

Improved Attainment through Outcome Based Education and a Case study

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Abstract----- Outcome Based Education (OBE) is student centered instruction that improves student performance. With outcome based education students may gain more knowledge to improve soft skills and subject to exploring different ideas and innovations. OBE is an active learning- teaching methodology provides solutions for graduate course ‘Control Systems Engineering’. This paper describes improvement in CO-PO attainment and is successfully implemented for one of the core subject “Control Systems engineering” for engineering graduates at Vidya Jyothi Institute of Technology, Hyderabad. One of the best ways to present any course in easy manner for students is achieved by Outcome –Based Education (OBE).OBE definitely builds complete knowledge by simplifying complex topics into small steps by applying OBE Methodologies. The attainment of the skills by the students are measured based on the Program Outcomes (PO’s) specified by the accreditation bodies. Defining the Course Outcomes (CO’s), CO-PO attainment, will modify the traditional teaching methodology to a well planned self-learning and scored good results too that is explained in this paper.

Index terms----Implementation of Outcome-Based Education (OBE), Course Outcomes (CO’s), Program Outcomes (PO’s) and Attainment results.

I. Introduction:

Indian Education System has introduced the Outcome Based Education System through National Board of Accreditation (NBA). OBE has popular and a focus on improving teaching-learning and enhancing delivering skills in engineering curriculum. There is no single specified style of teaching or assessment in OBE; instead, classes, opportunities, and assessments should all help students achieve the specified outcomes. The role of the faculty adapts into instructor, trainer, facilitator,

and/or mentor based on the outcomes targeted. However the exiting Teaching-learning process creates a gap between university curriculum and students knowledge. Conducting regular classes only without any practical experiments and designs will not plays a good impact on student’s results. The Program outcomes provides the information about ability of graduates to demonstrate knowledge in fundamentals of Basic Sciences, Humanities and Social Sciences, Engineering Sciences and apply the knowledge in professional core subjects, electives and projects. These outcomes enable the graduates to pursue higher studies and engage in R&D for a successful professional career. Based on CO-PO mapping, we can estimate effectiveness in teaching too. So finally with deep learning and analyzing, Outcome-Based Education reflects a great impact on student’s results as well as in higher studies too. Control Systems Engineering is the one of the most important, interesting subject in electronics engineering stream.

II. Traditional Teaching Approach and Literature Review:

The traditional teaching-learning methodology is in the way of classroom teaching with chalk, board, OHP sheets and revisions. With Outcome Based Teaching-Learning, each subject specified by a course outcome (CO’s), each of the CO’s will addresses one or more program outcomes (PO’s). Lizzie D’cruz Lecturer (Selection Grade), Department of Electronics and Communication Engineering, Dr. B. R. Ambedkar Institute of Technology, Port Blair, Andaman and Nicobar Islands, India presents CO , PO attainment for VLSI Course for internal & Board Exam results[1]. Course outcomes for digital switching systems will be defined and described by

Mark Ovinis proposed and described a Comparative Analysis of Attainment of Program Outcomes for Courses with and without the Use of Modern Tools and the usage of modern tools has led to slightly

better attainment [2]. M.Rajendra Prasad developed project based teaching methodology for embedded engineering education to execute projects for better attainment [3]. Joni e. Spurlin presented a procedure to design better engineering education through assessment [4]; this book is written for engineering faculty and department chairs as a practical guide to improving the assessment processes for undergraduate and graduate engineering education in the service of improved student learning. M.Vasanth Lakshmi has defined outcome-based teaching process for microwave and radar [6]. This paper presents an Outcome Based Education and it is compared with traditional approach and attainment of the Course Outcomes (CO's) with Program Outcomes (PO'S).

III. CO-PO Mapping in VJIT for R-15 Regulation:

Course: Control Systems Engineering

Course Code: A15415

Course Outcome Statements indicating what a student can do after the successful completion of a course. At the end of the course the student should be able to get below points.

CO1: Demonstrate and understand the fundamentals of control systems.

CO2: Obtain the transient and steady state response of both linear and non-linear control systems.

CO3: Determine and use models of physical systems in different forms suitable for use in the analysis and design of control systems.

CO4: Examine the stability of a closed-loop control system

CO5: Ability to represent and analyze control systems by state variable representation.

The program outcomes can be described what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program and those were shown in below table.1.

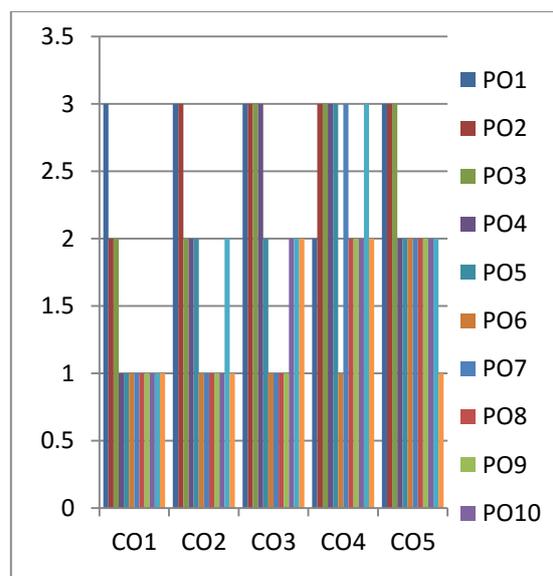
Table.1.The Program Outcomes (PO's)

Program Outcome			
PO1	Engineering knowledge	PO 7	Environment and sustainability
PO 2	Problem analysis	PO 8	Ethics
PO 3	Design / development of solutions	PO 9	Individual and team work
PO 4	Conduct investigations of complex problems	PO10	Communication
PO 5	Modern tool usage	PO11	Project management and finance
PO 6	The engineer and society	PO12	Life-long learning

III.1.CO-PO Mapping for the course control system engineering:

A sample CO-PO matrix for control systems engineering are given in below Table.2. Based on CO statements given. The CO-PO mapping has been done with correlation levels of 3, 2, and 1. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low).

Table.2. CO-PO Mapping for A15415



In VJIT, the students were assessed through the continuous internal exams and the end semester exams. The internal assessment includes descriptive tests and assignments. After two internal midterm exams, students may have a chance to write betterment exam to reduce absenteeism to improve their internal percentage. Out of three internal mid exams best of two will give the final internal performance of the student. If some components, to attain CO's/ PO's are not included in the curriculum provided by the affiliated university, then the institution makes additional efforts to impart such knowledge by covering aspects through "contents beyond syllabus" and "Gap Analysis". In Vidya Jyothi Institute Of Technology, the gap analysis is processed by taking feedback from the stake holders such as Employers, Alumni, Industry, Senior students, Faculty, Professional Bodies and Department Advisory Board (DAB).Based on the plan of action decided, the department arranges seminars, technical talks, workshops, training programs in Mat lab, NI-Lab view, Cisco Networking, ARM University program and industrial visits etc. Based on the student's

performance, the CO- PO attainments were calculated.

IV. Assessment of Course Outcomes:

As per university guidelines 25% weight age is given to internal assessment and 75% weight age is given to external exam assessment. In VJIT Institute the overall attainment is calculated for every course by using direct method. The calculations for over all attainment are shown in below Table.3.

Table.3. Assessment of Course Outcomes

Course out Come	Course outcome attainment level from internal assessment	Course outcome attainment level from university exams	CO Attainment	Indirect Attainment	Over all Attainment
CO Attainment	$a_1 = \text{Mid-1} + \text{Mid-2} + \text{Two Assignments}$	b_1	$c_1 = (0.25(a_1) + 0.75(b_1))$	$d_1 = \frac{(1 * X) + (2 * Y) + (3 * Z)}{(X + Y + Z)}$	$0.8(c_1) + 0.2(d_1)$

X---Number of students Opted for Low Option,
 Y---Number of students Opted for Medium Option,
 Z---Number of students Opted for Substantial High Option.

V. Direct Assessment Evaluation:

Step1: Internal Examinations & Assignments
 The First midterm examination shall be conducted for 1-2.5 units of syllabus and second midterm examination shall be conducted for 2.5-5 units. 5 marks are allocated for Assignments (as specified by the concerned subject teacher) – first Assignment should be submitted before the conduction of the first mid, and the second Assignment should be submitted before the conduct of the second mid. The total marks secured by the student in each midterm examination are evaluated for 25 marks.

Step 2: External Examinations

Total Duration: 3 Hours
 Total Marks: 75
 Minimum Expected Marks for Pass: 26M (35% of Maximum Marks 75)
 Minimum Expected Marks for course Attainment: 45M (60% of Maximum Marks 75)
 After completion of course by using defined Course Outcomes (CO's), attainment levels, the direct attainment will gives the information about CO attainment. For the academic year (2015-2019) the CO attainment is calculated for Control System Engineering course and that is shown in Table.4.

Table.4.External Assessment

S.No	Assessment	Maximum marks	Threshold level (%)	Attainment level Criteria	Attainment level
1	Mid Exams + Assignments	20+5=25	60%	At least 50%-59% of attempted students exceed the threshold level (60%) marks	1
				At least 70% of attempted students exceed threshold level (60%) marks	3
				At least 60%-69% of attempted students exceed threshold	2

The course outcomes attainment level computed at the end of the course using defined formula for the course Control Systems Engineering in VJIT is shown in below Table.5.

Table.5.CO internal attainment

co's	method	value	avg	CO attainment (internal exam)	attainment (overall CO attainment)
co1,co2	part-a mid-i + asm-i	2.8	2.766	2.64	2.5
	part-b mid-i q1	2.7			
	Part-b mid-i q2	2.8			
co2,co3	part-a mid-i + asm-i	2.5	2.7	2.64	2.5
	part-b mid-i q3	2.8			
	part-b mid-i q4	2.8			
co3,co4	part-a mid-ii + asm-ii	2.9	2.533	2.64	2.5
	part-b mid-ii q1	2.2			
	part-b mid-ii q2	2.5			

co4.co5	part-a mid-ii + asm-ii	2.7	2.5			
	part-b mid-ii q3	2.5				
	part-b mid-ii q4	2.3				

The improvement in attainment with teaching methodology under OBE after applying all those methods and after three certification programs students may gain best idea about their future plan as a Engineer and this paper is going to describe improved performance of one student, his academic profile, CO attainment, PO attainment, co-po attainment with direct and indirect methods were shown in below Table.6. And the student name is **Bharat Malaviya** of 2015-2019 batches from ECE department in VJIT.

Table.6.Academic Profile

Marks Obtained	5098/6350	CGPA :	9.21
Credits Obtained	192/192	Subject Due:	0/70

S. No.	Code	subject	Int Max	IntM arks	Ext Max	Ch1	Total	Per c	ActCr edits	Stat us	Grade	
		II/IV I SEM				dece mber						
1	A11001	English-I	25	23	75	59	82	82.00	2.00	P	O	
2	A11002	Mathematics - I	25	25	75	64	89	89.00	3.00	P	O	
3	A11003	Engineering Physics-I	25	21	75	39	60	60.00	3.00	P	A	
4	A11502	C Programming – I	25	25	75	55	80	80.00	3.00	P	O	
5	A11201	Electrical Circuits	25	18	75	48	66	66.00	3.00	P	A	
6	A11004	Engineering Chemistry	25	25	75	44	69	69.00	3.00	P	A	
Result(%):82.44												
S. No.	Code	subject	IntMax	IntM arks	Ext Max	Ch1	Ch2	Total	Per c	ActCr edits	Stat us	Grade
		II/IV II SEM				may 2016	november					
	A12005	English-II	25	24	75	51		75	75.00	2.00	P	A+
2	A12306	Engineering Graphics	25	25	75	38	38	63	63.00	3.00	P	A
3	A12007	Engineering Physics-II	25	25	75	47	57	82	82.00	3.00	P	O
4	A12006	Mathematics	25	25	75	50		75	75.00	3.00	P	A+

		- II										
5	A12009	Mathematics – III	25	25	75	43	75	100	100.00	3.00	P	O
6	A12503	C Programming – II	25	24	75	74		98	98.00	3.00	P	O
Result(%):86.79												
S. No.	Code	subject	Int Max	IntM arks	Ext Max	Ch1	Total	Per c	ActCr edits	Stat us	Grade	
		II/IV I SEM				november						
1	A13012	Mathematics – IV	25	22	75	65	87	87.00	3.00	P	O	
2	A134	EDC	25	20	75	51	71	71.00	3.00	P	A+	
3	A13402	Signals and Systems	25	24	75	46	70	70.00	4.00	P	A+	
4	A134	STLD	25	23	75	49	72	72.00	3.00	P	A+	
5	A134	EMI	25	21	75	49	70	70.00	3.00	P	A+	
6	A134	PTSP	25	24	75	41	65	65.00	4.00	P	A	
Result(%):76.80												
S. No.	Code	subject	Int Max	IntM arks	Ext Max	Ch1	Total	Per c	ActCr edits	Stat us	Grade	
		II/IV II SEM				APRIL 2017						
1	A142	PEE	25	25	75	61	86	86.00	3.00	P	O	
2	A144	ECA	25	23	75	56	79	79.00	4.00	P	A+	
3	A144	PDC	25	22	75	47	69	69.00	4.00	P	A	
4	A14411	EMTL	25	24	75	49	73	73.00	4.00	P	A+	
5	A14412	Digital System Design	25	25	75	62	87	87.00	3.00	P	O	
6	A14016	Environmental science	25	25	75	50	75	75.00	2.00	P	A+	
% of Marks: 81.87			200	193	550		614	81.87	24			
S. No.	Code	subject	Int Max	IntM arks	Ext Max	Ch1	Total	Per c	ActCr edits	Stat us	Grade	
		III/IV I SEM				november 2017						
	A15413	AC	25	24	75	44	68	68.00	3.00	P	A	
2	A15414	LDICA	25	24	75	54	78	78.00	4.00	P	A+	
3	A15415	Control Systems Engineering	25	24	75	48	72	72.00	3.00	P	A+	
4	A15416	COA	25	25	75	52	77	77.00	3.00	P	A+	
5	A15521	Operating Systems	25	23	75	61	84	84.00	3.00	P	O	
Result(%):77.94												
S. No.	Code	subject	Int Max	IntM arks	Ext Max	Ch1	Total	Per c	ActCr edits	Stat us	Grade	
		III/IV II SEM				MAY 2018						
	A16018	MEFA	25	25	75	48	73	73.00	3.00	P	A+	
3	A16019	FIM	25	25	75	40	65	65.00	3.00	P	A	

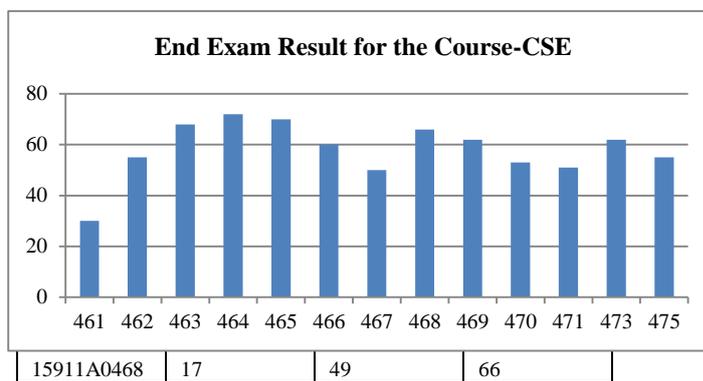
5	A16422	VLSI Design	25	24	75	56	80	80.00	3.00	P	O
6	A16TP1	PDBS	25	22	75	55	77	77.00	2.00	P	A+
7	A16426	Programming in	25	24	75	55	79	79.00	3.00	P	A+
Result(%):77.65											
S.No.	Code	subject	IntMax	IntMarks	ExtMax	Ch1	Total	Per cent	ActCredits	Status	Grade
		IV/IV I SEM				November 2018					
3	A17433	DIP	25	24	75	41	65.00	3.00	P	A	
4	A17437	TSSN	25	25	75	59	84.00	3.00	P	O	
5	A17542	Web Design	25	23	75	44	67.00	3.00	P	B+	
6	A17432	AWE	25	24	75	34	58.00	3.00	P	B+	
7	A17430	DC	25	23	75	51	74.00	3.00	P	A+	
8	A17431	ESD	25	23	75	50	73.00	3.00	P	A+	
9	A174P1	Industry Oriented Mini-Project	--	--	50	49	49	98.00	2.00	P	O
Result(%):77.00											
S.No.	Code	subject	IntMax	IntMarks	ExtMax	Ch1	Total	Per cent	ActCredits	Status	Grade
		IV/IV II				Mav					
	A184TS	Technical Seminar	50	46	--	--	46	92.00	2.00	P	O
2	A18444	Radar Engineering	25	24	75	44	68	68.00	3.00	P	A
3	A184P2	Major Project	50	47	150	142	189	94.50	11.00	P	O
4	A184CV	Comprehensive Viva Voce	100	97	--	--	97	97.00	2.00	P	O
5	A18442	CMC	25	24	75	42	66	66.00	3.00	P	A
6	A18443	DCN	25	24	75	41	65	65.00	3.00	P	A
Result(%):81.69											

End Exam Result for the Course-CSE is displayed for only few members out of combined strength of regular 240 plus 45 lateral entry students, to show the improvement in the results and student **Bharat** barring Roll number of 15911A0464 got total 72 marks for 100 shown in below Table.7.

Table.7.Results of the Batch 2015-2019 for the course Control System Engineering

		MATLAB									
8	A16424	MPMC	25	22	75	46	68	68.00	3.00	P	A
9	A16423	DSP	25	25	75	49	74	74.00	3.00	P	A+

Roll Number	Internal	External	Total
15911A0461	11	19	30
15911A0462	15	40	55
15911A0463	23	45	68
Bharat Malaviya of 15911A0464	24	48	72
15911A0465	20	50	70
15911A0466	18	42	60
15911A0467	10	40	50



The results for the course shown below using chat to visualize that how many students were above the 60% of assigned threshold and how many members were below the 50% to complete the direct CO attainment,PO attainment and that is shown in below Figure.2.

Figure.2.End Exam Results for the course-CSE

VI. Course End Survey Form for the course CSE:
The Course End Survey Form for all subjects can be collected from students after successful completion of the B.Tech in VJIT and the respected faculty will take care about that work.The course End Survey form for Control System Engineering is shown in below Table.8.

Table.8.Course End Survey Form in VJIT

VII. PO Attainment through direct Method:

The PO Attainment of individual student through direct and indirect method can be evaluated after the completing their program. All these works have to be done under the guidance of Department Advisory Board (DAB) in VJIT. In this regards The PO attainment for the student Bharath of roll number 15911A0464 is shown below Table.9.

TABLE.9. PO Attainment of the student Bharath of roll number 15911A0464

course code	course	po 1	po 2	po 3	po 4	po 5	po 6	po 7	po 8	po 9	po 10	po 11	po 12
101	english	2.67	-	-	2.67	2.67	3.00	3.00	3.00	3.00	3.00	-	3.00
102	mathematics-I	3.00	3.00	3.00	3.00	2.00	3.00	2.00	2.00	2.00	3.00	1.00	3.00
103	mathematical methods	3.00	3.00	3.00	3.00	2.00	3.00	2.00	2.00	2.00	-	1.00	2.00
104	engineering physics	3.00	2.80	2.40	2.80	2.00	2.00	1.60	2.00	1.00	1.00	1.00	2.00
105	engineering chemistry	3.00	2.00	2.30	2.00	1.00	1.00	2.00	-	-	-	2.00	2.00
106	computer programming	3.00	3.00	3.00	3.00	2.00	2.00	1.00	2.00	1.00	1.00	1.00	2.00
111	it workshop/engg workshop	3.00	3.00	2.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	-	1.00
201	mathematics iii	3.00	2.75	2.75	2.50	2.25	-	1.25	-	2.25	1.75	2.25	2.25
202	probability theory and stochastic process	2.75	3.00	2.75	3.00	3.00	2.75	2.75	-	2.75	3.00	3.00	2.00
203	switching theory and logic design	3.00	3.00	3.00	3.00	3.00	2.50	-	-	2.75	2.00	-	2.00
204	electric circuits	3.00	2.50	3.00	2.25	3.00	2.75	1.50	-	2.50	-	2.75	1.25
205	electronic devices and circuits	2.25	3.00	3.00	2.75	3.00	2.75	2.75	-	3.00	3.00	3.00	2.00
206	signals and systems	3.00	2.75	2.75	3.00	3.00	2.75	2.75	-	2.75	2.75	3.00	1.00
209	pee	3.00	3.00	3.00	3.00	2.50	2.00	3.00	-	3.00	-	2.25	3.00
210	electronic circuit analysis	3.00	3.00	3.00	3.00	3.00	2.75	-	-	3.00	3.00	3.00	3.00
211	pulse and digital circuits	3.00	3.00	3.00	3.00	3.00	2.75	-	-	3.00	-	3.00	3.00
212	environmental studies	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
213	emtl	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
214	digital design through verilog hdl	3.00	2.75	3.00	3.00	3.00	2.00	-	-	3.00	-	3.00	3.00
301	control systems engineering	2.75	3.00	2.75	3.00	3.00	2.00	2.00	-	3.00	-	3.00	3.00
214	digital design through verilog hdl	3.00	2.75	3.00	3.00	3.00	2.00	-	-	3.00	-	3.00	3.00
301	control systems engineering	2.75	3.00	2.75	3.00	3.00	2.00	2.00	-	3.00	-	3.00	3.00
302	computer organisation	3.00	3.00	3.00	3.00	3.00	2.00	3.00	-	2.00	-	3.00	3.00

	& operating systems	0	0	0	0	0	0	0	0	0	0	0	0
303	antennas and wave propagation	2.75	2.50	2.75	2.75	3.00	2.00	2.00	-	3.00	3.00	3.00	3.00
304	emi	3.00	3.00	3.00	3.00	3.00	2.00	2.00	-	2.00	-	3.00	3.00
305	analog communications	3.00	3.00	3.00	3.00	3.00	2.00	3.00	-	2.00	3.00	3.00	3.00
306	linear and digital ic applications	3.00	3.00	3.00	3.00	3.00	2.00	2.00	-	3.00	2.00	3.00	3.00
309	managerial economics and financial analysis	-	3.00	3.00	3.00	-	3.00	3.00	-	-	3.00	3.00	2.00
310	human values and professional ethics & disaster management	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	2.00	3.00	-	3.00
302	computer organisation & operating systems	3.00	3.00	3.00	3.00	3.00	2.00	3.00	-	2.00	-	3.00	3.00
303	antennas and wave propagation	2.75	2.50	2.75	2.75	3.00	2.00	2.00	-	3.00	3.00	3.00	3.00
304	emi	3.00	3.00	3.00	3.00	3.00	2.00	2.00	-	2.00	-	3.00	3.00

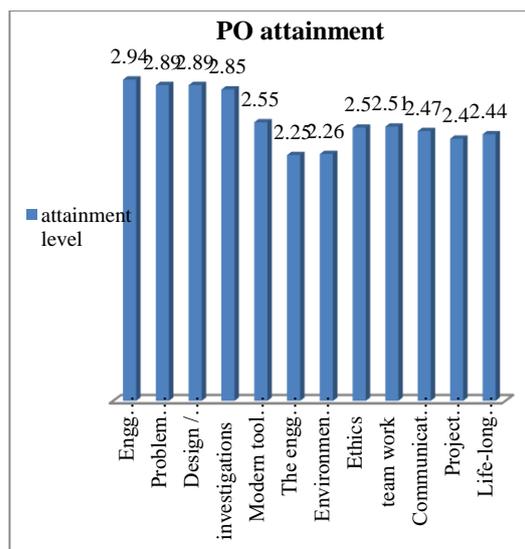
Vidya Jyothi Institute of Technology				
Faculty Name:K.PAVANI		Designation:Assoc Professor		
Course code :A15415		Course Name:CSE		
Student Name: Bharat Malaviya		Roll No:15911A0464		
Academic Year:2017-2018		Semester: I		
Batch:2015-2019				
CO Number	To what extent do you feel that you have learn	Slight (low) 1	Moderate (medium) 2	Substantia 1 (high) 3
CO1	Demonstrate and understand the fundamentals cs.			3
CO2	Obtain the transient and steady state resp.			3
CO3	Determine different forms suitable for use in the analysis and design of control systems		2	
CO4	Examine the stability of a closed-loop control system			3
CO5	Ability and analyze control systems by state variable representation		2	

305	analog communications	3.00	3.00	3.00	3.00	3.00	2.00	3.00	-	2.00	3.00	3.00	3.00
306	linear and digital ic	3.00	3.00	3.00	3.00	3.00	2.00	2.00	-	3.00	2.00	3.00	3.00

309	meffa	-	3.0	3.0	3.0	-	3.0	0.0	-	3.0	3.0	2.0
310	human values and professional ethics & disaster management	3.0	3.0	3.0	3.0	2.0	3.0	3.0	3.0	2.0	3.0	3.0
311	digital communications	3.0	3.0	3.0	3.0	3.0	2.0	2.0	-	3.0	3.0	3.0
312	vlsi design	2.5	2.5	3.0	3.0	3.0	2.5	2.5	-	3.0	3.0	3.0
313	micro	3.0	3.0	3.0	3.0	3.0	2.0	2.0	3.0	3.0	2.0	2.0
314	digital signal processing	3.0	3.0	3.0	3.0	3.0	3.0	3.0	-	2.0	3.0	2.0
	average of direct attainment	2.94	2.89	2.89	2.85	2.55	2.25	2.26	2.50	2.51	2.47	2.44

Table.10.PO Direct Attainment results of Bharath of roll number 15911A0464:

Attainment level												
(CO-PO) Mapping AVG	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
2.6	2.94	2.89	2.89	2.85	2.55	2.25	2.26	2.50	2.51	2.47	2.40	2.44



VIII.PO Attainment results through indirect method:

VIII.1. Analysis of Exit Survey Data:

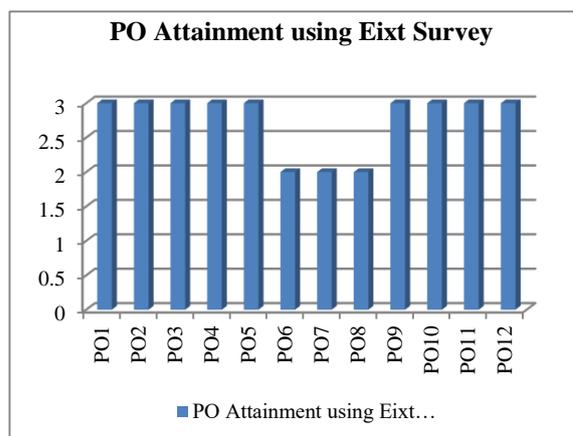
Analysis of Exit survey data was carried out through questionnaire form in VJIT has collected after completion of final 8th semester. Out of the

Table.11. Program Outcome Survey Form

20% weightage allotted for indirect method, 10% is taken from the Exit survey. 5% weight age allotted for Faculty survey and 5% for Course completion survey. The course end survey for the student Bharat is already shown in chapter VI and results also presented. Now the Program outcome using exit survey data in VJIT is shown in below Table.11. and in table 11.1.

Table.11.1. Program Outcome Survey Form

Vidya Jyothi Institute Of Technology (An Autonomous Institution) Department Of Electronics And Communication Engineering Program Outcomes/Program Specific Outcomes Survey Form				
Student name:	Bharat Malaviya	Roll no. /Reg. No (Optional)	15911A0464	
Program	B.Tech	Batch	2015-2019	
SL.No	To what extent do you feel	Slight (Low) 1	Moderate (Medium) 2	Substantial (High) 3
1	Engineering			3
2	Problem analysis:			3
3	Design/Development of Solutions:			3
4	Conduct investigations of complex problems:			3
5	Modern Tool Usage:			3
6	Engineer and		2	
7	Environment and sustainability:		2	
8	Ethics:		2	
9	Individual and team work			3
10	Communication			3
11	Project Management			3
12	Life long learning		2	



IX. Conclusion:

This paper presents complete CO attainment and PO Attainment of the course Control Systems

Engineering and the course B.Tech-ECE of the student M.Bharath of Roll No 15911A0464 for the both internal & Board Exam results using various surveys by using indirect and direct methods. Study reveals that although result was 97% for the course CSE, the attainment was less for CO3 & CO5. This analysis will help the faculty to plan new strategy for delivery, assessment and students involvement is also more important to improve practical knowledge. In Vidya Jyothi Institute of Technology, students can able to access, E- Journals (IEEE explore), SONET CD'S for core subjects like EDC, COMMUNICATIONS (it includes both AC and DC), STLD, MPMC and MICROWAVE ENGINEERING, and Students are encouraging with Project based learning and Electronics and communication Engg department is organizing many training programs for students like Ni Lab view, ARM university program, Modelsim, Machine Learning with Mous and in VJIT placement and training programs were running in semester breaks to provide placement for Students in both software and core side. For that reason only Mr. Bharath attainments shows improvements compared to traditional methods.

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