

**AN INVESTIGATION IN TO THE  
PROBLEM OF WASTAGE IN THE  
ENGINEERING COLLEGES IN KERALA**

**PROJECT REPORT**

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*Submitted to*

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## CONTENTS

### ACKNOWLEDGMENT

1. INTRODUCTION .....	1
2. OBJECTIVES .....	1
3. THE RESEARCH PROBLEM .....	2
4. METHODOLOGY .....	3-6
4.1. Selection of colleges .....	3
4.1.1. Confidentiality .....	3
4.2. Preparation of data sheets for primary data collection.....	3
4.3. Period of study .....	4
4.3.1. First phase.....	4
4.3.2. Second phase.....	4
4.3.3. Final phase.....	5
4.4. Sampling details .....	4
4.5. Limitations .....	6
4.6. Cross checking with university records .....	6
5. RESULTS .....	6-11
6. DISCUSSION .....	11-21
7. CONCLUSIONS AND RECOMMENDATIONS .....	21-23

### ANNEX-1

Table-A.....	24-26
Table-B.....	27-28

### ANNEX-2

Datashet-1 .....	29
------------------	----

### ANNEX-3

Datashet-2 .....	30
------------------	----

### ANNEX-4

Datashet-3 .....	31-32
------------------	-------

### ANNEX-5

Evaluation Sheets-College-A, B, C.....	33-40
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## SUMMARY

<b>Title:</b>	<b>An Investigation in To the Problem of Wastage in the Engineering Colleges in Kerala</b>
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<b>Funded By:</b>	<b>KRPLLD, CDS</b>

## INTRODUCTION

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Professional education enjoys considerable prestige in India. In fact, the entire school education, especially the higher secondary stage, is regarded by a section of the population as an elaborate preparation for entry into professional courses. Entrance examinations of various engineering and medical colleges are probably the most prestigious and hotly contested examinations in the country. In Kerala too, the high achievers from schools almost invariably enroll for professional courses. The lack of aptitude may or may not be reflected in the scores of Entrance Examinations. But it is a fact that due to the peculiarities of the Entrance Tests, and due to the phenomenal increase in the number of Engineering Colleges, students with very low scores in the tests (sometimes, even those who score zero in mathematics) get admission to Engineering courses. The problem is similar in the case of students with very low ranks who manage to secure admission in the Payment, Management or Community Reservation Quota. What happens to such students, once they enter the college, is not the concern of anybody. Preliminary studies reveal that a number of students fail to clear their early semester Examinations but still are promoted to the higher classes due to loopholes and concessions in the rules and regulations. Quite a few of them fail in the initial examinations, but manage to cross over to the higher classes because of the loopholes and concessions in the system. With the burden of dozens of “back papers” hanging from their necks, the possibility of these hapless students ever completing the course successfully is very remote. The present project is an investigation into the problem, its causes and possible remedies.

## OBJECTIVES

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- To ascertain the failure rates and wastage among the students of engineering in Kerala
- To identify the reasons for failure, including systemic defects.
- To suggest remedial action

## Methodology

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The study has been conducted in three established engineering colleges of the state: one in the government sector, one in the aided sector and one in the unaided (self-financing) sector; under two different universities. The names of colleges are withheld for obvious reasons. The data collection process from the respective departments was started with their knowledge, consent and cooperation. The colleges we had selected for the studies come under two different universities. The authorities in both universities offered full support for the research and they gave permission to us to do cross checking of the students records, which we had collected from the college departments and office, with the university records.

## **RESULTS**

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Out of the total sample of 2151 student records perused, 234 'Incompletes' (10.88%) had 'back papers' at the time of completing the coursework and writing the 8<sup>th</sup> Semester (S8) Examination. The Percentage of 'Wastage' in whole sample among the three colleges is 9% (195/2151). It is observed that almost all the 'Incompletes' have back papers pertaining to the First Year examination, remaining to be cleared. A perusal of the subsequent history of these 'Incompletes' reveals that these are the persons who do not manage to clear the examinations, even after 4 attempts, and end up as 'Wastage'. A particular sample was closely scrutinized to look into this aspect, and the results indicate that as many as 80% of the 'Incompletes' had been admitted in the Quota seats, while only the remaining 20% had gained admission under 'Merit' category. However, when it comes to 'Wastages', all of them belong to the Quota admissions. Another significant finding is that, almost all of the 'Incompletes' were admitted 'late' into the first year class, so they lost the introductory classes during the crucial first year. 198 students out of 234 'Incompletes' were failed in their first year mathematics paper.

## **CONCLUSIONS AND RECOMMENDATIONS**

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The study brings out the disturbing fact that wastage was a serious problem in the Engineering colleges of the state, even in the nineties, when admission was restricted to only the top rankers. A very clear correlation exists between the rank of the student and the likelihood of failure. Since the phenomenal growth in intake (From 4500 to over 18,000), students with very low ranks in the entrance examination and pitifully poor performance in mathematics are being admitted to the Engineering course. The study warns that this could result in an unacceptably high level of wastage. This will lead to a human tragedy of severe dimensions.

This study might help to convince the students themselves to realize that this is no concession or favor, but a trap. On the contrary, it might be more appropriate to enforce the 'Year Out' rule, before admission to every odd semester, including S3.

A cut off score should be stipulated for the qualifying examination and entrance examination and it must be strictly enforced for the community reservation students and other quota (Management, Payment, etc) by the Universities. The pressure from the private managements to lower the admission standards should be withstood and countered

In conclusion, it is sincerely hoped that the present study will throw some light into a little known and discussed aspect of engineering education in the state, and will lead to some meaningful intervention

## **1. INTRODUCTION**

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Professional education enjoys considerable prestige in India. In fact, the entire school education, especially the higher secondary stage, is regarded by a section of the population as an elaborate preparation for entry into professional courses. Entrance examinations of various engineering and medical colleges are probably the most prestigious and hotly contested examinations in the country. In Kerala too, the high achievers from schools almost invariably enroll for professional courses. A number of factors, like peer pressure, herd instinct, parental compulsion, social perception of engineering and medicine as the only 'glamorous' professions, the general belief that under a general cloud of unemployment, there are more employment opportunities in emerging areas like Electronics, IT, etc, result in a number of students with no real aptitude for engineering or medicine, ending up in these courses. The lack of aptitude may or may not be reflected in the scores of Entrance Examinations. But it is a fact that due to the peculiarities of the Entrance Tests, and due to the phenomenal increase in the number of Engineering Colleges, students with very low scores in the tests (sometimes, even those who score zero in mathematics) get admission to Engineering courses. The problem is similar in the case of students with very low ranks who manage to secure admission in the payment, management or community reservation quota. What happens to such students, once they enter the college, is not the concern of anybody. Preliminary studies reveal that a number of students fail to clear their early semester Examinations but still are promoted to the higher classes due to loopholes and concessions in the rules and regulations. There are indications that quite a few of them are unable to graduate owing to the heavy accumulated backlog. The present project is an investigation into the problem, its causes and possible remedies.

## **2. OBJECTIVES**

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To ascertain the failure rates and wastage among the students of engineering in Kerala

To identify the reasons for failure, including systemic defects.

To suggest remedial action

### **3. THE RESEARCH PROBLEM**

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Admission to the professional courses in Kerala is regulated through a Common Entrance Examination conducted statewide. It is highly competitive and demands elaborate preparation and special coaching to secure high ranks. But a number of students with no special aptitude for engineering manage to get admission due to various anomalies in the system. Quite a few of them fail in the initial examinations, but manage to cross over to the higher classes because of the loopholes and concessions in the system. A preliminary study conducted in one of the State Engineering colleges showed that as many as 26 students out of 136 presented for the Final Year Examinations had not passed any of the earlier exams completely. With the burden of dozens of “back papers” hanging from their necks, the possibility of these hapless students ever completing the course successfully is very remote. It is suspected that in human terms, the costs are terrible. The problem of dropouts at the school level has been studied in detail, but not the wastage in professional education. The only study was the one entrusted to Professor:A.Achuthan by the Kerala University in 2001, but that also was concerned only with the first year exams. A more detailed and comprehensive study is badly needed.

In the present context, the term ‘Wastage’ is used to denote the phenomenon of students completing the course work but failing to pass the examinations even after 4 repeated attempts. The position of such a student, immediately after course completion, is a precarious one. S(he) is still hopeful of passing the remaining papers (usually called ‘back papers’ by engineering students) within one or two attempts. They cannot be included among ‘Wastage’. So, the term ‘Incompletes’ is coined to indicate their condition.

The Research Problem is to make an assessment of the exact situation regarding ‘Incompletes’ and ‘Wastages’, by conducting an appropriate sample survey, to identify the reasons behind the failures, both individual factors as well as systemic defects, and to evolve a package of remedial measures through interviews and interactions with students, teachers and academic administrators.



## **4. METHODOLOGY**

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**4.**

### **5. 4.1 SELECTION OF COLLEGES**

The study has been conducted in three established engineering colleges of the state: one in the government sector, one in the aided sector and one in the unaided (self-financing) sector; under two different universities. The selection was done in such a way as to cover the three regions (North, Central, and South) also. After selecting the colleges, discussions were held with the heads of the institutions. The project methodology was also explained to the heads of the departments, teachers and university authorities. The data collection process from the respective departments was started with their knowledge, consent and cooperation.

#### **4.1.1. Confidentiality**

The names of colleges are withheld for obvious reasons. They have been designated merely as College A, B, and C. The names etc. of individuals also are masked by giving code numbers. However, it will be possible to retrieve the real name, address etc. of any respondent, for purpose of counter checking, should the need arise.

Preliminary information regarding students with very heavy backlog was collected from Student Records and the Master Mark Records kept by the Staff Advisor and the Heads of the Departments of each college. The data collected from the college records were crosschecked with university records to find out the subsequent history of these students. Attempts were made to trace out their permanent residential address and to conduct personal interviews and telephonic interviews, so as to build up some case studies. The selection of the students for the interviews was done on the basis of random sampling. The opinion of teachers, parents and administrators, regarding the causes and remedies of wastage, has been sought by circulating questionnaires among them and collecting their responses.

6.

7. **4.2. PREPARATION OF DATA SHEETS FOR PRIMARY DATA COLLECTION.**

The data sheet for the primary data collection was prepared, taking inputs from the college authorities, staff advisors, teachers and some eminent academicians. The data sheet contains personal data like name, address, parent's name and occupation, placement details of the student etc. This information has been collected for the purpose of personal interviews with the students to find out the reasons behind the failure in the engineering examinations and their family background. The data regarding the nature of admission, like whether the student was admitted to the college through the various quotas, their engineering entrance rank etc. were also collected. The second part of the data sheet concerned the details of back paper and examination results. The back paper details were collected in such a way that the month and year of the examination attended, and the subject in which they have failed, the number of chances they have taken for passing the examination, etc could be ascertained. These data were obtained from the Students' Records. These data sheets were then crosschecked with the university records.

**4. 3. Period of study**

The period of the study was from August 2003 to April 2004 and the work plan of the study was as follows:

**4. 3. 1. First phase**

Formulation of an Advisory Committee, consisting of academicians, college and university authorities.

Methodology discussion and finalisation, Preparation of data collection format.

Selection of three established engineering colleges for the study.

Formation of the study team.

Collection of secondary data of students from college records.

**4.3.2. Second phase**

Cross checking of the secondary data collected from the college with university records.

Collection of primary data through personal interviews with selected students, parents and teachers.

#### **4.3.3.Final phase**

**Data completion**

**Data analysis**

**Formulation of findings and recommendations.**

#### **4.4. Sampling details**

Admission batches of 1994,95,96,97, and 98 were chosen for the study, because they would have taken their final year examinations in 1998,99,2000,01 and 02. They would have got at least 4 chances (for 98 batch 3 chances) to clear their 'back papers' after leaving the college. Older batches were first scanned, and those with 'back papers' remaining to be cleared at the time of final year examination (results with held or 'Incomplete) were identified. This number was 234, and the total number of students whose records were perused came to 2151. (Please see table 1). These 234 records of the 'Incompletes' were examined in more detail.

In the mean time, a few of these cases, which exhibited an unusually high number of back papers (some times more than 10) were short listed, for detailed investigation. This came to 105. Their home addresses were collected and they were contacted by post for getting information about their present status and other personal details. 22 of them responded. These students and parents were contacted by telephone and e-mail. Again, the response was not too good. Only seven of them did respond and shared their views.

The Data sheet having all the details (examination, category of admission, rank in the engineering entrance examination, date of joining the course etc.) of each student having back papers even after completing the course was then prepared. After collecting the primary data and cross checking, we made some preliminary conclusions. We again contacted the teachers, students and parents for their reaction to these interim conclusions. Then their responses were tabulated with an appropriate weightage so as to reach some general conclusions and recommendations

#### **4.5. Limitations**

The engineering colleges are supposed to maintain an excellent system of keeping students records. There is the Students Advisory System and the Staff Advisor is supposed to keep comprehensive Student Records containing all the personal and academic data concerning each student. But in practice, very few staff advisors keep their Student Records updated or completed. So it was very difficult to construct a complete database, as was envisaged. But some batches or branches have very satisfactorily filled students records. So, for the micro level analysis we have taken

some specific batches/branches, which have complete records. These batches have been designated as Specific Batch A, B1, B2, and C. The letters A, B, and C correlate them with the respective college also. The analysis, like correlation of performance with the entrance rank, comparisons with the total sample and calculation of failure rates etc. have been done by taking these specific batches as samples.

#### **4. 6. Cross checking with university records**

The colleges we had selected for the studies come under two different universities. Both the universities were contacted through official letters and by personal approaches to appraise them of our study and its objectives. The authorities in both universities offered full support for the research and they gave permission to us to do cross checking of the students records, which we had collected from the college departments and office, with the university records. But at the end of the day, while one university gave us full support and access to all the relevant data for cross checking of the records of the students, the lower level functionaries of the other university came up with all kinds of objections. So, in about one third of the cases, the college records could not be counter checked, and we had to rely on them implicitly. But the experience of the other university showed that some students about whom data were not available in the college, were also among those who had not passed, as per university records But no data about the back papers of these students were available in the Students' Record kept in the college. This shows that the results arrived at, solely from the Students' Records, kept in the college, will err only on the conservative side. That means, the number of wastages is likely to be, if anything higher than the one arrived at from college records.

### **5. RESULTS**

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Table-1 presents the highlights of the results. Out of the total sample of 2151 student records perused, 234 'Incompletes' (10.88%) had 'back papers' at the time of completing the coursework and writing the 8<sup>th</sup> Semester (S8) Examination.

**TABLE- 1**  
**MAJOR FINDINGS**

No		No	Samples	%
1	Number of students with back papers on course completion (Number of "Incompletes")			
	Total Sample	234	2151	10.88
	College- A	102	1160	8.79
	College- B	78	635	12.28
	College- C	54	356	15.17
2	'Wastage' i.e. Number of students who failed to pass the degree after four attempts subsequent to completion of course work			
	Total Sample	195	2151	9.07
	College A	83	1160	7.16
	College B	66	635	10.39
	College C	46	356	12.92
3a	Number of 'late admissions' among 'incompletes'			
	Specific Group B1*	6	10	60
	Specific group B2 *	12	12	100
3b	Number of 'incompletes' among total no: of late admissions'			
	Specific group B1	6	15	40
	Specific group B2	12	59	20.34
4.a	No of students admitted under various quotas, among 'Wastages'			
	Total Sample	191	195	98
	College A	82	83	98.8
	College B	64	66	97
	College C	45	46	98
4.b	No of 'wastage' among students admitted under various Quotas			
	Total Sample	17	74	23
	Specific group B1 *	7	27	26
	Specific group B2 *	10	47	21.23
5.	No of students who failed in Mathematics in the first attempt in the first year among 'Incompletes'	198	234	84.62

\* B 1 and B 2 are Specific Batches taken from the same college B

There is a wide variation in this percentage of 'Incompletes' (9 to 15) among the three colleges studied. Even within the same college, there are striking variations (0 to 17% from College A, 6 to 22% from College B, and 6 to 27% from College C) among the different branches of specialization for this phenomenon. (Annex – Table-A).

The Percentage of 'Wastage' in whole sample among the three colleges is 9% and the variation among the college is between 7 to 13 % (Table 1). A striking variation among the different branches of specialization among the college is also observed, that is 0 to 15 % for College A, 4 to 22% for College B and 6 to 23% for College C, (See Annex-1 Table A)

A closer scrutiny of the records of the 'Incompletes' was done in certain selected batches, one in each college. This was possible only in those cases where 'Student Records' were kept meticulously by the staff advisor. So, strictly speaking, these are not random samples. However, the non-randomness refers to the quality of the student advisor and does not necessarily reflect on the quality or performance of the students. So this can be taken as representative samples, as far as the college is concerned. These are marked as specific batches A, B1, B2, and C.

It is observed (please see Table 2) that almost all the 'Incompletes' have back papers pertaining to the First Year (combined 1<sup>st</sup> & 2<sup>nd</sup> Semester or S1 S2) examination, still remaining to be cleared. In fact, two third of them have more than two such back papers, when they reach S8. A perusal of the subsequent history of these 'Incompletes' reveals that these are the persons who do not manage to clear the examinations, even after 4 attempts, and end up as 'Wastage'.

**TABLE -2**  
**SPECIFIC BATCH ANALYSIS-COLLEGE-A, B, C**

Sl No		College A	College B	College C
1	Total strength of the batch	125	49	50
2	No. of 'Incompletes' at the time of final year results	15	10	8
3	No. of students with more than four back paper at the time of final year results	11	5	8
4	No. of students with more than 10 back paper at the time of final year results	8	4	6
5	No. of 'Incompletes' after 4 chances from final year examination (No of Wastages):	9	5	7
6	Total No. of students who have cleared all the 'back papers' within four chances.	6	5	1
7	Out of these students, the number of students who had two or less back papers from S1, S2	4	1	--
	3 back papers from S1, S2	1	2	1
	4 back papers from S1, S2	1	1	--
	5 or more back papers from S1, S2	0	1	--
8	Out of the 'Wastages' (refer to Sl.No. 5) the number of students who had 2 back papers from S1, S2	1	1	--
	4 back papers from S1, S2	4	2	--
	5 back papers from S1, S2	0	1	5
	6 or more back papers from S1, S2	4	1	2
9	Out of the 'Incompletes', the proportion of students who came through various Quotas	12 (80%)	8 (80%)	7 (87.5%)
10	Out of these Quota students who are 'Incompletes', the proportion of students who have passed within 4 chances after final year exams.	3 (25%)	4 (50%)	0
11	Out of the 'wastages', the proportion who was admitted through various quotas.	9 (100%)	4 (80%)	7 (100%)



12	Out of the 'Incompletes', the number of students who have been admitted through 'Merit' seats.	3 (20%)	2 (20%)	0
13	Out of these, the proportion who have passed within 4 chances	3 (100%)	2 (100%)	1 (12.5%)
14	Proportion of wastage among quota seats	20.45%	20%	23.53%
15	Proportion of wastage among merit seats	0	0	0

Another significant finding is that, almost all of the 'Incompletes' were admitted 'late' into the first year class. The reasons might vary from individual to individual, but it is a fact that all of them lost the introductory classes during the crucial first year (Table 3).

**TABLE - 3**

**Admission particulars of the 'incompletes' of a specific batch (B2)**

Admission to this Batch commenced on July-August-1998

Serial Number	Student Code	Rank	*Quota	Date of Joining
1	UA53BVS	2793	TC	11/98
2	UA80BVS	3020	TC	1/99
3	UA16BVS	6085	BX	NE
4	UA79BVS	6507	MU	11/98
5	UA24BVS	6953	MU	1/99
6	UA52BVS	12260	BX	NE
7	UA51BVS	17263	SC	12/98
8	UA50BVS	18964	SC	01/99
9	UA54BVS	20389	SC	01/99
10	UA78BVS	NE	MQ	10/98

\* NE – Not entered in the students record, TC – TC merit, MU – Muslim, SC – Scheduled Caste, MQ – Management Quota, BX – Backward Christian

The admission to the engineering course is based on merit and various quotas. The quotas include reservations for the various backward communities, as well as other quotas prescribed by the government. In addition to this, there is the 15% Management Quota in Aided Private Colleges and the 50 % Payment Quota in Unaided Private Colleges. Even though inter se merit is the criterion prescribed for these quotas, there is a distinct discontinuity between the rankings of those admitted into 'Merit Seat' and 'Quota Seats'. A particular sample was closely scrutinized to look into this aspect, and the results (Table 3) indicate that as many as 80% of the 'Incompletes' had been admitted in the Quota seats, while only the remaining 20% had gained admission under 'Merit' category. However, when it comes to 'Wastages', all of them belong to the Quota admissions. The percentage of wastage, among merit category is practically nil.

## **6. DISCUSSION**

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An examination of the above results indicates certain striking features of the phenomenon of 'wastage'

- 1. If** a student has several back papers (more than 4) pertaining to the first year (S1S2) examination still remaining to be cleared, even after finishing the 8<sup>th</sup> semester, (s)he will find it very challenging to pass these papers, and qualify for the degree, ever. This is not only a question of 'wastage' but also a terrible tragedy in human terms.
- 2. The** indications of this tragedy are already discernible, if a student fails in more than, say, 4 or more papers in the First Year (S1S2) examination. The percentage of 'Incompletes' is much higher among such students, even though some of them do manage to escape. But this is certainly a high 'risk factor'.
- 3. A** major contributing factor to this situation is the practice of late admissions into the first year, even several months after the course has started. (6 months later, in the sample studied). Even though the University has prescribed 'minimum attendance' for appearing for the university examination, this is circumvented by a clever stratagem: the denominator for calculating the percentage, in such cases, is taken as the number of classes held after their joining. This stratagem was devised, supposedly, to 'help' these students. However, in effect, it eventually causes their

ruin. Because, the chances of failure will be very high among such students who lose the benefit of the crucial introductory lectures.

**TABLE 4**  
**Category wise distribution of a Specific Batch (College B)**

Category	Admission Strength in first year		No of students passed in first attempt at final year examination		No of 'Incompletes'		'Incomplete' after 4 chances (wastage)	
	B1*	B2*	B1	B2	B1	B2	B1	B2
<i>Merit</i>	26	54	23	52	3 (12%)	2 (4%)	1 (4%)	0
Various Quotas	23	40	15	30	8 (35 %)	10 (25%)	4 (17%)	10 (25%)
1. SC/ST	2	7	1	4	1 (50%)	3 (43%)	1 (50%)	3 (43%)
2. OBC	11	18	9	13	2 (18%)	5 (28%)	1 (9%)	5 (28%)
3. Other States Quota	2	2	1	2	1 (50%)	0	--	0
4. Management/ Payment Quota	7	13	4	11	3 (43%)	2 (15%)	1 (14%)	2 (15%)
No Data	1	--	1	--	1	--	1	--
Total	49	94	35	82	11 (22%)	12 (13 %)	5 (10 %)	10 (11%)

\* B1, B2-Specific batches from college B, SC-Scheduled Caste, ST-Scheduled tribe, OBC-other Back ward communities

**4.** Another significant factor contributing to failure is the 'quota' system by which comparatively low ranking students get admitted to the engineering course. The quotas for Backward Communities are almost a continuation of the Merit seats, but those admitted under 'Management Quota', 'Payment Quota' and the SC/ST Quota

usually include very low ranking students. In a class containing mostly high-ranking students, when there is a sharp discontinuity and then some low ranking students appear, the low rankers will find it very difficult to cope with the general progress, unless there is a special effort on the part of teachers. Table 4 shows that the proportion of 'Incompletes' (and 'Wastage') is much higher among the quota entrants compared to the merit entrants. While there is constitutional validity and ample ethical justification for the SC/ST Quota, the other quotas are hardly justifiable by any academic standard. Even in the case of the low ranking SC/ST students, who are admitted through this system, it is a matter of grave concern whether they are really being helped, at all. Table 4 shows that only about half of the SC/ST students who get the benefit of admission under reservation system, actually manage to pass the course. This shows that other measures are required to ensure that they get equal opportunity and justice.

**5.** Failure is normal in any examination, but it is also normal to explore reasons for the failure and to take remedial measures so as to mitigate its adverse effects. In some systems, the students who have failed in one or two papers are given immediate opportunities to take re-tests, so that they can continue their studies uninterrupted. However, if they have failed in too many papers, or if they fail to pass in all the papers even after a second or a third attempt, they are asked to temporarily withdraw from the course until they have cleared all the papers. There was a time when this rule was strictly enforced in the Universities in the State. But with the introduction of the Semester System, and the inability of the Universities to conduct the examinations and to bring out the results in time, the rules were relaxed so that all the students appearing for the Combined First and Second Semester (S1S2) Examination would be automatically promoted to the Third Semester (S3). The results of the S1S2 examinations usually come out when the Third Semester is almost over. It was thought only fair that those who failed should get at least one more chance before being denied promotion. So the rules were so framed that a student has to clear the First Year Examination (S1S2) in full, to qualify for promotion to the Third Year (Fifth Semester). Similarly, it was stipulated that the student should clear the first two years (up to S4) in full, to qualify for Fourth Year (Seventh Semester). This is the so-called N-3 Rule. Where N is the semester to which the student is seeking admission, and (N-3) is the semester up to which s(he) should have cleared all papers. That is to say, when a student seeks admission to S7,

s(he) should have cleared all papers up to S4. Those who do not satisfy this requirement have to withdraw from the course temporarily. And this came to be called the “Year Out Rule”.

**Box 1**

**DRIFTING INTO DEPRESSION**

*Prof: A was sitting in his cabin in the Department when a young woman came in seeking help. Her brother had been a student in the same Engineering College and had passed out last year. But ever since leaving the college, he was in a peculiar mood. Very moody and withdrawn: not mingling with his erstwhile friends; not even going out; not cheering to apply for any job; and being very irritable when questioned about these things. The aged parents were very worried and concerned. She had come to find out whether something had happened in the college to upset him. She had been directed to Prof: A by the Head of the Department, because he had been the Chief Advisor to that batch.*

*When Prof: A retrieved the Student Records of this boy, it revealed a very disturbing picture. He had a number of back papers, starting with the first year, and accumulating over the semesters. Apparently, he had been pulled down by the weight of back papers, and not being able to take care of the current semester. So, the papers had piled up. Now the number had become so overwhelming that he had no hope of clearing them, especially now that he is away from college and co-students, and out of touch with academic work.*

*His parents were blissfully unaware of his deteriorating situation. They thought that everything was ok, because he was moving up to the higher semesters regularly. Little did they dream that it was possible to do so in the engineering college, without passing the examination. His relatives and neighbours also had been led to believe that he was qualified as an Engineer.*

*The poor boy was unable to face the reality and had drifted into depression.*

This rule has been observed more in violations, than in practice. The ostensible reason is usually that the University does not bring out the results in time, and the

students do not get three chances before being forced into 'year out'. The sheer force of collective agitation on the part of student unions causes the authorities to cave in under pressure. Not infrequently, the Courts also come to their 'rescue', citing violations of procedures or denial of natural justice, quite possibly because the universities do not bother to present all the relevant facts before the Court. The unfortunate aspect is that everybody thinks that by relaxing the rules, the students are being shown a favor. But what this study reveals is that, in practice, such students who are pushed up through relaxations, end up spoiling their career irretrievably. If a student learns while studying in the Third Semester (S3) that (s)he has lost a number of papers (say, more than 2) in the S1S2 examinations, her/his immediate preoccupation will be to get those papers cleared at the earliest, so that the promotion to S5 is not jeopardised. Naturally, the S3 papers get neglected. So even if (s)he is lucky to clear all the S1S2 back papers at the next supplementary examination, it is more than likely that (s)he would have fared badly or even lost couple of papers in the S3 examination. And this goes on and on, carrying over the burden of previous papers into every succeeding semester, like in the proverbial example. If the N-3 rule is strictly observed, the cumulative damage could be arrested at the S5 stage. So that the student could start with a clean slate thereafter. But exemptions and relaxations spoil this chance also, and as we have seen many a student gets snowed under, trying to cope up with the back papers, while fresh burdens are added, semester after semester.

This happens, partly because, the student are mortally afraid of facing failure or losing a year. Losing a year in college is not a great tragedy. Many an illustrious person has survived it and gone on to achieve great things, even in academic or professional life. But after completing four years in the engineering college, and becoming an 'Engineer' in the eyes of friends and relatives and neighbours, such a failure becomes a psychological trauma to most students (See Box-1). Of course, there are some who take it in their stride and do well in life. One such person was found to run a Tutorial College, for engineering students! But they are the exceptions rather than the rule. There is no doubt that the terrible wastage and traumatic tragedy, and has to be minimised.

**6.** If one takes the proportion of 'Incompletes' and 'Wastages' in this sample study as a guideline, and extrapolates to the total admission strength during the study years, it may be concluded that about 400 students might have lost their careers,

every year, in this manner. The batches coming under this study were admitted during the mid-nineties, when the state had total intake strength of only about 4500 seats in the engineering colleges, roughly 2100 under merit and 2400 under various quotas. The picture might be vastly different now, when the total admission strength is about 18000, out of which as many as 14000 fall under quotas like, Payment Seat, Management seat, NRI quota and Community Reservations. Even under the merit category, candidates of far lower ranks than before are being admitted. The impact of this development on the phenomenon of wastage needs to be seriously examined. If we go by the percentages of 'Wastage' indicated among quota admissions in this study (23%), this number could be as high as 3000. This will be a huge tragedy, by any reckoning. It is important to remember that these 3000 belong to the 'cream' of our youth; the most promising section of our Higher Secondary pass outs. The phenomenon of Wastage will certainly be compounded by the recent trend to lower the admission standards so as to fill the 'self financing seats'. The private colleges managements cannot suffer any seat to be vacant, as that would adversely affect the profitability/viability of the college. So they have already managed to persuade the government to rescind the rule regarding a cutoff mark in the entrance examination as a criterion of eligibility for admission. Later, it was further ordered that even those who had not appeared for the Common Entrance Examination could join the course. The most recent move is to remove the requirement of minimum marks in the qualifying examinations. All these will definitely lead to the admission of students who are not fit to undergo the Engineering Course into the engineering colleges. The impact of this on Wastage can very well be imagined.

There is an unpublished study by KSSP, regarding the performance of the candidates in the Common Entrance Examination, in a particular year (Annex Table B). It revealed that out of the 19632 students who wrote the Mathematics paper, less than 5000 had scored at least 10%. Only 12000 students could score even 5%. After about 19000 or so, there are zero or negative scores. Since the marks for Physics and Chemistry are also counted for selection, even those with lower marks in Mathematics than indicated by their overall ranking could get admission to the Engineering College. (For example, a student who gets an overall rank of 5000 might actually have a much lower ranking in the Mathematics examination). While the score in Mathematics is not necessarily an indication of one's aptitude in engineering, it is certainly a good indicator of one's likelihood of doing well in the

various engineering examinations, which are highly mathematical. It is also significant that quite a good proportion of the 'Incompletes' had failed in their First Year Mathematics paper (See Table1)

**BOX 2**

**'THE BEST THING THAT HAPPENED TO ME WAS BEING THROWN  
OUT!'**

*Dr. H. was quite possibly the inspiration and the untiring effort behind the launching of the Students Advisory System in College A. He had created a network of dedicated teachers to be the Group Advisors to sets of 20 students. They kept meticulous records of the personal and academic background and progress of their wards.*

*The record of one student, K, caused worry to his adviser J, who brought it to the attention of Dr.H. K had a good academic record up to Pre-degree but had done consistently badly in the Engineering College. He had a brother also studying in the college, who was extremely brilliant. K had lost several papers in the First Year itself and was struggling to get through. The Professors called him and talked to him at length. Then it transpired that he hadn't wanted to join the Engineering College at all, but had succumbed to parental compulsion, they had somehow decided that both their sons should become engineers. The poor boy would rather have taken a course in the Arts College, but was unable to convince them*

*Later the Professors had a frank discussion with K's parents and persuaded them to take the boy out of the Engineering College and to put him on some course of his choice.*

*Several years later Prof: J told us, he saw K, as a happy and successful Executive, in a commercial firm. He had done a B.Com, and luckily, for him, that was the 'in' season for Commerce graduates. He readily and gratefully told J, "Sir, the best thing that happened to me in the Engineering College, was being thrown out at the right time. Had I continued these, it would have ruined my life!"*

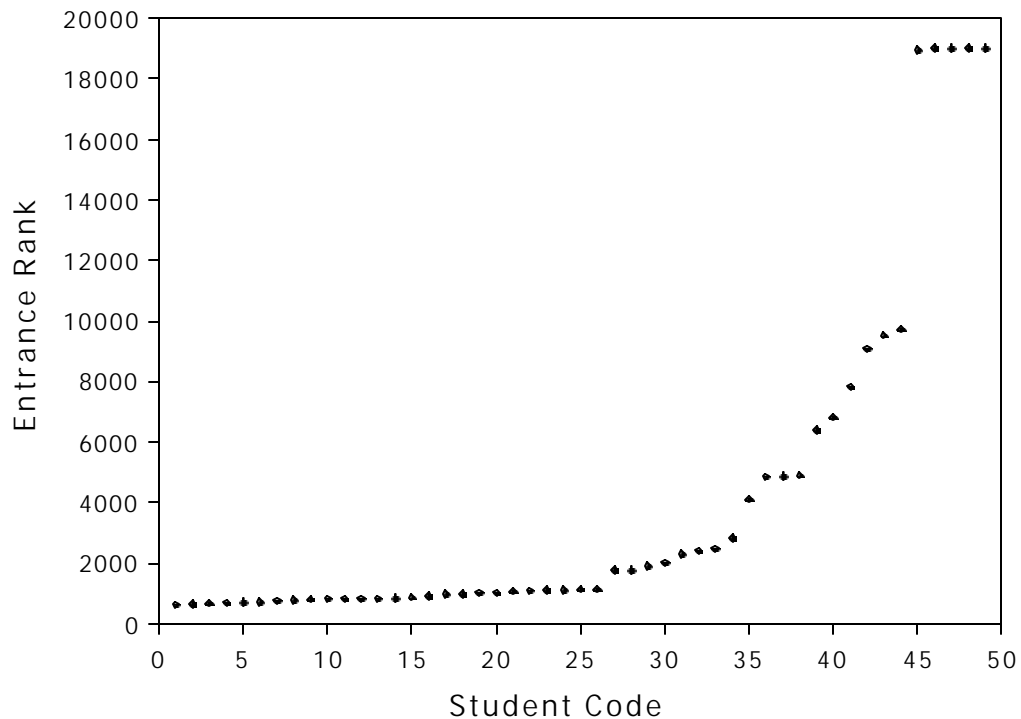
7. To say that a student may not do well in engineering is not to imply that that student is without merit or talent. Quite often students with no aptitude for



engineering end up in this course, due to parental compulsion, peer pressure, herd instinct, or even because of pure ignorance about other opportunities. Such students might have done well in the Entrance Examination also. Yet, they end up as misfits in the course, lose interest, and sometimes it reflects in their academic performance also. They might have done well in some other discipline in which they have taste and talent. (See Box 2). Such students can be identified by Student Advisors, and given counselling (Their parents too might need counselling). They may even be persuaded to change their course of study at an early stage, without undergoing the trauma of repeated failure and loss of self-esteem.

### CHART-1

#### ENTRANCE RANK DISTRIBUTION OF A SPECIFIC BATCH



*Dark stars indicate 'Wastages' and Squares indicate 'Incompletes'.*

8. Some of these factors, which were identified as contributors to the phenomenon of wastage, were tabulated and circulated among selected students, teachers and administrators. Their responses, on a scale of 0 to 4 (not relevant to most relevant), were weighted and integrated. The results are presented in Table 5

**TABLE - 5**

**POSSIBLE CONTRIBUTING FACTORS TO WASTAGE**

**The Weighted and Integrated score of responses. (On a scale of 0 to 4)**

No	Comments	Weighted Score (Max-100)
1	Owing to the fact that admission procedures are long delayed, many students are admitted very late. The classes start at the middle of the year. Only 4-5 months are available for covering all the subjects. This will affect the performance of the students in the 1st year (SI S2 combined) Examination.	65.45
2	The results should come before the start of the succeeding semester. Then it is possible to decide whether to discontinue or not.	61.82
3	If the "year out" rule is enforced strictly (only students who passed in the examination are allowed to be promoted to the higher classes) it will be beneficial to the students with high number of back papers	56.36
4	If the time lag between the examination and publishing results is reduced, it will help to improve the performance	54.55
5	If it is stipulated that the student should secure a minimum sessional mark in each subject for a pass, it will help the students to score better sessional marks, and avoid high failure rates	54.55
6	At present, there is no stipulated minimum sessional mark in each subject, for a pass. This sometimes results in very low marks being awarded to the students. Is this a factor in some students finding it impossible to get the pass minimum, for theory and sessional combined?	49.09

7	Do good students spoil their record because of the wrong circle of friends that they get into? May be they get trapped into such circles that they lose interest in studies and get diverted into other fields	45.45
8	Does the absence of parental intervention in the students, studies in the engineering course make any impact on their results?	43.64

9	Teacher - student relationship is often very strained. Even though there is a Counselor (Staff Advisor), the students do not often get enough personal attention from the teachers. Is the absence of such counseling a contributing factor in the high failure rate?	41.82
10	Does the family background of the student have any role in the decline of performance in examinations in engineering studies?	36.36
11	Is the inability of the universities to conduct the examinations in time affecting the performance?	36.36
12	If the valuation system of the Universities is changed in any manner, will it help to improve the performance? Please specify the changes needed?	34.55
13	Is it because of the lack of interest in the field of Engineering, which they have opted, because of the unhealthy pressure from the parents or any other source?	30.91
14	Does the sudden change in the system of studies from +2 level to Engineering Education contribute to high failures?	18.18
15	Does the hostel life, away from home interaction, affect the performance of students?	16.36
16	Does too much involvement in the extra curricular activities such as sports, culture, Art, etc, prevent the students from concentrating on their primary duty, via, studies?	14.55
17	Does the financial background of the student have any role in the decline of performance in examinations in engineering studies?	10.91

It may be seen that the most important reason identified by the respondents is the delayed admission to first year class. The next important factor is the burden of carrying over the 'back papers' from the first year. The government should take urgent measures to finish the admission process within reasonable time, and the Universities must insist on minimum attendance for all students. Late admissions, if any, must be given special attention by the college authorities. So this is where urgent policy decisions and interventions are required.

The recent 'explosion' in the number of engineering seats, is also going to have a significant bearing on the number of failures. A recent report reveals that in Anna University, Tamilnadu, when the first year results were announced, (*The review of U.R.Rao committee report on technical education, Frontline, March 26,2004.*) five engineering colleges had zero passes. Twenty-eight colleges had less than 5% pass, 78 colleges had less than 10% pass, and 108 less than 15% pass. Only 17 had more than 40% pass of which only 8 had more than 50% passes. The recent round of results in the S3 examinations of the Kerala University shows that our trend also is in the same direction. Only 5 colleges had more than 50% full pass. 8 had less than 40%, and 4 less than 30% full pass. (*Official Website, Kerala University*)

If the Year Out rule is continued to be relaxed, and these students are allowed to proceed to higher semesters without clearing their back papers, the resulting toll will be far worse than what been reflected in the present study.

The best practice will be: to conduct the First Year examination in April and to bring out the results in May itself, using centralised valuation, so that S3 classes can start in June. Any student who has lost more than two papers should be asked to stand out, clear those papers and join the subsequent batch. If the student is not able to clear all the first year papers within three chances (i.e. within one year), he/she should be asked to leave the engineering course.

On no account should admission standards be lowered, or under qualified students admitted, since it is clearly shown in the study that the likelihood of wastage increases, steeply, as the entrance rank is lowered. A 'cut off' score should be prescribed for admission, and this cut off score should be related to the performance of the student in mathematics.

## **7. CONCLUSIONS AND RECOMMENDATIONS**

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**1.** The study brings out the disturbing fact that wastage was a serious problem in the Engineering colleges of the state, even in the nineties, when admission was restricted to only the top rankers. A very clear correlation exists between the rank of the student and the likelihood of failure. Since the phenomenal growth in intake (From 4500 to over 18,000), students with very low ranks in the entrance examination and pitifully poor performance in mathematics are being admitted to the Engineering course. The study warns that this could result in an unacceptably high level of wastage. This will lead to a human tragedy of severe dimensions.

This has to be presented to the policy makers as an inevitable consequence of the disproportionate increase in the number of engineering seats.

**2.** Some of these ill effects can be mitigated by more responsible and efficient measures on the part of the government and the universities. The most important factor is the totally un-academic way of prolonging the admission process right up to the end of the academic year. If the government cannot change this practice, the universities should put their foot down and insist that the attendance requirements for appearing for the University Examination must be strictly adhered to, in both letter and spirit. It is better for those who are admitted very late, to forego the year and begin afresh, next year.

The practice of giving exemptions from the 'Year Out' rule, in the name of leniency must be discontinued forthwith. This study might help to convince the students themselves to realize that this is no concession or favor, but a trap. On the contrary, it might be more appropriate to enforce the 'Year Out' rule, before admission to every odd semester, including S3. If this is to be practicable, the University must conduct the examinations on schedule, and bring out the results within a couple of weeks. This is not impossible, if there is a will. But the results will be quite rewarding. The burden of carrying over the back papers will be removed. The students will be able to concentrate on the subjects being covered in the current semester instead of being perennially pre-occupied with improving/passing the previous semesters papers.

**3.** Reservation quotas for Socially and Economically Backward sections of the society are constitutional requirements and are ethically unexceptionable. But the question, whether it is performing the intended function, is equally relevant. It

appears that at least in the case of SC/ST students, the situation is quite alarming. Not only does the quota system not deliver the intended results, it even exacerbates the problem. Students who might have passed a conventional Arts/Science/Commerce course, are enticed into the engineering course, and are made to suffer horribly. The solution is not to do away with reservation altogether, but, as several educators have pointed out, to concentrate at the school stage, and ensure that those who want to pursue a career in engineering, are properly equipped and prepared.

The question of the other quotas (Management, Payment, etc) is quite different. The minimum marks specified for the qualifying examination must be strictly enforced. A cut off mark (which is reasonably high) must also be adhered to. The pressure from the private managements to lower the admission standards, so that they can fill up the vacant seats, should be withstood and countered.

**4.** The average age of the engineering entrant is only 17. Students of this age badly need counselling, and it must be made available 'on campus'. The Student Advisory system could help to some extent. But it has to improve quite a bit. The teachers have to be motivated and trained to perform this function efficiently, and with a human touch. There are excellent examples of conscientious and concerned teachers doing a wonderful job, in every college. They must be encouraged and held up as models. The Student Records should be checked periodically by senior faculty, and the interaction between the Advisors and their wards should be monitored. This should be considered a normal duty of the teaching faculty.

In conclusion, it is sincerely hoped that the present study will throw some light into a little known and discussed aspect of engineering education in the state, and will lead to some meaningful intervention

## ANNEX-1

**TABLE - A**

**Number and percentage of 'Incompletes'**

**Variation among different batches and branches within the college**

**Table-A-College A**

*Batch	Total Strength	'Incomplete' on course completion	%	'Incomplete' after 4 chances (wastage)	%
EC1	41	5	12.20	5	12.20
EC2	46	0	0.00	0	0.00
EC3	38	3	7.89	2	5.26
EC4	53	9	16.98	7	13.21
EC5	50	2	4.00	2	4.00
AEI6	26	6	23.08	4	15.38
AEI7	37	3	8.11	3	8.11
AEI8	48	5	10.42	3	6.25
AEI9	39	2	5.13	2	5.13
AEI10	49	4	8.16	2	4.08
CSE11	51	3	5.88	2	3.92
CSE12	50	2	4.00	2	4.00
CSE13	50	3	6.00	3	6.00
CSE14	50	2	4.00	2	4.00
ME15	96	9	9.38	9	9.38
ME16	136	14	10.29	13	9.56
ME17	80	6	7.50	6	7.50
ME18	95	9	9.47	7	7.37
ME19	125	15	12.72	9	7.20
Total	1160	102	8.66	83	6.98

\*EC: Electronics and Communication, EE: Electrical and Electronics

TABLE – A continued

## ANNEX-1

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**TABLE - A**

**Number and percentage of 'Incompletes'**

**Variation among different batches and branches within the college**

**Table -A-College B**

*Batch	Total Strength	'Incomplete' on course completion	%	'Incomplete' after 4 chances (wastage)	%
EC1	41	4	9.76	3	7.32
EC2	36	8	22.22	8	22.22
EC3	23	4	17.39	3	13.04
EC4	49	10	20.41	9	18.37
EC5	52	4	7.69	2	3.85
EE1	76	9	11.84	9	11.84
EE2	79	9	11.39	9	11.39
EE3	89	12	13.48	9	10.11
EE4	96	6	6.25	4	4.17
EE5	94	12	12.77	10	10.64
Total	635	78	13.32	66	11.29

\*EC: Electronics and Communication, AEI: Applied Electronics and Instrumentation, CSE: Computer Science and Engineering, ME:Mechanical Engineering

TABLE – A continued



## ANNEX-1

### TABLE - A

#### Number and percentage of 'Incompletes'

#### Variation among different batches and branches within the college

Table-A-College C

*Batch	Total Strength	'Incomplete' on course completion	%	'Incomplete' after 4 chances (wastage)	%
EE1	56	15	26.79	13	23.21
EE2	52	13	25	10	19.23
EE3	46	8	17.39	6	13.04
EE4	50	4	8	4	8
EC1	52	3	5.77	3	5.77
EC2	50	8	16	7	14
EC3	50	3	6	3	6
Total	356	54	14.99	46	12.75

\*EC: Electronics and Communication, EE: Electrical and Electronics

# ANNEX-1

**TABLE – B**

**COMMON ENTRANCE EXAMINATION, KERALA, SUBJECT-WISE**  
**RANK LIST AND MARKS (1997-98)**

Mathematics		Physics		Chemistry		Biology	
Rank	Marks (%)	Rank	Marks (%)	Rank	Marks (%)	Rank	Marks (%)
1	60.62	1	83.12	1	89.58	1	84.58
100	28.96	100	56.88	100	75	100	73.96
500	20.62	500	42.92	500	64.79	500	67.50
1000	17.08	1000	37.08	1000	58.96	1000	63.54
2000	13.96	2000	30.42	2000	51.25	2000	57.29
3000	12.08	3000	26.46	3000	46.25	3000	52.92
4000	10.62	4000	23.33	4000	42.08	4000	49.17
5000	9.58	5000	20.83	5000	38.75	5000	46.25
6000	8.75	6000	18.96	6000	36.04	6000	43.33
7000	8.12	7000	17.29	7000	33.54	7000	41.25
8000	7.29	8000	15.83	8000	31.25	8000	38.96
9000	6.88	9000	14.58	9000	29.38	9000	37.08
10,000	6.25	10000	13.54	10000	27.71	10000	35.21
11000	5.62	11000	12.50	11000	26.04	11000	33.33
12000	5.00	12000	11.46	12000	24.58	12000	31.67
13000	4.38	13000	10.83	13000	23.12	13000	30.00
14000	3.96	14000	10.00	14000	21.88	14000	28.33
15000	3.33	15000	9.38	15000	20.62	15000	26.88
16000	2.71	16000	8.54	16000	19.38	16000	25.21
17000	1.88	17000	7.92	17000	18.33	17000	23.33
18000	0.83	18000	7.29	18000	17.29	18000	21.46
19000	Below zero	19000	6.67	19000	16.25	19000	19.58
And onwards	Below zero	20000	6.25	20000	15.21	20000	17.08
		21000	5.62	21000	14.37	21000	14.17
		22000	5.21	22000	13.33	22000	9.17
		23000	4.58	23000	12.5	22543	Below zero
		24000	4.17	24000	11.67		
		25000	3.54	25000	10.62		

Table B continued

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**ANNEX-1**

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**TABLE – B****COMMON ENTRANCE EXAMINATION, KERALA, SUBJECT-WISE**  
**RANK LIST AND MARKS (1997-98)**

<b>Mathematics</b>		<b>Physics</b>		<b>Chemistry</b>		<b>Biology</b>	
Rank	Marks (%)	Rank	Marks (%)	Rank	Marks (%)	Rank	Marks (%)
		26000	3.12	26000	9.79		
		27000	2.5	27000	8.96		
		28000	1.88	28000	8.12		
		29000	1.46	29000	7.29		
		30000	0.83	30000	6.25		
		31000	0	31000	5.21		
		32000	Below zero	32000	3.96		
		And onwards	Below zero	33000	2.5		
				34000	0.62		
				34985	Below zero		

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**ANNEX-2**

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**DATA SHEET-1**

Date
Code No

**INTEGRATED RURAL TECHNOLOGY CENTRE (IRTC) MUNDUR, PALAKKAD**

<u>An Investigation into the Problem of Wastage in the Engineering Colleges in Kerala</u>										
<b>8. DATA SHEET</b>										
1. Name Code					2. College code					
3. Rank in entrance examination			4. Medium of studies			5. Date of joining the course				
6. Performance in qualifying examinations				7. Parent's name & occupation			8. Fee concession			
10 <sup>th</sup>		12 <sup>th</sup>					Yes	No		
%	Sub.	%	Sub.							
9. Year/Month of S8 examination			10. Nature of Admission							
			GEN	SC	ST	OBC	EX	PH	SF	MQ
11. Details of back papers in each semester at the time of course completed.										
S1	S2	S3	S4	S5	S6	S7	S8			
12. No of back papers in subsequent appearances (after S8).										
1	2	3	4	5	6	7	8	9	10	
13. Remarks:										

**ANNEX-3**

**DATA SHEET-2**

### Survey on the current status of engineering graduates

CODE:

1. Name :
2. Email :
3. Address (R) :

(O) :

4. Present Status (*Please tick the appropriate entry*)

1.  Studying/Unemployed
2. Employed in
  - Govt. Service  Private Company  Public Company
  - Research  Social Activities  Agriculture
  - Self Employed  Finance  Marketing Media (Print/Visual)
  - Defence  Other (specify)

3. Engaged in  Technical/Non Technical work

5 The Engineering education scene in Kerala is undergoing profound challenges.

a. Do you think that, so many new colleges are necessary?	Yes	No
b. Do you support the 'Self Financing' concept in professional college?	Yes	No
c. Do you think that the increase in the number of colleges will lead to:		
i. A fall in standards	Yes	No
ii. Increased unemployment of engineering graduates	Yes	No
iii. Students with low ranks being unable to pass the engineering course	Yes	No

**ANNEX 4**

**DATASHEET-3**

**AN INVESTIGATION IN TO THE PROBLEM OF WASTAGE IN ENGINEERING COLLEGES IN KERALA**

**DATA SHEET**

**PART 1**

1	Name	
2	Address[R]	
3	Address[O]	
4	Land phone No	
5	Mobile No	
6	Email	
10	Employed(Govt/Public/Pvt/self employed)(Technical/Non technical/Extent of service etc.)	
	Details,if any	

**PART 2**

Please rank the possible reasons named below, in the order in which you think they are relevant. We are also giving some suggestions as remedial measures. Please rank them also in the order of priorities.(Tick your choice of rank in the given box)

1	Owing to the fact that admission procedures are long delayed, many students are admitted very late. The classes start at the middle of the year. Only 4-5 months are available for covering all the subjects . This will affect the performance of the students in the 1st year (SI S2 combined) Examination.	0	1	2	3	4
2	Teacher - student relationship is often very strained. Even though there is a Counselor (Staff Advisor), the students do not often get enough personal attention from the teachers. Did any teacher monitor srudents individually and did he/she act as an advisor or a guide to solve personal and academic problems of the students? Is the absence of such counseling a contributing factor in high failure rate?	0	1	2	3	4
3	At present, there is no stipulated minimum sessional mark in each subject, for a pass. This sometimes results in very low marks being awarded to the students. Is this a factor in some students finding it impossible to get the pass minimum, for theory and sessional combined?	0	1	2	3	4
4	Does the sudden change in the system of studies from +2 level to Engg: Education contribute to high failures?	0	1	2	3	4
5	Is it because of the lack of interest in the field of Engineering, which they have opted, because of the unhealthy pressure from the parents or any other source?	0	1	2	3	4
6	Is it because of the hostel life, away from home intraction, some type of nostalgia affecting the results?	0	1	2	3	4
7	Is it because of the wrong circle of friends that they get into? May be people get trapped into such circles that they lose interest in studies and get diverted into other fields?	0	1	2	3	4
8	Is it because of too much involvement in the extra curricular activities such as sports, culture, Art, etc, that they don't get enough time to concentrate on their primary duty, viz, studies?	0	1	2	3	4
9	Does the family background of the student have any role in the decline of performance in examinations in engineering studies?	0	1	2	3	4
10	Does the financial background of the student have any role in the decline of performance in examinations in engineering studies?	0	1	2	3	4
11	Is the inability of the universities to conduct the examinations in time affecting the performance?	0	1	2	3	4
12	If the time lag between the examination and publishing results is reduced, will it help to improve the performance?	0	1	2	3	4