

Assessment of Attainment of Student Outcome

(Year 2017)

for the

Bachelor of Engineering

in

Mechanical Engineering

Thapar Institute of Engineering and Technology

Patiala (Punjab) - 147004

India

**Assessment of Attainment of Student Outcome
'A'
(Year 2017)**

for the

Bachelor of Engineering
in
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Thapar Institute of Engineering and Tecgnology

Patiala (Punjab) - 147004

INDIA

Attainment of Outcome A

The attainment of each outcome has been measured using a standard procedure explained in the Self Assessment Report for the program. A flow chart depicting the step by step methodology used to measure each attainment is provided below for ready reference.

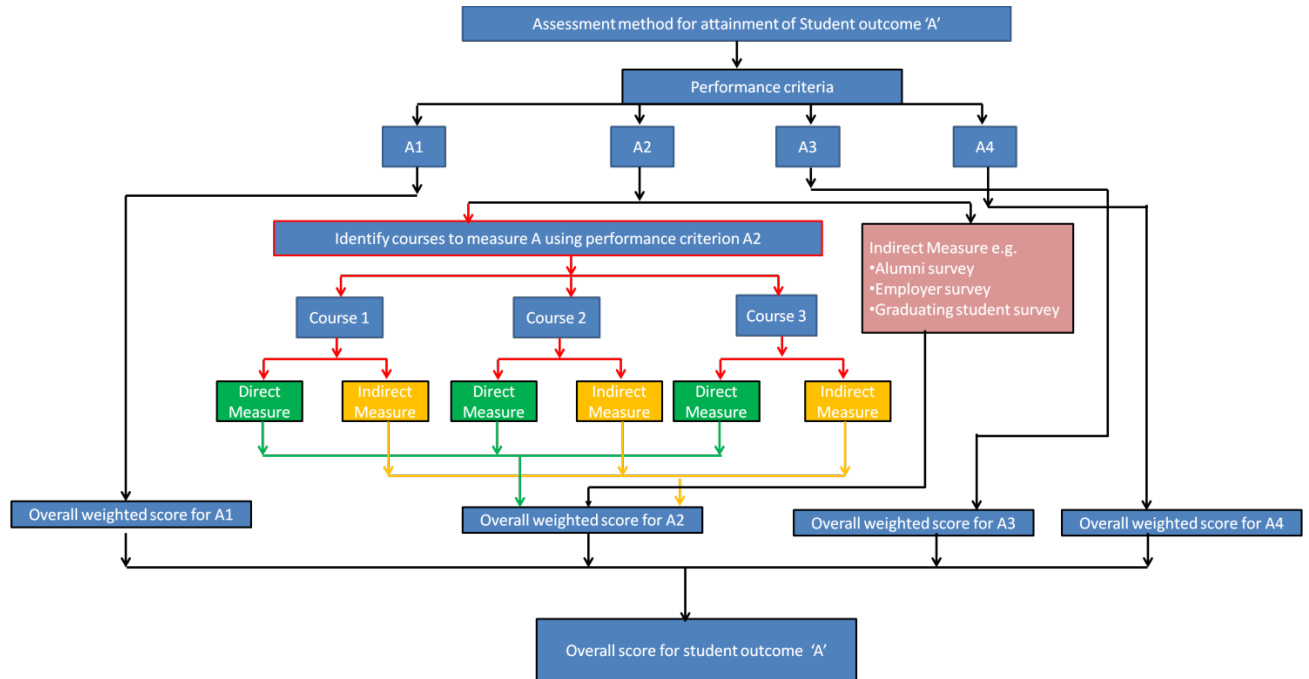


Figure A4.1: Flow chart for the attainment of outcome 'A'

The following courses have been considered for the assessment of student outcome 'A'

Courses:

1. Solids and Structures (UES010)
2. Turbo Machinery (UME804)
3. Manufacturing Processes (UTA002)
4. Project Semester (UME691)
5. Engineering Economics (UHU081)

Outcome A has been assessed by four performance criteria A1, A2, A3 and A4. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these four performance criteria has been used to measure the overall measure of outcome A.

1) Assessment of Outcome 'A' using performance criterion A1

Performance criteria 'A1': Applying mathematics (multivariate calculus, differential equations, linear algebra etc.) to obtain analytical and numerical solutions.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Turbo Machines (UME 804) and Solids and Structures (UES010) were used to assess performance criteria A1 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Turbo Machines (UME 804)

The above performance criteria is used to measure the attainment of outcome 'A1' by giving the following question (Question No. 5a: during EST in May 2017, weightage 11 marks) to the students.

Question: Prove that the maximum blade efficiency for Parson's reaction turbine is obtained at the following condition:

$$\rho = \cos\alpha_1, \text{ where } \rho \text{ is blade speed ratio and } \alpha_1 \text{ is nozzle angle.}$$

Further prove that the maximum blade efficiency at this condition is given by:

$$\eta_b = \frac{2 \cos^2 \alpha_1}{1 + \cos^2 \alpha_1}$$

Student's performance in the above question is given below:

Table A4.1: Student's performance in question targeting 'A1'; course: UME804

S. No.	Roll no.	Name	Marks (MM: 11)	Score (Scale 1 to 5)
1	101308015	Ankit Sehgal	8.5	5
2	101308033	Ekansh K. Srivastava	8.5	5
3	101308059	Kanwar Pal S. Gulati	4	2
4	101308067	Ketan Chauhan	8	4
5	101308069	Kirat Singh Basur	6	3
6	101308070	Kshitij Sharma	2.5	2
7	101308071	Lokendra Kumar	8.5	5
8	101308074	Manik Saharan	1	1
9	101308075	Manish Pandoh	8.5	5
10	101308077	Manutkarsh Kirpal	3.5	2
11	101308078	Nidan Prakash	7	4
12	101308079	Nikhil Aggarwal	9.5	5
13	101308080	Nikhil Ganta	9	5
14	101308082	Paramjot Singh	2	1
15	101308083	Paras	9	5
16	101308085	Prabhman Vir	1	1
17	101308088	Pulkit Kapoor	9	5
18	101308089	Puneet Singh	9	5

S. No.	Roll no.	Name	Marks (MM: 11)	Score (Scale 1 to 5)
19	101308090	Rajat Gupta	7	4
20	101308091	Ramnish Kumar	9	5
21	101308093	Rohan Kaushal	8.5	5
22	101308094	Sagar Singla	8	4
23	101308096	Sahil Sharma	9	5
24	101308097	Samdeep S. Sabharwal	2	1
25	101308098	Sameer Bhalla	7	4
26	101308099	Sartaj Singh	7.5	4
27	101308101	Shikhar Gaur	9	5
28	101308102	Shreyas Bhayana	9	5
29	101308103	Shubham	8	4
30	101308104	Shubham Bhama	9	5
31	101308105	Shubham Chaudhary	5	3
32	101308106	Shubham Gupta	8.5	5
33	101308108	Siddharth Ghiya	4	2
34	101308109	Siddharth Gupta	9	5
35	101308110	Siddharth Vasu	9	5
36	101308111	Sidhant	5	3
37	101308112	Simrandeep S. Bhullar	7.5	4
38	101308113	Sourav Singla	9	5
39	101308114	Tanjay Pathak	7.5	4
40	101308115	Tanuj Lamba	7	4
41	101308116	Utsav Mudgal	5	3
42	101308117	Vaibhav P. S.Pundir	7.5	4
43	101308118	Varmeet Singh Gulati	1	1
44	101308119	Varun Atri	9	5
45	101308120	Vedant Mansotra	7	4
46	101308121	Vikrant Nanda	8.5	5
47	101308122	Vishal Solanki	5	3
48	101308123	Vivek Mittal	9	5
49	101308124	Vivek Pundir	9	5
50	101308125	Yashwardhan Sharma	9	5
51	101488008	Ishan	8.5	5
52	101488012	Mohit Goyal	9	5
53	101488013	Navjot Rihal	9	5
54	101488014	Nikhil Gupta	9	5
55	101488015	Sankit	9.5	5
56	101488016	Sarang Vashisht	8.5	5
57	101488017	Varun Bansal	7	4
58	101488018	Vishnu Kalra	6	3

The overall performance of students in the above question is then summarized as given below

Table A4.2: Average score of student performance in the course UME804 for criteria A1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME804	51.7	22.4	10.3	6.9	8.6	4.02

(ii) Course: Solids and Structure (UES010)

The above performance criteria is used to measure the attainment of outcome ‘A1’ by giving the following question (Question No. 2(a): during EST in December 2017, weightage 12 marks) to the students.

Question: Draw the shear force and bending moment diagram for the beam shown in the **Figure 1**. Mark all the relevant points.

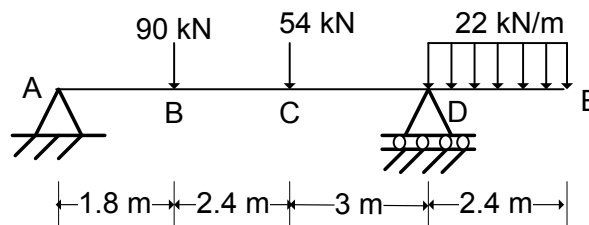


Figure 1.

Student’s performance in the above question is given below:

Table A4.3: Student’s performance in question targeting ‘A1’; course: UES010

Sr. no	Roll no	Name	Marks (MM: 12)	Score (Scale 1 to 5)
1	101604036	Arjun Singh Pathania	2	2
2	101604092	Naman Dhingra	2	2
3	101604094	Navdeep Kaur	3	3
4	101604095	Naveen Mehta	2	2
5	101604096	Navjot Kaur	0	1
6	101604097	Navodit S Madaan	0	1
7	101604098	Nikhil Anand	5	4
8	101604100	Nishtha Arora	0.5	1
9	101604101	Paarth Arora	1	2
10	101604102	Palam Singla	2	2
11	101604103	Parakh Sharma	11	5
12	101604104	Piyush	1.5	2
13	101604105	Piyusha	1	2
14	101604106	Prabhat Singh	11	5
15	101604107	Pradeep Murarka	10	5
16	101604108	Pragghya Chakravorty	0	1

17	101604109	Prakhar Pandey	7	5
18	101604110	Pranshu Kumar Sharma	12	5
19	101604111	Pranvi	9.5	5
20	101604112	Pratham Arora	8	5
21	101604113	Pratik Sidhu	11	5
22	101604114	Raghav Garg	11	5
23	101604115	Raghav Goyal	12	5
24	101604117	Ranjana	12	5
25	101604119	Rishav Jindal	8	5
26	101604121	Rohan Kansal	11	5
27	101604122	Rohan Singh	0	1
28	101604123	Rukman Kaur Brar	12	5
29	101604125	Sahil	12	5
30	101604127	Sahil Chigal	10	5
31	101604128	Sahil Goel	8	5
32	101604129	Sahil Goyal	6	5
33	101604130	Sahil Vasisht	10	5
34	101604131	Sajan Rana	10	5
35	101604133	Sakshi Kaushal	9.5	5
36	101604134	Sakshi Sharma	12	5
37	101604136	Saransh Sagar	11.5	5
38	101604137	Seeratdeep Kaur	4	4
39	101604138	Sehajdeep Singh	2	3
40	101604140	Shaunak Chattopadhyay	10	5
41	101604142	Shaurya Sharma	2	3
42	101604143	Shekhar Pal	4	4
43	101604144	Shivam Monga	11	5
44	101604145	Shivanshu Sharma	12	5
45	101604146	Shivi Deveshwar	11	5
46	101604147	Shreyansh Sharma	2	3
47	101604148	Shubham Agrawal	11	5
48	101604149	Shubham Singla	11	5
49	101604150	Sidharth	11	5
50	101604151	Simranjeet Singh	8.5	5
51	101604152	Simranpreet Singh	11	5
52	101604153	Soham Banerjee	9	5
53	101604154	Sukhpal Singh Mann	6	5
54	101604155	Sultan Singh	9	5
55	101604157	Surbhi Manral	7	5
56	101604158	Sushant Goyal	3.5	3
57	101604159	Sushant Joshi	7	5
58	101604160	Takshak Kohli	0.5	1

59	101604162	Tushar Jain	11	5
60	101604163	Utkarsh Srivastava	11	5
61	101604164	Vanshika Aggarwal	9	5
62	101604165	Vidhi Mehta	2	3
63	101604166	Vikramjit Singh	10	5
64	101604167	Vikramjit Singh	10	5
65	101604168	Vishal Choudhary	12	5
66	101604169	Yash Kumar	12	5
67	101604170	Yati Arora	12	5
68	101604171	Yukta Sharma	10	5
69	101654017	Oankar Singh Dev	8	5
70	101654018	Parth Wadhwa	11	5
71	101654019	Praveen Verma	8	5
72	101654021	Sehaj Arora	0	1
73	101654022	Shubham Gandhi	0	1
74	101654023	Shubhanjali Singh	11	5
75	101654024	Sirjan Ahluwalia	0	1
76	101654025	Vanit Yadav	7	5
77	101654026	Vibhuti	11	5
78	101654027	Yuvraj Singh Chauhan	7	5
79	101784009	Kshitiz Kochhar	3	3
80	101784010	Manan Jain	7	5
81	101784011	Pankaj	0	1
82	101784012	Rajnish	5	4
83	101784013	Rohtash Narula	3	4
84	101784014	Sahil Gaur	3	4
85	101784015	Sanamdeep Mehra	7	5
86	101784016	Simranjeet Singh Rathore	1	2
87	101784017	Subham Paul	0.5	1

The overall performance of students in the above question is then summarized as given below

Table A4.4: Average score of student performance in the course UES010 for criteria A1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UES010	63.21	6.89	8.04	9.19	12.64	3.98

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria A1 as given below in Table A4.5:

Table A4.5: Weighted Average Student class performance (course portfolio) for criteria A1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME804	51.7	22.4	10.3	6.9	8.6	4.02	5
UES010	63.21	6.89	8.04	9.19	12.64	3.98	5
Weighted average score	57.46	14.65	9.17	8.05	10.62	4.00	10

b) Indirect measures for Performance criteria A1 (Surveys)**i.) Assessment Tool: Student Course Survey****Table A4.6: Average score of student course survey for criteria A1**

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UES010	56.34	31.7	2	1	0	4.17	5
UME804	51.7	22.4	10.3	6.9	8.6	4.01	5
Weighted average score	54.02	27.05	6.15	3.95	4.30	4.09	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey**Table A4.7: Assessment for criteria A1 using Graduating student survey, alumni survey and employer survey tool**

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	28.00	52.00	12.00	4.00	4.00	3.96
Alumni survey	12.00	72.00	14.00	2.00	0.00	4.00
Employer Survey	72.22	27.78	0.00	0.00	0.00	4.72

c) Overall weighted average score of performance criterion 'A1'

Finally overall weighted average score of performance criterion 'A1' is evaluated as given below in Table A4.8:

Table A4.8: Overall weighted average score of performance criterion 'A1'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	57.46	14.65	9.17	8.05	10.62	4.00	5.00
Weighted average student course survey	54.02	27.05	6.15	3.95	4.30	4.09	4.00
Graduating student survey	28.00	52.00	12.00	4.00	4.00	3.96	3.00
Alumni survey	12.00	72.00	14.00	2.00	0.00	4.00	3.00
Employer survey	72.22	27.78	0.00	0.00	0.00	4.72	3.00
Overall weighted score	46.67	35.38	8.25	4.11	4.57	4.13	18.00

Assessment of Outcome 'A' using performance criterion A2

Performance criteria 'A2': Demonstrate knowledge of fundamentals, scientific and/or engineering principles.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Turbo Machines (UME 804) and Manufacturing Processes (UTA002) were used to assess performance criteria A2 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Turbo Machines (UME 804)

The above performance criteria is used to measure the attainment of outcome 'A2' by giving the following question (Question No. 2(b): during EST in May 2017, weightage 6 marks) to the students.

Question: Compare with neat sketch of T-S diagram the influence of reheating and intercooling on performance of gas turbine cycle.

Student's performance in the above question is given below:

Table A4.9: Student's performance in question targeting 'A2'; course: UME804

S. No.	Roll No.	Name	Marks (MM: 6)	Score (Scale 1 to 5)
1	101308015	Ankit Sehgal	4.5	5
2	101308033	Ekansh K. Srivastava	4.5	5
3	101308059	Kanwar Pal S. Gulati	0	1
4	101308067	Ketan Chauhan	4	4
5	101308069	Kirat Singh Basur	2	2
6	101308070	Kshitij Sharma	0	1
7	101308071	Lokendra Kumar	4.5	5

8	101308074	Manik Saharan	0	1
9	101308075	Manish Pandoh	4.5	5
10	101308077	Manutkarsh Kirpal	0	1
11	101308078	Nidan Prakash	3	3
12	101308079	Nikhil Aggarwal	5.5	5
13	101308080	Nikhil Ganta	5	5
14	101308082	Paramjot Singh	0	1
15	101308083	Paras	5	5
16	101308085	Prabhman Vir	0	1
17	101308088	Pulkit Kapoor	5	5
18	101308089	Puneet Singh	5	5
19	101308090	Rajat Gupta	3	3
20	101308091	Ramnish Kumar	5	5
21	101308093	Rohan Kaushal	4.5	5
22	101308094	Sagar Singla	4	4
23	101308096	Sahil Sharma	5	5
24	101308097	Samdeep S. Sabharwal	0	1
25	101308098	Sameer Bhalla	3	3
26	101308099	Sartaj Singh	3.5	4
27	101308101	Shikhar Gaur	5	5
28	101308102	Shreyas Bhayana	5	5
29	101308103	Shubham	4	4
30	101308104	Shubham Bhama	5	5
31	101308105	Shubham Chaudhary	1	1
32	101308106	Shubham Gupta	4.5	5
33	101308108	Siddharth Ghiya	0	1
34	101308109	Siddharth Gupta	5	5
35	101308110	Siddharth Vasu	5	5
36	101308111	Sidhant	1	1
37	101308112	Simrandeep S. Bhullar	3.5	4
38	101308113	Sourav Singla	5	5
39	101308114	Tanjay Pathak	3.5	4
40	101308115	Tanuj Lamba	3	3
41	101308116	Utsav Mudgal	1	1
42	101308117	Vaibhav P. S.Pundir	3.5	4
43	101308118	Varmeet Singh Gulati	0	1
44	101308119	Varun Atri	5	5
45	101308120	Vedant Mansotra	3	3
46	101308121	Vikrant Nanda	4.5	5
47	101308122	Vishal Solanki	1	1

48	101308123	Vivek Mittal	5	5
49	101308124	Vivek Pundir	5	5
50	101308125	Yashwardhan Sharma	5	5
51	101488008	Ishan	4.5	5
52	101488012	Mohit Goyal	5	5
53	101488013	Navjot Rihal	5	5
54	101488014	Nikhil Gupta	5	5
55	101488015	Sankit	5.5	5
56	101488016	Sarang Vashisht	4.5	5
57	101488017	Varun Bansal	3	3
58	101488018	Vishnu Kalra	2	2

The overall performance of students in the above question is then summarized as given below

Table A4.10: Average score of student performance in the course UME804 for criteria A2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME804	51.7	12.1	10.3	3.4	22.4	3.67

(ii) Course: Manufacturing Processes (UTA002)

The above performance criteria is used to measure the attainment of outcome 'A2' by giving the following question (Question No. 3 (a): during EST in May, 2017, weightage 15 marks) to the students.

Question: An automobile manufacturer wishes to produce 10 aluminium small cylindrical components using investment casting. The final part requires a diameter of 7.5 mm and height of 15 mm. The dimensions of the central sprue and runner are given in the following table. Central sprue Dia: 15 mm; Max length: 145 mm, Runner Dia: 5 mm; length: 10 mm. Calculate the mass of the material required for completely filling the moulds, runners and sprue. The density of aluminium is 2.6 g/cm³. Also, draw a neat sketch of the above investment casting with dimensions (Assume Shrinkage allowance = 0 mm/m, machining allowance = 1 mm and draft allowance = 0° for investment casting process).

Student's performance in the above question is given below:

Table A4.11: Student's performance in question targeting 'A2'; course: UTA002

S.No.	Rollno.	Name	ESE Q3(a) MARKS (15)	SCORE (1-5)
1	101503227	Simrit Singh Dhiman	0	1
2	101503228	Srijan Gupta	15	5
3	101503229	Srishti	14	5
4	101503230	Suraj Soni	5.5	4
5	101503231	Tanvir Kaur	4	3

6	101503232	Tejasva Bhatia	0	1
7	101503233	Tejsavi Pal Meharda	0	1
8	101503236	Vedika Bhutani	0	1
9	101503237	Vaibhav Kumar	0	1
10	101503238	Vanshika Agarwal	10	5
11	101503239	Vanshika Gupta	12.5	5
12	101503240	Varun Goel	12.5	5
13	101503241	Vibhor Sharma	15	5
14	101503243	Vikram Kumar	15	5
15	101503244	Vinayak Arora	7	4
16	101503245	Vishal Sethi	15	5
17	101503246	Vishwas Singla	15	5
18	101503247	Vivek Kumar	12.5	5
19	101503249	Yash Jain	15	5
20	101503250	Yash Pandey	5.5	4
21	101503251	Yogesh Dhiman	15	5
22	101512002	Abhishek Yakhmi	0	1
23	101512003	Aditya Karkara	15	5
24	101512005	Agambeer S Bajwa	10.5	5
25	101512006	Ajay Prakash Yadav	5	3
26	101512007	Ajaypal Singh	4	3
27	101512008	Amanpreet Kaur	15	5
28	101512009	Ankita	4	3
29	101512010	Ankur Malhan	9	5
30	101512012	Anshul	0	1
31	101512013	Arnav Agarwal	7.5	4
32	101512014	Ashray Sethi	4	3
33	101512015	Bhanav Jindal	13.5	5
34	101512016	Bharat Sanjeev Khanna	3	3
35	101512017	Bhavya Nath	15	5
36	101512018	Bikramjeet Singh	7	4
37	101512020	Himank Gupta	13.5	5
38	101512021	Himanshu Bansal	13.5	5
39	101512022	Himanshu Sharma	13.5	5
40	101512025	Jasmin Saroja	1	1
41	101512027	Kapil Mangal	13.5	5
42	101512028	Karan Gupta	12.5	5
43	101512029	Karandeep Parashar	8	4
44	101512030	Kriti Shukla	14	5
45	101512031	Manasvi Rajani	0	1
46	101512033	Meghna Misra	4	3
47	101512034	Mohil Agrawal	5	3
48	101512035	Naman Malhotra	5	3
49	101512036	Naveen Goyal	12	5

50	101512038	Parvez Singh Aulakh	4	3
51	101512040	Riya Jain	15	5
52	101512041	Rohan Sharma	1	1
53	101512042	Rubal Khosla	15	5
54	101512043	Sagar Shivani	5.5	4
55	101512044	Sanchit Bhargava	15	5
56	101512045	Sangam Mishra	15	5
57	101512046	Satnam Singh	15	5
58	101512047	Shashvat Bharti	15	5
59	101512048	Shivansh Gupta	11.5	5
60	101512049	Shorya Mittal	7.5	4
61	101512050	Shubham Dudeja	15	5
62	101512051	Sparsh Mehta	15	5
63	101512052	Sugandha Sehgal	2	2
64	101512053	Suman	12.5	5
65	101512054	Taran Preet Singh	13	5
66	101512055	Tejkultarn Singh Sohi	15	5
67	101512057	Umarpreet Singh	10.5	5
68	101512058	Vikas Gupta	4	3
69	101512059	Vineet Gupta	11.5	5
70	101512060	Viruj Janweja	13	5
71	101512061	Vivek Kapoor	15	5
72	101512062	Yuvraj Verma	15	5
73	101512063	Harvineet Singh	5	3
74	101512064	Arushi Hira	1	1
75	101553006	Prateek Awasthi	4	3
76	101562001	Amritpal Kaur	15	5
77	101562003	Madhur Batra	15	5
78	101562004	Mehtab Singh	15	5
79	101562005	Mukul Maheshwari	4	3
80	101562007	Rishabh Sharma	4	3
81	101562008	Sahil Arora	15	5
82	101562009	Shaunak Dixit	12.5	5
83	101642001	Aakash Patial	15	5
84	101683003	Aarushi Sharma	7.5	4
85	101683004	Ankit Vij	7.5	4
86	101683005	Ayush Karwal	5	3
87	101683007	Garima Puri	5	3
88	101683008	Gurcharan S. Jawanda	15	5
89	101683028	Kamalpreet Kaur	4	3
90	101683043	Shrey Mathur	14	5
91	101692001	Sunil Shivam	7	4
92	101692002	Aman Gupta	15	5
93	101692005	Kriti Asija	13	5

94	101692006	Rahul Kumar Yadav	15	5
95	101692007	Siddharath Ghai	2	2
96	401503029	Sophie Kakker	11.5	5
97	401503030	Varun Jain	5	3

The overall performance of students in the above question is then summarized as given below

Table A4.12: Average score of student performance in the course UTA002 for criteria A2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UTA002	55.7	11.3	19.6	2.1	11.3	3.98

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria A2 as given below in Table A4.13:

Table A4.13: Weighted average student class performance (course portfolio) for criteria A2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME804	51.7	12.1	10.3	3.4	22.4	3.67	5
UTA002	55.7	11.3	19.6	2.1	11.3	3.98	5
Weighted average score	53.70	11.70	14.95	2.75	16.85	3.83	10

b.) Assessment Tool: Student Course Survey

Table A4.14: Average score of student course survey for criteria

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA002	56.34	24.8	1	0	0	3.84	5
UME804	51.7	12.1	10.3	3.4	22.4	3.67	5
Weighted average score	54.02	18.45	5.65	1.70	11.20	3.75	10

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table A4.15: Assessment for criteria A2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	38.71	32.26	29.03	0	0	4.10
Alumni survey	29.63	62.96	7.41	0	0	4.22
Employer Survey	72.22	27.78	0.00	0	0	4.72

Finally overall weighted average score of performance criterion 'A2' is evaluated as given below in Table A4.16:

Table A4.16.: Overall weighted average score of performance criterion 'A2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	53.70	11.70	14.95	2.75	16.85	3.83	5.00
Weighted average student course survey	54.02	18.45	5.65	1.70	11.20	3.75	4.00
Graduating student survey	28.00	52.00	12.00	4.00	4.00	3.96	3.00
Alumni survey	12.00	72.00	14.00	2.00	0.00	4.00	3.00
Employer survey	72.22	27.78	0.00	0.00	0.00	4.72	3.00
Overall weighted score	45.62	32.65	9.74	2.14	7.84	4.01	18.00

Assessment of Outcome 'A' using performance criterion A3

Performance criteria 'A3': Applying scientific and/or engineering principles towards solving engineering problems.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Turbo Machinery (UME804) and Manufacturing Processes (UTA002) were used to assess performance criteria A3 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Turbo Machinery (UME804)

The above performance criteria is used to measure the attainment of outcome 'A3' by giving the following question (Question No. 1: during EST in May 2017, weightage 20 marks) to the students.

Question: A simple gas turbine takes in air at atmospheric pressure and 15°C and compresses air in the compressor up to 6 bar. Then air enters the combustion chamber and is heated to a maximum temperature of 750°C, and then it enters the turbine and expands to atmospheric pressure. The isentropic efficiency of compressor and turbine is 0.8, combustion efficiency is 0.9, fall of pressure through the combustion system is 0.1 bar, c_p and γ for both air and gases are 1.005 kJ/kg-K and 1.4 respectively. Neglecting the mass of fuel, determine:

- Mass flow rate of air to produce net power of 1100 kW
- Heat supplied per kg of air and work ratio

Student's performance in the above question is given below:

Table A4.17: Student's performance in question targeting 'A3'; course: UME804

S. No.	Roll No.	Name	Marks (MM: 20)	Score (Scale 1 to 5)
1	101308015	Ankit Sehgal	13.0	4
2	101308033	Ekansh K. Srivastava	8.5	3
3	101308059	Kanwar Pal S. Gulati	15.0	4
4	101308067	Ketan Chauhan	3.5	1
5	101308069	Kirat Singh Basur	15.0	4
6	101308070	Kshitij Sharma	5.0	2
7	101308071	Lokendra Kumar	18.0	5
8	101308074	Manik Saharan	11.5	3
9	101308075	Manish Pandoh	15.0	4
10	101308077	Manutkarsh Kirpal	20.0	5
11	101308078	Nidan Prakash	16.0	4
12	101308079	Nikhil Aggarwal	20.0	5
13	101308080	Nikhil Ganta	16.0	4
14	101308082	Paramjot Singh	19.0	5
15	101308083	Paras	19.0	5
16	101308085	Prabhman Vir	16.0	4
17	101308088	Pulkit Kapoor	19.0	5
18	101308089	Puneet Singh	1.0	1
19	101308090	Rajat Gupta	16.0	4
20	101308091	Ramnish Kumar	19.0	5
21	101308093	Rohan Kaushal	9.0	3
22	101308094	Sagar Singla	15.0	4
23	101308096	Sahil Sharma	19.0	5
24	101308097	Samdeep S. Sabharwal	14.0	4
25	101308098	Sameer Bhalla	19.0	5
26	101308099	Sartaj Singh	15.0	4
27	101308101	Shikhar Gaur	17.0	5
28	101308102	Shreyas Bhayana	17.0	5
29	101308103	Shubham	20.0	5
30	101308104	Shubham Bhama	19.0	5
31	101308105	Shubham Chaudhary	15.0	4
32	101308106	Shubham Gupta	16.5	5
33	101308108	Siddharth Ghiya	20.0	5
34	101308109	Siddharth Gupta	19.0	5
35	101308110	Siddharth Vasu	18.0	5
36	101308111	Sidhant	9.0	3
37	101308112	Simrandeep S. Bhullar	20.0	5

S. No.	Roll No.	Name	Marks (MM: 20)	Score (Scale 1 to 5)
38	101308113	Sourav Singla	20.0	5
39	101308114	Tanjay Pathak	14.0	4
40	101308115	Tanuj Lamba	19.0	5
41	101308116	Utsav Mudgal	15.0	4
42	101308117	Vaibhav P. S.Pundir	20.0	5
43	101308118	Varmeet Singh Gulati	2.0	1
44	101308119	Varun Atri	16.5	5
45	101308120	Vedant Mansotra	20.0	5
46	101308121	Vikrant Nanda	10.0	3
47	101308122	Vishal Solanki	19.0	5
48	101308123	Vivek Mittal	14.0	4
49	101308124	Vivek Pundir	20.0	5
50	101308125	Yashwardhan Sharma	15.0	4
51	101488008	Ishan	11.0	3
52	101488012	Mohit Goyal	16.0	4
53	101488013	Navjot Rihal	14.5	4
54	101488014	Nikhil Gupta	20	5
55	101488015	Sankit	0	1
56	101488016	Sarang Vashisht	0	1
57	101488017	Varun Bansal	19	5
58	101488018	Vishnu Kalra	14	4

The overall performance of students in the above question is then summarized as given below

Table A4.18: Average score of student performance in the course UME804 for criteria A3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME804	46.6	32.8	10.3	1.7	8.6	4.07

(ii) Course: Manufacturing Processes (UTA002)

The above performance criteria is used to measure the attainment of outcome ‘A3’ by giving the following question (Question No. 2 (b): during MST in March 2017, weightage 8 marks) to the students.

Question: In turning operation of a steel rod with a single point cutting tool (for a given machining and environmental conditions), the tool life decreases from 80 min to 20 min. with change in cutting speed (V) from 60 m/min to 120 m/min. Determine the cutting velocity at which the life of that tool will be 40 min. under the same conditions?

Student’s performance in the above questions given below:

Table A4.19: Student's performance in question targeting 'A3'; course: UTA002

S.No.	Rollno.	Name	MST Q2 (b) MARKS (08)	SCORE (1-5)
1	101503227	Simrit Singh Dhiman	4.5	3
2	101503228	Srijan Gupta	8	5
3	101503229	Srishti	8	5
4	101503230	Suraj Soni	8	5
5	101503231	Tanvir Kaur	3	2
6	101503232	Tejasva Bhatia	8	5
7	101503233	Tejsavi Pal Meharda	8	5
8	101503236	Vedika Bhutani	8	5
9	101503237	Vaibhav Kumar	8	5
10	101503238	Vanshika Agarwal	8	5
11	101503239	Vanshika Gupta	8	5
12	101503240	Varun Goel	8	5
13	101503241	Vibhor Sharma	8	5
14	101503243	Vikram Kumar	8	5
15	101503244	Vinayak Arora	8	5
16	101503245	Vishal Sethi	7	5
17	101503246	Vishwas Singla	8	5
18	101503247	Vivek Kumar	8	5
19	101503248	Yadwinder Singh Brar	8	5
20	101503249	Yash Jain	8	5
21	101503250	Yash Pandey	8	5
22	101503251	Yogesh Dhiman	8	5
23	101512002	Abhishek Yakhmi	8	5
24	101512003	Aditya Karkara	8	5
25	101512005	Agambeer S. Bajwa	8	5
26	101512006	Ajay Prakash Yadav	8	5
27	101512007	Ajaypal Singh	8	5
28	101512008	Amanpreet Kaur	8	5
29	101512009	Ankita	8	5
30	101512010	Ankur Malhan	8	5
31	101512012	Anshul	8	5
32	101512013	Arnav Agarwal	8	5
33	101512014	Ashray Sethi	8	5
34	101512015	Bhanav Jindal	8	5
35	101512016	Bharat Sanjeev Khanna	7	5
36	101512017	Bhavya Nath	8	5
37	101512018	Bikramjeet Singh	8	5
38	101512020	Himank Gupta	8	5
39	101512021	Himanshu Bansal	8	5
40	101512022	Himanshu Sharma	8	5
41	101512025	Jasmin Saroja	8	5
42	101512027	Kapil Mangal	8	5
43	101512028	Karan Gupta	2	2
44	101512029	Karandeep Parashar	8	5
45	101512030	Kriti Shukla	8	5
46	101512031	Manasvi Rajani	8	5
47	101512033	Meghna Misra	8	5
48	101512034	Mohil Agrawal	8	5

49	101512035	Naman Malhotra	8	5
50	101512036	Naveen Goyal	8	5
51	101512038	Parvez Singh Aulakh	8	5
52	101512040	Riya Jain	8	5
53	101512041	Rohan Sharma	8	5
54	101512042	Rubal Khosla	8	5
55	101512043	Sagar Shivani	3	2
56	101512044	Sanchit Bhargava	2	2
57	101512045	Sangam Mishra	8	5
58	101512046	Satnam Singh	8	5
59	101512047	Shashvat Bharti	8	5
60	101512048	Shivansh Gupta	8	5
61	101512049	Shorya Mittal	8	5
62	101512050	Shubham Dudeja	8	5
63	101512051	Sparsh Mehta	4	3
64	101512052	Sugandha Sehgal	2	2
65	101512053	Suman	4	3
66	101512054	Taran Preet Singh	8	5
67	101512055	Tejkultarn Singh Sohi	8	5
68	101512057	Umarpreet Singh	8	5
69	101512058	Vikas Gupta	8	5
70	101512059	Vineet Gupta	5	3
71	101512060	Viruj Janweja	8	5
72	101512061	Vivek Kapoor	8	5
73	101512062	Yuvraj Verma	8	5
74	101512063	Harvineet Singh	2	2
75	101512064	Arushi Hira	2	2
76	101553006	Prateek Awasthi	8	5
77	101562001	Amritpal Kaur	8	5
78	101562003	Madhur Batra	8	5
79	101562004	Mehtab Singh	8	5
80	101562005	Mukul Maheshwari	8	5
81	101562006	Prateek Rana	8	5
82	101562007	Rishabh Sharma	8	5
83	101562008	Sahil Arora	8	5
84	101562009	Shaunak Dixit	8	5
85	101642001	Aakash Patial	4	3
86	101683003	Aarushi Sharma	8	5
87	101683004	Ankit Vij	8	5
88	101683005	Ayush Karwal	0	1
89	101683007	Garima Puri	0	1
90	101683008	Gurcharan S. Jawanda	8	5
91	101683028	Kamalpreet Kaur	8	5
92	101683043	Shrey Mathur	8	5
93	101692001	Sunil Shivam	8	5
94	101692002	Aman Gupta	8	5
95	101692005	Kriti Asija	8	5
96	101692006	Rahul Kumar Yadav	8	5
97	101692007	Siddharath Ghai	6	4
98	401503029	Sophie Kakker	3	2

The overall performance of students in the above question is then summarized as given below

Table A4.20: Average score of student performance in the course UTA002 for criteria A3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UTA002	81.6	3.1	5.1	3.1	7.1	4.49

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria A3 as given below in Table A4.21:

Table A4.21: Weighted Average Student class performance (course portfolio) for criteria A3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA002	81.6	3.1	5.1	3.1	7.1	4.49	5
UME804	46.6	32.8	10.3	1.7	8.6	4.07	5
Weighted average score	64.10	17.95	7.70	2.40	7.85	4.28	10

b.) Assessment Tool: Student Course Survey

Table A4.22: Average score of student course survey for criteria A3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA002	46.77	36.68	1	0	0	3.84	5
UME804	46.6	32.8	10.3	1.7	8.6	4.07	5
Weighted average score	46.69	34.74	5.65	0.85	4.30	3.95	10

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table A4.23: Assessment for criteria A3 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	38.71	32.26	29.03	0	0	4.10
Alumni survey	29.63	62.96	7.41	0	0	4.22
Employer Survey	72.22	27.78	0.00	0	0	4.72

Finally overall weighted average score of performance criterion 'A3' is evaluated as given below in Table A4.24:

Table A4.24: Overall weighted average score of performance criterion 'A3'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	64.10	17.95	7.70	2.40	7.85	4.28	5.00
Weighted average student course survey	46.69	34.74	5.65	0.85	4.30	3.95	4.00
Graduating student survey	28.00	52.00	12.00	4.00	4.00	3.96	3.00
Alumni survey	12.00	72.00	14.00	2.00	0.00	4.00	3.00
Employer survey	72.22	27.78	0.00	0.00	0.00	4.72	3.00
Overall weighted score	46.88	38.00	7.73	1.86	3.80	4.18	18.00

Assessment of Outcome 'A' using performance criterion A4

Performance criteria 'A4': Applying statistical methods in analyzing data.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: One course namely Project Semester (UME691) and Engineering Economics (UHU081) were used to assess performance criteria A4 as a direct measure. The analysis for each of these courses is provided below:

(I) Course: Engineering Economics (UHU081)

The above performance criteria is used to measure the attainment of outcome 'A4' by giving the following question (Question No. 10: during EST in December 2017, weightage 16 marks) to the students.

(A) Suppose an economic research centre has published data on GDP and demand for refrigerators is given below:

Year	2010	2011	2012	2013	2014	2015	2016
GDP (Billion Rs)	20	22	25	27	30	33	35
Refrigerators	50	60	80	80	90	100	120

- Estimate Regression equations refrigerators to GDP & GDP to refrigerators.
 - Forecast the demand for refrigerators in the year 2017 and 2018. The research centre has projected GDP for 2017 as 40 billion and for 2018 as Rs 45 billion respectively. Student's performance in the above question is given below:
- (B) Vijaya Ltd. is operating in a perfectly competitive industry. The Total Cost function of the firm is given by $TC = 25000 + 150Q + 3Q^2$.
- If the industry is in long run equilibrium what is the price of the Vijaya Stores product?

- b) What is the profit maximizing output for the firm?
 c) In long run at what price firm would like to shut down its business?

Student's performance in the above question is given below:

The overall performance of students in the above question is then summarized as given below

Table A4.25: Student's performance in question targeting 'A3'; course: UME691

Rollno.	Name	Marks Obtained	Score (Scale 1 to 5)
101408001	Aashish Kumar	3	2
101408002	Aayush Khera	10	4
101408003	Abhishek Baruah	1	1
101408004	Abhishek Pandey	7	3
101408005	Abhishek Sharma	7	3
101408006	Abhishek Singh Nathawat	12	5
101408007	Abhishesh Aggarwal	2	1
101408008	Adit Goel	7	3
101408009	Aditya Shubham	14	5
101408010	Aerk Dimri	12	5
101408011	Ajitesh Bindal	7	3
101408012	Akhilesh Sharma	10	4
101408013	Akin	3.5	2
101408014	Akshansh Jain	6	3
101408015	Akshay Bajaj	0	1
101408016	Aman Singla	0	1
101408017	Amar Raj Singh	9.5	4
101408019	Anand Vardhan	14	5
101408020	Anil Barwar	14	5
101408022	Ankit Verma	5	2
101408023	Ankush Narula	10	4
101408024	Anurag Kumar	3	2
101408025	Anurag Verma	5.5	3
101408026	Arjun Raina	3	2
101408028	Arpit Kandhari	3.5	3
101408029	Ashish Goyal	10	4
101408030	Ashok Ranwa	11	5
101408031	Ashwinder Singh	9	4
101408032	Atul	0	1
101408033	Avanshu Shrivastav	7.5	3
101408034	Ayush Pandey	9	4
101408035	Ayush Rai	6	3
101408036	Channdeeep	5	2
101408037	Chetan Katyal	6	3
101408038	Daksh Garg	1	1

101408039	Deepanshu Mohan	0	1
101408040	Devjot Singh Sewak	1	1
101408041	Dheerendra Kumar Chau.	3	2
101408042	Dhruv Sharma	6.5	3
101408043	Divyesh Gupta	11	5
101408044	Ekam Jot Singh	3	2
101408045	Gaurav Gupta	13	5
101408047	Gurbaksh Singh	4	2
101408049	Hardik Vashistha	9	4
101408050	Harish Jala	8	3
101408051	Harjot Singh	0	1
101408052	Harmandeep Singh	2	1
101408055	Harnoor Singh	7.5	3
101408056	Harpreet Singh	7	3
101408057	Himalaya Nath Chinoriya	0	1
101408058	Himanshu Raj	5	2
101408059	Ishaan Mangla	8	3
101408060	Ishjot Singh Jaggi	12	5
101408120	Shivendra Kumar	6	3
101408121	Shlok Chanduka	14	5
101408122	Shubham Gupta	9	4
101408123	Shubham Saxena	5	2
101408124	Shubham Sharma	6	3
101408125	Sidharth Hinger	0	1
101408126	Simranpreet Singh	0	1
101408127	Sunpreet Kochhar	8	3
101408128	Tanmay Mathur	5	2
101408129	Tanvir Sidhu	1	1
101588001	Arpanjot Singh	9	4
101588005	Harshit Kashyap	9	4
101588006	Jashandeep Singh	9.5	4
101588010	Rachit Joshi	4	2
101588011	Rajinder Singh	8.5	4
101588012	Rajit Devgan	8	3
101588013	Shubham Sharma	13	5
101588015	Tejinder Singh	14	5

Table A4.26: Average score of student performance in the course UHU081 for criteria A4

Course	% of students in each score					Average Score
	5	4	3	2	1	
UHU081	16.9	18.3	26.76	18.3	19.71	2.94

(ii) **Course:** Project semester (UME691)

(The criteria 'A4' is evaluated from the student **Midway Report** submitted to their respective Faculty mentor)

Table A4.27: Student's performance targeting 'A4'; course: UME691

S. No.	Roll No. of Students	A4	Weight (Scale 1 to 5)
		(Midway Report) (15 Marks)	
1	101408001	13	5
2	101408002	13.5	5
3	101408003	12	5
4	101408004	11.5	4
5	101408005	13	5
6	101408006	13	5
7	101408007	12.5	5
8	101408008	11.5	4
9	101408009	13	5
10	101408010	14	5
11	101408011	13	5
12	101408012	12.5	5
13	101408013	10	4
14	101408014	13	5
15	101408015	14	5
16	101408016	13	5
17	101408017	12	5
18	101408019	14	5
19	101408020	5	1
20	101408022	12	5
21	101408023	13	5
22	101408025	13.75	5
23	101408026	13.5	5
24	101408028	13	5
25	101408029	12.5	5
26	101408030	4	1
27	101408031	12.5	5
28	101408032	2	1
29	101408033	13	5
30	101408034	13	5
31	101408035	10.5	4
32	101408036	13.5	5
33	101408037	9	3
34	101408038	13	5
35	101408039	4	1
36	101408040	13.5	5
37	101408041	11	4
38	101408042	11.5	4

39	101408043	12.5	5
40	101408044	9	3
41	101408045	14	5
42	101408047	11.5	4
43	101408048	14	5
44	101408049	10	4
45	101408050	13	5
46	101408051	12	5
47	101408052	12	5
48	101408055	13.5	5
49	101408056	14	5
50	101408057	11	4
51	101408058	12.5	5
52	101408059	11.5	4
53	101408060	13.5	5
54	101408062	0	1
55	101408063	10	4
56	101408064	12.5	5
57	101408065	9	3
58	101408066	14	5
59	101408067	5	1
60	101408069	9	3
61	101408070	9	3
62	101408071	12.5	5
63	101408074	7	2
64	101408076	11	4
65	101408077	12	5
66	101408078	10	4
67	101408079	13	5
68	101408080	9	3
69	101408082	13	5
70	101408083	11.5	4
71	101408084	13	5
72	101408085	10	4
73	101408086	12	5
74	101408087	13.5	5
75	101408088	12	5
76	101408089	12	5
77	101408090	13	5
78	101408091	14	5
79	101408092	11	4
80	101408093	12	5
81	101408094	11	4
82	101408095	13	5
83	101408096	13	5
84	101408097	12	5
85	101408098	13	5

86	101408100	12	5
87	101408101	12	5
88	101408102	14	5
89	101408103	12.5	5
90	101408104	11.5	4
91	101408105	12.5	5
92	101408106	13	5
93	101408107	11.5	4
94	101408108	14	5
95	101408110	9	3
96	101408111	13	5
97	101408112	13	5
98	101408113	11.5	4
99	101408114	13.5	5
100	101408115	12	5
101	101408116	13.5	5
102	101408118	13	5
103	101408120	11.5	4
104	101408121	12	5
105	101408122	12	5
106	101408123	12.5	5
107	101408124	11	4
108	101408125	13	5
109	101408126	11.5	4
110	101408127	12.5	5
111	101408128	12	5
112	101408129	13.85	5
113	101408130	13.5	5
114	101408131	12	5
115	101408132	14	5
116	101408134	12.5	5
117	101408136	12	5
118	101408137	12	5
119	101458001	13	5
120	101458003	12	5
121	101458004	13	5
122	101588001	13	5
123	101588002	13	5
124	101588003	12.5	5
125	101588004	12.5	5
126	101588005	12.5	5
127	101588006	12	5
128	101588008	12.5	5
129	101588009	8	3
130	101588010	11.5	4
131	101588011	13	5
132	101588012	12	5

133	101588013	12.5	5
134	101588014	12	5
135	101588015	13	5

The overall performance of students in the above question is then summarized as given below

Table A4.28: Average score of student performance in the course UME691 for criteria A4

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	71.1	17.8	5.9	0.7	4.5	4.503

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria A4 as given below in Table A4.29:

Table A4.29: Weighted Average Student class performance (course portfolio) for criteria A4

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UHU081	16.9	18.3	26.76	18.3	19.71	2.94	5
UME 691	71.1	17.8	5.9	0.7	4.5	4.503	5
Weighted average score	44.00	18.05	16.33	9.50	12.11	3.72	10

b.) Assessment Tool: Student Course Survey

Table A4.30: Average score of student course survey for criteria A4

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UHU081	16.9	18.3	26.76	18.3	19.71	2.94	5
UME 691	71.1	17.8	5.9	0.7	4.5	4.503	5
Weighted average score	44.00	18.05	16.33	9.50	12.11	3.72	10

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table A4.31: Assessment for criteria A4 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	38.71	32.26	29.03	0	0	4.10
Alumni survey	29.63	62.96	7.41	0	0	4.22
Employer Survey	72.22	27.78	0.00	0	0	4.72

Finally overall weighted average score of performance criterion 'A4' is evaluated as given below in Table A4.32:

Table A4.32: Overall weighted average score of performance criterion 'A4'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	44.00	18.05	16.33	9.50	12.11	3.72	5.00
Weighted average student course survey	44.00	18.05	16.33	9.50	12.11	3.72	4.00
Graduating student survey	28.00	52.00	12.00	4.00	4.00	3.96	3.00
Alumni survey	12.00	72.00	14.00	2.00	0.00	4.00	3.00
Employer survey	72.22	27.78	0.00	0.00	0.00	4.72	3.00
Overall weighted score	40.70	34.32	12.50	5.75	6.72	3.98	18

Overall assessment of student outcome A using scores of A1, A2, A3 and A4

In the above sections, each of the individual performance criteria A1, A2, A3 and A4 have been assessed. The performance for attainment of outcome A has been completed using the attainment values for A1, A2, A3 and A4 and is provided below:

Table A4.33 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome A.

Table A4.33: Overall score for outcome A at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
A1	46.67	35.38	8.25	4.11	4.57	4.13	5
A2	45.62	32.65	9.74	2.14	7.84	4.01	5
A3	46.88	38.00	7.73	1.86	3.80	4.18	4
A4	40.70	34.32	12.50	5.75	6.72	3.98	3
Overall score	45.36	35.00	9.31	3.29	7.70	4.08	17

Track Record and assessment of attainment of student outcome over the last three academic years

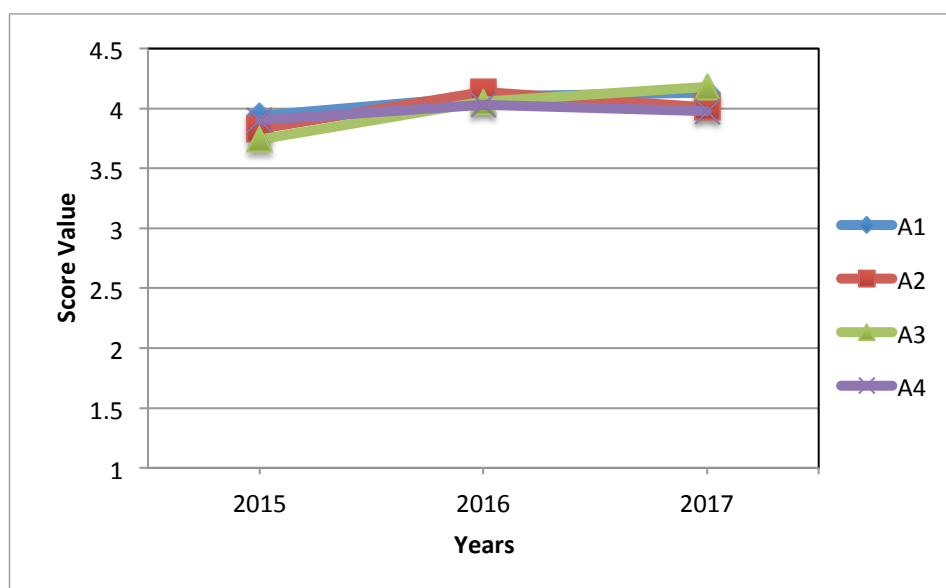
The performance criteria-wise assessment score distribution and overall weighted score for outcome 'A' for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table A4.34 presents the performance criteria-wise assessment score distribution for outcome 'A'

Table A4.34: Performance criteria-wise assessment score distribution of outcome A

Student outcomes and performance criteria		Year		
		2015	2016	2017
A	A1	3.94	4.10	4.13
	A2	3.83	4.14	4.01
	A3	3.74	4.06	4.18
	A4	3.90	4.03	3.98

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome 'A' over a period of last three years.

**Figure A4.2: Performance criteria-wise assessment score distribution of outcome A**

Level of attainment of student outcome over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table A4.35 presents the overall weighted score of outcome 'A' over the last three academic years

Table A4.35: Overall weighted score of outcome 'A' over a period of last three years

Year	Overall weighted score	Level of attainment
2015	3.85	Good
2016	4.09	Good
2017	4.08	Good

The above data has been plotted to visualize the overall weighted score of outcome ‘A’ over a period of last three years.

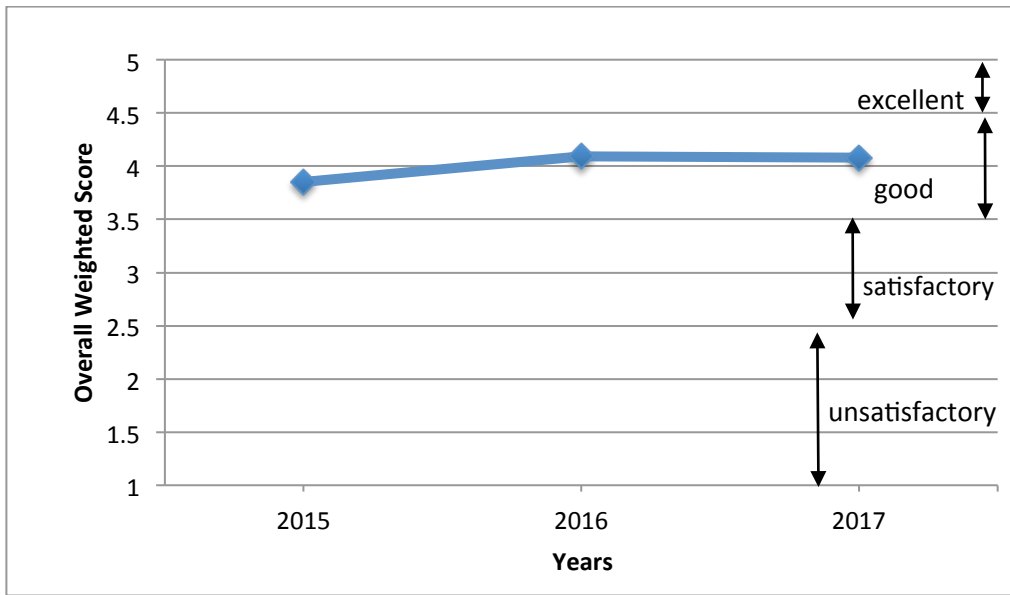


Figure A4.3: Overall weighted score of outcome ‘A’ over a period of last three years

The following actions have been taken based on the analysis of Outcome A

Weighted Score for Outcome A	Recommendation	Reason	Implemented from
4.08	For the subject UHU081 (Engineering Economics), the course instructors have been advised to recommend the measures that need to be initiated for the improvement of student outcome score.	Weighted score is below 3.5	--

**Assessment of Attainment of Student Outcome
'B'
(Year 2017)**

for the

Bachelor of Engineering
in
Mechanical Engineering

Thapar Institute of Engineering and Technology

Patiala (Punjab) - 147004

INDIA

Attainment of Outcome B

The attainment of each outcome has been measured using a standard procedure explained in the Self Assessment Report for the program. A flow chart depicting the step by step methodology used to measure each attainment is provided below for ready reference.

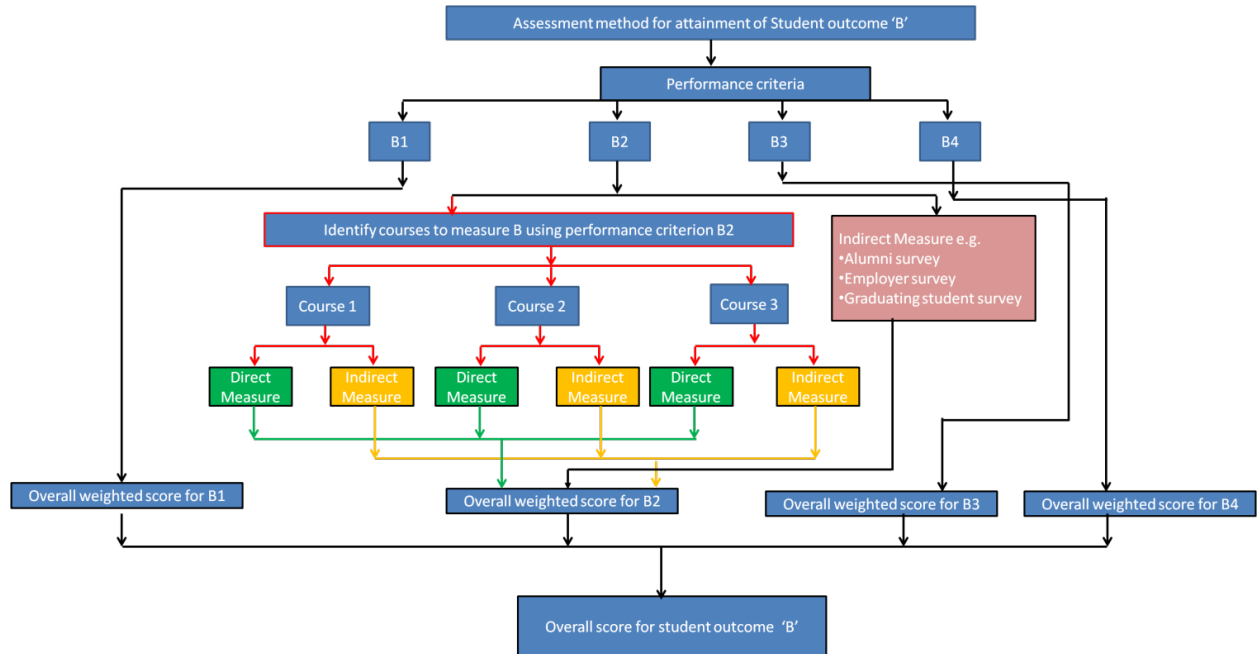


Figure B4.1: Flow chart for the attainment of outcome ‘B’

The following courses have been considered for the assessment of student outcome ‘B’

Courses:

1. Solids and Structures (UES010)
2. Machining Science (UME705)
3. Project Semester (UME691)

Outcome B has been assessed by four performance criteria B1, B2, B3 and B4. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these four performance criteria has been used to measure the overall measure of outcome B.

1) Assessment of Outcome 'B' using performance criterion B1

Performance criteria 'B1': Identifying the constraints, assumptions and models for the experiments.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Solids and Structures (UES010), Machining Science (UME705) were used to assess performance criteria B1 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Machining Science (UME705)

The above performance criteria is used to measure the attainment of outcome 'B1' by giving the following question (Question No. 3(B): during MST in September 2017, weightage 7 marks) to the students.

Question: A mild steel block is being drilled with a drill of 10mm diameter. The helix angle = 25° , point angle = 116° , feed = 0.2 mm/rev, work material shear stress = 450 MPa, coefficient of friction = 0.75. Estimate the drilling torque and thrust using the Lee and Shaffer shear angle relationship.

Student's performance in the above question is given below:

Table B4.1: Student's performance in question targeting 'B1'; course: UME705

Sr No	Rollno.	Name	Marks Max (7)	SCORE (1-5)
1	101408062	Jaskaran Singh	0	0
2	101408063	Jaskirat Singh	0	0
3	101408064	Jaspreet Singh	6.5	5
4	101408065	Jaswinder Singh	4	4
5	101408066	Jatin Sharma	0	0
6	101408067	Kamal Jindal	5	5
7	101408068	Kanwarpal	6	5
8	101408069	Karamjeet	4	4
9	101408070	Karan Bains	0	0
10	101408071	Karan Goyal	5	5
11	101408073	Kchaustabh	2	1
12	101408074	Kshitiz	0	0
13	101408075	Kumar Akshaan	0	0
14	101408076	Kunal	4	4
15	101408077	Lokesh	7	5
16	101408078	Lovedeep	7	5
17	101408079	Lucky	5	5
18	101408080	Mangal	1	1
19	101408130	Tejkirat	2	1
20	101408131	Thakur Singla	6	5
21	101408132	Tishir Chabria	0	0
22	101408134	Vikram	5	5

23	101588002	Govind Abhimanyu	1	1
24	101588004	Hardik	7	5
25	101408082	Mayank Manish	3	3
26	101408083	Mayank Singh	6	5
27	101408084	Mir Faizan	3	3
28	101408086	Muazz Ahmed	4	4
29	101408087	Mukul Barpagga	0	0
30	101408088	Navyug Kumar	3	3
31	101408089	Nimish Goyal	1	1
32	101408090	Nishant Shearon	3	3
33	101408091	Nitin Gupta	6	5
34	101408092	Om Prakash	6	5
35	101408093	Parag Gupta	5	5
36	101408094	Piyush Goyal	6	5
37	101408095	Piyush Kumar	0	0
38	101408096	Pranjal Sharma	0	0
39	101408097	Prasoon Khushwaha	1	1
40	101408098	Pulkit Gautam	2	1
41	101408136	Vivek Singla	7	5
42	101408137	Yudhveer Singh	6	5
43	101588007	Kulvir Singh	0	0
44	101588008	Mohit Kumar	7	5
45	101458001	Devansh Jain	1	1
46	101408048	Gurneet	0	0
47	101408100	Puneet Kumar	3	3
48	101408101	Rachit Jain	6	5
49	101408102	Raghav Ralhan	4	4
50	101408103	Ranmeek Multani	5	5
51	101408104	Ranmeek	6	5
52	101408105	Ravi K Mittal	1	1
53	101408106	Rishab Bhatnagar	0	0
54	101408107	Rishab Jain	5	5
55	101408108	Rishav Kumar	1	1
56	101408110	Rohan Bisht	0	0
57	101408111	Sagandeep Kang	4	4
58	101408112	Sagar Loomba	5	5
59	101408113	Sanchit Aggarwal	4	4
60	101408114	Sarabdeep Gambhir	6	5
61	101408115	Shanya	4	4
62	101408116	Shashank Bindal	0	0
63	101408117	Shikhar Pandey	0	0

64	101408118	Shirish Goel	3	3
65	101408119	Shivankar Pandey	0	0
66	101458002	Shrey Asthana	4	4
67	101588003	Gunjan Chauhan	0	0
68	101588009	Mukesh Saroj	3	3
69	101588014	Suraj Kumar	0	0
70	101458003	Pranav Tiwari	0	0
71	101458004	Ravi Bishnoi	5	5

The overall performance of students in the above question is then summarized as given below

Table B4.2: Average score of student performance in the course UME705 for criteria B1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME705	49	17.6	13.7	0.0	19.6	3.76

(ii) Course: Solids and Structures (UES010)

The above performance criteria is used to measure the attainment of outcome ‘B1’ by giving the following Project (in September 2017, weightage 10 marks) to the students.

Project Statement: Estimation of axial load-deformation characteristics

A load of $P = 50 \text{ kN}$ is applied to a compound axial member. The segment (1) is a 20 mm diameter solid steel rod and segment (2) is a solid aluminium rod. Determine the minimum diameter of the aluminium segment if the axial displacement of the C relative to support A must not exceed 5 mm.

Experiment involved: Determination of Young's modulus of steel and aluminium

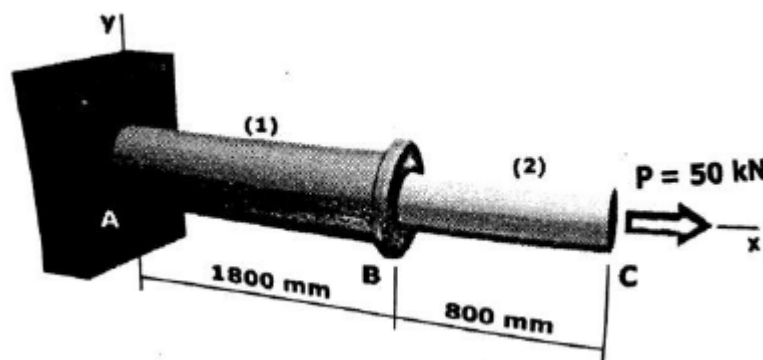


Figure 2. Student’s performance in the above Project is given below:

Table B4.3: Student’s performance in Project targeting ‘B1’; course: UES010

Sr. no.	Roll no.	Name	Marks (MM: 10)	Score (Scale 1 to 5)
1	101604092	Naman Dhingra	6	3

2	101604094	Navdeep Kaur	7	4
3	101604095	Naveen Mehta	7	4
4	101604096	Navjot Kaur	7	4
5	101604097	Navodit S Madaan	6.5	4
6	101604098	Nikhil Anand	7	4
7	101604100	Nishtha Arora	7	4
8	101654017	Oankar Singh Dev	8.5	5
9	101604101	Paarth Arora	6.5	4
10	101604102	Palam Singla	6.5	4
11	101604103	Parakh Sharma	8.5	5
12	101654018	Parth Wadhwa	7.0	4
13	101604104	Piyush Kumar	8.5	5
14	101604105	Piyusha	7.5	5
15	101604106	Prabhat Singh	8	5
16	101604107	Pradeep Murarka	8.5	5
17	101604108	Pragghya Chakravorty	6.5	4
18	101604109	Prakhar Pandey	8	5
19	101784010	Manan Jain	7.5	5
20	101784009	Kshitiz Kochhar	7	4

The overall performance of students in the above question is then summarized as given below

Table B4.4: Average score of student performance in the course UES010 for criteria B1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UES010	40	55	5	0	0	4.35

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria B1 as given below in Table B4.5:

Table B4.5: Weighted average student class performance (course portfolio) for criteria B1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UES010	40	55	5	0	0	4.35	5
UME705	49	17.6	13.7	0	19.6	3.76	5
Weighted average score	44.50	36.30	9.35	0.00	9.80	4.06	10

b) Indirect measures for Performance criteria B1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table B4.6: Weighted average student course survey for criteria B1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UES010	47.56	40.89	4.56	1.12	0	4.17	5
UME705	49	17.6	13.7	0	19.6	3.76	5
Weighted average score	48.28	29.25	9.13	0.56	9.80	3.97	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table B4.7: Assessment for criteria B1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26.00	44.00	22.00	4.00	4.00	3.84
Alumni survey	36.00	48.00	10.00	6.00	0.00	4.00
Employer Survey	46.00	46.00	8.00	0.00	0.00	4.38

c) Overall weighted average score of performance criterion 'B1'

Finally overall weighted average score of performance criterion 'B1' is evaluated as given below in Table B4.8:

Table B4.8: Overall weighted average score of performance criterion 'B1'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	44.50	36.30	9.35	0.00	9.80	4.06	5
Weighted average student course survey	48.28	29.25	9.13	0.56	9.80	3.97	4
Graduating student survey	26	44	22	4	4	3.84	3
Alumni survey	36	48	10	6	0	4	3
Employer survey	46	46	8	0	0	4.38	3
Overall weighted score	41.09	39.58	11.29	1.79	5.57	4.04	18

Assessment of Outcome 'B' using performance criterion B2

Performance criteria 'B2': Use appropriate equipment and techniques for data collection

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Solids and Structures (UES010) and Machining Science (UME705) were used to assess performance criteria B2 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Machining Science (UME705)

The above performance criteria is used to measure the attainment of outcome 'B2' by giving the following question (Question No. 1(B): during EST in December 2017, weightage 10 marks) to the students.

Question: During orthogonal cutting of HSLA steel with a 10° rake tool when cutting speed 2m/s and width of work are 2mm. Uncut chip thickness and chip thickness ratio are 0.2mm and 0.4, respectively. Estimate the average shear plane temperature. (Shear strength of steel = 500MPa, Steel density = 7200 kg/m³, C = 500 J/kg °C, ambient temperature = 25 °C and consider 90 % heat is carried away by the chip.

Student's performance in the above question is given below:

Table B4.9: Student's performance in question targeting 'B2'; course: UME705

Sr No	Rollno.	Name	Marks Max (10)	SCORE (1-5)
1	101408062	Jaskaran Singh	10	5
2	101408063	Jaskirat Singh	1	1
3	101408064	Jaspreet Singh	5	3
4	101408065	Jaswinder Singh	8	5
5	101408066	Jatin Sharma	6	4
6	101408067	Kamal Jindal	9.5	5
7	101408068	Kanwarpal	10	5
8	101408069	Karamjeet	4	3
9	101408070	Karan Bains	6	4
10	101408071	Karan Goyal	8	5
11	101408073	Kchaustabh	0	0
12	101408074	Kshitiz	7	4
13	101408075	Kumar Akshaan	0	0
14	101408076	Kunal	5	3
15	101408077	Lokesh	9	5
16	101408078	Lovedeep	8	5
17	101408079	Lucky	8	5
18	101408080	Mangal	8	5

19	101408130	Tejkirat	3	2
20	101408131	Thakur Singla	10	5
21	101408132	Tishir Chabria	10	5
22	101408134	Vikram	10	5
23	101588002	Govind Abhimanyu	7	4
24	101588004	Hardik	2	2
25	101408082	Mayank Manish	7	4
26	101408083	Mayank Singh	0	0
27	101408084	Mir Faizan	8	5
28	101408086	Muazz Ahmed	9	5
29	101408087	Mukul Barpagga	6	4
30	101408088	Navyug Kumar	0	0
31	101408089	Nimish Goyal	5	3
32	101408090	Nishant Shearon	0	0
33	101408091	Nitin Gupta	7	4
34	101408092	Om Prakash	6	4
35	101408093	Parag Gupta	10	5
36	101408094	Piyush Goyal	0	0
37	101408095	Piyush Kumar	4	3
38	101408096	Pranjal Sharma	0	0
39	101408097	Prasoon Khushwaha	1	1
40	101408098	Pulkit Gautam	1	1
41	101408136	Vivek Singla	10	5
42	101408137	Yudhveer Singh	0	0
43	101588007	Kulvir Singh	0	0
44	101588008	Mohit Kumar	6	4
45	101458001	Devansh Jain	0	0
46	101408048	Gurneet	2	2
47	101408100	Puneet Kumar	4	3
48	101408101	Rachit Jain	10	5
49	101408102	Raghav Ralhan	4	3
50	101408103	Ranmeek Multani	4	3
51	101408104	Ranmeek	8	5
52	101408105	Ravi K Mittal	5	3
53	101408106	Rishab Bhatnagar	5	3
54	101408107	Rishab Jain	10	5
55	101408108	Rishav Kumar	1	1
56	101408110	Rohan Bisht	0	0
57	101408111	Sagandeep Kang	0	0
58	101408112	Sagar Loomba	7	4
59	101408113	Sanchit Aggarwal	10	5

60	101408114	Sarabdeep Gambhir	2	2
61	101408115	Shanya	0	0
62	101408116	Shashank Bindal	2	2
63	101408117	Shikhar Pandey	0	0
64	101408118	Shirish Goel	10	5
65	101408119	Shivankar Pandey	0	0
66	101458002	Shrey Asthana	0	0
67	101588003	Gunjan Chauhan	0	0
68	101588009	Mukesh Saroj	0	0
69	101588014	Suraj Kumar	7	4
70	101458003	Pranav Tiwari	2	2
71	101458004	Ravi Bishnoi	10	5

The overall performance of students in the above question is then summarized as given below

Table B4.10: Average score of student performance in the course UME705 criteria B2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME705	41.5	20.8	18.9	11.3	7.5	3.77

(ii) Course: Solids and Structures (UES010)

The above performance criteria is used to measure the attainment of outcome ‘B2’ by giving the following Project (in September 2017, weightage 10 marks) to the students.

Project Statement: Estimation of maximum power transmitted by a shaft

A compound shaft consists of a solid steel segment (1) and a hollow CI segment (2). Segment (1) is a solid 45 mm diameter steel shaft while segment (2) is a hollow CI shaft with outside diameter of 32 mm, and a wall thickness of 4 mm. The rotation angle at the free end of the shaft must not exceed 2°. Determine the magnitude of largest torque T that may be applied to the compound shaft. Take factor of safety as 2.

Experiments involved: Determination of shear modulus and shear strength of steel and aluminium shafts.

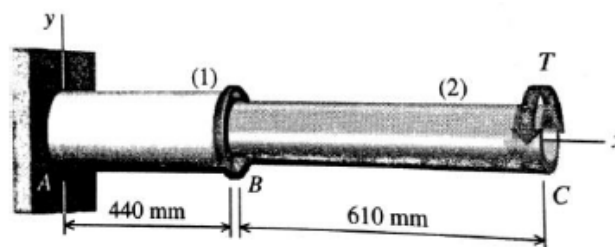


Figure 3

Student’s performance in the above Project is given below:

Table B4.11: Student's performance in Project targeting 'B2'; course: UES010

Sr. no.	Roll no.	Name	Marks (MM: 10)	Score (Scale 1 to 5)
1	101604136	Saransh Sagar	7.5	5
2	101604137	Seeratdeep Kaur	9	5
3	101654021	Sehaj Arora	6	3
4	101604138	Sehajdeep Singh	6	3
5	101604140	Shaunak Chattopadhyay	8.5	5
6	101604142	Shaurya Sharma	7	4
7	101604143	Shekhar Pal	8.5	5
8	101604144	Shivam Monga	7	4
9	101604145	Shivanshu Sharma	7	4
10	101604146	Shivi Deveshwar	8.5	5
11	101604147	Shreyansh Sharma	8.5	5
12	101604148	Shubham Agarwal	7	4
13	101654022	Shubham Gandhi	7	4
14	101604149	Shubham Singla	8.5	5
15	101654023	Shubhanjali Singh	8.5	5
16	101604150	Sidharth	8	5
17	101604151	Simranjeet Singh	8	5
18	101604152	Simranpreet Singh	8.5	5
19	101784014	Sahil Gaur	8	5
20	101784015	Sanamdeep Mehra	7.5	5

The overall performance of students in the above question is then summarized as given below

Table B4.12: Average score of student performance in the course UES010 for criteria B2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UES010	65	25	10	0	0	4.55

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria B2 as given below in Table B4.19:

Table B4.13: Weighted Average Student class performance (course portfolio) for criteria B2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UES010	65	25	10	0	0	4.55	5
UME705	41.5	20.8	18.9	11.3	7.5	3.77	5
Weighted average score	53.25	22.90	14.45	5.65	3.75	4.16	10

b.) Assessment Tool: Student Course Survey

Table B4.14: Average score of student course survey for criteria B2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UES010	47.56	40.89	4.56	1.12	0	4.17	5
UME705	41.5	20.8	18.9	11.3	7.5	3.77	5
Weighted average score	44.53	30.85	11.73	6.21	3.75	3.97	10

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table B4.15: Assessment for criteria B2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26.00	44.00	22.00	4.00	4.00	3.84
Alumni survey	36.00	48.00	10.00	6.00	0.00	4.00
Employer Survey	46.00	46.00	8.00	0.00	0.00	4.38

Finally overall weighted average score of performance criterion 'B2' is evaluated as given below in Table B4.16:

Table B4.16: Overall weighted average score of performance criterion 'B2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	53.25	22.90	14.45	5.65	3.75	4.16	5.00
Weighted average student course survey	44.53	30.85	11.73	6.21	3.75	3.97	4.00
Graduating student survey	26.00	44.00	22.00	4.00	4.00	3.84	3.00
Alumni survey	36.00	48.00	10.00	6.00	0.00	4.00	3.00
Employer survey	46.00	46.00	8.00	0.00	0.00	4.38	3.00
Overall weighted score	42.69	36.22	13.29	4.62	2.54	4.07	18.00

Assessment of Outcome 'B' using performance criterion B3

Performance criteria 'B3': Applying scientific and/or engineering principles towards solving engineering problems.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Machining Science (UME705) and Project Semester (UME691) were used to assess performance criteria B1 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Machining Science (UME705)

The above performance criteria is used to measure the attainment of outcome 'B2' by giving the following question (Question No. 2(A): during EST in December 2017, weightage 10 marks) to the students.

Question: Using a straight tooth cutter of diameter 80 mm, having 15 teeth with 10° rake angle which rotates at 200 rpm, a slab milling operation is carried out on mild steel plate. Work feed rate and depth of cut is kept constant as 75mm/min and 5 mm, respectively. The width of M.S. slab is 50 mm and shear strength of material is 420 N/mm². Assuming coefficient of friction = 0.7 and using Lee and Shaffer relation, plot variation of resultant torque with cutter rotation. Also estimate the average power consumption in the process.

Student's performance in the above question is given below:

Table B4.17: Student's performance in question targeting 'B3'; course: UME705

Sr No	Rollno.	Name	Marks Max (10)	SCORE (1-5)
1	101408062	Jaskaran Singh	5	3
2	101408063	Jaskirat Singh	2	2
3	101408064	Jaspreet Singh	0	0
4	101408065	Jaswinder Singh	10	5
5	101408066	Jatin Sharma	0	0
6	101408067	Kamal Jindal	8	5
7	101408068	Kanwarpal	7	4
8	101408069	Karamjeet	0	0
9	101408070	Karan Bains	0	0
10	101408071	Karan Goyal	6	4
11	101408073	Kchaustabh	2	2
12	101408074	Kshitiz	5	3
13	101408075	Kumar Akshaan	0	0
14	101408076	Kunal	6	4
15	101408077	Lokesh	10	5
16	101408078	Lovedeep	9	5
17	101408079	Lucky	8	5
18	101408080	Mangal	7	4
19	101408130	Tejkirat	2	2

20	101408131	Thakur Singla	7	4
21	101408132	Tishir Chabria	4	3
22	101408134	Vikram	10	5
23	101588002	Govind Abhimanyu	4	3
24	101588004	Hardik	0	0
25	101408082	Mayank Manish	5	3
26	101408083	Mayank Singh	1	1
27	101408084	Mir Faizan	7.5	5
28	101408086	Muazz Ahmed	10	5
29	101408087	Mukul Barpagga	0	0
30	101408088	Navyug Kumar	2	2
31	101408089	Nimish Goyal	0	0
32	101408090	Nishant Shearon	0	0
33	101408091	Nitin Gupta	8	5
34	101408092	Om Prakash	5	3
35	101408093	Parag Gupta	7	4
36	101408094	Piyush Goyal	0	0
37	101408095	Piyush Kumar	6	4
38	101408096	Pranjal Sharma	0	0
39	101408097	Prasoon Khushwaha	1	1
40	101408098	Pulkit Gautam	0	0
41	101408136	Vivek Singla	10	5
42	101408137	Yudhveer Singh	0	0
43	101588007	Kulvir Singh	0	0
44	101588008	Mohit Kumar	8	5
45	101458001	Devansh Jain	6	4
46	101408048	Gurneet	3	2
47	101408100	Puneet Kumar	3	2
48	101408101	Rachit Jain	10	5
49	101408102	Raghav Ralhan	4	3
50	101408103	Ranmeek Multani	0	0
51	101408104	Ranmeek	0	0
52	101408105	Ravi K Mittal	0	0
53	101408106	Rishab Bhatnagar	5	3
54	101408107	Rishab Jain	7	4
55	101408108	Rishav Kumar	0	0
56	101408110	Rohan Bisht	0	0
57	101408111	Sagandeep Kang	0	0
58	101408112	Sagar Loomba	3	2
59	101408113	Sanchit Aggarwal	4.5	3
60	101408114	Sarabdeep Gambhir	0	0

61	101408115	Shanya	1	1
62	101408116	Shashank Bindal	0	0
63	101408117	Shikhar Pandey	0	0
64	101408118	Shirish Goel	0	0
65	101408119	Shivankar Pandey	0	0
66	101458002	Shrey Asthana	2	2
67	101588003	Gunjan Chauhan	0	0
68	101588009	Mukesh Saroj	6	4
69	101588014	Suraj Kumar	4	3
70	101458003	Pranav Tiwari	0	0
71	101458004	Ravi Bishnoi	6	4

The overall performance of students in the above question is then summarized as given below

Table B4.18: Average score of student performance in the course UME705 criteria B3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME705	27.3	25.0	22.7	18.2	6.8	3.23

(ii) Course: Projet Semester (UME691)

(The criteria 'B3' is evaluated from the student **Total Marks**)

Table B4.19: Student's performance targeting 'B3'; course: UME691

S. No.	Roll No.	B3	Weight (Scale 1 to 5)
		(Total Marks) (100 Marks)	
1	101408001	77.8	5
2	101408002	89.3	5
3	101408003	80.4	5
4	101408004	79.0	5
5	101408005	84.9	5
6	101408006	76.2	5
7	101408007	84.5	5
8	101408008	66.1	2
9	101408009	80.4	5
10	101408010	89.8	5
11	101408011	85.8	5
12	101408012	71.3	4
13	101408013	68.7	2
14	101408014	84.1	5
15	101408015	78.8	5
16	101408016	80.3	5
17	101408017	79.8	5

18	101408019	91.6	5
19	101408020	62.6	1
20	101408022	71.4	4
21	101408023	86.7	5
22	101408025	80.0	5
23	101408026	84.5	5
24	101408028	86.7	5
25	101408029	88.5	5
26	101408030	58.1	1
27	101408031	81.5	5
28	101408032	55.9	1
29	101408033	86.6	5
30	101408034	80.3	5
31	101408035	73.0	5
32	101408036	88.8	5
33	101408037	81.8	5
34	101408038	85.4	5
35	101408040	82.3	5
36	101408041	76.7	5
37	101408042	76.9	5
38	101408043	91.7	5
39	101408044	74.5	5
40	101408045	89.5	5
41	101408047	80.9	5
42	101408048	89.6	5
43	101408049	70.8	4
44	101408050	85.8	5
45	101408051	86.5	5
46	101408052	74.3	5
47	101408055	87.5	5
48	101408056	88.7	5
49	101408057	72.1	4
50	101408058	82.8	5
51	101408059	79.2	5
52	101408060	88.0	5
53	101408062	62.5	1
54	101408063	73.3	5
55	101408064	91.3	5
56	101408065	80.2	5
57	101408066	83.7	5
58	101408067	70.0	4
59	101408069	68.3	2
60	101408070	73.5	5
61	101408071	85.0	5
62	101408074	62.4	1
63	101408076	75.6	5

64	101408077	89.6	5
65	101408078	76.2	5
66	101408079	83.4	5
67	101408080	65.4	2
68	101408082	76.9	5
69	101408083	77.8	5
70	101408084	91.3	5
71	101408085	67.0	2
72	101408086	87.6	5
73	101408087	72.9	3
74	101408088	66.2	2
75	101408089	85.1	5
76	101408090	76.2	5
77	101408091	91.1	5
78	101408092	73.9	5
79	101408093	82.7	5
80	101408094	73.6	5
81	101408095	82.4	5
82	101408096	81.8	5
83	101408097	72.0	3
84	101408098	78.6	5
85	101408100	89.8	5
86	101408101	90.4	5
87	101408102	90.0	5
88	101408103	74.0	4
89	101408104	79.3	5
90	101408105	75.1	4
91	101408106	74.7	4
92	101408107	84.3	5
93	101408108	81.5	5
94	101408110	73.0	4
95	101408111	80.4	5
96	101408112	82.2	5
97	101408113	79.7	5
98	101408114	85.9	5
99	101408115	79.1	5
100	101408116	79.0	5
101	101408118	78.7	4
102	101408120	85.9	5
103	101408121	82.6	5
104	101408122	80.8	5
105	101408123	79.0	5
106	101408124	70.0	3
107	101408125	86.8	5
108	101408126	71.9	3

109	101408127	87.1	5
110	101408128	80.5	5
111	101408129	82.0	5
112	101408130	93.6	5
113	101408131	80.5	5
114	101408132	89.3	5
115	101408134	82.0	5
116	101408136	81.8	5
117	101408137	82.4	5
118	101458001	81.6	5
119	101458003	79.7	5
120	101458004	91.6	5
121	101588001	86.7	5
122	101588002	82.4	5
123	101588003	83.3	5
124	101588004	81.3	5
125	101588005	82.6	5
126	101588006	77.8	4
127	101588008	87.9	5
128	101588009	82.7	5
129	101588010	85.2	5
130	101588011	81.1	5
131	101588012	84.1	5
132	101588013	88.4	5
133	101588014	88.7	5
134	101588015	83.3	5

The overall performance of students in the above question is then summarized as given below

Table B4.20: Average score of student performance in the course UME691 for criteria B3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	80.6	8.2	2.9	4.4	3.9	4.572

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria B3 as given below in Table B4.20:

Table B4.21: Weighted Average Student class performance (course portfolio) for criteria B3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME705	27.3	25	22.7	18.2	6.8	3.23	5
UME 691	80.6	8.2	2.9	4.4	3.9	4.572	5
Weighted average score	53.95	16.60	12.80	11.30	5.35	3.90	10

b.) Assessment Tool: Student Course Survey

Table B4.22: Average score of student course survey for criteria B3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	80.6	8.2	2.9	4.4	3.9	4.572	5
UME705	27.3	25	22.7	18.2	6.8	3.23	5
Weighted average score	53.95	16.60	12.80	11.30	5.35	3.90	10

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table B4.23: Assessment for criteria B3 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26.00	44.00	22.00	4.00	4.00	3.84
Alumni survey	36.00	48.00	10.00	6.00	0.00	4.00
Employer Survey	46.00	46.00	8.00	0.00	0.00	4.38

Finally overall weighted average score of performance criterion 'B3' is evaluated as given below in Table B4.23:

Table B4.24: Overall weighted average score of performance criterion 'B3'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	53.95	16.60	12.80	11.30	5.35	3.90	5.00
Weighted average student course survey	53.95	16.60	12.80	11.30	5.35	3.90	4.00
Graduating student survey	26.00	44.00	22.00	4.00	4.00	3.84	3.00
Alumni survey	36.00	48.00	10.00	6.00	0.00	4.00	3.00
Employer survey	46.00	46.00	8.00	0.00	0.00	4.38	3.00
Overall weighted score	44.98	31.30	13.07	7.32	3.34	3.99	18.00

Assessment of Outcome 'B' using performance criterion B4

Performance criteria 'B4' : Applying statistical methods in analyzing data.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Machining Science (UME705) and Solids and Structures (UES010) were used to assess performance criteria B1 as a direct measure. The analysis for each of these courses is provided below:

(i) **Course:** Machining Science (UME705)

The above performance criteria is used to measure the attainment of outcome 'B4' by giving the following question (Question No. 3(B): during EST in December 2017, weightage 10 marks) to the students.

Question: From a raw material of 100mm length and 10 mm diameter, a component having length 100mm and diameter 8 mm is to be produced using a cutting speed of 31.41 m/min and a feed rate of 0.7 mm/rev. How many times we have to sharpen if 1000 workpieces are to be produced. Use constants as $n=1.2$ and $C=180$ in Taylors equation.

Student's performance in the above question is given below:

Table B4.25: Student's performance in question targeting 'B4'; course: UME705

S. No	Roll No.	Name	Marks (10)	SCORE (1-5)
1	101408062	Jaskaran Singh	3	2
2	101408063	Jaskirat Singh	9	5
3	101408064	Jaspreet Singh	10	5
4	101408065	Jaswinder Singh	10	5
5	101408066	Jatin Sharma	10	5
6	101408067	Kamal Jindal	7	4
7	101408068	Kanwarpal	0	0
8	101408069	Karamjeet	6	4
9	101408070	Karan Bains	8	5
10	101408071	Karan Goyal	10	5
11	101408073	Kchaustabh	8	5
12	101408074	Kshitiz	4	3
13	101408075	Kumar Akshaan	0	0
14	101408076	Kunal	10	5
15	101408077	Lokesh	10	5
16	101408078	Lovedeep	4.5	3
17	101408079	Lucky	7	4
18	101408080	Mangal	5	3
19	101408130	Tejkirat	10	5
20	101408131	Thakur Singla	10	5
21	101408132	Tishir Chabria	6	4

22	101408134	Vikram	10	5
23	101588002	Govind Abhimanyu	4	3
24	101588004	Hardik	10	5
25	101408082	Mayank Manish	10	5
26	101408083	Mayank Singh	6	4
27	101408084	Mir Faizan	8	5
28	101408086	Muazz Ahmed	10	5
29	101408087	Mukul Barpagga	0	0
30	101408088	Navyug Kumar	4	3
31	101408089	Nimish Goyal	10	5
32	101408090	Nishant Shearon	10	5
33	101408091	Nitin Gupta	10	5
34	101408092	Om Prakash	6	4
35	101408093	Parag Gupta	10	5
36	101408094	Piyush Goyal	0	0
37	101408095	Piyush Kumar	7	4
38	101408096	Pranjal Sharma	10	5
39	101408097	Prasoon Khushwaha	2	2
40	101408098	Pulkit Gautam	10	5
41	101408136	Vivek Singla	10	5
42	101408137	Yudhveer Singh	0	0
43	101588007	Kulvir Singh	4	3
44	101588008	Mohit Kumar	10	5
45	101458001	Devansh Jain	10	5
46	101408048	Gurneet	10	5
47	101408100	Puneet Kumar	10	5
48	101408101	Rachit Jain	2	2
49	101408102	Raghav Ralhan	4	3
50	101408103	Ranmeek Multani	10	5
51	101408104	Ranmeek	2	2
52	101408105	Ravi K Mittal	0	0
53	101408106	Rishab Bhatnagar	4	3
54	101408107	Rishab Jain	9	5
55	101408108	Rishav Kumar	10	5
56	101408110	Rohan Bisht	3	2
57	101408111	Sagandeep Kang	0	0
58	101408112	Sagar Loomba	6	4
59	101408113	Sanchit Aggarwal	10	5
60	101408114	Sarabdeep Gambhir	2	2
61	101408115	Shanya	0	0
62	101408116	Shashank Bindal	0	0
63	101408117	Shikhar Pandey	0	0
64	101408118	Shirish Goel	10	5

65	101408119	Shivankar Pandey	10	5
66	101458002	Shrey Asthana	1	1
67	101588003	Gunjan Chauhan	0	0
68	101588009	Mukesh Saroj	0	0
69	101588014	Suraj Kumar	10	5
70	101458003	Pranav Tiwari	10	5
71	101458004	Ravi Bishnoi	6	4

The overall performance of students in the above question is then summarized as given below

Table B4.26: Average score of student performance in the course UME705 criteria B4

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME705	59.3	15.3	13.6	10.2	1.7	4.00

(ii) Course: Solids and Structures (UES010)

The above performance criteria is used to measure the attainment of outcome ‘B4’ by giving the following Project (in September 2017, weightage 10 marks) to the students.

Project Statement: Load-Deflection behaviour of different materials

- Estimate the load – deflection characteristics (Both experimentally and analytically) at the free end of a cantilever beam of a specific material (Wood/ Mild Steel/ Cast Iron) with specific X-section having span ‘L’ subjected to a point load ‘P’ at the free end.
- Also estimate the “E” value of the material of the beam using load –deflection data analytically.

Student’s performance in the above Project is given below:

Table B4.27: Student’s performance in Project targeting ‘B4’; course: UES010

Sr. no.	Roll no.	Name	Marks (10)	Score (Scale 1 to 5)
1	101654024	Sirjan Ahluwalia	6	3
2	101604153	Soham Banerjee	8.5	5
3	101604154	Sukhpal Singh Mann	8	5
4	101604155	Sultan Singh	8.25	5
5	101604157	Surbhi Manral	7.5	5
6	101604158	Sushant Goyal	8.5	5
7	101604159	Sushant Joshi	7.25	4
8	101604160	Takshak Kohli	6.5	4
9	101604162	Tushar Jain	7.5	4
10	101604163	Utkarsh Srivastava	8	5
11	101654025	Vanit Yadav	6	3
12	101604164	Vanshika Aggarwal	8.5	5

13	101654026	Vibhuti	8.75	5
14	101604165	Vidhi Mehta	8.25	5
15	101604167	Vikramjit Singh	8.5	5
16	101604166	Vikramjit Singh	8.75	5
17	101604168	Vishal Choudhary	8	5
18	101604169	Yash Kumar	7.5	5
19	101604170	Yati Arora	8.75	5
20	101604171	Yukta Sharma	7.75	5
21	101654027	Yuvraj Singh Chauhan	8	5
22	101784016	Simranjeet Singh Rathore	7	4
23	101784017	Subham Paul	6.75	4

The overall performance of students in the above question is then summarized as given below

Table B4.28: Average score of student performance in the course UES010 for criteria B4

Course	% of students in each score					Average Score
	5	4	3	2	1	
UES010	69.56	21.73	8.69	0	0	4.60

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria B4 as given below in Table B4.27:

Table B4.29: Weighted Average Student class performance (course portfolio) for criteria B4

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UES010	69.56	21.73	8.69	0	0	4.6	5
UME705	59.3	15.3	13.6	10.2	1.7	4	5
Weighted average score	64.43	18.52	11.15	5.10	0.85	4.30	10

b.) Assessment Tool: Student Course Survey

Table B4.30: Average score of student course survey for criteria B4

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UES010	47.56	40.89	4.56	1.12	0	4.17	4
UME705	59.3	15.3	13.6	10.2	1.7	4	4
Weighted average score	53.43	28.10	9.08	5.66	0.85	4.09	8

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table B4.31: Assessment for criteria B4 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26.00	44.00	22.00	4.00	4.00	3.84
Alumni survey	36.00	48.00	10.00	6.00	0.00	4.00
Employer Survey	46.00	46.00	8.00	0.00	0.00	4.38

Finally overall weighted average score of performance criterion 'B4' is evaluated as given below in Table B4.30:

Table B4.32: Overall weighted average score of performance criterion 'B4'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	64.43	18.52	11.15	5.10	0.85	4.30	5.00
Weighted average student course survey	53.43	28.10	9.08	5.66	0.85	4.09	4.00
Graduating student survey	26.00	44.00	22.00	4.00	4.00	3.84	3.00
Alumni survey	36.00	48.00	10.00	6.00	0.00	4.00	3.00
Employer survey	46.00	46.00	8.00	0.00	0.00	4.38	3.00
Overall weighted score	47.77	34.39	11.78	4.34	1.09	4.14	18.00

Overall assessment of student outcome B using scores of B1, B2, B3 and B4

In the above sections, each of the individual performance criteria B1, B2, B3 and B4 have been assessed. The performance for attainment of outcome B has been completed using the attainment values for B1, B2, B3 and B4 and is provided below:

Table B4.31 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome B.

Table B4.33: Overall score for outcome B at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
B1	41.09	39.58	11.29	1.79	5.57	4.04	4
B2	42.69	36.22	13.29	4.62	2.54	4.07	5
B3	44.98	31.30	13.07	7.32	3.34	3.99	5
B4	47.77	34.39	11.78	4.34	1.09	4.14	4
Overall score	44.10	35.19	12.45	4.68	2.75	4.06	18

Track Record and assessment of attainment of student outcome ‘B’ over the last three academic years

The performance criteria-wise assessment score distribution and overall weighted score for outcome ‘B’ for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table B4.42 presents the performance criteria-wise assessment score distribution for outcome ‘B’

Table B4.34: Performance criteria-wise assessment score distribution of outcome B

Student outcomes and performance criteria		Year		
		2015	2016	2017
B	B1	3.83	3.82	4.04
	B2	3.93	4.07	4.07
	B3	3.92	4.00	3.99
	B4	3.90	4.03	4.14

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome ‘B’ over a period of last three years.

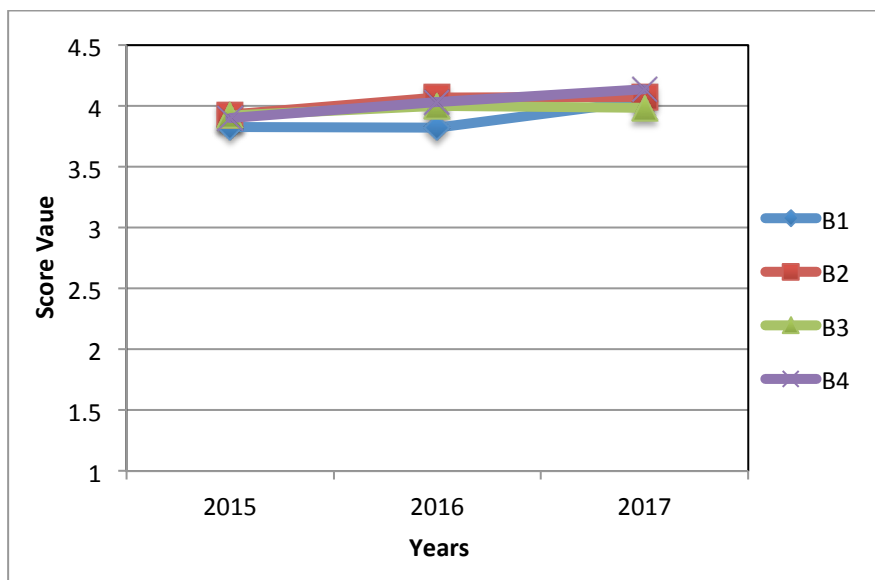


Figure B4.2: Performance criteria-wise assessment score distribution of outcome B

Level of attainment of student outcome ‘B’ over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table B4.43 presents the overall weighted score of outcome ‘B’ over the last three academic years

Table B4.35: Overall weighted score of outcome ‘B’ over a period of last three years

Year	Overall weighted score	Level of attainment
2015	3.90	Good
2016	3.99	Good
2017	4.06	Good

The above data has been plotted to visualize the overall weighted score of outcome ‘B’ over a period of last three years.

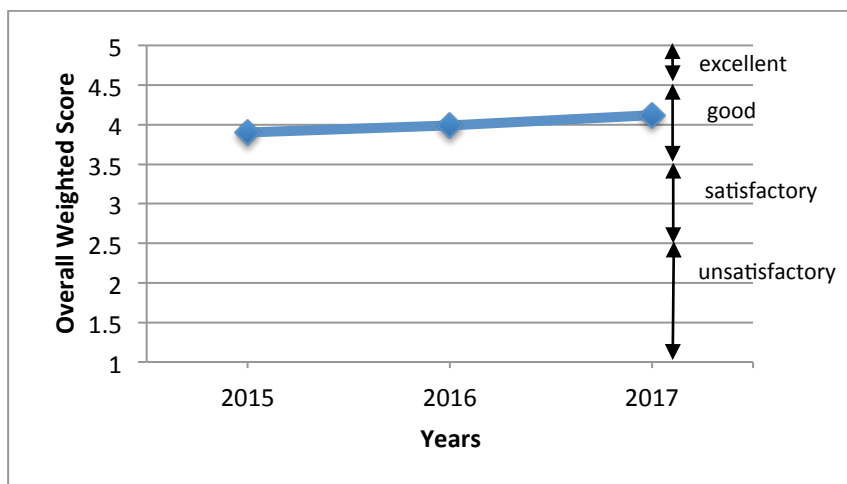


Figure B4.3: Overall weighted score of outcome ‘B’ over a period of last three years

The following actions have been taken based on the analysis of Outcome B

Weighted Score for Outcome B	Recommendation	Reason	Implemented from
4.06	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'C'
(Year 2017)**

for the

Bachelor of Engineering
in
Mechanical Engineering

Thapar Institute of Engineering and Technology

Patiala (Punjab) - 147004

INDIA

Attainment of Outcome C

The attainment of each outcome has been measured using a standard procedure explained in the Self Assessment Report for the program. A flow chart depicting the step by step methodology used to measure each attainment is provided below for ready reference.

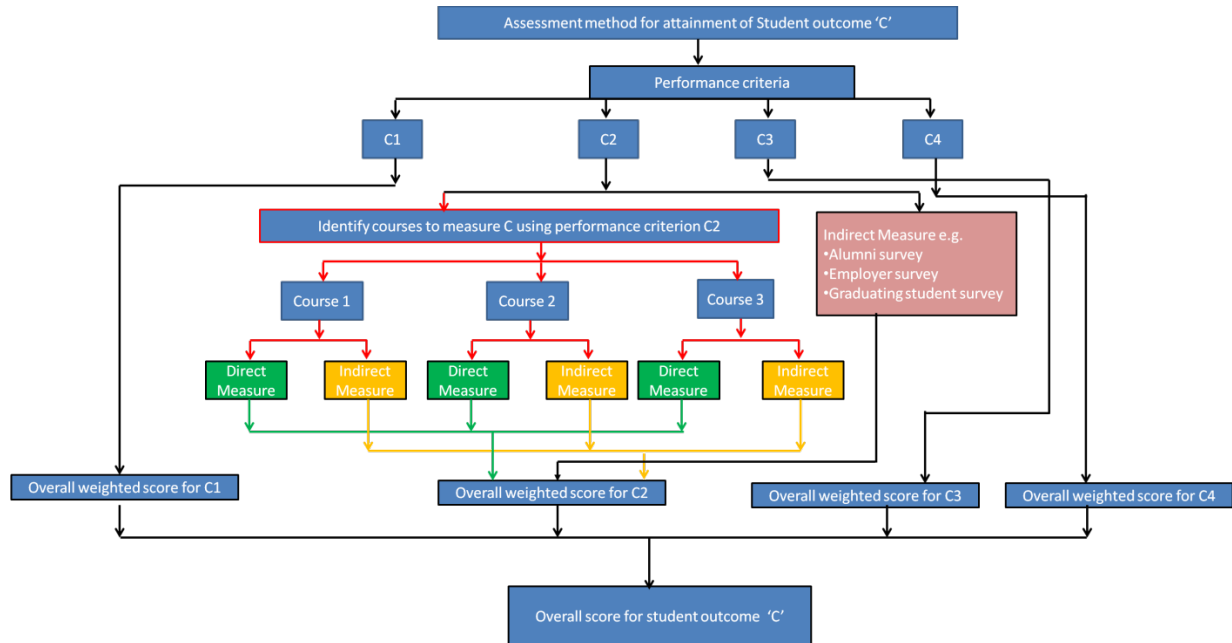


Figure C4.1: Flow chart for the attainment of outcome 'C'

The following course has been considered for the assessment of student outcome 'C'

- Courses:
- (1) Advanced Machine Design (UME701)
 - (2) Capstone Project (UME891)
 - (3) Engineering Design III (UTA011)

Outcome C has been assessed by three performance criteria C1, C2, and C3. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these three performance criteria has been used to measure the overall measure of outcome C.

1) Assessment of Outcome 'C' using performance criterion C1

Performance criteria 'C1': Analyzes needs to produce problem definition for thermal and mechanical systems.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: The course namely Advanced Machine Design (UME701) and Capstone Project (UME891) was used to assess performance criteria C1 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Advanced Machine Design (UME701)

The above performance criteria is used to measure the attainment of outcome 'C' by giving the following question (Question No. 2 Question No. 3 during EST in December 2017, weightage 30 marks) to the students.

Question:

2. A horizontal flat belt drive is to be designed for a general purpose application where an ac motor drives an air compressor. The compressor runs at 180 rpm and the motor rotates at 720 rpm transmitting 15 kW power. The diameter of the motor pulley is 0.3 m and the center distance between the pulleys is to be maintained between 1.5 m to 1.8 m. The total slip in the belt drive is 2%. It has been decided to use Dunlop high-speed belt and mild steel pulleys in the design. Furnish the complete specifications of the belt and pulleys.
3. It is required to design a chain drive to transmit 5 kW power from an IC engine with mechanical drive running at 500 rpm to a hammer mill, with a speed reduction of 2. Select a proper chain drive. Determine the pitch circle diameters of the driving and driven sprocket wheels. Determine chain length if approximate center distance = $40 \times \text{pitch (mm)}$

Student's performance in the above question is given below:

Table C4.1: Student's performance in question targeting 'C1'; course: UME701

S.No.	Roll No. of student	(QNo. 2 and 3 in EST) (30 Marks)	Weight (Scale 1 to 5)
1	101408001	16.0	3
2	101408002	19.5	4
3	101408003	21.0	4
4	101408004	15.0	3
5	101408005	25.0	5
6	101408006	18.0	3
7	101408007	-1.0	0
8	101408008	5.0	1
9	101408009	13.0	3
10	101408010	19.5	4
11	101408011	22.0	4
12	101408012	4.5	1
13	101408013	-1.0	0
14	101408014	19.5	4
15	101408015	13.5	3
16	101408016	-1.0	0
17	101408017	21.0	4
18	101408019	24.5	4
19	101408020	13.0	3
20	101408022	18.5	3

21	101408023	25.5	5
22	101408024	14.0	3
23	101408025	17.5	3
24	101408026	-1.0	0
25	101408028	19.0	4
26	101408029	25.5	5
27	101408030	11.0	2
28	101408031	23.5	4
29	101408032	21.5	4
30	101408033	14.5	3
31	101408034	12.0	2
32	101408035	23.5	4
33	101408036	17.0	3
34	101408037	23.0	4
35	101408038	17.5	3
36	101408039	17.5	3
37	101408040	17.0	3
38	101408041	24.0	4
39	101408042	27.5	5
40	101408043	25.5	5
41	101408044	11.0	2
42	101408045	25.5	5
43	101408047	19.5	4
44	101408049	21.5	4
45	101408050	19.0	4
46	101408051	24.5	4
47	101408052	20.5	4
48	101408055	20.0	4
49	101408056	21.5	4
50	101408057	-1.0	0
51	101408058	11.5	2
52	101408059	24.0	4
53	101408060	27.0	5
54	101408120	25.5	5
55	101408121	26.0	5
56	101408122	25.5	5
57	101408123	29.5	5
58	101408124	25.0	5
59	101408125	7.5	2
60	101408126	-1.0	0
61	101408127	23.5	4
62	101408128	22.5	4
63	101408129	28.5	5
64	101588001	27.0	5
65	101588005	27.5	5
66	101588006	28.0	5
67	101588010	27.0	5
68	101588011	27.5	5
69	101588012	25.0	5
70	101588013	27.5	5
71	101588015	28.0	5

The overall performance of students in the above question is then summarized as given below

Table C4.2: Average score of student performance in the course UME701 for criteria C1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME701	32.3	35.4	21.5	7.7	3.1	3.86

(ii) Course: Capstone Project (UME891/893)

The above performance criteria is used to measure the attainment of outcome 'C1' from the 1st Evaluation (Question: 1st Evaluation; weightage 10 marks).

Question: Need Analysis, Problem Definition & Implementation.

Student's performance in the above question is given below:

Table C4.3: Student's performance in question targeting 'C1'; course: UME891

S. No.	Roll No.	Name	Marks (10)	Score Scale (1-5)
1	101308001	Ankit Juneja	10	5
2	101308002	Abhinav	8.5	5
3	101308003	Abhishek Kumar Verma	7.5	4
4	101308004	Abhyuday Singh	8.5	5
5	101308006	Aditya Agrawal	7.5	4
6	101308007	Ajeet Pal Singh	9.5	5
7	101308008	Akash Malhotra	7.5	4
8	101308009	Akash Reddy Kakularam	10	5
9	101308010	Akash Sharma	8	4
10	101308011	Akashdeep Singh Gandhi	8.5	5
11	101308012	Akshay Kumar	7.5	4
12	101308013	Amritpal Singh Sangwan	6	3
13	101308014	Aneesh Kejariwal	10	5
14	101308015	Ankit Sehgal	6	3
15	101308016	Ankur Goyal	8	4
16	101308017	Ankush Bansal	8	4
17	101308018	Anoop	6	3
18	101308019	Anshaj Jindal	8	4
19	101308020	Anuj Jain	10	5
20	101308021	Arshdeep Singh	8.5	5
21	101308023	Bhabuk Goyal	8	4
22	101308024	Bhajanpreet Singh	8	4
23	101308025	Bhuvanyu	7.5	4
24	101308026	Bipin Loi	9.5	5
25	101308027	Brhamjyot Singh Sandhu	8	4
26	101308028	Deepak Dalal	7.5	4
27	101308029	Deepak Sharma	7.5	4
28	101308031	Dhiraj Dureja	7.5	4
29	101308032	Dildeep Singh	8	4
30	101308033	Ekansh Kumar Srivastava	6	3

31	101308034	Ekjyot Singh	8.5	5
32	101308035	Gagandeep Singh	8	4
33	101308036	Gautam Dawar	10	5
34	101308037	Gurkirat Pal Singh	10	5
35	101308038	Gurkirat Singh Sangha	8	4
36	101308039	Gurpreet Singh	8	4
37	101308040	Gurpreet Singh	6	3
38	101308042	Gurtej Singh	6	3
39	101308043	Guruteshwar	7.5	4
40	101308044	Harjot Singh	8	4
41	101308045	Harnoor Singh	8.5	5
42	101308046	Harsh Narang	10	5
43	101308047	Harsimran	7.5	4
44	101308048	Hemant Aggarwal	9	5
45	101308050	Iknoor Singh	7.5	4
46	101308051	Ishdeep Arora	6	3
47	101308052	Japdanish Singh	10	5
48	101308053	Jashanpreet Singh	8	4
49	101308054	Jaskaran Singh	10	5
50	101308055	Jatin Khosla	10	5
51	101308057	Kanav Bansal	10	5
52	101308059	Kanwar Gulati	8	4
53	101308060	Karan Chopra	10	5
54	101308061	Karan Goyal	8	4
55	101308063	Karan Veer Dewan	10	5
56	101308064	Karanbir Singh	8	4
57	101308065	Kashish Khurana	10	5
58	101308066	Keshav Jindal	10	5
59	101308067	Ketan Chauhan	8	4
60	101308068	Khushwinder Singh	8	4
61	101308069	Kirat Singh Basur	6	3
62	101308070	Kshitij Sharma	6	3
63	101308071	Lokendra Kumar	9	5
64	101308072	Lovedeep Garg	8	4
65	101308073	Manavdeep Singh Grover	10	5
66	101308074	Manik Saharan	6	3
67	101308075	Manish Pandoh	8	4
68	101308076	Manpreet Singh	10	5
69	101308077	Manutkarsh Kirpal	8	4
70	101308078	Nidan Prakash	8	4
71	101308079	Nikhil Aggarwal	8	4
72	101308080	Nikhil Ganta	8	4
73	101308082	Paramjot Singh	8	4
74	101308083	Paras	9	5
75	101308085	Prabhman Vir	6	3
76	101308088	Pulkit Kapoor	9	5
77	101308089	Puneet Singh	6	3
78	101308090	Rajat Gupta	8	4
79	101308091	Ramnish Kumar	8	4
80	101308093	Rohan Kaushal	9	5
81	101308094	Sagar Singla	8	4
82	101308096	Sahil Sharma	9	5
83	101308097	Samdeep Singh Sabharwal	8	4

84	101308098	Sameer Bhalla	9	5
85	101308099	Sartaj Singh	8	4
86	101308100	Shikhar Bhardwaj	6	3
87	101308101	Shikhar Gaur	7.5	4
88	101308102	Shreyas Bhayana	9	5
89	101308103	Shubham	8	4
90	101308104	Shubham Bhama	7.5	4
91	101308105	Shubham Choudhary	8	4
92	101308106	Shubham Gupta	9	5
93	101308108	Siddharth Ghiya	6.5	3
94	101308109	Siddharth Gupta	9	5
95	101308110	Siddharth Vasu	6.5	3
96	101308111	Sidhant	9	5
97	101308112	Simrandeep Singh Bhullar	9	5
98	101308113	Sourav Singla	6.5	3
99	101308114	Tanjay Pathak	6.5	3
100	101308115	Tanuj Lamba	7.5	4
101	101308116	Utsav Mudgal	9	5
102	101308117	Vaibhav Pratap Singh Pundir	6.5	3
103	101308118	Varmeet Singh Gulati	8	4
104	101308119	Varun Atri	7.5	4
105	101308120	Vedant Mansotra	6	3
106	101308121	Vikrant Nanda	7.5	4
107	101308122	Vishal Solanki	6	3
108	101308123	Vivek Mittal	8.5	5
109	101308124	Vivek Pundir	8.5	5
110	101308125	Yash Wardhan Sharma	8.5	5
111	101488001	Akash Tiwari	9.5	5
112	101488002	Anuj Tanwar	9.5	5
113	101488003	Bhupinder Singh	9.5	5
114	101488004	Bishant Sharma	9.5	5
115	101488005	Harish Yadav	7.5	4
116	101488006	Harpreet Singh	10	5
117	101488007	Inderjeet Kumar	10	5
118	101488008	Ishan Bansal	9	5
119	101488009	Jaspreet Singh	10	5
120	101488010	Jaspreet Singh	10	5
121	101488011	Kulwinder Singh	10	5
122	101488012	Mohit Goyal	8	4
123	101488013	Navjot Rihal	8	4
124	101488014	Nikhil Gupta	9	5
125	101488015	Sankit	6	3
126	101488016	Sarang Vashisht	9	5
127	101488017	Varun Bansal	8.5	5
128	101488018	Vishnu Kalra	8.5	5

The overall performance of students in the above question is then summarized as given below

Table C4.4: Average score of student performance in the course UME891 for criteria C1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	43	40.6	16.4	0	0	4.27

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria C1 as given below in Table C4.5:

Table C4.5: Weighted Average Student class performance (course portfolio) for criteria C1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME701	32.3	35.4	21.5	7.7	3.1	3.86	5
UME891	43	40.6	16.4	0	0	4.27	5
Weighted average score	37.65	38.00	18.95	3.85	1.55	4.07	10

b) Indirect measures for Performance criteria C1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table C4.6: Average score of student course survey for criteria C1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME701	32.3	35.4	21.5	7.7	3.1	3.86	5
UME891	43	40.6	16.4	0	0	4.27	5
Weighted average score	37.65	38.00	18.95	3.85	1.55	4.07	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table C4.7: Assessment for criteria C1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	20	50	22	4	4	3.78
Alumni survey	22	54	22	2	0	4.00
Employer Survey	30	54	14	2	0	4.12

c) Overall weighted average score of performance criterion 'C1'

Finally overall weighted average score of performance criterion 'C1' is evaluated as given below in Table C4.8:

Table C4.8: Overall weighted average score of performance criterion 'C1'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	37.65	38.00	18.95	3.85	1.55	4.07	5
Weighted average student course survey	37.65	38.00	18.95	3.85	1.55	4.07	4
Graduating student survey	20	50	22	4	4	3.78	3
Alumni survey	22	54	22	2	0	4	3
Employer survey	30	54	14	2	0	4.12	3
Overall weighted score	30.83	45.33	19.14	3.26	1.44	4.02	18

Assessment of Outcome 'C' using performance criterion C2

Performance criteria 'C2': Carries out design process to satisfy project requirement for thermal and mechanical systems.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: The course namely Advanced Machine Design (UME701) and Capstone Project (UME891) were used to assess performance criteria C2 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Advanced Machine Design (UME701)

The above performance criteria is used to measure the attainment of outcome 'C' by giving the following question (Question No.:1 during MST in September 2017, weightage 18 marks) to the students.

Question: The spring loaded safety valve for a boiler is required to blow off at a pressure of 1.3 MPa. The diameter of the valve is 65 mm and maximum lift of the valve is 17.5mm. Design a suitable compression spring for a valve assuming spring index to be 6 and providing initial compression of 30 mm. Take allowable shear stress of 0.45 GPa and modulus of rigidity as 84 Gpa.

Student's performance in the above question is given below:

Table C4.9: Student's performance in question targeting 'C2'; course: UME701

S. No.	Roll No. of Students	(Q. No.1 in MST) (18 Marks)	Weight (Scale 1 to 5)
1	101408001	12	4
2	101408002	18	5
3	101408003	7	2

4	101408004	4	2
5	101408005	8	3
6	101408006	8	3
7	101408007	4	2
8	101408008	4	2
9	101408009	11	3
10	101408010	9	3
11	101408011	7	2
12	101408012	13	4
13	101408013	5	2
14	101408014	18	5
15	101408015	10	3
16	101408016	10	3
17	101408017	12	4
18	101408019	18	5
19	101408020	16	5
20	101408022	2	1
21	101408023	10	3
22	101408024	12	4
23	101408025	14	4
24	101408026	0	0
25	101408028	7	2
26	101408029	9	3
27	101408030	16	5
28	101408031	12	4
29	101408032	4	2
30	101408033	12	4
31	101408034	13	4
32	101408035	11	3
33	101408036	12	4
34	101408037	12	4
35	101408038	-1	0
36	101408039	2	1
37	101408040	11	3
38	101408041	18	5
39	101408042	12	4
40	101408043	18	5
41	101408044	2	1
42	101408045	16	5
43	101408047	-1	0
44	101408049	18	5
45	101408050	16	5

46	101408051	8	3
47	101408052	2	1
48	101408055	9	3
49	101408056	7	2
50	101408057	-1	0
51	101408058	4	2
52	101408059	13	4
53	101408060	18	5
54	101408120	14	4
55	101408121	18	5
56	101408122	3	1
57	101408123	6	2
58	101408124	11	3
59	101408125	-1	0
60	101408126	-1	0
61	101408127	15	5
62	101408128	12	4
63	101408129	17	5
64	101588001	12	4
65	101588005	11	3
66	101588006	15	5
67	101588010	12	4
68	101588011	6	2
69	101588012	-1	0
70	101588013	18	5
71	101588015	18	5

The overall performance of students in the above question is then summarized as given below

Table C4.10: Average score of student performance in the course UME891 for criteria C2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME701	26.6	25	21.9	18.8	7.8	3.44

(ii) Course: Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome ‘C2’ from the 2nd Evaluation (Question: 2nd Evaluation; weightage 10 marks).

Question: Preliminary Design, Cost Analysis, Report and PPT.
Student’s performance in the above question is given below:

Table C4.11: Student's performance in question targeting 'C2'; course: UME891

S. No.	Roll No.	Name	Marks (10)	Score Scale (1-5)
1	101308001	Ankit Juneja	8	4
2	101308002	Abhinav	8.5	5
3	101308003	Abhishek Kumar Verma	8.5	5
4	101308004	Abhyuday Singh	8.5	5
5	101308006	Aditya Agrawal	8.5	5
6	101308007	Ajeet Pal Singh	8.5	5
7	101308008	Akash Malhotra	8.5	5
8	101308009	Akash Reddy Kakularam	10	5
9	101308010	Akash Sharma	8	4
10	101308011	Akashdeep Singh Gandhi	8.5	5
11	101308012	Akshay Kumar	8	4
12	101308013	Amritpal Singh Sangwan	8	4
13	101308014	Aneesh Kejariwal	10	5
14	101308015	Ankit Sehgal	4	2
15	101308016	Ankur Goyal	8	4
16	101308017	Ankush Bansal	7.5	4
17	101308018	Anoop	8	4
18	101308019	Anshaj Jindal	7.5	4
19	101308020	Anuj Jain	10	5
20	101308021	Arshdeep Singh	8.5	5
21	101308023	Bhabuk Goyal	8	4
22	101308024	Bhajanpreet Singh	7.5	4
23	101308025	Bhuvanyu	8.5	5
24	101308026	Bipin Loi	8.5	5
25	101308027	Brhamjyot Singh Sandhu	7	4
26	101308028	Deepak Dalal	8	4
27	101308029	Deepak Sharma	8	4
28	101308031	Dhiraj Dureja	8	4
29	101308032	Dildeep Singh	7	4
30	101308033	Ekansh Kumar Srivastava	5.5	3
31	101308034	Ekjyot Singh	8.5	5
32	101308035	Gagandeep Singh	7	4
33	101308036	Gautam Dawar	10	5
34	101308037	Gurkirat Pal Singh	10	5
35	101308038	Gurkirat Singh Sangha	7	4
36	101308039	Gurpreet Singh	7	4
37	101308040	Gurpreet Singh	8	4
38	101308042	Gurtej Singh	8	4
39	101308043	Guruteshwar	7.5	4

40	101308044	Harjot Singh	7	4
41	101308045	Harnoor Singh	8.5	5
42	101308046	Harsh Narang	10	5
43	101308047	Harsimran	7.5	4
44	101308048	Hemant Aggarwaal	9	5
45	101308050	Iknoor Singh	8.5	5
46	101308051	Ishdeep Arora	8	4
47	101308052	Japdanish Singh	8	4
48	101308053	Jashanpreet Singh	5.5	3
49	101308054	Jaskaran Singh	8.5	5
50	101308055	Jatin Khosla	8.5	5
51	101308057	Kanav Bansal	8.5	5
52	101308059	Kanwar Gulati	8.5	5
53	101308060	Karan Chopra	8.5	5
54	101308061	Karan Goyal	5.5	3
55	101308063	Karan Veer Dewan	8.5	5
56	101308064	Karanbir Singh	5.5	3
57	101308065	Kashish Khurana	8.5	5
58	101308066	Keshav Jindal	8	4
59	101308067	Ketan Chauhan	8.5	5
60	101308068	Khushwinder Singh	5.5	3
61	101308069	Kirat Singh Basur	4	2
62	101308070	Kshitij Sharma	4	2
63	101308071	Lokendra Kumar	9	5
64	101308072	Lovedeep Garg	5.5	3
65	101308073	Manavdeep Singh Grover	8	4
66	101308074	Manik Saharan	4	2
67	101308075	Manish Pandoh	8.5	5
68	101308076	Manpreet Singh	8.5	5
69	101308077	MANUTKARSH KIRPAL	8	4
70	101308078	Nidan Prakash	8.5	5
71	101308079	NIKHIL AGGARWAL	8.5	5
72	101308080	NIKHIL GANTA	8.5	5
73	101308082	PARAMJOT SINGH	8	4
74	101308083	Paras	9	5
75	101308085	Prabhman Vir	4	2
76	101308088	Pulkit Kapoor	9	5
77	101308089	Puneet Singh	5.5	3
78	101308090	Rajat Gupta	8	4
79	101308091	Ramnish Kumar	8	4
80	101308093	Rohan Kaushal	9	5
81	101308094	Sagar Singla	8	4

82	101308096	Sahil Sharma	9	5
83	101308097	Samdeep Singh Sabharwal	8	4
84	101308098	Sameer Bhalla	9	5
85	101308099	Sartaj Singh	8	4
86	101308100	Shikhar Bhardwaj	8	4
87	101308101	Shikhar Gaur	8	4
88	101308102	Shreyas Bhayana	7.5	4
89	101308103	Shubham	8	4
90	101308104	Shubham Bhama	8.5	5
91	101308105	Shubham Choudhary	8.5	5
92	101308106	Shubham Gupta	7.5	4
93	101308108	Siddharth Ghiya	9	5
94	101308109	Siddharth Gupta	7.5	4
95	101308110	Siddharth Vasu	8	4
96	101308111	Sidhant	7.5	4
97	101308112	Simrandeep Singh Bhullar	7.5	4
98	101308113	Sourav Singla	8.5	5
99	101308114	Tanjay Pathak	8	4
100	101308115	Tanuj Lamba	8	4
101	101308116	Utsav Mudgal	9	5
102	101308117	Vaibhav Pratap Singh Pundir	8	4
103	101308118	Varmeet Singh Gulati	8.5	5
104	101308119	Varun Atri	8	4
105	101308120	Vedant Mansotra	5.5	3
106	101308121	Vikrant Nanda	6	3
107	101308122	Vishal Solanki	5.5	3
108	101308123	Vivek Mittal	8	4
109	101308124	Vivek Pundir	8	4
110	101308125	Yash Wardhan Sharma	8	4
111	101488001	Akash Tiwari	8.5	5
112	101488002	Anuj Tanwar	8.5	5
113	101488003	Bhupinder Singh	8.5	5
114	101488004	Bishant Sharma	8.5	5
115	101488005	Harish Yadav	8.5	5
116	101488006	Harpreet Singh	8.5	5
117	101488007	Inderjeet Kumar	8.5	5
118	101488008	Ishan Bansal	9	5
119	101488009	Jaspreet Singh	8.5	5
120	101488010	Jaspreet Singh	8.5	5
121	101488011	Kulwinder Singh	8.5	5
122	101488012	MOHIT GOYAL	8.5	5
123	101488013	NAVJOT RIHAL	7	4

124	101488014	Nikhil Gupta	9	5
125	101488015	Sankit	5.5	3
126	101488016	Sarang Vashisht	9	5
127	101488017	Varun Bansal	8	4
128	101488018	Vishnu Kalra	8	4

The overall performance of students in the above question is then summarized as given below

Table C4.12: Average score of student performance in the course UME891 for criteria C2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	46.1	41.4	8.6	3.9	0	4.3

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria C2 as given below in Table C4.13:

Table C4.13: Weighted Average Student class performance (course portfolio) for criteria C2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME701	26.6	25	21.9	18.8	7.8	3.44	5
UME891	46.1	41.4	8.6	3.9	0	4.3	5
Weighted average score	36.35	33.20	15.25	11.35	3.90	3.87	10

b) Indirect measures for Performance criteria C2 (Surveys)

i.) Assessment Tool: Student Course Survey

Table C4.14: Average score of student course survey for criteria C2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME701	26.6	25	21.9	18.8	7.8	3.44	5
UME891	46.1	41.4	8.6	3.9	0	4.3	5
Weighted average score	36.35	33.20	15.25	11.35	3.90	3.87	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table C4.15: Assessment for criteria C2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	20	50	22	4	4	3.78
Alumni survey	22	54	22	2	0	4.00
Employer Survey	30	54	14	2	0	4.12

c) Overall weighted average score of performance criterion 'C2'

Finally overall weighted average score of performance criterion 'C2' is evaluated as given below in

Table C4.16:

Table C4.16: Overall weighted average score of performance criterion 'C2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	36.35	33.20	15.25	11.35	3.90	3.87	5
Weighted average student course survey	36.35	33.20	15.25	11.35	3.90	3.87	4
Graduating student survey	20	50	22	4	4	3.78	3
Alumni survey	22	54	22	2	0	4	3
Employer survey	30	54	14	2	0	4.12	3
Overall weighted score	30.18	42.93	17.29	7.01	2.62	3.92	18

Assessment of Outcome 'C' using performance criterion C3

Performance criteria 'C3': Can work within realistic constraints in realizing systems.

Step 1: The course namely Advanced Machine Design (UME701) and Capstone Project (UME891) were used to assess performance criteria C3 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Advanced Machine Design (UME701)

The above performance criteria is used to measure the attainment of outcome 'C' by giving the following question (Question No. 3 and Q.No.4 during MST in September 2017, (weightage 30 marks) to the students.

Question:

3. A brake drum is 320 mm in diameter and actuated by a mechanism, which exerts equal force F on each shoe as shown in Figure 1. Shoes are identical and the face width of the friction lining is 50 mm. Lining is molded asbestos with coefficient of friction = 0.30 and maximum intensity

- of normal pressure is limited to 1 N/mm^2 . The angle θ_1 can be assumed to be zero. What is the braking capacity of brake? Calculate the actuating force F .
4. A disk brake shown in Figure 2 uses a double calliper. Each half has a 60-mm-diameter round pad on each side of the disk. The center of contact of each of the four pads is at a radius of 125 mm. The outside diameter of the disk is 320 mm. The pads have woven linings that provide a coefficient of friction of approximately 0.30. The average pressure on the pads is to be limited to 500 kPa.
- (a) What clamping force must be provided in order to develop the limiting pad pressure?
 (b) With this clamping force, what approximate brake torque is obtained?

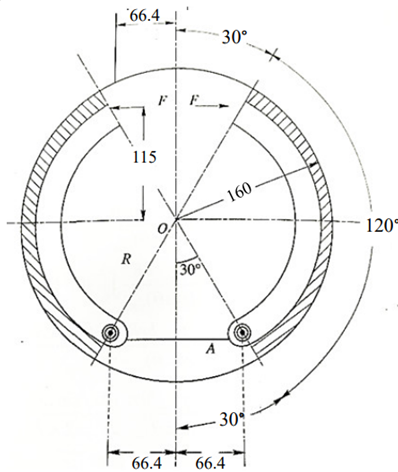


Figure 1

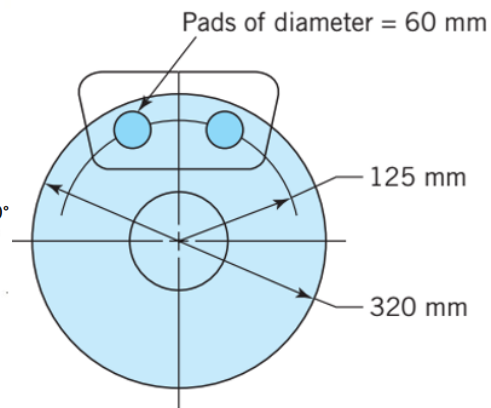


Figure 2

Student's performance in the above question is given below:

The overall performance of students in the above question is then summarized as given below:

Table C4.17: Student's performance in question targeting 'C3'; course: UME701

S. No.	Roll No. of Students	(Q. No. 3 and 4 in MST) (30 Marks)	Weight (Scale 1 to 5)
1	101408001	22	4
2	101408002	17	3
3	101408003	-1	0
4	101408004	13	3
5	101408005	10	2
6	101408006	28	5
7	101408007	11	2
8	101408008	1	0
9	101408009	16	3
10	101408010	10	2
11	101408011	26.5	5
12	101408012	-1	0
13	101408013	-1	0
14	101408014	20	4
15	101408015	6	1
16	101408016	20	4
17	101408017	30	5
18	101408019	18	3
19	101408020	12	2

20	101408022	-1	0
21	101408023	28	5
22	101408024	10	2
23	101408025	11	2
24	101408026	2	1
25	101408028	15	3
26	101408029	10	2
27	101408030	20	4
28	101408031	22	4
29	101408032	-1	0
30	101408033	11	2
31	101408034	30	5
32	101408035	15	3
33	101408036	25	5
34	101408037	15	3
35	101408038	10	2
36	101408039	5	1
37	101408040	22	4
38	101408041	25	5
39	101408042	5	1
40	101408043	30	5
41	101408044	9	2
42	101408045	30	5
43	101408047	23	4
44	101408049	-1	0
45	101408050	20	4
46	101408051	5	1
47	101408052	0	0
48	101408055	19	4
49	101408056	17	3
50	101408057	-1	0
51	101408058	9	2
52	101408059	30	5
53	101408060	18	3
54	101408120	29	5
55	101408121	20	4
56	101408122	11.5	2
57	101408123	17	3
58	101408124	3	1
59	101408125	-1	0
60	101408126	-1	0
61	101408127	28	5
62	101408128	10	2
63	101408129	21	4
64	101588001	28	5
65	101588005	25	5
66	101588006	26	5
67	101588010	11	2
68	101588011	0	0

69	101588012	-1	0
70	101588013	25	5
71	101588015	26	5

Table C4.18: Average score of student performance in the course UME701 for criteria C3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME701	29.3	19	17.2	24.1	10.3	3.33

(ii) Course: Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome 'C3' from the 3rd and showcase evaluation (Question: Component from 3rd evaluation (15)+Component from Showcasing event (12.5); weightage 27.5 marks).

Question: Final Design & Analysis. Fabrication and post-fabrication performance analysis of the product. Product Demonstration.

Student's performance in the above question is given below:

Table C4.19: Student's performance in question targeting 'C3'; course: UME891

S. No.	Roll No.	Name	Marks (27.5)	Score Scale (1-5)
1	101308001	Ankit Juneja	23.5	5
2	101308002	Abhinav	22.7	5
3	101308003	Abhishek Kumar Verma	22.5	5
4	101308004	Abhyuday Singh	22.7	5
5	101308006	Aditya Agrawal	22.5	5
6	101308007	Ajeet Pal Singh	22.3	5
7	101308008	Akash Malhotra	22.5	5
8	101308009	Akash Reddy Kakularam	23.7	5
9	101308010	Akash Sharma	21.7	4
10	101308011	Akashdeep Singh Gandhi	22.7	5
11	101308012	Akshay Kumar	22.5	5
12	101308013	Amritpal Singh Sangwan	22.3	5
13	101308014	Aneesh Kejariwal	24.7	5
14	101308015	Ankit Sehgal	18.0	4
15	101308016	Ankur Goyal	21.7	4
16	101308017	Ankush Bansal	21.7	4
17	101308018	Anoop	22.3	5
18	101308019	Anshaj Jindal	21.7	4
19	101308020	Anuj Jain	23.7	5
20	101308021	Arshdeep Singh	22.7	5
21	101308023	Bhabuk Goyal	21.7	4

22	101308024	Bhajanpreet Singh	21.7	4
23	101308025	Bhuvanyu	22.5	5
24	101308026	Bipin Loi	22.3	5
25	101308027	Brhamjyot Singh Sandhu	22.7	5
26	101308028	Deepak Dalal	21.7	4
27	101308029	Deepak Sharma	21.7	4
28	101308031	Dhiraj Dureja	21.7	4
29	101308032	Dildeep Singh	22.7	5
30	101308033	Ekansh Kumar Srivastava	20.3	4
31	101308034	Ekjyot Singh	22.7	5
32	101308035	Gagandeep Singh	22.7	5
33	101308036	Gautam Dawar	24.7	5
34	101308037	Gurkirat Pal Singh	23.7	5
35	101308038	Gurkirat Singh Sangha	22.7	5
36	101308039	Gurpreet Singh	22.7	5
37	101308040	Gurpreet Singh	22.3	5
38	101308042	Gurtej Singh	22.3	5
39	101308043	Guruteshwar	20.7	4
40	101308044	Harjot Singh	22.7	5
41	101308045	Harnoor Singh	22.7	5
42	101308046	Harsh Narang	23.7	5
43	101308047	Harsimran	20.7	4
44	101308048	Hemant Aggarwal	22.7	5
45	101308050	Iknoor Singh	22.5	5
46	101308051	Ishdeep Arora	22.3	5
47	101308052	Japdanish Singh	23.5	5
48	101308053	Jashanpreet Singh	20.3	4
49	101308054	Jaskaran Singh	22.7	5
50	101308055	Jatin Khosla	24.0	5
51	101308057	Kanav Bansal	22.7	5
52	101308059	Kanwar Gulati	22.5	5
53	101308060	Karan Chopra	24.0	5
54	101308061	Karan Goyal	20.3	4
55	101308063	Karan Veer Dewan	24.0	5
56	101308064	Karanbir Singh	20.3	4
57	101308065	Kashish Khurana	24.0	5
58	101308066	Keshav Jindal	23.5	5
59	101308067	Ketan Chauhan	21.5	4
60	101308068	Khushwinder Singh	20.3	4
61	101308069	Kirat Singh Basur	18.0	4
62	101308070	Kshitij Sharma	18.0	4
63	101308071	Lokendra Kumar	22.7	5

64	101308072	Lovedeep Garg	20.3	4
65	101308073	Manavdeep Singh Grover	23.5	5
66	101308074	Manik Saharan	18.0	4
67	101308075	Manish Pandoh	21.5	4
68	101308076	Manpreet Singh	22.7	5
69	101308077	MANUTKARSH KIRPAL	20.0	4
70	101308078	Nidan Prakash	22.5	5
71	101308079	NIKHIL AGGARWAL	20.0	4
72	101308080	NIKHIL GANTA	20.0	4
73	101308082	PARAMJOT SINGH	20.0	4
74	101308083	Paras	22.7	5
75	101308085	Prabhman Vir	18.0	4
76	101308088	Pulkit kapoor	23.3	5
77	101308089	Puneet Singh	20.3	4
78	101308090	Rajat Gupta	22.7	5
79	101308091	Ramnish Kumar	22.7	5
80	101308093	Rohan Kaushal	23.3	5
81	101308094	Sagar Singla	22.7	5
82	101308096	Sahil Sharma	23.3	5
83	101308097	Samdeep Singh Sabharwal	22.7	5
84	101308098	Sameer Bhalla	22.7	5
85	101308099	Sartaj Singh	22.7	5
86	101308100	Shikhar Bhardwaj	22.3	5
87	101308101	Shikhar Gaur	21.3	4
88	101308102	Shreyas Bhayana	24.2	5
89	101308103	Shubham	22.7	5
90	101308104	Shubham Bhama	21.3	4
91	101308105	Shubham Choudhary	22.5	5
92	101308106	Shubham Gupta	24.2	5
93	101308108	Siddharth Ghiya	20.7	4
94	101308109	Siddharth Gupta	24.2	5
95	101308110	Siddharth Vasu	20.7	4
96	101308111	Sidhant	24.2	5
97	101308112	Simrandeep Singh Bhullar	24.2	5
98	101308113	Sourav Singla	20.7	4
99	101308114	Tanjay Pathak	20.7	4
100	101308115	Tanuj Lamba	21.3	4
101	101308116	Utsav Mudgal	23.3	5
102	101308117	Vaibhav Pratap Singh Pundir	20.7	4
103	101308118	Varmeet Singh Gulati	22.5	5
104	101308119	Varun Atri	21.3	4
105	101308120	Vedant Mansotra	20.3	4

106	101308121	Vikrant Nanda	21.3	4
107	101308122	Vishal Solanki	20.3	4
108	101308123	Vivek Mittal	23.8	5
109	101308124	Vivek Pundir	23.8	5
110	101308125	Yash Wardhan Sharma	23.8	5
111	101488001	Akash Tiwari	22.3	5
112	101488002	Anuj Tanwar	22.3	5
113	101488003	Bhupinder Singh	22.3	5
114	101488004	Bishant Sharma	22.3	5
115	101488005	Harish Yadav	21.7	4
116	101488006	Harpreet Singh	22.7	5
117	101488007	Inderjeet Kumar	24.0	5
118	101488008	Ishan Bansal	23.3	5
119	101488009	Jaspreet Singh	22.7	5
120	101488010	Jaspreet Singh	24.0	5
121	101488011	Kulwinder Singh	22.7	5
122	101488012	MOHIT GOYAL	20.0	4
123	101488013	NAVJOT RIHAL	19.0	4
124	101488014	Nikhil Gupta	22.7	5
125	101488015	Sankit	20.3	4
126	101488016	Sarang Vashisht	23.3	5
127	101488017	Varun Bansal	23.8	5
128	101488018	Vishnu Kalra	23.8	5

The overall performance of students in the above question is then summarized as given below

Table C4.20: Average score of student performance in the course UME891 for criteria C3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	64.8	35.2	0	0	0	4.65

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria C3 as given below in Table C4.21:

Table C4.21: Weighted Average Student class performance (course portfolio) for criteria C3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	64.8	35.2	0	0	0	4.65	5
UME701	29.3	19	17.2	24.1	10.3	3.33	5
Weighted average score	47.05	27.10	8.60	12.05	5.15	3.99	10

b) Indirect measures for Performance criteria C3 (Surveys)

i.) Assessment Tool: Student Course Survey

Table C4.22: Average score of student course survey for criteria C3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	64.8	35.2	0	0	0	4.65	5
UME701	29.3	19	17.2	24.1	10.3	3.33	5
Weighted average score	47.05	27.10	8.60	12.05	5.15	3.99	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table C4.23: Assessment for criteria C3 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	20	50	22	4	4	3.78
Alumni survey	22	54	22	2	0	4.00
Employer Survey	30	54	14	2	0	4.12

c) Overall weighted average score of performance criterion 'C3'

Finally overall weighted average score of performance criterion 'C3' is evaluated as given below in Table C4.24:

Table C4.24: Overall weighted average score of performance criterion 'C3'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	47.05	27.10	8.60	12.05	5.15	3.99	5
Weighted average student course survey	47.05	27.10	8.60	12.05	5.15	3.99	4
Graduating student survey	20	50	22	4	4	3.78	3
Alumni survey	22	54	22	2	0	4	3
Employer survey	30	54	14	2	0	4.12	3
Overall weighted score	35.53	39.88	13.97	7.36	3.24	3.98	18

Assessment of Outcome 'C' using performance criterion C4

Performance criteria 'C4': Can build prototypes that meet design specifications.

Step 1: The course namely Capstone Project (UME891) and Engineering Design III (UTA011) were used to assess performance criteria C4 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome 'C4' from the component of showcasing event (Question: Component from Showcasing event; weightage 12.5 marks).

Question: Product Demonstration.

Student's performance in the above question is given below:

Table C4.25: Student's performance in question targeting 'C4'; course: UME891

S. No.	Roll No.	Name	Marks (12.5)	Score Scale (1-5)
1	101308001	Ankit Juneja	10.5	5
2	101308002	Abhinav	9.7	4
3	101308003	Abhishek Kumar Verma	9.5	4
4	101308004	Abhyuday Singh	9.7	4
5	101308006	Aditya Agrawal	9.5	4
6	101308007	Ajeet Pal Singh	10.3	5
7	101308008	Akash Malhotra	9.5	4
8	101308009	Akash Reddy Kakularam	10.7	5
9	101308010	Akash Sharma	8.7	4
10	101308011	Akashdeep Singh Gandhi	9.7	4
11	101308012	Akshay Kumar	9.5	4
12	101308013	Amritpal Singh Sangwan	10.3	5
13	101308014	Aneesh Kejariwal	10.7	5
14	101308015	Ankit Sehgal	8.0	3
15	101308016	Ankur Goyal	8.7	4
16	101308017	Ankush Bansal	8.7	4
17	101308018	Anoop	10.3	5
18	101308019	Anshaj Jindal	8.7	4
19	101308020	Anuj Jain	10.7	5
20	101308021	Arshdeep Singh	9.7	4
21	101308023	Bhabuk Goyal	8.7	4
22	101308024	Bhajanpreet Singh	8.7	4
23	101308025	Bhuvanyu	9.5	4
24	101308026	Bipin Loi	10.3	5
25	101308027	Brhamjyot Singh Sandhu	9.7	4

26	101308028	Deepak Dalal	9.7	4
27	101308029	Deepak Sharma	9.7	4
28	101308031	Dhiraj Dureja	9.7	4
29	101308032	Dildeep Singh	9.7	4
30	101308033	Ekansh Kumar Srivastava	9.3	4
31	101308034	Ekjyot Singh	9.7	4
32	101308035	Gagandeep Singh	9.7	4
33	101308036	Gautam Dawar	10.7	5
34	101308037	Gurkirat Pal Singh	10.7	5
35	101308038	Gurkirat Singh Sangha	9.7	4
36	101308039	Gurpreet Singh	9.7	4
37	101308040	Gurpreet Singh	10.3	5
38	101308042	Gurtej Singh	10.3	5
39	101308043	Guruteshwar	9.7	4
40	101308044	Harjot Singh	9.7	4
41	101308045	Harnoor Singh	9.7	4
42	101308046	Harsh Narang	10.7	5
43	101308047	Harsimran	9.7	4
44	101308048	Hemant Aggarwal	9.7	4
45	101308050	Iknor Singh	9.5	4
46	101308051	Ishdeep Arora	10.3	5
47	101308052	Japdanish Singh	10.5	5
48	101308053	Jashanpreet Singh	8.3	4
49	101308054	Jaskaran Singh	8.7	4
50	101308055	Jatin Khosla	11.0	5
51	101308057	Kanav Bansal	8.7	4
52	101308059	Kanwar Gulati	9.5	4
53	101308060	Karan Chopra	11.0	5
54	101308061	Karan Goyal	8.3	4
55	101308063	Karan Veer Dewan	11.0	5
56	101308064	Karanbir Singh	8.3	4
57	101308065	Kashish Khurana	11.0	5
58	101308066	Keshav Jindal	10.5	5
59	101308067	Ketan Chauhan	9.5	4
60	101308068	Khushwinder Singh	8.3	4
61	101308069	Kirat Singh Basur	8.0	3
62	101308070	Kshitij Sharma	8.0	3
63	101308071	Lokendra Kumar	9.7	4
64	101308072	Lovedeep Garg	8.3	4
65	101308073	Manavdeep Singh Grover	10.5	5
66	101308074	Manik Saharan	8.0	3
67	101308075	Manish Pandoh	9.5	4

68	101308076	Manpreet Singh	8.7	4
69	101308077	Manutkarsh Kirpal	8.0	3
70	101308078	Nidan Prakash	9.5	4
71	101308079	Nikhil Aggarwal	8.0	3
72	101308080	Nikhil Ganta	8.0	3
73	101308082	Paramjot Singh	8.0	3
74	101308083	Paras	9.7	4
75	101308085	Prabhman Vir	8.0	3
76	101308088	Pulkit Kapoor	10.3	5
77	101308089	Puneet Singh	9.3	4
78	101308090	Rajat Gupta	9.7	4
79	101308091	Ramnish Kumar	9.7	4
80	101308093	Rohan Kaushal	10.3	5
81	101308094	Sagar Singla	9.7	4
82	101308096	Sahil Sharma	10.3	5
83	101308097	Samdeep Singh Sabharwal	9.7	4
84	101308098	Sameer Bhalla	9.7	4
85	101308099	Sartaj Singh	9.7	4
86	101308100	Shikhar Bhardwaj	10.3	5
87	101308101	Shikhar Gaur	8.3	4
88	101308102	Shreyas Bhayana	11.2	5
89	101308103	Shubham	9.7	4
90	101308104	Shubham Bhama	8.3	4
91	101308105	Shubham Choudhary	9.5	4
92	101308106	Shubham Gupta	11.2	5
93	101308108	Siddharth Ghiya	8.7	4
94	101308109	Siddharth Gupta	11.2	5
95	101308110	Siddharth Vasu	8.7	4
96	101308111	Sidhant	11.2	5
97	101308112	Simrandeep Singh Bhullar	11.2	5
98	101308113	Sourav Singla	8.7	4
99	101308114	Tanjay Pathak	8.7	4
100	101308115	Tanuj Lamba	8.3	4
101	101308116	Utsav Mudgal	10.3	5
102	101308117	Vaibhav Pratap Singh Pundir	8.7	4
103	101308118	Varmeet Singh Gulati	9.5	4
104	101308119	Varun Atri	8.3	4
105	101308120	Vedant Mansotra	9.3	4
106	101308121	Vikrant Nanda	8.3	4
107	101308122	Vishal Solanki	9.3	4
108	101308123	Vivek Mittal	10.8	5
109	101308124	Vivek Pundir	10.8	5

110	101308125	Yash Wardhan Sharma	10.8	5
111	101488001	Akash Tiwari	10.3	5
112	101488002	Anuj Tanwar	10.3	5
113	101488003	Bhupinder Singh	10.3	5
114	101488004	Bishant Sharma	10.3	5
115	101488005	Harish Yadav	9.7	4
116	101488006	Harpreet Singh	8.7	4
117	101488007	Inderjeet Kumar	11.0	5
118	101488008	Ishan Bansal	10.3	5
119	101488009	Jaspreet Singh	8.7	4
120	101488010	Jaspreet Singh	11.0	5
121	101488011	Kulwinder Singh	8.7	4
122	101488012	Mohit Goyal	8.0	3
123	101488013	Navjot Rihal	8.0	3
124	101488014	Nikhil Gupta	9.7	4
125	101488015	Sankit	9.3	4
126	101488016	Sarang Vashisht	10.3	5
127	101488017	Varun Bansal	10.8	5
128	101488018	Vishnu Kalra	10.8	5

The overall performance of students in the above question is then summarized as given below

Table C4.26: Average score of student performance in the course UME891 for criteria C4

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	34.4	57.0	8.6	0	0	4.26

(ii) Course: Engineering Design III (UTA011)

The above performance criteria is used to measure the attainment of outcome 'C4' by giving the following lab activities (Evaluation 1: before MST in September 2017, weightage 20 marks) to the students.

ECE lab:

Experiment-3

Design and testing of IR transmitter circuit which generates rectangular pulses of specific pulse width for corresponding Gantry.

- To solder IR transmitter circuit on a general purpose PCB.
- To write a Program and upload it on the ATtiny based microcontroller through Arduino boot-loader circuit.
- To test the output pulses on CRO generated through IR transmitter circuit.

Experiment-4

Design and testing of IR receiver circuit which can sense the signal of a specific pulse width and able to recognize the corresponding Gantry.

- To solder IR receiver circuit on a general purpose PCB.

b. To test the combined module of IR transmitter and receiver circuits on Buggy Track with Gantry provision through supervisory control mode for Bronze and silver level.

Student's performance in the above question is given below:

Table C4.27: Student's performance in question targeting 'C4'; course: UTA011

S. No.	Roll No.	Name of student	Marks (20)	Score (Scale 1 to 5)
1	101608001	Aaditya Mittal	10	3
2	101608002	Aakash Rishi	15.5	4
3	101608003	Aarush Bansal	13.5	4
4	101608004	Abhay Singh Hundal	13	4
5	101608006	Abhishek Garg	15	4
6	101608007	Abhishek Kalia	14	4
7	101608008	Aditya Gupta	18.5	5
8	101608010	Aakashdeep Singh Brar	16	4
9	101608011	Akshay Pratap Singh	13.5	4
10	101608013	Amandeep Singh Sandhu	18.5	5
11	101608014	Amritashan S Bassan	14.5	4
12	101608015	Animesh Bhatia	13.5	4
13	101608016	Animesh Nandwani	13.5	4
14	101608017	Ankit Bhargava	19	5
15	101608018	Anmol Dhiman	17	5
16	101608021	Apoorv Bansal	17.5	5
17	101608023	Arshdeep Singh	16	4
18	101608024	Arshpreet Singh Sandhu	18.5	5
19	101608025	Arun Chauhan	13.5	4
20	101608026	Aryan Khera	17	5
21	101608027	Ashish Kumar	17.5	5
22	101608028	Ashish Lal	16	4
23	101608029	Ashray Bhardwaj	14	4
24	101608030	Atishay Mahajan	15	4
25	101608031	Atishey Jain	13.5	4
26	101608032	Ayush Goyal	16.5	4
27	101608033	Bhavay Kukreja	14.5	4
28	101608034	Bhavya Suneja	14	4
29	101608035	Bhupendra Singh Rathore	16	4
30	101608036	Bikramjeet Singh	14.5	4
31	101608037	Chetandeep Singh	18	5
32	101608038	Daksh Burman	7	2
33	101608039	Deepak Bisht	14	4
34	101608040	Deepak Garg	14.5	4
35	101608041	Deepam	15.5	4
36	101608043	Devinder Singh	14	4
37	101608044	Dhairya K Agnihotry	13	4
38	101608045	Dhaumya Gangopadhyay	14	4
39	101608046	Dhruva S. Harapanahalli	15	4
40	101608047	Dilbagh Singh	13	4
41	101608048	Dinmani Malhan	15	4
42	101608049	Divyanshu Bhatia	13	4
43	101608050	Divyaraj Singh Chundawat	13	4
44	101608052	Gagan Bansal	15	4

S. No.	Roll No.	Name of student	Marks (20)	Score (Scale 1 to 5)
45	101608053	Gagan Garg	15	4
46	101608054	Gaurav Jindal	14	4
47	101608055	Gopal Singh Raghav	14	4
48	101608056	Gungeet Singh	15	4
49	101608057	Guriqbal Singh Makkar	16	4
50	101608058	Gurjot Singh	15	4
51	101608059	Gurkaran Sidhu	15	4
52	101608060	Gursimran Singh	15	4
53	101608061	Gurveer Singh Tiwana	15	4
54	101608062	Hardaman Singh Benipal	15	4
55	101608063	Harjinder Singh Sra	16	4
56	101608064	Harneet Singh	16	4
57	101608065	Harsh	14	4
58	101608067	Harsimar Bhan Singh	14.5	4
59	101608068	Harsimran Singh Mavi	15	4
60	101608069	Hemant Kumawat	16.5	4
61	101608070	Hitesh Bhatia	15	4
62	101608071	Jagjot Singh	16.0	4
63	101608073	Jasjot Singh	15.0	4
64	101608074	Kananvir Pathania	15.0	4
65	101608075	Karan Arora	14.5	4
66	101608076	Karan Veer Singh	0.0	1
67	101608077	Kartikeya Kardam	15.0	4
68	101608078	Kawaljeet Singh	16.5	4
69	101608079	Keshav Singla	16.5	4
70	101608080	Khushhaal Deep Singh	14.0	4
71	101608082	Kundan Deep Singh	16.0	4
72	101608083	Lakshay Shukla	16.0	4
73	101608084	Lincoln Verma	15.0	4
74	101608085	Madhav Singla	13.5	4
75	101608086	Manjeet Singh	14.5	4
76	101608087	Manpreet Singh	16.5	4
77	101608175	Pranav	15.0	4
78	101658001	Abhishek Garg	17.0	5
79	101658002	Achint Behl	17.5	5
80	101658003	Akhil Singla	14.0	4
81	101658004	Aman Gupta	17.0	5
82	101658006	Ashish Verma	13.0	4
83	101658007	Falesh Kumar Mahbubani	14.0	4
84	101658008	Himanshu Saxena	13.5	4
85	101658009	Ishan Thakur	0.0	1
86	101658010	Jaskirat Singh	14.0	4
87	101658011	Kunal Manchanda	16.5	4
88	101788001	Abhinav	12.5	3
89	101788002	Archit Bajaj	14.0	4
90	101788003	Baljeet Singh	16.0	4
91	101788004	Deepanshu Goyal	13.5	4
92	101788005	Gurpreet Singh	18.0	5
93	101788006	Hamandeep Singh	15.0	4
94	101788007	Harpreet Singh	13.0	4
95	101788008	Himanshu Thakur	13.0	4

S. No.	Roll No.	Name of student	Marks (20)	Score (Scale 1 to 5)
96	101788009	Issac Kuriakose	15.0	4
97	101788010	Jatin Kumar	16.0	4
98	101788011	Kartik Choudhary	16.0	4
99	101788012	Karun Kumar	15.0	4
100	101788026	Abhishek Jain	16.0	4
101	101788027	Ali Safwan	14.5	4
102	101788028	Chaitanya Bansal	14.0	4
103	101788029	Harmanjot Singh	13.5	4
104	401608001	Adhyan Bhatti	14.5	4
105	401608003	Anchit Jain	13.5	4
106	401608004	Anshdeep Malhotra	14.0	4
107	401658001	Avnish Dhiman	17.0	5
108	101608088	Mayur Saxena	13.5	4
109	101608089	Mehakdeep Singh	14.0	4
110	101608091	Mukul Bhandari	13.0	4
111	101608092	Naman Jain	14.0	4
112	101608093	Nandan Jindal	13.5	4
113	101608094	Nardev Singh	14.5	4
114	101608095	Neeraj Goyal	13.5	4
115	101608096	Nikhil Gupta	11.0	3
116	101608097	Nikhil Kumar	13.0	4
117	101608098	Nishchay Wadhwa	13.3	4
118	101608099	Nitesh Singh Chauhan	14.0	4
119	101608100	Nitin Garg	12.0	3
120	101608101	Parampreet Singh Saagi	17.0	5
121	101608102	Paramraj Singh	15.0	4
122	101608104	Parth Ahuja	13.5	4
123	101608105	Parth Garg	15.0	4
124	101608106	Parukh Sharma	12.5	3
125	101608107	Piyush Singla	11.5	3
126	101608108	Prabhat Verma	14.5	4
127	101608109	Pradyumn	16.0	4
128	101608110	Prashant Gupta	12.5	3
129	101608111	Raghav Goyal	15.0	4
130	101608112	Raghav Kacker	12.5	3
131	101608113	Raghav Khetarpal	15.5	4
132	101608115	Rajat Kumar	14.0	4
133	101608117	Ravi Shankar Prasad Ray	12.5	3
134	101608118	Ripudaman Singh	13.0	4
135	101608119	Rishabh Kapoor	13.5	4
136	101608120	Rishubh Kaushal	15.5	4
137	101608121	Rohit Nigam	15.0	4
138	101608122	Rohit Rai	13.5	4
139	101608123	Rubalpreet Singh	15.0	4
140	101608124	Sachin Choudhary	14.5	4
141	101608125	Sachin Gautam	15.0	4
142	101608126	Sachin Kumar	17.5	5
143	101608127	Sahibjeet Singh	14.0	4
144	101608128	Sahil Bhatia	16.0	4
145	101608129	Sahil Manuja	13.5	4
146	101608130	Sandeep Kumar Saini	13.0	4

S. No.	Roll No.	Name of student	Marks (20)	Score (Scale 1 to 5)
147	101608131	Sanjeev Kumar	14.0	4
148	101608132	Sanket Sutradhar	14.0	4
149	101608133	Sanyam Jain	15.0	4
150	101608134	Saswat Mishra	16.5	4
151	101608135	Shivam Pundir	16.5	4
152	101608136	Shivam Saini	15.0	4
153	101608137	Shubham Chadha	15.0	4
154	101608138	Shubham Pandey	15.5	4
155	101608139	Shubham Satija	15.0	4
156	101608140	Shubhi Mishra	16.0	4
157	101608141	Sidhant Ban	5.5	2
158	101608142	Simranjeet Singh	14.0	4
159	101608143	Subeg Singh	15.5	4
160	101608144	Sukhchain Singh	13.5	4
161	101608145	Sukhdev Sharma	0.0	1
162	101608146	Sumit Chaudhary	16.0	4
163	101608147	Suraj Bhan Singh Rathor	15.0	4
164	101608148	Suraj Kumar	14.5	4
165	101608149	Tamandeep Singh Jolly	15.5	4
166	101608150	Tanmai Garg	15.5	4
167	101608151	Tanmay Malhotra	16.0	4
168	101608152	Tanmay Vaibhav Mehrotra	13.0	4
169	101608153	Tanvir Singh	16.5	4
170	101608154	Tejveer Bal	16.5	4
171	101608155	Tishar Sinha	16.5	4
172	101608156	Tripatpreet Singh	15.0	4
173	101608157	Tushar Garg	14.0	4
174	101608158	Urjit	15.0	4
175	101608159	Vaatsuly Khandelwal	15.0	4
176	101608160	Vaibhav Gupta	15.5	4
177	101608161	Vaibhav Sethi	14.0	4
178	101608163	Vibhav Bhatia	15.5	4
179	101608164	Vinay Dogra	16.5	4
180	101608165	Vinay Kapoor	15.0	4
181	101608166	Vinayak Goel	15	4
182	101608167	Vipul Kant Gaur	13	4
183	101608168	Vishal	16	4
184	101608169	Vishal Sharma	14	4
185	101608170	Vishv Pratap Singh	16.5	4
186	101608171	Vishwas Arora	15	4
187	101608174	Yushal Garg	17	5
188	101654017	Oankar Singh Dev	14	4
189	101654018	Parth Wadhwa	16	4
190	101654019	Praveen Verma	14	4
191	101654021	Sehaj Arora	15	4
192	101654022	Shubham Gandhi	9	3
193	101654023	Shubhanjali Singh	12	3
194	101654024	Sirjan Ahluwalia	12.5	3
195	101654025	Vanit Yadav	12.5	3
196	101654026	Vibhuti	15.5	4
197	101654027	Yuvraj Singh Chauhan	16.5	4

S. No.	Roll No.	Name of student	Marks (20)	Score (Scale 1 to 5)
198	101658005	Anand Kumar Singh	12.5	3
199	101658012	Mehul Sachdeva	18	5
200	101658013	Priyanshi Goel	13.5	4
201	101658014	Rahul Singla	13	4
202	101658015	Saksham Sethi	16.5	4
203	101658016	Sumit Gupta	15	4
204	101658017	Sunay Sharma	15	4
205	101658018	Syed Mohammed Yusuf Ali	15.5	4
206	101658019	Vaibhav Dutta	15	4
207	101658020	Vishal Bharadwaj	16	4
208	101658021	Yash Goyal	16.5	4
209	101784009	Kshitiz Kochhar	15	4
210	101784010	Manan Jain	13	4
211	101784011	Pankaj	15	4
212	101784012	Rajnish	16.5	4
213	101784013	Rohtash Narula	12	3
214	101784014	Sahil Gaur	15.5	4
215	101784015	Sanamdeep Mehra	13.5	4
216	101784016	Simranjeet Singh Rathore	17	5
217	101784017	Subham Paul	12.5	3
218	101788013	Kushagar Chanana	13.5	4
219	101788014	Mahesh Gosain	16	4
220	101788015	Mayank Bansal	12	3
221	101788016	Mohit Manhas	14	4
222	101788017	Nikhil Sharma	14	4
223	101788018	Nitpreet Randhawa	13.5	4
224	101788019	Rahul Dhiman	14.5	4
225	101788020	Rahul Kakkar	15.5	4
226	101788021	Raman Verma	14.5	4
227	101788022	Sachin Sethi	15.5	4
228	101788023	Shubham Sharma	15.5	4
229	101788024	Simrandeep Singh	14.5	4
230	101788025	Tushant Jindal	14.5	4
231	101788030	Kapil	18.5	5
232	101788031	Manas Asija	13.5	4
233	101788032	Manav Sharma	16.5	4
234	101788033	Manpreet Singh Bamrah	15.5	4
235	101788034	Pulkit Jain	15	4
236	101788035	Rishav Pathania	16	4
237	101788036	Tarang Gupta	16	4
238	101788037	Vidula Chhabra	15.5	4
239	101788038	Shubhjit Kaur	16.5	4
240	401608008	Siddharth Khurana	16.5	4
241	401608009	Sushant Parmar	16	4
242	101609001	Anirudh Goyal	13	4
243	101609003	Arun Kumar	14	4
244	101609004	Deepanshu Yadav	14.5	4
245	101609006	Gaurav Singh	16	4
246	101609007	Hetarth Chopra	17	5
247	101609008	Himank Kashyap	15	4
248	101609009	Hritwik Verma	17	5

S. No.	Roll No.	Name of student	Marks (20)	Score (Scale 1 to 5)
249	101609010	Iqbal Singh Sandhu	0	1
250	101609011	Jasjeet Singh	15	4
251	101609012	Kushagra Mishra	17	5
252	101609013	Manas Puti	17	5
253	101609014	Manvendra Kumar Mishra	13	4
254	101609015	Mayank Malhotra	17.5	5
255	101609016	Mehakjit Singh	18	5
256	101609017	Mehul Loomba	14	4
257	101609019	Piyush Thapar	16.5	4
258	101609021	Rishabh Jain	14	4
259	101609022	Ritvik Bajaj	17.5	5
260	101609023	Riya Bhalla	15	4
261	101609024	Sarvagya Airi	18	5
262	101609026	Shashwat Chawla	16	4
263	101609027	Subheg Singh	17	5
264	101609028	Tanmay Swami	15	4
265	101614001	Abhinav Joshi	14	4
266	101614004	Arpit Oberoi	15	4
267	101614005	Baraspreet Singh	18	5
268	101614007	Ishan Garg	16	4
269	101614008	Naman Mangal	14	4
270	101614010	Nipun	16	4
271	101614011	Paritosh Gaur	14	4
272	101614012	Piyush Kamboj	15	4
273	101614013	Pranav Chanana	14	4
274	101614014	Pratyush Goyal	15	4
275	101614016	Priyanshu Singla	14	4
276	101614019	Rathin Sharma	12	3
277	101614020	Rehan R Agrawal	15.5	4
278	101614021	Rohan Gupta	17.5	5
279	101614022	Shreyansh Jain	17.5	5
280	101614023	Shriya Malhotra	16.5	4
281	101614026	Syed Arslaan Hassan Kazmi	16.5	4
282	101614027	Vrenaiya Bhardwaj	16.5	4
283	101614028	Aseem Goel	16	4
284	101659001	Abhinav Jain	16.5	4
285	101664001	Anant Kumar	16	4
286	101664002	Dhananjay Kohli	14	4
287	101664003	Gurchet Singh	0	1
288	101664004	Harjot Singh Viridi	15	4
289	101664005	Pulkit Sharma	0	1
290	101664006	Shakti Sharma	18	5
291	101664007	Swapnil Bhandari	14.5	4
292	101664008	Shivansh Nauriyal	17	5
293	101789001	Gurkeerat Singh	14	4
294	101794001	Ankit Pandey	13	4
295	101794002	Rahul Verma	13	4
296	101794003	Shivansh Mahajan	14	4
297	101794004	Subrata Mukherjee	14.5	4
298	101794005	Vivek Dhiman	13	4

The overall performance of students in the above question is then summarized as given below

Table C4.28: Average score of student performance in the course UTA011 for criteria C4

Course	% of students in each score					Average Score
	5	4	3	2	1	
UTA011	11.4	79.9	6	0.7	2	3.98

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria C3 as given below in Table C4.29:

Table C4.29: Weighted Average Student class performance (course portfolio) for criteria C3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA011	11.4	79.9	6	0.7	2	3.98	5
UME891	34.4	57	8.6	0	0	4.26	5
Weighted average score	22.90	68.45	7.30	0.35	1.00	4.12	10

b) Indirect measures for Performance criteria C3 (Surveys)

i.) Assessment Tool: Student Course Survey

Table C4.30: Average score of student course survey for criteria C3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA011	37.11	19.14	27.11	10.09	7.45	3.71	5
UME891	34.4	57	8.6	0	0	4.26	5
Weighted average score	35.75	38.07	17.85	5.05	3.72	3.99	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table C4.31: Assessment for criteria C4 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	20	50	22	4	4	3.78
Alumni survey	22	54	22	2	0	4.00
Employer Survey	30	54	14	2	0	4.12

c) Overall weighted average score of performance criterion ‘C4’

Finally overall weighted average score of performance criterion ‘C4’ is evaluated as given below in Table C4.32:

Table C4.32: Overall weighted average score of performance criterion ‘C4’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	22.90	68.45	7.30	0.35	1.00	4.12	5
Weighted average student course survey	35.75	38.07	17.85	5.05	3.72	3.99	4
Graduating student survey	20	50	22	4	4	3.78	3
Alumni survey	22	54	22	2	0	4	3
Employer survey	30	54	14	2	0	4.12	3
Overall weighted score	26.31	53.81	15.66	2.55	1.77	4.01	18

Overall assessment of student outcome C using scores of C1, C2, C3 and C4

In the above sections, each of the individual performance criteria C1, C2, C3 and C4 have been assessed. The performance for attainment of outcome C has been completed using the attainment values for C1, C2, C3 and C4 is provided below:

Table C4.33 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome C.

Table C4.33: Overall score for outcome C at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
C1	30.83	45.33	19.14	3.26	1.44	4.02	5
C2	30.18	42.93	17.29	7.01	2.62	3.92	5
C3	35.53	39.88	13.97	7.36	3.24	3.98	4
C4	26.31	53.81	15.66	2.55	1.77	4.01	3
Overall score	30.94	44.84	16.77	5.20	2.05	3.98	17

Track Record and assessment of attainment of student outcome ‘C’ over the last three academic years

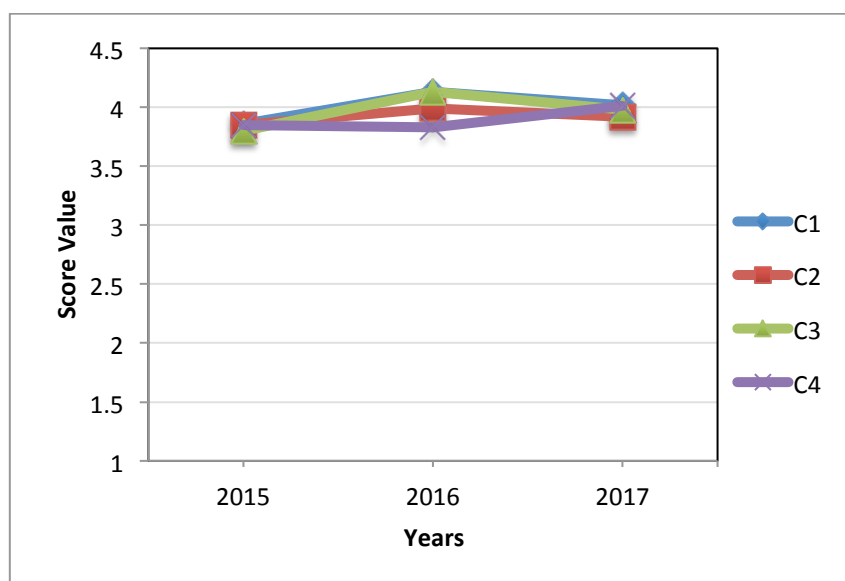
The performance criteria-wise assessment score distribution and overall weighted score for outcome ‘C’ for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table C4.34 presents the performance criteria-wise assessment score distribution for outcome ‘C’

Table C4.34: Performance criteria-wise assessment score distribution of outcome C

Student outcomes and performance criteria		Year		
		2015	2016	2017
C	C1	3.86	4.13	4.02
	C2	3.85	3.99	3.92
	C3	3.80	4.13	3.98
	C4	3.85	3.83	4.01

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome 'C' over a period of last three years.

**Figure C4.2: Performance criteria-wise assessment score distribution of outcome C**

Level of attainment of student outcome 'C' over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table C4.35 presents the overall weighted score of outcome 'C' over the last three academic years.

Table C4.35: Overall weighted score of outcome 'C' over a period of last three years

Year	Overall weighted score	Level of attainment
2015	3.84	Good
2016	4.04	Good
2017	3.98	Good

The above data has been plotted to visualize the overall weighted score of outcome ‘C’ over a period of last three years.

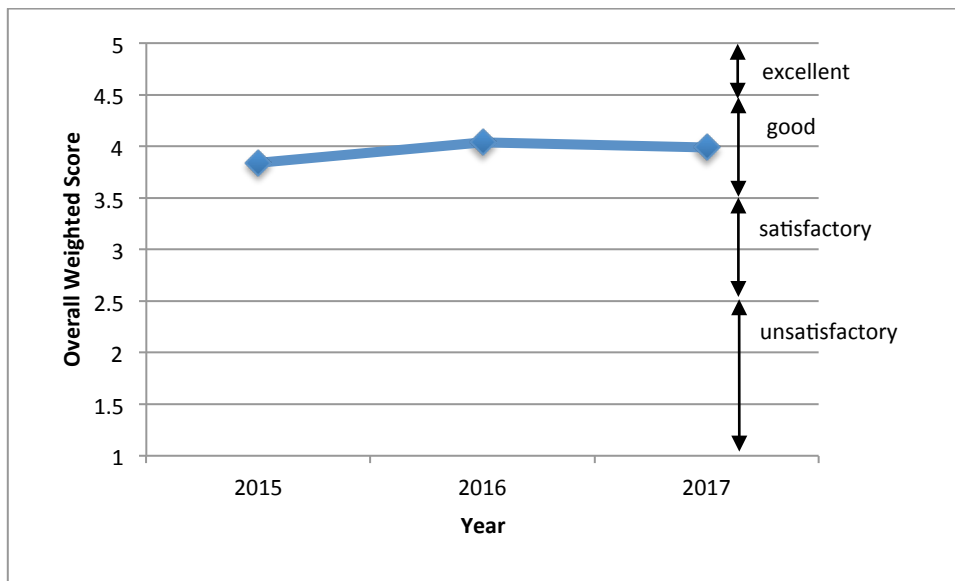


Figure C4.3: overall weighted score of outcome ‘C’ over a period of last three years

The following actions have been taken based on the analysis of Outcome C

Weighted Score for Outcome C	Recommendation	Reason	Implemented from
3.98	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'D'
(Year 2017)**

for the

Bachelor of Engineering
in
Mechanical Engineering

Thapar Institute of Engineering and Technology

Patiala (Punjab) - 147004

INDIA

Attainment of Outcome D

The attainment of each outcome has been measured using a standard procedure explained in the Self Assessment Report for the program. A flow chart depicting the step by step methodology used to measure each attainment is provided below for ready reference.

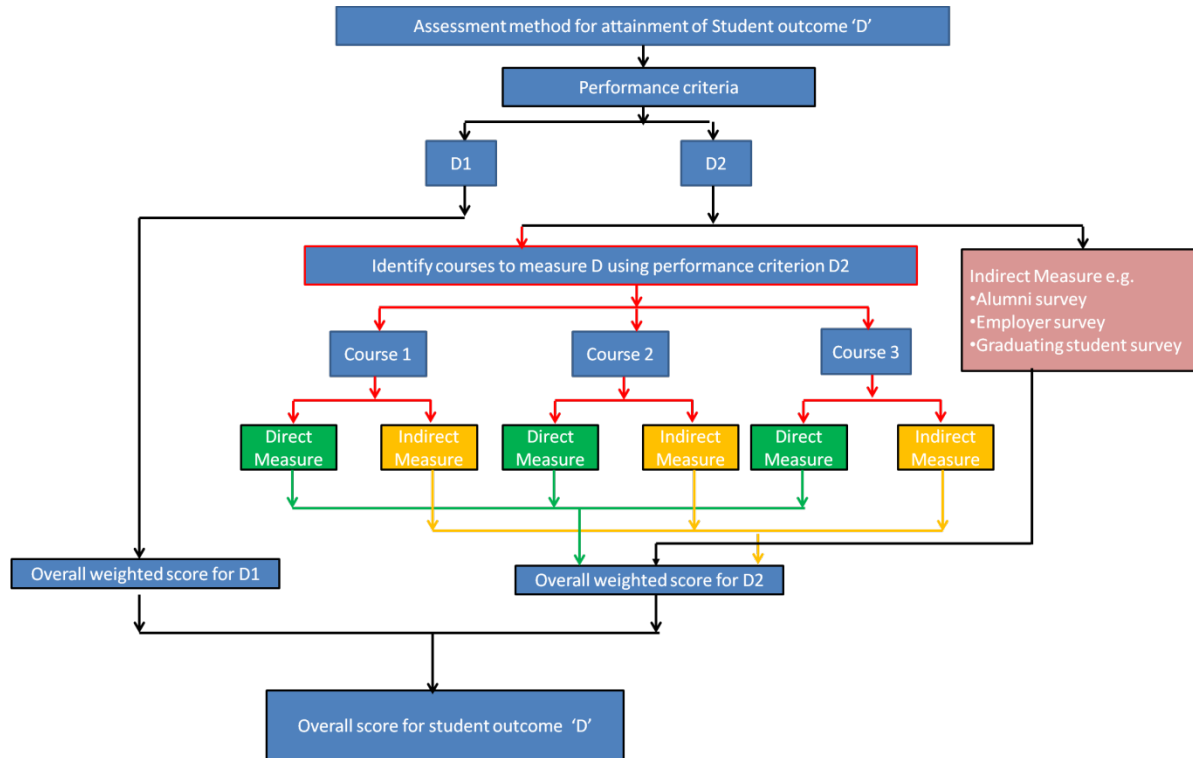


Figure D4.1: Flow chart for the attainment of outcome 'D'

The following courses have been considered for the assessment of student outcome 'D'

Courses:

1. Engineering Design-II (UTA010)

Outcome D has been assessed by two performance criteria D1 and D2. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these two performance criteria has been used to measure the overall measure of outcome D.

1) Assessment of Outcome 'D' using performance criterion D1

Performance criteria 'D1': Shares responsibility and information schedule with others in team.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: One course namely, Engineering Design-II (UTA010) was used to assess performance criteria D1 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Engineering Design-II (UTA010)

The above performance criteria is used to measure the attainment of outcome 'D1' by giving the following question in Viva having 5 marks.

Question: Individual viva voce of contribution to Mangonel project as member of group. (05)

Student's performance in the above question is given below:

Table D4.1: Student's performance in question targeting 'D1'; course: UTA010

S.No.	Rollno.	Name	Marks (5)	Score (1-5)
1	101603001	Aarush Chopra	4.0	4
2	101603002	Aasham Taneja	5.0	5
3	101603003	Aashutosh Chaudhary	4.0	4
4	101603004	Aastha Khare	4.5	5
5	101603005	Abhijeet Singh	4.5	5
6	101603006	Abhijeet Singh Malhi	4.0	4
7	101603007	Abhimanyu Singh	4.0	4
8	101603009	Abhinav Saxena	4.5	5
9	101603010	Abhinav Singla	5.0	5
10	101603011	Abhishek Ghai	4.5	5
11	101603012	Abhishek Kaushal	4.5	5
12	101603013	Abhishek Modi	5.0	5
13	101603014	Adish Aggarwal	5.0	5
14	101603015	Aditi Prasad	4.5	5
15	101610001	Aayush Agrawal	4.5	5
16	101610002	Abhishek Singh	4.5	5
17	101611001	Abhishek Garg	4.0	4
18	101611002	Abhishek Kumar Sakari	4.5	5
19	101660001	Aayush Wadhwa	4.5	5
20	101783001	Abhilasha Girdhar	4.5	5
21	101783002	Abhishek Grover	4.0	4
22	101783003	Abhishek Kumar	4.0	4
23	401603001	Aaradhya Mahajan	4.5	5
24	401603002	Abhijeet Singla	4.0	4
25	101603090	Divraj Singh	2.0	2
26	101603128	Ishan Bhargava	3.0	3
27	101603129	Ishita Paliwal	4.0	4
28	101603130	Ishkaran Singh Saini	4.0	4
29	101603131	Japesh Singh Thind	2.0	2
30	101603132	Japneet Singh Nanda	2.5	3
31	101603133	Jasdeep Singh	3.0	3

32	101603134	Jashanpreet Singh Sraw	3.0	3
33	101603136	Jaskirat Singh Benipal	4.0	4
34	101603137	Jasmeen Gill	4.0	4
35	101603138	Jasmine Mehta	3.5	4
36	101603139	Jasvir Singh Walia	4.0	4
37	101603140	Jatin Garg	4.0	4
38	101603141	Jishan Garg	4.0	4
39	101603142	Jitesh Solanki	4.0	4
40	101603143	Jitish Bhateja	4.0	4
41	101603144	Justin Mangat	4.0	4
42	101610028	Gautam Ahuja	3.0	3
43	101610040	Jahnavi Bhardwaj	3.5	4
44	101610041	Jasraj Kaur Gill	4.0	4
45	101610042	Jayant Jain	4.0	4
46	101610043	Jodh Singh	4.0	4
47	101610044	Kairavi Kalra	4.0	4
48	101611025	Jatin Khera	3.5	4
49	101783019	Harsh Jindal	3.0	3
50	101783020	Harshim Sachdeva	4.0	4
51	401603015	Ishaan Kohli	3.5	4
52	101603116	Harshita	3.5	4
53	101603145	Kamal Kant	4.0	4
54	101603146	Kamalpreet Singh	4.0	4
55	101603147	Kanav Garg	4.5	5
56	101603148	Kanav Khajuria	4.5	5
57	101603149	Kangan	4.0	4
58	101603151	Kanwar Bhumika Kaur	4.0	4
59	101603152	Karanbir Singh	4.0	4
60	101603153	Karmanpreet Singh	4.5	5
61	101603154	Kartik Shinghal	4.5	5
62	101603155	Kashish Bansal	4.5	5
63	101603156	Kashish Mittal	4.5	5
64	101603157	Kashna Bhagat	3.0	3
65	101603287	Roopnit Kaur	4.0	4
66	101603329	Shubhdeep Kaur	3.0	3
67	101603388	Karan Bhardwaj	4.0	4
68	101610045	Kanishk Srivastava	4.5	5
69	101610046	Kanupriya Raheja	3.5	4
70	101611026	Kanav Talwar	4.5	5
71	101611027	Kanav Vashisht	4.0	4
72	101611028	Karanveer Singh Sodhi	4.5	5
73	101611029	Kartik Ramsinghaney	4.0	4
74	101611030	Kashish Garg	4.0	4
75	101783021	Jai Prakash	4.5	5
76	101783022	Jashandeep Kaur	4.0	4
77	101783054	Bharat Kashyap	4.0	4
78	401603016	Kartik Arora	4.5	5
79	401633001	Kali Nigam	3.5	4
80	101603158	Kashyap Nepaliya	4.5	5
81	101603159	Kaustabh Kumar Kakoty	4.5	5
82	101603160	Keshav Gupta	4.5	5
83	101603161	Keshav Sharma	4.5	5

84	101603162	Kishan Raj	3.5	4
85	101603163	Komal Malviya	3.5	4
86	101603164	Kriti Sethi	3.5	4
87	101603165	Kulpreet Singh	3.5	4
88	101603166	Kumar Sambhav Jain	3.5	4
89	101603167	Kunal	3.5	4
90	101603168	Kunal Kumar	4.5	5
91	101603169	Kunal Virmani	3.5	4
92	101603170	Kush Kharb	4.5	5
93	101603171	Kushal Kumar	3.5	4
94	101603172	Lavish Singla	4.5	5
95	101603173	Lavish Thakkar	3.5	4
96	101603174	Lokesh	3.5	4
97	101603184	Manpriya Gill	4.0	4
98	101610047	Kunal Singla	4.0	4
99	101610048	Kunwar Parth Singh	3.5	4
100	101610049	Kushagra Arora	4.0	4
101	101611031	Kirti Bansal	3.5	4
102	101783023	Kanwarbir Singh	3.5	4
103	101783024	Mohit Verma	3.5	4
104	101783068	Lakshita Sharma	3.5	4
105	401603017	Keshav	4.0	4
106	101603175	Loveneet Singh	4.5	5
107	101603176	Madanjeet Kumar	4.0	4
108	101603177	Madhav Arora	4.5	5
109	101603178	Madhav Mehta	4.0	4
110	101603179	Maganjot Singh	4.5	5
111	101603180	Manatveer Singh	4.0	4
112	101603181	Manav Sekhri	4.5	5
113	101603183	Manish Aggarwal	5.0	5
114	101603185	Mansi Garg	4.0	4
115	101603186	Mansi Singh	4.0	4
116	101603187	Manveer Singh	4.0	4
117	101603188	Mayank Singhal	4.5	5
118	101603189	Mayank Watts	4.5	5
119	101610050	Madhav Goyal	4.5	5
120	101610051	Mahesh Singla	4.0	4
121	101610052	Manraj Singh Chalokia	4.5	5
122	101610053	Manshi Tomar	4.0	4
123	101610054	Meenal Gaba	4.5	5
124	101610055	Mehak Garg	4.0	4
125	101783025	Mohita Khanna	3.5	4
126	101783026	Muskaan Kohli	3.5	4
127	401603018	Manjot Singh	4.5	5
128	401603019	Mansi	4.0	4
129	401603020	Mayank Aggarwal	0.0	1
130	101603190	Mehak Rehal	4.5	5
131	101603191	Mohit Ahuja	3.5	4
132	101603192	Mohit Chhabra	4.0	4
133	101603193	Mohit Mor	4.0	4
134	101603194	Mokshit Jhirwal	3.0	3
135	101603195	Mudit Jain	4.0	4

136	101603196	Muskan Bansal	3.5	4
137	101603197	Naman Yash	3.5	4
138	101603198	Namit Wadhwa	3.5	4
139	101603200	Navneet Kaur	4.0	4
140	101603201	Navya Nanda	3.5	4
141	101610056	Mridul Mittal	4.0	4
142	101610057	Mudit Mittal	4.0	4
143	101610058	Mukul Gupta	4.0	4
144	101610059	Mukul Kaushik	4.5	5
145	101610060	Navdeep Sharma	4.0	4
146	101611032	Mehar Gupta	4.5	5
147	101611033	Mohit Bansal	4.0	4
148	101611034	Mohit Gupta	4.5	5
149	101611035	Mradul Gaur	4.0	4
150	101783027	Nafisha Thakur	4.0	4
151	101783028	Navneet Kaur	0.0	1
152	101783057	Harsh Mehra	4.0	4
153	101603202	Neha	4.5	5
154	101603203	Nikhil	4.0	4
155	101603204	Nikhil Bains	3.8	4
156	101603205	Nikhil Bansal	3.5	4
157	101603206	Nikhil Jain	4.5	5
158	101603208	Nikhil Mittal	4.0	4
159	101603209	Nishad Gupta	4.5	5
160	101603210	Nishant Bansal	4.5	5
161	101603211	Nishtha Mittal	4.3	5
162	101603212	Nivesh	3.8	4
163	101603213	Palak Gupta	4.0	4
164	101603214	Palakreet Kaur	4.0	4
165	101603215	Pankaj Gupta	4.0	4
166	101603216	Parikshit Panwar	4.5	5
167	101610061	Neel Kumar	4.3	5
168	101610062	Neeraj Kumar	4.3	5
169	101610063	Nishek Wadhwa	3.5	4
170	101610064	Palak Kalra	3.8	4
171	101611036	Nihal	4.5	5
172	101611037	Nitin Bakshi	4.5	5
173	101783029	Nidhi Rajpal	4.0	4
174	101783030	Palak	3.5	4
175	101783031	Pardaman Kaur	4.0	4
176	101603218	Parul Goyal	3.0	3
177	101603219	Parv Agarwal	5.0	5
178	101603220	Parwinder Kaur	4.0	4
179	101603221	Pinaak Goel	3.0	3
180	101603222	Piyush Goyal	3.0	3
181	101603223	Piyush Killa	4.0	4
182	101603224	Piyush Kumar	3.0	3
183	101603225	Piyush Narula	5.0	5
184	101603226	Piyush Raj Mishra	3.0	3
185	101603228	Prabhdaman Singh Kareer	0.0	1
186	101603229	Prabhjit Singh	4.0	4
187	101603230	Prabhjot Kaur	5.0	5

188	101603231	Prabhjot Singh	4.0	4
189	101603232	Prabhjot Singh	5.0	5
190	101603233	Pragati Singh	4.0	4
191	101603234	Pragun Gandotra	4.5	5
192	101603235	Pragya Garg	4.0	4
193	101603236	Prajwal Bhandari	2.0	2
194	101603237	Prakhar Agarwal	4.5	5
195	101603244	Pranvi	4.0	4
196	101610066	Prakhar Gupta	5.0	5
197	101611038	Prafful Singhal	5.0	5
198	101611039	Pragya Jain	3.5	4
199	101783032	Parshant Jindal	3.0	3
200	101783033	Parv Kamal	3.5	4
201	101783036	Ritik Verma	3.0	3
202	101603238	Prakhar Jain	3.3	4
203	101603239	Pramatma Ram	3.5	4
204	101603240	Pranav Pahuja	3.3	4
205	101603241	Pranjal Gupta	3.5	4
206	101603242	Pranjal Saxena	3.5	4
207	101603243	Pranjay Dhamija	3.3	4
208	101603245	Prashil	4.3	5
209	101603246	Prasiddha Raj Gurung	3.3	4
210	101603247	Prateek Chhikara	4.0	4
211	101603248	Prayag Lehana	3.3	4
212	101603249	Priyam Garg	1.5	2
213	101603250	Priyanka Chauhan	3.5	4
214	101603251	Pulkit Arora	3.5	4
215	101603252	Pushapdeep	3.5	4
216	101603253	Raghav Bhutani	3.5	4
217	101603256	Raghav Mittal	3.3	4
218	101603386	Preetam Singhvi	4.3	5
219	101610067	Pranav Magotra	3.3	4
220	101610068	Pranav Pratap Singh	4.0	4
221	101610069	Pulkit Chugh	3.3	4
222	101611040	Prateek Garg	4.3	5
223	101611041	Rabjot Singh	3.5	4
224	101611042	Radhay Anand	3.3	4
225	101783060	Navdeep Kaur	3.3	4
226	101603254	Raghav Gupta	4.0	4
227	101603255	Raghav Mittal	4.0	4
228	101603257	Raghav Sindhwani	4.0	4
229	101603258	Rahat Bhambri	4.0	4
230	101603259	Rahul Chandawat	4.0	4
231	101603260	Rahul Chaudhary	4.0	4
232	101603261	Rahul Gothwal	3.5	4
233	101603262	Rahul Kaushik	4.0	4
234	101603264	Rahul Raj	4.0	4
235	101603265	Rahul Rampal	4.0	4
236	101603266	Rahul Sethi	4.0	4
237	101603267	Rajat Garg	4.0	4
238	101603268	Rajat Goyal	4.5	5
239	101603269	Rajat Sagar Mehta	4.0	4

240	101603270	Rajinder Singh Mahi	3.5	4
241	101603271	Rajkaran Singh	3.5	4
242	101610070	Rahul Gautam	4.0	4
243	101610071	Rajeev Ranjan	4.0	4
244	101611043	Rahul Rai	4.0	4
245	101611044	Rajan Goyal	3.5	4
246	101611045	Rakshit Gupta	4.0	4
247	101783061	Preeteesh Sharma	5.0	5
248	101603272	Ramandeep Singh	4.0	4
249	101603273	Ravi Gupta	5.0	5
250	101603274	Ravi Singla	4.0	4
251	101603275	Ripudaman Singh Uppal	4.0	4
252	101603276	Rishab	4.0	4
253	101603277	Rishab Goel	4.0	4
254	101603278	Rishabh Gupta	4.0	4
255	101603279	Ritik Jain	4.0	4
256	101603280	Ritika Garg	4.0	4
257	101603281	Riya Garg	4.5	5
258	101603282	Robin Singh	5.0	5
259	101603283	Rohan Gupta	4.0	4
260	101603284	Rohan Subedi	3.5	4
261	101603285	Rohit Gupta	4.5	5
262	101603286	Rohit Salwan	4.0	4
263	101603288	Rushali Battarai	4.0	4
264	101610072	Rishab Arora	4.0	4
265	101610073	Ritika	3.5	4
266	101610074	Riya Puri	4.0	4
267	101611046	Rishabh Kumar	3.5	4
268	101611047	Riya Aggarwal	4.0	4
269	101611048	Robin Singla	3.5	4
270	101783062	Ritik Mahajan	3.5	4
271	401603021	Ripudaman Singh	4.0	4
272	401603022	Rishabh	3.5	4
273	101603016	Aditya Dahiya	4.5	5
274	101603017	Aditya Kansal	4.0	4
275	101603018	Aditya Kumar	3.5	4
276	101603019	Akash Garg	4.0	4
277	101603020	Akhil Garg	4.5	5
278	101603021	Akhil Goyal	4.0	4
279	101603022	Akshat Khanna	4.0	4
280	101603024	Akshit Janjua	4.0	4
281	101603025	Akshit Kaushik	4.5	5
282	101603026	Akspreet Kaur	4.0	4
283	101603027	Aman Rai	4.0	4
284	101603028	Aman Sharma	3.5	4
285	101603029	Amneet Kaur Sawhney	4.0	4
286	101603030	Amritpal Singh	4.0	4
287	101610003	Aiana Verma	4.5	5
288	101610004	Akshat Pathak	4.5	5
289	101610005	Aman Agarwal	4.5	5
290	101610006	Aman Saxena	4.0	4
291	101610007	Amandeep Singh	4.0	4

292	101610008	Amit Kumar	3.5	4
293	101611003	Advait Choudhary	4.5	5
294	101783004	Arshdeep Kaur	3.5	4
295	101783005	Arshdeep Singh	4.5	5
296	401603003	Amrita Singla	4.0	4
297	101603289	Rushil Kush	4.0	4
298	101603290	Sachin Chopra	4.5	5
299	101603291	Sachin Pandey	4.0	4
300	101603292	Sachin Shandilya	4.0	4
301	101603293	Sai Siddartha Maram	4.0	4
302	101603294	Sajal Agrawal	4.5	5
303	101603295	Sakshi Jindal	4.0	4
304	101603298	Samarth Gupta	0.0	1
305	101603299	Samarth Koul	4.0	4
306	101603317	Shivangi Khusara	3.0	3
307	101610075	Rumanchi Jindal	4.0	4
308	101610076	Saaket	4.0	4
309	101610077	Sabhan Goyal	4.0	4
310	101610078	Sahil	3.5	4
311	101610079	Saiyam Jhamb	4.5	5
312	101610080	Samarth Sharma	4.0	4
313	101611049	Rushil Kumar	4.0	4
314	101611050	Sahil Sharma	4.0	4
315	101611051	Saksham Mehra	4.0	4
316	101783037	Sarthak Sharma	4.0	4
317	101783038	Sharanpreet Kaur	3.0	3
318	101603296	Sakshi Sharma	4.5	5
319	101603300	Samprati Jain	4.5	5
320	101603301	Sanchit Kapoor	4.0	4
321	101603302	Sanchit Nayyar	4.5	5
322	101603303	Sanchit Sood	4.5	5
323	101603304	Sanjeevani Jain	4.5	5
324	101603305	Sankalp Rajpoot	4.5	5
325	101603306	Sarbjot Singh	0.0	1
326	101603307	Satvik Singh	4.0	4
327	101603309	Sehajbir Singh	4.5	5
328	101603310	Shagun Khaitan	4.5	5
329	101603311	Shashi Shekhar	4.0	4
330	101603312	Shervil Gupta	4.0	4
331	101603313	Shikhar Chaudhary	4.0	4
332	101603314	Shikhar Pilania	4.0	4
333	101603315	Shivam Garg	4.0	4
334	101603316	Shivam Mittal	4.0	4
335	101603319	Shobhit Gupta	4.0	4
336	101610081	Satwik Tripathi	4.0	4
337	101610082	Shagun Kaushal	3.5	4
338	101610084	Shivam Abrol	4.0	4
339	101610085	Shivam Agarwal	4.0	4
340	101611052	Sanchit	4.0	4
341	101611053	Shagun	4.0	4
342	101783034	Purnima Tayal	4.0	4
343	101783039	Shivam Bhushan	4.5	5

344	101783040	Shruti	4.0	4
345	101603320	Shreel Adhikari	4.0	4
346	101603321	Shrey Sharma	3.0	3
347	101603322	Shreya Goyal	4.0	4
348	101603323	Shreya Gupta	5.0	5
349	101603324	Shriansh Nauriyal	4.0	4
350	101603325	Shubham	3.0	3
351	101603326	Shubham Gupta	4.0	4
352	101603327	Shubham Jindal	4.0	4
353	101603328	Shubham Kamboj	3.0	3
354	101603330	Siddhant Jain	3.0	3
355	101603331	Siddhant Sharma	4.0	4
356	101603332	Sidharth Mehra	3.0	3
357	101603333	Simranjeet Singh	3.5	4
358	101603334	Sparsh Jain	0.0	1
359	101603335	Sparsh Jain	4.0	4
360	101610086	Srijan Srivastav	3.5	4
361	101610087	Sudhanshu Prashar	3.5	4
362	101610088	Sukhjeet Singh Rathi	3.5	4
363	101611054	Siddharth Gautam	3.0	3
364	101611055	Sneha Arora	4.0	4
365	101661001	Sourabh Kumar	0.0	1
366	101783041	Sutikshan Lakhanpal	4.0	4
367	101783042	Swaril Rani	3.0	3
368	101603337	Sukhpal Singh	4.5	5
369	101603338	Sukhpreet Singh	3.5	4
370	101603339	Sumair Bashir	3.5	4
371	101603340	Sumit Kumar Tack	3.5	4
372	101603341	Sunmeet Singh	4.5	5
373	101603342	Surbhit Lamba	4.5	5
374	101603344	Suryansh Saran	4.5	5
375	101603345	Suyash Jain	4.5	5
376	101603346	Syed Asad Husain	3.5	4
377	101603347	Talwinder Singh	3.5	4
378	101603348	Tamanna More	4.5	5
379	101603349	Tanish Bhardwaj	4.5	5
380	101603350	Tanmay Bhatnagar	4.5	5
381	101603351	Tanuj Dua	4.5	5
382	101603352	Tanuj Kukreja	4.5	5
383	101603353	Tanuj Vishnoi	4.5	5
384	101603355	Tathagat Thapliyal	3.5	4
385	101610089	Sukruth G	3.5	4
386	101610090	Swati Kothari	3.5	4
387	101611056	Tanish Charaya	4.5	5
388	101783066	Varun Lall	4.5	5
389	401603023	Sukriti Chaudhary	4.5	5
390	401603024	Surya Pratap Babbar	3.5	4
391	401603025	Tanisha Jain	4.5	5
392	101603354	Tarun Dani	3.0	3
393	101603356	Taveesh Anand	5.0	5
394	101603357	Teshali Mittal	5.0	5
395	101603358	Toshi Kashyap	5.0	5

396	101603359	Tribhuvan Bisht	4.0	4
397	101603360	Tushar Mohan	4.0	4
398	101603361	Tushar Shrivastava	3.0	3
399	101603362	Ujjwal Tyagi	3.0	3
400	101603363	Ujjwal Kanethia	4.0	4
401	101603364	Utkarsh Chugh	4.0	4
402	101603366	Utkarsh Suryaman	3.0	3
403	101603367	Vanshita Garg	3.0	3
404	101603368	Varun Bansal	4.0	4
405	101603369	Vasudev Sharma	4.0	4
406	101603382	Yashvi Goyal	3.0	3
407	101610091	Taranjeet Singh	4.0	4
408	101610092	Upsehaj Singh Makkar	4.0	4
409	101610093	Vaibhav Sood	4.0	4
410	101611057	Tushar Mahajan	4.0	4
411	101611058	Ujjwal Mishra	4.0	4
412	101611059	Vareesh Bainwala	4.0	4
413	101611060	Vidushi Agarwal	4.0	4
414	101783043	Vibhu Prashar	4.0	4
415	101783067	Vikas Airan	4.0	4
416	401603026	Tushar Monga	2.0	2
417	401603028	Vaibhav	3.0	3
418	101603318	Shivani	3.5	4
419	101603370	Vedansh Garg	4.5	5
420	101603371	Vedant Mehra	3.5	4
421	101603372	Veenak Kansal	3.5	4
422	101603373	Venkatesh Sharma	4.5	5
423	101603374	Vibhor Khanna	4.5	5
424	101603375	Videept Kohli	4.5	5
425	101603376	Vikas Sidhar	3.5	4
426	101603377	Vikash Pathak	4.5	5
427	101603378	Vipin	3.5	4
428	101603379	Vishal Singh	4.5	5
429	101603380	Yash Bhardwaj	3.5	4
430	101603381	Yash Tibarewala	4.5	5
431	101603383	Yuvraj Singh	4.5	5
432	101610094	Vikram Singh Vishnoi	4.5	5
433	101610095	Vinayak Maithani	3.5	4
434	101610096	Vipul Sharma	4.5	5
435	101610097	Yash Srivastava	4.5	5
436	101611061	Vikrant Dhawan	4.5	5
437	101611062	Vipul Kaushal	5.0	5
438	101611063	Yash Verma	0.0	1
439	101603031	Amy Bhatia	4.5	5
440	101603032	Animesh Attri	4.0	4
441	101603033	Animesh Jain	4.0	4
442	101603035	Anit Aggarwal	5.0	5
443	101603036	Anket Goyal	4.5	5
444	101603037	Ankit	4.5	5
445	101603038	Ankit Aggarwal	4.0	4
446	101603039	Ankit Kumar Shah	4.5	5
447	101603040	Ankit Madan	4.5	5

448	101603041	Ankit Mahajan	4.0	4
449	101603042	Ankita Sharma	4.0	4
450	101603043	Ankur Sharma	4.5	5
451	101603044	Ankush Karara	4.0	4
452	101603045	Anmol Jain	4.0	4
453	101610009	Ankan Kumar Ghosal	4.5	5
454	101610010	Anmol Dhawan	4.5	5
455	101610011	Anmol Lotey	4.0	4
456	101610012	Anmol Mahajan	4.5	5
457	101611004	Anmol Tayal	4.0	4
458	101783006	Arushi Malhotra	4.5	5
459	101783007	Ashbir Singh Dhiman	4.5	5
460	101783008	Avineet Kaur Soch	4.0	4
461	101783010	Bhakti	4.0	4
462	101783035	Radhika Malhotra	4.5	5
463	101783047	Ankit Bansal	4.0	4
464	101783048	Ankit Sinha	4.5	5
465	401603004	Anjali	4.0	4
466	101603046	Ansh Gujral	4.5	5
467	101603047	Anshal Chhabra	4.5	5
468	101603048	Anushka Prasad	4.5	5
469	101603049	Aparna Tripathi	4.5	5
470	101603050	Archit Puri	4.0	4
471	101603051	Arham Bansal	4.0	4
472	101603052	Armaan Thakur	4.0	4
473	101603053	Arman Deep Singh	4.0	4
474	101603054	Arpit Agarwal	4.5	5
475	101603055	Arpnik Singh	4.5	5
476	101603056	Arshdeep Singh Kuner	4.5	5
477	101610013	Anuj Panwar	4.0	4
478	101610014	Apoorve Bhargava	4.0	4
479	101611005	Anmolpreet Singh	4.5	5
480	101611006	Anshul Bhardwaj	4.5	5
481	101611007	Apoorv Sharma	4.0	4
482	101611008	Arjun Gupta	4.0	4
483	101611009	Arpit Sardana	4.5	5
484	101611010	Arshdeep Singh Boparai	4.0	4
485	101783050	Anshuman Gupta	4.0	4
486	101783051	Anuj Saini	5.0	5
487	101783053	Anurag Prakash	4.5	5
488	401603006	Arjun Chopra	3.0	3
489	401603007	Arnav Goel	4.0	4
490	401603031	Anmoldeep Kaur	4.0	4
491	101603057	Arshit Goel	4.0	4
492	101603058	Arushi Aggarwal	4.0	4
493	101603059	Ashish Jindal	4.5	5
494	101603060	Ashish Niranjana	4.5	5
495	101603061	Astitva Sood	4.5	5
496	101603062	Atul Anand	4.5	5
497	101603063	Atul Gupta	4.5	5
498	101603064	Avin Kumar	4.5	5
499	101603065	Ayush Gautam	4.0	4

500	101603066	Ayush Goyal	3.5	4
501	101603067	Ayush Gupta	3.5	4
502	101603068	Ayush Gupta	4.5	5
503	101603069	Ayush Raj	3.0	3
504	101610015	Arshpreet Kaur Chauhan	4.0	4
505	101610016	Arushi Mishra	4.5	5
506	101610017	Asees	4.5	5
507	101610018	Ashmeet Singh Deol	4.5	5
508	101610019	Atin Srivastava	4.5	5
509	101610020	Avnish Mangla	4.0	4
510	101611011	Aryan Anand	4.5	5
511	101611012	Astha Nigam	4.5	5
512	101611013	Avesh Jindal	5.0	5
513	101783011	Bhargav Sood	4.0	4
514	401603008	Ayush Seth	4.5	5
515	101603070	Ayush Tyagi	4.0	4
516	101603072	Ayushi Manuwal	3.5	4
517	101603073	Bandhan Goyal	3.5	4
518	101603074	Bhavay Pahuja	4.0	4
519	101603075	Bhavneet Kaur	3.5	4
520	101603076	Bhavya	3.5	4
521	101603078	Chirag Mahawar	4.0	4
522	101603079	Chirag Setia	3.5	4
523	101603080	Daanish Ghuman	3.5	4
524	101603081	Deepak Sharma	4.0	4
525	101603082	Deveshwar Raj	3.5	4
526	101603199	Navjot Singh Sandhu	3.5	4
527	101610021	Chirag	3.5	4
528	101610022	Deepak Lather	4.0	4
529	101610023	Devanshu Rastogi	4.0	4
530	101611014	Bhanvi Goyal	3.5	4
531	101611015	Chandni Mittal	3.5	4
532	101611016	Chetan Sharma	3.5	4
533	101611017	Damanpreet Singh Arora	3.5	4
534	101611018	Devanshu Chaturvedi	4.0	4
535	101783012	Chahat Jindal	3.0	3
536	101783013	Chetan Batra	4.0	4
537	101783049	Anmol Bajwa	3.5	4
538	401603009	Deepanshu Udhwani	3.5	4
539	401603010	Devak Ohri	3.5	4
540	101603077	Chinmaya Kumar Khatri	5.0	5
541	101603083	Dheeraj Kumar Singla	3.0	3
542	101603085	Dhruv Aggarwal	3.0	3
543	101603086	Dhruv Kaushal	3.0	3
544	101603087	Dikshant Mundra	4.0	4
545	101603088	Dinkar Gautam	5.0	5
546	101603089	Disha Chaturvedi	3.0	3
547	101603091	Divya Aman	4.0	4
548	101603092	Divya Kumari	3.5	4
549	101603093	Divyam Garg	2.5	3
550	101603095	Dixit Garg	4.0	4
551	101603096	Dushyant Kant Sharma	2.0	2

552	101610024	Dhruv Agarwal	4.0	4
553	101610025	Dipesh Rishi	4.0	4
554	101610026	Divyansh Jain	3.5	4
555	101610027	Eshaan Mangal	5.0	5
556	101611019	Dhiraj Hazarika	3.0	3
557	101611020	Eklavya Gehlaut	3.0	3
558	101783009	Barjinder Pal Singh	2.0	2
559	101783014	Chitvan Bhutani	2.0	2
560	101783015	Gurpreet Singh Walia	3.0	3
561	401603011	Dipanshu	2.5	3
562	401603012	Disha Nainwal	2.5	3
563	401603013	Dolly Kurmi	3.0	3
564	101603097	Eshani Agrawal	3.5	4
565	101603098	Gagandeep Singh Ahuja	4.5	5
566	101603099	Garvit Tyagi	5.0	5
567	101603100	Girish Jain	4.5	5
568	101603101	Guntas Singh	5.0	5
569	101603103	Gurkirat Singh	5.0	5
570	101603104	Gurleen Kaur Bindra	4.5	5
571	101603105	Gurpreet Singh	4.0	4
572	101603106	Gurpreet Singh	5.0	5
573	101603107	Gyandeep Digra	4.5	5
574	101603108	Hardik Chawla	5.0	5
575	101603109	Hardik Mittal	5.0	5
576	101603110	Hardik Sharma	3.5	4
577	101603182	Manik Billawria	3.5	4
578	101610029	Gautam Awasthi	3.5	4
579	101610030	Geetika	3.5	4
580	101610031	Gundeep Singh	4.0	4
581	101610032	Guntas Singh	3.5	4
582	101610033	Gurmeet Singh	4.0	4
583	101610035	Hammad Mansoor	4.0	4
584	101610036	Harkanwal Grewal	4.5	5
585	101783016	Gursukhab Singh	5.0	5
586	401603014	Harinder Kaur	4.0	4
587	101603112	Harpreet Chaudhary	4.0	4
588	101603113	Harraj Singh	4.0	4
589	101603114	Harsh Jain	4.0	4
590	101603115	Harshdeep Kaur	4.5	5
591	101603117	Himani Dogra	4.0	4
592	101603118	Himani Garg	3.5	4
593	101603119	Himanshu	4.0	4
594	101603120	Himanshu Dhiman	4.5	5
595	101603121	Himanshu Goyal	4.0	4
596	101603122	Himanshu Gupta	4.5	5
597	101603123	Himanshu Gupta	4.5	5
598	101603124	Himanshu Jain	4.5	5
599	101603125	Himanshu Pandey	3.5	4
600	101603126	Hirdyanshu Goyal	0.0	1
601	101603127	Hridaypal Singh Saraya	4.0	4
602	101610037	Harsimran Singh Thukral	4.0	4
603	101610039	Isha	4.0	4

604	101611022	Harshdeep Dhiman	4.5	5
605	101611023	Himanshu Kumar Amethia	4.5	5
606	101611024	Himanshu Sharma	4.0	4
607	101783017	Harjot Singh	4.0	4
608	101783018	Harjot Singh	4.0	4
609	101606001	Aayushi Mathur	5.0	5
610	101606002	Abhijeet Singh Yadav	4.5	5
611	101606003	Abhinav Choudhary	4.5	5
612	101606004	Abhinav	4.5	5
613	101606005	Abhinav Gupta	4.5	5
614	101606006	Abhinav Jassal	4.5	5
615	101606007	Abhinav Kamboj	4.5	5
616	101606009	Abhishek Arora	5.0	5
617	101606010	Abhishek Bhatia	4.5	5
618	101606012	Abhishek Gupta	5.0	5
619	101606013	Abhishek Jayant	4.5	5
620	101606014	Abhishek Kumar	4.0	4
621	101606015	Abhishek Singla	5.0	5
622	101606016	Aditi Mishra	3.5	4
623	101606017	Aditya Rai	3.5	4
624	101606018	Aditya Ranjan	3.5	4
625	101606019	Akanksha Bajaj	5.0	5
626	101606020	Akshat Sharma	4.0	4
627	101606021	Akshit Bansal	4.0	4
628	101656001	Abhinav Sharma	4.0	4
629	101786001	Aditya Bhardwaj	5.0	5
630	101786010	Kritagya Sain Vyoli	3.5	4
631	101606024	Anirudh Gupta	4.0	4
632	101606025	Anisha Kochhar	4.5	5
633	101606026	Ankit Garg	4.5	5
634	101606027	Ankit Kumar	4.5	5
635	101606029	Anmol Khurana	4.0	4
636	101606031	Anmol Vohra	0.0	1
637	101606032	Anshu	4.0	4
638	101606033	Anshuman Aditya	0.0	1
639	101606034	Anubhav Kohli	3.5	4
640	101606035	Anubhav Singhal	4.0	4
641	101606037	Anurag Mishra	4.0	4
642	101606038	Anurag Sabharwal	4.5	5
643	101606039	Anuva Sehgal	4.0	4
644	101606040	Archit Sethi	4.5	5
645	101606041	Arindam Goel	4.5	5
646	101786002	Bhupinder Kaur	3.0	3
647	101606042	Arjun Singh	4.0	4
648	101606043	Armaandeeep Singh Chhina	4.5	5
649	101606044	Arshek Kumar Singh	4.0	4
650	101606045	Arshia Gupta	3.5	4
651	101606046	Arushi	4.0	4
652	101606047	Asad Shakri	4.0	4
653	101606048	Asees Kaur Logani	4.0	4
654	101606049	Ashish Garg	0.0	1
655	101606051	Atishay Mittal	3.5	4

656	101606053	Bipin Kumar	4.0	4
657	101606054	Celina Gupta	4.5	5
658	101606055	Chakshita	4.0	4
659	101606056	Charu Garg	4.5	5
660	101606057	Chetan Bhushan Aggarwal	4.5	5
661	101606058	Devangna Dubey	4.5	5
662	101606059	Devansh Mittal	3.5	4
663	101606060	Dikshant Chadha	4.0	4
664	101606061	Dipanshu Aggarwal	4.0	4
665	101606062	Divanshu Bhatia	3.0	3
666	101606063	Divya	3.5	4
667	101786003	Gurnoor Singh Brar	4.5	5
668	401606001	Aryushi Sharma	4.0	4
669	101606064	Eshita Jain	4.0	4
670	101606065	Gaurav Kumar Sinha	3.5	4
671	101606066	Girish Shelly	3.5	4
672	101606067	Harshit Bahri	4.0	4
673	101606068	Harshit Mendiratta	3.5	4
674	101606069	Harsimar Banga	3.5	4
675	101606070	Hemant Kumar	4.5	5
676	101606071	Hitesh Jain	4.0	4
677	101606072	Hrishikesh Johri	4.0	4
678	101606073	Japleen Kaur	3.5	4
679	101606074	Jaskaran Singh	3.5	4
680	101606075	Jasmine Kaur	3.0	3
681	101606077	Karan Kapur	3.5	4
682	101606078	Karteek Kandhari	4.0	4
683	101606079	Kartik Bajaj	4.5	5
684	101606080	Kartik Manhas	3.5	4
685	101606081	Kirti Kumar	2.0	2
686	101606082	Kokandeep Singh	3.0	3
687	101606083	Kultaj Singh	4.0	4
688	101606084	Kushagra Sharma	4.0	4
689	101656021	Sahil Vaid	4.0	4
690	101656026	Veera Ganesh Suprateek	4.0	4
691	101786004	Jatin Lohia	2.0	2
692	101606085	Lakshay	5.0	5
693	101606086	Lavish Chhabra	3.0	3
694	101606087	Lovepreet Singh	5.0	5
695	101606089	Mananadeep Singh Panjrath	5.0	5
696	101606090	Mayank Jalan	3.0	3
697	101606091	Mehak Dhiman	4.0	4
698	101606092	Mishthi Jhaldiyal	4.0	4
699	101606093	Mohit Sharma	5.0	5
700	101606094	Monik Singla	4.5	5
701	101606095	Mrinal Chhabra	3.0	3
702	101606096	Munish	5.0	5
703	101606097	Muskan	5.0	5
704	101606099	Navdeep Saini	5.0	5
705	101606100	Nikhil Arora	5.0	5
706	101606101	Nikita	3.5	4
707	101606102	Nikita Jindal	3.5	4

708	101606103	Nikshit Kapoor	5.0	5
709	101606104	Nitin Kumar Singh	4.0	4
710	101606105	Nitish Garg	3.0	3
711	101786005	Jatin Mittal	3.5	4
712	101606106	Nitish Garg	4.5	5
713	101606109	Parneet Kaur	4.0	4
714	101606110	Parvesh Kumar	3.5	4
715	101606111	Prachi Gupta	4.0	4
716	101606112	Prakhar Sharma	4.0	4
717	101606113	Pranav Mahajan	4.5	5
718	101606114	Pranav Mittal	3.5	4
719	101606115	Pranav Singla	4.0	4
720	101606118	Priyam Tiwari	5.0	5
721	101606119	Puja Goyal	4.5	5
722	101606120	Pulkit Bansal	4.5	5
723	101606121	Raghav Mittal	3.5	4
724	101606122	Rahul Bhutani	4.5	5
725	101606123	Rahul Kumar	3.5	4
726	101606124	Rajat Sharma	5.0	5
727	101606125	Rajeev Goel	5.0	5
728	101606126	Ratinderpal Singh	3.5	4
729	101656017	Pradhi Gupta	4.0	4
730	101656020	Rahul Sharma	5.0	5
731	101786006	Pranav Sood	3.5	4
732	401606003	Pallav Goel	3.5	4
733	401606004	Prabhleen Singh	5.0	5
734	101506146	Samarth Kukreja	4.0	4
735	101606127	Ravit Sood	4.5	5
736	101606128	Ravneet Singh Sohi	4.5	5
737	101606129	Reetika	4.5	5
738	101606130	Rishab Aggarwal	4.0	4
739	101606131	Rishabh Agarwal	4.0	4
740	101606132	Rishabh Kumar	4.5	5
741	101606133	Rishav Talwar	3.5	4
742	101606135	Ritwek Khosla	5.0	5
743	101606136	Rushil Sharma	4.5	5
744	101606137	Saakshi	3.5	4
745	101606138	Sachin Goyal	4.0	4
746	101606139	Sachit Srivastava	4.5	5
747	101606140	Sahil	4.0	4
748	101606141	Sajal Khurana	4.0	4
749	101606142	Saksham	4.5	5
750	101606143	Saksham Singh	3.5	4
751	101606144	Sanchit Tanwar	4.5	5
752	101606145	Sanjana Pramanik	4.0	4
753	101606146	Sanjwal Singh	4.5	5
754	101786007	Shabnam Dhiman	4.0	4
755	101606147	Sanman Singh Brar	3.5	4
756	101606148	Sarbdeep Singh Saini	4.0	4
757	101606149	Sarthak Kalra	3.5	4
758	101606150	Sarthak Mehta	3.5	4
759	101606151	Saurav Goel	3.0	3

760	101606152	Saurav Singh	3.5	4
761	101606153	Shantanu Das Gupta	3.0	3
762	101606154	Shivam Gupta	4.0	4
763	101606155	Shivam Kalia	3.0	3
764	101606156	Shivam Kumar	3.5	4
765	101606157	Shreyanshu	3.5	4
766	101606158	Shubham Goyal	3.0	3
767	101606159	Shubham Jain	4.0	4
768	101606160	Siddharth Malhotra	3.0	3
769	101606161	Sourav Atri	0.0	1
770	101606162	Sudhanshu Dua	3.0	3
771	101606163	Sudhir Pratap Singh	3.0	3
772	101606164	Sunehpreet Kaur	3.0	3
773	101606165	Surbhi Dhanetwal	3.0	3
774	101606166	Sushmita Srivastava	3.0	3
775	101606167	Tanshu Jindal	3.0	3
776	101656024	Shikhar Arora	3.5	4
777	101786012	Ujjawal Aggarwal	3.0	3
778	101606168	Tanya Bansal	4.5	5
779	101606169	Tarandeep Singh Sachdeva	4.5	5
780	101606170	Tarun Angrish	4.5	5
781	101606171	Uday Bansal	4.0	4
782	101606172	Uday Jindal	4.5	5
783	101606173	Utkarsh Saxena	4.5	5
784	101606174	Utkristh Kohli	4.5	5
785	101606175	Utsav Garg	4.0	4
786	101606176	Vaibhav Grover	4.0	4
787	101606177	Vaibhav Gulati	4.0	4
788	101606178	Varun Kapila	4.5	5
789	101606182	Vinayak O P Bansal	3.5	4
790	101606183	Vivek Garg	4.5	5
791	101606184	Vivek Goyal	4.5	5
792	101606185	Vrinda Bansal	4.0	4
793	101606186	Yash Garg	4.0	4
794	101606187	Yashdeep Singh	4.5	5
795	101606188	Yashpal Bansal	4.5	5
796	101606189	Yukti	5.0	5
797	101636001	Yash Agarwal	4.5	5
798	101656025	Tarun Goyal	0.0	1
799	101656027	Vidisha Yadav	4.5	5
800	101786009	Tanya Mehta	4.0	4
801	101615001	Aabhas Kedia	4.5	5
802	101615002	Aakash Gilotra	4.0	4
803	101615003	Aarushi Singhal	4.0	4
804	101615004	Abhigyan Thakur	3.5	4
805	101615005	Abhinandan Kainth	4.0	4
806	101615006	Abhinav Vij	4.0	4
807	101615007	Abhishek Nayyar	4.5	5
808	101615008	Abhishek Sanadhya	4.0	4
809	101615009	Aditya Gupta	4.0	4
810	101615010	Akanksha Vashisth	4.0	4
811	101615011	Akhil Jindal	4.0	4

812	101615012	Akhilesh Saini	4.0	4
813	101615013	Akshat Aggarwal	4.5	5
814	101615014	Akshita Sawhney	4.0	4
815	101615015	Anant Agarwal	5.0	5
816	101615016	Anish Mendiratta	4.5	5
817	101615018	Annanya Gupta	4.0	4
818	101615126	Abhinav Gemawat	4.0	4
819	101795001	Arpit Garg	5.0	5
820	101795003	Abhishek Goyal	5.0	5
821	101795008	Nikhil Malhotra	5.0	5
822	101615020	Anup Parm Kaushal	4.0	4
823	101615021	Anurag Mittal	4.0	4
824	101615023	Arpit Jain	4.0	4
825	101615024	Arshnoor Bedi	4.0	4
826	101615025	Ashutosh Mishra	4.0	4
827	101615027	Avik Bansal	4.0	4
828	101615028	Ayoshee Beriwal	3.5	4
829	101615029	Ayush Kalra	4.0	4
830	101615030	Bharat Goel	4.5	5
831	101615032	Bhaskar Gupta	4.0	4
832	101615033	Bhavya Chopra	3.5	4
833	101615034	Bhavya Mahajan	4.0	4
834	101615035	Bhavya Sharma	4.0	4
835	101615036	Bhumika Agarwal	4.0	4
836	101615037	Chetan Mittal	4.0	4
837	101615038	Chirag Oberoi	4.0	4
838	101615039	Daksh Sharma	4.5	5
839	101615040	Deepak	4.0	4
840	101615074	Mukul Gupta	4.5	5
841	101795002	Hanish Kumar	4.5	5
842	101795004	Amandeep Singh Madaan	3.5	4
843	101615041	Deepak Sharma	4.5	5
844	101615042	Dharampreet Singh	4.5	5
845	101615043	Era Singla	4.0	4
846	101615044	Eshita Sharma	4.5	5
847	101615045	Falak Guglani	4.0	4
848	101615046	Gaurav Gupta	4.0	4
849	101615047	Guneet Sharma	4.0	4
850	101615048	Gurasis Singh	4.5	5
851	101615049	Hardik Dhamija	4.5	5
852	101615050	Harseerat Kaur	4.0	4
853	101615052	Harshul Agarwal	4.0	4
854	101615054	Ishan Lohomi	4.0	4
855	101615055	Japkeerat Singh	4.5	5
856	101615056	Javesh Vasu Khungar	4.0	4
857	101615057	Kanav Garg	4.5	5
858	101615058	Karan Bangia	4.5	5
859	101615059	Kartikeya Manchanda	4.0	4
860	101615060	Kirat Virmani	4.5	5
861	101615125	Ekasmeet Singh	4.5	5
862	101665001	Kawaljit Singh Bindra	0.0	1
863	101795005	Amrit Gopal Singh	4.5	5

864	101615061	Krupesh Mahesh Anadkat	4.5	5
865	101615062	Kshitij Bhatia	4.5	5
866	101615063	Lakshay Gupta	4.0	4
867	101615065	Maanvi Maini	3.5	4
868	101615066	Manas Chhabra	4.0	4
869	101615067	Manishi Sharma	3.5	4
870	101615068	Mataikya Singh	4.5	5
871	101615069	Mayank Chaudhary	4.0	4
872	101615070	Medhavee Pravin	5.0	5
873	101615071	Mohd Nomaan	4.5	5
874	101615072	Mokshlakshmi Bhan	4.5	5
875	101615073	Mukesh Singla	4.0	4
876	101615075	Neeraj Goyal	3.5	4
877	101615076	Palak Agrawal	4.0	4
878	101615077	Pardhuman Mittal	3.0	3
879	101615078	Parmod Kumar	4.0	4
880	101615079	Pranav Raizada	4.0	4
881	101615080	Pulkit Bhatia	5.0	5
882	101615081	Rachit Chaudhary	4.0	4
883	101615083	Raj Jaiswal	3.0	3
884	101615084	Rajneesh Pundir	3.0	3
885	101615085	Rajnish Kumar Chaturvedi	3.5	4
886	101615086	Raman Singh Malhotra	4.0	4
887	101615087	Rashim	3.5	4
888	101615088	Ravindra Suthar	3.5	4
889	101615089	Ravneet Sethi	3.0	3
890	101615090	Rehat Chugh	3.0	3
891	101615091	Ribhu Rishi Sharma	3.5	4
892	101615092	Rishabh Gupta	4.0	4
893	101615093	Rishi Kaushik	3.5	4
894	101615094	Ritika Kapoor	3.0	3
895	101615095	Ritwik Patil	3.0	3
896	101615097	Sachin Singla	3.5	4
897	101615098	Sahibpreet Singh Sikand	3.5	4
898	101615099	Saksham Behl	3.5	4
899	101615100	Saksham Nayyar	4.0	4
900	101615101	Sanyam Aggarwal	4.5	5
901	101615102	Sarthak Baweja	3.5	4
902	101615103	Shivang Goel	3.5	4
903	101615104	Shivanshu Kapila	3.5	4
904	101615105	Shrey Garg	5.0	5
905	101615106	Shubham Chopra	4.0	4
906	101615107	Shubham Jain	4.0	4
907	101615108	Siddharth Bansal	3.5	4
908	101615109	Sidharth Loumash	5.0	5
909	101615110	Smarth Mittal	4.0	4
910	101615111	Srijati Agrawal	3.5	4
911	101615112	Srishty Kak	3.0	3
912	101615113	Tanish	2.5	3
913	101615115	Ujjawal Singh	3.0	3
914	101615116	Vaibhav Agarwal	4.5	5
915	101615117	Vaibhav Gupta	5.0	5

916	101615118	Varun Bansal	4.0	4
917	101615119	Varun Bharti	4.0	4
918	101615120	Vasu Naman Verma	3.5	4
919	101615121	Vijay Mundra	2.5	3
920	101615123	Yatin Goyal	4.0	4
921	101504091	Pranav Singh	3.0	3
922	101633001	Mehar Singh Grewal	0.0	1
923	101658006	Ashish Verma	3.3	4

The overall performance of students in the above question is then summarized as given below

Table D4.2: Average score of student performance in the course UTA010 criteria D1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UTA010	32.3	56.4	8.5	1.1	1.7	4.16

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria D1 as given below in Table D4.3:

Table D4.3: Weighted Average Student class performance (course portfolio) for criteria D1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA010	32.3	56.4	8.5	1.1	1.7	4.16	5
Weighted average score	32.3	56.4	8.5	1.1	1.7	4.16	5

b) Indirect measures for Performance criteria D1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table D4.4: Average score of student course survey for criteria D1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA010	23.18	45.23	25.34	9.12	0	3.91	5
Weighted average score	23.19	45.23	25.34	9.12	0	3.91	5

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table D4.5: Assessment for criteria D1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	30	42	24	2	2	3.96
Alumni survey	46	46	6	2	0	4.00
Employer Survey	64	30	6	0	0	4.58

c) Overall weighted average score of performance criterion ‘D1’

Finally overall weighted average score of performance criterion ‘D1’ is evaluated as given below in Table D4.6:

Table D4.6: Overall weighted average score of performance criterion ‘D1’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	32.30	56.40	8.50	1.10	1.70	4.16	5
Weighted average student course survey	23.19	45.23	25.34	9.12	0.00	3.91	4
Graduating student survey	30	42	24	2	2	3.96	3
Alumni survey	46	46	6	2	0	4	3
Employer survey	64	30	6	0	0	4.58	3
Overall weighted score	37.46	45.38	13.99	3.00	0.81	4.11	18

Assessment of Outcome ‘D’ using performance criterion D2

Performance criteria ‘D2’: Participates in the development and selection of ideas.

The above performance criteria is used to measure the attainment of outcome ‘D’ by giving the following question to the students.

Question: Poster of redesign of the mangonel arm for max throw. (10 marks)

Student’s performance in the above question is given below:

Table D4.7: Student’s performance in question targeting ‘D2’; course: UTA010

S.No.	Rollno.	Name	Marks (10)	Score (1-5)
1	101603001	Aarush Chopra	9.0	5
2	101603002	Aasham Taneja	9.5	5
3	101603003	Aashutosh Chaudhary	8.0	4
4	101603004	Aastha Khare	9.0	5
5	101603005	Abhijeet Singh	8.0	4
6	101603006	Abhijeet Singh Malhi	9.0	5
7	101603007	Abhimanyu Singh	9.0	5
8	101603009	Abhinav Saxena	8.0	4
9	101603010	Abhinav Singla	7.5	4
10	101603011	Abhishek Ghai	7.5	4
11	101603012	Abhishek Kaushal	7.5	4
12	101603013	Abhishek Modi	8.0	4
13	101603014	Adish Aggarwal	9.5	5
14	101603015	Aditi Prasad	9.0	5

15	101610001	Aayush Agrawal	9.5	5
16	101610002	Abhishek Singh	8.0	4
17	101611001	Abhishek Garg	8.0	4
18	101611002	Abhishek Kumar Sakari	9.5	5
19	101660001	Aayush Wadhwa	7.5	4
20	101783001	Abhilasha Girdhar	9.5	5
21	101783002	Abhishek Grover	8.0	4
22	101783003	Abhishek Kumar	8.0	4
23	401603001	Aaradhya Mahajan	8.0	4
24	401603002	Abhijeet Singla	8.0	4
25	101603090	Divraj Singh	4.0	2
26	101603128	Ishan Bhargava	8.0	4
27	101603129	Ishita Paliwal	9.0	5
28	101603130	Ishkaran Singh Saini	9.0	5
29	101603131	Japesh Singh Thind	4.0	2
30	101603132	Japneet Singh Nanda	6.0	3
31	101603133	Jasdeep Singh	8.0	4
32	101603134	Jashanpreet Singh Sraw	9.0	5
33	101603136	Jaskirat Singh Benipal	7.0	4
34	101603137	Jasmeen Gill	8.0	4
35	101603138	Jasmine Mehta	8.0	4
36	101603139	Jasvir Singh Walia	8.0	4
37	101603140	Jatin Garg	9.0	5
38	101603141	Jishan Garg	9.0	5
39	101603142	Jitesh Solanki	7.0	4
40	101603143	Jitish Bhateja	8.0	4
41	101603144	Justin Mangat	9.0	5
42	101610028	Gautam Ahuja	7.0	4
43	101610040	Jahnavi Bhardwaj	7.0	4
44	101610041	Jasraj Kaur Gill	9.0	5
45	101610042	Jayant Jain	8.0	4
46	101610043	Jodh Singh	8.0	4
47	101610044	Kairavi Kalra	8.0	4
48	101611025	Jatin Khera	8.0	4
49	101783019	Harsh Jindal	8.0	4
50	101783020	Harshim Sachdeva	8.0	4
51	401603015	Ishaan Kohli	7.0	4
52	101603116	Harshita	8.0	4
53	101603145	Kamal Kant	8.0	4
54	101603146	Kamalpreet Singh	7.5	4
55	101603147	Kanav Garg	8.5	5
56	101603148	Kanav Khajuria	8.5	5
57	101603149	Kangan	8.0	4
58	101603151	Kanwar Bhumika Kaur	8.0	4
59	101603152	Karanbir Singh	8.0	4
60	101603153	Karmanpreet Singh	7.5	4
61	101603154	Kartik Shinghal	7.5	4
62	101603155	Kashish Bansal	7.5	4
63	101603156	Kashish Mittal	7.5	4
64	101603157	Kashna Bhagat	7.5	4
65	101603287	Roopnit Kaur	7.5	4
66	101603329	Shubhdeep Kaur	7.5	4
67	101603388	Karan Bhardwaj	7.5	4

68	101610045	Kanishk Srivastava	8.5	5
69	101610046	Kanupriya Raheja	7.5	4
70	101611026	Kanav Talwar	8.5	5
71	101611027	Kanav Vashisht	7.5	4
72	101611028	Karanveer Singh Sodhi	7.5	4
73	101611029	Kartik Ramsinghaney	8.0	4
74	101611030	Kashish Garg	7.5	4
75	101783021	Jai Prakash	8.0	4
76	101783022	Jashandeep Kaur	8.0	4
77	101783054	Bharat Kashyap	7.5	4
78	401603016	Kartik Arora	8.0	4
79	401633001	Kali Nigam	8.0	4
80	101603158	Kashyap Nepaliya	7.0	4
81	101603159	Kaustabh Kumar Kakoty	7.0	4
82	101603160	Keshav Gupta	7.0	4
83	101603161	Keshav Sharma	7.0	4
84	101603162	Kishan Raj	8.0	4
85	101603163	Komal Malviya	7.0	4
86	101603164	Kriti Sethi	8.0	4
87	101603165	Kulpreet Singh	7.0	4
88	101603166	Kumar Sambhav Jain	7.0	4
89	101603167	Kunal	7.0	4
90	101603168	Kunal Kumar	8.0	4
91	101603169	Kunal Virmani	8.0	4
92	101603170	Kush Kharb	7.0	4
93	101603171	Kushal Kumar	8.0	4
94	101603172	Lavish Singla	8.0	4
95	101603173	Lavish Thakkar	8.0	4
96	101603174	Lokesh	8.0	4
97	101603184	Manpriya Gill	6.0	3
98	101610047	Kunal Singla	6.0	3
99	101610048	Kunwar Parth Singh	7.0	4
100	101610049	Kushagra Arora	6.0	3
101	101611031	Kirti Bansal	7.0	4
102	101783023	Kanwarbir Singh	7.0	4
103	101783024	Mohit Verma	8.0	4
104	101783068	Lakshita Sharma	7.0	4
105	401603017	Keshav	6.0	3
106	101603175	Loveneet Singh	8.0	4
107	101603176	Madanjeet Kumar	7.0	4
108	101603177	Madhav Arora	7.0	4
109	101603178	Madhav Mehta	7.0	4
110	101603179	Maganjot Singh	7.5	4
111	101603180	Manatveer Singh	8.0	4
112	101603181	Manav Sekhri	8.0	4
113	101603183	Manish Aggarwal	7.5	4
114	101603185	Mansi Garg	8.5	5
115	101603186	Mansi Singh	8.5	5
116	101603187	Manveer Singh	8.0	4
117	101603188	Mayank Singhal	8.5	5
118	101603189	Mayank Watts	8.0	4
119	101610050	Madhav Goyal	7.0	4
120	101610051	Mahesh Singla	8.0	4

121	101610052	Manraj Singh Chalokia	8.5	5
122	101610053	Manshi Tomar	7.5	4
123	101610054	Meenal Gaba	8.5	5
124	101610055	Mehak Garg	7.5	4
125	101783025	Mohita Khanna	8.0	4
126	101783026	Muskaan Kohli	8.0	4
127	401603018	Manjot Singh	8.0	4
128	401603019	Mansi	8.0	4
129	401603020	Mayank Aggarwal	0.0	1
130	101603190	Mehak Rehal	7.5	4
131	101603191	Mohit Ahuja	7.0	4
132	101603192	Mohit Chhabra	7.0	4
133	101603193	Mohit Mor	8.0	4
134	101603194	Mokshit Jhirwal	5.0	3
135	101603195	Mudit Jain	8.5	5
136	101603196	Muskan Bansal	7.0	4
137	101603197	Naman Yash	7.0	4
138	101603198	Namit Wadhwa	7.0	4
139	101603200	Navneet Kaur	8.5	5
140	101603201	Navya Nanda	7.0	4
141	101610056	Mridul Mittal	9.0	5
142	101610057	Mudit Mittal	8.5	5
143	101610058	Mukul Gupta	7.0	4
144	101610059	Mukul Kaushik	7.5	4
145	101610060	Navdeep Sharma	8.0	4
146	101611032	Mehar Gupta	7.5	4
147	101611033	Mohit Bansal	9.0	5
148	101611034	Mohit Gupta	7.5	4
149	101611035	Mradul Gaur	8.5	5
150	101783027	Nafisha Thakur	7.0	4
151	101783028	Navneet Kaur	0.0	1
152	101783057	Harsh Mehra	7.0	4
153	101603202	Neha	7.5	4
154	101603203	Nikhil	6.5	4
155	101603204	Nikhil Bains	7.5	4
156	101603205	Nikhil Bansal	6.5	4
157	101603206	Nikhil Jain	8.0	4
158	101603208	Nikhil Mittal	7.5	4
159	101603209	Nishad Gupta	8.0	4
160	101603210	Nishant Bansal	8.0	4
161	101603211	Nishtha Mittal	7.5	4
162	101603212	Nivesh	7.5	4
163	101603213	Palak Gupta	7.5	4
164	101603214	Palakreet Kaur	7.0	4
165	101603215	Pankaj Gupta	8.0	4
166	101603216	Parikshit Panwar	8.0	4
167	101610061	Neel Kumar	7.5	4
168	101610062	Neeraj Kumar	7.5	4
169	101610063	Nishek Wadhwa	6.5	4
170	101610064	Palak Kalra	7.5	4
171	101611036	Nihal	7.0	4
172	101611037	Nitin Bakshi	7.5	4
173	101783029	Nidhi Rajpal	7.0	4

174	101783030	Palak	6.5	4
175	101783031	Pardaman Kaur	7.0	4
176	101603218	Parul Goyal	8.0	4
177	101603219	Parv Agarwal	7.0	4
178	101603220	Parwinder Kaur	7.0	4
179	101603221	Pinaak Goel	8.0	4
180	101603222	Piyush Goyal	6.5	4
181	101603223	Piyush Killa	6.5	4
182	101603224	Piyush Kumar	6.5	4
183	101603225	Piyush Narula	6.5	4
184	101603226	Piyush Raj Mishra	6.5	4
185	101603228	Prabhdaman Singh Kareer	0.0	1
186	101603229	Prabhjit Singh	7.0	4
187	101603230	Prabhjot Kaur	7.0	4
188	101603231	Prabhjot Singh	8.0	4
189	101603232	Prabhjot Singh	8.0	4
190	101603233	Pragati Singh	6.5	4
191	101603234	Pragun Gandotra	6.5	4
192	101603235	Pragya Garg	7.0	4
193	101603236	Prajwal Bhandari	9.0	5
194	101603237	Prakhar Agarwal	9.0	5
195	101603244	Pranvi	9.0	5
196	101610066	Prakhar Gupta	8.0	4
197	101611038	Prafful Singhal	9.0	5
198	101611039	Pragya Jain	9.0	5
199	101783032	Parshant Jindal	6.5	4
200	101783033	Parv Kamal	6.5	4
201	101783036	Ritik Verma	6.5	4
202	101603238	Prakhar Jain	8.0	4
203	101603239	Pramatma Ram	8.5	5
204	101603240	Pranav Pahuja	8.0	4
205	101603241	Pranjal Gupta	8.5	5
206	101603242	Pranjal Saxena	8.5	5
207	101603243	Pranjay Dhamija	7.3	4
208	101603245	Prashil	7.3	4
209	101603246	Prasiddha Raj Gurung	7.3	4
210	101603247	Prateek Chhikara	8.5	5
211	101603248	Prayag Lehana	7.3	4
212	101603249	Priyam Garg	7.0	4
213	101603250	Priyanka Chauhan	8.0	4
214	101603251	Pulkit Arora	8.0	4
215	101603252	Pushapdeep	8.0	4
216	101603253	Raghav Bhutani	8.0	4
217	101603256	Raghav Mittal	8.0	4
218	101603386	Preetam Singhvi	8.0	4
219	101610067	Pranav Magotra	7.3	4
220	101610068	Pranav Pratap Singh	7.0	4
221	101610069	Pulkit Chugh	8.0	4
222	101611040	Prateek Garg	8.0	4
223	101611041	Rabjot Singh	8.0	4
224	101611042	Radhay Anand	8.0	4
225	101783060	Navdeep Kaur	8.0	4

226	101603254	Raghav Gupta	8.0	4
227	101603255	Raghav Mittal	8.0	4
228	101603257	Raghav Sindhwani	8.0	4
229	101603258	Rahat Bhambri	8.0	4
230	101603259	Rahul Chandawat	7.5	4
231	101603260	Rahul Chaudhary	6.5	4
232	101603261	Rahul Gothwal	7.0	4
233	101603262	Rahul Kaushik	7.0	4
234	101603264	Rahul Raj	7.5	4
235	101603265	Rahul Rampal	7.0	4
236	101603266	Rahul Sethi	7.5	4
237	101603267	Rajat Garg	6.5	4
238	101603268	Rajat Goyal	7.0	4
239	101603269	Rajat Sagar Mehta	7.5	4
240	101603270	Rajinder Singh Mahi	7.0	4
241	101603271	Rajkaran Singh	7.0	4
242	101610070	Rahul Gautam	6.5	4
243	101610071	Rajeev Ranjan	7.5	4
244	101611043	Rahul Rai	6.5	4
245	101611044	Rajan Goyal	7.0	4
246	101611045	Rakshit Gupta	7.0	4
247	101783061	Preeteesh Sharma	8.0	4
248	101603272	Ramandeep Singh	8.0	4
249	101603273	Ravi Gupta	7.0	4
250	101603274	Ravi Singla	7.0	4
251	101603275	Ripudaman Singh Uppal	8.0	4
252	101603276	Rishab	7.0	4
253	101603277	Rishab Goel	8.0	4
254	101603278	Rishabh Gupta	7.0	4
255	101603279	Ritik Jain	8.0	4
256	101603280	Ritika Garg	8.0	4
257	101603281	Riya Garg	9.0	5
258	101603282	Robin Singh	9.0	5
259	101603283	Rohan Gupta	8.0	4
260	101603284	Rohan Subedi	7.0	4
261	101603285	Rohit Gupta	9.0	5
262	101603286	Rohit Salwan	8.0	4
263	101603288	Rushali Battarai	9.0	5
264	101610072	Rishab Arora	8.0	4
265	101610073	Ritika	8.0	4
266	101610074	Riya Puri	9.0	5
267	101611046	Rishabh Kumar	9.0	5
268	101611047	Riya Aggarwal	8.0	4
269	101611048	Robin Singla	9.0	5
270	101783062	Ritik Mahajan	9.0	5
271	401603021	Ripudaman Singh	9.0	5
272	401603022	Rishabh	9.0	5
273	101603016	Aditya Dahiya	8.0	4
274	101603017	Aditya Kansal	8.0	4
275	101603018	Aditya Kumar	8.0	4
276	101603019	Akash Garg	8.0	4
277	101603020	Akhil Garg	7.5	4
278	101603021	Akhil Goyal	8.0	4

279	101603022	Akshat Khanna	7.0	4
280	101603024	Akshit Janjua	7.0	4
281	101603025	Akshit Kaushik	6.5	4
282	101603026	Akspreet Kaur	7.5	4
283	101603027	Aman Rai	6.5	4
284	101603028	Aman Sharma	8.0	4
285	101603029	Amneet Kaur Sawhney	7.5	4
286	101603030	Amritpal Singh	6.5	4
287	101610003	Aiana Verma	7.5	4
288	101610004	Akshat Pathak	6.5	4
289	101610005	Aman Agarwal	6.5	4
290	101610006	Aman Saxena	8.0	4
291	101610007	Amandeep Singh	7.5	4
292	101610008	Amit Kumar	8.0	4
293	101611003	Advait Choudhary	7.0	4
294	101783004	Arshdeep Kaur	8.0	4
295	101783005	Arshdeep Singh	7.0	4
296	401603003	Amrita Singla	7.0	4
297	101603289	Rushil Kush	7.0	4
298	101603290	Sachin Chopra	9.0	5
299	101603291	Sachin Pandey	9.0	5
300	101603292	Sachin Shandilya	9.0	5
301	101603293	Sai Siddartha Maram	9.0	5
302	101603294	Sajal Agrawal	9.0	5
303	101603295	Sakshi Jindal	9.0	5
304	101603298	Samarth Gupta	0.0	1
305	101603299	Samarth Koul	9.0	5
306	101603317	Shivangi Khusara	7.0	4
307	101610075	Rumanchi Jindal	7.0	4
308	101610076	Saaket	7.0	4
309	101610077	Sabhan Goyal	9.0	5
310	101610078	Sahil	7.0	4
311	101610079	Saiyam Jhamb	7.0	4
312	101610080	Samarth Sharma	9.0	5
313	101611049	Rushil Kumar	9.0	5
314	101611050	Sahil Sharma	7.0	4
315	101611051	Saksham Mehra	7.0	4
316	101783037	Sarthak Sharma	7.0	4
317	101783038	Sharanpreet Kaur	7.0	4
318	101603296	Sakshi Sharma	8.0	4
319	101603300	Samprati Jain	8.5	5
320	101603301	Sanchit Kapoor	7.5	4
321	101603302	Sanchit Nayyar	9.0	5
322	101603303	Sanchit Sood	8.0	4
323	101603304	Sanjeevani Jain	8.5	5
324	101603305	Sankalp Rajpoot	8.0	4
325	101603306	Sarbjot Singh	0.0	1
326	101603307	Satvik Singh	9.0	5
327	101603309	Sehajbir Singh	8.5	5
328	101603310	Shagun Khaitan	8.0	4
329	101603311	Shashi Shekhar	7.0	4
330	101603312	Shervil Gupta	9.0	5
331	101603313	Shikhar Chaudhary	7.0	4

332	101603314	Shikhar Pilonia	9.0	5
333	101603315	Shivam Garg	8.0	4
334	101603316	Shivam Mittal	8.0	4
335	101603319	Shobhit Gupta	9.0	5
336	101610081	Satwik Tripathi	8.0	4
337	101610082	Shagun Kaushal	8.0	4
338	101610084	Shivam Abrol	9.0	5
339	101610085	Shivam Agarwal	7.0	4
340	101611052	Sanchit	9.0	5
341	101611053	Shagun	8.0	4
342	101783034	Purnima Tayal	7.0	4
343	101783039	Shivam Bhushan	8.5	5
344	101783040	Shruti	7.0	4
345	101603320	Shreel Adhikari	8.0	4
346	101603321	Shrey Sharma	8.0	4
347	101603322	Shreya Goyal	8.0	4
348	101603323	Shreya Gupta	8.0	4
349	101603324	Shriansh Nauriyal	6.0	3
350	101603325	Shubham	6.0	3
351	101603326	Shubham Gupta	6.0	3
352	101603327	Shubham Jindal	6.0	3
353	101603328	Shubham Kamboj	6.0	3
354	101603330	Siddhant Jain	6.0	3
355	101603331	Siddhant Sharma	6.0	3
356	101603332	Sidharth Mehra	6.0	3
357	101603333	Simranjeet Singh	7.0	4
358	101603334	Sparsh Jain	0.0	1
359	101603335	Sparsh Jain	7.0	4
360	101610086	Srijan Srivastav	7.0	4
361	101610087	Sudhanshu Prashar	7.0	4
362	101610088	Sukhjeet Singh Rathi	7.0	4
363	101611054	Siddharth Gautam	7.0	4
364	101611055	Sneha Arora	7.0	4
365	101661001	Sourabh Kumar	0.0	1
366	101783041	Sutikshan Lakhanpal	7.0	4
367	101783042	Swaril Rani	7.0	4
368	101603337	Sukhpal Singh	8.5	5
369	101603338	Sukhpreet Singh	8.5	5
370	101603339	Sumair Bashir	9.0	5
371	101603340	Sumit Kumar Tack	8.5	5
372	101603341	Sunmeet Singh	8.5	5
373	101603342	Surbhit Lamba	8.0	4
374	101603344	Suryansh Saran	8.0	4
375	101603345	Suyash Jain	8.0	4
376	101603346	Syed Asad Husain	9.0	5
377	101603347	Talwinder Singh	9.0	5
378	101603348	Tamanna More	9.0	5
379	101603349	Tanish Bhardwaj	9.0	5
380	101603350	Tanmay Bhatnagar	8.0	4
381	101603351	Tanuj Dua	8.0	4
382	101603352	Tanuj Kukreja	9.0	5
383	101603353	Tanuj Vishnoi	9.0	5
384	101603355	Tathagat Thapliyal	9.0	5

385	101610089	Sukruth G	8.0	4
386	101610090	Swati Kothari	8.0	4
387	101611056	Tanish Charaya	8.0	4
388	101783066	Varun Lall	8.0	4
389	401603023	Sukriti Chaudhary	9.0	5
390	401603024	Surya Pratap Babbar	8.5	5
391	401603025	Tanisha Jain	9.0	5
392	101603354	Tarun Dani	7.0	4
393	101603356	Taveesh Anand	8.0	4
394	101603357	Teshali Mittal	8.0	4
395	101603358	Toshi Kashyap	8.0	4
396	101603359	Tribhuvan Bisht	7.0	4
397	101603360	Tushar Mohan	7.0	4
398	101603361	Tushar Shrivastava	7.0	4
399	101603362	Ujjawal Tyagi	7.0	4
400	101603363	Ujjwal Kanethia	7.0	4
401	101603364	Utkarsh Chugh	7.0	4
402	101603366	Utkarsh Suryaman	7.0	4
403	101603367	Vanshita Garg	7.0	4
404	101603368	Varun Bansal	8.0	4
405	101603369	Vasudev Sharma	9.0	5
406	101603382	Yashvi Goyal	7.0	4
407	101610091	Taranjeet Singh	7.0	4
408	101610092	Upsehaj Singh Makkar	9.0	5
409	101610093	Vaibhav Sood	7.0	4
410	101611057	Tushar - Mahajan	7.0	4
411	101611058	Ujjwal Mishra	7.0	4
412	101611059	Vareesh Bainwala	9.0	5
413	101611060	Vidushi Agarwal	8.0	4
414	101783043	Vibhu Prashar	9.0	5
415	101783067	Vikas Airan	9.0	5
416	401603026	Tushar Monga	7.0	4
417	401603028	Vaibhav	7.0	4
418	101603318	Shivani	8.0	4
419	101603370	Vedansh Garg	8.0	4
420	101603371	Vedant Mehra	9.0	5
421	101603372	Veenak Kansal	9.0	5
422	101603373	Venkatesh Sharma	8.0	4
423	101603374	Vibhor Khanna	8.0	4
424	101603375	Videept Kohli	9.0	5
425	101603376	Vikas Sidhar	8.0	4
426	101603377	Vikash Pathak	8.5	5
427	101603378	Vipin	8.5	5
428	101603379	Vishal Singh	8.5	5
429	101603380	Yash Bhardwaj	8.0	4
430	101603381	Yash Tibarewala	8.0	4
431	101603383	Yuvraj Singh	8.5	5
432	101610094	Vikram Singh Vishnoi	8.0	4
433	101610095	Vinayak Maithani	8.5	5
434	101610096	Vipul Sharma	8.0	4
435	101610097	Yash Srivastava	8.0	4
436	101611061	Vikrant Dhawan	9.0	5
437	101611062	Vipul Kaushal	9.0	5

438	101611063	Yash Verma	0.0	1
439	101603031	Amy Bhatia	8.0	4
440	101603032	Animesh Attri	8.0	4
441	101603033	Animesh Jain	8.0	4
442	101603035	Anit Aggarwal	8.0	4
443	101603036	Anket Goyal	8.0	4
444	101603037	Ankit	8.0	4
445	101603038	Ankit Aggarwal	8.0	4
446	101603039	Ankit Kumar Shah	8.0	4
447	101603040	Ankit Madan	8.0	4
448	101603041	Ankit Mahajan	8.0	4
449	101603042	Ankita Sharma	8.0	4
450	101603043	Ankur Sharma	8.0	4
451	101603044	Ankush Karara	8.0	4
452	101603045	Anmol Jain	8.0	4
453	101610009	Ankan Kumar Ghosal	8.0	4
454	101610010	Anmol Dhawan	8.0	4
455	101610011	Anmol Lotey	8.5	5
456	101610012	Anmol Mahajan	8.0	4
457	101611004	Anmol Tayal	8.0	4
458	101783006	Arushi Malhotra	8.5	5
459	101783007	Ashbir Singh Dhiman	8.5	5
460	101783008	Avineet Kaur Soch	8.0	4
461	101783010	Bhakti	8.5	5
462	101783035	Radhika Malhotra	8.0	4
463	101783047	Ankit Bansal	8.0	4
464	101783048	Ankit Sinha	8.0	4
465	401603004	Anjali	8.0	4
466	101603046	Ansh Gujral	9.0	5
467	101603047	Anshal Chhabra	9.0	5
468	101603048	Anushka Prasad	9.0	5
469	101603049	Aparna Tripathi	9.0	5
470	101603050	Archit Puri	8.0	4
471	101603051	Arham Bansal	9.0	5
472	101603052	Armaan Thakur	9.0	5
473	101603053	Arman Deep Singh	9.0	5
474	101603054	Arpit Agarwal	9.0	5
475	101603055	Arprik Singh	9.0	5
476	101603056	Arshdeep Singh Kuner	9.0	5
477	101610013	Anuj Panwar	8.0	4
478	101610014	Apoorve Bhargava	8.0	4
479	101611005	Anmolpreet Singh	8.0	4
480	101611006	Anshul Bhardwaj	8.0	4
481	101611007	Apoorv Sharma	8.0	4
482	101611008	Arjun Gupta	8.0	4
483	101611009	Arpit Sardana	8.0	4
484	101611010	Arshdeep Singh Boparai	9.0	5
485	101783050	Anshuman Gupta	9.0	5
486	101783051	Anuj Saini	9.0	5
487	101783053	Anurag Prakash	9.0	5
488	401603006	Arjun Chopra	8.0	4
489	401603007	Arnav Goel	9.0	5
490	401603031	Anmoldeep Kaur	8.0	4

491	101603057	Arshit Goel	8.0	4
492	101603058	Arushi Aggarwal	8.0	4
493	101603059	Ashish Jindal	8.0	4
494	101603060	Ashish Niranjana	7.5	4
495	101603061	Astitva Sood	7.5	4
496	101603062	Atul Anand	8.0	4
497	101603063	Atul Gupta	8.0	4
498	101603064	Avin Kumar	8.0	4
499	101603065	Ayush Gautam	8.0	4
500	101603066	Ayush Goyal	8.0	4
501	101603067	Ayush Gupta	8.0	4
502	101603068	Ayush Gupta	8.0	4
503	101603069	Ayush Raj	8.0	4
504	101610015	Arshpreet Kaur Chauhan	7.5	4
505	101610016	Arushi Mishra	7.5	4
506	101610017	Asees	8.0	4
507	101610018	Ashmeet Singh Deol	8.0	4
508	101610019	Atin Srivastava	7.5	4
509	101610020	Avnish Mangla	7.5	4
510	101611011	Aryan Anand	7.5	4
511	101611012	Astha Nigam	7.5	4
512	101611013	Avesh Jindal	7.5	4
513	101783011	Bhargav Sood	8.0	4
514	401603008	Ayush Seth	7.5	4
515	101603070	Ayush Tyagi	7.5	4
516	101603072	Ayushi Manuwal	7.5	4
517	101603073	Bandhan Goyal	7.5	4
518	101603074	Bhavay Pahuja	8.0	4
519	101603075	Bhavneet Kaur	8.0	4
520	101603076	Bhavya	8.0	4
521	101603078	Chirag Mahawar	8.0	4
522	101603079	Chirag Setia	8.0	4
523	101603080	Daanish Ghuman	8.0	4
524	101603081	Deepak Sharma	8.0	4
525	101603082	Deveshwar Raj	7.0	4
526	101603199	Navjot Singh Sandhu	8.0	4
527	101610021	Chirag	8.0	4
528	101610022	Deepak Lather	8.0	4
529	101610023	Devanshu Rastogi	7.5	4
530	101611014	Bhanvi Goyal	8.0	4
531	101611015	Chandni Mittal	8.0	4
532	101611016	Chetan Sharma	8.0	4
533	101611017	Damanpreet Singh Arora	8.0	4
534	101611018	Devanshu Chaturvedi	8.0	4
535	101783012	Chahat Jindal	7.5	4
536	101783013	Chetan Batra	8.0	4
537	101783049	Anmol Bajwa	8.0	4
538	401603009	Deepanshu Udhwani	8.0	4
539	401603010	Devak Ohri	8.0	4
540	101603077	Chinmaya Kumar Khatri	8.5	5
541	101603083	Dheeraj Kumar Singla	6.0	3
542	101603085	Dhruv Aggarwal	8.0	4
543	101603086	Dhruv Kaushal	7.0	4

544	101603087	Dikshant Mundra	6.5	4
545	101603088	Dinkar Gautam	6.5	4
546	101603089	Disha Chaturvedi	7.0	4
547	101603091	Divya Aman	8.0	4
548	101603092	Divya Kumari	6.5	4
549	101603093	Divyam Garg	6.5	4
550	101603095	Dixit Garg	8.0	4
551	101603096	Dushyant Kant Sharma	8.0	4
552	101610024	Dhruv Agarwal	7.0	4
553	101610025	Dipesh Rishi	6.0	3
554	101610026	Divyansh Jain	6.6	4
555	101610027	Eshaan Mangal	6.0	3
556	101611019	Dhiraj Hazarika	7.0	4
557	101611020	Eklavya Gehlaut	7.0	4
558	101783009	Barjinder Pal Singh	7.0	4
559	101783014	Chitvan Bhutani	7.0	4
560	101783015	Gurpreet Singh Walia	7.0	4
561	401603011	Dipanshu	6.0	3
562	401603012	Disha Nainwal	6.0	3
563	401603013	Dolly Kurmi	8.5	5
564	101603097	Eshani Agrawal	7.5	4
565	101603098	Gagandeep Singh Ahuja	6.5	4
566	101603099	Garvit Tyagi	8.0	4
567	101603100	Girish Jain	8.0	4
568	101603101	Guntas Singh	7.0	4
569	101603103	Gurkirat Singh	7.0	4
570	101603104	Gurleen Kaur Bindra	8.5	5
571	101603105	Gurpreet Singh	8.0	4
572	101603106	Gurpreet Singh	8.0	4
573	101603107	Gyandeep Digra	7.0	4
574	101603108	Hardik Chawla	7.5	4
575	101603109	Hardik Mittal	6.5	4
576	101603110	Hardik Sharma	6.5	4
577	101603182	Manik Billawria	6.5	4
578	101610029	Gautam Awasthi	8.5	5
579	101610030	Geetika	7.5	4
580	101610031	Gundeep Singh	8.0	4
581	101610032	Guntas Singh	8.5	5
582	101610033	Gurmeet Singh	7.5	4
583	101610035	Hammad Mansoor	7.5	4
584	101610036	Harkanwal Grewal	7.0	4
585	101783016	Gursukhab Singh	6.5	4
586	401603014	Harinder Kaur	8.5	5
587	101603112	Harpreet Chaudhary	8.0	4
588	101603113	Harraj Singh	7.0	4
589	101603114	Harsh Jain	6.5	4
590	101603115	Harshdeep Kaur	7.0	4
591	101603117	Himani Dogra	8.0	4
592	101603118	Himani Garg	7.5	4
593	101603119	Himanshu	8.0	4
594	101603120	Himanshu Dhiman	7.0	4
595	101603121	Himanshu Goyal	7.5	4
596	101603122	Himanshu Gupta	7.0	4

597	101603123	Himanshu Gupta	7.0	4
598	101603124	Himanshu Jain	6.5	4
599	101603125	Himanshu Pandey	7.0	4
600	101603126	Hirdyanshu Goyal	0.0	1
601	101603127	Hridaypal Singh Saraya	7.0	4
602	101610037	Harsimran Singh Thukral	7.0	4
603	101610039	Isha	7.5	4
604	101611022	Harshdeep Dhiman	8.0	4
605	101611023	Himanshu Kumar Amethia	7.5	4
606	101611024	Himanshu Sharma	7.5	4
607	101783017	Harjot Singh	6.5	4
608	101783018	Harjot Singh	6.5	4
609	101606001	Aayushi Mathur	9.5	5
610	101606002	Abhijeet Singh Yadav	7.5	4
611	101606003	Abhinav Choudhary	7.5	4
612	101606004	Abhinav	7.0	4
613	101606005	Abhinav Gupta	7.5	4
614	101606006	Abhinav Jassal	7.0	4
615	101606007	Abhinav Kamboj	7.0	4
616	101606009	Abhishek Arora	7.5	4
617	101606010	Abhishek Bhatia	7.5	4
618	101606012	Abhishek Gupta	9.5	5
619	101606013	Abhishek Jayant	7.0	4
620	101606014	Abhishek Kumar	7.5	4
621	101606015	Abhishek Singla	9.5	5
622	101606016	Aditi Mishra	7.5	4
623	101606017	Aditya Rai	7.5	4
624	101606018	Aditya Ranjan	7.5	4
625	101606019	Akanksha Bajaj	9.5	5
626	101606020	Akshat Sharma	7.5	4
627	101606021	Akshit Bansal	7.5	4
628	101656001	Abhinav Sharma	7.5	4
629	101786001	Aditya Bhardwaj	7.5	4
630	101786010	Kritagya Sain Vyoli	7.0	4
631	101606024	Anirudh Gupta	8.0	4
632	101606025	Anisha Kochhar	8.0	4
633	101606026	Ankit Garg	8.0	4
634	101606027	Ankit Kumar	8.0	4
635	101606029	Anmol Khurana	7.5	4
636	101606031	Anmol Vohra	0.0	1
637	101606032	Anshu	7.5	4
638	101606033	Anshuman Aditya	0.0	1
639	101606034	Anubhav Kohli	7.5	4
640	101606035	Anubhav Singhal	7.5	4
641	101606037	Anurag Mishra	7.0	4
642	101606038	Anurag Sabharwal	7.0	4
643	101606039	Anuva Sehgal	7.0	4
644	101606040	Archit Sethi	7.0	4
645	101606041	Arindam Goel	7.0	4
646	101786002	Bhupinder Kaur	6.0	3
647	101606042	Arjun Singh	7.5	4
648	101606043	Armaandeep Singh	7.5	4

		Chhina		
649	101606044	Arshek Kumar Singh	7.5	4
650	101606045	Arshia Gupta	7.0	4
651	101606046	Arushi	8.0	4
652	101606047	Asad Shakri	7.5	4
653	101606048	Asees Kaur Logani	8.0	4
654	101606049	Ashish Garg	0.0	1
655	101606051	Atishay Mittal	7.0	4
656	101606053	Bipin Kumar	8.0	4
657	101606054	Celina Gupta	8.0	4
658	101606055	Chakshita	8.0	4
659	101606056	Charu Garg	8.0	4
660	101606057	Chetan Bhushan Aggarwal	8.0	4
661	101606058	Devangna Dubey	7.0	4
662	101606059	Devansh Mittal	7.0	4
663	101606060	Dikshant Chadha	8.0	4
664	101606061	Dipanshu Aggarwal	7.0	4
665	101606062	Divanshu Bhatia	7.0	4
666	101606063	Divya	7.0	4
667	101786003	Gurnoor Singh Brar	7.0	4
668	401606001	Aryushi Sharma	8.0	4
669	101606064	Eshita Jain	7.0	4
670	101606065	Gaurav Kumar Sinha	8.0	4
671	101606066	Girish Shelly	8.0	4
672	101606067	Harshit Bahri	8.0	4
673	101606068	Harshit Mendiratta	8.0	4
674	101606069	Harsimar Banga	8.0	4
675	101606070	Hemant Kumar	9.0	5
676	101606071	Hitesh Jain	8.0	4
677	101606072	Hrishikesh Johri	9.0	5
678	101606073	Japleen Kaur	6.0	3
679	101606074	Jaskaran Singh	6.0	3
680	101606075	Jasmine Kaur	6.0	3
681	101606077	Karan Kapur	7.0	4
682	101606078	Karteek Kandhari	9.0	5
683	101606079	Kartik Bajaj	7.0	4
684	101606080	Kartik Manhas	7.0	4
685	101606081	Kirti Kumar	5.0	3
686	101606082	Kokandeep Singh	8.5	5
687	101606083	Kultaj Singh	8.0	4
688	101606084	Kushagra Sharma	8.0	4
689	101656021	Sahil Vaid	8.5	5
690	101656026	Veera G.Suprateek	9.0	5
691	101786004	Jatin Lohia	5.0	3
692	101606085	Lakshay	9.0	5
693	101606086	Lavish Chhabra	8.0	4
694	101606087	Lovepreet Singh	8.0	4
695	101606089	Mananadeep S. Panjrath	9.0	5
696	101606090	Mayank Jalan	8.0	4
697	101606091	Mehak Dhiman	8.5	5
698	101606092	Mishthi Jhaldiyal	8.5	5
699	101606093	Mohit Sharma	9.0	5

700	101606094	Monik Singla	8.5	5
701	101606095	Mrinal Chhabra	8.5	5
702	101606096	Munish	9.0	5
703	101606097	Muskan	9.0	5
704	101606099	Navdeep Saini	8.0	4
705	101606100	Nikhil Arora	9.0	5
706	101606101	Nikita	9.0	5
707	101606102	Nikita Jindal	9.0	5
708	101606103	Nikshit Kapoor	9.0	5
709	101606104	Nitin Kumar Singh	8.0	4
710	101606105	Nitish Garg	8.5	5
711	101786005	Jatin Mittal	9.0	5
712	101606106	Nitish Garg	7.0	4
713	101606109	Parneet Kaur	8.5	5
714	101606110	Parvesh Kumar	7.5	4
715	101606111	Prachi Gupta	7.0	4
716	101606112	Prakhar Sharma	7.5	4
717	101606113	Pranav Mahajan	7.5	4
718	101606114	Pranav Mittal	7.5	4
719	101606115	Pranav Singla	7.5	4
720	101606118	Priyam Tiwari	8.5	5
721	101606119	Puja Goyal	8.5	5
722	101606120	Pulkit Bansal	8.5	5
723	101606121	Raghav Mittal	8.5	5
724	101606122	Rahul Bhutani	7.0	4
725	101606123	Rahul Kumar	8.0	4
726	101606124	Rajat Sharma	8.0	4
727	101606125	Rajeev Goel	8.0	4
728	101606126	Ratinderpal Singh	8.0	4
729	101656017	Pradhi Gupta	7.0	4
730	101656020	Rahul Sharma	8.0	4
731	101786006	Pranav Sood	7.5	4
732	401606003	Pallav Goel	7.5	4
733	401606004	Prabhleen Singh	7.5	4
734	101506146	Samarth Kukreja	8.0	4
735	101606127	Ravit Sood	7.0	4
736	101606128	Ravneet Singh Sohi	7.0	4
737	101606129	Reetika	8.0	4
738	101606130	Rishab Aggarwal	8.5	5
739	101606131	Rishabh Agarwal	7.0	4
740	101606132	Rishabh Kumar	8.5	5
741	101606133	Rishav Talwar	8.0	4
742	101606135	Ritwek Khosla	8.0	4
743	101606136	Rushil Sharma	7.0	4
744	101606137	Saakshi	8.0	4
745	101606138	Sachin Goyal	7.5	4
746	101606139	Sachit Srivastava	7.5	4
747	101606140	Sahil	8.0	4
748	101606141	Sajal Khurana	8.5	5
749	101606142	Saksham	8.0	4
750	101606143	Saksham Singh	7.5	4
751	101606144	Sanchit Tanwar	8.5	5
752	101606145	Sanjana Pramanik	8.0	4

753	101606146	Sanjwal Singh	7.5	4
754	101786007	Shabnam Dhiman	8.0	4
755	101606147	Sanman Singh Brar	8.0	4
756	101606148	Sarbdeep Singh Saini	8.0	4
757	101606149	Sarthak Kalra	7.0	4
758	101606150	Sarthak Mehta	7.0	4
759	101606151	Saurav Goel	8.5	5
760	101606152	Saurav Singh	8.0	4
761	101606153	Shantanu Das Gupta	8.5	5
762	101606154	Shivam Gupta	7.0	4
763	101606155	Shivam Kalia	8.0	4
764	101606156	Shivam Kumar	8.0	4
765	101606157	Shreyanshu	8.0	4
766	101606158	Shubham Goyal	8.0	4
767	101606159	Shubham Jain	8.5	5
768	101606160	Siddharth Malhotra	8.5	5
769	101606161	Sourav Atri	0.0	1
770	101606162	Sudhanshu Dua	8.0	4
771	101606163	Sudhir Pratap Singh	7.5	4
772	101606164	Sunehpreet Kaur	7.0	4
773	101606165	Surbhi Dhanetwal	7.0	4
774	101606166	Sushmita Srivastava	8.0	4
775	101606167	Tanshu Jindal	7.5	4
776	101656024	Shikhar Arora	7.5	4
777	101786012	Ujjawal Aggarwal	7.5	4
778	101606168	Tanya Bansal	9.0	5
779	101606169	Tarandeep S. Sachdeva	9.0	5
780	101606170	Tarun Angrish	9.0	5
781	101606171	Uday Bansal	8.0	4
782	101606172	Uday Jindal	8.0	4
783	101606173	Utkarsh Saxena	8.0	4
784	101606174	Utkristh Kohli	9.0	5
785	101606175	Utsav Garg	8.0	4
786	101606176	Vaibhav Grover	7.5	4
787	101606177	Vaibhav Gulati	7.5	4
788	101606178	Varun Kapila	7.5	4
789	101606182	Vinayak O P Bansal	7.5	4
790	101606183	Vivek Garg	8.0	4
791	101606184	Vivek Goyal	8.0	4
792	101606185	Vrinda Bansal	8.0	4
793	101606186	Yash Garg	8.0	4
794	101606187	Yashdeep Singh	8.0	4
795	101606188	Yashpal Bansal	8.5	5
796	101606189	Yukti	8.5	5
797	101636001	Yash Agarwal	8.5	5
798	101656025	Tarun Goyal	0.0	1
799	101656027	Vidisha Yadav	8.5	5
800	101786009	Tanya Mehta	8.5	5
801	101615001	Aabhas Kedia	8.5	5
802	101615002	Aakash Gilotra	8.0	4
803	101615003	Aarushi Singhal	9.4	5
804	101615004	Abhigyan Thakur	8.0	4
805	101615005	Abhinandan Kainth	8.0	4

806	101615006	Abhinav Vij	8.5	5
807	101615007	Abhishek Nayyar	8.0	4
808	101615008	Abhishek Sanadhya	9.0	5
809	101615009	Aditya Gupta	8.5	5
810	101615010	Akanksha Vashisth	9.0	5
811	101615011	Akhil Jindal	8.5	5
812	101615012	Akhilesh Saini	9.0	5
813	101615013	Akshat Aggarwal	9.5	5
814	101615014	Akshita Sawhney	9.5	5
815	101615015	Anant Agarwal	9.0	5
816	101615016	Anish Mendiratta	8.0	4
817	101615018	Annanya Gupta	8.0	4
818	101615126	Abhinav Gemawat	9.0	5
819	101795001	Arpit Garg	8.0	4
820	101795003	Abhishek Goyal	8.0	4
821	101795008	Nikhil Malhotra	9.5	5
822	101615020	Anup Parm Kaushal	7.0	4
823	101615021	Anurag Mittal	8.5	5
824	101615023	Arpit Jain	7.0	4
825	101615024	Arshnoor Bedi	7.0	4
826	101615025	Ashutosh Mishra	7.5	4
827	101615027	Avik Bansal	8.5	5
828	101615028	Ayoshee Beriwal	8.5	5
829	101615029	Ayush Kalra	7.0	4
830	101615030	Bharat Goel	8.5	5
831	101615032	Bhaskar Gupta	8.0	4
832	101615033	Bhavya Chopra	7.5	4
833	101615034	Bhavya Mahajan	7.5	4
834	101615035	Bhavya Sharma	8.0	4
835	101615036	Bhumika Agarwal	8.0	4
836	101615037	Chetan Mittal	8.0	4
837	101615038	Chirag Oberoi	7.5	4
838	101615039	Daksh Sharma	7.5	4
839	101615040	Deepak	7.5	4
840	101615074	Mukul Gupta	7.5	4
841	101795002	Hanish Kumar	7.5	4
842	101795004	Amandeep Singh Madaan	7.5	4
843	101615041	Deepak Sharma	8.5	5
844	101615042	Dharampreet Singh	8.5	5
845	101615043	Era Singla	8.5	5
846	101615044	Eshita Sharma	8.5	5
847	101615045	Falak Guglani	8.0	4
848	101615046	Gaurav Gupta	8.5	5
849	101615047	Guneet Sharma	8.0	4
850	101615048	Gurasis Singh	8.0	4
851	101615049	Hardik Dhamija	8.0	4
852	101615050	Harseerat Kaur	8.0	4
853	101615052	Harshul Agarwal	8.0	4
854	101615054	Ishan Lohomi	8.0	4
855	101615055	Japkeerat Singh	8.0	4
856	101615056	Javesh Vasu Khungar	8.0	4
857	101615057	Kanav Garg	8.0	4

858	101615058	Karan Bangia	8.5	5
859	101615059	Kartikeya Manchanda	8.5	5
860	101615060	Kirat Virmani	8.5	5
861	101615125	Ekasmeet Singh	8.5	5
862	101665001	Kawaljit Singh Bindra	0.0	1
863	101795005	Amrit Gopal Singh	8.5	5
864	101615061	Krupesh Mahesh Anadkat	8.5	5
865	101615062	Kshitij Bhatia	6.0	3
866	101615063	Lakshay Gupta	6.5	4
867	101615065	Maanvi Maini	6.5	4
868	101615066	Manas Chhabra	6.5	4
869	101615067	Manishi Sharma	6.5	4
870	101615068	Mataikya Singh	8.5	5
871	101615069	Mayank Chaudhary	6.0	3
872	101615070	Medhavee Pravin	6.0	3
873	101615071	Mohd Nomaan	8.5	5
874	101615072	Mokshlakshmi Bhan	8.5	5
875	101615073	Mukesh Singla	7.0	4
876	101615075	Neeraj Goyal	7.0	4
877	101615076	Palak Agrawal	7.0	4
878	101615077	Pardhuman Mittal	7.0	4
879	101615078	Parmod Kumar	7.0	4
880	101615079	Pranav Raizada	6.0	3
881	101615080	Pulkit Bhatia	6.5	4
882	101615081	Rachit Chaudhary	6.0	3
883	101615083	Raj Jaiswal	7.5	4
884	101615084	Rajneesh Pundir	7.5	4
885	101615085	Rajnish K. Chaturvedi	6.5	4
886	101615086	Raman Singh Malhotra	7.5	4
887	101615087	Rashim	6.5	4
888	101615088	Ravindra Suthar	7.5	4
889	101615089	Ravneet Sethi	7.5	4
890	101615090	Rehat Chugh	7.5	4
891	101615091	Ribhu Rishi Sharma	8.0	4
892	101615092	Rishabh Gupta	8.0	4
893	101615093	Rishi Kaushik	6.5	4
894	101615094	Ritika Kapoor	6.5	4
895	101615095	Ritwik Patil	6.5	4
896	101615097	Sachin Singla	7.5	4
897	101615098	Sahibpreet Singh Sikand	7.5	4
898	101615099	Saksham Behl	7.5	4
899	101615100	Saksham Nayyar	7.5	4
900	101615101	Sanyam Aggarwal	8.0	4
901	101615102	Sarthak Baweja	8.0	4
902	101615103	Shivang Goel	8.0	4
903	101615104	Shivanshu Kapila	6.5	4
904	101615105	Shrey Garg	7.0	4
905	101615106	Shubham Chopra	6.5	4
906	101615107	Shubham Jain	6.0	3
907	101615108	Siddharth Bansal	6.5	4
908	101615109	Sidharth Loumash	6.5	4
909	101615110	Smarth Mittal	7.0	4

910	101615111	Srijati Agrawal	6.0	3
911	101615112	Srishty Kak	6.0	3
912	101615113	Tanish	7.0	4
913	101615115	Ujjawal Singh	6.0	3
914	101615116	Vaibhav Agarwal	7.5	4
915	101615117	Vaibhav Gupta	7.5	4
916	101615118	Varun Bansal	7.5	4
917	101615119	Varun Bharti	7.5	4
918	101615120	Vasu Naman Verma	7.0	4
919	101615121	Vijay Mundra	7.0	4
920	101615123	Yatin Goyal	7.5	4
921	101504091	Pranav Singh	7.0	4
922	101633001	Mehar Singh Grewal	0.0	1
923	101658006	Ashish Verma	8.0	4

The overall performance of students in the above question is then summarized as given below

Table D4.8: Average score of student performance in the course UTA010 criteria D2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UTA010	22.2	72.2	3.7	0.2	1.7	4.13

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria D2 as given below in Table D4.9:

Table D4.9: Weighted Average Student class performance (course portfolio) for criteria D2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA010	22.2	72.2	3.7	0.2	1.7	4.13	5
Weighted average score	22.20	72.20	3.70	0.20	1.70	4.13	5

b) Indirect measures for Performance criteria D2 (Surveys)

i.) Assessment Tool: Student Course Survey

Table D4.10: Average score of student course survey for criteria D2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UTA010	23.187	45.231	25.34	9.123	0	3.91	5
Weighted average score	23.19	45.23	25.34	9.12	0.00	3.91	5

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table D4.11: Assessment for criteria D2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	30	42	24	2	2	3.96
Alumni survey	46	46	6	2	0	4.00
Employer Survey	64	30	6	0	0	4.58

c) Overall weighted average score of performance criterion 'D2'

Finally overall weighted average score of performance criterion 'D2' is evaluated as given below in Table D4.12:

Table D4.12: Overall weighted average score of performance criterion 'D2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	22.20	72.20	3.70	0.20	1.70	4.13	5
Weighted average student course survey	23.19	45.23	25.34	9.12	0.00	3.91	4
Graduating student survey	30	42	24	2	2	3.96	3
Alumni survey	46	46	6	2	0	4	3
Employer survey	64	30	6	0	0	4.58	3
Overall weighted score	34.65	49.77	12.66	2.75	0.81	4.11	18

Overall assessment of student outcome D using scores of D1 and D2

In the above sections, each of the individual performance criteria D1 and D2 have been assessed. The performance for attainment of outcome D has been completed using the attainment values for D1 and D2 and is provided below:

Table D4.13 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome D.

Table D4.13: Overall score for outcome D at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
D1	37.46	45.38	13.99	3.00	0.81	4.11	5
D2	34.65	49.77	12.66	2.75	0.81	4.11	5
Overall score	36.06	47.58	13.33	2.87	0.40	4.11	10

Track Record and assessment of attainment of student outcome 'D' over the last three academic years

The performance criteria-wise assessment score distribution and overall weighted score for outcome 'D' for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table D4.14 presents the performance criteria-wise assessment score distribution for outcome 'D'

Table D4.14: Performance criteria-wise assessment score distribution of outcome D

Student outcomes and performance criteria		Year		
		2015	2016	2017
D	D1	4.00	4.33	4.11
	D2	4.00	4.33	4.11

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome 'D' over a period of last three years.

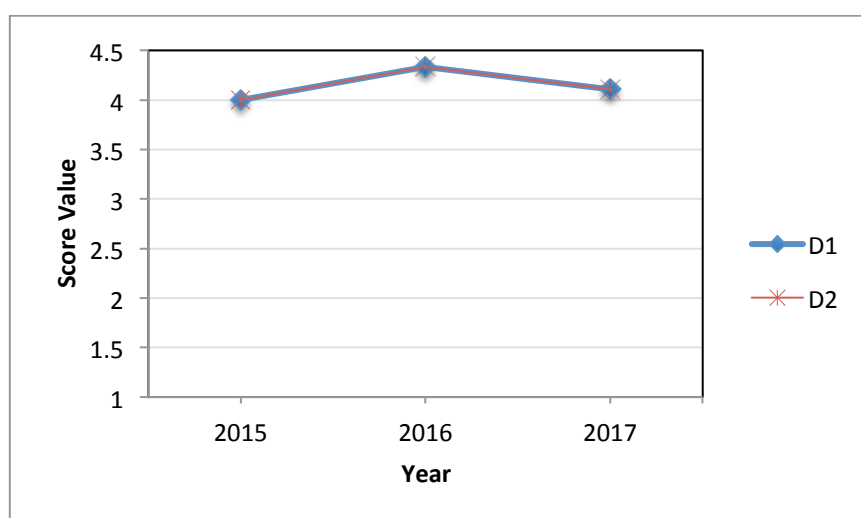


Figure D4.2: Performance criteria-wise assessment score distribution of outcome D

Level of attainment of student outcome 'D' over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table D4.15 presents the overall weighted score of outcome 'D' over the last three academic years.

Table D4.15: Overall weighted score of outcome 'D' over a period of last three years

Year	Overall weighted score	Level of attainment
2015	4.00	good
2016	4.33	good
2017	4.11	good

The above data has been plotted to visualize the overall weighted score of outcome ‘D’ over a period of last three years.

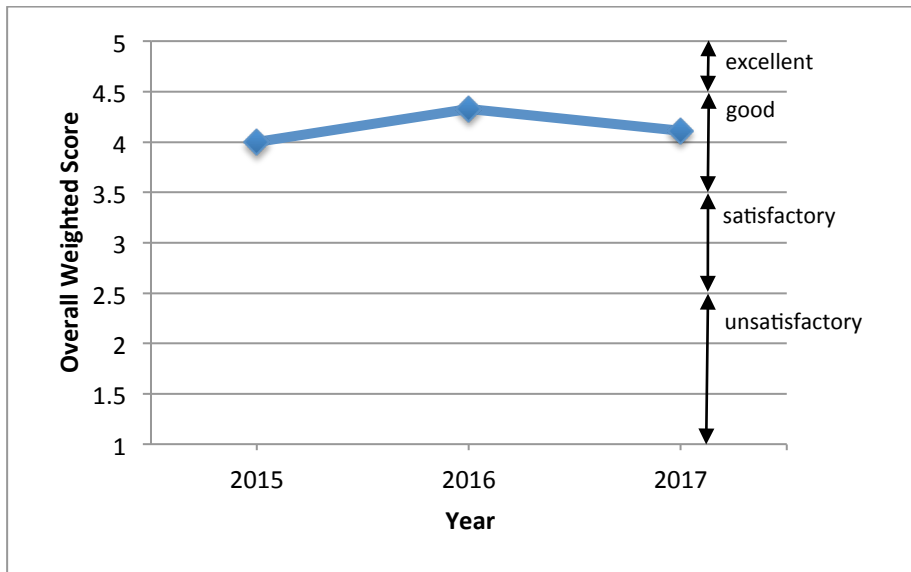


Figure D4.3: overall weighted score of outcome ‘D’ over a period of last three years

The following actions have been taken based on the analysis of Outcome D

Weighted Score for Outcome D	Recommendation	Reason	Implemented from
4.11	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'E'
(Year 2017)**

for the

*Bachelor of Engineering
in
Mechanical Engineering*

**Thapar Institute of Engineering & Technology
Patiala (Punjab) - 147004
INDIA**

Attainment of Outcome E

The attainment of each outcome has been measured using a standard procedure explained in the Self-Assessment Report for the program. A flow chart depicting the step-by-step methodology used to measure each attainment is provided below for ready reference.

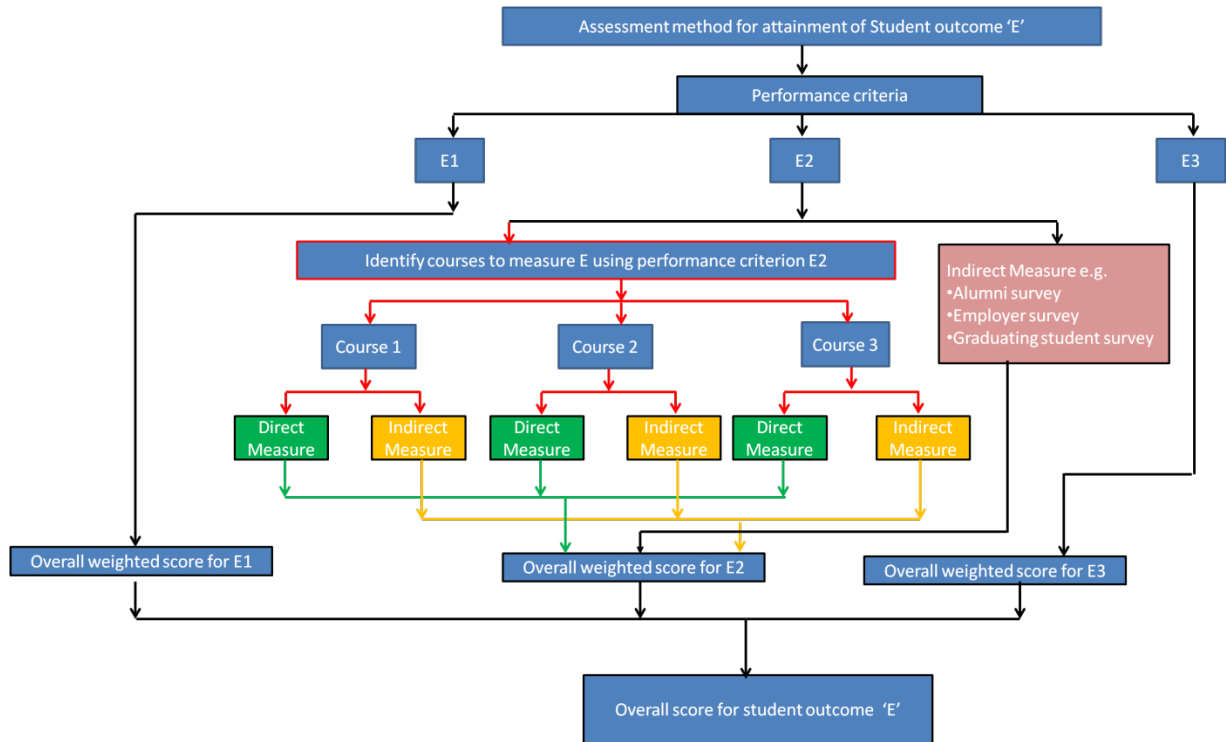


Figure E 4.1 Flow chart for Attainment of Outcome E

The following courses have been considered for the assessment of student outcome 'E'

Courses:

1. Computer Aided Design & Analysis (UME409)
2. Mechanics of Deformable Bodies (UME404)
3. Applied Thermodynamics (UME501)

Outcome E has been assessed by three performance criteria E1, E2 and E3. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these three performance criteria has been used to measure the overall measure of outcome E.

1) Assessment of Outcome 'E' using performance criterion E1

Performance criteria 'E1': E1. Classifies information to identify engineering problems.

a. Assessment Tool: Student's Performance using course portfolio

Step 1: Two courses namely Computer Aided Design & Analysis (UME409) and Mechanics of Deformable Bodies (UME404) were used to assess performance criteria E1 as a direct measure. The analysis of each of these courses is provided below:

i. Course: Computer Aided Design & Analysis (UME409)

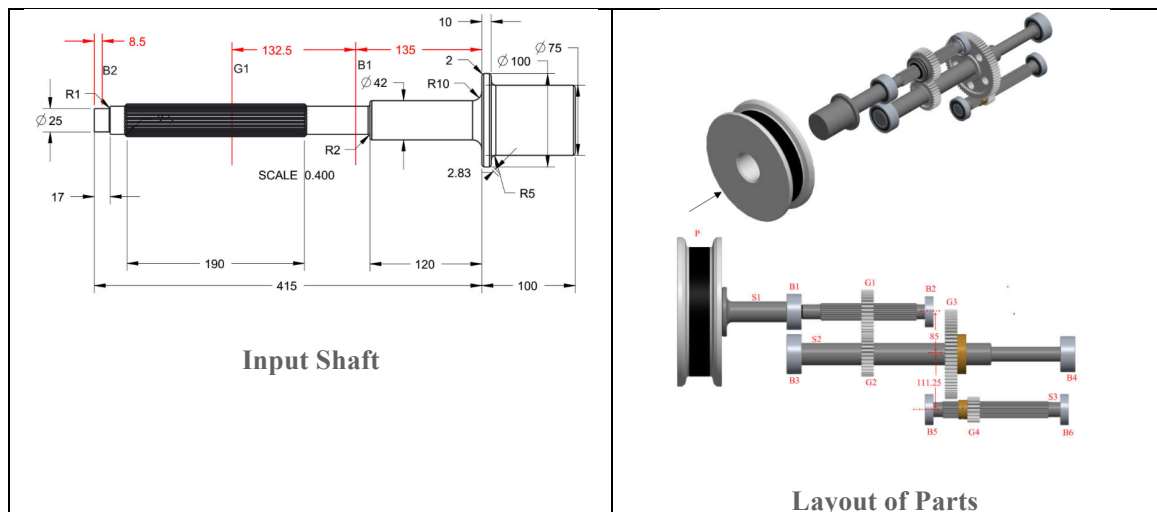
The above performance criteria is used to measure the attainment of outcome 'E1' by giving the following problem (Project No.3 during March-April 2017, weightage 10 marks) to the students.

Project on analysis of input shaft considering stress concentrations

Model the input shaft given in *input shaft drw.pdf*. The input shaft is supported on bearings at B1 and B2. Apply loads on model of shaft considering torque of 155 kN mm, gear forces (Tangential component of force on gear tooth = 3670 N and radial component = 10065 N acting at G1) and a belt tension of 3600 N acting horizontally. Perform a static stress analysis using PTC creo parametric software. Determine the factor of safety used in design and the stress concentration factor (K_t). The shaft is made of ASTM A 536 steel and properties can be obtained from material properties database available on www.matweb.com (UNS F33800). The SAE straight sided splines were made on the shaft. Please refer to design of transmission shafts assignment (Design project 1) on the following link for details

<https://sites.google.com/a/thapar.edu/ume408-machine-design/home/project-assignment>

The submission is to be in soft-copy form in one PDF file titled Project3_ShaftAnalysis.pdf. The pdf should be briefing the above, the final results and conclusions so that at a quick glance the reader is aided by pics/images and their interpretations/descriptions to arrive at understanding of the project. All the relevant files related to project work should also be submitted in a separate folder titled Rollnumber_Project3data.



Student's performance in the above Project work is given below:

Table: Student's performance in question targeting 'E1'; course: UME409

Roll No.	Name	Project Marks [10]	Score (Scale 1 to 5)
101508062	Kunal Swami	8	5
101508063	Lakshya Jain	10	5
101508064	Lakshya Khanduja	5	3
101508065	Lovepreet Singh	6	3
101508066	Mahesh Chugh	4	2
101508067	Manmohit Chugh	5	3
101508068	Mannan Jain	5	3
101508069	Manu Rawal	5	3
101508070	Mayank Singh	6	3
101508071	Mehar Satsangi	6	3
101508073	Mehkant Singh Mittal	6	3
101508074	Mehul Satyajit	6	3
101508075	Mohit Sorout	6	3
101508076	Navjot Wadhwa	4	2
101508077	Navkaran Singh Mroque	5	3
101508078	Navnoor Singh Sidhu	5	3
101508079	Nikhil Jain	6	3
101508080	Nikhil Joshi	6	3
101508081	Nimrat Singh Brar	9	5
101508083	Nitin Kumar	5	3
101508084	Parth Ahuja	9	5
101508085	Parth Mahajan	4	2
101508086	Prabhsimran Singh Bakshi	6	3
101508087	Pranshu Kansal	5	3
101508088	Prasu Shome	6	3
101688011	Keshav Goyal	5	3
101688012	Munish Kumar Garg	6	3
101688020	Navi Sood	10	5
401508024	Mrigendra Gupta	7	4
401688001	Nilay Sagar	6	3
101508090	Prateek Choudhary	3	2
101508091	Prateek Prasad	5	3
101508092	Preetam Singh Manku	6	3
101508093	Prince Nirwal	7	4
101508094	Raghav Gupta	7	4
101508095	Ragjot Kiran Chhibber	9	5
101508096	Rahul Choudhary	5	3
101508098	Rajnish Bharti	6	3
101508099	Rakshit Ahuja	6	3

101508100	Ramneek Devgan	9	5
101508101	Ravneesh Munjal	10	5
101508102	Rohit Kumar	7	4
101508103	Sharanpreet Singh	7	4
101508104	Sahil Chhabra	7	4
101508105	Sahil Garg	5	3
101508106	Saksham	6	3
101508107	Saravpreet Singh	9	5
101508108	Sarthak Bathla	5	3
101508109	Satyam Gupta	8	5
101508110	Saurabh Garg	10	5
101508111	Sehaj Aggarwal	8	5
101508112	Shailendra Rai	7	4
101508139	Karan Saxena	10	5
101688014	Prashant Jindal	6	3
101688015	Robin Chandel	9	5
101688021	Navneet Singh	8	5
101688023	Sahil Bhola	7	4
401508025	Pushpinder Singh	8	5
401508026	Rahul Sheoran	6	3
401508027	Sachin Malhotra	6	3
401688002	Ramneek Singh	10	5
401688005	Sartaj Singh Sidhu	10	5
101508024	Asheesh Sharma	6	3
101508113	Shashwat Jain	7	4
101508114	Shivam Mittal	6	3
101508115	Shreshth Dhawan	6	3
101508116	Shubhang Gupta	6	3
101508117	Shubhang Prasad	6	3
101508118	Siddarth	6	3
101508119	Siddharth Nagpal	6	3
101508121	Souravdeep Singh	5	3
101508122	Sumanyu Aggarwal	6	3
101508123	Supandeep Singh	6	3
101508124	Tushar Bansal	7	4
101508125	Utkarsh Mishra	6	3
101508126	Vaibhav Chobisa	5	3
101508127	Vaibhav Dogra	6	3
101508128	Vaidant Bakshi	5	3
101508129	Vikas Singh Chauhan	5	3
101508130	Vikram Singh	5	3
101508131	Yash Parmar	6	3
101508133	Yatin Singla	5	3

101508134	Deepankar Kumar	6	3
101688016	Sayansh	6	3
101688017	Shiv Kumar	6	3
101688024	Vaibhav Singla	6	3
401508029	Shwetank Pati Tripathi	6	3
401508030	Sudhanshu Ranjan	5	3
401508031	Sukhmanpreet Singh	8	5
401508032	Sumanyu Kapoor	6	3
401508033	Viresh Gupta	6	3
401508034	Yogesh Mehta	6	3
401688003	Sourav Prasher	8	5
401688004	Utsav Gautam	5	3

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME409 for criteria 'E1'

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME409	21.3%	52.1%	22.3%	4.3%	0%	3.90

ii. Course: Mechanics of Deformable Bodies (UME404)

Performance criteria 'E1': Classifies information to identify engineering problems.

The above performance criteria is used to measure the attainment of outcome 'E1' by giving the following question (Question No. 4: during MST in September 2017, weightage 08 marks) to the students.

Question: The stress components (in MPa) in a thin aluminum alloy tube are The yield strength of the material is 240 MPa and Poisson's ratio is 0.33. Considering a factor of safety of 2.3, determine whether the tube will remain safe according to: (a) Maximum principle stress theory (b) Maximum shear stress theory (c) Distortion energy theory.

Students' performance in the above question is given below:

Table: Student's performance in question targeting 'E1'; course: UME404

S.No.	Roll No.	Name	MST Q4 (08)	SCORE (1-5)
1	101508062	Kunal Swami	4	4
2	101508063	Lakshya Jain	6.5	5
3	101508064	Lakshya Khanduja	0.5	1
4	101508065	Lovepreet Singh	4.5	5
5	101508066	Mahesh Chugh	4.5	5
6	101508067	Manmohit Chugh	3.5	4
7	101508068	Mannan Jain	2.5	3
8	101508069	Manu Rawal	3.5	4
9	101508070	Mayank Singh	5.5	5

10	101508071	Mehar Satsangi	7	5
11	101508073	Mehkant Singh Mittal	5.5	5
12	101508074	Mehul Satyajit	1	1
13	101508075	Mohit Sorout	6	5
14	101508076	Navjot Wadhwa	6.5	5
15	101508077	Navkaran Singh Mroque	5.5	5
16	101508078	Navnoor Singh Sidhu	2	2
17	101508079	Nikhil Jain	8	5
18	101508080	Nikhil Joshi	4.5	5
19	101508081	Nimrat Singh Brar	8	5
20	101508083	Nitin Kumar	5	5
21	101508084	Parth Ahuja	7	5
22	101508086	Prabhsimran Singh Bakshi	6	5
23	101508087	Pranshu Kansal	6.5	5
24	101508088	Prasu Shome	3.5	4
25	101508091	Prateek Prasad	4	4
26	101508093	Prince Nirwal	6	5
27	101508095	Ragjot Kiran Chhibber	1	1
28	101508096	Rahul Choudhary	3.5	4
29	101508100	Ramneek Devgan	6	5
30	101508101	Ravneesh Munjal	3.5	4
31	101508102	Rohit Kumar	8	5
32	101508103	Sharanpreet Singh	1.5	2
33	101508104	Sahil Chhabra	3.5	4
34	101508105	Sahil Garg	1.5	2
35	101508106	Saksham	8	5
36	101508107	Saravpreet Singh	6.5	5
37	101508109	Satyam Gupta	1.5	2
38	101508110	Saurabh Garg	3.5	4
39	101508112	Shailendra Rai	2.5	3
40	101508113	Shashwat Jain	4	4
41	101508114	Shivam Mittal	6.5	5
42	101508115	Shreshth	4.5	5
43	101508116	Shubhang Gupta	7	5
44	101508117	Shubhang Prasad	5.5	5
45	101508118	Siddarth	0	1
46	101508119	Siddharth Nagpal	0	1
47	101508121	Sourav Deep Singh	4.5	5
48	101508123	Supandeep Singh	6.5	5
49	101508124	Tushar Bansal	0.5	1
50	101508125	Utkarsh Mishra	5	5
51	101508126	Vaibhav Chobisa	0	1
52	101508127	Vaibhav Dogra	3.5	4

53	101508128	Vaidant Bakshi	2.5	3
54	101508129	Vikas Singh Chauhan	1	1
55	101508130	Vikram Singh	5	5
56	101508131	Yash Parmar	8	5
57	101508133	Yatin Singla	7.5	5
58	101508134	Deepankar Kumar	7	5
59	101508140	Animesh Agarwal	2.5	3
60	101688011	Keshav Goyal	4	4
61	101688012	Munish Kumar Garg	2	2
62	101688014	Prashant Jindal	4.5	5
63	101688015	Robin Chandel	5	5
64	101688016	Sayansh Garg	2.5	3
65	101688017	Shiv Kumar	6.5	5
66	101688020	Navi Sood	8	5
67	101688021	Navneet Singh	5	5
68	101688023	Sahil Bhola	6	5
69	101688024	Vaibhav Singla	8	5
70	401508023	Kumar Mangalam	2.5	3
71	401508024	Mrigendra Gupta	4	4
72	401508025	Pushpinder Singh	4.5	5
73	401508026	Rahul Sheoran	4.5	5
74	401508027	Sachin Malhotra	6.5	5
75	401508029	Shwetank Pati Tripathi	4	4
76	401508030	Sudhanshu Ranjan	1.5	2
77	401508031	Sukhmanpreet Singh	5.5	5
78	401508032	Sumanyu Kapoor	4.5	5
79	401508033	Viresh Gupta	2.5	3
80	401508034	Yogesh Mehta	0	1
81	401508035	Prateek Chaudhary	0	1
82	401688001	Nilay Sagar	6	5
83	401688002	Ramneek Singh	4	4
84	401688003	Sourav Prasher	0	1
85	401688004	Utsav Gautam	0	1
86	401688005	Sartaj Singh Sidhu	3.5	4

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME404 for criteria E1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME404	52.3	18.6	8.1	7.0	14.0	3.88

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria E1 as given below in Table E4.5:

Table E4.5: Weighted Average Student class performance (course portfolio) for criteria E1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME409	21.3	52.1	22.3	4.3	0	3.90	5
UME404	52.3	18.6	8.1	7.0	14.0	3.88	5
Weighted average score	36.80	35.35	15.20	5.65	7.00	3.89	10

b) Indirect measures for Performance criteria E1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table E4.6: Average score of student course survey for criteria E1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME409	43	12	13	11	20	3.65	5
UME404	55	9	8	6	19	4.25	5
Weighted average score	49	10.5	10.5	8.5	19.5	3.95	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table E4.7: Assessment for criteria E1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	30	54	12	2	2	4.08
Alumni survey	28	46	24	2	0	4
Employer Survey	54	42	4	0	0	4.50

c) Overall weighted average score of performance criterion ‘E1’

Finally, overall weighted average score of performance criterion ‘E1’ is evaluated as given below in Table E4.8:

Table E4.8: Overall weighted average score of performance criterion ‘E1’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	36.80	35.35	15.20	5.65	7.00	3.89	5.0
Weighted average student course survey	49	10.5	10.5	8.5	19.5	3.95	4.0
Graduating student survey	30	54	12	2	2	4.08	3.0
Alumni survey	28	46	24	2	0	4	3.0
Employer survey	54	42	4	0	0	4.50	3.0
Overall weighted score	39.78	35.82	13.22	4.13	6.61	4.06	18.0

Assessment of Outcome ‘E’ using performance criterion E2

Performance criteria ‘E2’: Develop appropriate models to formulate solutions.

a.) Assessment Tool: Student’s performance using course portfolio

Step 1: Two courses namely Applied Thermodynamics (UME501) and Mechanics of Deformable Bodies (UME404) were used to assess performance criteria E2 as a direct measure. The analysis for each of these courses is provided below:

i. Course: Applied Thermodynamics (UME501)

Performance criteria ‘E2’: Develop appropriate models to formulate solutions.

The above performance criteria is used to measure the attainment of outcome ‘E2’ by giving the following question (Question No. 4: during EST in December 2017, weightage 20 marks) to the students.

<p>Question: 4 (a) Consider an air standard cycle in which the air enters the compressor at 1.0 bar and 20°C. The pressure of air leaving the compressor is 3.5 bar and the temperature at turbine inlet is 600°C. Determine per kg of air :</p> <p>(i) Efficiency of the cycle (ii) Heat supplied to air (iii) Work available at the shaft (iv) Heat rejected in the cooler and (v) Temperature of air leaving the turbine For air $\gamma = 1.4$ and $c_p = 1.005$ kJ/kg K.</p> <p>4(b) (i) Define propulsive efficiency and write expression for it. (ii) Explain the working of ram jet engine with a neat sketch.</p>
--

Student’s performance in the above question is given below:

Table: Student’s performance in question targeting ‘E2’; course: UME501

S. No.	Roll No.	Name	Marks (20)	Score (Scale 1to 5)
1	101508062	Kunal Swami	1	1
2	101508063	Lakshya Jain	8	3
3	101508064	Lakshya Khanduja	4	2

4	101508065	Lovepreet Singh	5	2
5	101508066	Mahesh Chugh	10	4
6	101508067	Manmohit Chugh	6	3
7	101508068	Mannan Jain	3	2
8	101508069	Manu Rawal	15.5	5
9	101508070	Mayank Singh	10	4
10	101508071	Mehar Satsangi	15	5
11	101508073	Mehkant Singh Mittal	2	1
12	101508074	Mehul Satyajit	9.5	4
13	101508075	Mohit Sorout	13	5
14	101508076	Navjot Wadhwa	12	4
15	101508077	Navkaran Singh Mroque	10	4
16	101508078	Navnoor Singh Sidhu	0	1
17	101508079	Nikhil Jain	12	4
18	101508080	Nikhil Joshi	12.5	5
19	101508081	Nimrat Singh Brar	7.5	3
20	101508083	Nitin Kumar	0	1
21	101508084	Parth Ahuja	13.5	5
22	101508086	Prabhsimran Singh Bakshi	6	3
23	101508087	Pranshu Kansal	0	1
24	101508088	Prasu Shome	6	3
25	101508091	Prateek Prasad	12	4
26	101508093	Prince Nirwal	8	3
27	101508095	Ragjot Kiran Chhibber	8	3
28	101508096	Rahul Choudhary	14.5	5
29	101508100	Ramneek Devgan	14.5	5
30	101508101	Ravneesh Munjal	1	1
31	101508102	Rohit Kumar	13	5
32	101508103	Sharanpreet Singh	14	5
33	101508104	Sahil Chhabra	11	4
34	101508105	Sahil Garg	15	5
35	101508106	Saksham	0	1
36	101508107	Saravpreet Singh	17	5
37	101508109	Satyam Gupta	7	3
38	101508110	Saurabh Garg	12	4
39	101508112	Shailendra Rai	13	5
40	101508113	Shashwat Jain	6	3
41	101508114	Shivam Mittal	11	4
42	101508115	Shreshth	6	3
43	101508116	Shubhang Gupta	14	5
44	101508117	Shubhang Prasad	12.5	5
45	101508118	Siddarth	6	3

46	101508119	Siddharth Nagpal	12	4
47	101508121	Sourav Deep Singh	13	5
48	101508123	Supandeep Singh	12	4
49	101508124	Tushar Bansal	6	3
50	101508125	Utkarsh Mishra	11.5	4
51	101508126	Vaibhav Chobisa	10	4
52	101508127	Vaibhav Dogra	13.5	5
53	101508128	Vaidant Bakshi	7	3
54	101508129	Vikas Singh Chauhan	0	1
55	101508130	Vikram Singh	7.5	3
56	101508131	Yash Parmar	14.5	5
57	101508133	Yatin Singla	14	5
58	101508134	Deepankar Kumar	11	4
59	101508140	Animesh Agarwal	5	2
60	101688011	Keshav Goyal	0	1
61	101688012	Munish Kumar Garg	5	2
62	101688014	Prashant Jindal	10	4
63	101688015	Robin Chandel	13	5
64	101688016	Sayansh Garg	13.5	5
65	101688017	Shiv Kumar	9	4
66	101688020	Navi Sood	15	5
67	101688021	Navneet Singh	10	4
68	101688023	Sahil Bhola	16.5	5
69	101688024	Vaibhav Singla	15	5
70	401508023	Kumar Mangalam	2	1
71	401508024	Mrigendra Gupta	0	1
72	401508025	Pushpinder Singh	1	1
73	401508026	Rahul Sheoran	12.5	5
74	401508027	Sachin Malhotra	5.5	3
75	401508029	Shwetank Pati Tripathi	6	3
76	401508030	Sudhanshu Ranjan	0	1
77	401508031	Sukhmanpreet Singh	9	4
78	401508032	Sumanyu Kapoor	6	3
79	401508033	Viresh Gupta	4	2
80	401508034	Yogesh Mehta	9	4
81	401508035	Prateek Chaudhary	2	1
82	401688001	Nilay Sagar	2	1
83	401688002	Ramneek Singh	10	4
84	401688003	Sourav Prasher	2.5	2
85	401688004	Utsav Gautam	5	2
86	401688005	Sartaj Singh Sidhu	0.5	1

The overall performance of students in the above question is then summarized as given below:

Table: Average score of student performance in the course UME501 for criteria E2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME501	27.9	24.4	19.7	9.3	18.6	3.34

ii. Course: Mechanics of Deformable Bodies (UME404)

Performance criteria ‘E2’: Develop appropriate models to formulate solutions.

The above performance criteria is used to measure the attainment of outcome ‘E2’ by giving the following question (Question No. 5: during EST in December 2017, weightage 15 marks) to the students.

The curved member shown in Figure 3 has a solid circular cross section 0.10 m in diameter. If the maximum tensile and compressive stresses in the member are not to exceed 150 MPa and 200 MPa respectively, determine the value of load P that can be safely carried by the member.

Student’s performance in the above questions given below:

Table: Student’s performance in question targeting ‘E2’; course: UME404

S.No.	Roll No.	Name	EST Q5 (15)	SCORE (1-5)
1	101508062	Kunal Swami	9	4
2	101508063	Lakshya Jain	9	4
3	101508064	Lakshya Khanduja	9	4
4	101508065	Lovepreet Singh	12	5
5	101508066	Mahesh Chugh	10.5	4
6	101508067	Manmohit Chugh	9	4
7	101508068	Mannan Jain	4	3
8	101508069	Manu Rawal	15	5
9	101508070	Mayank Singh	11	5

10	101508071	Mehar Satsangi	15	5
11	101508073	Mehkant Singh Mittal	6	3
12	101508074	Mehul Satyajit	7.5	4
13	101508075	Mohit Sorout	15	5
14	101508076	Navjot Wadhwa	14.5	5
15	101508077	Navkaran Singh Mroque	4	3
16	101508078	Navnoor Singh Sidhu	0	1
17	101508079	Nikhil Jain	15	5
18	101508080	Nikhil Joshi	14	5
19	101508081	Nimrat Singh Brar	9	4
20	101508083	Nitin Kumar	14	5
21	101508084	Parth Ahuja	15	5
22	101508086	Prabhsimran Singh Bakshi	13	5
23	101508087	Pranshu Kansal	13.5	5
24	101508088	Prasu Shome	15	5
25	101508091	Prateek Prasad	11	5
26	101508093	Prince Nirwal	8.5	4
27	101508095	Ragjot Kiran Chhibber	1	1
28	101508096	Rahul Choudhary	7.5	4
29	101508100	Ramneek Devgan	7.5	4
30	101508101	Ravneesh Munjal	8.5	4
31	101508102	Rohit Kumar	13.5	5
32	101508103	Sharanpreet Singh	8.5	4
33	101508104	Sahil Chhabra	7.5	4
34	101508105	Sahil Garg	10.5	4
35	101508106	Saksham	15	5
36	101508107	Saravpreet Singh	1.5	2
37	101508109	Satyam Gupta	12	5
38	101508110	Saurabh Garg	12.5	5
39	101508112	Shailendra Rai	13	5
40	101508113	Shashwat Jain	13.5	5
41	101508114	Shivam Mittal	12.5	5
42	101508115	Shreshth	15	5
43	101508116	Shubhang Gupta	9.5	4

44	101508117	Shubhang Prasad	13	5
45	101508118	Siddarth	1	1
46	101508119	Siddharth Nagpal	8.5	4
47	101508121	Sourav Deep Singh	9	4
48	101508123	Supandeep Singh	15	5
49	101508124	Tushar Bansal	12.5	5
50	101508125	Utkarsh Mishra	12.5	5
51	101508126	Vaibhav Chobisa	2	2
52	101508127	Vaibhav Dogra	15	5
53	101508128	Vaidant Bakshi	0	1
54	101508129	Vikas Singh Chauhan	0	1
55	101508130	Vikram Singh	13.5	5
56	101508131	Yash Parmar	11.5	5
57	101508133	Yatin Singla	15	5
58	101508134	Deepankar Kumar	10	4
59	101508140	Animesh Agarwal	5	3
60	101688011	Keshav Goyal	6.5	3
61	101688012	Munish Kumar Garg	7	4
62	101688014	Prashant Jindal	5.5	3
63	101688015	Robin Chandel	14	5
64	101688016	Sayansh Garg	9.5	4
65	101688017	Shiv Kumar	15	5
66	101688020	Navi Sood	10.5	4
67	101688021	Navneet Singh	11.5	5
68	101688023	Sahil Bhola	15	5
69	101688024	Vaibhav Singla	14	5
70	401508023	Kumar Mangalam	5.5	3
71	401508024	Mrigendra Gupta	3	2
72	401508025	Pushpinder Singh	4.5	3
73	401508026	Rahul Sheoran	6.5	3
74	401508027	Sachin Malhotra	8	4
75	401508029	Shwetank Pati Tripathi	4	3
76	401508030	Sudhanshu Ranjan	0	1
77	401508031	Sukhmanpreet Singh	11	5

78	401508032	Sumanyu Kapoor	6.5	3
79	401508033	Viresh Gupta	0	1
80	401508034	Yogesh Mehta	7	4
81	401508035	Prateek Chaudhary	0	1
82	401688001	Nilay Sagar	9	4
83	401688002	Ramneek Singh	8.5	4
84	401688003	Sourav Prasher	4	3
85	401688004	Utsav Gautam	8.5	4
86	401688005	Sartaj Singh Sidhu	7.5	4

The overall performance of students in the above question is then summarized as given below

Table E4.12: Average score of student performance in the course UME404 for criteria E2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME404	41.9	31.4	14	3.5	9.3	3.93

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria E2 as given below in Table E4.13:

Table E4.13: Weighted Average Student class performance (course portfolio) for criteria E2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME501	27.9	24.4	19.7	9.3	18.6	3.34	5
UME404	41.9	31.4	14	3.5	9.3	3.93	5
Weighted average score	34.90	27.90	16.85	6.40	13.95	3.64	10

b) Indirect measures for Performance criteria E2 (Surveys)

i.) Assessment Tool: Student Course Survey

Table E4.14: Average score of student course survey for criteria E2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME501	27.9	24.4	19.7	9.3	18.6	3.34	5
UME404	50	11	6	12	21	4.15	5
Weighted average score	38.95	17.70	12.85	10.65	19.80	3.75	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table E4.15: Assessment for criteria E2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	30	54	12	2	2	4.08
Alumni survey	28	46	24	2	0	4
Employer Survey	54	42	4	0	0	4.50

c) Overall weighted average score of performance criterion ‘E2’

Finally overall weighted average score of performance criterion ‘E2’ is evaluated as given below in Table E4.16:

Table E4.16: Overall weighted average score of performance criterion ‘E2’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	34.90	27.90	16.85	6.40	13.95	3.64	5.0
Weighted average student course survey	38.95	17.70	12.85	10.65	19.80	3.75	4.0
Graduating student survey	30	54	12	2	2	4.08	3.0
Alumni survey	28	46	24	2	0	4	3.0
Employer survey	54	42	4	0	0	4.50	3.0
Overall weighted score	37.02	35.35	14.20	4.81	8.61	3.94	18.0

Assessment of Outcome ‘E’ using performance criterion E3

Performance criteria ‘E3’: Uses analytical, computational and/or experimental methods to obtain solutions.

Step 1: Two courses namely Applied Thermodynamics (UME 501) and Mechanics of Deformable Bodies (UME404) were used to assess performance criteria E3 as a direct measure. The analysis for each of these courses is provided below:

i. Applied Thermodynamics (UME 501)

The above performance criteria is used to measure the attainment of outcome ‘E3’ by giving the following question (Question No. 2(b): during MST in September 2017, weightage 07 marks) to the students.

Question: Tool used: MST Q 2(b) The following observations were taken during a test on steam boiler; Quantity of coal supplied = 4400 kg/hr; Steam generated = 35,000 kg/hr steam conditions = 20 bar, 260oC; Calorific value of coal =30,000 Kj/kg; Temperature of water entering the economiser = 15 deg C; Temperature of water leaving the economiser = 90 deg C. Calculate the thermal efficiency of boiler and the percentage of the fuel utilised by the economiser.

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'E3'; course: UME501

S. No.	Roll No.	Name	Marks (07)	Score (Scale 1to 5)
1	101508062	Kunal Swami	5	4
2	101508063	Lakshya Jain	4.5	4
3	101508064	Lakshya Khanduja	1	1
4	101508065	Lovepreet Singh	6	5
5	101508066	Mahesh Chugh	4	3
6	101508067	Manmohit Chugh	6.5	5
7	101508068	Mannan Jain	4	3
8	101508069	Manu Rawal	6	5
9	101508070	Mayank Singh	6	5
10	101508071	Mehar Satsangi	6	5
11	101508073	Mehkant Singh Mittal	5	4
12	101508074	Mehul Satyajit	5	4
13	101508075	Mohit Sorout	5.5	5
14	101508076	Navjot Wadhwa	5.5	5
15	101508077	Navkaran Singh Mroque	5	4
16	101508078	Navnoor Singh Sidhu	2	1
17	101508079	Nikhil Jain	6	5
18	101508080	Nikhil Joshi	7	5
19	101508081	Nimrat Singh Brar	6	5
20	101508083	Nitin Kumar	4	3
21	101508084	Parth Ahuja	7	5
22	101508086	Prabhsimran Singh Bakshi	6	5
23	101508087	Pranshu Kansal	6.5	5
24	101508088	Prasu Shome	6	5
25	101508091	Prateek Prasad	7	5
26	101508093	Prince Nirwal	6	5
27	101508095	Ragjot Kiran Chhibber	2	1
28	101508096	Rahul Choudhary	6	5
29	101508100	Ramneek Devgan	4	3
30	101508101	Ravneesh Munjal	5	4
31	101508102	Rohit Kumar	6	5
32	101508103	Sharanpreet Singh	4	3
33	101508104	Sahil Chhabra	7	5
34	101508105	Sahil Garg	5	4
35	101508106	Saksham	6.5	5
36	101508107	Saravpreet Singh	3	2
37	101508109	Satyam Gupta	5	4

38	101508110	Saurabh Garg	7	5
39	101508112	Shailendra Rai	6	5
40	101508113	Shashwat Jain	6	5
41	101508114	Shivam Mittal	6	5
42	101508115	Shreshth	6.5	5
43	101508116	Shubhang Gupta	6	5
44	101508117	Shubhang Prasad	7	5
45	101508118	Siddarth	2	1
46	101508119	Siddharth Nagpal	2.5	2
47	101508121	Sourav Deep Singh	7	5
48	101508123	Supandeep Singh	5	4
49	101508124	Tushar Bansal	5	4
50	101508125	Utkarsh Mishra	6.5	5
51	101508126	Vaibhav Chobisa	5	4
52	101508127	Vaibhav Dogra	6	5
53	101508128	Vaidant Bakshi	3	2
54	101508129	Vikas Singh Chauhan	4	3
55	101508130	Vikram Singh	7	5
56	101508131	Yash Parmar	6.5	5
57	101508133	Yatin Singla	6	5
58	101508134	Deepankar Kumar	5	4
59	101508140	Animesh Agarwal	4.5	4
60	101688011	Keshav Goyal	4	3
61	101688012	Munish Kumar Garg	5	4
62	101688014	Prashant Jindal	5.5	5
63	101688015	Robin Chandel	5	4
64	101688016	Sayansh Garg	5.5	5
65	101688017	Shiv Kumar	5	4
66	101688020	Navi Sood	5	4
67	101688021	Navneet Singh	7	5
68	101688023	Sahil Bholra	4	3
69	101688024	Vaibhav Singla	6	5
70	401508023	Kumar Mangalam	3	2
71	401508024	Mrigendra Gupta	5	4
72	401508025	Pushpinder Singh	6	5
73	401508026	Rahul Sheoran	5.5	5
74	401508027	Sachin Malhotra	4	3
75	401508029	Shwetank Pati Tripathi	6	5
76	401508030	Sudhanshu Ranjan	3	2
77	401508031	Sukhmanpreet Singh	6.5	5
78	401508032	Sumanyu Kapoor	7	5
79	401508033	Viresh Gupta	3	2

80	401508034	Yogesh Mehta	4	3
81	401508035	Prateek Chaudhary	1	1
82	401688001	Nilay Sagar	4	3
83	401688002	Ramneek Singh	4	3
84	401688003	Sourav Prasher	4	3
85	401688004	Utsav Gautam	5	4
86	401688005	Sartaj Singh Sidhu	5	4

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME501 for criteria E3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME501	48.83	23.25	15.11	6.97	5.81	4.02

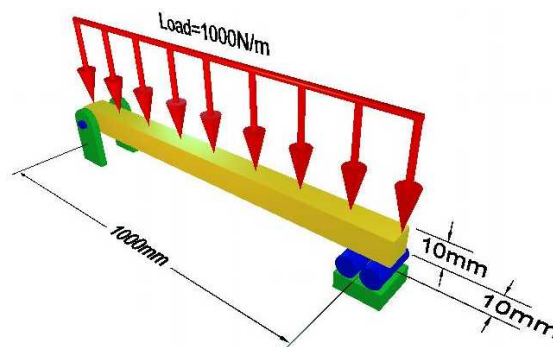
ii. Mechanics of Deformable Bodies (UME404)

The above performance criteria is used to measure the attainment of outcome 'E3' by giving the following question (Project: Post MST in October 2017, weightage 10 marks) to the students.

Question:

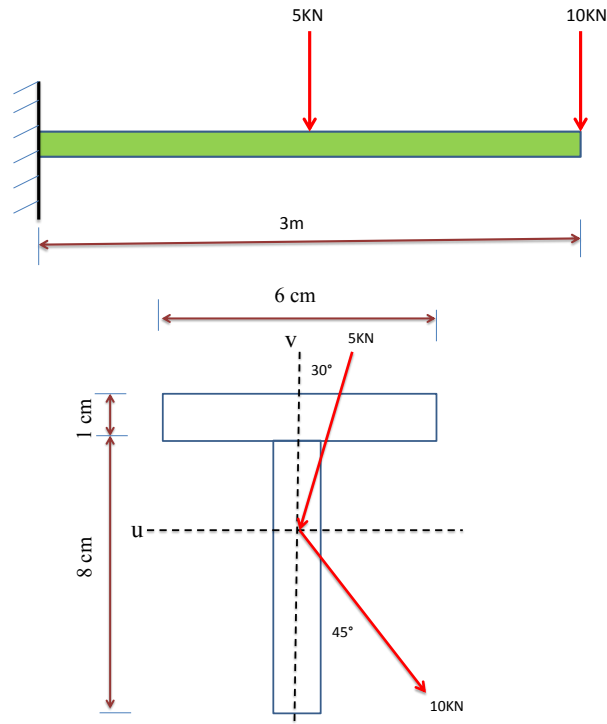
Project A: A simply supported solid steel beam is subjected to a uniform distributed load of 1000 N/m (1 N/mm) with a rectangular cross section as shown in the figure below. The cross-section of the beam is 10mm x 10mm while the modulus of elasticity of the steel is 200GPa. Determine:

- The maximum deflection of the beam using ANSYS/commercial software. Also, plot the deflection across the span of the beam (deformed shape)
- The maximum deflection of the beam using Castigliano's theorem. (Also, represent your calculations in MATLAB and plot the deflection of beam across the span using MATLAB)

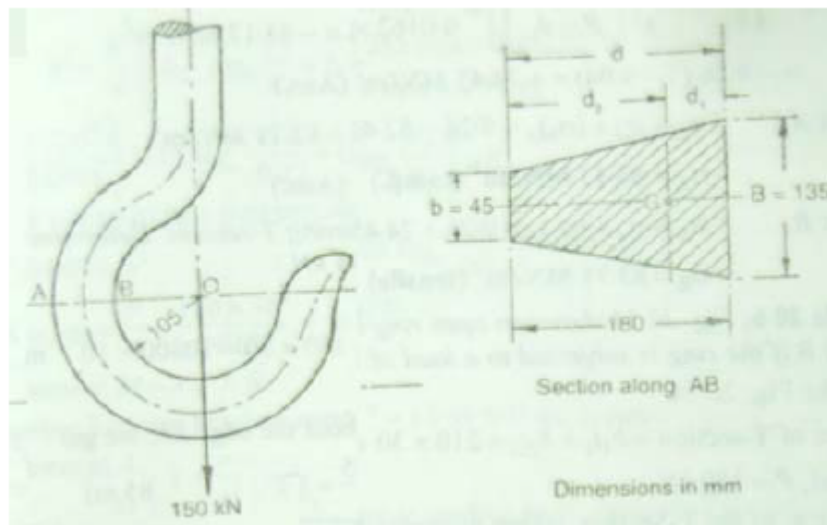


Project B: The figure below indicates a cantilever beam with T cross-section. The beam is loaded with two point loads at the centre and free end of the beam. Determine:

- Bending stress distribution across the cross-section at the built-in end using ANSYS/commercial software.
- Bending stress distribution across the cross-section at the built-in end analytically and implement your calculations in MATLAB to generate the results.



Project C: The figure below shows a crane hook lifting a load of 150 kN. Determine:
 (a) the maximum compressive and tensile stresses in the critical section of the crane hook using ANSYS
 (b) the maximum compressive and tensile stresses in the critical section of the crane hook using analytically and implement your calculations in MATLAB to generate results.



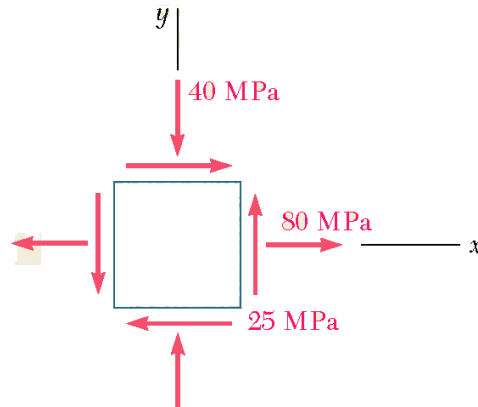
Project D: A pipe of 200 mm internal diameter and 50mm thickness carries a fluid at a pressure of 15 MPa.

(a) Calculate the maximum and minimum intensities of circumferential stresses across the section using ANSYS/commercial software. Also sketch the radial stress distribution and circumferential stress distribution across the section.

(a) Calculate the maximum and minimum intensities of circumferential stresses across the section analytically. Also sketch the radial stress distribution and circumferential stress distribution across the section. Implement your calculations in MATLAB to generate results

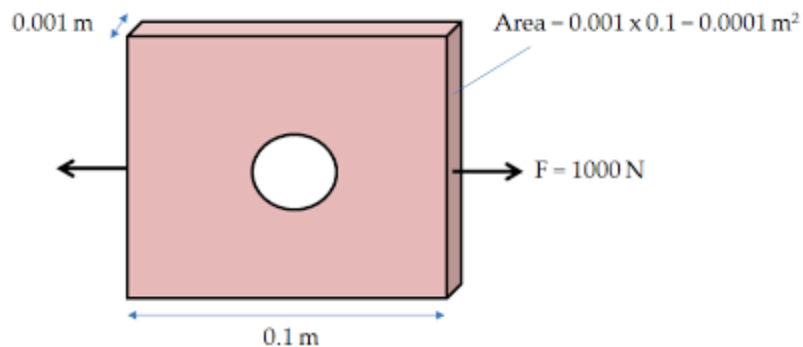
Project E: (a) The state of plane stress shown occurs at a critical point of a steel machine component.

As a result of several tensile tests, it has been found that the tensile yield strength is 250 MPa for the grade of steel used.



Determine the factor of safety with respect to yield, using (1) the maximum-shearing-stress criterion, and (2) the maximum-distortion-energy criterion. Also, sketch the locus of safe zone in the two cases. Implement your calculations in MATLAB to generate the results.

(b) Calculate the maximum and minimum intensities of stresses (for the component shown in figure below) using ANSYS/commercial software. Also sketch the stress distribution for the same.



Student's performance in the above question is given below:

Table: Student's performance in question targeting 'E3'; course: UME404

S. No.	Roll No.	Name	Post MST Project (10)	SCORE (1-5)
1	101508062	Kunal Swami	10.00	5
2	101508063	Lakshya Jain	8.57	5
3	101508064	Lakshya Khanduja	5.71	3
4	101508065	Lovepreet Singh	7.14	4
5	101508066	Mahesh Chugh	8.57	5
6	101508067	Manmohit Chugh	7.14	4
7	101508068	Mannan Jain	5.71	3
8	101508069	Manu Rawal	10.00	5

9	101508070	Mayank Singh	8.57	5
10	101508071	Mehar Satsangi	10.00	5
11	101508073	Mehkant Singh Mittal	7.14	4
12	101508074	Mehul Satyajit	7.14	4
13	101508075	Mohit Sorout	8.57	5
14	101508076	Navjot Wadhwa	10.00	5
15	101508077	Navkaran Singh Mroque	10.00	5
16	101508078	Navnoor Singh Sidhu	8.57	5
17	101508079	Nikhil Jain	10.00	5
18	101508080	Nikhil Joshi	10.00	5
19	101508081	Nimrat Singh Brar	8.57	5
20	101508083	Nitin Kumar	10.00	5
21	101508084	Parth Ahuja	10.00	5
22	101508086	Prabhsimran Singh Bakshi	7.14	4
23	101508087	Pranshu Kansal	8.57	5
24	101508088	Prasu Shome	10.00	5
25	101508091	Prateek Prasad	7.14	4
26	101508093	Prince Nirwal	7.14	4
27	101508095	Ragjot Kiran Chhibber	5.71	3
28	101508096	Rahul Choudhary	10.00	5
29	101508100	Ramneek Devgan	8.57	5
30	101508101	Ravneesh Munjal	10.00	5
31	101508102	Rohit Kumar	10.00	5
32	101508103	Sharanpreet Singh	10.00	5
33	101508104	Sahil Chhabra	10.00	5
34	101508105	Sahil Garg	7.14	4
35	101508106	Saksham	8.57	5
36	101508107	Saravpreet Singh	8.57	5
37	101508109	Satyam Gupta	10.00	5
38	101508110	Saurabh Garg	8.57	5
39	101508112	Shailendra Rai	10.00	5
40	101508113	Shashwat Jain	8.57	5
41	101508114	Shivam Mittal	7.14	4
42	101508115	Shreshth	5.71	3
43	101508116	Shubhang Gupta	10.00	5
44	101508117	Shubhang Prasad	10.00	5
45	101508118	Siddarth	7.14	4
46	101508119	Siddharth Nagpal	7.14	4
47	101508121	Sourav Deep Singh	5.71	3
48	101508123	Supandeep Singh	8.57	5
49	101508124	Tushar Bansal	8.57	5
50	101508125	Utkarsh Mishra	7.14	4
51	101508126	Vaibhav Chobisa	8.57	5
52	101508127	Vaibhav Dogra	10.00	5
53	101508128	Vaidant Bakshi	5.71	3

54	101508129	Vikas Singh Chauhan	5.71	3
55	101508130	Vikram Singh	10.00	5
56	101508131	Yash Parmar	10.00	5
57	101508133	Yatin Singla	5.71	3
58	101508134	Deepankar Kumar	10.00	5
59	101508140	Animesh Agarwal	5.71	3
60	101688011	Keshav Goyal	7.14	4
61	101688012	Munish Kumar Garg	5.71	3
62	101688014	Prashant Jindal	7.14	4
63	101688015	Robin Chandel	10.00	5
64	101688016	Sayansh Garg	8.57	5
65	101688017	Shiv Kumar	8.57	5
66	101688020	Navi Sood	7.14	4
67	101688021	Navneet Singh	10.00	5
68	101688023	Sahil Bhola	10.00	5
69	101688024	Vaibhav Singla	10.00	5
70	401508023	Kumar Mangalam	10.00	5
71	401508024	Mrigendra Gupta	7.14	4
72	401508025	Pushpinder Singh	7.14	4
73	401508026	Rahul Sheoran	5.71	3
74	401508027	Sachin Malhotra	10.00	5
75	401508029	Shwetank Pati Tripathi	8.57	5
76	401508030	Sudhanshu Ranjan	5.71	3
77	401508031	Sukhmanpreet Singh	10.00	5
78	401508032	Sumanyu Kapoor	10.00	5
79	401508033	Viresh Gupta	5.71	3
80	401508034	Yogesh Mehta	7.14	4
81	401508035	Prateek Chaudhary	5.71	3
82	401688001	Nilay Sagar	7.14	4
83	401688002	Ramneek Singh	5.71	3
84	401688003	Sourav Prasher	7.14	4
85	401688004	Utsav Gautam	7.14	4
86	401688005	Sartaj Singh Sidhu	8.57	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME404 for criteria E3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME404	58.1	24.4	17.4	0	0	4.41

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria E3 as given below in Table E4.21:

Table E4.21: Weighted Average Student class performance (course portfolio) for criteria E3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME501	48.83	23.25	15.11	6.97	5.81	4.02	5
UME404	58.1	24.4	17.4	0	0	4.41	5
Weighted average score	53.47	23.83	16.26	3.49	2.91	4.22	10

b) Indirect measures for Performance criteria E3 (Surveys)

i.) Assessment Tool: Student Course Survey

Table E4.22: Average score of student course survey for criteria E3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME501	48.83	23.25	15.11	6.97	5.81	4.02	5
UME404	51	10	7	11	21	4.17	5
Weighted average score	49.92	16.63	11.06	8.99	13.41	4.10	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table E4.23: Assessment for criteria E3 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	30	54	12	2	2	4.08
Alumni survey	28	46	24	2	0	4
Employer Survey	54	42	4	0	0	4.50

c) Overall weighted average score of performance criterion ‘E3’

Finally, overall weighted average score of performance criterion ‘E3’ is evaluated as given below in Table E4.24:

Table E4.24: Overall weighted average score of performance criterion ‘E3’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	53.47	23.83	16.26	3.49	2.91	4.22	5.0
Weighted average student course survey	49.92	16.63	11.06	8.99	13.41	4.10	4.0
Graduating student survey	30	54	12	2	2	4.08	3.0
Alumni survey	28	46	24	2	0	4	3.0
Employer survey	54	42	4	0	0	4.50	3.0
Overall weighted score	44.61	33.98	13.64	3.63	4.12	4.18	18.0

Overall assessment of student outcome E using scores of E1, E2 and E3

In the above sections, each of the individual performance criteria E1, E2 and E3 have been assessed. The performance for attainment of outcome E has been completed using the attainment values for E1, E2 and E3 and is provided below:

Table E4.25 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome E.

Table E4.25: Overall score for outcome E at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
E1	40	35.38	12.78	3.46	6.61	4.06	5
E2	37.02	35.35	14.2	4.81	8.61	3.94	5
E3	44.61	33.98	13.64	3.63	4.12	4.18	4
Overall score	40.25	34.97	13.53	3.99	4.82	4.05	14

Track Record and assessment of attainment of student outcome ‘E’ over the last three academic years

The performance criteria-wise assessment score distribution and overall weighted score for outcome ‘E’ for last three calendar years, i.e., 2015, 2016 and 2017 presented in this section.

The following table E4.26 presents the performance criteria-wise assessment score distribution for outcome ‘E’

Table E4.26: Performance criteria-wise assessment score distribution of outcome E

Student outcomes and performance criteria		Year		
		2015	2016	2017
E	E1	3.78	4.05	4.06
	E2	3.84	4.11	3.94
	E3	3.66	3.97	4.18

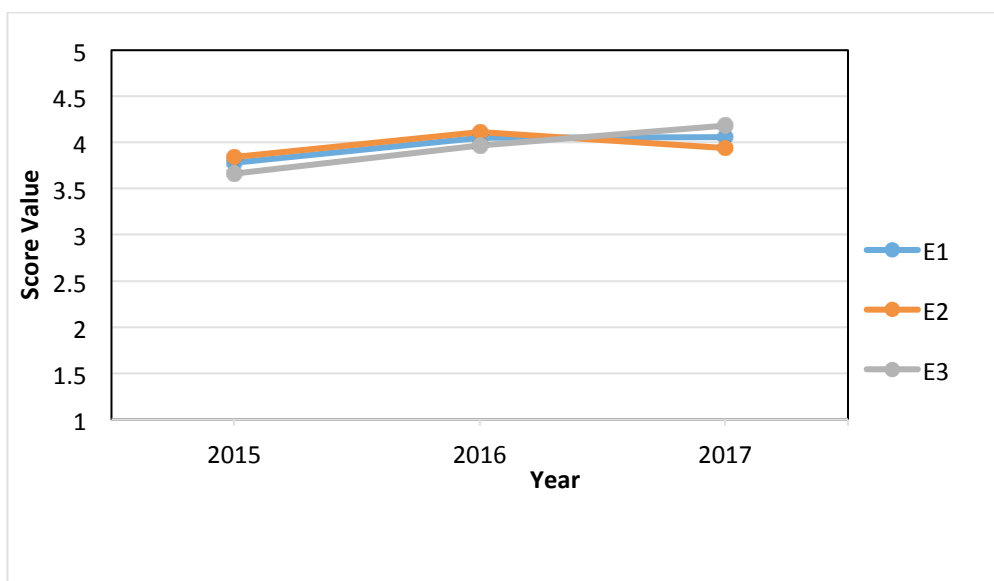


Figure E 4.2: Performance Criteria-wise assessment score distribution of outcome E

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome ‘E’ over a period of last three years.

Level of attainment of student outcome ‘E’ over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table E4.27 presents the overall weighted score of outcome ‘E’ over the last three academic years

Table E4.27: Overall weighted score of outcome ‘E’ over a period of last three years

Year	Overall weighted score	Level of attainment
2015	3.76	Good
2016	4.04	Good
2017	4.06	Good

The above data has been plotted to visualize the overall weighted score of outcome ‘E’ over a period of last three years.

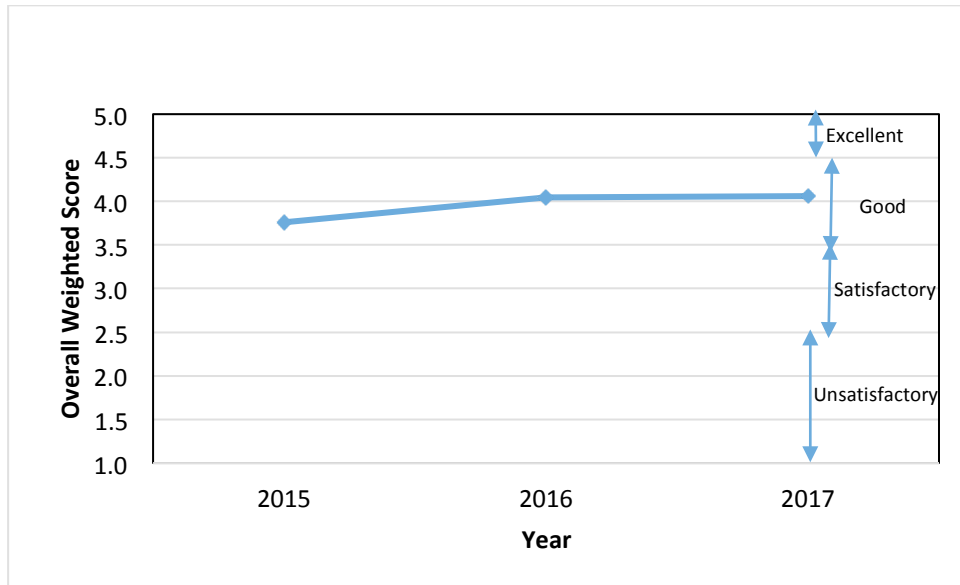


Figure E4.3: Overall weighted score of outcome 'E' over a period of last three years

The following actions have been taken based on the analysis of Outcome E

Weighted Score for Outcome E	Recommendation	Reason	Implemented from
4.06	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'F'
(Year 2017)**

for the

*Bachelor of Engineering
in
Mechanical Engineering*

**Thapar Institute of Engineering & Technology
Patiala (Punjab) - 147004
INDIA**

Attainment of Outcome F

The attainment of each outcome has been measured using a standard procedure explained in the Self-Assessment Report for the program. A flow chart depicting the step-by-step methodology used to measure each attainment is provided below for ready reference.

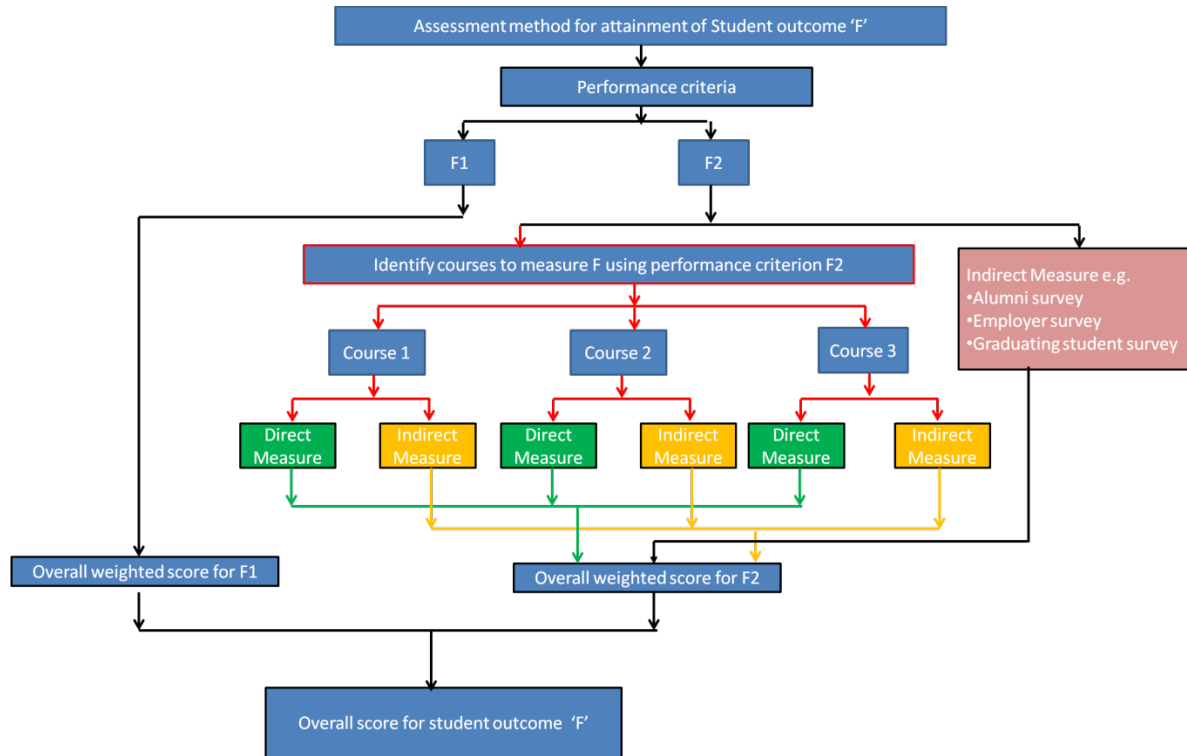


Figure F 4.1 flow chart for Attainment of Outcome F

The following courses have been considered for the assessment of student outcome 'F'

Courses:

1. Project Semester (UME691)

Outcome F has been assessed by two performance criteria F1, and F2. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these two performance criteria has been used to measure the overall measure of outcome F.

1) Assessment of Outcome 'F' using performance criterion F1

Performance criteria 'F1': Evaluates ethical issues that may occur in professional practice using professional codes of ethics.

a.) Assessment Tool: Student's performance using course portfolio

(The criteria 'F1' is evaluated from the student report card submitted by their respective industry mentor by Q. No. A (iv))

Q A (iv): Refers to the ability to conceptualise all aspects of project and to systematically plan the series of activities to achieve the goal.

Table: Student's performance targeting 'F1'; course: UME691

S. No.	Roll No.	F1	Weight (Scale 1 to 5)
		Q. No. A (iv) (10 Marks)	
1	101588003	8	4
2	101408056	10	5
3	101588012	10	5
4	101408062	10	5
5	101408020	10	5
6	101588009	10	5
7	101408030	10	5
8	101408032	10	5
9	101408069	10	5
10	101408080	10	5
11	101408067	10	5
12	101408086	10	5
13	101408093	10	5
14	101408104	10	5
15	101408121	10	5
16	101408122	8	4
17	101408137	10	5
18	101588008	10	5
19	101408029	8	4
20	101408031	10	5
21	101588005	10	5
22	101408035	8	4
23	101408070	8	4
24	101408063	10	5
25	101408034	8	4
26	101408041	10	5
27	101408066	8	4
28	101408132	10	5
29	101408130	10	5
30	101408082	6	3
31	101408033	8	4
32	101408060	10	5
33	101408127	8	4
34	101408005	8	4
35	101408007	8	4

36	101408050	10	5
37	101408079	8	4
38	101408114	8	4
39	101408134	10	5
40	101588014	10	5
41	101408077	10	5
42	101408116	6	3
43	101408064	10	5
44	101408078	10	5
45	101408125	10	5
46	101408136	10	5
47	101458004	10	5
48	101408065	10	5
49	101408028	10	5
50	101408051	10	5
51	101408019	8	4
52	101408037	10	5
53	101408022	8	4
54	101408098	8	4
55	101408049	10	5
56	101588013	8	4
57	101408044	10	5
58	101408071	10	5
59	101408040	10	5
60	101588010	10	5
61	101408012	8	4
62	101408011	10	5
63	101408101	10	5
64	101408113	10	5
65	101408115	8	4
66	101408123	8	4
67	101408087	10	5
68	101408043	10	5
69	101408120	8	4
70	101408089	10	5
71	101408055	10	5
72	101408059	10	5
73	101408100	10	5
74	101408107	10	5
75	101408110	10	5
76	101458003	10	5
77	101408131	8	4
78	101408016	10	5
79	101408036	8	4
80	101408038	10	5
81	101408076	10	5
82	101408083	10	5
83	101408094	10	5
84	101408092	10	5
85	101408010	10	5
86	101408045	10	5
87	101408091	10	5
88	101408003	10	5

89	101408014	10	5
90	101408090	8	4
91	101408095	8	4
92	101408111	8	4
93	101588002	8	4
94	101408001	10	5
95	101408006	10	5
96	101408009	10	5
97	101408026	10	5
98	101408096	8	4
99	101458001	8	4
100	101408002	8	4
101	101408052	10	5
102	101408017	8	4
103	101408042	10	5
104	101588004	10	5
105	101588006	10	5
106	101408023	10	5
107	101588001	10	5
108	101588015	10	5
109	101408124	10	5
110	101408085	8	4
111	101408013	8	4
112	101408108	10	5
113	101408126	10	5
114	101408047	8	4
115	101408058	8	4
116	101408004	10	5
117	101408128	10	5
118	101408074	8	4
119	101408057	10	5
120	101408008	8	4
121	101408084	10	5
122	101408112	10	5
123	101408118	10	5

Table: Average score of student performance in the course UME691for criteria F1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	68.3	30.1	1.6	0	0	4.619

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria F1 as given below in Table F4.3:

Table F4.3: Weighted Average Student class performance (course portfolio) for criteria F1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	68.3	30.1	1.6	0	0	4.619	5
Weighted average score	68.3	30.1	1.6	0	0	4.619	5

b) Indirect measures for Performance criteria F1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table F4.4: Average score of student course survey for criteria F1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	68.3	30.1	1.6	0	0	4.619	5
Weighted average score	68.3	30.1	1.6	0	0	4.619	5

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table F4.5: Assessment for criteria F1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	24	46	26	2	2	3.88
Alumni survey	42	36	20	2	0	4.18
Employer Survey	60	36	4	0	0	4.56

c) Overall weighted average score of performance criterion 'F1'

Finally overall weighted average score of performance criterion 'F1' is evaluated as given below in Table F4.6:

Table F4.6: Overall weighted average score of performance criterion 'F1'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	68.3	30.1	1.6	0	0	4.619	5.0
Weighted average student course survey	68.3	30.1	1.6	0	0	4.619	4.0
Graduating student survey	24	46	26	2	2	3.88	3.0
Alumni survey	42	36	20	2	0	4.18	3.0
Employer survey	60	36	4	0	0	4.56	3.0
Overall weighted score	55.15	34.72	9.13	0.67	0.33	4.41	18.0

Assessment of Outcome 'F' using performance criterion F2

Performance criteria 'F2': Interacts with industry, project sponsors, professional societies and/or communities in a professional manner.

a.) Assessment Tool: Student's performance using course portfolio

(The criteria 'F2' is evaluated from the student report card submitted by their respective industry mentor by Q. No. A (iv))

Q A(iv): Refers to the ability to conceptualise all aspects of project and to systematically plan the series of activities to achieve the goal.

Table: Student's performance targeting 'F2'; course: UME691

S. No.	Roll No. of Students	F2	Weight (Scale 1 to 5)
		Q. No. A(iv) (10 Marks)	
1	101588003	8	4
2	101408056	10	5
3	101588012	10	5
4	101408062	10	5
5	101408020	10	5
6	101588009	10	5
7	101408030	10	5
8	101408032	10	5
9	101408069	10	5
10	101408080	10	5
11	101408067	10	5
12	101408086	10	5
13	101408093	10	5
14	101408104	10	5
15	101408121	10	5
16	101408122	8	4
17	101408137	10	5
18	101588008	10	5
19	101408029	8	4
20	101408031	10	5
21	101588005	10	5
22	101408035	8	4
23	101408070	8	4
24	101408063	10	5
25	101408034	8	4
26	101408041	10	5
27	101408066	8	4
28	101408132	10	5
29	101408130	10	5

30	101408082	6	3
31	101408033	8	4
32	101408060	10	5
33	101408127	8	4
34	101408005	8	4
35	101408007	8	4
36	101408050	10	5
37	101408079	8	4
38	101408114	8	4
39	101408134	10	5
40	101588014	10	5
41	101408077	10	5
42	101408116	6	3
43	101408064	10	5
44	101408078	10	5
45	101408125	10	5
46	101408136	10	5
47	101458004	10	5
48	101408065	10	5
49	101408028	10	5
50	101408051	10	5
51	101408019	8	4
52	101408037	10	5
53	101408022	8	4
54	101408098	8	4
55	101408049	10	5
56	101588013	8	4
57	101408044	10	5
58	101408071	10	5
59	101408040	10	5
60	101588010	10	5
61	101408012	8	4
62	101408011	10	5
63	101408101	10	5
64	101408113	10	5
65	101408115	8	4
66	101408123	8	4
67	101408087	10	5
68	101408043	10	5
69	101408120	8	4
70	101408089	10	5
71	101408055	10	5

72	101408059	10	5
73	101408100	10	5
74	101408107	10	5
75	101408110	10	5
76	101458003	10	5
77	101408131	8	4
78	101408016	10	5
79	101408036	8	4
80	101408038	10	5
81	101408076	10	5
82	101408083	10	5
83	101408094	10	5
84	101408092	10	5
85	101408010	10	5
86	101408045	10	5
87	101408091	10	5
88	101408003	10	5
89	101408014	10	5
90	101408090	8	4
91	101408095	8	4
92	101408111	8	4
93	101588002	8	4
94	101408001	10	5
95	101408006	10	5
96	101408009	10	5
97	101408026	10	5
98	101408096	8	4
99	101458001	8	4
100	101408002	8	4
101	101408052	10	5
102	101408017	8	4
103	101408042	10	5
104	101588004	10	5
105	101588006	10	5
106	101408023	10	5
107	101588001	10	5
108	101588015	10	5
109	101408124	10	5
110	101408085	8	4
111	101408013	8	4
112	101408108	10	5
113	101408126	10	5
114	101408047	8	4

115	101408058	8	4
116	101408004	10	5
117	101408128	10	5
118	101408074	8	4
119	101408057	10	5
120	101408008	8	4
121	101408084	10	5
122	101408112	10	5
123	101408118	10	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME691 for criteria F2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	68.3	30.1	1.6	0	0	4.619

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria F2 as given below in Table F4.9:

Table F4.9: Weighted Average Student class performance (course portfolio) for criteria F2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME691	68.3	30.1	1.6	0	0	4.619	5
Weighted average score	68.3	30.1	1.6	0	0	4.619	5

b.) Assessment Tool: Student Course Survey

Table F4.10: Average score of student course survey for criteria F2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME691	68.3	30.1	1.6	0	0	4.619	5
Weighted average score	68.3	30.1	1.6	0	0	4.619	5

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table F4.11: Assessment for criteria F2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	24	46	26	2	2	3.88
Alumni survey	42	36	20	2	0	4.18
Employer Survey	60	36	4	0	0	4.56

Finally, overall weighted average score of performance criterion 'F2' is evaluated as given below in Table F4.12:

Table F4.12: Overall weighted average score of performance criterion 'F2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	68.3	30.1	1.6	0	0	4.619	5.0
Weighted average student course survey	68.3	30.1	1.6	0	0	4.619	4.0
Graduating student survey	24	46	26	2	2	3.88	3.0
Alumni survey	42	36	20	2	0	4.18	3.0
Employer survey	60	36	4	0	0	4.56	3.0
Overall weighted score	55.15	34.72	9.13	0.67	0.33	4.41	18.0

Overall assessment of student outcome F using scores of F1 and F2

In the above sections, each of the individual performance criteria F1 and F2 have been assessed. The performance for attainment of outcome F has been completed using the attainment values for F1 and F2 and is provided below:

Table F4.13 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome F.

Table F4.13: Overall score for outcome F at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
F1	55.15	34.72	9.13	0.67	0.33	4.41	5
F2	55.15	34.72	9.13	0.67	0.33	4.41	5
Overall score	55.15	34.72	9.13	0.67	0.17	4.41	10

Track Record and assessment of attainment of student outcome 'F' over the last three academic years

The performance criteria-wise assessment score distribution and overall weighted score for outcome 'F' for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table F4.14 presents the performance criteria-wise assessment score distribution for outcome 'F'

Table F4.14: Performance criteria-wise assessment score distribution of outcome F

Student outcomes and performance criteria		Year		
		2015	2016	2017
F	F1	4.05	4.36	4.41
	F2	4.03	4.18	4.41

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome 'F' over a period of last three years

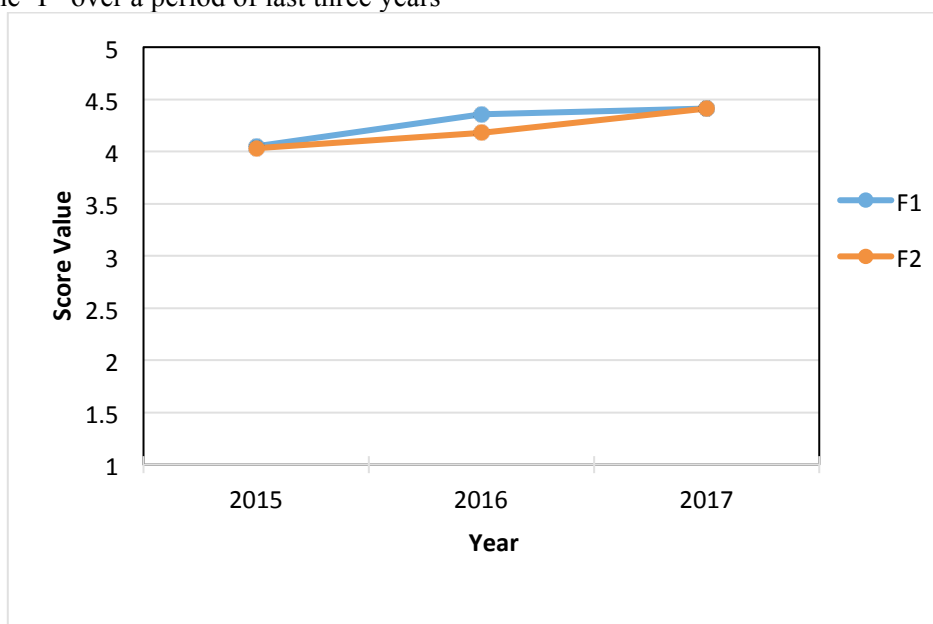


Figure F 4.2: Performance Criteria-wise assessment score distribution of outcome F

Level of attainment of student outcome 'F' over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table F4.15 presents the overall weighted score of outcome 'F' over the last three academic years.

Table F4.15: Overall weighted score of outcome 'F' over a period of last three years

Year	Overall weighted score	Level of attainment
2015	4.04	Good
2016	4.27	Good
2017	4.41	Good

The above data has been plotted to visualize the overall weighted score of outcome 'F' over a period of last three years.

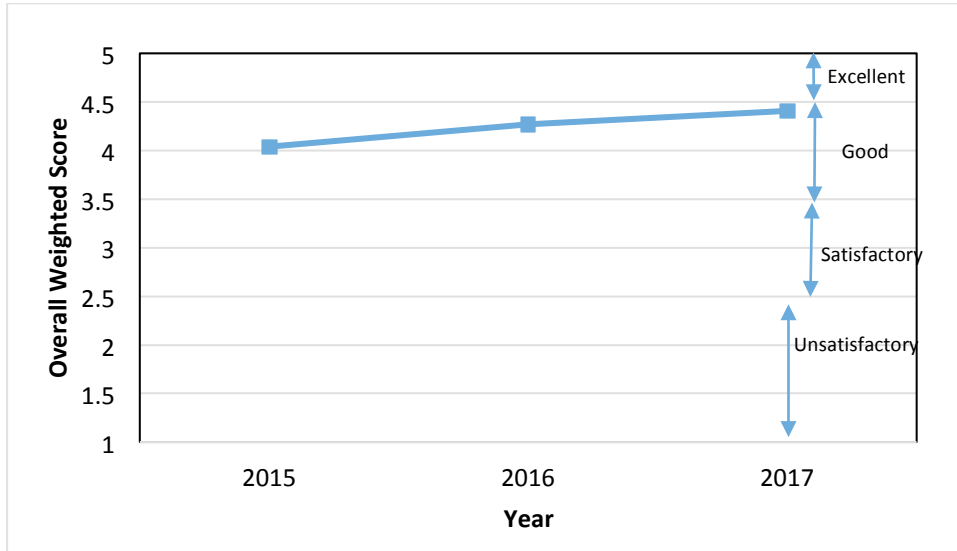


Figure F4.3: Overall weighted score of outcome 'F' over a period of last three years

The following actions have been taken based on the analysis of Outcome F

Weighted Score for Outcome F	Recommendation	Reason	Implemented from
4.41	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'G'
(Year 2017)**

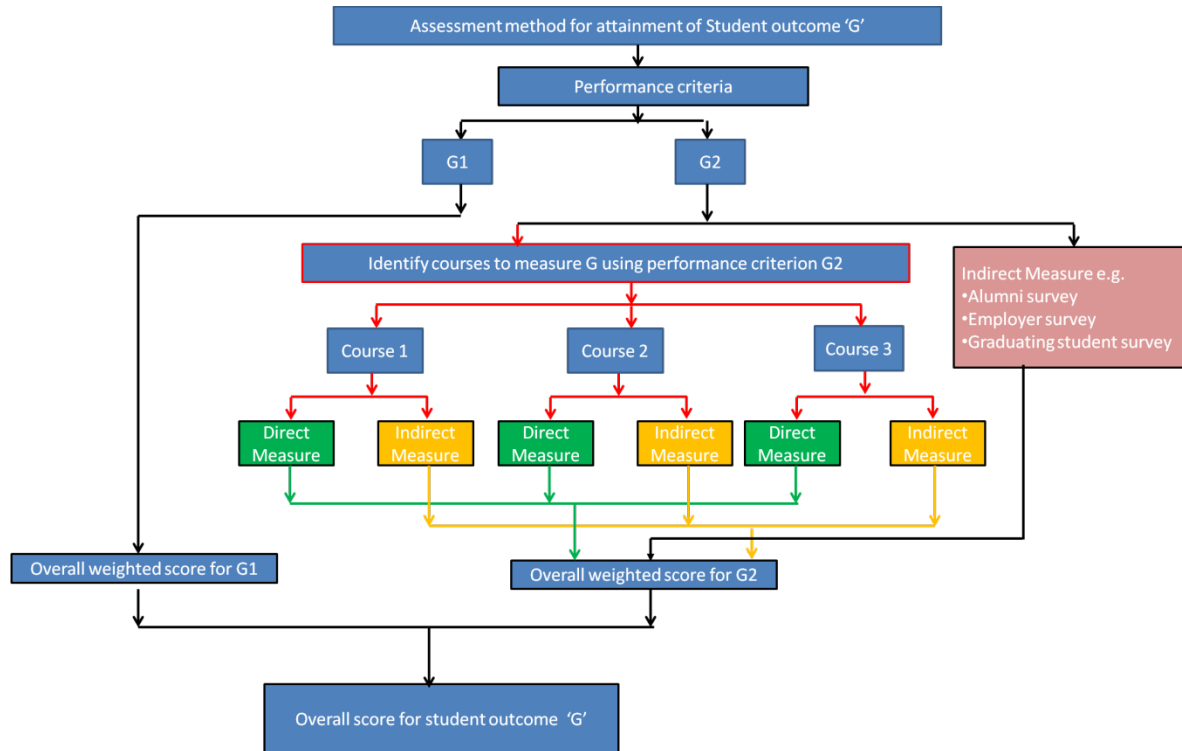
for the

*Bachelor of Engineering
in
Mechanical Engineering*

**Thapar Institute of Engineering & Technology
Patiala (Punjab) - 147004
INDIA**

Attainment of Outcome G

The attainment of each outcome has been measured using a standard procedure explained in the Self Assessment Report for the program. A flow chart depicting the step by step methodology used to measure each attainment is provided below for ready reference.



The following courses have been considered for the assessment of student outcome 'G'

Courses:

1. Project Semester (UME691)
2. Capstone Project (UME891/893)

Outcome G has been assessed by two performance criteria G1, and G2. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these two performance criteria has been used to measure the overall measure of outcome G.

1) Assessment of Outcome 'G' using performance criterion G1

Performance criteria 'G1': Produce a variety of documents such as laboratory or project reports using appropriate formats and grammar with discipline specific conventions including citations.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Project Semester (UME691) and Mechanical System Design (UME891) were used to assess performance criteria G1 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Project Semester (UME691)

The above performance criteria is used to measure the attainment of outcome 'G' by giving the following question (Evaluation No: Report Writing during final evaluation of Project Semester in department) to the students.

Question:

Each student has to submit one printed report on the projects completed during training. Students are evaluated on the basis of report writing skills, formatting, grammar mistakes and overall structure of the report

(The criteria 'G1' is evaluated from the internal panel evaluation and review of the training reports conducted by individual faculty members.)

Table: Student's performance targeting 'G1'; course: UME691

S. No.	Roll No.	G1	Weight (Scale 1 to 5)
		Q. No. B (vii) (10 Marks)	
1	101408001	10	5
2	101408002	8	4
3	101408003	10	5
4	101408004	8	4
5	101408005	10	5
6	101408006	10	5
7	101408007	10	5
8	101408008	8	4
9	101408009	10	5
10	101408010	10	5
11	101408011	10	5
12	101408012	10	5
13	101408013	8	4
14	101408014	10	5
15	101408016	10	5
16	101408017	8	4
17	101408019	10	5
18	101408020	10	5
19	101408022	8	4
20	101408023	10	5
21	101408026	8	4

23	101408028	8	4
24	101408029	10	5
25	101408030	10	5
26	101408031	10	5
27	101408033	8	4
28	101408034	10	5
31	101408035	10	5
33	101408036	10	5
34	101408037	10	5
35	101408038	8	4
36	101408040	10	5
38	101408041	10	5
40	101408042	10	5
43	101408043	10	5
44	101408044	10	5
45	101408045	10	5
46	101408047	8	4
47	101408049	10	5
50	101408050	10	5
51	101408051	8	4
54	101408052	10	5
56	101408055	10	5
58	101408056	10	5
59	101408057	10	5
60	101408058	8	4
61	101408059	10	5
62	101408060	10	5
63	101408062	10	5
64	101408063	10	5
65	101408064	8	4
66	101408065	10	5
67	101408066	10	5
68	101408067	10	5
69	101408069	10	5
70	101408070	8	4
71	101408071	8	4
72	101408074	8	4
73	101408076	10	5
75	101408077	10	5
77	101408078	10	5
78	101408079	10	5
80	101408080	10	5
81	101408082	8	4
82	101408083	10	5
83	101408084	10	5
84	101408085	8	4
85	101408086	10	5
87	101408087	10	5
88	101408089	10	5

93	101408090	8	4
94	101408091	8	4
95	101408092	10	5
98	101408093	10	5
100	101408094	10	5
102	101408095	8	4
103	101408096	8	4
104	101408098	8	4
105	101408100	10	5
106	101408101	10	5
107	101408104	10	5
108	101408107	10	5
111	101408108	10	5
118	101408110	8	4
120	101408111	8	4
121	101408112	10	5
22	101408113	10	5
29	101408114	8	4
30	101408115	10	5
32	101408116	8	4
37	101408118	8	4
39	101408120	10	5
41	101408121	10	5
42	101408122	10	5
48	101408123	10	5
49	101408124	10	5
52	101408125	10	5
53	101408126	8	4
55	101408127	8	4
57	101408128	8	4
74	101408130	10	5
76	101408131	8	4
79	101408132	10	5
86	101408134	10	5
89	101408136	10	5
90	101408137	10	5
91	101458001	10	5
92	101458003	10	5
96	101458004	10	5
97	101588001	10	5
99	101588002	8	4
101	101588003	10	5
109	101588004	10	5
110	101588005	10	5
112	101588006	10	5
113	101588008	10	5
114	101588009	10	5
115	101588010	10	5
116	101588012	10	5

117	101588013	8	4
119	101588014	8	4
122	101588015	10	5

Table: Student's performance in question targeting 'G1'; course: UME891

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	70.5	29.5	0	0	0	4.705

(ii) Course: Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome 'G1' from the 2nd and 3rd evaluation (Question: Component of 2nd Evaluation (3) + Component of 3rd Evaluation (15); weightage 18 marks).

Question: Technical Report and Production Drawings.

Student's performance in the above question is given below:

S. No.	Roll No.	Name	Marks (18)	Score Scale (1-5)
1	101308001	Ankit Juneja	14.5	4
2	101308002	Abhinav	15.5	5
3	101308003	Abhishek Kumar Verma	15.5	5
4	101308004	Abhyuday Singh	15.5	5
5	101308006	Aditya Agrawal	15.5	5
6	101308007	Ajeet Pal Singh	15.5	5
7	101308008	Akash Malhotra	15.5	5
8	101308009	Akash Reddy Kakularam	16.0	5
9	101308010	Akash Sharma	15.0	5
10	101308011	Akashdeep Singh Gandhi	15.5	5
11	101308012	Akshay Kumar	15.5	5
12	101308013	Amritpal Singh Sangwan	14.0	4
13	101308014	Aneesh Kejariwal	16.0	5
14	101308015	Ankit Sehgal	12.5	4
15	101308016	Ankur Goyal	15.0	5
16	101308017	Ankush Bansal	15.5	5
17	101308018	Anoop	14.0	4
18	101308019	Anshaj Jindal	15.0	5
19	101308020	Anuj Jain	16.0	5
20	101308021	Arshdeep Singh	15.5	5
21	101308023	Bhabuk Goyal	15.0	5
22	101308024	Bhajanpreet Singh	15.5	5
23	101308025	Bhuvanyu	15.5	5
24	101308026	Bipin Loi	15.5	5
25	101308027	Brhamjyot Singh Sandhu	14.0	4

26	101308028	Deepak Dalal	12.5	4
27	101308029	Deepak Sharma	12.5	4
28	101308031	Dhiraj Dureja	13.5	4
29	101308032	Dildeep Singh	14.0	4
30	101308033	Ekansh Kumar Srivastava	13.5	4
31	101308034	Ekjyot Singh	15.5	5
32	101308035	Gagandeep Singh	14.0	4
33	101308036	Gautam Dawar	16.0	5
34	101308037	Gurkirat Pal Singh	16.0	5
35	101308038	Gurkirat Singh Sangha	14.0	4
36	101308039	Gurpreet Singh	14.0	4
37	101308040	Gurpreet Singh	14.0	4
38	101308042	Gurtej Singh	14.0	4
39	101308043	Guruteshwar	12.0	4
40	101308044	Harjot Singh	14.0	4
41	101308045	Harnoor Singh	15.5	5
42	101308046	Harsh Narang	16.0	5
43	101308047	Harsimran	12.0	4
44	101308048	Hemant Aggarwal	15.0	5
45	101308050	Iknoor Singh	15.5	5
46	101308051	Ishdeep Arora	14.0	4
47	101308052	Japdanish Singh	14.5	4
48	101308053	Jashanpreet Singh	13.5	4
49	101308054	Jaskaran Singh	16.5	5
50	101308055	Jatin Khosla	14.5	4
51	101308057	Kanav Bansal	16.5	5
52	101308059	Kanwar Gulati	14.5	4
53	101308060	Karan Chopra	14.5	4
54	101308061	Karan Goyal	13.5	4
55	101308063	Karan Veer Dewan	14.5	4
56	101308064	Karanbir Singh	13.5	4
57	101308065	Kashish Khurana	14.5	4
58	101308066	Keshav Jindal	14.5	4
59	101308067	Ketan Chauhan	14.5	4
60	101308068	Khushwinder Singh	13.5	4
61	101308069	Kirat Singh Basur	12.5	4
62	101308070	Kshitij Sharma	12.5	4
63	101308071	Lokendra Kumar	15.0	5
64	101308072	Lovedeep Garg	13.5	4
65	101308073	Manavdeep Singh Grover	14.5	4
66	101308074	Manik Saharan	12.5	4
67	101308075	Manish Pandoh	14.5	4
68	101308076	Manpreet Singh	16.5	5
69	101308077	MANUTKARSH KIRPAL	13.0	4
70	101308078	Nidan Prakash	14.5	4
71	101308079	NIKHIL AGGARWAL	14.5	4
72	101308080	NIKHIL GANTA	14.5	4
73	101308082	PARAMJOT SINGH	12.0	4

74	101308083	Paras	15.0	5
75	101308085	Prabhman Vir	12.5	4
76	101308088	Pulkit Kapoor	16.0	5
77	101308089	Puneet Singh	13.5	4
78	101308090	Rajat Gupta	15.0	5
79	101308091	Ramnish Kumar	15.0	5
80	101308093	Rohan Kaushal	16.0	5
81	101308094	Sagar Singla	15.0	5
82	101308096	Sahil Sharma	16.0	5
83	101308097	Samdeep Singh Sabharwal	15.0	5
84	101308098	Sameer Bhalla	15.0	5
85	101308099	Sartaj Singh	15.0	5
86	101308100	Shikhar Bhardwaj	14.0	4
87	101308101	Shikhar Gaur	14.0	4
88	101308102	Shreyas Bhayana	14.5	4
89	101308103	Shubham	15.0	5
90	101308104	Shubham Bhama	14.5	4
91	101308105	Shubham Choudhary	14.5	4
92	101308106	Shubham Gupta	14.5	4
93	101308108	Siddharth Ghiya	15.5	5
94	101308109	Siddharth Gupta	14.5	4
95	101308110	Siddharth Vasu	15.5	5
96	101308111	Sidhant	14.5	4
97	101308112	Simrandeep Singh Bhullar	14.5	4
98	101308113	Sourav Singla	15.5	5
99	101308114	Tanjay Pathak	15.5	5
100	101308115	Tanuj Lamba	14.0	4
101	101308116	Utsav Mudgal	16.0	5
102	101308117	Vaibhav Pratap Singh Pundir	15.5	5
103	101308118	Varmeet Singh Gulati	14.5	4
104	101308119	Varun Atri	14.0	4
105	101308120	Vedant Mansotra	13.5	4
106	101308121	Vikrant Nanda	14.0	4
107	101308122	Vishal Solanki	13.5	4
108	101308123	Vivek Mittal	15.0	5
109	101308124	Vivek Pundir	15.0	5
110	101308125	Yash Wardhan Sharma	15.0	5
111	101488001	Akash Tiwari	15.5	5
112	101488002	Anuj Tanwar	15.5	5
113	101488003	Bhupinder Singh	15.5	5
114	101488004	Bishant Sharma	15.5	5
115	101488005	Harish Yadav	13.5	4
116	101488006	Harpreet Singh	16.5	5
117	101488007	Inderjeet Kumar	14.5	4
118	101488008	Ishan Bansal	16.0	5
119	101488009	Jaspreet Singh	16.5	5
120	101488010	Jaspreet Singh	14.5	4
121	101488011	Kulwinder Singh	16.5	5

122	101488012	MOHIT GOYAL	14.5	4
123	101488013	NAVJOT RIHAL	12.0	4
124	101488014	Nikhil Gupta	15.0	5
125	101488015	Sankit	13.5	4
126	101488016	Sarang Vashisht	16.0	5
127	101488017	Varun Bansal	15.0	5
128	101488018	Vishnu Kalra	16.0	5

Table: Average score of student performance in the course UME891 for criteria G1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	49.2	50.8	0	0	0	4.49

The overall performance of students in the above question is then summarized as given below

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria G1 as given below in Table G4.5:

Table G4.5: Weighted Average Student class performance (course portfolio) for criteria G1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	70.5	29.5	0	0	0	4.705	5
UME891	49.2	50.8	0	0	0	4.49	5
Weighted average score	59.85	40.15	0.00	0.00	0.00	4.60	10

b) Indirect measures for Performance criteria G1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table G4.6: Average score of student course survey for criteria G1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	70.5	29.5	0	0	0	4.705	5
UME891	49.2	50.8	0	0	0	4.49	5
Weighted average score	59.85	40.15	0.00	0.00	0.00	4.60	10

ii.) **Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey**

Table G4.7: Assessment for criteria G1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	46	24	0	4	3.9
Alumni survey	52	36	8	4	0	4.36
Employer Survey	56	38	6	0	0	4.50

c) Overall weighted average score of performance criterion ‘G1’

Finally, overall weighted average score of performance criterion ‘G1’ is evaluated as given below in Table G4.8:

Table G4.8: Overall weighted average score of performance criterion ‘G1’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	59.85	40.15	0.00	0.00	0.00	4.60	5.0
Weighted average student course survey	59.85	40.15	0.00	0.00	0.00	4.60	4.0
Graduating student survey	26	46	24	0	4	3.9	3.0
Alumni survey	52	36	8	4	0	4.36	3.0
Employer survey	56	38	6	0	0	4.50	3.0
Overall weighted score	52.26	40.08	6.33	0.67	0.67	4.43	18.0

Assessment of Outcome ‘G’ using performance criterion G2

Performance criteria ‘G2’: Deliver well-organized, logical oral presentation, including good explanations when questioned.

a.) Assessment Tool: Student’s performance using course portfolio

Step 1: Two courses namely Project Semester (UME691) and Capstone Project (UME891) were used to assess performance criteria G1 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Project Semester (UME691)

Question:

Students are evaluated by a group of members for the evaluation of communication skills during presentation of the project report and his/her ability of answer the questions raised by the panel. Student’s performance in the above question is given below in Table G4.13:(The criteria ‘G2’ is evaluated by the internal panel through the oral presentation by the students during their post training seminar)

Table 4.13: Student's performance targeting 'G2'; course: UME691

S. No.	Roll No.	G2	Weight (Scale 1 to 5)
		Q. No. C(i) (5 Marks)	
1	101408001	5	5
2	101408002	5	5
3	101408003	5	5
4	101408004	5	5
5	101408005	3	4
6	101408006	5	5
7	101408007	5	5
8	101408008	5	5
9	101408009	5	5
10	101408010	5	5
11	101408011	5	5
12	101408012	5	5
13	101408013	4	4
14	101408014	5	5
15	101408016	4	4
16	101408017	4	4
17	101408019	5	5
18	101408020	5	5
19	101408022	5	5
20	101408023	5	5
21	101408026	5	5
22	101408028	5	5
23	101408029	5	5
24	101408030	5	5
25	101408031	5	5
26	101408032	5	5
27	101408033	4	4
28	101408034	5	5
29	101408035	5	5
30	101408036	5	5
31	101408037	5	5
32	101408038	4	4
33	101408040	5	5
34	101408041	5	5
35	101408042	5	5
36	101408043	4	4
37	101408044	4	4
38	101408045	5	5
39	101408047	5	5

40	101408049	5	5
41	101408050	5	5
42	101408051	5	5
43	101408052	5	5
44	101408055	5	5
45	101408056	5	5
46	101408057	5	5
47	101408058	5	5
48	101408059	5	5
49	101408060	5	5
50	101408062	5	5
51	101408063	5	5
52	101408064	5	5
53	101408065	5	5
54	101408066	5	5
55	101408067	5	5
56	101408069	5	5
57	101408070	5	5
58	101408071	5	5
59	101408074	4	4
60	101408076	5	5
61	101408077	5	5
62	101408078	5	5
63	101408079	5	5
64	101408080	5	5
65	101408082	3	4
66	101408083	5	5
67	101408084	5	5
68	101408085	4	4
69	101408086	5	5
70	101408087	5	5
71	101408089	5	5
72	101408090	5	5
73	101408091	5	5
74	101408092	5	5
75	101408093	5	5
76	101408094	5	5
77	101408095	5	5
78	101408096	5	5
79	101408098	5	5
80	101408100	5	5
81	101408101	4	4

82	101408104	5	5
83	101408107	5	5
84	101408108	5	5
85	101408110	5	5
86	101408111	5	5
87	101408112	5	5
88	101408113	5	5
89	101408114	4	4
90	101408115	5	5
91	101408116	4	4
92	101408118	5	5
93	101408120	5	5
94	101408121	4	4
95	101408122	5	5
96	101408123	5	5
97	101408124	5	5
98	101408125	5	5
99	101408126	5	5
100	101408127	4	4
101	101408128	5	5
102	101408130	5	5
103	101408131	5	5
104	101408132	5	5
105	101408134	5	5
106	101408136	5	5
107	101408137	5	5
108	101458001	4	4
109	101458003	5	5
110	101458004	5	5
111	101588001	5	5
112	101588002	4	4
113	101588003	5	5
114	101588004	5	5
115	101588005	5	5
116	101588006	5	5
117	101588008	5	5
118	101588009	5	5
119	101588010	5	5
120	101588012	5	5
121	101588013	5	5
122	101588014	5	5
123	101588015	5	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME691for criteria G2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	85.4	14.6	0	0	0	4.854

ii. Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome ‘G2’ from the components of 2nd, 3rd evaluation and showcase event (Question: Component of 2nd Evaluation (3)+Component of 3rd Evaluation (15)+ Component from showcasing event (5); weightage 23 marks).

Question:
Presentations, Group & individual Assessment, Questions and Answers.

Student’s performance in the above question is given below:

Table: Student’s performance in question targeting ‘G2’; course: UME891

S. No.	Roll No.	Name	Marks (23)	Score Scale (1-5)
1	101308001	Ankit Juneja	17.2	4
2	101308002	Abhinav	16.0	4
3	101308003	Abhishek Kumar Verma	18.5	5
4	101308004	Abhyuday Singh	19.0	5
5	101308006	Aditya Agrawal	18.5	5
6	101308007	Ajeet Pal Singh	17.8	4
7	101308008	Akash Malhotra	18.5	5
8	101308009	Akash Reddy Kakularam	16.7	4
9	101308010	Akash Sharma	17.0	4
10	101308011	Akashdeep Singh Gandhi	18.0	4
11	101308012	Akshay Kumar	17.5	4
12	101308013	Amritpal Singh Sangwan	14.5	3
13	101308014	Aneesh Kejariwal	19.7	5
14	101308015	Ankit Sehgal	14.5	3
15	101308016	Ankur Goyal	17.0	4
16	101308017	Ankush Bansal	17.5	4
17	101308018	Anoop	14.5	3
18	101308019	Anshaj Jindal	17.0	4
19	101308020	Anuj Jain	17.7	4
20	101308021	Arshdeep Singh	17.0	4
21	101308023	Bhabuk Goyal	17.0	4
22	101308024	Bhajanpreet Singh	17.5	4
23	101308025	Bhuvanyu	18.5	5

24	101308026	Bipin Loi	15.8	4
25	101308027	Brhamjyot Singh Sandhu	19.0	5
26	101308028	Deepak Dalal	18.5	5
27	101308029	Deepak Sharma	18.5	5
28	101308031	Dhiraj Dureja	18.5	5
29	101308032	Dildeep Singh	15.0	3
30	101308033	Ekansh Kumar Srivastava	13.8	3
31	101308034	Ekjyot Singh	20.0	5
32	101308035	Gagandeep Singh	15.0	3
33	101308036	Gautam Dawar	19.7	5
34	101308037	Gurkirat Pal Singh	17.7	4
35	101308038	Gurkirat Singh Sangha	16.0	4
36	101308039	Gurpreet Singh	17.0	4
37	101308040	Gurpreet Singh	14.5	3
38	101308042	Gurtej Singh	14.5	3
39	101308043	Guruteshwar	17.0	4
40	101308044	Harjot Singh	18.0	4
41	101308045	Harnoor Singh	20.0	5
42	101308046	Harsh Narang	18.7	5
43	101308047	Harsimran	16.0	4
44	101308048	Hemant Aggarwaal	17.7	4
45	101308050	Iknoor Singh	18.5	5
46	101308051	Ishdeep Arora	16.5	4
47	101308052	Japdanish Singh	16.2	4
48	101308053	Jashanpreet Singh	16.2	4
49	101308054	Jaskaran Singh	19.5	5
50	101308055	Jatin Khosla	18.2	4
51	101308057	Kanav Bansal	18.5	5
52	101308059	Kanwar Gulati	17.3	4
53	101308060	Karan Chopra	17.2	4
54	101308061	Karan Goyal	18.2	4
55	101308063	Karan Veer Dewan	19.2	5
56	101308064	Karanbir Singh	15.2	4
57	101308065	Kashish Khurana	19.2	5
58	101308066	Keshav Jindal	18.2	4
59	101308067	Ketan Chauhan	18.3	4
60	101308068	Khushwinder Singh	14.2	3
61	101308069	Kirat Singh Basur	16.5	4
62	101308070	Kshitij Sharma	14.5	3
63	101308071	Lokendra Kumar	17.7	4
64	101308072	Lovedeep Garg	14.2	3
65	101308073	Manavdeep Singh Grover	19.2	5

66	101308074	Manik Saharan	16.5	4
67	101308075	Manish Pandoh	18.3	4
68	101308076	Manpreet Singh	17.5	4
69	101308077	MANUTKARSH KIRPAL	18.0	4
70	101308078	Nidan Prakash	18.3	4
71	101308079	NIKHIL AGGARWAL	19.5	5
72	101308080	NIKHIL GANTA	19.5	5
73	101308082	PARAMJOT SINGH	18.0	4
74	101308083	Paras	18.7	5
75	101308085	Prabhman Vir	16.5	4
76	101308088	Pulkit Kapoor	18.3	4
77	101308089	Puneet Singh	14.8	3
78	101308090	Rajat Gupta	17.7	4
79	101308091	Ramnish Kumar	18.7	5
80	101308093	Rohan Kaushal	16.3	4
81	101308094	Sagar Singla	16.7	4
82	101308096	Sahil Sharma	17.3	4
83	101308097	Samdeep Singh Sabharwal	15.7	4
84	101308098	Sameer Bhalla	17.7	4
85	101308099	Sartaj Singh	15.7	4
86	101308100	Shikhar Bhardwaj	15.5	4
87	101308101	Shikhar Gaur	17.3	4
88	101308102	Shreyas Bhayana	20.5	5
89	101308103	Shubham	15.7	4
90	101308104	Shubham Bhama	17.8	4
91	101308105	Shubham Choudhary	17.3	4
92	101308106	Shubham Gupta	20.5	5
93	101308108	Siddharth Ghiya	19.2	5
94	101308109	Siddharth Gupta	19.5	5
95	101308110	Siddharth Vasu	17.2	4
96	101308111	Sidhant	18.5	5
97	101308112	Simrandeep Singh Bhullar	17.5	4
98	101308113	Sourav Singla	18.2	4
99	101308114	Tanjay Pathak	17.2	4
100	101308115	Tanuj Lamba	16.3	4
101	101308116	Utsav Mudgal	18.3	4
102	101308117	Vaibhav Pratap Singh Pundir	17.2	4
103	101308118	Varmet Singh Gulati	17.3	4
104	101308119	Varun Atri	15.3	4
105	101308120	Vedant Mansotra	15.8	4
106	101308121	Vikrant Nanda	13.3	3
107	101308122	Vishal Solanki	15.8	4

108	101308123	Vivek Mittal	18.2	4
109	101308124	Vivek Pundir	18.2	4
110	101308125	Yash Wardhan Sharma	20.2	5
111	101488001	Akash Tiwari	16.8	4
112	101488002	Anuj Tanwar	17.8	4
113	101488003	Bhupinder Singh	17.8	4
114	101488004	Bishant Sharma	17.8	4
115	101488005	Harish Yadav	18.5	5
116	101488006	Harpreet Singh	18.5	5
117	101488007	Inderjeet Kumar	19.2	5
118	101488008	Ishan Bansal	16.3	4
119	101488009	Jaspreet Singh	19.5	5
120	101488010	Jaspreet Singh	19.2	5
121	101488011	Kulwinder Singh	18.5	5
122	101488012	MOHIT GOYAL	19.5	5
123	101488013	NAVJOT RIHAL	16.0	4
124	101488014	Nikhil Gupta	17.7	4
125	101488015	Sankit	14.8	3
126	101488016	Sarang Vashisht	16.3	4
127	101488017	Varun Bansal	19.2	5
128	101488018	Vishnu Kalra	19.2	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria G2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	30.5	58.6	10.9	0	0	4.2

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria G2 as given below in Table G4.13

Table G4.13: Weighted Average Student class performance (course portfolio) for criteria G2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	85.4	14.6	0	0	0	4.854	5
UME891	30.5	58.6	10.9	0	0	4.2	5
Weighted average score	57.95	36.60	5.45	0.00	0.00	4.53	10

b.) Assessment Tool: Student Course Survey

Table G4.14: Average score of student course survey for criteria G2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	85.4	14.6	0	0	0	4.854	5
UME891	30.5	58.6	10.9	0	0	4.2	5
Weighted average score	57.95	36.60	5.45	0.00	0.00	4.53	10

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table G4.15: Assessment for criteria G2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	46	24	0	4	3.9
Alumni survey	52	36	8	4	0	4.36
Employer Survey	56	38	6	0	0	4.50

Finally overall weighted average score of performance criterion 'G2' is evaluated as given below in Table G4.16:

Table G4.16: Overall weighted average score of performance criterion 'G2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	57.95	36.60	5.45	0.00	0.00	4.53	5.0
Weighted average student course survey	57.95	36.60	5.45	0.00	0.00	4.53	4.0
Graduating student survey	26	46	24	0	4	3.9	3.0
Alumni survey	52	36	8	4	0	4.36	3.0
Employer survey	56	38	6	0	0	4.50	3.0
Overall weighted score	51.31	38.30	9.06	0.67	0.67	4.39	18.0

Overall assessment of student outcome G using scores of G1 and G2

In the above sections, each of the individual performance criteria G1 and G2 have been assessed. The performance for attainment of outcome G has been completed using the attainment values for G1 and G2 and is provided below:

Table G4.17 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome G.

Table G4.17: Overall score for outcome G at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
G1	52.26	40.08	6.33	0.67	0.67	4.43	4
G2	51.31	38.30	9.06	0.67	0.67	4.39	5
Overall score	51.73	39.09	7.85	0.67	0.30	4.41	9

Track Record and assessment of attainment of student outcome 'G' over the last three academic years

The performance criteria-wise assessment score distribution and overall weighted score for outcome 'G' for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table G4.18 presents the performance criteria-wise assessment score distribution for outcome 'G'

Table G4.18: Performance criteria-wise assessment score distribution of outcome G

Student outcomes and performance criteria		Year		
		2015	2016	2017
G	G1	3.93	4.30	4.43
	G2	3.92	4.30	4.39

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome 'G' over a period of last three years.

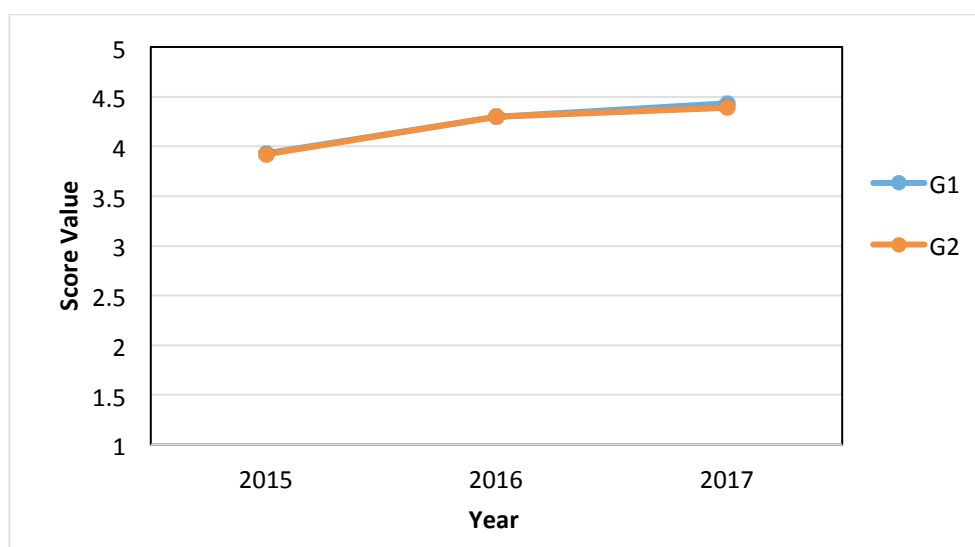


Figure G 4.2: Performance Criteria-wise assessment score distribution of outcome G

Level of attainment of student outcome ‘G’ over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table G4.19 presents the overall weighted score of outcome ‘G’ over the last three academic years.

Table G4.19: Overall weighted score of outcome ‘G’ over a period of last three years

Year	Overall weighted score	Level of attainment
2015	3.925	Good
2016	4.3	Good
2017	4.41	Good

The above data has been plotted to visualize the overall weighted score of outcome ‘G’ over a period of last three years.

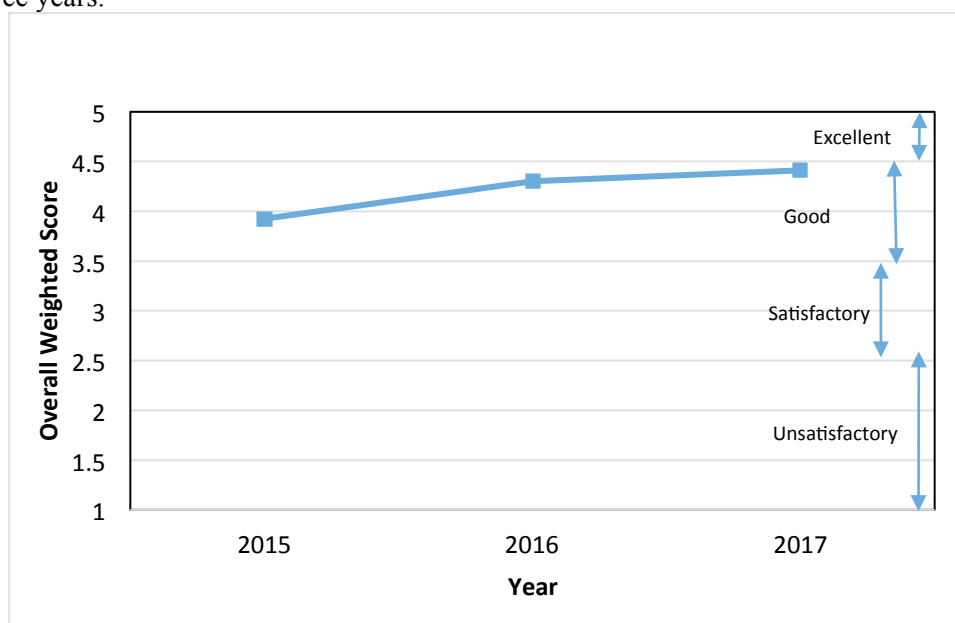


Figure G4.3: Overall weighted score of outcome ‘G’ over a period of last three years

The following actions have been taken based on the analysis of Outcome G

Weighted Score for Outcome F	Recommendation	Reason	Implemented from
4.41	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'H'
(Year 2017)**

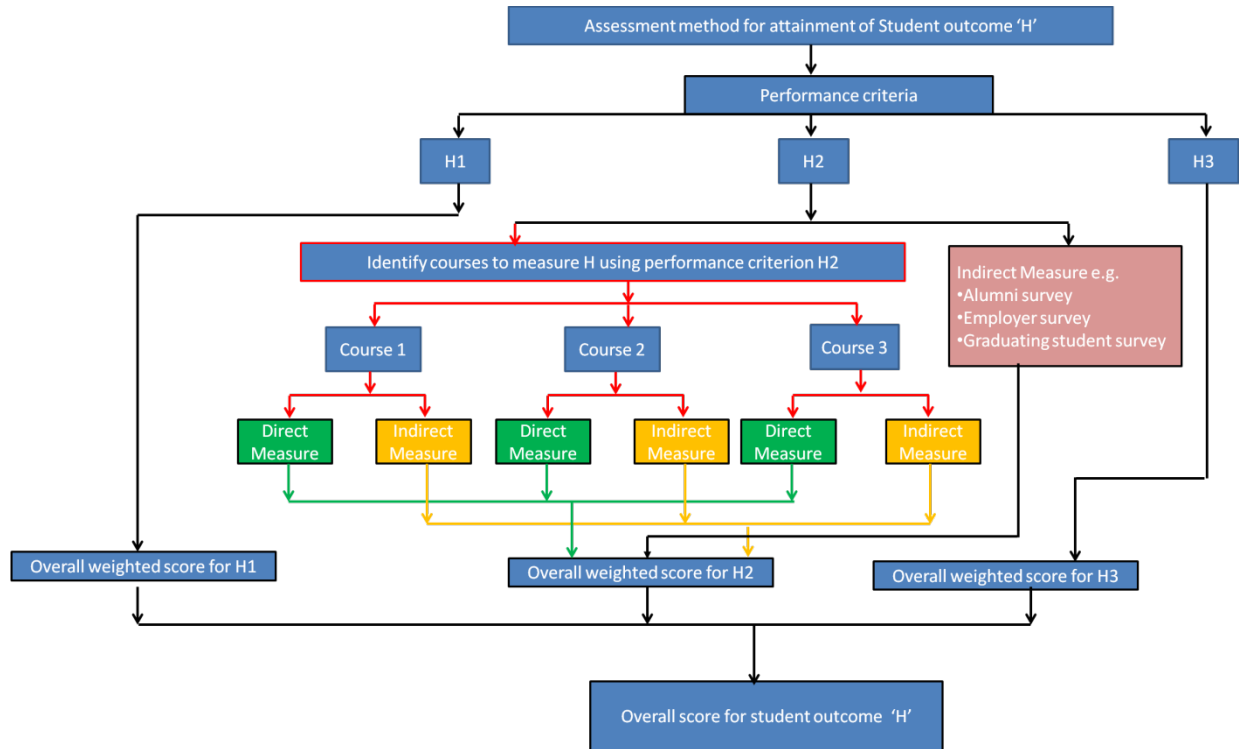
for the

*Bachelor of Engineering
in
Mechanical Engineering*

**Thapar Institute of Engineering & Technology
Patiala (Punjab) - 147004
INDIA**

Attainment of Outcome H

The attainment of each outcome has been measured using a standard procedure explained in the Self Assessment Report for the program. A flow chart depicting the step by step methodology used to measure each attainment is provided below for ready reference.



The following courses have been considered for the assessment of student outcome 'H'

Courses:

1. Capstone Project (UME891)

Outcome H has been assessed by Three performance criteria H1, H2 and H3. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these three performance criteria has been used to measure the overall measure of outcome H.

1) Assessment of Outcome 'H' using performance criterion H1

Performance criteria 'H1': Aware of societal and global changes that engineering innovations may cause.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: One course namely Capstone Project (UME891) was used to assess performance criteria H1 as a direct measure. The analysis for each of the course is provided below:

The above performance criteria is used to measure the attainment of outcome 'H1' from the components of 1st evaluation (Question: Component of 1st Evaluation; weightage 10 marks).

Question: Need Analysis, Problem Definition

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'H1'; course: UME891

S. No.	Roll No.	Name	Marks (10)	Score Scale (1-5)
1	101308001	Ankit Juneja	10	5
2	101308002	Abhinav	8.5	5
3	101308003	Abhishek Kumar Verma	7.5	4
4	101308004	Abhyuday Singh	8.5	5
5	101308006	Aditya Agrawal	7.5	4
6	101308007	Ajeet Pal Singh	9.5	5
7	101308008	Akash Malhotra	7.5	4
8	101308009	Akash Reddy Kakularam	10	5
9	101308010	Akash Sharma	8	4
10	101308011	Akashdeep Singh Gandhi	8.5	5
11	101308012	Akshay Kumar	7.5	4
12	101308013	Amritpal Singh Sangwan	6	3
13	101308014	Aneesh Kejariwal	10	5
14	101308015	Ankit Sehgal	6	3
15	101308016	Ankur Goyal	8	4
16	101308017	Ankush Bansal	8	4
17	101308018	Anoop	6	3
18	101308019	Anshaj Jindal	8	4
19	101308020	Anuj Jain	10	5
20	101308021	Arshdeep Singh	8.5	5
21	101308023	Bhabuk Goyal	8	4
22	101308024	Bhajanpreet Singh	8	4
23	101308025	Bhuvanyu	7.5	4
24	101308026	Bipin Loi	9.5	5
25	101308027	Brhamjyot Singh Sandhu	8	4

26	101308028	Deepak Dalal	7.5	4
27	101308029	Deepak Sharma	7.5	4
28	101308031	Dhiraj Dureja	7.5	4
29	101308032	Dildeep Singh	8	4
30	101308033	Ekansh Kumar Srivastava	6	3
31	101308034	Ekjyot Singh	8.5	5
32	101308035	Gagandeep Singh	8	4
33	101308036	Gautam Dawar	10	5
34	101308037	Gurkirat Pal Singh	10	5
35	101308038	Gurkirat Singh Sangha	8	4
36	101308039	Gurpreet Singh	8	4
37	101308040	Gurpreet Singh	6	3
38	101308042	Gurtej Singh	6	3
39	101308043	Guruteshwar	7.5	4
40	101308044	Harjot Singh	8	4
41	101308045	Harnoor Singh	8.5	5
42	101308046	Harsh Narang	10	5
43	101308047	Harsimran	7.5	4
44	101308048	Hemant Aggarwaal	9	5
45	101308050	Iknoor Singh	7.5	4
46	101308051	Ishdeep Arora	6	3
47	101308052	Japdanish Singh	10	5
48	101308053	Jashanpreet Singh	8	4
49	101308054	Jaskaran Singh	10	5
50	101308055	Jatin Khosla	10	5
51	101308057	Kanav Bansal	10	5
52	101308059	Kanwar Gulati	8	4
53	101308060	Karan Chopra	10	5
54	101308061	Karan Goyal	8	4
55	101308063	Karan Veer Dewan	10	5
56	101308064	Karanbir Singh	8	4
57	101308065	Kashish Khurana	10	5
58	101308066	Keshav Jindal	10	5
59	101308067	Ketan Chauhan	8	4
60	101308068	Khushwinder Singh	8	4
61	101308069	Kirat Singh Basur	6	3
62	101308070	Kshitij Sharma	6	3
63	101308071	Lokendra Kumar	9	5
64	101308072	Lovedeep Garg	8	4
65	101308073	Manavdeep Singh Grover	10	5
66	101308074	Manik Saharan	6	3
67	101308075	Manish Pandoh	8	4

68	101308076	Manpreet Singh	10	5
69	101308077	MANUTKARSH KIRPAL	8	4
70	101308078	Nidan Prakash	8	4
71	101308079	NIKHIL AGGARWAL	8	4
72	101308080	NIKHIL GANTA	8	4
73	101308082	PARAMJOT SINGH	8	4
74	101308083	Paras	9	5
75	101308085	Prabhman Vir	6	3
76	101308088	Pulkit Kapoor	9	5
77	101308089	Puneet Singh	6	3
78	101308090	Rajat Gupta	8	4
79	101308091	Ramnish Kumar	8	4
80	101308093	Rohan Kaushal	9	5
81	101308094	Sagar Singla	8	4
82	101308096	Sahil Sharma	9	5
83	101308097	Samdeep Singh Sabharwal	8	4
84	101308098	Sameer Bhalla	9	5
85	101308099	Sartaj Singh	8	4
86	101308100	Shikhar Bhardwaj	6	3
87	101308101	Shikhar Gaur	7.5	4
88	101308102	Shreyas Bhayana	9	5
89	101308103	Shubham	8	4
90	101308104	Shubham Bhama	7.5	4
91	101308105	Shubham Choudhary	8	4
92	101308106	Shubham Gupta	9	5
93	101308108	Siddharth Ghiya	6.5	3
94	101308109	Siddharth Gupta	9	5
95	101308110	Siddharth Vasu	6.5	3
96	101308111	Sidhant	9	5
97	101308112	Simrandeep Singh Bhullar	9	5
98	101308113	Sourav Singla	6.5	3
99	101308114	Tanjay Pathak	6.5	3
100	101308115	Tanuj Lamba	7.5	4
101	101308116	Utsav Mudgal	9	5
102	101308117	Vaibhav Pratap Singh Pundir	6.5	3
103	101308118	Varmeet Singh Gulati	8	4
104	101308119	Varun Atri	7.5	4
105	101308120	Vedant Mansotra	6	3
106	101308121	Vikrant Nanda	7.5	4
107	101308122	Vishal Solanki	6	3
108	101308123	Vivek Mittal	8.5	5
109	101308124	Vivek Pundir	8.5	5

110	101308125	Yash Wardhan Sharma	8.5	5
111	101488001	Akash Tiwari	9.5	5
112	101488002	Anuj Tanwar	9.5	5
113	101488003	Bhupinder Singh	9.5	5
114	101488004	Bishant Sharma	9.5	5
115	101488005	Harish Yadav	7.5	4
116	101488006	Harpreet Singh	10	5
117	101488007	Inderjeet Kumar	10	5
118	101488008	Ishan Bansal	9	5
119	101488009	Jaspreet Singh	10	5
120	101488010	Jaspreet Singh	10	5
121	101488011	Kulwinder Singh	10	5
122	101488012	MOHIT GOYAL	8	4
123	101488013	NAVJOT RIHAL	8	4
124	101488014	Nikhil Gupta	9	5
125	101488015	Sankit	6	3
126	101488016	Sarang Vashisht	9	5
127	101488017	Varun Bansal	8.5	5
128	101488018	Vishnu Kalra	8.5	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria H1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	43	40.6	16.4	0	0	4.27

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria H1 as given below in Table H4.5:

Table H4.5: Weighted Average Student class performance (course portfolio) for criteria H1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	43	40.6	16.4	0	0	4.27	5
Weighted average score	43	40.6	16.4	0	0	4.27	5

b) Indirect measures for Performance criteria H1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table H4.6: Average score of student course survey for criteria H1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	43	40.6	16.4	0	0	4.27	5
Weighted average score	43	40.6	16.4	0	0	4.27	5

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table H4.7: Assessment for criteria H1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	40	26	4	4	3.8
Alumni survey	24	52	18	4	2	3.92
Employer Survey	44	44	12	0	0	4.32

c) Overall weighted average score of performance criterion ‘H1’

Finally, overall weighted average score of performance criterion ‘H1’ is evaluated as given below in Table H4.8:

Table H4.8: Overall weighted average score of performance criterion ‘H1’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	43	40.6	16.4	0	0	4.27	5.0
Weighted average student course survey	43	40.6	16.4	0	0	4.27	4.0
Graduating student survey	26	40	26	4	4	3.8	3.0
Alumni survey	24	52	18	4	2	3.92	3.0
Employer survey	44	44	12	0	0	4.32	3.0
Overall weighted score	37.17	42.97	17.53	1.33	1.00	4.14	18.0

Assessment of Outcome ‘A’ using performance criterion H2

Performance criteria ‘H2’: Examines economics trade-offs in engineering systems.

a.) Assessment Tool: Student’s performance using course portfolio

Step 1: One course namely Capstone Project (UME891) were used to assess performance criteria H2 as a direct measure. The analysis for each of these courses is provided below:

The above performance criteria is used to measure the attainment of outcome 'H2' from the components of 1st & 2nd evaluation (Question: Component from 1st Evaluation (5) + Component from 2nd Evaluation (2); weightage 7 marks)

Question: Problem Definition, Implementation and Cost Analysis.

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'H2'; course: UME891

S. No.	Roll No.	Name	Marks (7)	Score Scale (1-5)
1	101308001	Ankit Juneja	6.5	5
2	101308002	Abhinav	6.0	5
3	101308003	Abhishek Kumar Verma	5.5	4
4	101308004	Abhyuday Singh	6.0	5
5	101308006	Aditya Agrawal	5.5	4
6	101308007	Ajeet Pal Singh	6.0	5
7	101308008	Akash Malhotra	5.5	4
8	101308009	Akash Reddy Kakularam	7.0	5
9	101308010	Akash Sharma	6.0	5
10	101308011	Akashdeep Singh Gandhi	6.0	5
11	101308012	Akshay Kumar	5.5	4
12	101308013	Amritpal Singh Sangwan	5.0	4
13	101308014	Aneesh Kejariwal	7.0	5
14	101308015	Ankit Sehgal	3.0	2
15	101308016	Ankur Goyal	5.0	4
16	101308017	Ankush Bansal	5.0	4
17	101308018	Anoop	5.0	4
18	101308019	Anshaj Jindal	5.5	4
19	101308020	Anuj Jain	7.0	5
20	101308021	Arshdeep Singh	6.0	5
21	101308023	Bhabuk Goyal	6.0	5
22	101308024	Bhajanpreet Singh	5.0	4
23	101308025	Bhuvanyu	5.5	4
24	101308026	Bipin Loi	6.0	5
25	101308027	Brhamjyot Singh Sandhu	6.0	5
26	101308028	Deepak Dalal	6.0	5
27	101308029	Deepak Sharma	6.0	5
28	101308031	Dhiraj Dureja	6.0	5
29	101308032	Dildeep Singh	6.0	5
30	101308033	Ekansh Kumar Srivastava	4.0	3
31	101308034	Ekjyot Singh	6.0	5
32	101308035	Gagandeep Singh	6.0	5

33	101308036	Gautam Dawar	7.0	5
34	101308037	Gurkirat Pal Singh	7.0	5
35	101308038	Gurkirat Singh Sangha	6.0	5
36	101308039	Gurpreet Singh	6.0	5
37	101308040	Gurpreet Singh	5.0	4
38	101308042	Gurtej Singh	5.0	4
39	101308043	Guruteshwar	6.0	5
40	101308044	Harjot Singh	6.0	5
41	101308045	Harnoor Singh	6.0	5
42	101308046	Harsh Narang	7.0	5
43	101308047	Harsimran	6.0	5
44	101308048	Hemant Aggarwaal	6.5	5
45	101308050	Iknoor Singh	5.5	4
46	101308051	Ishdeep Arora	5.0	4
47	101308052	Japdanish Singh	6.5	5
48	101308053	Jashanpreet Singh	5.0	4
49	101308054	Jaskaran Singh	6.5	5
50	101308055	Jatin Khosla	7.0	5
51	101308057	Kanav Bansal	6.5	5
52	101308059	Kanwar Gulati	6.0	5
53	101308060	Karan Chopra	7.0	5
54	101308061	Karan Goyal	5.0	4
55	101308063	Karan Veer Dewan	7.0	5
56	101308064	Karanbir Singh	5.0	4
57	101308065	Kashish Khurana	7.0	5
58	101308066	Keshav Jindal	6.5	5
59	101308067	Ketan Chauhan	6.0	5
60	101308068	Khushwinder Singh	5.0	4
61	101308069	Kirat Singh Basur	3.0	2
62	101308070	Kshitij Sharma	3.0	2
63	101308071	Lokendra Kumar	6.5	5
64	101308072	Lovedeep Garg	5.0	4
65	101308073	Manavdeep Singh Grover	6.5	5
66	101308074	Manik Saharan	3.0	2
67	101308075	Manish Pandoh	6.0	5
68	101308076	Manpreet Singh	6.5	5
69	101308077	MANUTKARSH KIRPAL	6.0	5
70	101308078	Nidan Prakash	6.0	5
71	101308079	NIKHIL AGGARWAL	6.0	5
72	101308080	NIKHIL GANTA	6.0	5
73	101308082	PARAMJOT SINGH	6.0	5
74	101308083	Paras	6.5	5

75	101308085	Prabhman Vir	3.0	2
76	101308088	Pulkit Kapoor	6.5	5
77	101308089	Puneet Singh	4.0	3
78	101308090	Rajat Gupta	6.0	5
79	101308091	Ramnish Kumar	6.0	5
80	101308093	Rohan Kaushal	6.5	5
81	101308094	Sagar Singla	6.0	5
82	101308096	Sahil Sharma	6.5	5
83	101308097	Samdeep Singh Sabharwal	6.0	5
84	101308098	Sameer Bhalla	6.5	5
85	101308099	Sartaj Singh	6.0	5
86	101308100	Shikhar Bhardwaj	5.0	4
87	101308101	Shikhar Gaur	6.0	5
88	101308102	Shreyas Bhayana	5.0	4
89	101308103	Shubham	6.0	5
90	101308104	Shubham Bhama	5.0	4
91	101308105	Shubham Choudhary	6.0	5
92	101308106	Shubham Gupta	5.0	4
93	101308108	Siddharth Ghiya	5.0	4
94	101308109	Siddharth Gupta	5.0	4
95	101308110	Siddharth Vasu	5.0	4
96	101308111	Sidhant	5.0	4
97	101308112	Simrandeep Singh Bhullar	5.0	4
98	101308113	Sourav Singla	5.0	4
99	101308114	Tanjay Pathak	5.0	4
100	101308115	Tanuj Lamba	6.0	5
101	101308116	Utsav Mudgal	6.5	5
102	101308117	Vaibhav Pratap Singh Pundir	5.0	4
103	101308118	Varmeet Singh Gulati	6.0	5
104	101308119	Varun Atri	6.0	5
105	101308120	Vedant Mansotra	4.0	3
106	101308121	Vikrant Nanda	5.0	4
107	101308122	Vishal Solanki	4.0	3
108	101308123	Vivek Mittal	5.5	4
109	101308124	Vivek Pundir	6.5	5
110	101308125	Yash Wardhan Sharma	6.5	5
111	101488001	Akash Tiwari	6.0	5
112	101488002	Anuj Tanwar	6.0	5
113	101488003	Bhupinder Singh	6.0	5
114	101488004	Bishant Sharma	6.0	5
115	101488005	Harish Yadav	6.0	5
116	101488006	Harpreet Singh	6.5	5

117	101488007	Inderjeet Kumar	7.0	5
118	101488008	Ishan Bansal	6.5	5
119	101488009	Jaspreet Singh	6.5	5
120	101488010	Jaspreet Singh	7.0	5
121	101488011	Kulwinder Singh	6.5	5
122	101488012	MOHIT GOYAL	6.0	5
123	101488013	NAVJOT RIHAL	5.5	4
124	101488014	Nikhil Gupta	6.5	5
125	101488015	Sankit	4.0	3
126	101488016	Sarang Vashisht	6.5	5
127	101488017	Varun Bansal	6.5	5
128	101488018	Vishnu Kalra	5.5	4

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria H2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	64.1	28.1	3.9	3.9	0	4.52

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria H2 as given below in Table H4.13:

Table H4.13: Weighted Average Student class performance (course portfolio) for criteria H2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	64.1	28.1	3.9	3.9	0	4.52	5
Weighted average score	64.1	28.1	3.9	3.9	0	4.52	5

b.) Assessment Tool: Student Course Survey

Table H4.14: Average score of student course survey for criteria H2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	64.1	28.1	3.9	3.9	0	4.52	5
Weighted average score	64.1	28.1	3.9	3.9	0	4.52	5

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table H4.15: Assessment for criteria H2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	40	26	4	4	3.8
Alumni survey	24	52	18	4	2	3.92
Employer Survey	44	44	12	0	0	4.32

Finally overall weighted average score of performance criterion 'H2' is evaluated as given below in Table H4.16:

Table H4.16: Overall weighted average score of performance criterion 'H2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	64.1	28.1	3.9	3.9	0	4.52	5.0
Weighted average student course survey	64.1	28.1	3.9	3.9	0	4.52	4.0
Graduating student survey	26	40	26	4	4	3.8	3.0
Alumni survey	24	52	18	4	2	3.92	3.0
Employer survey	44	44	12	0	0	4.32	3.0
Overall weighted score	47.72	36.72	11.28	3.28	1.00	4.27	18.0

Assessment of Outcome 'H' using performance criterion H3

Performance criteria 'H3': Evaluates engineering solutions that consider environmental factors.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: One course namely Capstone Project (UME891) was used to assess performance criteria H3 as a direct measure. The analysis for each of these courses is provided below:

The above performance criteria is used to measure the attainment of outcome 'H3' from the Project Title +Project response sheet (Question: From final report and Q&A from project response sheet; weightage 5 marks)

Question: Evaluate the environmental factors in the engineering design of this project. What was the environmental impact, energy requirement/saving/regeneration of your project? Did the project make you appreciate the impact of engineering decisions on energy resources?

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'H3'; course: UME891

S. No.	Roll No.	Name	Marks (5)	Score Scale (1-5)
1	101308001	Ankit Juneja	5	5
2	101308002	Abhinav	3	3
3	101308003	Abhishek Kumar Verma	4	4

4	101308004	Abhyuday Singh	3	3
5	101308006	Aditya Agrawal	4	4
6	101308007	Ajeet Pal Singh	3	3
7	101308008	Akash Malhotra	4	4
8	101308009	Akash Reddy Kakularam	4	4
9	101308010	Akash Sharma	3	3
10	101308011	Akashdeep Singh Gandhi	3	3
11	101308012	Akshay Kumar	4	4
12	101308013	Amritpal Singh Sangwan	5	5
13	101308014	Aneesh Kejariwal	4	4
14	101308015	Ankit Sehgal	4.5	5
15	101308016	Ankur Goyal	3	3
16	101308017	Ankush Bansal	3	3
17	101308018	Anoop	5	5
18	101308019	Anshaj Jindal	3	3
19	101308020	Anuj Jain	4	4
20	101308021	Arshdeep Singh	3	3
21	101308023	Bhabuk Goyal	3	3
22	101308024	Bhajanpreet Singh	3	3
23	101308025	Bhuvanyu	4	4
24	101308026	Bipin Loi	3	3
25	101308027	Brhamjyot Singh Sandhu	4.5	5
26	101308028	Deepak Dalal	5	5
27	101308029	Deepak Sharma	5	5
28	101308031	Dhiraj Dureja	5	5
29	101308032	Dildeep Singh	4.5	5
30	101308033	Ekansh Kumar Srivastava	4	4
31	101308034	Ekjyot Singh	3	3
32	101308035	Gagandeep Singh	4.5	5
33	101308036	Gautam Dawar	4	4
34	101308037	Gurkirat Pal Singh	4	4
35	101308038	Gurkirat Singh Sangha	4.5	5
36	101308039	Gurpreet Singh	4.5	5
37	101308040	Gurpreet Singh	5	5
38	101308042	Gurtej Singh	5	5
39	101308043	Guruteshwar	5	5
40	101308044	Harjot Singh	4.5	5
41	101308045	Harnoor Singh	3	3
42	101308046	Harsh Narang	4	4
43	101308047	Harsimran	5	5
44	101308048	Hemant Aggarwal	4.5	5
45	101308050	Iknoor Singh	4	4

46	101308051	Ishdeep Arora	5	5
47	101308052	Japdanish Singh	5	5
48	101308053	Jashanpreet Singh	3	3
49	101308054	Jaskaran Singh	4.5	5
50	101308055	Jatin Khosla	3	3
51	101308057	Kanav Bansal	4.5	5
52	101308059	Kanwar Gulati	3	3
53	101308060	Karan Chopra	3	3
54	101308061	Karan Goyal	3	3
55	101308063	Karan Veer Dewan	3	3
56	101308064	Karanbir Singh	3	3
57	101308065	Kashish Khurana	3	3
58	101308066	Keshav Jindal	5	5
59	101308067	Ketan Chauhan	3	3
60	101308068	Khushwinder Singh	3	3
61	101308069	Kirat Singh Basur	4.5	5
62	101308070	Kshitij Sharma	4.5	5
63	101308071	Lokendra Kumar	4.5	5
64	101308072	Lovedeep Garg	3	3
65	101308073	Manavdeep Singh Grover	5	5
66	101308074	Manik Saharan	4.5	5
67	101308075	Manish Pandoh	3	3
68	101308076	Manpreet Singh	4.5	5
69	101308077	MANUTKARSH KIRPAL	3	3
70	101308078	Nidan Prakash	3	3
71	101308079	NIKHIL AGGARWAL	3	3
72	101308080	NIKHIL GANTA	3	3
73	101308082	PARAMJOT SINGH	3	3
74	101308083	Paras	4.5	5
75	101308085	Prabhman Vir	4.5	5
76	101308088	Pulkit Kapoor	5	5
77	101308089	Puneet Singh	4	4
78	101308090	Rajat Gupta	5	5
79	101308091	Ramnish Kumar	5	5
80	101308093	Rohan Kaushal	5	5
81	101308094	Sagar Singla	5	5
82	101308096	Sahil Sharma	5	5
83	101308097	Samdeep Singh Sabharwal	5	5
84	101308098	Sameer Bhalla	4.5	5
85	101308099	Sartaj Singh	5	5
86	101308100	Shikhar Bhardwaj	5	5
87	101308101	Shikhar Gaur	4	4

88	101308102	Shreyas Bhayana	5	5
89	101308103	Shubham	5	5
90	101308104	Shubham Bhama	4	4
91	101308105	Shubham Choudhary	3	3
92	101308106	Shubham Gupta	5	5
93	101308108	Siddharth Ghiya	4.5	5
94	101308109	Siddharth Gupta	5	5
95	101308110	Siddharth Vasu	4.5	5
96	101308111	Sidhant	5	5
97	101308112	Simrandeep Singh Bhullar	5	5
98	101308113	Sourav Singla	4.5	5
99	101308114	Tanjay Pathak	4.5	5
100	101308115	Tanuj Lamba	4	4
101	101308116	Utsav Mudgal	5	5
102	101308117	Vaibhav Pratap Singh Pundir	4.5	5
103	101308118	Varmeet Singh Gulati	3	3
104	101308119	Varun Atri	4	4
105	101308120	Vedant Mansotra	4	4
106	101308121	Vikrant Nanda	4	4
107	101308122	Vishal Solanki	4	4
108	101308123	Vivek Mittal	5	5
109	101308124	Vivek Pundir	5	5
110	101308125	Yash Wardhan Sharma	5	5
111	101488001	Akash Tiwari	3	3
112	101488002	Anuj Tanwar	3	3
113	101488003	Bhupinder Singh	3	3
114	101488004	Bishant Sharma	3	3
115	101488005	Harish Yadav	5	5
116	101488006	Harpreet Singh	4.5	5
117	101488007	Inderjeet Kumar	3	3
118	101488008	Ishan Bansal	5	5
119	101488009	Jaspreet Singh	4.5	5
120	101488010	Jaspreet Singh	3	3
121	101488011	Kulwinder Singh	4.5	5
122	101488012	MOHIT GOYAL	3	3
123	101488013	NAVJOT RIHAL	3	3
124	101488014	Nikhil Gupta	4.5	5
125	101488015	Sankit	4	4
126	101488016	Sarang Vashisht	5	5
127	101488017	Varun Bansal	5	5
128	101488018	Vishnu Kalra	5	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria H3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	50.8	17.2	32	0	0	4.19

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria H3 as given below in Table H4.19:

Table H4.19: Weighted Average Student class performance (course portfolio) for criteria H3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	50.8	17.2	32	0	0	4.19	5
Weighted average score	50.8	17.2	32	0	0	4.19	5

b.) Assessment Tool: Student Course Survey

Table H4.20: Average score of student course survey for criteria H3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME801	50.8	17.2	32	0	0	4.19	5
Weighted average score	50.8	17.2	32	0	0	4.19	5

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table H4.21: Assessment for criteria A3 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	40	26	4	4	3.8
Alumni survey	24	52	18	4	2	3.92
Employer Survey	44	44	12	0	0	4.32

Finally overall weighted average score of performance criterion ‘H3’ is evaluated as given below in Table H4.22:

Table H4.22: Overall weighted average score of performance criterion ‘H3’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	50.8	17.2	32	0	0	4.19	5.0
Weighted average student course survey	50.8	17.2	32	0	0	4.19	4.0
Graduating student survey	26	40	26	4	4	3.8	3.0
Alumni survey	24	52	18	4	2	3.92	3.0
Employer survey	44	44	12	0	0	4.32	3.0
Overall weighted score	41.07	31.27	25.33	1.33	1.00	4.10	18.0

Overall assessment of student outcome H using scores of H1, H2 and H3

In the above sections, each of the individual performance criteria H1, H2 and H3 have been assessed. The performance for attainment of outcome H has been completed using the attainment values for H1, H2 and H3 and is provided below:

Table H4.23 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome H.

Table H4.23: Overall score for outcome H at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
H1	37.17	42.97	17.53	1.33	1.00	4.14	5
H2	47.72	36.72	11.28	3.28	1.00	4.27	5
H3	41.07	31.27	25.33	1.33	1.00	4.09	4
Overall score	42.05	37.40	17.53	2.03	0.64	4.17	14

Track Record and assessment of attainment of student outcome ‘H’ over the last three academic years

The performance criteria-wise assessment score distribution and overall weighted score for outcome ‘H’ for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table H4.24 presents the performance criteria-wise assessment score distribution for outcome ‘H’

Table H4.24: Performance criteria-wise assessment score distribution of outcome H

Student outcomes and performance criteria		Year		
		2015	2016	2017
H	H1	3.73	4.05	4.14
	H2	3.89	4.01	4.27
	H3	3.79	4.09	4.09

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome ‘H’ over a period of last three years.

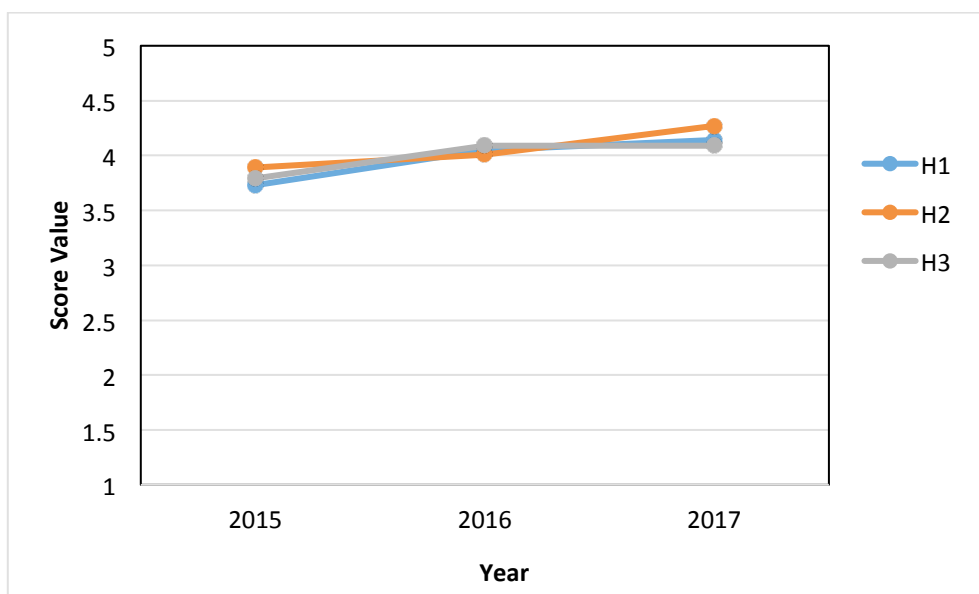


Figure H4.2: Performance criteria-wise assessment score distribution of outcome H

Level of attainment of student outcome ‘H’ over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table H4.25 presents the overall weighted score of outcome ‘H’ over the last three academic years

Table H4.25: Overall weighted score of outcome ‘H’ over a period of last three years

Year	Overall weighted score	Level of attainment
2015	3.80	Good
2016	4.05	Good
2017	4.17	Good

The above data has been plotted to visualize the overall weighted score of outcome ‘H’ over a period of last three years.

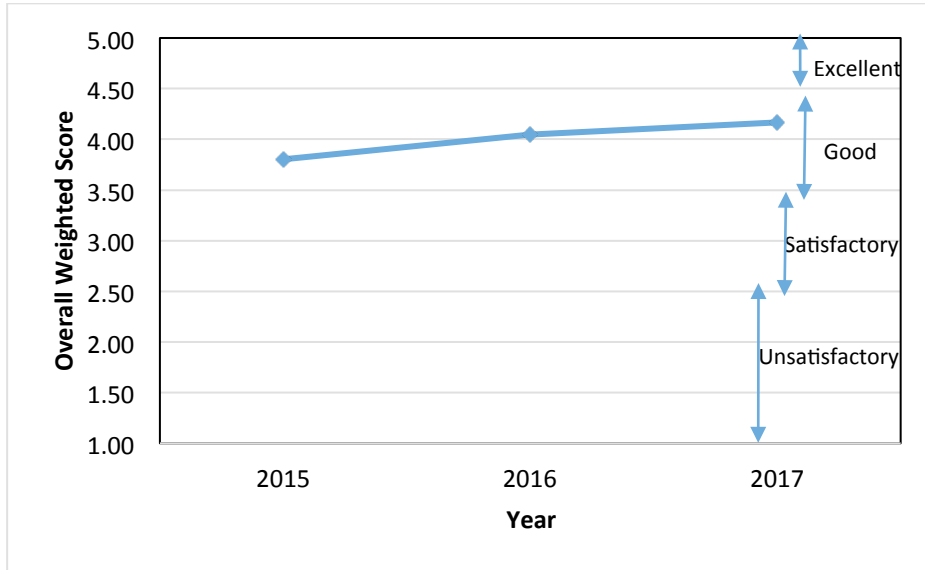


Figure H4.3: Overall weighted score of outcome ‘H’ over a period of last three years

The following actions have been taken based on the analysis of Outcome H

Weighted Score for Outcome F	Recommendation	Reason	Implemented from
4.17	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'I'
(Year 2017)**

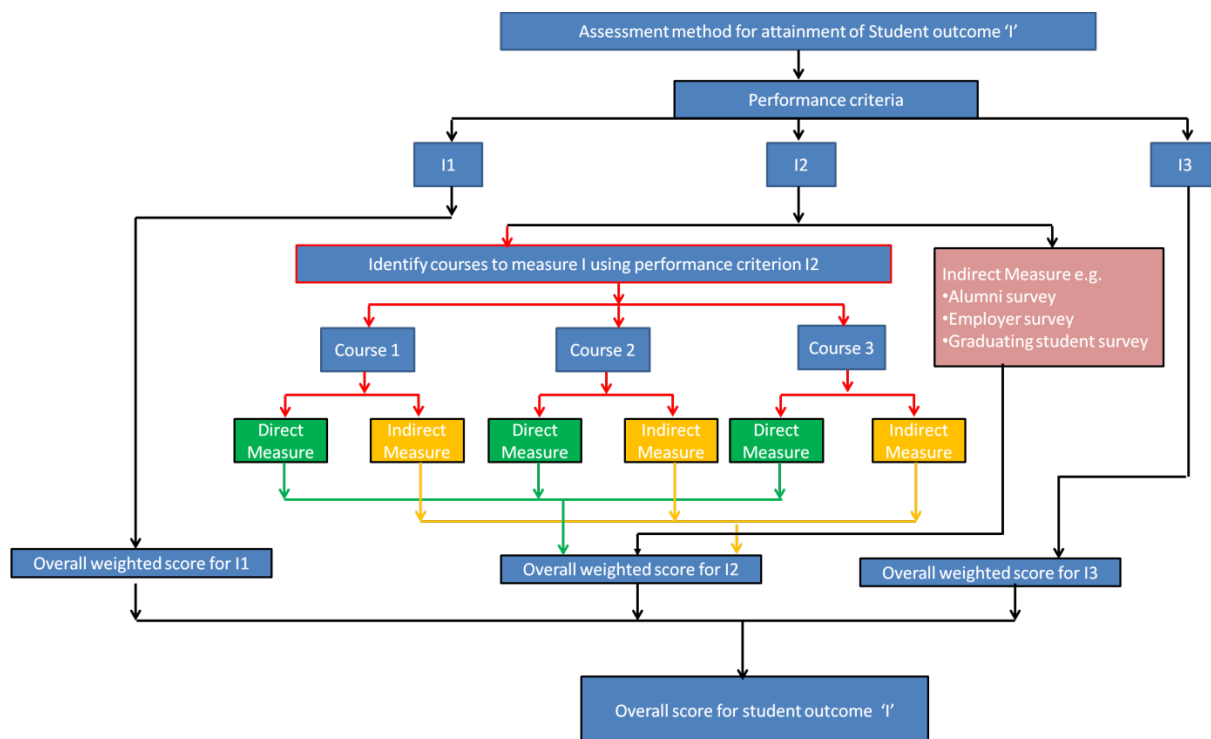
for the

*Bachelor of Engineering
in
Mechanical Engineering*

**Thapar Institute of Engineering & Technology
Patiala (Punjab) - 147004
INDIA**

Attainment of Outcome I

The attainment of each outcome has been measured using a standard procedure explained in the Self Assessment Report for the program. A flow chart depicting the step by step methodology used to measure each attainment is provided below for ready reference.



The following courses have been considered for the assessment of student outcome 'I'

Courses:

1. Project Semester (UME691)
2. Capstone Project (UME891)

Outcome I has been assessed by three performance criteria I1, I2 and I3. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these three performance criteria has been used to measure the overall measure of outcome I.

1) Assessment of Outcome 'I' using performance criterion I1

Performance criteria 'I1': Able to use resources to learn new materials not taught in class.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Project Semester (UME691) and Capstone Project (UME891) were used to assess performance criteria I1 as a direct measure. The analysis for each of these courses is provided below:

i. Project Semester (UME691)

(The criteria 'I1' is evaluated from the student report card submitted by their respective industry mentor by Q. No. B (vii))

Q B(vii): The performance of student measured through project report and defence

Table: Student's performance targeting 'I1'; course: UME691

S. No.	Roll No. of Students	I1	Weight (Scale 1 to 5)
		Q. No. B(vii) (10 Marks)	
1	101408001	10	5
2	101408002	8	4
3	101408003	10	5
4	101408004	8	4
5	101408005	10	5
6	101408006	10	5
7	101408007	10	5
8	101408008	8	4
9	101408009	10	5
10	101408010	10	5
11	101408011	10	5
12	101408012	10	5
13	101408013	8	4
14	101408014	10	5
15	101408016	10	5
16	101408017	8	4
17	101408019	10	5
18	101408020	10	5
19	101408022	8	4
20	101408023	10	5
21	101408026	8	4
23	101408028	8	4
24	101408029	10	5
25	101408030	10	5
26	101408031	10	5
27	101408033	8	4

28	101408034	10	5
31	101408035	10	5
33	101408036	10	5
34	101408037	10	5
35	101408038	8	4
36	101408040	10	5
38	101408041	10	5
40	101408042	10	5
43	101408043	10	5
44	101408044	10	5
45	101408045	10	5
46	101408047	8	4
47	101408049	10	5
50	101408050	10	5
51	101408051	8	4
54	101408052	10	5
56	101408055	10	5
58	101408056	10	5
59	101408057	10	5
60	101408058	8	4
61	101408059	10	5
62	101408060	10	5
63	101408062	10	5
64	101408063	10	5
65	101408064	8	4
66	101408065	10	5
67	101408066	10	5
68	101408067	10	5
69	101408069	10	5
70	101408070	8	4
71	101408071	8	4
72	101408074	8	4
73	101408076	10	5
75	101408077	10	5
77	101408078	10	5
78	101408079	10	5
80	101408080	10	5
81	101408082	8	4
82	101408083	10	5
83	101408084	10	5
84	101408085	8	4
85	101408086	10	5

87	101408087	10	5
88	101408089	10	5
93	101408090	8	4
94	101408091	8	4
95	101408092	10	5
98	101408093	10	5
100	101408094	10	5
102	101408095	8	4
103	101408096	8	4
104	101408098	8	4
105	101408100	10	5
106	101408101	10	5
107	101408104	10	5
108	101408107	10	5
111	101408108	10	5
118	101408110	8	4
120	101408111	8	4
121	101408112	10	5
22	101408113	10	5
29	101408114	8	4
30	101408115	10	5
32	101408116	8	4
37	101408118	8	4
39	101408120	10	5
41	101408121	10	5
42	101408122	10	5
48	101408123	10	5
49	101408124	10	5
52	101408125	10	5
53	101408126	8	4
55	101408127	8	4
57	101408128	8	4
74	101408130	10	5
76	101408131	8	4
79	101408132	10	5
86	101408134	10	5
89	101408136	10	5
90	101408137	10	5
91	101458001	10	5
92	101458003	10	5
96	101458004	10	5
97	101588001	10	5

99	101588002	8	4
101	101588003	10	5
109	101588004	10	5
110	101588005	10	5
112	101588006	10	5
113	101588008	10	5
114	101588009	10	5
115	101588010	10	5
116	101588012	10	5
117	101588013	8	4
119	101588014	8	4
122	101588015	10	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME691 for criteria I1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	70.5	29.5	0	0	0	4.705

ii. Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome 'I1' from the showcase event (Question: Showcase event evaluation; weightage 30 marks).

Question: Prototype design, fabrication, demonstration, poster design and presentation.

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'I1'; course: UME891

S. No.	Roll No.	Name	Marks (30)	Score Scale (1-5)
1	101308001	Ankit Juneja	23.8	4
2	101308002	Abhinav	22.5	4
3	101308003	Abhishek Kumar Verma	22.2	4
4	101308004	Abhyuday Singh	22.5	4
5	101308006	Aditya Agrawal	22.2	4
6	101308007	Ajeet Pal Singh	22.3	4
7	101308008	Akash Malhotra	22.2	4
8	101308009	Akash Reddy Kakularam	25.0	5
9	101308010	Akash Sharma	19.0	3
10	101308011	Akashdeep Singh Gandhi	22.5	4
11	101308012	Akshay Kumar	22.2	4

12	101308013	Amritpal Singh Sangwan	21.2	4
13	101308014	Aneesh Kejariwal	25.0	5
14	101308015	Ankit Sehgal	18.0	3
15	101308016	Ankur Goyal	19.0	3
16	101308017	Ankush Bansal	19.0	3
17	101308018	Anoop	21.2	4
18	101308019	Anshaj Jindal	19.0	3
19	101308020	Anuj Jain	25.0	5
20	101308021	Arshdeep Singh	22.5	4
21	101308023	Bhabuk Goyal	19.0	3
22	101308024	Bhajanpreet Singh	19.0	3
23	101308025	Bhuvanyu	22.2	4
24	101308026	Bipin Loi	22.3	4
25	101308027	Brhamjyot Singh Sandhu	23.3	4
26	101308028	Deepak Dalal	22.0	4
27	101308029	Deepak Sharma	22.0	4
28	101308031	Dhiraj Dureja	22.0	4
29	101308032	Dildeep Singh	23.3	4
30	101308033	Ekansh Kumar Srivastava	20.7	4
31	101308034	Ekjyot Singh	22.5	4
32	101308035	Gagandeep Singh	23.3	4
33	101308036	Gautam Dawar	25.0	5
34	101308037	Gurkirat Pal Singh	25.0	5
35	101308038	Gurkirat Singh Sangha	23.3	4
36	101308039	Gurpreet Singh	23.3	4
37	101308040	Gurpreet Singh	21.2	4
38	101308042	Gurtej Singh	21.2	4
39	101308043	Guruteshwar	22.0	4
40	101308044	Harjot Singh	23.3	4
41	101308045	Harnoor Singh	22.5	4
42	101308046	Harsh Narang	25.0	5
43	101308047	Harsimran	22.0	4
44	101308048	Hemant Aggarwal	22.0	4
45	101308050	Iknoor Singh	22.2	4
46	101308051	Ishdeep Arora	21.2	4
47	101308052	Japdanish Singh	23.8	4
48	101308053	Jashanpreet Singh	19.7	4
49	101308054	Jaskaran Singh	20.7	4
50	101308055	Jatin Khosla	23.7	4
51	101308057	Kanav Bansal	20.7	4
52	101308059	Kanwar Gulati	22.0	4
53	101308060	Karan Chopra	23.7	4

54	101308061	Karan Goyal	19.7	4
55	101308063	Karan Veer Dewan	23.7	4
56	101308064	Karanbir Singh	19.7	4
57	101308065	Kashish Khurana	23.7	4
58	101308066	Keshav Jindal	23.8	4
59	101308067	Ketan Chauhan	22.0	4
60	101308068	Khushwinder Singh	19.7	4
61	101308069	Kirat Singh Basur	18.0	3
62	101308070	Kshitij Sharma	18.0	3
63	101308071	Lokendra Kumar	22.0	4
64	101308072	Lovedeep Garg	19.7	4
65	101308073	Manavdeep Singh Grover	23.8	4
66	101308074	Manik Saharan	18.0	3
67	101308075	Manish Pandoh	22.0	4
68	101308076	Manpreet Singh	20.7	4
69	101308077	MANUTKARSH KIRPAL	18.0	3
70	101308078	Nidan Prakash	22.0	4
71	101308079	NIKHIL AGGARWAL	18.0	3
72	101308080	NIKHIL GANTA	18.0	3
73	101308082	PARAMJOT SINGH	18.0	3
74	101308083	Paras	22.0	4
75	101308085	Prabhman Vir	18.0	3
76	101308088	Pulkit Kapoor	22.0	4
77	101308089	Puneet Singh	20.7	4
78	101308090	Rajat Gupta	21.3	4
79	101308091	Ramnish Kumar	21.3	4
80	101308093	Rohan Kaushal	22.0	4
81	101308094	Sagar Singla	21.3	4
82	101308096	Sahil Sharma	22.0	4
83	101308097	Samdeep Singh Sabharwal	21.3	4
84	101308098	Sameer Bhalla	22.0	4
85	101308099	Sartaj Singh	21.3	4
86	101308100	Shikhar Bhardwaj	21.2	4
87	101308101	Shikhar Gaur	19.7	4
88	101308102	Shreyas Bhayana	25.8	5
89	101308103	Shubham	21.3	4
90	101308104	Shubham Bhama	19.7	4
91	101308105	Shubham Choudhary	22.0	4
92	101308106	Shubham Gupta	25.8	5
93	101308108	Siddharth Ghiya	20.0	4
94	101308109	Siddharth Gupta	25.8	5
95	101308110	Siddharth Vasu	20.0	4

96	101308111	Sidhant	25.8	5
97	101308112	Simrandeep Singh Bhullar	25.8	5
98	101308113	Sourav Singla	20.0	4
99	101308114	Tanjay Pathak	20.0	4
100	101308115	Tanuj Lamba	19.7	4
101	101308116	Utsav Mudgal	22.0	4
102	101308117	Vaibhav Pratap Singh Pundir	20.0	4
103	101308118	Varmeet Singh Gulati	22.0	4
104	101308119	Varun Atri	19.7	4
105	101308120	Vedant Mansotra	20.7	4
106	101308121	Vikrant Nanda	19.7	4
107	101308122	Vishal Solanki	20.7	4
108	101308123	Vivek Mittal	25.3	5
109	101308124	Vivek Pundir	25.3	5
110	101308125	Yash Wardhan Sharma	25.3	5
111	101488001	Akash Tiwari	22.3	4
112	101488002	Anuj Tanwar	22.3	4
113	101488003	Bhupinder Singh	22.3	4
114	101488004	Bishant Sharma	22.3	4
115	101488005	Harish Yadav	22.0	4
116	101488006	Harpreet Singh	20.7	4
117	101488007	Inderjeet Kumar	23.7	4
118	101488008	Ishan Bansal	22.0	4
119	101488009	Jaspreet Singh	20.7	4
120	101488010	Jaspreet Singh	23.7	4
121	101488011	Kulwinder Singh	20.7	4
122	101488012	MOHIT GOYAL	18.0	3
123	101488013	NAVJOT RIHAL	18.0	3
124	101488014	Nikhil Gupta	22.0	4
125	101488015	Sankit	20.7	4
126	101488016	Sarang Vashisht	22.0	4
127	101488017	Varun Bansal	25.3	5
128	101488018	Vishnu Kalra	25.3	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria I1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	12.5	74.2	13.3	0	0	3.99

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria I1 as given below in Table I4.5:

Table I4.5: Weighted Average Student class performance (course portfolio) for criteria I1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	12.5	74.2	13.3	0	0	3.99	5
UME691	70.5	29.5	0	0	0	4.705	5
Weighted average score	41.50	51.85	6.65	0.00	0.00	4.35	10

b) Indirect measures for Performance criteria I1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table I4.6: Average score of student course survey for criteria I1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	12.5	74.2	13.3	0	0	3.99	5.00
UME891	70.5	29.5	0	0	0	4.705	5.00
Weighted average score	41.50	51.85	6.65	0.00	0.00	4.35	10.00

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table I4.7: Assessment for criteria I1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	58	12	0	4	4.02
Alumni survey	34	46	18	2	0	4.12
Employer Survey	58	40	2	0	0	4.56

c) Overall weighted average score of performance criterion 'I1'

Finally, overall weighted average score of performance criterion 'I1' is evaluated as given below in Table I4.8:

Table I4.8: Overall weighted average score of performance criterion 'I1'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	41.50	51.85	6.65	0.00	0.00	4.35	5.0
Weighted average student course survey	41.50	51.85	6.65	0.00	0.00	4.35	4.0
Graduating student survey	26	58	12	0	4	4.02	3.0
Alumni survey	34	46	18	2	0	4.12	3.0
Employer survey	58	40	2	0	0	4.56	3.0
Overall weighted score	40.42	49.93	8.66	0.33	0.67	4.29	18.0

Assessment of Outcome 'I' using performance criterion I2

Performance criteria 'I2': Ability to list sources for continuing education opportunities.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Project Semester (UME691) and Capstone Project (UME801) were used to assess performance criteria I2 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Project Semester (UME691)

(The criteria 'I2' is evaluated from the student report card submitted by their respective industry mentor by Q. No. B (iv))

Q B(iv): Information collection update: This refers to (a) Literature survey (b) Guidance from others in industry and institute.

Table: Student's performance targeting 'I2'; course: UME691

S. No.	Roll No.	I2	Weight (Scale 1 to 5)
		Q. No. B(iv) (10 Marks)	
1	101408001	10	5
2	101408002	10	5
3	101408003	10	5
4	101408004	10	5
5	101408005	8	4
6	101408006	10	5
7	101408007	10	5
8	101408008	10	5
9	101408009	10	5
10	101408010	10	5

11	101408011	10	5
12	101408012	10	5
13	101408013	8	4
14	101408014	10	5
15	101408016	10	5
16	101408017	8	4
17	101408019	10	5
18	101408020	8	4
19	101408022	8	4
20	101408023	10	5
21	101408026	10	5
22	101408028	10	5
23	101408029	10	5
24	101408030	8	4
25	101408031	8	4
26	101408032	10	5
27	101408033	10	5
28	101408034	8	4
29	101408035	8	4
30	101408036	10	5
31	101408037	8	4
32	101408038	8	4
33	101408040	10	5
34	101408041	10	5
35	101408042	10	5
36	101408043	10	5
37	101408044	10	5
38	101408045	10	5
39	101408047	10	5
40	101408049	8	4
41	101408050	10	5
42	101408051	10	5
43	101408052	6	3
44	101408055	10	5
45	101408056	10	5
46	101408057	10	5
47	101408058	8	4
48	101408059	10	5
49	101408060	10	5
50	101408062	10	5
51	101408063	8	4
52	101408064	10	5
53	101408065	10	5

54	101408066	8	4
55	101408067	10	5
56	101408069	10	5
57	101408070	10	5
58	101408071	10	5
59	101408074	8	4
60	101408076	10	5
61	101408077	10	5
62	101408078	10	5
63	101408079	8	4
64	101408080	10	5
65	101408082	8	4
66	101408083	10	5
67	101408084	10	5
68	101408085	8	4
69	101408086	10	5
70	101408087	8	4
71	101408089	10	5
72	101408090	10	5
73	101408091	10	5
74	101408092	10	5
75	101408093	10	5
76	101408094	10	5
77	101408095	10	5
78	101408096	10	5
79	101408098	8	4
80	101408100	10	5
81	101408101	10	5
82	101408104	10	5
83	101408107	10	5
84	101408108	10	5
85	101408110	8	4
86	101408111	10	5
87	101408112	8	4
88	101408113	10	5
89	101408114	10	5
90	101408115	10	5
91	101408116	10	5
92	101408118	10	5
93	101408120	10	5
94	101408121	10	5
95	101408122	10	5

96	101408123	10	5
97	101408124	10	5
98	101408125	10	5
99	101408126	10	5
100	101408127	10	5
101	101408128	10	5
102	101408130	10	5
103	101408131	8	4
104	101408132	10	5
105	101408134	10	5
106	101408136	10	5
107	101408137	10	5
108	101458001	10	5
109	101458003	8	4
110	101458004	10	5
111	101588001	10	5
112	101588002	8	4
113	101588003	10	5
114	101588004	8	4
115	101588005	10	5
116	101588006	10	5
117	101588008	10	5
118	101588009	10	5
119	101588010	10	5
120	101588012	10	5
121	101588013	10	5
122	101588014	8	4

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME691for criteria I2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	76.4	22.8	0.8	0	0	4.756

ii. Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome 'I2' from the 2nd and 3rd evaluation (Question: Component from 2nd evaluation (3)+Component from 3rd evaluation (15); weightage 18 marks).

Question: Contents of reports from 2nd and 3rd evaluation.

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'I2'; course: UME891

S. No.	Roll No.	Name	Marks (18)	Score Scale (1-5)
1	101308001	Ankit Juneja	14.5	4
2	101308002	Abhinav	15.5	5
3	101308003	Abhishek Kumar Verma	15.5	5
4	101308004	Abhyuday Singh	15.5	5
5	101308006	Aditya Agrawal	15.5	5
6	101308007	Ajeet Pal Singh	15.5	5
7	101308008	Akash Malhotra	15.5	5
8	101308009	Akash Reddy Kakularam	16.0	5
9	101308010	Akash Sharma	15.0	5
10	101308011	Akashdeep Singh Gandhi	15.5	5
11	101308012	Akshay Kumar	15.5	5
12	101308013	Amritpal Singh Sangwan	14.0	4
13	101308014	Aneesh Kejariwal	16.0	5
14	101308015	Ankit Sehgal	12.5	4
15	101308016	Ankur Goyal	15.0	5
16	101308017	Ankush Bansal	15.5	5
17	101308018	Anoop	14.0	4
18	101308019	Anshaj Jindal	15.0	5
19	101308020	Anuj Jain	16.0	5
20	101308021	Arshdeep Singh	15.5	5
21	101308023	Bhabuk Goyal	15.0	5
22	101308024	Bhajanpreet Singh	15.5	5
23	101308025	Bhuvanyu	15.5	5
24	101308026	Bipin Loi	15.5	5
25	101308027	Brhamjyot Singh Sandhu	14.0	4
26	101308028	Deepak Dalal	12.5	4
27	101308029	Deepak Sharma	12.5	4
28	101308031	Dhiraj Dureja	13.5	4
29	101308032	Dildeep Singh	14.0	4
30	101308033	Ekansh Kumar Srivastava	13.5	4
31	101308034	Ekjyot Singh	15.5	5
32	101308035	Gagandeep Singh	14.0	4
33	101308036	Gautam Dawar	16.0	5
34	101308037	Gurkirat Pal Singh	16.0	5
35	101308038	Gurkirat Singh Sangha	14.0	4
36	101308039	Gurpreet Singh	14.0	4
37	101308040	Gurpreet Singh	14.0	4
38	101308042	Gurtej Singh	14.0	4

39	101308043	Guruteshwar	12.0	4
40	101308044	Harjot Singh	14.0	4
41	101308045	Harnoor Singh	15.5	5
42	101308046	Harsh Narang	16.0	5
43	101308047	Harsimran	12.0	4
44	101308048	Hemant Aggarwaal	15.0	5
45	101308050	Iknoor Singh	15.5	5
46	101308051	Ishdeep Arora	14.0	4
47	101308052	Japdanish Singh	14.5	4
48	101308053	Jashanpreet Singh	13.5	4
49	101308054	Jaskaran Singh	16.5	5
50	101308055	Jatin Khosla	14.5	4
51	101308057	Kanav Bansal	16.5	5
52	101308059	Kanwar Gulati	14.5	4
53	101308060	Karan Chopra	14.5	4
54	101308061	Karan Goyal	13.5	4
55	101308063	Karan Veer Dewan	14.5	4
56	101308064	Karanbir Singh	13.5	4
57	101308065	Kashish Khurana	14.5	4
58	101308066	Keshav Jindal	14.5	4
59	101308067	Ketan Chauhan	14.5	4
60	101308068	Khushwinder Singh	13.5	4
61	101308069	Kirat Singh Basur	12.5	4
62	101308070	Kshitij Sharma	12.5	4
63	101308071	Lokendra Kumar	15.0	5
64	101308072	Lovedeep Garg	13.5	4
65	101308073	Manavdeep Singh Grover	14.5	4
66	101308074	Manik Saharan	12.5	4
67	101308075	Manish Pandoh	14.5	4
68	101308076	Manpreet Singh	16.5	5
69	101308077	MANUTKARSH KIRPAL	13.0	4
70	101308078	Nidan Prakash	14.5	4
71	101308079	NIKHIL AGGARWAL	14.5	4
72	101308080	NIKHIL GANTA	14.5	4
73	101308082	PARAMJOT SINGH	12.0	4
74	101308083	Paras	15.0	5
75	101308085	Prabhman Vir	12.5	4
76	101308088	Pulkit Kapoor	16.0	5
77	101308089	Puneet Singh	13.5	4
78	101308090	Rajat Gupta	15.0	5
79	101308091	Ramnish Kumar	15.0	5
80	101308093	Rohan Kaushal	16.0	5

81	101308094	Sagar Singla	15.0	5
82	101308096	Sahil Sharma	16.0	5
83	101308097	Samdeep Singh Sabharwal	15.0	5
84	101308098	Sameer Bhalla	15.0	5
85	101308099	Sartaj Singh	15.0	5
86	101308100	Shikhar Bhardwaj	14.0	4
87	101308101	Shikhar Gaur	14.0	4
88	101308102	Shreyas Bhayana	14.5	4
89	101308103	Shubham	15.0	5
90	101308104	Shubham Bhama	14.5	4
91	101308105	Shubham Choudhary	14.5	4
92	101308106	Shubham Gupta	14.5	4
93	101308108	Siddharth Ghiya	15.5	5
94	101308109	Siddharth Gupta	14.5	4
95	101308110	Siddharth Vasu	15.5	5
96	101308111	Sidhant	14.5	4
97	101308112	Simrandeep Singh Bhullar	14.5	4
98	101308113	Sourav Singla	15.5	5
99	101308114	Tanjay Pathak	15.5	5
100	101308115	Tanuj Lamba	14.0	4
101	101308116	Utsav Mudgal	16.0	5
102	101308117	Vaibhav Pratap Singh Pundir	15.5	5
103	101308118	Varmeet Singh Gulati	14.5	4
104	101308119	Varun Atri	14.0	4
105	101308120	Vedant Mansotra	13.5	4
106	101308121	Vikrant Nanda	14.0	4
107	101308122	Vishal Solanki	13.5	4
108	101308123	Vivek Mittal	15.0	5
109	101308124	Vivek Pundir	15.0	5
110	101308125	Yash Wardhan Sharma	15.0	5
111	101488001	Akash Tiwari	15.5	5
112	101488002	Anuj Tanwar	15.5	5
113	101488003	Bhupinder Singh	15.5	5
114	101488004	Bishant Sharma	15.5	5
115	101488005	Harish Yadav	13.5	4
116	101488006	Harpreet Singh	16.5	5
117	101488007	Inderjeet Kumar	14.5	4
118	101488008	Ishan Bansal	16.0	5
119	101488009	Jaspreet Singh	16.5	5
120	101488010	Jaspreet Singh	14.5	4
121	101488011	Kulwinder Singh	16.5	5
122	101488012	MOHIT GOYAL	14.5	4

123	101488013	NAVJOT RIHAL	12.0	4
124	101488014	Nikhil Gupta	15.0	5
125	101488015	Sankit	13.5	4
126	101488016	Sarang Vashisht	16.0	5
127	101488017	Varun Bansal	15.0	5
128	101488018	Vishnu Kalra	16.0	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria I2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	49.2	50.8	0	0	0	4.49

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria I2 as given below in Table I4.13:

Table I4.13: Weighted Average Student class performance (course portfolio) for criteria I2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	49.2	50.8	0	0	0	4.49	5
UME691	76.4	22.8	0.8	0	0	4.76	5
Weighted average score	62.80	36.80	0.40	0.00	0.00	4.62	10

b.) Assessment Tool: Student Course Survey

Table I4.14: Average score of student course survey for criteria I2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	49.2	50.8	0	0	0	4.49	5.00
UME691	76.4	22.8	0.8	0	0	4.76	5.00
Weighted average score	62.80	36.80	0.40	0.00	0.00	4.62	10.00

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table I4.15: Assessment for criteria I2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	58	12	0	4	4.02
Alumni survey	34	46	18	2	0	4.12
Employer Survey	58	40	2	0	0	4.56

Finally overall weighted average score of performance criterion 'I2' is evaluated as given below in Table I4.16:

Table I4.16: Overall weighted average score of performance criterion 'I2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	69.8	40.9	0.4	0	0	4.6	5.0
Weighted average student course survey	69.8	40.9	0.4	0	0	4.62	4.0
Graduating student survey	26	58	12	0	4	4.02	3.0
Alumni survey	34	46	18	2	0	4.12	3.0
Employer survey	58	40	2	0	0	4.56	3.0
Overall weighted score	51.07	42.40	5.53	0.33	0.67	4.43	18.0

Assessment of Outcome 'I' using performance criterion I3

Performance criteria 'I3': Applying scientific and/or engineering principles towards solving engineering problems.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Project Semester (UME691) and Capstone Project (UME891) were used to assess performance criteria I3 as a direct measure. The analysis for each of these courses is provided below:

(i) Course: Project Semester (UME691)

(The criteria 'I3' is evaluated from the student report card submitted by their respective industry mentor by Q. No. A (vi))

Q A(vi): Application skills (refers to the ability to apply knowledge to the real life situations)

Table: Student's performance targeting 'I3'; course: UME691

S. No.	Roll No.	I3	Weight (Scale 1 to 5)
		Q. No. A(vi) (10 Marks)	
1	101408001	10	5
2	101408002	10	5
3	101408003	10	5

4	101408004	8	4
5	101408005	8	4
6	101408006	10	5
7	101408007	10	5
8	101408008	10	5
9	101408009	10	5
10	101408010	10	5
11	101408011	10	5
12	101408012	10	5
13	101408013	10	5
14	101408014	10	5
15	101408016	10	5
16	101408017	8	4
17	101408019	10	5
18	101408020	10	5
19	101408022	6	3
20	101408023	10	5
21	101408026	10	5
22	101408028	10	5
23	101408029	10	5
24	101408030	8	4
25	101408031	10	5
26	101408032	10	5
27	101408033	10	5
28	101408034	6	3
29	101408035	10	5
30	101408036	10	5
31	101408037	10	5
32	101408038	10	5
33	101408040	8	4
34	101408041	10	5
35	101408042	8	4
36	101408043	10	5
37	101408044	10	5
38	101408045	8	4
39	101408047	10	5
40	101408049	8	4
41	101408050	10	5
42	101408051	10	5
43	101408052	10	5
44	101408055	8	4
45	101408056	10	5
46	101408057	8	4
47	101408058	10	5
48	101408059	8	4
49	101408060	8	4

50	101408062	10	5
51	101408063	10	5
52	101408064	10	5
53	101408065	10	5
54	101408066	10	5
55	101408067	10	5
56	101408069	10	5
57	101408071	10	5
58	101408074	8	4
59	101408076	10	5
60	101408077	10	5
61	101408078	10	5
62	101408079	10	5
63	101408080	10	5
64	101408082	6	3
65	101408083	10	5
66	101408084	10	5
67	101408085	10	5
68	101408086	10	5
69	101408087	10	5
70	101408089	8	4
71	101408090	8	4
72	101408091	10	5
73	101408092	10	5
74	101408093	10	5
75	101408094	10	5
76	101408095	10	5
77	101408096	8	4
78	101408098	10	5
79	101408100	10	5
80	101408101	10	5
81	101408104	10	5
82	101408107	8	4
83	101408108	10	5
84	101408110	8	4
85	101408111	8	4
86	101408112	10	5
87	101408113	10	5
88	101408114	8	4
89	101408115	10	5
90	101408116	10	5
91	101408118	10	5
92	101408120	10	5
93	101408121	10	5
94	101408122	10	5
95	101408123	10	5

96	101408124	10	5
97	101408125	10	5
98	101408126	8	4
99	101408127	10	5
100	101408128	8	4
101	101408130	10	5
102	101408131	10	5
103	101408132	10	5
104	101408134	10	5
105	101408136	10	5
106	101408137	10	5
107	101458001	10	5
108	101458003	10	5
109	101458004	10	5
110	101588001	10	5
111	101588002	8	4
112	101588003	8	4
113	101588004	10	5
114	101588005	10	5
115	101588006	10	5
116	101588008	10	5
117	101588009	10	5
118	101588010	10	5
119	101588012	10	5
120	101588013	10	5
121	101588014	10	5
122	101588015	10	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME691 for criteria I3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	77.9	19.7	2.4	0	0	4.755

ii. Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome 'I3' from the 3rd and showcase event (Question: Component from 3rd evaluation (10) + Component from showcase event (5); weightage 15 marks).

Question: Daily diaries and individual assessment through viva voce.

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'I3'; course: UME891

S. No.	Roll No.	Name	Marks (15)	Score Scale (1-5)
1	101308001	Ankit Juneja	11.2	4
2	101308002	Abhinav	10.5	4
3	101308003	Abhishek Kumar Verma	12.0	4
4	101308004	Abhyuday Singh	12.5	5
5	101308006	Aditya Agrawal	12.0	4
6	101308007	Ajeet Pal Singh	11.3	4
7	101308008	Akash Malhotra	12.0	4
8	101308009	Akash Reddy Kakularam	10.7	4
9	101308010	Akash Sharma	10.0	4
10	101308011	Akashdeep Singh Gandhi	12.5	5
11	101308012	Akshay Kumar	11.0	4
12	101308013	Amritpal Singh Sangwan	9.5	3
13	101308014	Aneesh Kejariwal	12.7	5
14	101308015	Ankit Sehgal	9.0	3
15	101308016	Ankur Goyal	10.0	4
16	101308017	Ankush Bansal	10.0	4
17	101308018	Anoop	9.5	3
18	101308019	Anshaj Jindal	10.0	4
19	101308020	Anuj Jain	11.7	4
20	101308021	Arshdeep Singh	11.5	4
21	101308023	Bhabuk Goyal	10.0	4
22	101308024	Bhajanpreet Singh	10.0	4
23	101308025	Bhuvanyu	12.0	4
24	101308026	Bipin Loi	9.3	3
25	101308027	Brhamjyot Singh Sandhu	13.0	5
26	101308028	Deepak Dalal	13.0	5
27	101308029	Deepak Sharma	13.0	5
28	101308031	Dhiraj Dureja	13.0	5
29	101308032	Dildeep Singh	10.0	4
30	101308033	Ekansh Kumar Srivastava	7.3	2
31	101308034	Ekjyot Singh	12.5	5
32	101308035	Gagandeep Singh	10.0	4
33	101308036	Gautam Dawar	12.7	5
34	101308037	Gurkirat Pal Singh	11.7	4
35	101308038	Gurkirat Singh Sangha	10.0	4
36	101308039	Gurpreet Singh	12.0	4
37	101308040	Gurpreet Singh	9.5	3
38	101308042	Gurtej Singh	9.5	3

39	101308043	Guruteshwar	13.0	5
40	101308044	Harjot Singh	13.0	5
41	101308045	Harnoor Singh	12.5	5
42	101308046	Harsh Narang	12.7	5
43	101308047	Harsimran	12.0	4
44	101308048	Hemant Aggarwaal	11.7	4
45	101308050	Iknoor Singh	12.0	4
46	101308051	Ishdeep Arora	10.5	4
47	101308052	Japdanish Singh	9.7	3
48	101308053	Jashanpreet Singh	10.7	4
49	101308054	Jaskaran Singh	12.0	4
50	101308055	Jatin Khosla	12.7	5
51	101308057	Kanav Bansal	11.0	4
52	101308059	Kanwar Gulati	11.8	4
53	101308060	Karan Chopra	12.7	5
54	101308061	Karan Goyal	12.7	5
55	101308063	Karan Veer Dewan	12.7	5
56	101308064	Karanbir Singh	9.7	3
57	101308065	Kashish Khurana	13.7	5
58	101308066	Keshav Jindal	12.7	5
59	101308067	Ketan Chauhan	11.8	4
60	101308068	Khushwinder Singh	9.7	3
61	101308069	Kirat Singh Basur	11.0	4
62	101308070	Kshitij Sharma	9.0	3
63	101308071	Lokendra Kumar	11.7	4
64	101308072	Lovedeep Garg	9.7	3
65	101308073	Manavdeep Singh Grover	12.7	5
66	101308074	Manik Saharan	11.0	4
67	101308075	Manish Pandoh	11.8	4
68	101308076	Manpreet Singh	9.0	3
69	101308077	MANUTKARSH KIRPAL	13.0	5
70	101308078	Nidan Prakash	11.8	4
71	101308079	NIKHIL AGGARWAL	13.0	5
72	101308080	NIKHIL GANTA	13.0	5
73	101308082	PARAMJOT SINGH	13.0	5
74	101308083	Paras	11.7	4
75	101308085	Prabhman Vir	11.0	4
76	101308088	Pulkit Kapoor	12.3	5
77	101308089	Puneet Singh	9.3	3
78	101308090	Rajat Gupta	12.7	5
79	101308091	Ramnish Kumar	12.7	5
80	101308093	Rohan Kaushal	10.3	4

81	101308094	Sagar Singla	11.7	4
82	101308096	Sahil Sharma	11.3	4
83	101308097	Samdeep Singh Sabharwal	11.7	4
84	101308098	Sameer Bhalla	11.7	4
85	101308099	Sartaj Singh	11.7	4
86	101308100	Shikhar Bhardwaj	10.5	4
87	101308101	Shikhar Gaur	12.3	5
88	101308102	Shreyas Bhayana	13.0	5
89	101308103	Shubham	11.7	4
90	101308104	Shubham Bhama	12.3	5
91	101308105	Shubham Choudhary	11.8	4
92	101308106	Shubham Gupta	13.0	5
93	101308108	Siddharth Ghiya	12.7	5
94	101308109	Siddharth Gupta	12.0	4
95	101308110	Siddharth Vasu	10.7	4
96	101308111	Sidhant	11.0	4
97	101308112	Simrandeep Singh Bhullar	10.0	4
98	101308113	Sourav Singla	11.7	4
99	101308114	Tanjay Pathak	10.7	4
100	101308115	Tanuj Lamba	11.3	4
101	101308116	Utsav Mudgal	12.3	5
102	101308117	Vaibhav Pratap Singh Pundir	10.7	4
103	101308118	Varmeet Singh Gulati	11.8	4
104	101308119	Varun Atri	9.3	3
105	101308120	Vedant Mansotra	11.3	4
106	101308121	Vikrant Nanda	8.3	3
107	101308122	Vishal Solanki	11.3	4
108	101308123	Vivek Mittal	13.2	5
109	101308124	Vivek Pundir	13.2	5
110	101308125	Yash Wardhan Sharma	13.2	5
111	101488001	Akash Tiwari	10.3	4
112	101488002	Anuj Tanwar	11.3	4
113	101488003	Bhupinder Singh	11.3	4
114	101488004	Bishant Sharma	11.3	4
115	101488005	Harish Yadav	13.0	5
116	101488006	Harpreet Singh	11.0	4
117	101488007	Inderjeet Kumar	13.7	5
118	101488008	Ishan Bansal	10.3	4
119	101488009	Jaspreet Singh	12.0	4
120	101488010	Jaspreet Singh	13.7	5
121	101488011	Kulwinder Singh	11.0	4
122	101488012	MOHIT GOYAL	13.0	5

123	101488013	NAVJOT RIHAL	12.0	4
124	101488014	Nikhil Gupta	11.7	4
125	101488015	Sankit	9.3	3
126	101488016	Sarang Vashisht	10.3	4
127	101488017	Varun Bansal	13.2	5
128	101488018	Vishnu Kalra	13.2	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria I3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	32.8	53.9	12.5	0.8	0	4.19

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria I3 as given below in Table I4.21:

Table I4.21: Weighted Average Student class performance (course portfolio) for criteria I3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	32.8	53.9	12.5	0.8	0	4.19	5
UME691	77.9	19.7	2.4	0	0	4.755	5
Weighted average score	55.35	36.80	7.45	0.40	0.00	4.47	10

b.) Assessment Tool: Student Course Survey

Table I4.22: Average score of student course survey for criteria I3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME891	32.8	53.9	12.5	0.8	0	4.19	5.00
UME691	77.9	19.7	2.4	0	0	4.755	5.00
Weighted average score	55.35	36.80	7.45	0.40	0.00	4.47	10.00

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table I4.23: Assessment for criteria I3 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	58	12	0	4	4.02
Alumni survey	34	46	18	2	0	4.12
Employer Survey	58	40	2	0	0	4.56

Finally overall weighted average score of performance criterion ‘A3’ is evaluated as given below in Table I4.24:

Table I4.24: Overall weighted average score of performance criterion ‘I3’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	55.35	36.80	7.45	0.40	0.00	4.47	5.0
Weighted average student course survey	55.35	36.80	7.45	0.40	0.00	4.47	4.0
Graduating student survey	26	58	12	0	4	4.02	3.0
Alumni survey	34	46	18	2	0	4.12	3.0
Employer survey	58	40	2	0	0	4.56	3.0
Overall weighted score	47.34	42.40	9.06	0.53	0.67	4.35	18.0

Overall assessment of student outcome I using scores of I1, I2 and I3

In the above sections, each of the individual performance criteria I1, I2 and I3 have been assessed. The performance for attainment of outcome A has been completed using the attainment values for I1, I2 and I3 and is provided below:

Table A4.25 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome A.

Table I4.25: Overall score for outcome I at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
I1	40.42	49.93	8.66	0.33	0.67	4.29	5
I2	54.57	44.45	5.53	0.33	0.67	4.42	5
I3	47.34	42.40	9.06	0.53	0.67	4.35	4
Overall score	46.20	45.09	7.66	0.39	0.43	4.36	14

Track Record and assessment of attainment of student outcome ‘I’ over the last three academic years

The performance criteria-wise assessment score distribution and overall weighted score for outcome 'I' for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table I4.26 presents the performance criteria-wise assessment score distribution for outcome 'I'

Table I4.26: Performance criteria-wise assessment score distribution of outcome I

Student outcomes and performance criteria		Year		
		2015	2016	2017
I	I1	4.06	4.29	4.29
	I2	4.04	4.33	4.42
	I3	4.06	4.31	4.35

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome 'I' over a period of last three years.

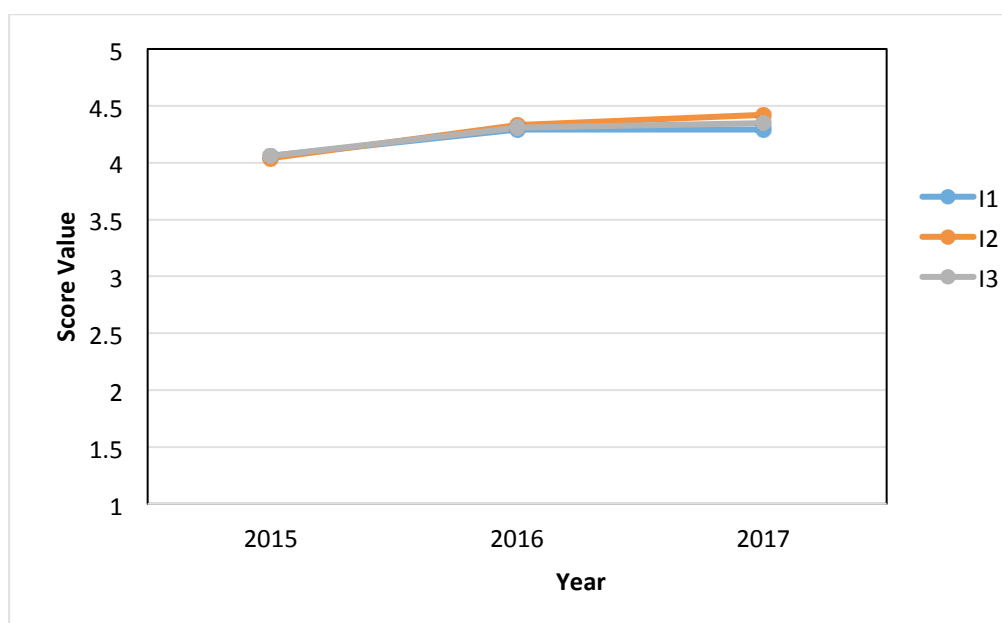


Figure I4.2: Performance criteria-wise assessment score distribution of outcome I

Level of attainment of student outcome 'I' over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table I4.27 presents the overall weighted score of outcome 'I' over the last three academic years.

Table I4.27: Overall weighted score of outcome 'I' over a period of last three years

Year	Overall weighted score	Level of attainment
2015	4.05	Good
2016	4.31	Good
2017	4.36	Good

The above data has been plotted to visualize the overall weighted score of outcome 'I' over a period of last three years.

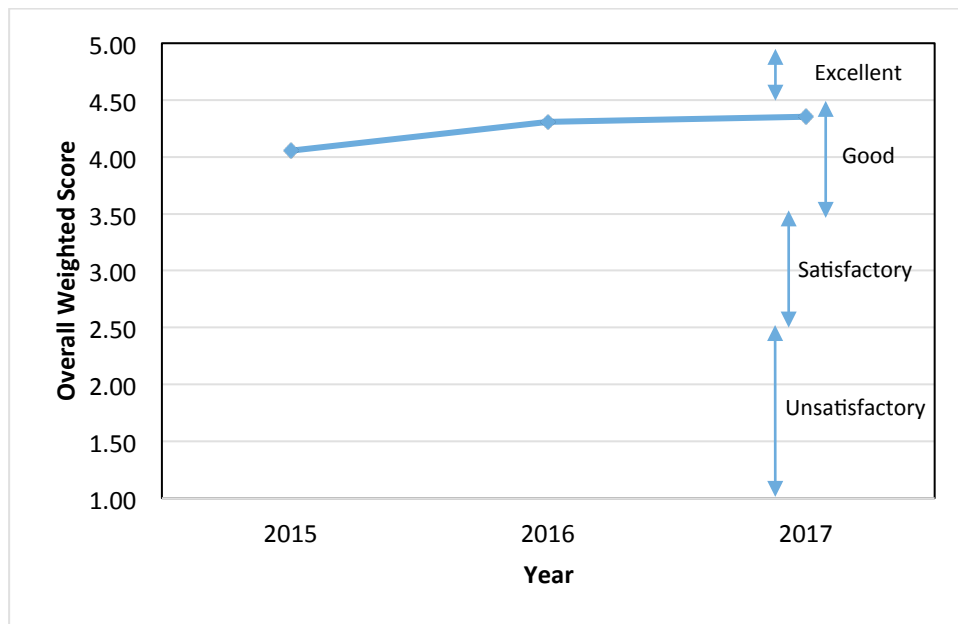


Figure I4.3: Overall weighted score of outcome 'I' over a period of last three years

The following actions have been taken based on the analysis of Outcome I

Weighted Score for Outcome F	Recommendation	Reason	Implemented from
4.36	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'J'
(Year 2017)**

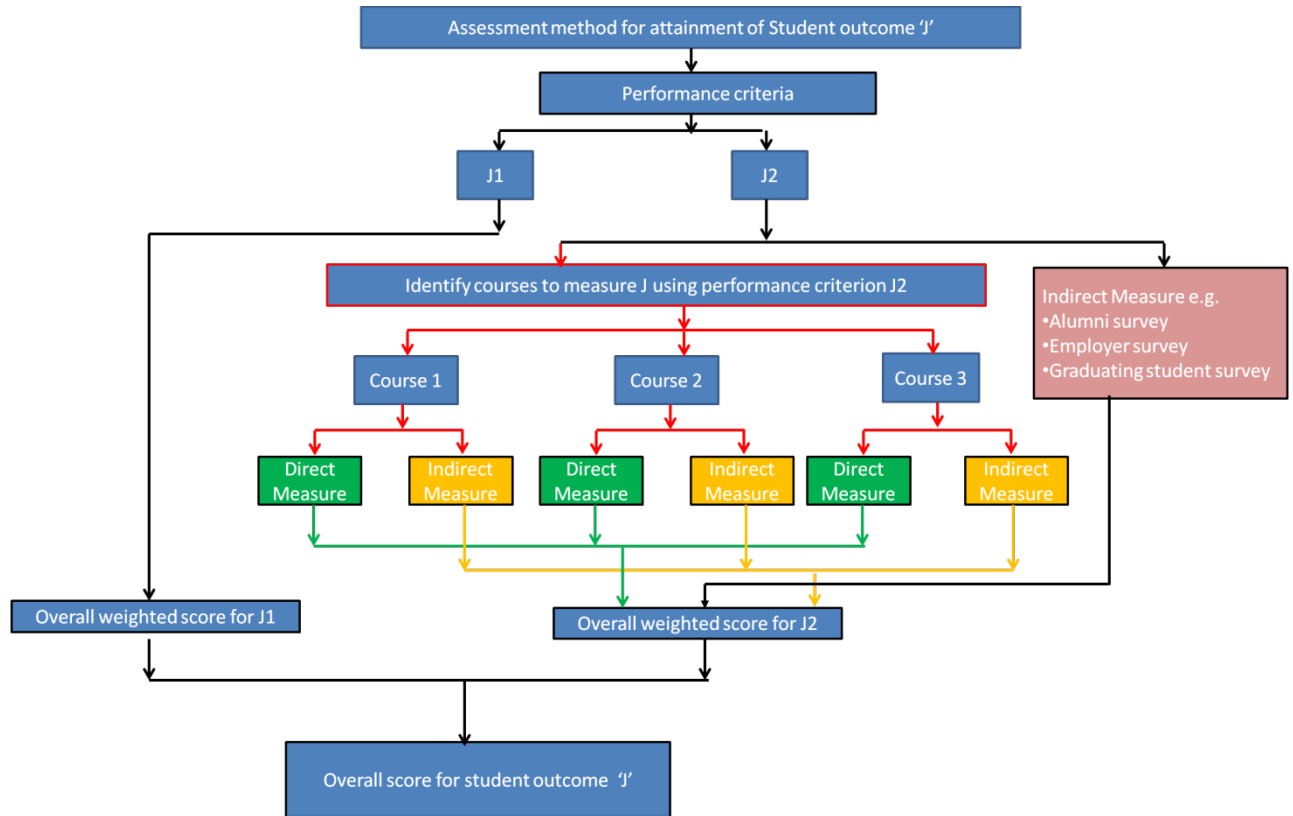
For the

*Bachelor of Engineering
in
Mechanical Engineering*

**Thapar Institute of Engineering & Technology
Patiala (Punjab) - 147004
INDIA**

Attainment of Outcome J

The attainment of each outcome has been measured using a standard procedure explained in the Self-Assessment Report for the program. A flow chart depicting the step-by-step methodology used to measure each attainment is provided below for ready reference.



The following courses have been considered for the assessment of student outcome 'J'

Courses:

1. Automobile Engineering (UME 502)

Outcome J has been assessed by two performance criteria J1 and J2. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these two performance criteria has been used to measure the overall measure of outcome J.

1) Assessment of Outcome 'J' using performance criterion J1

Performance criteria 'J1': Describes the importance of contemporary issues.

a.) Assessment Tool: Student's performance using course portfolio

1. **Step 1:** One course namely Automobile Engineering (UME 502) was used to assess performance criteria J1 as a direct measure. The analysis for each of these courses is provided below:

i. Automobile Engineering (UME 502)

The above performance criteria is used to measure the attainment of outcome 'J' by giving the following question (Question No.: 3 in EST December 2017, weightage 10 marks) to the students.

Question: Identify the components shown in two figures (Fig. 1 and Fig. 2). Where these components are used and describe their working when used in vehicles? You can also draw figures to represent their working?



Student's performance in the above question is given below:

Table: Student's performance in question targeting 'J1'; course: UME502

S.No.	Rollno.	Name	EST Q3 MARKS (10)	SCORE (1-5)
1	101409001	Aadil Marya	7	5
2	101409002	Aakash Singhal	8	5
3	101409003	Aakash Singhal	9	5
4	101409004	Aashish Sharma	2	2
5	101409005	Aayush Sharma	0	1
6	101409006	Akhil Jandial	10	5
7	101409007	Akshita Sachdeva	0	1
8	101409009	Ankit Ahuja	5	4
9	101409010	Arpit Jindal	9	5
10	101409011	Arush Garg	3	3
11	101409012	Ayush Goel	6	5
12	101409013	Damanjit Singh	10	5
13	101409015	Gungeet Singh	5	4
14	101409016	Hanish Bansal	2	2
15	101409018	Harleen Singh	4	4

16	101409019	Hemant Goyal	8	5
17	101409020	Jatin Badyal	-1	0
18	101409021	Juhi Gupta	5	4
19	101409022	Karandeep Singh	4	4
20	101409025	Preet Kamal Singh	7	5
21	101409027	Rishabh Jain	0	1
22	101409028	Rishabh Khanna	0	1
23	101409029	Rishi Garg	5	4
24	101409030	Rohit Aggarwal	2	2
25	101409031	Sahil Khatter	6	5
26	101409032	Sahil Nagi	0	1
27	101409033	Shubham Dixit	0	1
28	101409034	Shubham Gupta	4	4
29	101409035	Sidhant Aggarwal	-1	0
30	101409036	Sulakshay Todwal	3	3
31	101409037	Taranveer Toor	8	5
32	101409038	Vaibhav Bansal	4	4
33	101409039	Vasu Gupta	0	1
34	101409040	Vidit Gupta	6	5
35	101409041	Vidit Vivek Sharma	3	3
36	101414001	Aashray Chopra	5	4
37	101414002	Aayush Goel	5	4
38	101414003	Abhishek Verma	-1	0
39	101414004	Akshay Dureja	6	5
40	101414005	Akshay Garg	6	5
41	101414006	Ayaan Loona	2	2
42	101414007	Brahmdeep Singh	7	5
43	101414009	Chanakya Gupta	3	3
44	101414010	Eshan Aggarwal	3	3
45	101414011	Furqan Khan	5	4
46	101414013	Himal Sharma	3	3
47	101414014	Karan Matta	4	4
48	101414015	Keshav Jindal	2	2
49	101414016	Manvi Sood	3	3
50	101414017	Mayank Mani Sinha	3	3
51	101414018	Mohit Juneja	2	2
52	101414019	Nimish Chhabra	5	4
53	101414020	Rahul Goel	5	4
54	101414021	Rahul Malhotra	5	4
55	101414023	Rishav Kansal	4	4
56	101414026	Sanchit	5	4
57	101414027	Sanghmitra Saxena	5	4
58	101414028	Sanjay saini	6	5
59	101414030	Shivendra Nath Vashishta	5	4
60	101414031	Shray Saboo	5	4
61	101414032	Shubham Sharma	5	4
62	101414033	Tashdeep Singh	1	1
63	101414034	Vedant Bhardwaj	5	4

64	101414035	Yashaswi Issar	3	3
65	101459001	Saajanpreet Singh	8	5
66	101459002	Amrantar Joshi	2	2
67	101459003	Arpit Garg	2	2
68	101459004	Shanav Garg	3	3
69	101459005	Hemant Kumar	4	4
70	101459006	Sameer Mehta	4	4
71	101464001	Harkewalpreet Singh	5	4
72	101464002	Rohan Patel	6	5
73	101464003	Tejeshwar Singh	5	4
74	101464004	Navam Jain	5	4
75	101464005	Sahib harish	6	5
76	101464006	Nikhil Goyal	5	4
77	101464007	Yajan Chopra	5	4
78	101464008	Nitish Kumar	-1	0
79	101464011	Siddhant Gulati	6	5
80	101589002	Himanshu Sharma	-1	0
81	101589003	Jaskirat Singh	8	5
82	101589004	Nitish Gupta	0	1
83	101594001	Chirag Mutreja	5	4
84	101594002	Hardeep singh	5	4
85	101594003	Himanshu Awasthi	9	5
86	101594004	Ravi Inder Singh	9	5
87	401257011	Touseef Alvi	0	1

Table: Weighted Average Student Class Performance (course portfolio) for Attribute J1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME502	28.0	37.8	12.2	9.8	12.2	3.60

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria A1 as given below in Table J4.3:

Table J4.3: Weighted Average Student class performance (course portfolio) for criteria J1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME502	28.0	37.8	12.2	9.8	12.2	3.60	5
Weighted average score	28.0	37.8	12.2	9.8	12.2	3.60	5

b) Indirect measures for Performance criteria J1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table J4.4: Average score of student course survey for criteria J1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME502	44	17	9	13	17	4.11	5
Weighted average score	44	17	9	13	17	4.11	5

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table J4.5: Assessment for criteria J1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	50	18	0	6	3.9
Alumni survey	28	52	14	6	0	4.02
Employer Survey	36	56	4	2	0	4.29

c) Overall weighted average score of performance criterion ‘J1’

Finally overall weighted average score of performance criterion ‘J1’ is evaluated as given below in Table J4.6:

Table J4.6: Overall weighted average score of performance criterion ‘J1’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	28.0	37.8	12.2	9.8	12.2	3.60	5.0
Weighted average student course survey	44	17	9	13	17	4.11	4.0
Graduating student survey	26	50	18	0	6	3.9	3.0
Alumni survey	28	52	14	6	0	4.02	3.0
Employer survey	36	56	4	2	0	4.29	3.0
Overall weighted score	32.56	40.61	11.39	6.94	8.17	3.95	18.0

Assessment of Outcome ‘J’ using performance criterion J2

Performance criteria ‘J2’: Describes the impact of engineering decisions on energy resources/ environment.

The above performance criteria is used to measure the attainment of outcome ‘J’ by giving the following question (Question No.: 2 in MST December 2017, weightage 10 marks) to the students.

Question: Draw the road performance curves of any vehicle showing power available at wheels versus road speed for different gears ratios. Why the slope of every curve is different and peak power for every curve is same for different gear ratios?

Table: Student's performance in question targeting 'J2'; course: UME502

S.No	Rollno.	Name	MST Q2 Marks (10)	SCORE (1-5)
1	101409001	Aadil Marya	7.5	5
2	101409002	Aakash Singhal	8.5	5
3	101409003	Aakash Singhal	7.5	5
4	101409004	Aashish Sharma	5.5	5
5	101409005	Aayush Sharma	0	1
6	101409006	Akhil Jandial	2.5	3
7	101409007	Akshita Sachdeva	2.5	3
8	101409009	Ankit Ahuja	9.5	5
9	101409010	Arpit Jindal	9.5	5
10	101409011	Arush Garg	9.5	5
11	101409012	Ayush Goel	6	5
12	101409013	Damanjit Singh	5	4
13	101409015	Gungeet Singh	7	5
14	101409016	Hanish Bansal	-1	0
15	101409018	Harleen Singh	7.5	5
16	101409019	Hemant Goyal	8.5	5
17	101409020	Jatin Badyal	-1	0
18	101409021	Juhi Gupta	6	5
19	101409022	Karandeep Singh	2.5	3
20	101409025	Preet Kamal Singh	7	5
21	101409027	Rishabh Jain	2	0
22	101409028	Rishabh Khanna	2.5	3
23	101409029	Rishi Garg	9.5	5
24	101409030	Rohit Aggarwal	2	2
25	101409031	Sahil Khatter	4	4
26	101409032	Sahil Nagi	8.5	5
27	101409033	Shubham Dixit	4	4
28	101409034	Shubham Gupta	2	2
29	101409035	Sidhant Aggarwal	1	2
30	101409036	Sulakshay Todwal	6	5
31	101409037	Taranveer Toor	8	5
32	101409038	Vaibhav Bansal	4	4
33	101409039	Vasu Gupta	1.5	2
34	101409040	Vidit Gupta	8.5	5
35	101409041	Vidit Vivek Sharma	8	5
36	101414001	Aashray Chopra	8.5	5
37	101414002	Aayush Goel	3.5	4
38	101414003	Abhishek Verma	1	2
39	101414004	Akshay Dureja	6.5	5

40	101414005	Akshay Garg	0	1
41	101414006	Ayaan Loona	3.5	4
42	101414007	Brahmdeep Singh	7	5
43	101414009	Chanakya Gupta	5.5	5
44	101414010	Eshan Aggarwal	-1	0
45	101414011	Furqan Khan	-1	0
46	101414013	Himal Sharma	3.5	4
47	101414014	Karan Matta	-1	0
48	101414015	Keshav Jindal	4.5	4
49	101414016	Manvi Sood	-1	0
50	101414017	Mayank Mani Sinha	1.5	2
51	101414018	Mohit Juneja	7.5	5
52	101414019	Nimish Chhabra	-1	0
53	101414020	Rahul Goel	6.5	5
54	101414021	Rahul Malhotra	9.5	5
55	101414023	Rishav Kansal	1.5	2
56	101414026	Sanchit	6	5
57	101414027	Sanghmitra Saxena	5	4
58	101414028	Sanjay saini	8.5	5
59	101414030	Shivendra N Vashishta	8.5	5
60	101414031	Shray Saboo	-1	0
61	101414032	Shubham Sharma	6	5
62	101414033	Tashdeep Singh	0	1
63	101414034	Vedant Bhardwaj	9	5
64	101414035	Yashaswi Issar	3	3
65	101459001	Saajanpreet Singh	0	1
66	101459002	Amrantar Joshi	8	5
67	101459003	Arpit Garg	7.5	5
68	101459004	Shanav Garg	-1	0
69	101459005	Hemant Kumar	3	3
70	101459006	Sameer Mehta	5	4
71	101464001	Harkewalpreet Singh	6.5	5
72	101464002	Rohan Patel	6	5
73	101464003	Tejeshwar Singh	8	5
74	101464004	Navam Jain	8.5	5
75	101464005	Sahib harish	8.5	5
76	101464006	Nikhil Goyal	3	3
77	101464007	Yajan Chopra	4.5	4
78	101464008	Nitish Kumar	2.5	3
79	101464011	Siddhant Gulati	5	4
80	101589002	Himanshu Sharma	7	5
81	101589003	Jaskirat Singh	8	5
82	101589004	Nitish Gupta	9	5
83	101594001	Chirag Mutreja	6.5	5
84	101594002	Hardeep singh	0	1
85	101594003	Himanshu Awasthi	8	5
86	101594004	Ravi Inder Singh	1	2
87	401257011	Touseef Alvi	-1	0

Table: Weighted Average Student Class Performance (course portfolio) for Attribute J2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME502	56.6	14.8	10.5	10.5	6.6	4.01

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria J2 as given below in Table J4.9:

Table J4.9: Weighted Average Student class performance (course portfolio) for criteria J2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME502	56.6	14.8	10.5	10.5	6.6	4.01	5
Weighted average score	56.6	14.8	10.5	10.5	6.6	4.01	5

b.) Assessment Tool: Student Course Survey

Table J4.10: Average score of student course survey for criteria J2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME502	44.00	17.00	9.00	13.00	17.00	4.11	5
Weighted average score	44.00	17.00	9.00	13.00	17.00	4.11	5

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table J4.11: Assessment for criteria J2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	26	50	18	0	6	3.9
Alumni survey	28	52	14	6	0	4.02
Employer Survey	36	56	4	2	0	4.29

Finally overall weighted average score of performance criterion ‘J2’ is evaluated as given below in Table J4.12:

Table J4.12: Overall weighted average score of performance criterion ‘J2’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	56.60	14.80	10.50	10.50	6.60	4.01	5.0
Weighted average student course survey	44.00	17.00	9.00	13.00	17.00	4.11	4.0
Graduating student survey	26	50	18	0	6	3.9	3.0
Alumni survey	28	52	14	6	0	4.02	3.0
Employer survey	36	56	4	2	0	4.20	3.0
Overall weighted score	40.50	34.22	10.92	7.14	6.61	4.06	18.0

Overall assessment of student outcome J using scores of J1, and J2

In the above sections, each of the individual performance criteria J1 and J2 have been assessed. The performance for attainment of outcome J has been completed using the attainment values for J1 and J2 and is provided below:

Table J4.13 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome J.

Table J4.13: Overall score for outcome J at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
J1	32.56	40.61	11.39	6.94	8.17	3.95	5
J2	40.50	34.22	10.92	7.14	6.61	4.06	5
Overall score	36.53	37.42	11.16	7.04	4.09	4.01	10

Track Record and assessment of attainment of student outcome ‘J’ over the last three academic years

The performance criteria-wise assessment score distribution and overall weighted score for outcome ‘J’ for last three calendar years, i.e., 2015, 2016 and 2017 presented in this section.

The following table J4.14 presents the performance criteria-wise assessment score distribution for outcome ‘J’.

Table J4.14: Performance criteria-wise assessment score distribution of outcome J

Student outcomes and performance criteria		Year		
		2015	2016	2017
J	J1	3.85	4.41	3.95
	J2	3.76	4.48	4.06

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome ‘J’ over a period of last three years.

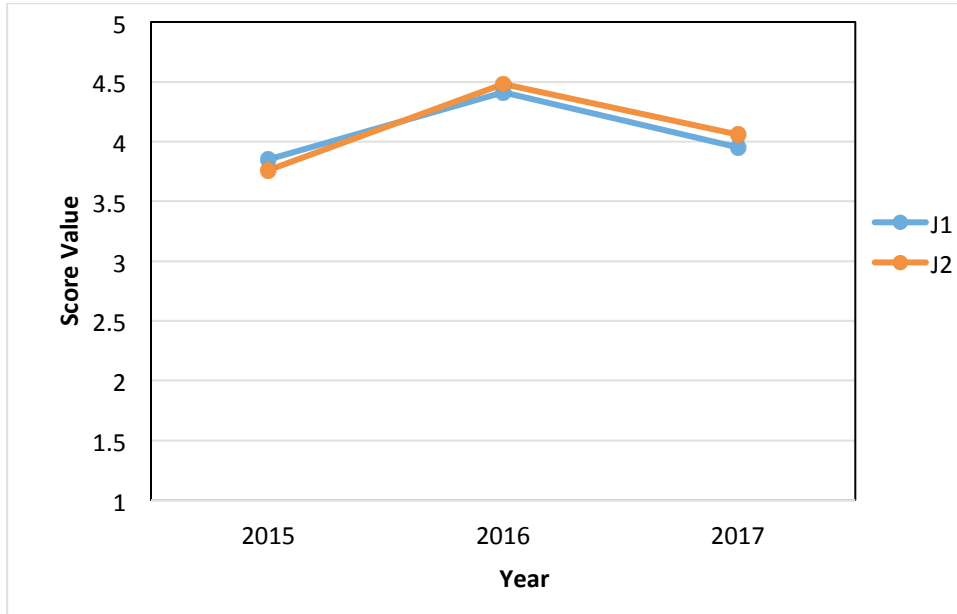


Figure J4.2: Performance criteria-wise assessment score distribution of outcome J

Level of attainment of student outcome ‘J’ over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table J4.15 presents the overall weighted score of outcome ‘J’ over the last three academic years.

Table J4.15: Overall weighted score of outcome ‘J’ over a period of last three years

Year	Overall weighted score	Level of attainment
2015	3.81	Good
2016	4.45	Good
2017	4.01	Good

The above data has been plotted to visualize the overall weighted score of outcome ‘J’ over a period of last three years.

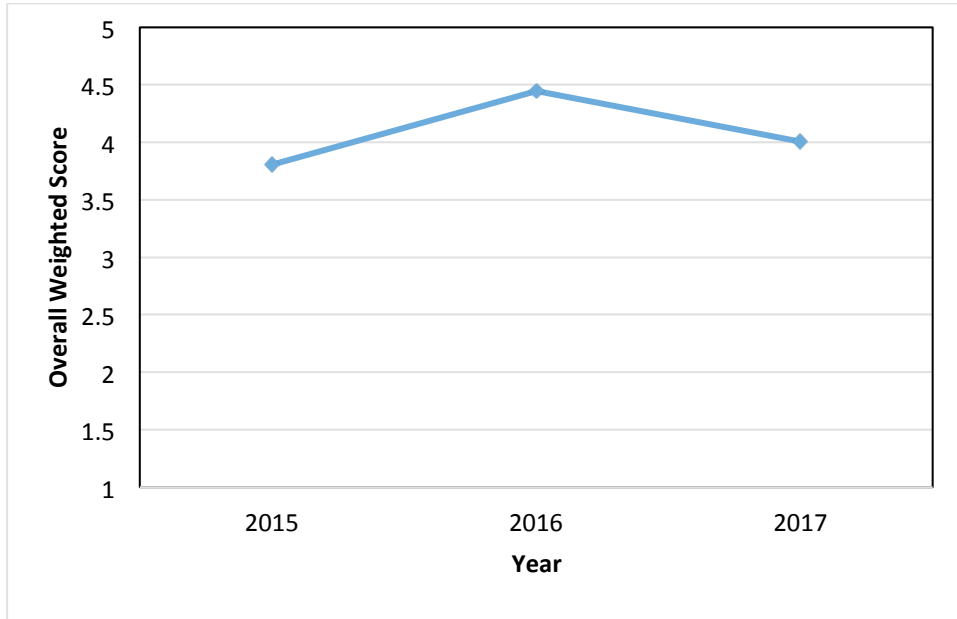


Figure J4.2: Performance criteria-wise assessment score distribution of outcome J

The following actions have been taken based on the analysis of Outcome J

Weighted Score for Outcome F	Recommendation	Reason	Implemented from
4.01	No action required	Weighted score is above 3.5	--

**Assessment of Attainment of Student Outcome
'K'
(Year 2017)**

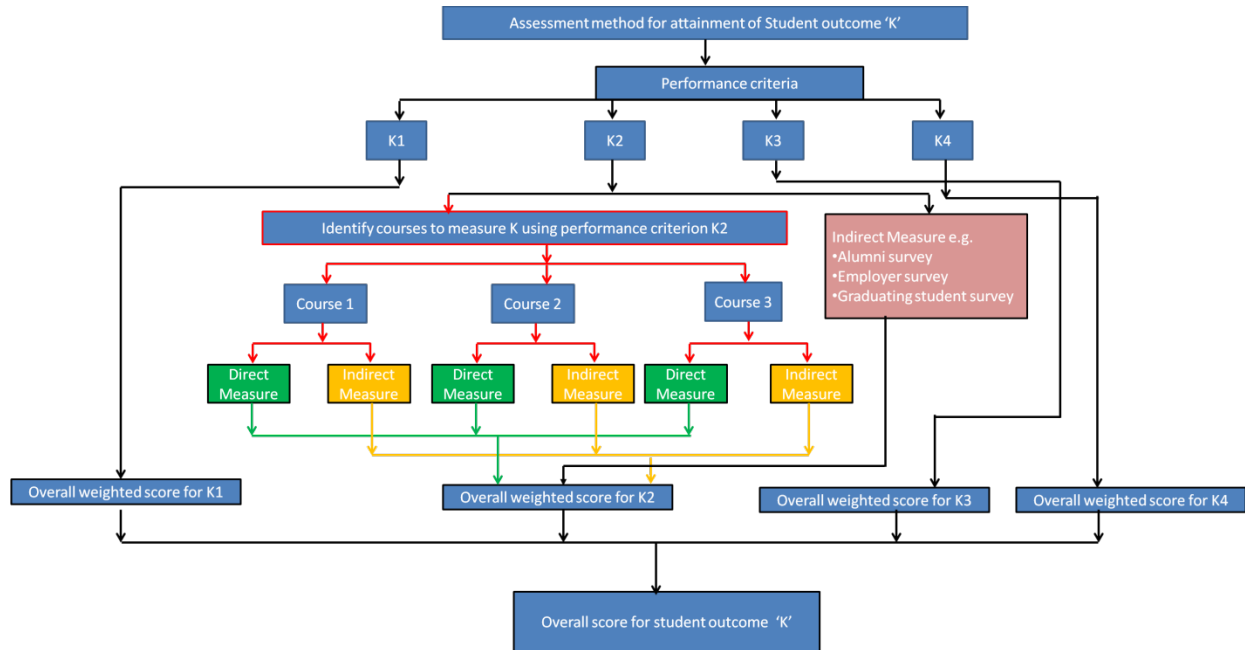
for the

*Bachelor of Engineering
in
Mechanical Engineering*

**Thapar Institute of Engineering & Technology
Patiala (Punjab) - 147004
INDIA**

Attainment of Outcome K

The attainment of each outcome has been measured using a standard procedure explained in the Self-Assessment Report for the program. A flow chart depicting the step-by-step methodology used to measure each attainment is provided below for ready reference.



The following courses have been considered for the assessment of student outcome 'K'

Courses:

1. Automobile Engineering (UME502)
2. Applied Thermodynamics(UME501)
3. Project Semester (UME691)
4. Capstone Project (UME891)

Outcome K has been assessed by four performance criteria K1, K2, K3 and K4. The sections below provide data for separate assessments for each of these performance criteria and in the end the results for these four performance criteria has been used to measure the overall measure of outcome K.

1) Assessment of Outcome 'K' using performance criterion K1

Performance criteria 'K1': K1. Able to operate engineering equipment

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely **Automobile Engineering (UME 502)** and **Applied Thermodynamics (UME501)** were used to assess performance criteria K1 as a direct measure. The analysis for each of these courses is provided below:

i. Automobile Engineering (UME 502)

The above performance criteria is used to measure the attainment of outcome 'K' by giving the following question (Question No.: 1 in MST December 2017, weightage 10 marks) to the students.

Question: Gasoline engine produce power by burning of fuel and power is finally transmitted it to the ground through contact patch of the tyre. Mention all the components of the vehicle, which take part in the whole process in a sequence as per their occurrence. You need to name every component (either small or big) of the path. Representation with the help of a schematic diagram is desirable?

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'K1'; course: UME502

S.No.	Rollno.	Name	MST Q1 MARKS(10)	SCORE (1-5)
1	101409001	Aadil Marya	8	5
2	101409002	Aakash Singhal	7.5	5
3	101409003	Aakash Singhal	9.5	5
4	101409004	Aashish Sharma	7.5	5
5	101409005	Aayush Sharma	5	4
6	101409006	Akhil Jandial	8	5
7	101409007	Akshita Sachdeva	8.5	5
8	101409009	Ankit Ahuja	8	5
9	101409010	Arpit Jindal	10	5
10	101409011	Arush Garg	8.5	5
11	101409012	Ayush Goel	8	5
12	101409013	Damanjit Singh	7.5	5
13	101409015	Gungeet Singh	9	5
14	101409016	Hanish Bansal	-1	0
15	101409018	Harleen Singh	8.5	5
16	101409019	Hemant Goyal	9	5
17	101409020	Jatin Badyal	-1	0
18	101409021	Juhi Gupta	7.5	5
19	101409022	Karandeep Singh	7	5
20	101409025	Preet Kamal Singh	7.5	5
21	101409027	Rishabh Jain	-1	0
22	101409028	Rishabh Khanna	7	5
23	101409029	Rishi Garg	6.5	5

24	101409030	Rohit Aggarwal	8.5	5
25	101409031	Sahil Khatter	7.5	5
26	101409032	Sahil Nagi	6	4
27	101409033	Shubham Dixit	3	3
28	101409034	Shubham Gupta	8.5	5
29	101409035	Sidhant Aggarwal	1.5	2
30	101409036	Sulakshay Todwal	6	4
31	101409037	Taranveer Toor	8.5	5
32	101409038	Vaibhav Bansal	9	5
33	101409039	Vasu Gupta	3	3
34	101409040	Vidit Gupta	6.5	5
35	101409041	Vidit Vivek Sharma	7.5	5
36	101414001	Aashray Chopra	9	5
37	101414002	Aayush Goel	8.5	5
38	101414003	Abhishek Verma	2	2
39	101414004	Akshay Dureja	7.5	5
40	101414005	Akshay Garg	5	4
41	101414006	Ayaan Loona	6	4
42	101414007	Brahmdeep Singh	6.5	5
43	101414009	Chanakya Gupta	5	4
44	101414010	Eshan Aggarwal	-1	0
45	101414011	Furqan Khan	-1	0
46	101414013	Himal Sharma	10	5
47	101414014	Karan Matta	-1	0
48	101414015	Keshav Jindal	8.5	5
49	101414016	Manvi Sood	-1	0
50	101414017	Mayank Mani Sinha	6	4
51	101414018	Mohit Juneja	8.5	5
52	101414019	Nimish Chhabra	-1	0
53	101414020	Rahul Goel	9	5
54	101414021	Rahul Malhotra	9.5	5
55	101414023	Rishav Kansal	8.5	5
56	101414026	Sanchit	9.5	5
57	101414027	Sanghmitra Saxena	7.5	5
58	101414028	Sanjay saini	8.5	5
59	101414030	Shivendra Nath Vashishta	9.5	5
60	101414031	Shray Saboo	-1	0
61	101414032	Shubham Sharma	5	4
62	101414033	Tashdeep Singh	7	5
63	101414034	Vedant Bhardwaj	9	5
64	101414035	Yashaswi Issar	7	5
65	101459001	Saajanpreet Singh	9.5	5
66	101459002	Amrantar Joshi	7.5	5
67	101459003	Arpit Garg	6	4
68	101459004	Shanav Garg	-1	0
69	101459005	Hemant Kumar	9	5
70	101459006	Sameer Mehta	7.5	5
71	101464001	Harkewalpreet Singh	8.5	5

72	101464002	Rohan Patel	6.5	5
73	101464003	Tejeshwar Singh	7	5
74	101464004	Navam Jain	8.5	5
75	101464005	Sahib harish	2	2
76	101464006	Nikhil Goyal	6.5	5
77	101464007	Yajan Chopra	6	4
78	101464008	Nitish Kumar	1.5	2
79	101464011	Siddhant Gulati	4	3
80	101589002	Himanshu Sharma	7	5
81	101589003	Jaskirat Singh	8	5
82	101589004	Nitish Gupta	9	5
83	101594001	Chirag Mutreja	7.5	5
84	101594002	Hardeep singh	4.5	4
85	101594003	Himanshu Awasthi	7	5
86	101594004	Ravi Inder Singh	5	4
87	401257011	Touseef Alvi	-1	0

Table: Weighted Average Student Class Performance (course portfolio) for Attribute K1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME502	75.0	15.8	3.9	5.3	0.0	4.61

ii. **Applied Thermodynamics (UME501)**

The above performance criteria is used to measure the attainment of outcome 'K1' by conducting laboratory test (05 marks) and oral viva-voce (05 marks) in which questions were asked related to the operational knowledge of various test set ups for different types of engines.

Student's performance in the above parameter (lab test + viva; 10 marks) is given below:

Table: Student's performance in question targeting 'K1'; course: UME501

S. No.	Roll No.	Name	Marks (MM:10)	Score (Scale 1to 5)
1	101508062	Kunal Swami	6.5	4
2	101508063	Lakshya Jain	6	4
3	101508064	Lakshya Khanduja	3.5	3
4	101508065	Lovepreet	4.5	3
5	101508066	Mahesh Chugh	5	4
6	101508067	Manmohit Chugh	6	4
7	101508068	Mannan	6.5	4
8	101508069	Manu	8	5
9	101508070	Mayank	8	5
10	101508071	Meher Satsangi	7.5	5
11	101508073	Mehkant	6	4

12	101508074	Mehul Satyajit	8	5
13	101508075	Mohit Sorout	6.5	4
14	101508076	Navjot Wadhwa	7	5
15	101508134	Deepankar Kumar	6.5	4
16	101688011	Keshav Goyal	6.5	4
17	101688012	Munish Kumar Garg	6.5	4
18	101688020	Navi Sood	7.5	5
19	401257011	Touseef Ali	5.5	4
20	101508077	Navkaran Singh Mroque	5.5	4
21	101508078	Navnoor Singh Sidhu	5.5	4
22	101508079	Nikhil Jain	7.5	5
23	101508080	Nikhil Joshi	6	4
24	101508081	Nimrat Singh Brar	5.5	4
25	101508083	Nitin Kumar	6.5	4
26	101508084	Parth Ahuja	7	5
27	101508086	Prabhsimran S. Bakshi	5.5	4
28	101508087	Pranshu Kansal	6	4
29	101508088	Prasu Shome	6	4
30	101508091	Prateek Prasad	6	4
31	101508093	Prince Nirwal	7	5
32	101508095	Ragjot Kiran Chhibber	7.5	5
33	101508096	Rahul Choudhary	6.5	4
34	101688014	Prashant Jindal	6.5	4
35	101688021	Navneet Singh	8	5
36	101508100	Ramneek Devgan	7	5
37	101508101	Ravneesh Munjal	4.9	3
38	101508102	Rohit Kumar	5.7	4
39	101508103	Sharanpreet Singh	4.2	3
40	101508104	Sahil Chhabra	6.4	4
41	101508105	Sahil Garg	4.1	3
42	101508106	Saksham Gupta	8	5
43	101508107	Saravpreet Singh	7	5
44	101508109	Satyam Gupta	5.5	4
45	101508110	Saurabh Garg	6.5	4
46	101508112	Shailender Rai	7.5	5
47	101508113	Shashwant Jain	5.2	4
48	101688015	Robin Chandel	3.9	3
49	101688016	Sayansh Garg	4.7	4
50	101688017	Shiv Kumar	5.2	4
51	101688023	Sahil Bhola	4.4	4
52	101508114	Shivam Mittal	3.9	3
53	101508115	Shreshth	5.2	4

54	101508116	Shubhang Gupta	7.5	5
55	101508117	Shubhang Prasad	4.7	4
56	101508118	Siddarth	5.2	4
57	101508119	Siddarth Nagpal	6	4
58	101508121	Souravdeep Singh	6	4
59	101508123	Supandeep Singh	5.5	4
60	101508124	Tushar Bansal	6.7	4
61	101508125	Utkarsh Mishra	3.9	3
62	101508126	Vaibhav Chobic	4.4	3
63	101508127	Vaibhav Dogra	7	5
64	101508128	Vaidhant Bakshi	4.2	3
65	101508129	Vikas Chauhan	3.4	3
66	101508130	Vikram Singh	6.4	4
67	101508131	Yash Parmar	3.9	3
68	101508133	Yatin Singla	4.7	3
69	101688024	Vaibhav Singla	7	5
70	101508140	Animesh	5	4
71	401508023	Kumar Mangalam	7.5	5
72	401508024	Mrigendra Gupta	7	5
73	401508025	Pushpinder Singh	7	5
74	401508026	Rahul Sheoran	7.5	5
75	401508027	Sachin Malhotra	5.75	4
76	401508029	Shwetank Tripathi	7.5	5
77	401508030	Sudhanshu Ranjan	6	4
78	40150803	Sukhmanpreet Singh	8	5
79	401508032	Sumanyu Kapoor	7.25	5
80	401508033	Viresh Gupta	7	5
81	401508034	Yogesh Mehta	6.75	4
82	401508090	Prateek Chaudhary	6.5	4
83	401688001	Nilay Sagar	7.5	5
84	401688002	Ramneek Singh	7.75	5
85	401688003	Sourav Prasher	7.5	5
86	401688004	Utsav Gautam	6	4
87	401688005	Sartaj Singh Sidhu	7.25	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME501 for criteria K1

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME501	25.7	55.7	18.57	0	0	4.07

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria K1 as given below in Table K4.5:

Table K4.5: Weighted Average Student class performance (course portfolio) for criteria K1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME502	75	15.8	3.9	5.3	0	4.61	5
UME501	25.7	55.7	18.57	0	0	4.07	5
Weighted average score	50.35	35.75	11.24	2.65	0.00	4.34	10

b) Indirect measures for Performance criteria K1 (Surveys)

i.) Assessment Tool: Student Course Survey

Table K4.6: Average score of student course survey for criteria K1

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME502	42	20	6	14	18	4.11	5
UME501	25.7	55.7	18.57	0	0	4.07	5
Weighted average score	33.85	37.85	12.29	7.00	9.00	4.09	10

ii.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table K4.7: Assessment for criteria K1 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	32	50	10	4	4	4.02
Alumni survey	44	46	6	4	0	4.30
Employer Survey	58	34	6	2	0	4.48

c) Overall weighted average score of performance criterion 'K1'

Finally, overall weighted average score of performance criterion 'K1' is evaluated as given below in Table K4.8:

Table K4.8: Overall weighted average score of performance criterion 'K1'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	50.35	35.75	11.24	2.65	0.00	4.34	5.0
Weighted average student course survey	33.85	37.85	12.29	7.00	9.00	4.09	4.0
Graduating student survey	32	50	10	4	4	4.02	3.0
Alumni survey	44	46	6	4	0	4.30	3.0
Employer survey	58	34	6	2	0	4.48	3.0
Overall weighted score	43.84	40.01	9.52	3.96	2.67	4.25	18.0

Assessment of Outcome 'K' using performance criterion K2

Step 1: Performance criteria 'K2': Able to program machines.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: One course, namely Computer Aided Manufacturing(UME702) was used to assess performance criteria K2 as a direct measure. The analysis for the courses is provided below:

The above performance criteria is used to measure the attainment of outcome 'K2' by giving the following question (Question No. 2: during MST in September 2017, weightage 15 marks) to the students.

Write a CNC program on the lathe machine in absolute mode for the profile given in Figure 2. The profile is to be machined using stock removal turning canned cycle. The grooving tool to be used is of 2 mm width with lower left corner as its reference point. All the operations shown in the figure are to be done using canned cycles with assumed parameters. (15)

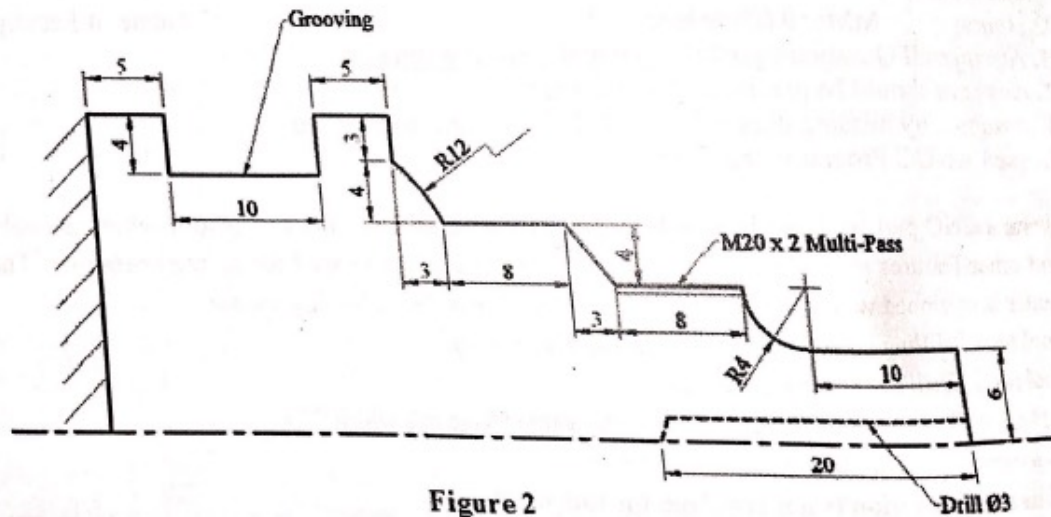


Figure 2

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'K2'; course: UME702

S.No.	Rollno.	Name	MST Q2 MARKS (15)	SCORE (1-5)
1	101208059	Kanwaljeet Singh	-1	0
2	101408001	Aashish Kumar	10.5	4
3	101408002	Aayush Khera	12	4
4	101408003	Abhishek Baruah	-1	0
5	101408004	Abhishek Pandey	3	1
6	101408005	Abhishek Sharma	12.5	5
7	101408006	Abhishek Singh Nathawat	13.5	5
8	101408007	Abhishesh Aggarwal	5	2
9	101408008	Adit Goel	1	1
10	101408009	Aditya Shubham	12	4
11	101408010	Aerk Dimri	10.5	4

12	101408011	Ajitesh Bindal	15	5
13	101408012	Akhilesh Sharma	6	2
14	101408013	Akin	0.5	1
15	101408014	Akshansh Jain	-1	0
16	101408015	Akshay Bajaj	9	3
17	101408016	Aman Singla	-1	0
18	101408017	Amar Raj Singh	12.5	5
19	101408019	Anand Vardhan	14	5
20	101408020	Anil Barwar	6	2
22	101408022	Ankit Verma	-1	0
23	101408023	Ankush Narula	12	4
24	101408024	Anurag Kumar	4	2
25	101408025	Anurag Verma	10	4
26	101408026	Arjun Raina	5.5	2
27	101408028	Arpit Kandhari	-1	0
28	101408029	Ashish Goyal	2	1
29	101408030	Ashok Ranwa	9.5	4
30	101408031	Ashwinder Singh	14	5
31	101408032	Atul	-1	0
32	101408033	Avanshu Shrivastav	9	3
33	101408034	Ayush Pandey	11	4
34	101408035	Ayush Rai	-1	0
35	101408036	Channdeeep	8.5	3
36	101408037	Chetan Katyal	8.5	3
37	101408038	Daksh Garg	10	4
38	101408039	Deepanshu Mohan	0.5	1
39	101408040	Devjot Singh Sewak	-1	0
40	101408041	Dheerendra K Chaudhary	5	2
41	101408042	Dhruv Sharma	12	4
42	101408043	Divyesh Gupta	14	5
43	101408044	Ekam Jot Singh	5.5	2
44	101408045	Gaurav Gupta	10	4
45	101408047	Gurbaksh Singh	10	4
46	101408049	Hardik Vashistha	-1	0
47	101408050	Harish Jala	8	3
48	101408051	Harjot Singh	8	3
49	101408052	Harmandeep Singh	-1	0
50	101408055	Harnoor Singh	6	2
51	101408056	Harpreet Singh	8	3
52	101408057	Himalaya Nath Chinoriya	8	3
53	101408058	Himanshu Raj	2	1
54	101408059	Ishaan Mangla	13	5
55	101408060	Ishjot Singh Jaggi	4	2
56	101408120	Shivendra Kumar	12.5	5

57	101408121	Shlok Chanduka	9.5	4
58	101408122	Shubham Gupta	8.5	3
59	101408123	Shubham Saxena	4	2
60	101408124	Shubham Sharma	0	1
61	101408125	Sidharth Hinger	-1	0
62	101408126	Simranpreet Singh	-1	0
63	101408127	Sunpreet Kochhar	8	3
64	101408128	Tanmay Mathur	9.5	4
65	101408129	Tanvir Sidhu	5	2
66	101588001	Arpanjot Singh	14	5
67	101588005	Harshit Kashyap	12	4
68	101588006	Jashandeep Singh	12	4
69	101588010	Rachit Joshi	8	3
70	101588011	Rajinder Singh	12	4
71	101588012	Rajit Devgan	8	3
72	101588013	Shubham Sharma	14	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME702 for criteria K2

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME702	18.6	28.8	22.0	18.6	11.9	3.24

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria K2 as given below in Table K4.13:

Table K4.13: Weighted Average Student class performance (course portfolio) for criteria K2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME702	18.6	28.8	22.0	18.6	11.9	3.24	5
Weighted average score	18.6	28.8	22.0	18.6	11.9	3.24	5

b.) Assessment Tool: Student Course Survey

Table K4.14: Average score of student course survey for criteria K2

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME702	18.6	28.8	22.0	18.6	11.9	3.24	5
Weighted average score	18.6	28.8	22.0	18.6	11.9	3.24	5

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table K4.15: Assessment for criteria K2 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	32	50	10	4	4	4.02
Alumni survey	44	46	6	4	0	4.30
Employer Survey	58	34	6	2	0	4.48

Finally overall weighted average score of performance criterion 'K2' is evaluated as given below in Table A4.16:

Table A 4.16.: Overall weighted average score of performance criterion 'K2'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	18.6	28.8	22.0	18.6	11.9	3.24	5
Weighted average student course survey	18.6	28.8	22.0	18.6	11.9	3.24	4
Graduating student survey	32	50	10	4	4	4.02	3
Alumni survey	44	46	6	4	0	4.30	3
Employer survey	58	34	6	2	0	4.48	3
Overall weighted score	31.63	36.07	14.67	10.97	6.62	3.75	18

Assessment of Outcome 'K' using performance criterion K3

Performance criteria 'K3': Able to use solid modeling software for engineering applications

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Project Semester (UME691) and Capstone Project (UME891) were used to assess performance criteria K3 as a direct measure. The analysis for each of these courses is provided below:

(The criteria 'K3' is evaluated from the student report card submitted by their respective industry mentor by Q. No. B(ii))

Q B(iii): Information collection update: This refers to techniques/tools used at various stages

Table: Student's performance targeting 'K3'; course: UME691

S. No.	Roll No.	K3	Weight (Scale 1 to 5)
		Q. No. B(iii) (10 Marks)	
1	101408001	10	5
2	101408002	8	4

3	101408003	10	5
4	101408004	8	4
5	101408005	8	4
6	101408006	10	5
7	101408007	10	5
8	101408008	10	5
9	101408009	10	5
10	101408010	10	5
11	101408011	10	5
12	101408012	10	5
13	101408013	10	5
14	101408014	10	5
15	101408016	10	5
16	101408017	8	4
17	101408019	10	5
18	101408020	10	5
19	101408022	8	4
20	101408023	10	5
21	101408026	10	5
22	101408028	10	5
23	101408029	10	5
24	101408030	10	5
25	101408031	8	4
26	101408032	8	4
27	101408033	8	4
28	101408034	6	3
29	101408035	8	4
30	101408036	10	5
31	101408037	10	5
32	101408038	8	4
33	101408040	10	5
34	101408041	10	5
35	101408042	8	4
36	101408043	8	4
37	101408044	8	4
38	101408045	8	4
39	101408047	10	5
40	101408049	10	5
41	101408050	10	5
42	101408051	10	5
43	101408052	10	5
44	101408055	10	5
45	101408056	10	5
46	101408057	10	5
47	101408058	8	4
48	101408059	10	5

49	101408060	8	4
50	101408062	10	5
51	101408063	10	5
52	101408064	10	5
53	101408065	10	5
54	101408066	10	5
55	101408067	10	5
56	101408069	10	5
57	101408070	8	4
58	101408071	10	5
59	101408074	8	4
60	101408076	10	5
61	101408077	8	4
62	101408078	10	5
63	101408079	10	5
64	101408080	10	5
65	101408082	6	3
66	101408083	10	5
67	101408084	10	5
68	101408085	8	4
69	101408086	10	5
70	101408087	10	5
71	101408089	10	5
72	101408090	10	5
73	101408091	10	5
74	101408092	10	5
75	101408093	10	5
76	101408094	10	5
77	101408095	10	5
78	101408096	8	4
79	101408098	10	5
80	101408100	10	5
81	101408101	10	5
82	101408104	10	5
83	101408107	8	4
84	101408108	10	5
85	101408110	8	4
86	101408111	10	5
87	101408112	10	5
88	101408113	10	5
89	101408114	10	5
90	101408115	10	5
91	101408116	8	4
92	101408118	10	5
93	101408120	10	5
94	101408121	10	5

95	101408122	10	5
96	101408123	10	5
97	101408124	10	5
98	101408125	10	5
99	101408126	10	5
100	101408127	8	4
101	101408128	8	4
102	101408130	10	5
103	101408131	8	4
104	101408132	10	5
105	101408134	10	5
106	101408136	10	5
107	101408137	10	5
108	101458001	10	5
109	101458003	10	5
110	101458004	10	5
111	101588001	10	5
112	101588002	8	4
113	101588003	8	4
114	101588004	10	5
115	101588005	10	5
116	101588006	10	5
117	101588008	10	5
118	101588009	10	5
119	101588010	10	5
120	101588012	10	5
121	101588013	10	5
122	101588014	10	5
123	101588015	10	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME691for criteria K3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	74.8	23.6	1.6	0	0	4.732

ii. Capstone Project (UME891)

The above performance criteria is used to measure the attainment of outcome ‘K3’ from the 2nd and 3rd evaluation (Question: Component from 2nd evaluation (5)+Component from 3rd evaluation (15); weightage 20 marks).

Question: Preliminary and Final design and analysis.

Student’s performance in the above question is given below:

Table: Student's performance in question targeting 'K3'; course: UME891

S. No.	Roll No.	Name	Marks (20)	Score Scale (1-5)
1	101308001	Ankit Juneja	17.0	5
2	101308002	Abhinav	17.0	5
3	101308003	Abhishek Kumar Verma	17.0	5
4	101308004	Abhyuday Singh	17.0	5
5	101308006	Aditya Agrawal	17.0	5
6	101308007	Ajeet Pal Singh	16.5	5
7	101308008	Akash Malhotra	17.0	5
8	101308009	Akash Reddy Kakularam	18.0	5
9	101308010	Akash Sharma	17.0	5
10	101308011	Akashdeep Singh Gandhi	17.0	5
11	101308012	Akshay Kumar	16.5	5
12	101308013	Amritpal Singh Sangwan	16.0	4
13	101308014	Aneesh Kejariwal	19.0	5
14	101308015	Ankit Sehgal	12.5	3
15	101308016	Ankur Goyal	18.0	5
16	101308017	Ankush Bansal	17.0	5
17	101308018	Anoop	16.0	4
18	101308019	Anshaj Jindal	17.0	5
19	101308020	Anuj Jain	18.0	5
20	101308021	Arshdeep Singh	17.0	5
21	101308023	Bhabuk Goyal	17.0	5
22	101308024	Bhajanpreet Singh	17.0	5
23	101308025	Bhuvanyu	17.0	5
24	101308026	Bipin Loi	16.5	5
25	101308027	Brhamjyot Singh Sandhu	16.0	4
26	101308028	Deepak Dalal	15.5	4
27	101308029	Deepak Sharma	15.5	4
28	101308031	Dhiraj Dureja	15.5	4
29	101308032	Dildeep Singh	16.0	4
30	101308033	Ekansh Kumar Srivastava	14.0	4
31	101308034	Ekjyot Singh	17.0	5
32	101308035	Gagandeep Singh	16.0	4
33	101308036	Gautam Dawar	19.0	5
34	101308037	Gurkirat Pal Singh	18.0	5
35	101308038	Gurkirat Singh Sangha	16.0	4
36	101308039	Gurpreet Singh	16.0	4
37	101308040	Gurpreet Singh	16.0	4
38	101308042	Gurtej Singh	16.0	4

39	101308043	Guruteshwar	14.5	4
40	101308044	Harjot Singh	16.0	4
41	101308045	Harnoor Singh	17.0	5
42	101308046	Harsh Narang	18.0	5
43	101308047	Harsimran	14.5	4
44	101308048	Hemant Aggarwaal	17.0	5
45	101308050	Iknor Singh	17.0	5
46	101308051	Ishdeep Arora	16.0	4
47	101308052	Japdanish Singh	17.0	5
48	101308053	Jashanpreet Singh	15.0	4
49	101308054	Jaskaran Singh	18.5	5
50	101308055	Jatin Khosla	17.0	5
51	101308057	Kanav Bansal	18.5	5
52	101308059	Kanwar Gulati	17.0	5
53	101308060	Karan Chopra	17.0	5
54	101308061	Karan Goyal	15.0	4
55	101308063	Karan Veer Dewan	17.0	5
56	101308064	Karanbir Singh	15.0	4
57	101308065	Kashish Khurana	17.0	5
58	101308066	Keshav Jindal	17.0	5
59	101308067	Ketan Chauhan	16.0	4
60	101308068	Khushwinder Singh	15.0	4
61	101308069	Kirat Singh Basur	12.5	3
62	101308070	Kshitij Sharma	12.5	3
63	101308071	Lokendra Kumar	17.0	5
64	101308072	Lovedeep Garg	15.0	4
65	101308073	Manavdeep Singh Grover	17.0	5
66	101308074	Manik Saharan	12.5	3
67	101308075	Manish Pandoh	16.0	4
68	101308076	Manpreet Singh	18.5	5
69	101308077	MANUTKARSH KIRPAL	16.0	4
70	101308078	Nidan Prakash	17.0	5
71	101308079	NIKHIL AGGARWAL	16.0	4
72	101308080	NIKHIL GANTA	16.0	4
73	101308082	PARAMJOT SINGH	16.0	4
74	101308083	Paras	17.0	5
75	101308085	Prabhman Vir	12.5	3
76	101308088	Pulkit Kapoor	17.0	5
77	101308089	Puneet Singh	14.0	4
78	101308090	Rajat Gupta	17.0	5
79	101308091	Ramnish Kumar	17.0	5
80	101308093	Rohan Kaushal	17.0	5

81	101308094	Sagar Singla	17.0	5
82	101308096	Sahil Sharma	17.0	5
83	101308097	Samdeep Singh Sabharwal	17.0	5
84	101308098	Sameer Bhalla	17.0	5
85	101308099	Sartaj Singh	17.0	5
86	101308100	Shikhar Bhardwaj	16.0	4
87	101308101	Shikhar Gaur	17.0	5
88	101308102	Shreyas Bhayana	17.0	5
89	101308103	Shubham	17.0	5
90	101308104	Shubham Bhama	18.0	5
91	101308105	Shubham Choudhary	17.0	5
92	101308106	Shubham Gupta	17.0	5
93	101308108	Siddharth Ghiya	16.5	5
94	101308109	Siddharth Gupta	17.0	5
95	101308110	Siddharth Vasu	15.5	4
96	101308111	Sidhant	17.0	5
97	101308112	Simrandeep Singh Bhullar	17.0	5
98	101308113	Sourav Singla	16.0	4
99	101308114	Tanjay Pathak	15.5	4
100	101308115	Tanuj Lamba	17.0	5
101	101308116	Utsav Mudgal	17.0	5
102	101308117	Vaibhav Pratap Singh Pundir	15.5	4
103	101308118	Varmeet Singh Gulati	17.0	5
104	101308119	Varun Atri	17.0	5
105	101308120	Vedant Mansotra	14.0	4
106	101308121	Vikrant Nanda	16.0	4
107	101308122	Vishal Solanki	14.0	4
108	101308123	Vivek Mittal	18.0	5
109	101308124	Vivek Pundir	17.0	5
110	101308125	Yash Wardhan Sharma	17.0	5
111	101488001	Akash Tiwari	16.5	5
112	101488002	Anuj Tanwar	16.5	5
113	101488003	Bhupinder Singh	16.5	5
114	101488004	Bishant Sharma	16.5	5
115	101488005	Harish Yadav	16.0	4
116	101488006	Harpreet Singh	18.5	5
117	101488007	Inderjeet Kumar	17.0	5
118	101488008	Ishan Bansal	17.0	5
119	101488009	Jaspreet Singh	18.5	5
120	101488010	Jaspreet Singh	17.0	5
121	101488011	Kulwinder Singh	18.5	5
122	101488012	MOHIT GOYAL	16.0	4

123	101488013	NAVJOT RIHAL	14.5	4
124	101488014	Nikhil Gupta	17.0	5
125	101488015	Sankit	14.0	4
126	101488016	Sarang Vashisht	17.0	5
127	101488017	Varun Bansal	17.0	5
128	101488018	Vishnu Kalra	17.0	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria K3

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	64.1	32	3.9	0	0	4.6

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria K2 as given below in Table K4.13:

Table K4.13: Weighted Average Student class performance (course portfolio) for criteria K3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	74.8	23.6	1.6	0	0	4.732	5
UME891	64.1	32	3.9	0	0	4.6	5
Weighted average score	69.45	27.80	2.75	0.00	0.00	4.67	10

b.) Assessment Tool: Student Course Survey

Table K4.14: Average score of student course survey for criteria K3

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	74.8	23.6	1.6	0	0	4.732	5
UME891	64.1	32	3.9	0	0	4.6	5
Weighted average score	69.45	27.80	2.75	0.00	0.00	4.67	10

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table K4.15: Assessment for criteria K3 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	32	50	10	4	4	4.02
Alumni survey	44	46	6	4	0	4.30
Employer Survey	58	34	6	2	0	4.48

Finally overall weighted average score of performance criterion 'K2' is evaluated as given below in Table A4.16:

Table A 4.16.: Overall weighted average score of performance criterion 'K3'

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	69.45	27.80	2.75	0.00	0.00	4.67	5
Weighted average student course survey	69.45	27.80	2.75	0.00	0.00	4.67	4
Graduating student survey	32	50	10	4	4	4.02	3
Alumni survey	44	46	6	4	0	4.30	3
Employer survey	58	34	6	2	0	4.48	3
Overall weighted score	57.06	35.57	5.04	1.67	0.67	4.47	18

Assessment of Outcome 'K' using performance criterion K4

Performance criteria 'K4': Able to analyze engineering problems using software tools.

a.) Assessment Tool: Student's performance using course portfolio

Step 1: Two courses namely Project Semester (UME691) and Capstone Project (UME891) were used to assess performance criteria K4 as a direct measure. The analysis for each of these courses is provided below:

(The criteria 'K4' is evaluated from the student report card submitted by their respective industry mentor by Q. No. B(ii))

Q B(ii): Information collection update: Approach/Methods used

Table: Student's performance targeting 'K4'; course: UME691

S. No.	Roll No. of Students	K4	Weight (Scale 1 to 5)
		Q. No. B(ii) (10 Marks)	
1	101408001	10	5
2	101408002	10	5
3	101408003	10	5
4	101408004	8	4
5	101408005	8	4
6	101408006	8	4
7	101408007	10	5
8	101408008	8	4
9	101408009	10	5
10	101408010	10	5
11	101408011	10	5

12	101408012	8	4
13	101408013	8	4
14	101408014	10	5
15	101408016	10	5
16	101408017	8	4
17	101408019	10	5
18	101408020	10	5
19	101408022	8	4
20	101408023	10	5
21	101408026	10	5
22	101408028	10	5
23	101408029	8	4
24	101408030	10	5
25	101408031	8	4
26	101408032	10	5
27	101408033	8	4
28	101408034	6	3
29	101408035	8	4
30	101408036	10	5
31	101408037	10	5
32	101408038	10	5
33	101408040	10	5
34	101408041	10	5
35	101408042	10	5
36	101408043	10	5
37	101408044	10	5
38	101408045	8	4
39	101408047	10	5
40	101408049	10	5
41	101408050	10	5
42	101408051	10	5
43	101408052	10	5
44	101408055	10	5
45	101408056	10	5
46	101408057	10	5
47	101408058	10	5
48	101408059	8	4
49	101408060	8	4
50	101408062	10	5
51	101408063	10	5
52	101408064	10	5
53	101408065	10	5
54	101408066	10	5
55	101408067	10	5
56	101408069	10	5
57	101408070	8	4

58	101408071	10	5
59	101408074	8	4
60	101408076	10	5
61	101408077	8	4
62	101408078	10	5
63	101408079	10	5
64	101408080	10	5
65	101408082	6	3
66	101408083	10	5
67	101408084	10	5
68	101408085	8	4
69	101408086	10	5
70	101408087	10	5
71	101408089	10	5
72	101408090	8	4
73	101408091	10	5
74	101408092	10	5
75	101408093	10	5
76	101408094	10	5
77	101408095	10	5
78	101408096	8	4
79	101408098	8	4
80	101408100	10	5
81	101408101	10	5
82	101408104	10	5
83	101408107	10	5
84	101408108	10	5
85	101408110	8	4
86	101408111	8	4
87	101408112	10	5
88	101408113	10	5
89	101408114	8	4
90	101408115	10	5
91	101408116	8	4
92	101408118	10	5
93	101408120	10	5
94	101408121	10	5
95	101408122	10	5
96	101408123	8	4
97	101408124	10	5
98	101408125	10	5
99	101408126	8	4
100	101408127	8	4
101	101408128	10	5
102	101408130	10	5
103	101408131	8	4

104	101408132	10	5
105	101408134	10	5
106	101408136	10	5
107	101408137	10	5
108	101458001	10	5
109	101458003	10	5
110	101458004	10	5
111	101588001	10	5
112	101588002	10	5
113	101588003	10	5
114	101588004	10	5
115	101588005	10	5
116	101588006	10	5
117	101588008	10	5
118	101588009	10	5
119	101588010	10	5
120	101588012	10	5
121	101588013	10	5
122	101588014	10	5
123	101588015	10	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME691 for criteria K4

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME 691	73.9	24.4	1.7	0	0	4.722

ii. Capstone Project

The above performance criteria is used to measure the attainment of outcome 'K4' from the 3rd evaluation (Question: Component from 3rd evaluation; weightage 30 marks).

Question: Final design and analysis, Technical Report and Production Drawings.

Student's performance in the above question is given below:

Table: Student's performance in question targeting 'K4'; course: UME891

S. No.	Roll No.	Name	Marks (30)	Score Scale (1-5)
1	101308001	Ankit Juneja	25.0	5
2	101308002	Abhinav	26.0	5
3	101308003	Abhishek Kumar Verma	26.0	5
4	101308004	Abhyuday Singh	26.0	5
5	101308006	Aditya Agrawal	26.0	5

6	101308007	Ajeet Pal Singh	25.0	5
7	101308008	Akash Malhotra	26.0	5
8	101308009	Akash Reddy Kakularam	26.0	5
9	101308010	Akash Sharma	26.0	5
10	101308011	Akashdeep Singh Gandhi	26.0	5
11	101308012	Akshay Kumar	26.0	5
12	101308013	Amritpal Singh Sangwan	24.0	4
13	101308014	Aneesh Kejariwal	27.0	5
14	101308015	Ankit Sehgal	21.0	4
15	101308016	Ankur Goyal	26.0	5
16	101308017	Ankush Bansal	26.0	5
17	101308018	Anoop	24.0	4
18	101308019	Anshaj Jindal	26.0	5
19	101308020	Anuj Jain	26.0	5
20	101308021	Arshdeep Singh	26.0	5
21	101308023	Bhabuk Goyal	26.0	5
22	101308024	Bhajanpreet Singh	26.0	5
23	101308025	Bhuvanyu	26.0	5
24	101308026	Bipin Loi	25.0	5
25	101308027	Brhamjyot Singh Sandhu	25.0	5
26	101308028	Deepak Dalal	22.0	4
27	101308029	Deepak Sharma	22.0	4
28	101308031	Dhiraj Dureja	23.0	4
29	101308032	Dildeep Singh	25.0	5
30	101308033	Ekansh Kumar Srivastava	23.0	4
31	101308034	Ekjyot Singh	26.0	5
32	101308035	Gagandeep Singh	25.0	5
33	101308036	Gautam Dawar	27.0	5
34	101308037	Gurkirat Pal Singh	26.0	5
35	101308038	Gurkirat Singh Sangha	25.0	5
36	101308039	Gurpreet Singh	25.0	5
37	101308040	Gurpreet Singh	24.0	4
38	101308042	Gurtej Singh	24.0	4
39	101308043	Guruteshwar	21.0	4
40	101308044	Harjot Singh	25.0	5
41	101308045	Harnoor Singh	26.0	5
42	101308046	Harsh Narang	26.0	5
43	101308047	Harsimran	21.0	4
44	101308048	Hemant Aggarwaal	25.0	5
45	101308050	Iknoor Singh	26.0	5
46	101308051	Ishdeep Arora	24.0	4
47	101308052	Japdanish Singh	25.0	5

48	101308053	Jashanpreet Singh	24.0	4
49	101308054	Jaskaran Singh	28.0	5
50	101308055	Jatin Khosla	25.0	5
51	101308057	Kanav Bansal	28.0	5
52	101308059	Kanwar Gulati	25.0	5
53	101308060	Karan Chopra	25.0	5
54	101308061	Karan Goyal	24.0	4
55	101308063	Karan Veer Dewan	25.0	5
56	101308064	Karanbir Singh	24.0	4
57	101308065	Kashish Khurana	25.0	5
58	101308066	Keshav Jindal	25.0	5
59	101308067	Ketan Chauhan	24.0	4
60	101308068	Khushwinder Singh	24.0	4
61	101308069	Kirat Singh Basur	21.0	4
62	101308070	Kshitij Sharma	21.0	4
63	101308071	Lokendra Kumar	25.0	5
64	101308072	Lovedeep Garg	24.0	4
65	101308073	Manavdeep Singh Grover	25.0	5
66	101308074	Manik Saharan	21.0	4
67	101308075	Manish Pandoh	24.0	4
68	101308076	Manpreet Singh	28.0	5
69	101308077	MANUTKARSH KIRPAL	23.0	4
70	101308078	Nidan Prakash	25.0	5
71	101308079	NIKHIL AGGARWAL	24.0	4
72	101308080	NIKHIL GANTA	24.0	4
73	101308082	PARAMJOT SINGH	22.0	4
74	101308083	Paras	25.0	5
75	101308085	Prabhman Vir	21.0	4
76	101308088	Pulkit Kapoor	26.0	5
77	101308089	Puneet Singh	23.0	4
78	101308090	Rajat Gupta	26.0	5
79	101308091	Ramnish Kumar	26.0	5
80	101308093	Rohan Kaushal	26.0	5
81	101308094	Sagar Singla	26.0	5
82	101308096	Sahil Sharma	26.0	5
83	101308097	Samdeep Singh Sabharwal	26.0	5
84	101308098	Sameer Bhalla	25.0	5
85	101308099	Sartaj Singh	26.0	5
86	101308100	Shikhar Bhardwaj	24.0	4
87	101308101	Shikhar Gaur	25.0	5
88	101308102	Shreyas Bhayana	25.0	5
89	101308103	Shubham	26.0	5

90	101308104	Shubham Bhama	25.0	5
91	101308105	Shubham Choudhary	25.0	5
92	101308106	Shubham Gupta	25.0	5
93	101308108	Siddharth Ghiya	25.0	5
94	101308109	Siddharth Gupta	25.0	5
95	101308110	Siddharth Vasu	25.0	5
96	101308111	Sidhant	25.0	5
97	101308112	Simrandeep Singh Bhullar	25.0	5
98	101308113	Sourav Singla	25.0	5
99	101308114	Tanjay Pathak	25.0	5
100	101308115	Tanuj Lamba	25.0	5
101	101308116	Utsav Mudgal	26.0	5
102	101308117	Vaibhav Pratap Singh Pundir	25.0	5
103	101308118	Varmeet Singh Gulati	25.0	5
104	101308119	Varun Atri	25.0	5
105	101308120	Vedant Mansotra	23.0	4
106	101308121	Vikrant Nanda	25.0	5
107	101308122	Vishal Solanki	23.0	4
108	101308123	Vivek Mittal	26.0	5
109	101308124	Vivek Pundir	26.0	5
110	101308125	Yash Wardhan Sharma	26.0	5
111	101488001	Akash Tiwari	25.0	5
112	101488002	Anuj Tanwar	25.0	5
113	101488003	Bhupinder Singh	25.0	5
114	101488004	Bishant Sharma	25.0	5
115	101488005	Harish Yadav	23.0	4
116	101488006	Harpreet Singh	28.0	5
117	101488007	Inderjeet Kumar	25.0	5
118	101488008	Ishan Bansal	26.0	5
119	101488009	Jaspreet Singh	28.0	5
120	101488010	Jaspreet Singh	25.0	5
121	101488011	Kulwinder Singh	28.0	5
122	101488012	MOHIT GOYAL	24.0	4
123	101488013	NAVJOT RIHAL	21.0	4
124	101488014	Nikhil Gupta	25.0	5
125	101488015	Sankit	23.0	4
126	101488016	Sarang Vashisht	26.0	5
127	101488017	Varun Bansal	26.0	5
128	101488018	Vishnu Kalra	26.0	5

The overall performance of students in the above question is then summarized as given below

Table: Average score of student performance in the course UME891 for criteria K4

Course	% of students in each score					Average Score
	5	4	3	2	1	
UME891	72.7	27.3	0	0	0	4.73

Step 2: The above data is used to evaluate weighted average student class performance (course portfolio) for criteria K4 as given below in Table K4.27:

Table K4.27: Weighted Average Student class performance (course portfolio) for criteria K4

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	73.9	24.4	1.7	0	0	4.722	5
UME891	72.7	27.3	0	0	0	4.73	5
Weighted average score	73.30	25.85	0.85	0.00	0.00	4.72	10

b.) Assessment Tool: Student Course Survey

Table K4.28: Average score of student course survey for criteria K4

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
UME 691	73.9	24.4	1.7	0	0	4.722	5
UME891	72.7	27.3	0	0	0	4.73	5
Weighted average score	73.30	25.85	0.85	0.00	0.00	4.72	10

c.) Assessment Tool: Graduating student survey, Alumni Survey and Employer Survey

Table K4.29: Assessment for criteria K4 using Graduating student survey, alumni survey and employer survey tool

Assessment Tools	% of students in each score					Average score
	5	4	3	2	1	
Graduating student survey	32	50	10	4	4	4.02
Alumni survey	44	46	6	4	0	4.30
Employer Survey	58	34	6	2	0	4.48

Finally overall weighted average score of performance criterion 'K4' is evaluated as given below in Table K4.30:

Table K4.30: Overall weighted average score of performance criterion ‘K4’

Assessment tools	% of students in each score					Average weighted score	Assessment tool weight
	5	4	3	2	1		
Weighted average student class performance	73.30	25.85	0.85	0.00	0.00	4.72	5.0
Weighted average student course survey	73.30	25.85	0.85	0.00	0.00	4.72	4.0
Graduating student survey	32	50	10	4	4	4.02	3.0
Alumni survey	44	46	6	4	0	4.30	3.0
Employer survey	58	34	6	2	0	4.48	3.0
Overall weighted score	58.98	34.59	4.09	1.67	0.67	4.49	18.0

Overall assessment of student outcome K using scores of K1, K2, K3 and K4

In the above sections, each of the individual performance criteria K1, K2, K3 and K4 have been assessed. The performance for attainment of outcome K has been completed using the attainment values for K1, K2, K3 and K4 and is provided below:

Table K4.31 summarizes the scores of each of the four performance criteria and these scores have been used to assess an overall score for outcome K.

Table K4.31: Overall score for outcome K at the program level

Performance criteria	% of students in each score					Overall weighted average score	Criteria weight
	5	4	3	2	1		
K1	43.84	40.01	9.52	3.96	2.67	4.25	4
K2	31.63	36.07	14.67	10.97	6.62	3.75	5
K3	57.06	35.57	5.04	1.67	0.67	4.47	5
K4	58.98	34.59	4.09	1.67	0.67	4.49	5
Overall score	48.09	36.38	8.27	4.60	2.42	4.24	19

Track Record and assessment of attainment of student outcome ‘K’ over the last three academic years

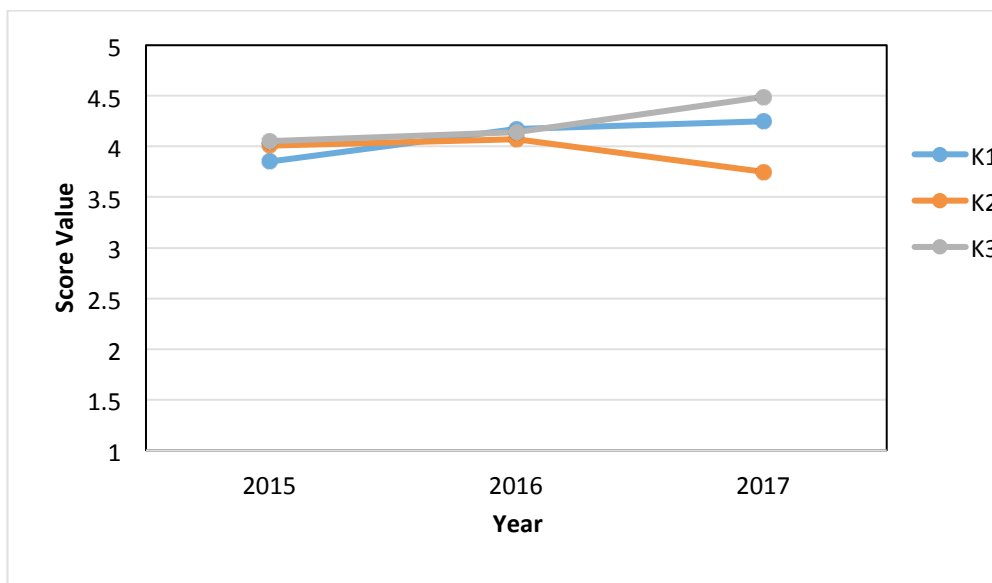
The performance criteria-wise assessment score distribution and overall weighted score for outcome ‘K’ for last three calendar years, i.e., 2015, 2016 and 2017 are presented in this section.

The following table K4.32 presents the performance criteria-wise assessment score distribution for outcome ‘K’.

Table K4.32: Performance criteria-wise assessment score distribution of outcome K

Student outcomes and performance criteria		Year		
		2015	2016	2017
K	K1	3.85	4.17	4.25
	K2	4.01	4.07	3.75
	K3	3.97	4.23	4.47
	K4	4.05	4.14	4.49

The above data has been plotted to visualize performance criteria-wise assessment score distribution for outcome ‘K’ over a period of last three years.



Level of attainment of student outcome ‘K’ over the last three academic years

Level of attainment for each outcome is categorized into three categories as given below:

- **Excellent:** Overall weighted score for the outcome ≥ 4.5 on a scale of 1 to 5
- **Good:** Overall weighted score for the outcome between 3.5 to 4.5 on a scale of 1 to 5
- **Satisfactory:** Overall weighted score for the outcome between 2.5 to 3.5 on a scale of 1 to 5
- **Unsatisfactory:** Overall weighted score for the outcome ≤ 2.5 on a scale of 1 to 5

The following table K4.33 presents the overall weighted score of outcome ‘K’ over the last three academic years.

Table K4.33: Overall weighted score of outcome ‘K’ over a period of last three years

Year	Overall weighted score	Level of attainment
2015	3.97	Good
2016	4.15	Good
2017	4.24	Good

The above data has been plotted to visualize the overall weighted score of outcome ‘K’ over a period of last three years.

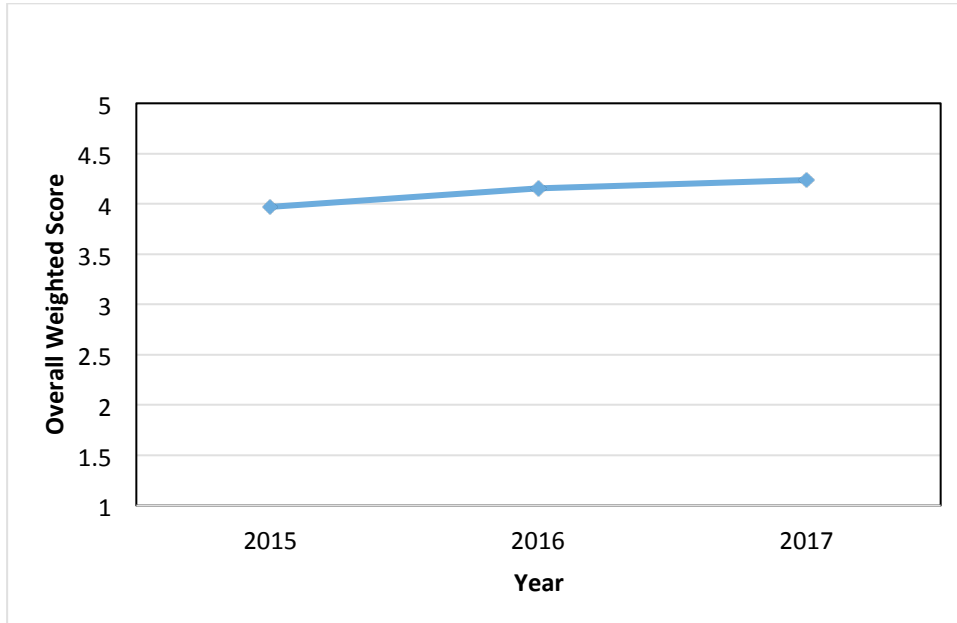


Figure K4.3: Overall weighted score of outcome ‘K’ over a period of last three years

The following actions have been taken based on the analysis of Outcome K

Weighted Score for Outcome F	Recommendation	Reason	Implemented from
4.24	No action required	Weighted score is above 3.5	--