department of Computer Science and Engineering offers four courses:

- Certificate in Data Entry & Word Processing
- Diploma in Computer Programming & Applications
- Diploma in Computer Servicing & Maintenance
- Degree in Computer Science & Engineering

b) In addition to the above, the Department is conducting a 6-month Computer Course for the economically weak unemployed women sponsored by NORAD Women Welfare Scheme.

c) The Department has recently been recognized as an authorized SCO Center.

d) A project entitled Image.Based Database System funded by the AICTE is under implementation.

e) The Department has 1 Assistant Professor and 13 Lecturers.

3.1.3 Department of Chemical Technology

a) The Department offers three courses:

- Diploma in Chemical Technology
- Degree in Chemical Technology with specialization in Paper Technology
- Degree in Chemical Technology with specialization in Polymer Technology

b) The Department has 1 Assistant Professor and 10 Lecturers.

3.1.4 Department of Instrumentation & Electrical Engineering

a) The Department offers the following 4 courses:

- Certificate in Servicing & Maintenance of Medical Instruments
- Certificate in Servicing & Maintenance of Electrical Equipment
- Diploma in Instrumentation & Process Control
- Degree in Instrumentation Engineering

b) The Department has 2 Professors, 3 Assistant Professors and 15 Lecturers.

3.1.5 Department of Electronics & Communication Engineering

a) The Department offers the following 4 courses:

- Certificate in Servicing & Maintenance of Electronic Equipment
- Certificate in Television Mechanic
- Diploma in Electronics & Communication Engineering
- Degree in Electronics & Communication Engineering

b) In addition to the above, the Department also offers the following non-formal courses:

- 6-month course in Television Servicing & Maintenance under Community Development Program sponsored by the MHRD, Govt. of India.
- 1-year course in Repair & Maintenance of Television, VCR and Electronic Items under Women & Child Development Program sponsored by the MHRD, Govt. of India.
- 9-month course in Television Servicing & Maintenance under C-PYTE program sponsored by the Punjab Govt.

c) A project on Modernization of Advanced Communications Laboratory funded by the MHRD, Govt. of India is under implementation.

d) The Department has 2 Assistant Professors and 10 Lecturers.

3.1.6 Department of Food Technology

a) The Department of Food Technology has been set up to provide technological inputs to the upcoming agro-based food industry in the region. It offers the following three courses:

- Certificate in Food Processing and Preservation
- Diploma in Food Processing
- Degree in Food Technology

b) The Department is equipped to manufacture and analyze dairy products, to conduct food grade oil testing and carry out microbiological experiments.

c) The Department has 1 Professor and 10 Lecturers.

3.1.7 Department of Physics

a) The Department offers various courses of applied physics and material science to the students of all certificate, diploma and degree programs. It has a total of 6 laboratories, of which one is for research purposes.

b) Besides teaching, research activities are also undertaken by the faculty in areas such as:

- Studies of transport properties of III-V compound thin films,
- Preparation of ceramics,
- Development of thin films for device applications,
- Investigation of angular distribution and polarization of fluorescent X-rays, and
- Elemental analysis.

c) Various research projects funded by AICTE, UGC, CSIR and DST are also in progress in the department.

d) The Department has 2 Assistant Professors and 10 Lecturers.

3.1.8 Department of Chemistry

a) The Department offers courses to all the students of certificate, diploma and degree programs. It has 3 laboratories, one of which is for research purposes.

b) In addition to teaching, research activities in the fields of Co-ordination Chemistry, Biochemistry and Hetero-cyclic Chemistry are undertaken by the faculty. Research projects funded by CSIR, DST and AICTE are also in progress.

The researches carried out have earned international recognition through publications and presentation of papers in National/International conferences. Prestigious fellowships, DAAD (Germany) and Common Wealth (UK) have been awarded recently to two of the faculty members.

c) The Department has 1 Assistant Professor and 10 Lecturers.

3.1.9 Department of Mathematics

a) The Department offers various courses to all students of certificate, diploma and degree programs.

b) A part from teaching, the faculty members are actively involved in various research activities.

One of the faculty members was awarded Young Scientist award at the 83rd Indian Science Congress held at Punjabi University, Patiala.

c) The Department has 2 Assistant Professors and 7 Lecturers.

3.1.10 Department of EDP & Languages

a) This Department is responsible for promoting:

- Communication skill of the students,
- Managerial skills of the students, and
- Liaison between the institute and the industry.

b) It offers courses in English and Management. All the courses are designed with a special emphasis that the students are expected to manage real life situations. A habit for documentation and reasoning is encouraged.

c) The Department has 7 Lecturers.

3.2 SUPPORT FACILITIES

The major facilities supporting academic work of the Institute are: Central Workshop, Central Library, Computer Center and Central Instrumentation Center. Brief details of these are given below.

3.2.1 Central Workshop

a) The Central Workshop comprises of adequately equipped Machine Shop, Tool Room, Advanced Welding Shop, 2 Basic Welding Shops, Fitting Shop, Sheet Metal Shop, Pattern Making Shop, Foundry Shop, and Forging Shop.

b) It provides training to students of almost all certificate, diploma and degree programs and also to participants under the C-PYTE program.

c) The workshop staff consists of one Workshop Superintendent, one Assistant Workshop Superintendent, 3 Senior Technicians and 10 Technicians.

3.2.2 Central Library

a) The Central Library is housed in an area of 2800 sqm.

b) Holdings of the library include:

- 23000 text books
- 1800 reference books
- 1150 general interest books

TOTAL 25950

c) Subscriptions to professional journals and general interest magazines include:

- 70 Indian Journals
- 10 Foreign Journals
- General interest magazines

The Institute has also Central Computer Center - Internet Services & Central Instrumentation Center.

3.3 TEACHING AND OTHER STAFF

The Institute has in position 133 faculty members (Annexure-2), against the sanctioned strength of 189. Against the 22 sanctioned posts of Dean/Professor, only 6 are filled. At the Assistant Professor level, of the 45 sanctioned posts, only about 50% of the posts are filled. Over the last 4 years, the overall teaching staff vacancy has varied from a low of 16% to a high of 24%.

With a total estimated student population of 2154, the staff: student ratio maintained at the present is 1:15. It is not possible to deduce the existing individual staff:student ratio for certificate, diploma and degree courses, as there is no clear demarcation in respect of teaching-level amongst the existing staff. The overall ratio of 1:15, though different from the 1st EFC approved 1:16, 1:12 and 1:10 for certificate, diploma and degree courses respectively, is within the AICTE norms for staffing.

The faculty is generally active in attending seminars, conferences and workshops, and presentation and publication of research papers. Some of the teachers have also received national/international recognition. SLIET has succeeded in obtaining grants for sponsored researches. From the list of papers published by the SLIET staff (**Annexure-3**), it is noted that the majority of papers are in sciences, giving the impression that researches are not yet being actively pursued in the Engineering/Technology faculties.

In the proposal for Phase-II, adopting non-teaching to teaching staff ratio of 1:2, the Institute had proposed a non-teaching staff strength of 375. The 2nd EFC gave no specific approval for the non-teaching staff by way of specific numbers or ratio with respect to teaching staff. The EFC however prescribed the condition that salary expenditure on non-teaching staff be limited to 50% of that on the teaching staff. The Institute presently has 59 non-teaching technical support staff and 37 administrative staff, giving a total of 96. Though no firm figures on salary expenditure are available, on this number it would be well below the 50% limit imposed as above. Lists of administrative and non-teaching technical staff are given in **Annexures-4 & 5** respectively.

3.4 CONDUCT OF COURSES AND ANALYSIS OF CURRICULA

Starting from 5 certificate and 3 diploma courses in 1991-92, the Institute presently conducts 12 certificate, 10 diploma and 8 degree courses the details regarding course and intake is given in (**Annexure-6**).

As originally designed and approved, all the 3 levels of courses were to be of 2-year duration, with 6-month duration bridge courses offered at the transition stages between certificate and diploma and, between diploma and degree courses. The Institute presently does not offer any bridge courses, though these were a condition of the AICTE approval.

The certificate and diploma courses awarded by the SLIET itself are of 2-year duration as originally approved. However, the degree level courses, affiliated to the Punjab Technical University, are of 3-year duration. This duration is at variance with the originally approved scheme.

Course-wise distribution of contact hours for Certificate, Diploma and Degree courses is given in **Annexure-7**, and a summary is given in Table-1 below.

Table-1

Overall Distribution of Contact Hours in Teaching and Applied Work

S. No.	Course Level	Duration	Distribution of Contact Hours %		Duration of Industrial Training
			Theory	Applied	
1	Certificate	6 Trimesters	64	36	2 Trimesters
2	Diploma	6 Trimesters	59	41	I Trimester
3	Degree	6 Semesters	70	30	Not specified

The contact-hour distributions between theory and applied work for the Diploma and Degree courses are normal but for Certificate, the distribution is highly tilted towards theory.

3.5 ADMISSIONS AND ADMISSION PROCEDURES

3.5.1 Admissions

As shown in Table-2, the number of total student admissions to the ongoing 12 Certificate, 10 Diploma and 8 Degree courses have been uniform over the last 3 years. The overall success rates in all the 3 levels of courses are noted to be low.

Table-2

Student Admissions and Pass Status

S. No	Level of Courses	1996-97				1997-98				1998-99			
		Admissions		D	P	Admissions		D	P	Admissions		D	P
		TA	F			TA	F			TA	F		
1	Certificate	335	67	41	228	328	44	34	228	316	47	14	211
2	Diploma	295	53	8	272	292	38	12	278	340	62	19	282
3	Degree	307	51	20	181	274	48	11	176	297	50	08	218

TA: admitted F: female students among the admitted
D: Dropout
P: Passed

Note:

- The 1996-97 data is based on final trimester results of certificate and diploma and 4th trimester of degree courses. The 1997-98 data is based on 4th trimester results of certificate and diploma and 3rd trimester of degree courses. The 1998-99 data is based on 1st trimester results of certificate and diploma and degree courses.
- The Institute has reported offering of only 5 of non-formal/continuing education programs with total participation of about 130 candidates.

Female participation has been fairly uniform over all the 3 years at 15%, 18% and 17% for the Certificate, Diploma and Degree courses respectively.

3.5.2 Admission Procedures

Admissions procedures for all 3 types of courses are different from each other and are briefly described below:

Certificate Courses

An All India Entrance Test is conducted by SLIET to fill all seats in the 12 courses on merit. Quota for Punjab State is 75%. Punjab State quota is available to all candidates who pass the qualifying examination from a school/college situated in the State of Punjab. The qualifying examination is 10th pass. On all seats, there is a reservation of 15% for SC students and 7.5% for ST students.

Diploma Courses

There are 2 categories of admissions to the 10 Diploma courses conducted by SLIET. The categories are: admissions by vertical entry and admissions by direct entry. Vertical Entry seats are open to only SLIET Certificate holders, whereas the Direct Entry seats are open to both SLIET Certificate holders and 10+2 pass students. Procedures for admissions to these 2 categories are not the same.

Vertical Entry seats to the extent of 55% are reserved for SLIET alumni, who can get admissions to these seats on inter-se merit based on 80% weightage of the score in an Entrance Test (SET-IV) specially designed for them and 20% weightage of score in the SLIET certificate course.

Direct Entry seats to the extent of 45% are filled on merit determined through an All India Entrance Test, called SET-II, conducted by SLIET. The test is common for both 10+2 students and SLIET certificate holders.

Of the Direct Entry seats (45% of all diploma seats), 50% are reserved for Punjab State students as defined above. There is a further reservation of 15% for SC and 7.5% for ST students on the direct entry seats.

Degree Courses

As for Diploma courses, there are vertical entry and direct entry seats. Admissions are open to Diploma holders only. Admissions to both categories are based on course-wise merit lists, i.e. a candidate who qualifies the test for Chemical Technology will be eligible for admission to only Chemical Technology only as per merit and not in any other program.

Vertical Entry seats to the extent of 52% are reserved for SLIET alumni, who can get admissions to these seats on inter-se merit determined in a manner similar to that followed for admissions to Diploma courses.

Direct Entry seats to the extent of 48% are filled on merit determined through an All India Entrance Test conducted by SLIET. The test is common for both direct applicants and SLIET alumni.

There is no quota for Punjab State students. There is, however, a reservation of 15% for SC and 7.5% for ST students on the direct entry seats.

3.5.3 Academic Profile of Entrants

The academic profile of the entrants to the 3 levels of courses over the last 2 academic years is given in Table-3. It is noted that a large percentage of students with below 50% marks in the qualifying examination are getting admissions to all 3 levels of courses.

Table-3

Academic Profile of Students at the Time of Admission

S. No.	Level of Courses	1997-98				1998-99			
		Total Admissions	% Distribution by Marks			Total Admissions	% Distribution by Marks		
			Less than 50%	50 to 60%	More than 60%		Less than 50%	50 to 60%	More than 60%
1	Certificate	308	70	19	11	333	72	18	10
2	Diploma	293	56	35	9	343	64	30	6
3	Degree	275	47	43	10	302	48	45	7

3.6 INSTITUTE FINANCES

The Institute through its 1st EFC (1989-90 to 1994-95) (**Annexure-8**) was sanctioned an amount of Rs. 1934 lakhs, the major amount of Rs. 1439 lakhs for buildings (82613 sqm) and campus development. Rs. 328 lakhs were allocated for equipment and Rs. 167 lakhs for development of central facilities.

The 2nd EFC (1995-2000) (**Annexure-9**) has sanctioned an amount of Rs. 3634 lakhs with the non-recurring expenditure component of Rs. 2877 lakhs. The allocations were: Rs. 1877.82 lakhs for buildings (37392 sqm) and campus development, Rs. 839 lakhs for equipment and Rs. 160.33 for development of central facilities. The 2nd EFC had envisaged completion of the Institute by the year 1999-2000. The approval stated that the Institute should make efforts to enhance internal revenue generation.

The Institute has been receiving adequate funds to meet its recurring and non-recurring expenditures with the major amount being invested in buildings. Income and expenditure figures for all the years till 1997-98 are given in Table-4.

Table-4

Income and Expenditure (Rs. in lakhs)

S.No	Item of Income/Expenditure	Financial Year									
		1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
1	Balance brought forward	0.00	204.63	208.35	20.48	16.57	77.77	151.36	143.45	253.82	120.34
2	Grant-in-aid from MHRD	200.00	300.00	800.00	500.00	800.00	875.00	496.00	675.00	500.00	1375.00
3	Interest	5.96	13.31	7.55	5.38	7.88	8.24	5.98	185.70	263.52	162.03
4	Fees & Other Receipts	0.00	0.00	0.00	12.74	30.28	44.38	117.16			
Total Income		**205.96**	**517.94**	**1015.90**	**538.60**	**854.73**	**1005.39**	**770.50**	**1004.15**	**1017.34**	**1657.37**
5	Utilization	1.33	309.59	995.42	522.03	776.96	915.06	743.87	750.33	897.00	1116.41
Balance		**204.63**	**208.35**	**20.48**	**16.57**	**77.77**	**90.33**	**26.63**	**253.82**	**120.34**	**540.96**

3.7 MANAGEMENT OF THE INSTITUTE

The Institute's overall management is vested in its Governing Body with a total of 17 members. Composition of the Governing Body is given at **Annexure-10**. The Chairman (to be appointed by the State Government in consultation with the AICTE) has since inception of the Institute been the Chief Secretary of Punjab State. The Director of SLIET is the Member-Secretary of the Governing Body.

The Governing Board is assisted in its work by duly constituted Committees. These are: Finance Committee, Building & Works Committee, Equipment & Stores Purchase Committee and Staff Selection Committees. Composition of these Committees are also given in **Annexure-10**.

Observations on academic, physical infrastructure and financial aspects of SLIET have been made in Chapter 4.

CHAPTER 4

OBSERVATIONS ON PERFORMANCE

This Chapter is devoted to a critical examination of the key academic, physical and financial issues.

4.1 ACADEMIC ISSUES

4.1.1 Academic Programs

Certificate Programs

a) The curricula for these courses have laid large emphasis on taught courses with insufficient time allotted for hands-on-experience. This does not seem to be in consonance with the guidelines of National Council for Vocational Training (NCVT).

b) The infrastructural facilities in the form of workshops and laboratories for these courses are good.

c) Although the overall response to these courses as measured in terms of the number of admission applications seems good, the Task Force was informed that some of the courses are not popular, and the popularity of some is declining.

d) Acquisition of skills as a craftsman is expected to be the focus of these courses. This appears to be of secondary interest. Upward mobility into diploma courses appears to be the primary goal of the certificate students. Consequently, professional pride to use skills in industry is not being nurtured. Instead, certificate holders are not available to serve in industry in certain disciplines (e.g. welding). Clearly, therefore, the main objective of certificate courses is not being achieved.

e) The institute has increased reservation for its certificate students for vertical mobility into diploma courses from 50% to 55%. The rest of the students can compete for the remainder 45% diploma seats with the outside 10+2 students through a competitive examination. With liberal marking and liberal interpretation of merit, certificate courses are mainly seen as stepping-stones to diploma (and later to degree) courses by nearly 80% of the students.

f) Providing industrial training to a very large number of certificate students for 2 full trimesters is a big task that has been managed well by the Institute. However, the students are more interested in higher level courses (diploma and degree courses) and are thus not very keen on this much quantum of industrial training.

g) Industries providing training would like to have flexibility both in terms of duration and schedules of training programs in order that the industry is also benefited.

h) Teaching of certificate courses is best done by specially trained and skilled instructors. Presently, these courses are being taught in most cases by the same faculty which teaches diploma and degree courses. As a result, neither the faculty nor the students are satisfied.

Diploma Programs

i) The curricula of diploma level courses needs to lay more emphasis on practical training aspects. It should be in consonance with the guidelines of the AICTE.

j) The laboratory facilities are adequate in most cases and are good for computer-based and food technology courses.

k) Because of 55% reservation of seats for its own Certificate holders, and the fact that its remaining certificate holders can compete for the rest of 45% seats, the seats in Diploma courses are predominantly filled by the SLIET certificate holders.

l) Compared with the 10^{th} class input certificate students who are proficient in trades, the laterally entering 10+2 students are proficient in Science and Mathematics. This gap in knowledge and skills between the two groups of students in the same class creates psychological and academic problems for the students as also for the faculty.

m) To overcome the problem of knowledge deficiency in one group of entrants and skill deficiency in the other, all the students admitted to Diploma courses were originally expected to initially undergo bridge courses for six months. Such courses are not being offered.

n) An elaborate system of retired technical persons acting as training coordinators has been evolved by SLIET for overseeing training programs in various industries. This is proving to be very effective in arranging the large scale training programs and managing the large number of trainees.

o) The teaching faculty for diploma courses is more or less the same as that for the degree courses. As a result, the diploma courses are in many cases diluted versions of the corresponding degree courses. The distinctive nature of diploma programs with heavy emphasis on practical aspects of engineering/technology is thus missing.

p) As in the Certificate programs, the ultimate objective of the diploma students is to move upwards to the degree course. Whereas this may lead to good competition among students in view of 55% reservation of seats on the basis of merit, the objectives of running diploma programs are not met. Nor does this large-scale promotion of diploma holders to degree programs provide high quality students.

Degree Programs

q) Engineering degree courses in all types of institutions in the country are in great demand. Judging by the number of applications, SLIET degree programs can be considered to be in good demand. However, judging by the academic achievements of the applicants, it is clear that the quality of students applying for such programs is not very good.

r) SLIET management has reserved 52% seats for its own diploma holders through a test specifically for SLIET alumni. The rest 48% are filled by an open competition conducted by SLIET. In this competition, SLIET alumni can compete with others from all over the country. As a result of the reservation policy and the mode of admission, the SLIET degree programs are predominantly attended by its own diploma holders.

s) Without higher level science and mathematics input, SLIET diploma holders cannot cope with all the degree courses unless the level is lowered. Bridge courses of six months were envisaged to rectify the deficiency. These courses do not exist at the present.

t) As per the directive of the Punjab State Government, SLIET stands affiliated to Punjab Technical University (PTU). The newly established PTU has no established academic or administrative structure. It does, however, conduct entrance test for SLIET degree programs with the help of SLIET and other similar institutions.

u) Since the degree programs for the lateral entrants in the State are of 3-year duration, PTU has imposed the same on SLIET, disregarding the novelty of the SLIET concept/pattern of 2-year certificate plus 2-year diploma plus 2-year degree, along with the bridge courses of a total of one year duration. This imposition has distorted the SLIET concept.

v) Because of the imposed affiliation, all academic programs at degree level (and post graduate level as and when initiated) require the approval of PTU since it awards degrees.

w) An examination of the results of degree recipients shows an abnormal situation. Almost all successful students score 60% or higher marks because of the high weightages given for attendance and sessionals, and with liberal marking.

x) The credit system with its inherent advantages for assessment of academic achievements of students is now universally accepted. The same has been abandoned after some initial attempts.

4.1.2 Students

1. The entrants to certificate programs are 10th pass students with academic performance in 10th Class examination ranging from average to poor. This has a direct negative effect on both the Diploma and Degree programs because of the large scale vertical mobility provided to these same students.

2. The overall strength of girls student in the Certificate, Diploma and Degree programs is about 20% which is well above that prevailing in other technical institutions and is a matter of much satisfaction.

3. The number of students from rural areas is not known but does not appear to be significant. However, as a part of community services, a large number of girls are being trained in a few skill programs.

4.1.3. Faculty

1. In view of the EFC approval, there ought to have been 3 cadres of teachers/instructors 45 for Certificate, 50 for Diploma and 81 for Degree programs respectively. Presently, distribution is load wise and department wise. It is desirable to have guidelines for distribution.

2. There is also no department-wise fixed distribution of faculty.

3. Most faculty members are required to teach courses at all the 3 levels.

4. There are very few (only 4 at present) senior faculty in the professional areas. Some departments are headed by junior faculty.

5. Most engineering faculty has B.Tech. /M.Tech. qualifications and have very limited teaching experience at post-graduate level. Most of them have little or no R&D interests and very little meaningful links with industry.

6. A rather high percentage (about 25%) of the faculty is in the areas of Science, Humanities and EDP (Entreprenuership Development Program). Most of these faculty members have Ph.D. degrees and are involved in routine teaching with a few of them undertaking basic research projects for Government of India agencies.

7. Except for some departments such as Mechanical and Computer Science & Engineering, the number of well-qualified faculty is not adequate. Several efforts to recruit good faculty have not fared well so far.

8. The Institute has encouraged faculty to attend seminars/workshops elsewhere and also to enhance their qualifications by providing study leave. The number utilizing this facility could be increased.

9. More organized administrative effort is required to encourage faculty to undertake consultancy work with the industry.

10. No attempt has so far been made to run short term formal/non-formal courses (in-house or at site) at any level for the industry.

4.1.4 Interactions with Industry, Community and Other Institutions

1. Except for interaction in respect of training programs, there is no serious interaction with any organized industry.

2. Interaction/collaboration with academic and R&D institutions in the area is negligible.

3. Several extension service programs for community development have been undertaken. These include TV Repair, TV Service, Computer Data Entry, etc. per six months.

4. SLIET has set up a cell for Industry-Institute Interaction. An agreement has been signed with Santa Cruz Operations, Inc (SCO) for SCO Certification, service and support.

5. SLIET plans to run 15 manpower and development programs during 1999-2000.

4.2 PHYSICAL INFRASTRUCTURE

1. Physical facilities such as housing for staff and students, for community services, and for student activities are very good. On the whole, it is a good campus.

2. The laboratories and lecture rooms are spacious and could accommodate more activities. However, except for the Departments of Mechanical Engineering and Food Technology, the laboratory facilities are barely adequate.

3. The library is growing. The concept of digital networked library has not yet been planned.

4. The facilities for Educational Technology are very limited. Education delivery systems based on computer assisted learning packages, Internet, etc. are not available.

5. Workshop facilities of the conventional type are extensive and need to be exploited for outside jobs.

4.3 FINANCES

1. The Institute has been receiving regular funds from MHRD of the Government of India.

2. It is noted that the Institute has rather large unspent balances at the end of most financial years, especially 1995-96, 1996-97 and 1997-98.

3. There is scope of internal revenue generation, especially through consultancy services.

CHAPTER 5

SWOT ANALYSIS

5.1 INTRODUCTION

Strength, weakness, opportunity and threat (SWOT) analysis had its genesis in business houses. It helps in generating comparative data used for trend analysis and competition existing in the market.

It is worthwhile defining strengths, weakness, opportunities and threats of an institute in order to maximize advantages and minimize threats. Strength is a resource, skill or other advantages of the institute. A weakness is a limitation or deficiency in resources, skills and capabilities. An opportunity is a major favorable situation in the institution's environment and a threat is a major unfavorable situation.

A SWOT analysis was carried out to compare the perceptions of the stakeholders with the observations made by the Task Force.

5.2 METHODOLOGY

In order to analyze SWOT for SLIET, a large group of twenty members from a cross section representing senior and junior faculty, technical staff and secretarial staff was formed. This group was sub-divided into 4 sub-groups of 5 members each. Each sub-group had representation from all sections (list of participants is given at **Annexure-11**). A brief introduction on Ed.CIL and of the Project was presented to the group. Importance of their contribution in the exercise and methodology to be followed was explained.

1. All were asked to write as many points under four headings of strength, weakness, opportunity and threat as one could think without consulting each other.

2. Each one argued their point in their respective teams to reach consensus to finalize sub-groups' report.

3. One member from each sub-group presented the respective report to the whole group.

4. Each point was discussed at length before being finalized.

5.3 SWOT AS PERCEIVED BY THE SLIET STAFF

5.3.1 Strengths

a) The Institute is funded by the Central Government.
b) It has established strong linkages with Industry.
c) Unique pattern of modular, flexible and three level of education.
d) Young, enthusiastic and qualified staff.
e) Sufficient land area (451 acres).
f) Location ideal for rural development programs.

5.3.2 Opportunities

a) It has a potential to become a deemed-to-be-university.
b) Rural development programs could be implemented effectively.
c) Workshops/laboratories can be used for R&D by industry.
d) Land area available in the Institute can be used to establish small-scale industries.
e) Consultancy services could be provided to industries.
f) Postgraduate and doctoral programs could be started.

5.3.3 Weaknesses

a) Location of the institute is a great disadvantage to the residents of the campus for civil facilities.
b) Support staff is less compared to the teaching faculty.
c) Teacher to student ratio is low.
d) Senior faculty are less in the Institute.
e) Faculty development programs are missing
f) Promotional avenues are not well defined for faculty and staff.
g) There are no R&D programs.
h) Low quality of students leading to decline in academic standards.
i) Lack of stable academic structure, changing from credit to marks system.
j) Lack of bridge courses leading to mismatch in the capabilities of students from lateral and direct entry.
k) Lack of library and laboratory facilities.
l) Absence of proper access road to the campus.

5.3.4. Threats

Certificate courses are not equivalent to 10+2 level. Students who are not able to make it to diploma level cannot join any other general stream. As a result, the number of applications to certificate level is decreasing every year.

5.4 CONCLUSIONS

Numerous environmental opportunities along with substantial internal strengths and critical internal weaknesses support an aggressive turn around strategy for the Institute.

CHAPTER 6

VISION AND DEVELOPMENT PERSPECTIVE

6.1 VISION

SLIET was created with a Vision of new pattern of technical education with flexible, modular, multi-point entry and multi-point exit programs at Certificate, Diploma and Degree levels. The limited experience of nine years in establishing and operationalising the institute has indicated need for improvements. At the same time, it is clear that the success of this novel experience and future growth of SLIET depends strongly on adopting post-graduate diploma/degree programs on a selective basis. Implementation of these concepts is possible only if SLIET has a Deemed-to-be-University status with autonomous governance pertinent to an institution of national importance. And thus the Vision for the next decade is to implement rigorously truly flexible, modular and multi-point entry/exit system at all levels of technical education in SLIET as an autonomous and Deemed Technical University.

6.2 DEVELOPMENT PERSPECTIVE

1. The novel SLIET experiment has already entered its Second Phase. The Institute now conducts 12 Certificate, 10 Diploma and 8 Degree courses. Any respectable National Institution, which conducts degree courses in Engineering & Technology, must have well qualified faculty which can teach postgraduate courses and also has interests in research, development and industrial consultancy. It is, therefore, understood that such an institution would make special efforts to attract such qualified faculty and to provide adequate facilities for R&D activities. The very presence of such an atmosphere will also have a significant effect on the quality of Certificate and Diploma programs. It is only logical that such an institution should develop to aspire to conduct postgraduate level programs during its next phase of development. However, it is very essential to build postgraduate programs only on the foundations of strong undergraduate programs, reasonably good infrastructure for teaching and research, and accomplished faculty.

2. A critical examination of the academic programs of SLIET as pursued in the last 8-9 years shows that the original concept of SLIET has been distorted. What was envisaged was a pyramid structure of academic programs, with the number of courses and total student admissions decreasing from the Certificate level to Diploma to Degree levels. It was also implicit in the SLIET concept that the Craftsmen and Technicians passing from SLIET would move out to the industry, particularly the

regional ones and that these industry-experienced alumni would be given preference in admissions by vertical mobility to Diploma and Degree programs respectively after successfully completing the prescribed bridge courses. What has however happened is vastly different, resulting in almost a cylindrical system, at best slightly tapered at the end. With over 50% reservation for admission by vertical mobility to both Certificate and Diploma holders, and further allowing the remaining alumni to compete nationally in a SLIET Test for the remainder of the seats, the results are as expected—the diploma and degree students are predominantly SLIET alumni, who have simply moved upwards. Besides distorting the SLIET concept, the academic consequences of this approach are serious. The entrants to Certificate programs are 10 pass students, with the academic performance of most ranging from average to poor. Certificate programs are expected to develop proficiency in trade and crafts but it is noted that these students, instead, are given more theoretical courses for which they are not well equipped. This results in a lot of dropouts. Those who continue and move up into diploma and then to degree programs, being initially weak can hardly cope with the rigor of science based courses. Despite this recognized and foreseen problem, no effort has been made to offer bridge courses to overcome deficiencies as envisaged in the AICTE approval. The student evaluation system should ensure quality of the product at each level.

With the faculty required to teach courses at all the 3 levels, a smooth transition of the academic curricula is ensured. Quality of education pertinent to the 3 levels is sacrificed.

3. If postgraduate programs were to be started, it is reasonable to assume that these would also form a part of this slightly tapered cylinder. Such a system will earn a bad reputation for its postgraduates in the market. Furthermore, it will not be possible to attract well-qualified faculty for such a system.

4. The corrections and reforms, which SLIET has to undertake before entering the 3rd Phase, are very clear. These are:

   a) All the ongoing programs must be critically examined as separate entities and only the viable ones continued.

   b) Admission procedures, reservations and student evaluation are to be dictated by the goal of quality education.

   c) A pyramid like structure with lateral entry only and with full flexibility of entry & exit even during a program needs to be established.

d) The mindset of both the students and the faculty has to be changed to understand the virtues of the SLIET concept.

5. Once the real SLIET model is in operation, 1-year postgraduate diploma for part-time/full-time sponsored students can be experimented with. After recruitment of senior and well-qualified faculty, and after a rigorous exercise with the help of national level expert committees, conventional 3-semester PG programs in very selected areas should be planned. Presently the Department of Mechanical Engineering, Computer Science & Engineering and Food Technology have the potential to undertake post graduate teaching.

6. The requirements of flexibility, modularity and multi-point entry are becoming increasingly more meaningful in the rapidly changing scenario of science and technology. This has led to new educational experiments by IITs with integrated programs leading to award of either two bachelor degrees, or to one bachelor degree plus one master's degree. Such programs are more challenging for the faculty and more attractive to the students.

Two models for possible adoption by SLIET are shown schematically in Figs. 1 & 2. It may be found useful to conduct special PG programs in Engineering/Technology areas for Science graduates. A suitable model for this mode of education is shown in Fig. 3. Implementation of any one of these models or their variants requires initially a very stringent in-house exercise by the concerned faculty. It is, accordingly, not considered proper to give a specific recommendation on this issue at this stage.

7. Experience of leading educational institutions in the country has shown that autonomy, responsive and apolitical governance, and well-qualified and committed modern management are essential to deliver quality education to our society. This is also essential for maintaining the national character of an institution which is funded primarily by the Central Government. The attaining of a Deemed University status, with responsive governance, somewhat similar to that prevailing in IITs and even the sister institution, namely NERIST, is of paramount importance for SLIET.

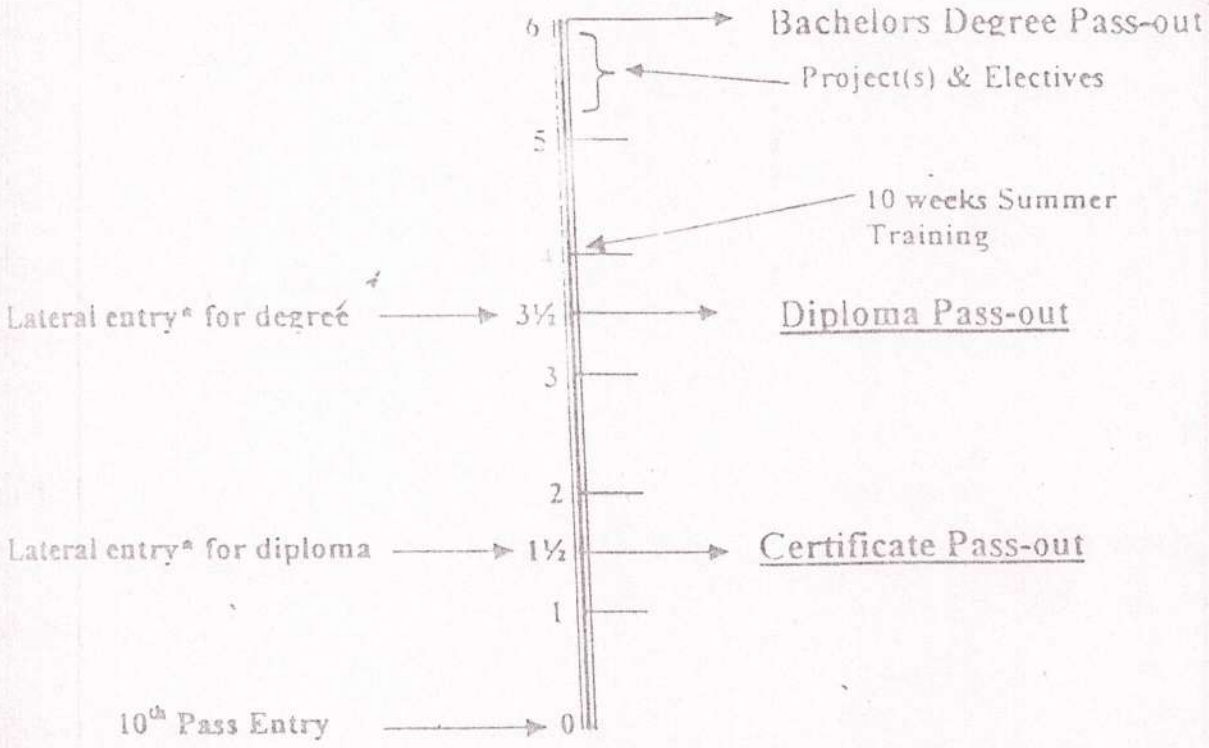

Fig. 1: Six Years integrated degree course for 10th pass entrants

Note: (1) Numbers indicate the number of years as the students progress through the integrated course

*(2) * Entry through an appropriate selection method*

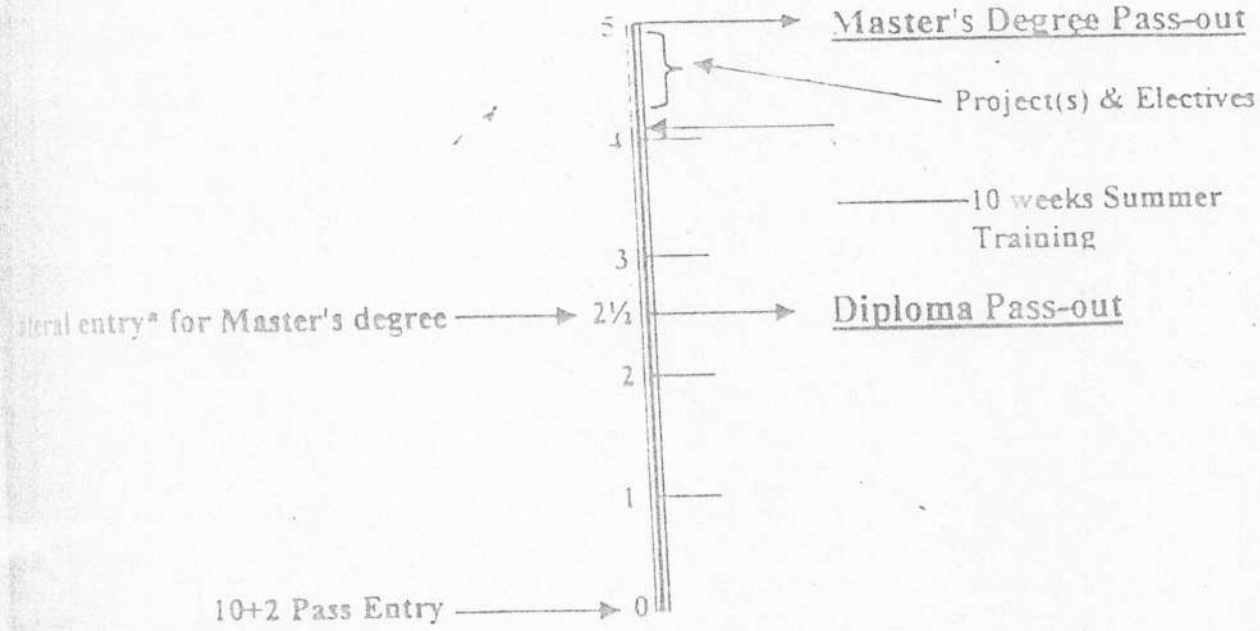

Fig. 2: Five Years integrated Master's degree course for 10+2 pass entrants

Note: *(1) Numbers indicate the number of years as the students progress through the integrated course*

*(2) * Entry through an appropriate selection method*

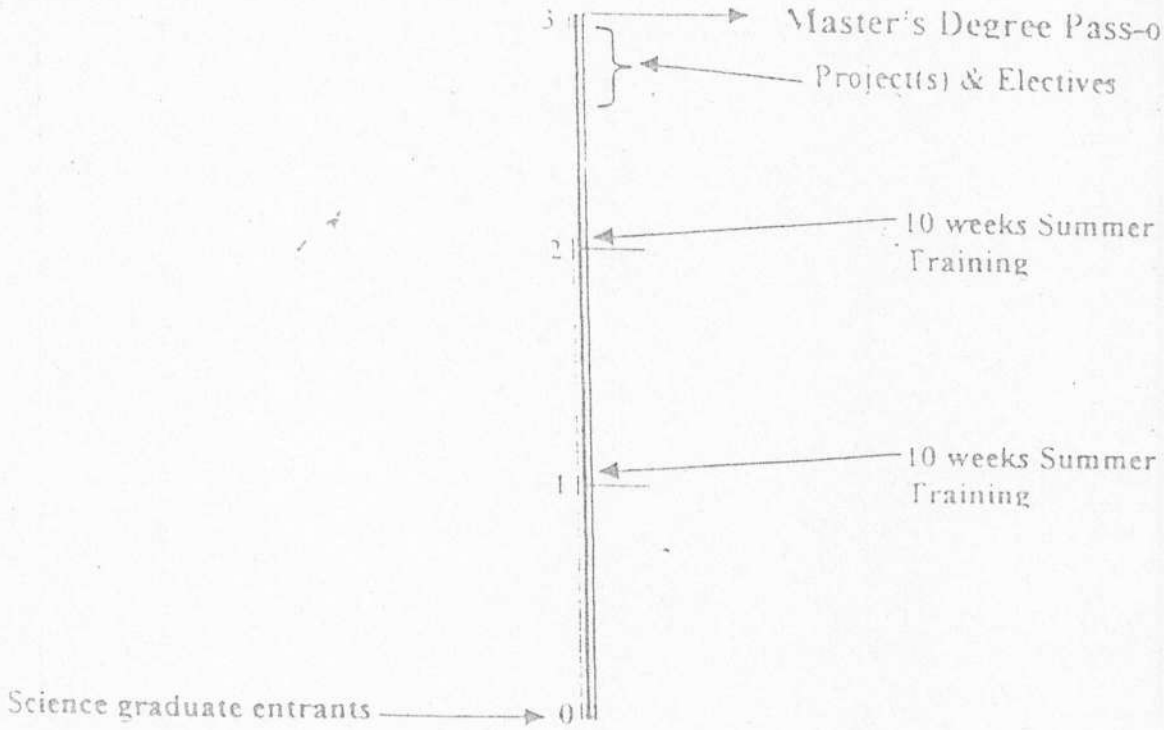

Fig. 3: Three Years Master's degree course for entrants with Bachelor of Science degree

Note: (1) Numbers indicate the number of years as the students progress through the integrated course

CHAPTER 7

RECOMMENDATIONS

Based on observations made during visit to SLIET, study of various documents and reports, the data made available by the Institute, and drawing support from SWOT analysis, the Task Force suggests adoption of an aggressive turn around strategy by the Institute for removing the critical weaknesses which have crept into the SLIET system of education and for embarking on a path of further growth by making use of its existing internal strengths. With these goals in view, the Task Force makes the following recommendations.

7.1 COURSES OF STUDY AND TRAINING PROGRAMS

1. Certificate programs must have their unique identity in consonance with the guidelines of the NCVT. Instructors and teachers for these programs should be a separate cadre.

2. Certificate holders must be encouraged to join industry through effective placement services and positive discouragement from joining Diploma programs directly on completion of Certificate courses.

3. Only those Certificate programs be run for which adequate facilities and market demand exist.

   For this SLIET should be enabled flexibility to annually select market-driven programs and to also adjust intakes for each course within the overall approved intake for Certificate courses.

   Diploma programs should have their distinctive academic identity in consonance with the guidelines of the Punjab State Board for Technical Education.

   Periodic assessment of Certificate, Diploma and Degree programs be undertaken so as to abandon the undesirable ones and to consolidate high demand quality programs with enhanced intakes consistent with the available infrastructure.

   The benchmarking of Certificate and Diploma level programs needs to be in consonance with the guidelines of National Council for Vocational Training and the State Board of Technical Education respectively. Quality must be the goal.

7. Bridge courses for individual students as envisaged in the SLIET concept, or its equivalent, be introduced.

8. Reservation policy for admission of SLIET alumni to Degree programs be reviewed, and possibly abolished.

9. Post Diploma industrial experience of at least one year should be given a high weightage for admission to degree programs.

10. Through a judicious and dynamically reactive choice of Certificate, Diploma and Degree programs and their respective intakes, the Institute should strive to achieve a pyramid structure of student population at all 3 levels.

11. Setting up of a Science Technology Entrepreneurship Park (STEP) be considered so that Certificate/Diploma holders are provided opportunities to start their own businesses and thus become job creators rather than job seekers.

12. Flexibility of timing and duration of training in conformity with the needs of the industry should be considered.

13. Curricula should be delivered in a flexible mode through a combination of direct learning, and self-learning by the students, seminar and assignments.

14. The use of Education Technology whereby video, computer assisted learning packages and video conference modes are integrated should be encouraged among faculty and students. The availability of first rate teaching ware in digital form from inspiring teachers in IITs and other institutions provides "virtual" faculty which should be utilized effectively.

15. It is essential for the academic growth of the Institute to initiate part-time/full time post-graduate diploma/degree programs on a very selective basis and after thorough scrutiny by expert committees.

    At the present, Computer Science & Engineering and Food Technology departments have reasonable infrastructure to offer postgraduate courses. Postgraduate courses sponsored by industry would be a good start, especially through collaboration with academic institutions and industry.

16. Dual degree and integrated academic programs as being adopted by IITs and as proposed in this review should be the ultimate goal for SLIET. However, this calls for extensive preparations by the faculty and thus a suitable model should be evolved over the next few years through discussion among the concerned.

17. SLIET should develop closer linkages for academic and training programs with other neighboring institutions such as Thapar Institute, REC, Jallandhar and CSIO, Chandigarh.

7.2 PERFORMANCE EVALUATION

1. Student evaluation should be continuous and should depend on assignments, short examinations and projects. The students should be encouraged to discuss their evaluation with the teachers in an open and transparent manner.

2. A proper credit system in the form of grades should be restored.

3. Involvement of students in assessment of teaching courses and teaching skills of the faculty is a desirable goal.

7.3. FACULTY

1. Recruitment of well-qualified and reputed faculty be given the highest priority. Simplified selection procedures for the faculty, the introduction of flexible cadre structure among faculty, making appointments on contractual and temporary basis, incentives such as higher salaries, payment of moving expenses, provision of seed money for starting R&D work, liberal support for attending conferences, liberal study leave, etc. should be initiated.

2. Reputed faculty can be attracted only by providing an intellectually stimulating atmosphere of good students at the graduate, post-graduate and Ph.D. levels. It is, therefore, desirable to start such courses after consideration of the recommendations made earlier in this Chapter.

Incentives be provided for faculty to run shot-term, formal and non-formal certificate type of courses for those employed in industry and R&D institutions.

Research/development/consultancy are vital for the growth of a good and competent faculty. Liberalized rules and financial incentives such as those prevailing in IITs be adopted to encourage faculty to pursue these goals.

It may be noted that the faculty:student ratio, and the faculty:supporting staff ratio are consistent with the AICTE guidelines. Thus, the views expressed by the participants in SWOT analysis are not factually correct.

7.4 CONCLUDING REMARKS

1. SLIET has developed a very large number of Certificate, Diploma and Degree programs rather rapidly in a period of less than 9 years. In a way, it is a commendable achievement to set up an institution of such size and status. However, it is high time to review critically to ensure that all viable academic programs have their unique identity and quality consistent with the requirements of the respective national bodies such as the National Council for Vocational Training, Board of Vocational Education, State Board of Technical Education and the AICTE.

2. Pyramid structure of programs with lateral entry only after satisfying strict conditions and standards must be restored. The existing cylindrical, at best only slightly tapering at the top, system is a serious distortion of what was envisaged as the SLIET concept. The reservation system and, the admission and student evaluation procedures need to be reviewed and corrected to achieve the SLIET objectives.

3. Only a good and well-qualified faculty will attract good students and thus establish a good name for SLIET. Whatever it takes in the form of changes in recruitment rules and offer of incentives, every effort has to be made to attract the best faculty available in the country.

4. Good faculty would require credible national level postgraduate programs to sustain their intellectual interests. And thus selected postgraduate teaching and R&D programs become inevitable. However, such programs must be established only after thorough scrutiny by national level expert committees. It may be desirable and challenging to start novel integrated postgraduate programs as are being experimented with by IITs. Flexible, part-time postgraduate programs for sponsored industry personnel could be implemented if the demand exists.

5. Delivery of quality education in the SLIET pattern requires autonomy of a Deemed University with a responsive and apolitical governance such as prevalent in IITs and NERIST. Steps be, therefore, initiated to achieve these objectives during the 3rd phase of evolution of SLIET.

YEAR-WISE ACTION PLAN FOR THIRD PHASE OF SLIET

S.No.	Activity	YEAR I	YEAR II	YEAR III	YEAR IV	YEAR V
1.	Review and reform admission procedures and reservation policy					
2.	Harmonize certificate and diploma curricula with the guidelines of NCVT and SBTE					
3.	Revive use of credit system for student performance evaluation					
4.	Reform appointment methods for senior faculty					
5.	Review and adjust number of courses and intakes and achieve pyramid structure of student population					
6.	Revive conduct of bridge courses					
7.	Frame consultancy rules for sharing income with staff					
8.	Establish Science & Technology Entrepreneurship Park					
9.	Take up consultancy work					
10.	Expand conduct of short term courses					
11.	Increase use of education technology and information technology in teaching and self-learning.					
12.	Start PG courses in Food Technology and Computer Science & Engineering					

NATIONAL EXPERT COMMITTEE RECOMMENDATIONS ON COURSES AND THEIR PHASING

Phase-I (7th Five-Year Plan period):

Certificate Courses:

1. Servicing & Maintenance of Electronic Instruments
2. Servicing & Maintenance of Medical Instruments
3. T.V. Mechanic
4. Data Entry Operators and Word Processing
5. Computer Servicing and Maintenance
6. Food Processing and Preservation
7. Civil Draftsmanship
8. Auto and Farm Equipment Mechanic
9. Tool and Die Making
10. Welding
11. Foundry and Forging
12. Air Conditioning Mechanic

Diploma Courses:

1. Electronics and Communication Engineering
2. Instrumentation and Process Control
3. Computer Programming and Applications
4. Rural Technology and Environmental Engineering
5. Entrepreneurship and Management
6. Welding Technology
7. Maintenance and Plant Engineering
8. Foundry Technology
9. Tool Engineering
10. Polymer Technology

The above courses have been identified taking into consideration the manpower requirements of the State.

Phase-II (8th Plan & onwards)

Certificate Courses:

1. Dyeing and Printing
2. Hand and Machine Knitting
3. Electrician for Industrial Power Systems
4. Off-set Printing

5. Building Maintenance
6. Construction Supervisor
7. Metrology and Inspection
8. Mechanical Draftsmanship
9. Lineman

Diploma Programs:

1. Food Processing
2. Textile technology
3. Textile Chemistry
4. Chemical Engineering
5. Printing Technology
6. Building Technology
7. Public Health Engineering
8. Machine Tool Technology
9. Bio-Technology
10. Paper Technology
11. Personnel & Office Management

Degree Level Program:

1. Electronics & Communication Engineering
2. Instrumentation and Control
3. Computer Science and Engineering
4. Information Science
5. Rural Technology
6. Entrepreneurship Development
7. Food Technology
8. Post Harvesting technology
9. Bio Technology
10. Textile Technology
11. Energy Science and Engineering
12. Printing Technology
13. Construction Technology (Buildings, Roads, Bridges and Canals)
14. Public Health and Environmental Engineering
15. Transportation engineering
16. Water Resource Management
17. Manufacturing Engineering (Production and Industrial Engineering incorporating CAD/CAM, Robotics and FMS.)

(The programs to be offered in the 2nd phase are tentative).

DEPARTMENT-WISE LIST OF TEACHING STAFF

Mechanical Engineering Department

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	P.C. Gupta	Professor	Ph.D.		
2	V. Sahani	-do-	Ph.D.	20	45
3	Anand Vaz	-do-	-do-	12	36
4	M.A. Akhtar	Asst. Professor	M.Tech./ME	10	34
5	S.K. Mohapatra	-do-	-do-	5	32
6	Samudra Vijay	-do-	-do-	5	31
7	P.K. Singh	-do-	-do-	5	32
8	R. Arulmani	-do-	-do-	4	29
9	Pradeep Gupta	-do-	-do-	8	32
10	Kulwant Singh	Lecturer	-do-	7	29
11	Rajesh Kumar	-do-	-do-	4	32
12	Anil K. Singh	-do-	-do-	3	29
13	S.C. Verma	-do-	-do-	5	34
14	Raj Kuma Yadav	-do-	-do-	4	33
15	Vikas Kumar	-do-	-do-	4	27
16	Harmesh Kumar	-d0-	B.Tech./BE	1	27
17	Indraj Singh	-do-	-do-	1	25
18	C. Kumar	-do-	-do-	5	31
19	Jagtar Singh	-do-	-do-	2	30
20	Raj Kumar	-do-	-do-	5	29
21	R.K. Saxena	-do-	-do-	3	26
22	Amandeep Singh Sahi	-do-	-do-	3	30
	Rakesh Kumar	-do-	-do-	2	26
	Jaspal Singh	-do-	-do-	3	27
25	Manoj Kumar	-do-	-do-	7	35
26	Jatinder Madan	-do-	-do-	5	29

Computer Science & Engineering

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	J.S. Sidhu	Asst. Professor	M.C.A	12	36
2	Savita Gupta	Lecturer	M.Tech	6	28
3	Sukhwinder Singh	-do-	B.Tech	6	30
4	Lakhwinder Kaur	-do-	MCA	6	32
5	Bir Mohan Singh	-do-	MCA	6	31
6	Mohinder Kumar	-do-	B.E(CS)	6	30
7	Sanjeev Sood	-do-	B.E (CS)	6	32
8	Abanish K.Singh	-do-	B.Tech	6	31
9	Manoj Kumar	-do-	B.E	2	26
10	Brijendra Kumar	-do-	M.Tech	3	25
11	Gurjinder Kaur	-do-	B.E	2	25
12	Yogesh Chaba	-do-	M.E	1	26
13	Pardeep Singh	-do-	B.E	1	27
14	L.L. Singh	-do-	B.E	1	24

Chemical Technology

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	Manohar Singh	Asst Professor	M.E	16	41
2	H.R. Ghatak	Lecturer	M.E	5	31
3	P.P. Kundu	-do-	Ph.D	4	35
4	Anil Srivastava	-do-	Ph.D	15	40
5	Rajinder Soni	-do-	B.E	8	34
6	Kamlesh Kumari	-do-	B.E	4	26
7	Tapan Sarkar	-do-	M.Tech	1	28
8	Gulshan Kumar	-do-	B.E	1	26
9	Avinash Thakur	-do-	B.E	1	28
10	Uttam Kumar Mandal	-do-	Ph.D	6	33
11	Naveen Kumar	-do-	B.E	1	27

Electronics & Communication Engineering

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	Shaibal Mitra	Asst Professor	M.Tech	14	38
2	Col. J.S.Virk (Retd)	-do-	M.E		
3	Manjit Singh	Lecturer	M.S	8	33
4	L.R. Karl Marx	-do-	B.E	9	32
5	Ranjit Kaur	-do-	B.E	1	28
6	Lakhwinder Singh	-do-	B.E	8	34
7	P.C. Upadhaya	-do-	B.E	7	36
8	M.Mukta	-do-	B.Tech	1	25
9	Sanjay Sharma	-do-	B.Tech	5	28
10	J.P. Singh	-do-	B.E	1	25
11	Gagan Mittal	-do-	B.E.	1	24
12	Ajay Pal Singh	-do-	B.E.	1	31

Electrical & Instrumentation

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	N.P. Kohli	Professor	Ph.D.	--	--
2	L.V. Sud	-do-	--	--	--
3	Ajat Shatru Arora	Asst. Professor	M.E	7	30
4.	Amar Pratap Singh	-do-	M.E	-	-
5	Pratibha Tyagi	-do-	M.E	6	33
6.	Charanjiv Gupta	Lecturer	B.E	2	26
7	Gurmit Singh	-do-	B.E	2	33
8	Diljinder Singh	-do-	B.E	3	32
9	Rajinder Kaur	-do-	B.E	3	27
10	Manpreet Singh	-do-	B.E	1	28
11	Anshuka Bansal	-do-	B.E	1	28
12	S.K.Soni	-do-	B.E	7	34
13	Asim Ali Khan	-do-	B.E	1	27
14	Ashwani Kumar	-do-	B.E.	--	--
15	Subhash Chandra	-do-	B.E	2	24
16	Manpreet Kaur	-do-	B.E	3	27
17	Surita Maini	-do-	B.E	3	27
18	Bhupinder Singh	-do-	B.E	3	28
19	K.R. Kansal	-do-	B.E	2	26
20	Praveen Kr. Garg	-do-	B.E	1	28

Chemistry

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	B.K. Kanungo	Asst Professor	Ph.D.	18	42
2	Dhiraj Sud	Lecturer	Ph.D.	6	33
3	Minati Baral	-do-	Ph.D.	9	37
4	N.P. Kaur	-do-	Ph.D.	6	36
5	Harish Kumar	-do-	Ph.D.	6	32
6	Rita Goyal	-do-	Ph.D.	6	38
7	S.Bhattacharya	-do-	Ph.D.	7	31
8	Damanjit Singh	-do-	Ph.D.	4	36
9	Ram Pal	-do-	Ph.D.	5	36
10	Debyani Niyogi	-do-	Ph.D.	8	33
11	Yudhistra Sahoo	-do-	Ph.D.	5	27

Food Technology

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	Rajinder Singh	Professor	Ph.D.		
2	Kamlesh Prasad	Lecturer	M.Sc	5	32
3	Charanjit Raina	-do-	B.Tech	2	28
4	P.S. Panesar	-do-	Ph.D	1	29
5	Kawaljit Singh	-do-	M.Sc	3	31
6	Vikas Nanda	-do-	M.Sc.	3	29
7	Sukhcharan Singh	-do-	MSc	1	27
8	Pradyuman Kumar	-do-	MSc	1	27
9	Charanjiv Singh	-do-	MSc	1	27
10	Bahadur Singh	-do-	B.Tech	1	34
11	Iqbal Singh	-do-	M.Sc	3	28

Physics

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	N.P. Singh	Asst. Professor	Ph.D.	13	40
2	A.S. Dhaliwal	-do-	Ph.D.	14	36
3	K.S Kahlon	Lecturer	Ph.D.	7	35
4	S.S. Ghuman	-do-	Ph.D.	8	38
5	K.S. Mann	-do-	Ph.D.	8	30
6	T.K.S.P. Gupta	-do-	Ph.D.	5	36
7	S.N. Pandey	-do-	Ph.D.	9	34
8	Sanjeev Puri	-do-	Ph.D.	4	32
9	P.B. Barman	-do-	Ph.D.	9	36
10	M.M. Sinha	-do-	Ph.D.	7	38
11	S.S. Verma	-do-	Ph.D.	8	39
12	Ashwani Kumar Singh	-do-	Ph.D.	7	32

Mathematics

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	S.S. Dhaliwal	Asst. Professor	Ph.D.		
2	Sukhjit Singh	-do-	Ph.D	12	39
3	Sushma Gupta	Lecturer	M.Sc	7	38
4	Mandeep Singh	-do-	M.Sc	10	35
5	Asha Goel	-do-	M.Sc	6	31
6	R.K. Bawa	-do-	Ph.D	5	36
7	Vinod Mishra	-do-	Ph.D	6	31
8	R.K. Guha	-do-	Ph.D	8	37
9	R.K. Goel	-do-	M.Sc	17	42

EDP & Languages

S. No.	Name	Designation	Qualifications	Total Experience, years	Age, years
1	Sanjeev Bansal	Lecturer	MBA		
2	J.K. Bhangu	-do-	M.Phil		
3	Pawan Kumar Dhiman	-do-	MBA		
4	Sanjeev Kumar Garg	-do-	MBA		
5	Pradeep Kumar Jain	-do-	MBA		
6	Praveen Kaur Khanna	-do-	M.Phil		
7	Mahesh Kumar	-do-	M.Phil		

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2. Kalsi. P.S., Goyal., Talwar, K.K. and Chabbra, B.R, *Stereostructures of two biologically active sesquiterpene lactones from Inula racemosa.* Phytochem 28, 2093 (1989)

3. Goyal, R, Chabbra B.R. and Kalsi. P.S., *Three Oxygenated Alantolides from Inula racemosa.* Phytochem 29, 2341 (1990)

4. Singh, R., Goyal, R.K. Bhullar, S.S. and Goyal,R., *Factors including enzymes, controlling the imprt and transformation of sucrose to the starch in the developing Sorghum caryopsis.* Plant Physiol. Biochem 29, 177 (1991).

5. Goyal , R and Kalsi, P.S., *A novel iodine catalysed low temperature elimination of acetyle and hydroxyl groups with dehydrogenation.* Ind.J. Chem 32 B, 1234 (1993).

6. Singh, I.P., Goyal, R., Anu and Kalsi, P.S., *Reduction of Terpenoid lactones with Na/CH OH.* Ind J. Chem 32B 1229 (1993)

7. Singh, S., Goyal,R., Gupta, S.K. Chabbra B.R. and Kalsi, P.S., *Chemistry of Pyrazolines of some sesquiterpenal lactones.* Ind. J. Chem 32B, 1229 (1993).

8. Manrao, M.R. Goyal.R., Sharma , R.C. and Kalsi P.S., *Potential of Benzal-(p-acety) anilines and their adducts as antifungal compounds.* Pl.Dis Res 8, 78 (1993).

9. Manrao, M.R. Goyal, R. Sethi, R.K. and Kalsi P.S., *Synthesis and antifungal activity of Naphtho (2,1-b) pyrans.* Ind. J. Hetrocyclic Chem 4, 231 (1995).

10. Parmar, A, Kaur J. Goyal , R. Kumar, B and Kumar H. *Esterification in dry media using Ferric Perchlorate adsorbed on silica gel.* Synth. Commn. 28:15, 2821 (1998).

11. Parmar. A, Goyal, R. Kumar, B and Kumar, H., *Ferric Perchlorate adsorbed on silica gel, an efficient reagent for cleacage of C=N.* Ind. J. Chem 37B: 9, 941 (1998)

12. Parmar, A. Goyal R. Kumar, B and Kumar, H., *Transesterification in dry media using Ferric Perchlorate adsorbed on silica gel.* Synth. Commn. 29:1 (1999)

13. R. Goyal and P.S. Kalsi., *New Alantolides from Inula racemos.* Ind. Chem. Soc. 23rd Annual Convention of Chemists. Annamalai Univ. Annamalainagar, 1986.

14. P.S. Kalsi, R Goyal and N.M. Ahuja., *Biogenesis of Inunal and Isoinunal isolated from Inula racemosa.* 7th Annual Conference of ICC, 1987, Jiwaji Univ., Gwalior.

15. P.S. Kalsi, R. Goyal, K.K. Talwar and B.R. Chabbra. *Sesquiterpence lactones from Inula racemosa: Isolation structure elucidation and PGR activity (abstr.no.3).* 76th session of Science Congress 7012, 1989, Madurai

16. K.K. Talwar, R. Goyal and P.s. Kalsi., *Isolantodiene : A new biologically active sesquiterpene lactone from Inula racemosa L and its effect on nitrate reductase activity.* 1st Convention of Indian Society of Agricultural Biochemists at Kanpur. Abstr.No. S II 3.

17. M.R. Manrao, R. Goyal, R.C. Sharma and P.S. Kalsi., *Biological activity of Benzal derivatives.* 23rd Annual Convention of Chemists, ICC, Annamalai Uni. Annamalai nagar, 1986.

18. R. Goyal, M , Rai, A. Kumar and P.S. Kalsi, *Synthesis and reduction of benzal p-(acety) anilines.* ICC 5th Annual Conference, 1985, Sindri, Dhanbad.

19. M.R. Manrao, S. Khera, R. Goyal and Anil Kumar. *Reaction of active methylene compounds with4-aminophenylethylidene anilines.* ICC 5th Annual Conference, 1983, Dharwad, Karnataka

20. P.S. Kalsi, R. Goyal, S.Kaur and B.R. Chabbra., *Chemistry and Plant growth activity of terpenoids from Parthenium hysterophorus.* International Conference on plant physiology on physiological strategies for crop improvement Jan22-25, 1991. Banaras Hindu Univ. Varanasi, India.

21. B.R. Chabbra, R. Goyal and G. Kaur *Synthesis of alkylidenes of cyclic 1-3-diones: mechanistic studies by C-NMR and IR spectroscopy.* Abstr. no. ORG (OS) 9.27th Annual Convention of Chemists, Magadh Univ. Bodhgaya, Bihar, Dec.26-3019990.

22. Baldev Dumar, Harish Kumar & N. Singh, Indian J. Chem.*Iron (III) Perchlorate: A Novel Reagent in Synthesis*,. 30B (5), 460 (1991)

23. Harish Kumar, Balbir Kaur & Baldev Kumar, Indian J. Chem., *Iron (III) Perchlorate: A Reagent for Oxidative Cleavage of Carbon-Nitrogen Double Bond*, 30B(9), 869 (1991).

24. Harish Kumar, Uma Thakur & Balbir Kaur, *Indian J. chem Reductive Dimerization of Anils & Regeneration of Ketones from Oximes & Hydrazones by Zinc Dust and Ammonium Chlorido*, , 30B (11), 1069 (1991)

25. Baldev Kumar, Harish Kumar & Anupama Parmar *Facile Conversion of halides, alcohols and olefins to Esters using Iron (III) Perchlorate*, Synth.Commun.(22)7, 1087 (1992).

26. Baldev Kumar, Harish Kumar & Anupama Parmar, *Iron (III) Perchlorate: A Reagenet for Trans-esterification* Indian J. Chem. 32B(2), 292 (1993)

27. Baldev Kumar &Shivani Arora *Synthesis of Hexahydro-1,3,5-Triazines: A New Approach from N-substituted-o-Aminoisothiocyanates*, , Indian J. Chem,32B (7), 779 (1993).

28. Baldev Kumar, Harish Kumar & Anupama Parmar *Facile Esterification of Succeinanilic acids with Iron (III) Perchlorate*, , Indian J. Chem 33B(7), 698 (1994).

29. Harish Kumar & Baldev Kumar *Amidation Using Iron (III) Perchlorate*, , "National Seminar on Recent Trends in Heterocyclic Chemistry, "held at Kurukhestra University, Kurukshetra on March 1990.

30. Baldev Kumar, Harish Kumar & Anupama Parmar *Iron (III) Perchlorate: A Reagent for Stereospecific transformations on a Chiral Carbon*, , Presented in " National symposium on Recent Advances in Chiral Synthesis" held at IICT, Hyderabad on April 2-3, 1992.

31. Harish Kumar, Anupama Parmar, Anita Rajpal & Baldev Kumar *Iron (III) Perchlorate : A Novel Reagent in Synthesis*, Presented in "National Seminar on Newer Methods of Synthesis in Chemistry", held at Punjabi University, Patiala on October 27-29, 1993.

32. Baldev Kumar, Anupama Parmar, Anita Rajpal & Harish Kumar, *Iron (III) Perchlorate: a novel Reagent for Functional Group as well as Ring Transformation in Organic Synthesis*, Indian J. Chem. Vol.e7(B): 593 (1998)

33. Anupama Parmar, Harish Kumar, Marwaha & J.F. Kennedy, *Recent Trends in Enzymatic Conversion of Cephalosporin C to 7-Aminocephalosporanic Acid (7-ACA)*, Crit. Rev. Biotechnol., 18(1): 1-12 (1998)

34. Harish Kumar, Anupama Parmar and Baldeve Kumar, *Organic Functional Group Transformations using Ferric Perchlorate supported on Silica Gel and A12O3*, Presented in " 21st International Conference on Science & Technology" held at Bangkok, Thailand on October 16-17, 1997.

35. Anupama Parmar, Jatinder Kaur, Rita Goyal, Baldel Kumar & Harish Kumar, *Esterification In dry Media using Ferric Perclorate Adsorbed on Silica Gel*, Synth, Commun, 28 (15): 2821 (1998)

36. Anupama Parmar, Rita Goyal, Baldev Kumar & Harish Kumar, *Ferric Perchlorate Adsorbed on Silica Gel: An Efficient Reagent for Cleabage of Carbon-Nitrogen Double Bond*, Indian J. chem , 37(B):941 (1998)

37. Anupama Parmar, Harish Kumar, S.S. Marwaha &J.F.Kennedy (Communicated), *Enzymatic Conversion of Penicillins to 6-Aminopenicillanic acid (6-APA) and Semi-Synthetic Penicillins.*

38. Anupama Parmar, Rita Goyal, Baldev Kumar and Harish Kumar *Transesterification in Dry Media using Iron (III) perchlorate adsorbed on Silica Gel,* , Synth, Commun (accepted)

39. Anupama Parmar, Parmjit Sing, Harish Kumar, S.S. Marwaha & J.F. Kennedy (Under revision). *Enzyme Catalyzed Regioselective Esterification/Trans-esterification of Sugars and Related Compounds.*

40. S.S. Parmjit Singh & Harish Kumar *Food Processing Technology: Applications of Immobilized Biocatalysts, Marwaha,* , in " Fruit and Vegetables Processing", (Ed. Verma, L.R. and Joshi, V.K.), (In press).

41. P.S. Panesar and Harish Kumar, *Technologies for the production of alcoholic beverages*, in "Proc. Popular Biotechnology Lecture Series 1998" held at Sant Longowal Institute of Engg. & Technology, Longowal (Accepted).

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43. Y. Sahoo *Thermopower of CuV2S4, charge density wave transition?* Communicated

44. Y. Sahoo, *Dielectric modulation inside a nanoreactor: a preparatory route* Proceedings of the National Conference on Surfactrants and Colloids, Sambalpur University, 1997

45. Minati Baral, B.K. Kanungo and Y. Sahoo, *Nanoparticles of mixed silver halides via reverse micelles*Proceedings of the National Conference on Surfactants and Colloids, Sambalpur University, 1997

46. Y. Sahoo*Crystalline Electron Glass like Materials*Xith Orissa Chemical Society, 1997.

47. S Bhattacharya, Minati Baral, Y. Sahoo and B.K. Kanungo *Imido-polyaza Macrocycles with Bipyridy1 subunit designed to recognise anion and their co-ordination chemistry with divalent copper.* Proceedings of the Conference on supramolecular science and technology, held at Zakopane, Poland, 27 Sep-Oct, 1988.

48. Y. Sahoo *Metal cluster in ternary vanadium spinels* Proceeding of the XXIX National Seminar on Crystallography held University of Madras, Chennai, 21-23 December 1998

49. Y. Sahoo *Core shell nanometric particles through microemulsion*

50. Marwaha, S.S. P.S. Panesar and B. Singh (1998) *Isolation of efficient yeast strain for the treatment of dairy waste water.* Int. J.Pollut Res. 17:51-56

51. Marwaha, S.S. P.S. Panesar and B. Singh (1998) *Treatment of dairy industry effluents by indigenous yeast isolates. In : Advances in Wate water Treatement Technologies . Vol I (Ed) R.K. Trivedy. Global Science Publishers Ltd.,* pp. 285-305.

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53. Marwaha, S.S. , P.S. Panesar and B. Singh (1999) *Methanogenesis of black liquor of pulp and paper industry using USAB reactor in the monophasic system.* Int. Pollut Res.(In Press).

54. Marwaha, S.S. P.S. Panesar and H. Chopra (1998) *Food processing technology: application of immobilized Biocatalysts. In Book : Post Harvest Technology (Ed. Dr V. Joshi & L.R. Verma) Indus publications, New Delhi* pp. 1204-1226.

55. Panesar, P.S. and H. Chopra (1998) *Technologies for the production of alcoholic beverages. In proceedings : Popular Biotechnology Lecture Series 1998 held at SLIET Longowal (accepted).*

56. Panesar, P.S. S.S. Marwah and S.S. Gill (1997) *Studies on the plasmid profiles of Zymomonas mobiles strains. Presented at National Symposium on Bio technology held at Punjabi University Patiala (Abstract published).*

57. Panesar, P.S. N. Arora and S.S. Marwaha (1998) *Studies on screening of lactic acid culture for the production of quality dahi. National Seminar on Bioinocululants for Holistic sustainable Rural Developments. G.K. University, Hardwar (Abstract published)*

58. Panesar P.S. Gupta, K. Singh V, Singhla and Savita (1998) *Studies on the shelf life extension of kinnow juice. 4th International Food Convention IFCON-98 held at Mysore (Abstract published).*

59. Kawaljit Singh, A.S. Bawa & Jaseem Ahmed (1998), *Drying study of ginger.* IFCON - 98 held at Mysore.

PROFILE OF ADMINISTRATIVE & SUPPORTIVE STAFF

S. No	Name	Designation	Qualifications	Total Experience, Years
1	Sudeep Singh	Estate Officer	B.E. (Civil)	14
2	C.S. Mathroo	Store Purchase Officer	Dip.in Mech	20
3	Dr. Lalita Bhateja	A.M.O	M.S. (Gyne & Obs)	
4	Dr. Kuldeep Singh	A..M.O	M.B.B.S	
5	Amarjit Kaur	Pharmacist	Dip in Pharmacy	
6	Dharam Vir Sharma	Supervisor	Dip.in Civil Engg.	16
7	Gurmukh Singh	Technician	Dip in CSE	5.5.
8	Sinder Pal	Compounder	Dip in Pharmacy	9.5
9	Sukhdeep Kaur	Staff Nurse	Dip.in Nursing	5
10	Gurmeet Singh	Care Taker	B.A	9
11	Sanjay Sharma	Care Taker	B.A	11
12	Mishra Singh	Care Taker	B.A	10
13	Kanta Rani	B.H.S	Gyani	11
14	Harbans Singh	B.H.S	Illiterate	10
15	Gurtej Singh	B.H.S	10+2	8
16	Surinder Dutt	Cook	Middle	14
17	Manohar Lal	Bearer	Middle	8.5

18	Rattan Chand	Bearer	Matric	5.5
19	Ravinder Singh	Helper	ITI	11.5
20	Sukhdev Singh	Helper	ITI	8
21	Jarnail Singh	Helper	Matric	8
22	Jagdeep Singh	Helper	Matric	8
23	Mohan Lal	Helper	Matric	10
24	Ranjit Singh	Helper	B.A.	8
25	Manjit Singh	Helper	B.A.	3.5
26	Amarjit Singh	Helper	Matric	6
27	Ms Surinder Kaur	Helper	Matric	9
28	Chandran Pillai	Helper	B.A	9
29	Gurnam Singh	Helper	Matric	9
30	Ranvijay Singh	Helper	B.Com	6
31	Kesar Singh	Helper	Matric	6
32	Surinder Kaur	Helper	Matric	6
33	Harmail Singh	Helper	ITI Fitter	6
34	Ram Karan	Helper	Under Matric	11
35	Mahaveer Singh	Helper	Matric	9.5
36	Navinder Singh	Helper	ITI	6.5
37	Mohinder Singh	B.H.S	B.A	11

PROFILE OF NON-TEACHING TECHNICAL SUPPORTING STAFF

S. No	Name	Designation	Discipline	Qualifications	Total Experience, Years
1	Sanjay Gupta	Librarian		B.Sc, B.Lib,M.Lib	7
2	Prithvi Singh	Librarian		M.A (Pub.Admn)	10
3	Jaspreet Kaur	Asst. Librarian		M.Lib	7.5
4	Narindra Kumar	Asst. Librarian		M.Lib	--
5	Harbhajan Singh	Asst. Work Supdt.		AMIE	16
6	Ranjit Singh	Sr. Technician		Diploma (Mech.)	14
7	Kulwinder Singh	Sr. Technician		Diploma in Die Moulding Making	18
8	Arjun K.C	Technician	Computer	Diploma (Computer Engg.)	11
9	Arpanjit Kaur	Technician	Computer	Diploma (Computer Engg.)	8
10	Manjodh Singh	Technician	Electronic	Diploma in Electronics	9.5
11	Vijay Prashar	Technician	T.V	ITI Electronics	13
12	Gurmit Singh	Technician	Electronic	Diploma in Electronics	8
13	Ravinder Singh	Technician	Electronic	ITI Electronics	10
14	Amarjit Singh	Technician	Electronics	Diploma in Electronics	5.5
15	Jujhar Singh	Technician	Electronic	Diploma in Electronics	7
16	Ms. Gurmit Kaur	Technician	Physics	Diploma in Electronics	5.5.
17	R. Saraswati	Technician	Physics	M.Sc (Physics)	5
18	Bal Krishan	Technician	Physics	B.Sc (Non-medi) B.Ed	6
19	Maninder Pal Kaur	Technician	Chemistry	M.Sc, M.Phil	9

20	Essaki Muthu	Technician	Chemistry	M.Sc	7
21	Ajay K. Gupta	Technician	Mechanic	Diploma (Mech)	10
22	Kewal Singh	Technician	Mechanic	Dip.in Mech,Engg.	8.5
23	Satish Kumar	Technician	Mechanic	ITI (Mech.)	10
24	Debashish Biswas	Technician	Mechanic	Diploma (Mech.)	4
25	Nachttar Singh	Technician	Electrical	Dip.in Electronics	Ex-Serviceman
26	Vipan Kumar	Technician	Electrical	Dip.in Electrical	7
27	Rakesh Kumar	Technician	Electrical	Dip.in Electrical	6.5
28	Rajiv Kumar Yadav	Technician	Chemical	B.Sc Dip.in Chemical	6.5
29	Vishesh Kumar	Technician	Chemical	4 year Course in Chemical Engg.,	5
30	Sukhminder Sing	Technician	Instrumentation	Dip.in Electronics	10
31	S.S Rathore	Technician	Instrumentation	Dip. in Instru. Control Engg.,	10
32	Jaswinder Singh	Technician	Workshop	Dip.in Mechanical	21
33	Harpar Singh	Technician	Carpentar	Dip.in Automobile Engg.	14
34	Jagdish Chander	Technician	Workshop	NTC Appren.	9
35	Sulkhan Singh	Technician	Workshop	CTI/ATI	7
36	Gurtej Singh	Technician	Auto Farm	NTC Instructorship Farm Machinery	6.5
37	Taar Singh	Technician	Workshop	Diploma(Prof&Industrial)	8
38	Manoj K. Pandey	Technician	Food	IDD/DT	6.5
39	Praveen Goel	Technician	Food	Diploma (Food)	4
40	Sukhinder S. Punia	Sr. Physical Instructor		Degree in Physical Education. MP.Ed	4
41	Hari Ram	Techn ECE		Dip in ECE	5.5
42	Saroop Singh	Lab Tech.	Dispenser	Dip. in Medical Lab	8

43	Harpreet Singh	Technician	Food	PG Diploma in Food Technology	5.5
44	Amarjit Singh	Technician	Instt.	Dip. im ECE	7.5
45	Jasminder Singh	Lab. Attdt.	CSE	B.A	1.5.
46	Karan Singh	Technician	Mechanical	Dip.in Mech.Engg.,	15.4
47	Inder Pal	La.Attdt.	Workshop	Dip.in Prod.Engg.	6.5
48	Laxmi Narayan Singh	Technician	Food	B.Sc(Food)	5
49	Om Chand Singh	Technician		B.Sc (Food)	9
50	Madan Mohan Kumar	Lab.Attdt.	Workshop	ITI	3
51	Mohinder Pal	Technician	CSE	Dip in CSE	2.5
52	Naresh Kumar	Lab. Attdt.	CSE	B.Com	1.5
53	Naresh Kumar	Technician	Workshop	ITI	15.5.
54	Ravneet Kakria	Sr. Technician	Workshop	AMIE	6.5.
55	R.K. Mishra	Lab. Attdt.	ECE	Dip in ECE	3.5
56	R. K. Jyotiana	Technician	Workshop	ITI	10
57	Ram Ashish Mishra	Technician	Chemical	Dip in Carpentary	3.5
58	Ram Sabad Ram	Technician	Carpentar	Dip in Carpentary	6.5
59	Rajesh Kumar	Technician	Chemical	Dip in Chemical Engg.	4

LIST OF COURSES BEING CURRENTLY CONDUCTED AT SLIET

S.No.	Names of Courses	Intake
CERTIFICATE PROGRAMMES		
1	Servicing & Maintenance of Electronic Instruments	30
2	Data Entry Operator & Word Processing	30
3	Food Processing & Preservation	30
4	Air Conditioning and Refrigeration	30
5	Foundry & Forging	30
6	Tool & Die Technology	30
7	Auto & Farm Machinery	30
8	Welding Technology	30
9	Servicing & Maintenance of Medical Instruments	30
10	Maintenance of Television	30
11	Maintenance of Electrical Equipment	30
12	Building Maintenance	30
DIPLOMA PROGRAMMES		
1	Chemical Technology	30
2	Computer Programming & Applications	30
3	Computer Servicing & Maintenance	30
4	Electronics & Communication Engineering	30
5	Food Processing	30
6	Foundry Technology	30
7	Industrial & Production Engineering	30
8	Instrumentation & Process Control	30
9	Maintenance & Plant Engineering	30
10	Welding Technology	30

DEGREE PROGRAMMES		Intake
1	Chemical Technology with specialization in	
	(i) Polymer Technology	30
	(ii) Paper Technology	30
2	Computer Science & Engineering	60
3	Electronics & Communication Engineering	30
4	Food Technology	30
5	Instrumentation Engineering	30
6	Mechanical Engineering with specialization in	
	(i) Manufacturing Engineering	40
	(ii) Welding Technology	40

CONTACT HOUR DISTRIBUTION FOR VARIOUS COURSES

1. **Certificate Courses Duration: 6 Trimesters Nomenclature and Curricula Effectiveness: 1997**

S. No.	Title of Course	Distribution of Total Contact Hours over 4 Trimesters		Duration of Industrial Training
		Theory + Tutorials	Applied Work	
1	Air Conditioning & Refrigeration	83	45	2 trimesters
2	Auto and Farm Machinery	83	45	-do-
3	Foundry & Forging	83	45	-do-
4	Tool & Die Technology	83	45	-do-
5	Welding Technology	83	45	-do-
6	Data Entry & Word processing	80	48	-do-
7	Maintenance of Electrical Equipment	80	48	-do-
8	Servicing & Maintenance of Medical Equipment	82	46	-do-
9	Food Processing & Preservation	83	45	-do-
10	Servicing & maintenance of Electronic Equipment	84	44	-do-
11	TV Mechanic	84	44	-do-
12	Building Maintenance	Not Available	Not Available	Not Available

Diploma Courses Duration: 6 Trimesters Nomenclature and Curricula
Effectiveness: 1997

Title of Course	Distribution of Total Contact Hours over 5 Trimesters		Duration of Industrial Training
	Theory + Tutorials	Applied Work	
Computer Programming & Applications	96	64	1 trimester
Computer Servicing & Maintenance	92	68	-do-
Electronics & Communication Engineering	92	68	-do-
Instrumentation & Process Control	102	58	-do-
Chemical Technology	106	54	-do-
Food Processing	90	70	-do-
Foundry Technology	84	76	-do-
Industrial & Production Engineering	84	81	-do-
Maintenance & Plant Engineering	84	76	-do-
Welding Technology	84	76	-do-

Degree Courses Duration: 6 Semesters Nomenclature and Curricula Effectiveness: 1996

Title of Course	Distribution of Total Contact Hours over 6 Semesters		Duration of Industrial Training
	Theory + Tutorials	Applied Work	
Computer Science & Engineering	136	56	In 2 rounds but period not specified
Chemical Engineering (Paper Techn)	136	56	-do-
Chemical Engineering (Polymer Tech)	136	56	-do-
Electronics & Communication Engg	141	50	-do-
Food Technology	120	72	-do-
Instrumentation Engineering	142	50	-do-
Mechanical Engg (Manufacturing)	132	60	-do-
Mechanical Engineering (Welding Tech)	132	60	-do-

Overall Distribution of Contact Hours in Teaching and Applied Work

Course Level	Duration	Distribution of Contact Hours %		Duration of Industrial Training
		Theory	Applied	
Certificate	6 Trimesters	64	36	2 Trimesters
Diploma	6 Trimesters	59	41	I Trimester
Degree	6 Semesters	70	30	Not specified

AICTE & EFC APPROVAL FOR ESTABLISHMENT OF SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY

I am directed to state that on the recommendations of the National Expert Committee, the Minister for Human Resource Development, in his capacity as Chairman, all India Council for Technical Education (AICTE), has approved the setting up of Longowal Institute of Engineering & Technology, Longowal, Punjab, for introduction of 12 certificate courses and 10 diploma courses in the first phase of its development in the various fields as shown in **Annexure-1.** These courses will be designed and conducted on modular pattern and duration of the course will be 2- year at each level.

2. The Institute, during its development in the second and third phases, will conduct more certificate and diploma level programmes, besides degree level programmes as and when the need arises. In addition, the Institute will provide non-formal education and training to persons from unorganized sectors of population and school drop-outs to enable them to acquire basic technical skills so that they are gainfully employed. Entrepreneurship Development will be an in-built feature in the curriculum of all courses so as to motivate pass-outs to become self-employed. There will also be provision for lateral entry into diploma course after 10+2 or equivalent and degree course as and when started after B.Sc. or Polytechnic diploma or equivalent with the provision of bridge courses of specific duration. The introduction of degree courses would be subject to the approval of the report of the National Expert committee.

3. The job opportunities shall be taken into account in designing the courses so that those who qualify at the various levels do not have to remain without employment once they come out of the institution. Dovetailing of skills required, whether for self-employment or jobs, with education, training and skills imparted shall be duly ensured by the Institute.

4. The overall I non-recurring estimates for the Ist phase for the establishment of this Institute will be as under:-

Buildings		Areas in Sq.Meters
1.	Central service block (including hostel & faculty Guest House)	23827
2.	Certificate block	5411
3.	Diploma block	9225
4.	Common Utility Block	3900
5.	Staff Quarters	40250
	Total	82613

Cost @ Rs. 1,500/- per sq. M.		12.39 crore
Campus Development		2.00 crore
	Total	14.39 crore
Equipment and central services		4.95 crore
GRAND TOTAL (Non-Recurring)		19.34 crore

The full complement of posts proposed to be created may be seen at **Annexure-2**. The Longowal Institute of Engineering and Technology, Longowal, would be conducting besides the regular courses, appropriate bridge courses to enable some students to join the next level of higher courses. In addition, the Institute would have to cater to the diverse requirements of the Region for which, a large number of electives would be offered in the courses at all levels, i.e. Certificate, Diploma and Degree. Introduction of non-formal technical education and entrepreneurship development will further add to the teaching load. Adding all these additional loads, the ratio would come up to the acceptable norm generally obtaining in other technical institutions of the same level in the country. However, at the time of sanction the necessary staff, the Management Committee of the Institution, Ministry of Human Resource Development and all other concerned will ensure that the effective teacher student ratio for the various courses would be as follows:

i)	Certificate courses	1:12
ii)	Diploma courses	1:10
iii)	Degree courses	1:8

The full complement of staff will be recruited subject to the fulfillment of the above teacher student ratio. As such, the recruitment of the faculty at any point of time will be as per the student strength. Total complement of faculty, mentioned above, would act as a ceiling. The interse ratio of teachers shall be as recommended by the Madan Committee on staff structure in technical institutions. So far as degree courses are concerned, the ratio of Professor, Assistant Professor, Lecturer will be 1:2:4. In respect of Diploma and Certificate courses the ratio of senior teacher and junior teacher will be 1:3. The grouping of teaching among senior and junior shall be as per general norms and recommendations of the Madan Committee.

5. The non-teaching, administrative and supporting staff shall be as given in the Project Report of the Institution. The expenditure on the non-teaching and other supporting and administrative staff shall, however, not exceed 50% of the expenditure on the teaching staff.

6. The Institution will be autonomous in character and registered as a Society under the Societies Registration Act. The Administrative and Academic matters of the Institute will be managed by a Board of Governors which has already been registered as a Society. There will also be a close association between the Institute and the other Universities/Institution in the Northern Region to co-relate the courses with the well-defined and well-established needs and to avoid duplication and overlapping.

SECOND EFC APPROVAL

The proposal for Phase-II of the SLIET was approved with the following observations:

a) The Project will be completed by the year 1999-2000 at a total estimated cost of Rs. 36.34 crores, bearing a non-recurring component of Rs. 28.77 crores and net recurring cost of Rs. 7.57 crores.

b) **Possibility of taking over of the recurring liability by the State Government after 1999-2000 will be explored.**

c) The Institute should make efforts to enhance generation of Internal Resources and the recurring cost projected in the EFC memo should take into consideration the revenue receipts, which are to be adjusted from the recurring cost.

It was pointed during the EFC meeting that the courses conducted at SLIET do not have any component related to environment/environmental engineering. The Institute Director noted the concern to be taken up while restructuring the courses.

COMPOSITION OF THE GOVERNING BODY AND OTHER COMMITTEES

A. Board of Governors

1 Chairman to be appointed by the State Government in consultation with the Council
2-3 Two nominees of the State Government.
4-5 Two nominees of the Central Government.
6-7 Two representative of the All India Council for Technical Education.
8 A representative of the National Council of Vocational Training, Government of India.
9. The Principal of the Regional Engineering College in State.
10-11 Two industrialists/representatives of consumer agency (non-official representatives) in the region to be nominated by the Board of Governors.
12-13 Two eminent Educationists/Scientists/Technologists to be nominated by the Board of Governors.
14 One nominee of the concerned University
15-16 Two representatives of the faculty of the Institute by rotation.
17. The Director of the Institute as ex-officio Member-Secretary.

B. Finance Committee

1.	Chairman, Board of Governors or his nominee	Chairman
2.	Two members of the Board	Member
3.	Secretary (Finance) to the Govt. of Punjab or his nominee	Member
4.	F.A. or his nominee	Member
5.	A nominee of Govt. of India, Ministry of Human Resource Development	Member
6.	Director, Technical Education & Industrial Training, Punjab	Member
7.	A nominee of All India Council for Technical Education	Member
8.	Director, Sant Longowal Institute of Engg. Technology	Member-Secretary

C. **Building & Works Committee**

1.	Secretary to Govt. Punjab, Technical Education & IT	Chairman
2.	Chief Engineer, Punjab PWD B & R (senior-most)	Member
3.	A representative of CPWD in circle, not below the rank of Executive Engineer	Member
4.	Chief Architect of State Govt. or his nominee not below the rank of a Senior Architect	Member
5.	One nominee of Council	Member
6.	Chairman, NBCC or his representative (not below the rank of Chief Engineer, NBCC)	Member
7.	Director, Sant Longowal Institute Engineering & Technology	Member-Secretary

D. **Equipment & Stores Purchase Committee**

1.	Director of the Institute	Chairman
2.	Director Technical Education & IT, Punjab	Member
3.	One nominee of Council.	Member
4.	A representative of Dept. of Finance, Govt. of Punjab	Member
5.	Head of the concerned Department	Member-Secretary

E. **Staff Selection Committees**

<u>For the post of Director</u>:

1.	Chairman, Board of Governors	Chairman
2.	One nominee of Govt. of India, M.H.R.D	Member
3.	One eminent Educationist/Scientist/Technologist	Member
4.	Vice-Chancellor of the University in the region	Member
5.	At least 2 experts from Industry/Technical Education	Member
6.	A representative of All India Council for Technical Education	Member
6.	Secretary to Govt. Punjab, Technical Education & IT	Member-Secretary

LIST OF SWOT TEAMS

TEAM-A

1. Dr. Rajinder Singh, Professor
2. Dr. A.S. Dhaliwal, Asst. Prof.
3. Sh. Sukhwinder Singh, Lecturer
4. Mr. Ramesh Kaushil, Deputy Registrar (Acctts.)
5. Mr. Vinod Kumar, Clerk

TEAM-B

1. Dr. Varinder Sahni, Professor
2. Sh. Manjit Singh, Asstt. Prof.
3. Ms. Parveen Kaur, Lecturer
4. Sh. C.S. Matharoo, Store Purchase Officer
5. Sh. Sanjay Gupta, Librarian

TEAM-C

1. Dr. P.P. Kundu, Asst. Prof.
2. Sh. S.K. Soni
3. Sh. Gurcharan Singh DEO-cum-Clerk
4. Sh. Anil Singla, Lecturer
5. Dr. S.S. Dhaliwal

TEAM-D

1. Dr. L.V. Sud, Professor
2. Sh. Mahesh Kumar, Lecturer
3. Sh. Sudeep Singh, Estate Officer
4. Sh. Shyam Singh, Asstt.
5. Dr. S.K. Mahapatra, Lecturer

OBSERVERS

1. Sh. H.R. Ghatak, Asstt. Prof.
2. Mr. Kaler, Asst. Prof.

Persons Met by Ed.CIL's Team

1. Dr. Hira
2. Dr. Kohli
3. Dr. S.S. Dhaliwal
4. Sh. J.S. Sidhu
5. Mr. R.K. Aggarwal