



SREE VAAGESWARI EDUCATIONAL SOCIETY
VAAGESWARI COLLEGE OF ENGINEERING

(Affiliated to JNTUH, Hyderabad.)

(Approved by AICTE New Delhi & Recognised by the Govt. of Telangana State)

2.6.2 Attainment of Program outcomes and course outcomes are evaluated by the institution.

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Principal

Vaageswari College of Engineering
KARIMNAGAR.



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ATTAINMENT OF COURSE OUTCOMES

Assessment Process adopted for attainment of course outcomes for various courses:

Tools used for assessment:

Marks allocation by University: The division of marks given by university, and weightages in arriving at the attainment of CO are given below. The CO assessment is carried out through CIE and SEE with the following proportions:

Table: Weightage of Marks for CIE: SEE

Type of Course	Internal Marks(CIE)	External Marks(SEE)	Total Marks	Net CO attainment level as per weightage
Theory	25	75	100	$0.25 \times \text{CIE Level} + 0.75 \times \text{SEE Level}$
Laboratory	25	75	100	$0.25 \times \text{CIE Level} + 0.75 \times \text{SEE Level}$
Seminar	100		100	CIE Level
Industrial Oriented Mini Project/ Summer Internship	25	75	100	$0.25 \times \text{CIE Level} + 0.75 \times \text{SEE Level}$
Project Stage – I	100	-	100	CIE Level
Project Stage – II	25	75	100	$0.25 \times \text{CIE Level} + 0.75 \times \text{SEE Level}$
Mandatory Course	100	-	100	CIE Level

Based on combined marks (i.e., CIE+SEE) obtained by the candidate, Letter grades are awarded as shown below and corresponding Grade Points are also shown in table

% of Marks Secured in a Subject/Course (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points
Greater than or equal to 90%	O (Outstanding)	10
80 and less than 90%	A+ (Excellent)	9
70 and less than 80%	A (Very Good)	8
60 and less than 70%	B+ (Good)	7
50 and less than 60%	B (Average)	6
40 and less than 50%	C (Pass)	5
Below 40%	F (FAIL)	0
Absent	Absent	0


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Table: Letter grades with respect to academic Performance

For attainment of course outcomes

- Final Letter grades obtained by each student in the course are made available by university.
- These Letter grades must be converted to marks as shown in below table.

% of Marks Secured in a Subject	Letter Grade	Corresponding Marks
Greater than or equal to 90%	O	1*Max SEE Marks
80 and less than 90%	A+	0.89* Max SEE Marks
70 and less than 80%	A	0.79* Max SEE Marks
60 and less than 70%	B+	0.69* Max SEE Marks
50 and less than 60%	B	0.59* Max SEE Marks
40 and less than 50%	C	0.49* Max SEE Marks
Below 40%	F	0.39* Max SEE Marks

Table: Conversion of Letter grades into corresponding marks

➤ **Frequency of Data Collection**

The data required for calculating attainments is to be gathered. Each course instructor maintains the data required like Internal Marks mid wise and External Marks of their respective course. The frequency of data collection for each assessment tool is shown in a table.

Assessment Tool	Frequency
University Examination	once a semester
Mid Examination	twice a semester
Assignments	twice a semester
Internal/External Lab Examination	once a semester

Table: Data Frequency

Attainment of CO's for Theory Courses:

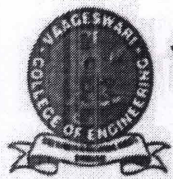
Attainment of theory courses calculated based on student performance in Continuous Internal Evaluation (CIE) and Semester End Examination (SEE)

$$\text{Overall CO attainment} = 0.25 * \text{CIE Level} + 0.75 * \text{SEE Level}$$

These values of the CO levels for the course are then used for mapping the PO attainments, using the array of target PO values for the course. The procedure adapted for calculating the attainment of Course Outcomes for a Theory course is described with an example for the course Python Programming

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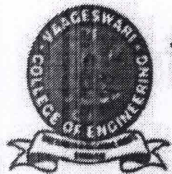
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Table: Mid-I Internal Examination Attainment

Sl.No	Roll Number	Question No.				Objective	Assignment
		1	2	3	4		
Maximum Marks		5	5	5	5	10	5
1	17S41A0507	5	5			6	5
2	17S41A0519	5	5		5	9	5
3	17S41A0522	5		5		6	5
4	17S41A0548	5	5			5	5
5	17B71A0506	5			5	5	5
6	17S41A0560	5			5	9	5
7	17S41A0571			4	5	5	5
8	17S41A0593	5			5	8	5
No. of students attempted		67	55	36	28	95	95
Max Marks Question wise		5	5	4.5	5	10	5
Threshold 55%		2.75	2.75	2.75	2.75	5.5	2.75
No. of Students above threshold		56	50	32	20	85	93
% of Students>Target Score		94.67	98.56	83.73	89.48	96.53	100
Attainment Level		3	3	3	3	3	3
Attainment Level 1:		60% students score more than threshold					
Attainment Level 2:		70% students score more than threshold					
Attainment Level 3:		80% students score more than threshold					

Course Outcome Attainment based on Exam Questions in terms of percentage of total students when mapped to each question

CO's	Subjective	Objective	Assignment	Attainment Level
Course outcome - 1	3	3	3	3
Course outcome - 2	3	3	3	3
Course outcome - 3			3	3
Course outcome - 4				
Course outcome - 5				



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Table: Mid-2 Internal Examination Attainment

Sl.No	Roll Number	Question No.				Objective	Assignment
		1	2	3	4		
Maximum Marks		5	4	5	5	10	5
1	17S41A0512	4		4		9	5
2	17S41A0516	4	4			6	5
3	17S41A0526		4.5		4.5	6	5
4	17S41A0528		4.5	4.5		5	5
5	17S41A0564	5	5			7	5
6	17S41A0565		4	4		6	5
7	17S41A0572	3.5			4.5	6	5
8	17S41A0582	4			4	8	5
9	17S41A0593	5		4		7	5
No. of students attempted		59	61	33	26	93	93
Max Marks Question wise		5	5	5	5	10	5
Threshold 55%		2.75	2.75	2.75	2.75	5.5	2.75
No. of Students above threshold		51	55	25	20	88	93
% of Students>Target Score		96.3	77.47	50	78.58	93.92	100
Attainment Level		3	2	1	2	3	3

Course Outcome Attainment based on Exam Questions in terms of percentage of total students when mapped to each question

CO's	Subjective	Objective	Assignment	Attainment Level
Course outcome - 1				
Course outcome - 2				
Course outcome - 3	3	3	3	3
Course outcome - 4	2	3	3	3
Course outcome - 5	1	3	3	2



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External Examination Attainment

S.NO.	HALLTICKET NO	TOTAL (Max. Score:75)
1	17S41A0506	56
2	17S41A0514	50
3	17S41A0539	49
4	17S41A0543	14
5	17S41A0558	46
6	17S41A0560	56
7	17S41A0568	58
8	17S41A0575	12
9	17S41A0588	54
10	17S41A0598	39
11	18S45A0505	28
12	18S45A0510	27
No. of students who attempted the subject		94
Max. Marks		75
Threshold 40%		30
No. of students who scored more than the target score.		61
Percentage of students who scored more than target score.		64.89%
Overall External Attainment level		2

Table: Overall Attainment for Python Programming (CS751PC)

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal (Avg.)	University Exam	Overall Attainment
Course outcome - 1	3		3	2	2.25
Course outcome - 2	3		3	2	2.25
Course outcome - 3	3	3	3	2	2.25
Course outcome - 4		3	3	2	2.25
Course outcome - 5		2	2	2	2

Similarly CO attainment is calculated for all theory courses for corresponding academic years respectively


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CO attainment level for courses other than Theory:

a) Laboratory:

Continuous Internal Evaluation:

The internal evaluation is based on session wise performance of experiment and viva voce, Observation, record and internal examination. The final internal marks are considered for CIE, and CO level for CIE attainment is decided upon the percentage of students who score more than 55% of the maximum internal marks, i.e., 13.75 out of 25 is used to decide the CO attainment level and is uniform for all CO's.

Semester End University Examination Evaluation (SEE):

SEE Lab exam is evaluated for 75 marks. In SEE of the lab, % of students who score over 40% of the maximum marks, i.e. 30 out of 75 marks, is used to decide the CO attainment level and is uniform for all CO's.

b) Seminar:

For seminars, the assessment is based only on internal evaluation. The marks obtained in seminar is used to decide the % of students who scored more than 55% of maximum marks, and this % is used for determining corresponding CO attainment level. This Attainment level is construed as uniform for all COs of the course.

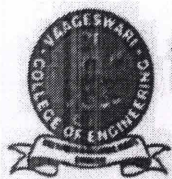
c) Industry Oriented Mini Project:

For Industry Oriented Mini Project, the assessment is based only on External evaluation. The marks obtained in Industry Oriented Mini Project is used to decide the % of students who scored more than 40% of maximum marks, and this % is used for determining corresponding CO attainment level. This Attainment level is construed as uniform for all COs of the course.

d) Project:

Continuous Internal Evaluation:

The internal marks for project (25) are the total of marks allotted in Project review, final presentation, and by project guide. The final internal marks are considered for CIE, and CO level for CIE attainment is decided upon the percentage of students who score more than 55% of the maximum internal marks, i.e., 13.75 out of 25 is used to decide the CO attainment level and is uniform for all COs.



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Semester End University Examination Evaluation (SEE):

The external evaluation is by award of Grade (Excellent/Very Good/Satisfactory /Poor). These grades are considered for SEE, and CO level for SEE attainment is decided upon the percentage of students who got Excellent/Very Good/Good to the number of students appeared is used to decide the CO attainment level and is uniform for all COs. The average value of the CO levels for the course are then used for mapping the PO attainments, using the array of target PO values for the course.

Attainment of Program Outcomes and Program Specific Outcomes:

Direct assessment of POs and PSOs for a course is obtained by mapping the respective CO value of Course Outcome attainment with the mapping of the target or expected POs and PSOs for the particular course.

The procedure adapted for calculating the attainment of Course Outcomes for a Theory course is described with an example for the course Python Programming

The CO values arrived from CIE and SEE for the course **Python Programming (CS751PC)** for academic year **2020-21** is

Table: CO values of Python Programming

CS751PC	CO1	CO2	CO3	CO4	CO5
	2.25	2.25	2.25	2.25	2

The Mapping POs for particular COs for the course CS751PC are given below

Table: CO-PO Mapping of CS751PC course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	3	3	3	2	1	-	-	-	3	3	3	3
CO2	1	1	3	2	3	2	2	-	-	-	3	3	3	3
CO3	1	1	3	2	2	2	2	-	-	-	3	3	3	3
CO4	2	2	3	3	2	2	2	-	-	-	3	3	3	3
CO5	2	2	3	2	2	2	2	-	-	-	3	3	2	2
Avg.	1.4	1.5	3	2.4	2.4	2	1.8	-	-	-	3	3	2.8	2.8

Mapping value for combination of CO1-PO1 is 1.

Then the attainment value is $2.25 \times 1/3 = 1.40$

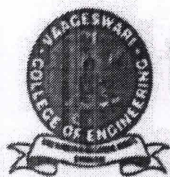
Mapping value for combination of CO4-PO2 is 2.

Then the attainment value is $2.25 \times 2/3 = 1.5$

Other POs are mapped similarly.

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The Complete PO Attainment mapping for the course **CS751PC** is shown below.

Table: PO Attainment from Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	0.75	0.75	2.25	2.25	2.25	1.50	0.75	-	-	-	2.25	2.25	2.25	2.25
CO2	0.75	0.75	2.25	1.50	2.25	1.50	1.50	-	-	-	2.25	2.25	2.25	2.25
CO3	0.75	0.75	2.25	1.50	1.50	1.50	1.50	-	-	-	2.25	2.25	2.25	2.25
CO4	1.50	1.50	2.25	2.25	1.50	1.50	1.50	-	-	-	2.25	2.25	2.25	2.25
CO5	1.33	1.33	2.00	1.33	1.33	1.33	1.33	-	-	-	2.00	2.00	1.33	1.33
Avg.	1.02	1.02	2.20	1.77	1.77	1.47	1.32	-	-	-	2.20	2.20	2.07	2.07

The PO/PSO attainment values so obtained from their direct component for the course. The direct components for all the courses are obtained similarly and tabulated. The average for each PO/PSO gives the values attained directly.

Indirect Component:

The PO/PSOs are attained indirectly by taking different surveys. These surveys are also having equal weightage for Overall PO/PSO attainment.

1. Program Exit Survey
2. Alumni Survey
3. Employer Feedback Survey

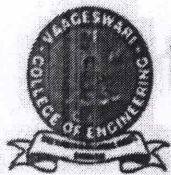
Frequency of Data Collection:

Table: Data frequency

Assessment Tool	Frequency of data collection
Program Exit Survey	once a year
Employer Survey	once a year
Alumni Survey	once a year

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Indirect Assessment Tools:

- **Alumni Survey:** A feedback is collected on POs & PSOs from alumni students. It contributes towards the weightage of PO and PSO attainment. This survey is conducted by Alumni coordinator with the passed out students. Alumni coordinator collects both Alumni feedback forms filled by passed out student.
- **Employer Feedback Survey:** A feedback is collected on Vision & Mission, PEOs, and POs & PSOs. It is an indirect assessment tool which contributes towards the weightage of PO and PSOs. It is conducted after one year of service completed by the graduates from joining those respective organizations.
- **Program Exit Survey:** The Program graduate exit survey is collected at the end of the program. The objective of the survey is to know the level of confidence of each POs & PSOs that a graduate possess by the end of the program.


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Program Outcomes														
S.No.	Code	Subject	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
B. Tech I Year														
1	MA101BS	Mathematics - I	1.25	1.5	1.5	1.75	1.5	1.5	-	-	1.25	1.5	1.5	1.75
2	CH102BS	Chemistry	1.5	1.5	1.5	1.5	1.5	1.5	-	-	1.5	-	1.5	1.5
3	EE103ES	Basic Electrical Engineering	1.5	1.5	1.5	1.5	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5
4	ME105ES	Engineering Workshop	1.75	1.5	1.5	1.25	1.5	-	1.5	-	1.75	1.5	-	1.25
5	EN105HS	English	-	1.5	1.3	1.5	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5
6	CH106BS	Engineering Chemistry Lab	2	-	-	-	-	-	-	-	2.5	-	-	-
7	EN107HS	English Language And Communication Skills Lab	3	2	3	3	3	3	3	3	3	3	3	3
8	EE108ES	Basic Electrical Engineering Lab	1.75	1.5	1.5	1.5	-	1.5	1.5	1.5	1.25	1.5	1.5	1.5

9	MC209ES	Environmental Science	2.25	2.25	2.05	2.25	2.45	2.25	-	-	2	2.5	2.25	2.25
10	MA201BS	Mathematics - II	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
11	AP202BS	Applied Physics	1.5	1.5	1.5	-	-	-	-	-	-	-	-	-
12	CS203ES	Programming For Problem Solving	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
13	ME204ES	Engineering Graphics	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
14	AP205BS	Applied Physics Lab	-	-	-	3	-	-	-	-	-	-	-	-
15	CS206ES	Programming For Problem Solving Lab	3	3	3	3	3	3	3	3	3	3	3	3
B. Tech II Year														
16	MA301BS	Mathematics – IV	1.5	1.5	0.5	0.5	-	-	-	-	-	-	-	0.5
17	CS302ES	Data Structures Through C++	2.1	2.1	2.1	1.8	1.5	1.8	1.8	-	1.5	-	-	1.5
18	CS303ES	Mathematical Foundations Of Computer Science	1.8	1.8	1.95	-	-	1.05	-	1.05	-	-	1.2	1.05
19	CS304ES	Digital Logic Design	1.1	1.1	1.2	-	0.8	-	-	-	-	1.0	-	-
20	CS305ES	Object Oriented Programming	1.5	1.5	1.2	1.1	1.1	1	1	-	0.8	0.8	-	-

		Through Java												
21	CS306ES	Data Structures Through C++ Lab	3	3	2.6	2.4	3	2	3	-	2	-	-	-
22	CS307ES	It Workshop	2.4	2.6	2.4	-	2.6	2	2	-	2	1.75	1.8	1.8
23	CS308ES	Object Oriented Programming Through Java Lab	2.8	2.8	2.6	2	2.6	2	-	-	2	1.8	-	1.6
24	CS401BS	Computer Organization	2.6	2.6	2.4	2.4	2.2	2	2	-	-	-	-	-
25	CS402ES	Database Management Systems	1.2	1.1	1.4	1	1.4	1	1	-	1	1.3	-	-
26	CS403ES	Operating Systems	2.1	1.5	2.1	2.0625	1.05	1.35	-	-	-	-	-	-
27	CS404ES	Formal Languages And Automata Theory	1.5	2	1.2	1	0.75	0.75	0.75	-	-	-	-	-
28	SM405MS	Business Economics And Financial Analysis	1.2	1	-	1	1.2	-	1.2	-	-	-	1.8	-
29	CS406ES	Computer Organization Lab	2	1.8	3	3	3	1	-	-	-	-	-	-
30	CS407ES	Database Management Systems Lab	2.6	2.6	2	2	3	2	-	-	-	1.4	2	1.2

31	CS408ES	Operating Systems Lab	2.5	2.5	3	2	3	1	-	-	1.5	-	2.5	1
B.Tech III Year														
32	CS501PC	Design and Analysis of Algorithms	2.25	1.35	2.25	2.25	2.25	-	-	-	-	-	1.5	1.35
33	CS502PC	Data Communication and Computer Networks	2.25	1.5	0.975	1	0.5	-	-	-	-	1.1	1	-
34	CS503PC	Software Engineering	1.2	1.2	1.2	1.1	1.375	1	-	-	1	1	1	0.7
35	SM504MS	Fundamentals of Management	1	0.7	0.5	-	0.6	0.6	0.8	-	0.7	0.7	0.7	0.6
36	CE511OE	Disaster Management	1	2	2	-	2	1	1	-	2	3	-	3
37	CS505PC	Design and Analysis of Algorithms Lab	3	2.8	3	2.25	3	1.75	2	-	1	-	-	-
38	CS506PC	Computer Networks Lab	3	3	3	3	3	2	2	-	1	2	-	2
39	CS507PC	Software Engineering Lab	3	3	3	3	3	3	2	2	2	1.25	3	2
40	CS601PC	Compiler Design	1.1	0.83	1.2	-	1	1	-	-	-	-	-	-

41	CS602PC	Web Technologies	3	2.5	2.2	1.2	2.7	-	3	-	-	-	-	-
42	CS603PC	Cryptography and Network Security	1.65	1.5	1.35	1.5	-	1.35	1.5	-	1.5	-	0.9	1.2
43	EC621OE	Principles of Computer Communication s and Networks	1	1	1	1	1	1	-	-	-	3	2	3
44	CS612PE	Design Patterns	1.5	1.125	0.5	0.5	-	-	-	-	-	1	-	-
45	CS604PC	Cryptography and Network Security Lab	3	3	3	3	3	2	2	-	2	1	-	1
46	CS605PC	Web Technologies Lab	1.4	1.6	3	1.2	3	3	-	-	3	2	-	2
47	EN606HS	Advanced English Communication Skills Lab	-	-	-	-	-	-	-	1.8	1.8	2.2	2	2.4
B.Tech IV Year														
48	A70511	Linux Programming	1.95	-	1.65	1.5	1.8	2.25	1.2	-	1.95	1.8	1.95	-
49	A70530	Design Patterns	0.8	0.8	0.8	-	-	-	-	-	-	-	0.8	-
50	A70520	Data Warehousing and Data Mining	2.2	2	1.3	1.9	2	-	-	-	2	-	-	-
51	A70519	Cloud Computing	1.8	1.245	2.1	1.35	-	-	1.125	-	1.5	-	1.5	1.5

52	A70540	Software Project Management	1.35	1.65	1.5	1.2	-	1.245	1.5	-	1.5	1.5	1.5	1.35
53	A70533	Information Retrieval Systems	1	1	1.2	1.2	0.8	0.7	0.7	-	-	1	0.7	-
54	A70596	Linux Programming Lab	2.25	1	2.25	1.5	2	-	-	-	-	-	-	-
55	A70595	Data Warehousing and Mining Lab	2.4	2.4	2.8	2.2	2.8	2	2	-	2	3	2.4	-
56	A80014	Management Science	-	-	1.6	1.55	-	0.75	1.2	1.35	-	-	1.05	
57	A80547	Multi media and Rich internet application	0.8	0.7	0.7	0.5	-	-	-	-	-	-	-	-
58	A80543	Database Security	2.25	1.5	1.5	1.125	2.25	-	-	-	2	-	-	2.5
59	A80087	Industry Oriented Mini Project	2.2	2.6	2.6	2	2	1.6	2	1	2	2.6	2.6	1.6
60	A80089	Seminar	2	1.5	-	1.35	2.1	-	0.55	-	-	3	-	3
61	A80088	Project Work	1.7	1.95	1.25	2	3	2.75	1	-	1.3	2.5	1.5	1.33
62	A80090	Comprehensive Viva	2.6	2.6	2	-	-	-	-	3	3	3	-	1.75
Average			1.98	1.83	1.89	1.75	2.04	1.67	1.7	1.76	1.77	1.86	1.77	1.73

PO ATTAINMENT LEVEL (2021-2022)												
Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
DIRECT ATTAINMENT (Average)	1.98	1.83	1.89	1.75	2.04	1.67	1.7	1.76	1.77	1.86	1.77	1.73
DIRECT ATTAINMENT (80% of Average)	1.58	1.46	1.51	1.40	1.63	1.34	1.36	1.38	1.42	1.49	1.42	1.38
INDIRECT ATTAINMENT	2.97	2.88	2.90	2.88	2.95	2.82	2.72	2.70	2.83	2.72	2.84	2.83
INDIRECT ATTAINMENT (20%)	0.59	0.58	0.58	0.57	0.59	0.56	0.55	0.54	0.57	0.55	0.57	0.57
OVERAL PO ATTAINMENT (80+20)	2.17	2.04	2.09	1.97	2.22	1.90	1.91	1.93	1.93	2.04	1.99	1.95


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