CO-PO MAPPING FOR APPLIED CHEMISTRY 15001 COURSE 2015-2019

ACH 15001

Course Education Objectives (CEO)

1. To impart the understanding of fundamental principles, analytical methods and the technological aspects of modern chemistry.
2. To impart knowledge about chemical bonding and corrosion.
3. To emphasize on water chemistry and quality parameters of water.
4. To impart the awareness of various fuels and combustion.
5. To generate the usefulness of instrumental methods of analysis.
6. To bring about the overall awareness of the use of various materials like polymers and nanomaterials.

Course Outcomes (CO)

1. Student will know structure property relationship and corrosion.
2. Student will know the use of water as an engineering material, its properties and applications.
3. Student will generate usefulness and apply the various instrumental techniques for identification and characterization of materials.
4. Student will understand the various types of fuels and combustion.
5. Student will know the types,properties and applications of polymers and nanomaterials.

PO-ACH CO I5001	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	3	3	1	3			2
CO2	3	3	2	3	2	3	3	1	3			2
CO3	3	3	3	3	3	3	3	1	3			2
CO4	3	2	2	3	3	2	2	1	3			2
CO5	3	3	2	2	2	2	2	2	3			3
Total	15	13	11	13	12	13	13	6	15	0	0	11
Avg	3	2.6	2.2	2.6	2.4	2.6	2.6	1.2	3	0	0	2.2
Rounded of Weightage	3	3	2	3	2	3	3	1	3	0	0	2

Existing COs of 2019-2020 syllabus for ACH

Course Outcomes (CO):

Student will able to
1. Appreciate the role and impact of chemistry in various engineering field
2. Analyze engineering problems and also derive solution based on the knowledge of chemistry
3. Select appropriate materials and processes for specific applications
4. Consolidate theoretical knowledge into practical experience

Modified COs for ACH 19001 :

Students will be able to

CO1: Appreciate material properties and their engineering applications

CO2: Analyze and select the most appropriate engineering material

CO3: Perform experiments to establish suitability of various chemicals, materials and techniques

CO4: Develop problem solving ability to justify choice of chemicals and materials

CO5: Acknowledge the current developments in the field of nanotechnology, energy storage systems and green chemistry for sustainable development

PO-ACH CO I5001	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	3	0	3	3	0	2	0	0	3
CO2	3	3	2	3	0	3	2	0	2	0	0	3
CO3	3	2	3	3	0	3	3	0	3	0	0	2
CO4	3	2	3	1	0	3	2	0	2	0	0	2
CO5	3	2	2	3	0	3	3	0	2	0	0	3
Total	15	11	13	13	0	15	13	0	11	0	0	13

Program outcomes (POs)-12 Graduate Attributes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs

with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear

instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

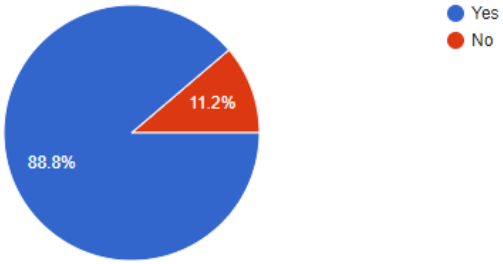
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Exit surveys Responses:

ACH 15001 Exit survey responses, Number of Responses : 374

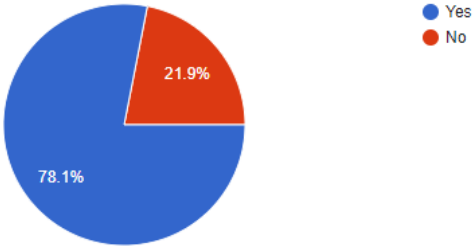
1) I have been exposed to role of Chemistry in various fields and applications of Engineering

374 responses



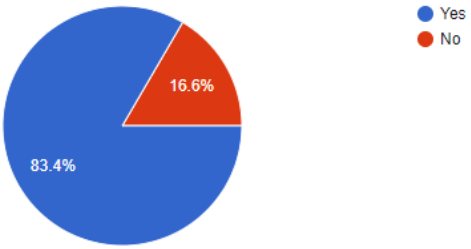
2) I will be able to analyze Engineering problem and will be able to derive its solution using knowledge of Chemicals and materials

374 responses



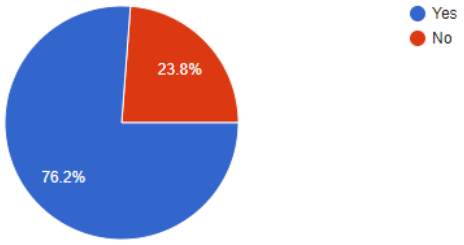
3) I will be able to experimentally determine water quality and decide its suitability for Industrial applications

374 responses



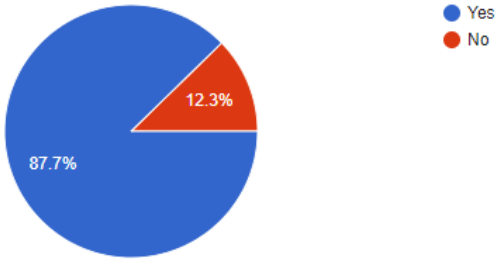
4) I will be able to decide which polymer is suitable for a certain engineering application based on my knowledge of Properties of Polymers

374 responses



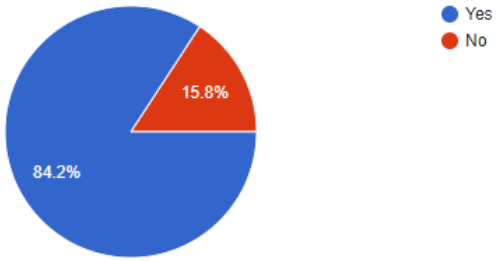
5) I will be able to decide mechanism of corrosion and how to control the rate of carrion in different practical situations

374 responses



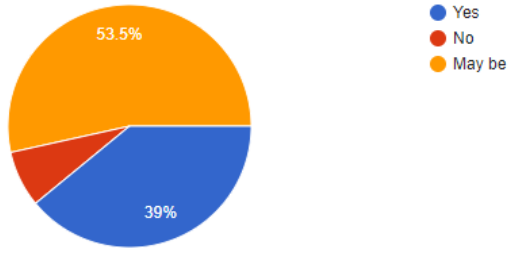
6) I will be able to decide most suitable fuel based on characteristics of different fuels

374 responses



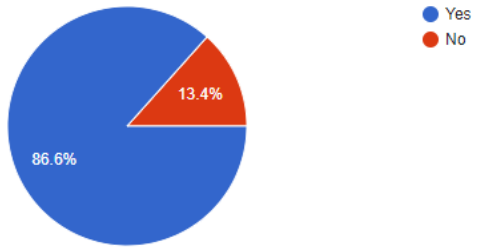
7) I have been exposed to instrumental methods of analysis and will be able to decide which spectroscopy method will be appropriate for testing the sample under test

374 responses



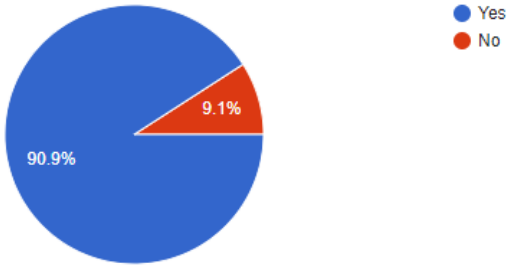
8) I am now better equipped to appreciate the Role of Chemistry in the working life of an Engineer

374 responses



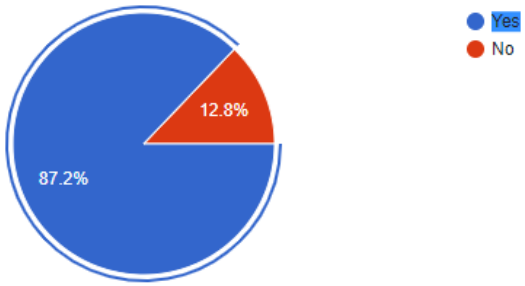
9) I appreciate the role and significance of Nanomaterials and their applications

374 responses



10) Learning this course has enhanced my knowledge of fundamentals required for Engineering practices.

374 responses



Exit survey responses : 20% weightage

Sr No	% attained	Target	%attained * weightage for Indirect assessment
CO15001.1	88.8	60	
CO15001-2	78.1	60	
CO15001-3	39.4	60	
CO15001-4	84.2	60	
Co15001-5	76.2	60	

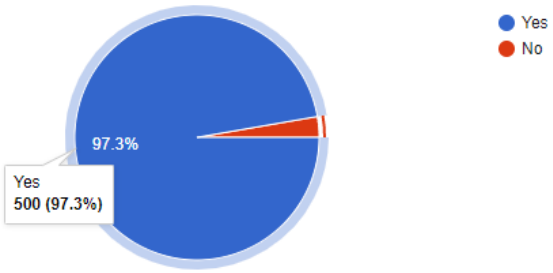
CO1: Appreciate material properties and their engineering applications
CO2:Analyze and select the most appropriate engineering material
CO3: Perform experiments to establish suitability of various chemicals, materials and techniques
CO4: Develop problem solving ability to justify choice of chemicals and materials
CO5: Acknowledge the current developments in the field of nanotechnology, energy storage systems and green chemistry for sustainable development

ACH 19001, Exit Survey Responses

Forms response chart. Number of responses: 514 responses.

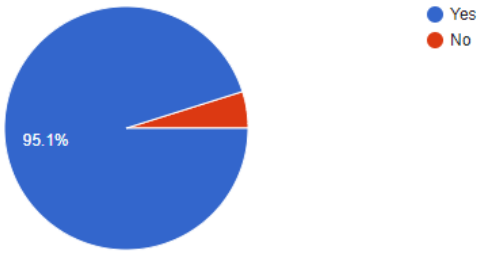
1) I was made aware about role of Chemistry in various fields and applications of Engineering

514 responses



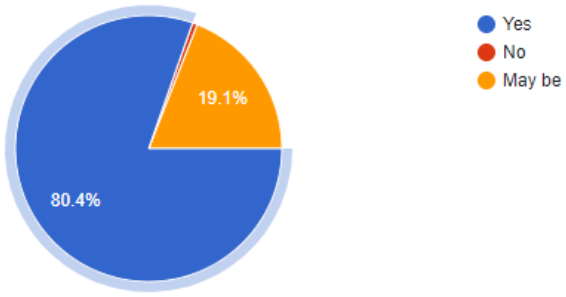
2) I will be able to analyze Engineering problem and will be able to derive its solution using knowledge of different Chemicals and materials

514 responses



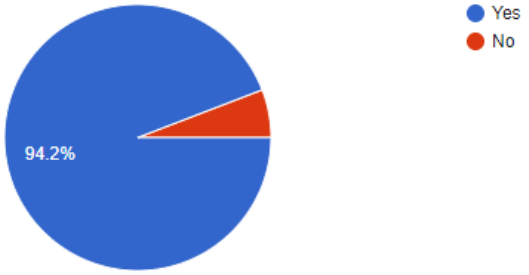
3) I will be able to experimentally determine water quality and decide its suitability for Industrial applications

514 responses



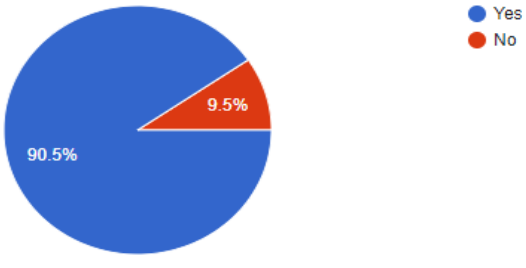
4) I will be able to decide which polymer is suitable for a certain engineering application based on my knowledge of Properties of Polymers

514 responses



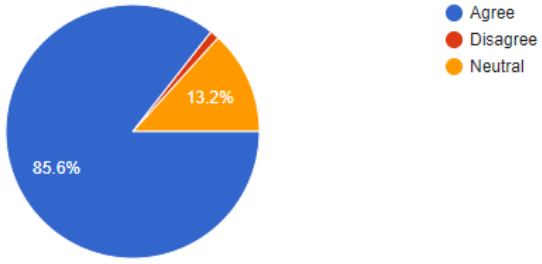
5) I will be able to compare between relative merits and demerits of various electro-chemical energy storage systems and their suitability for various applications

514 responses



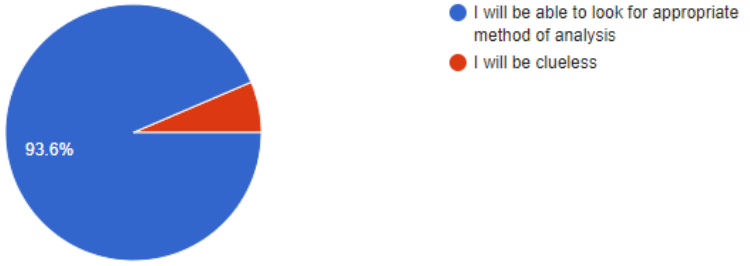
6) I am aware of various hazards of Manufacturing processes and hence I will prefer Green Chemistry Route over conventional if need arises

514 responses



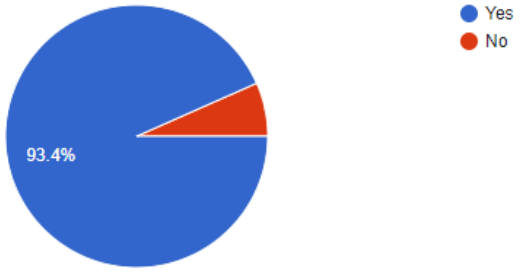
7) I am aware of various instrumental methods of chemical analysis and will be able to decide which method will be appropriate for testing different samples

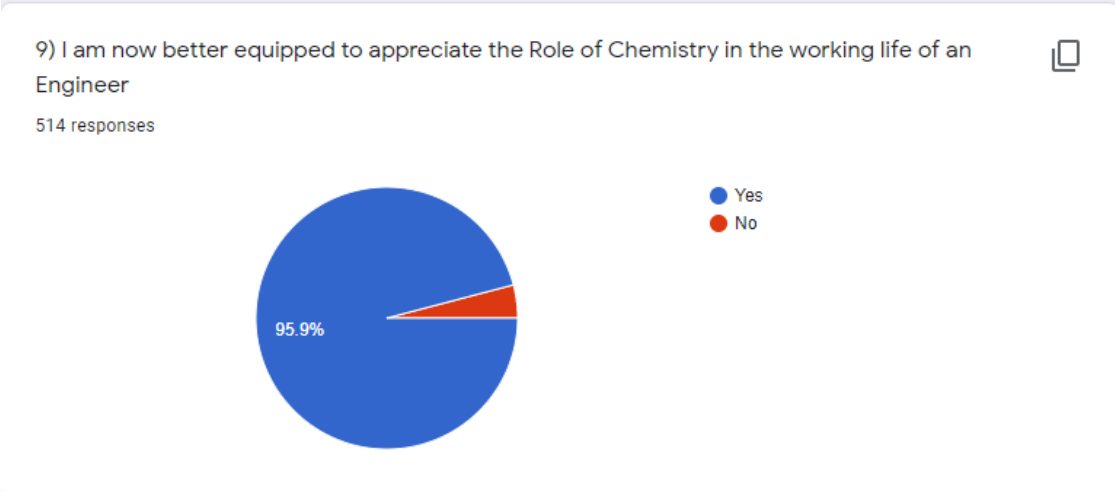
514 responses

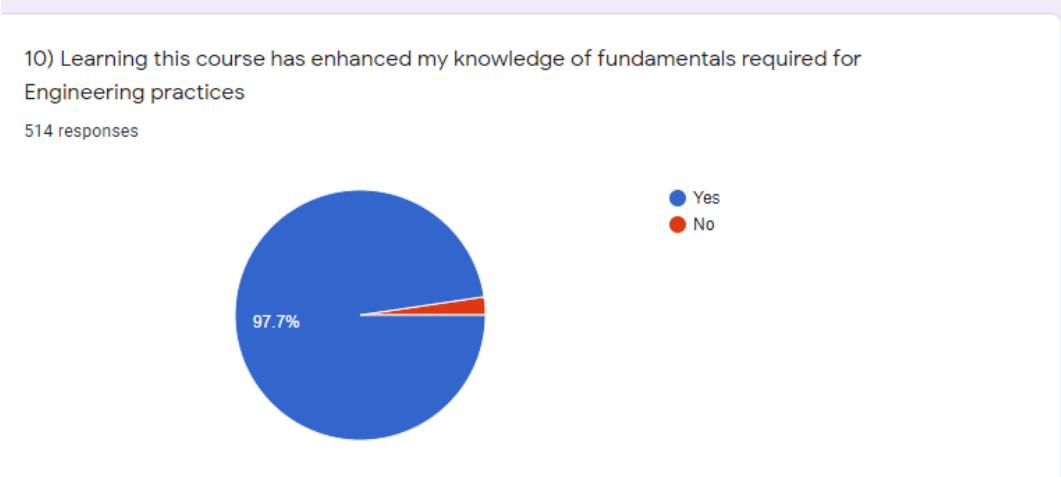


8) I have been exposed to various material classes and know characteristic properties of each material class

514 responses







ACH 19001 Exit Survey Responses

Co-attainment calculations:

Applied Chemistry FYBTechSem I (2017-18) Division 1-10

Table 1: CO Assessment with different evaluation modes

Course outcome	Div 6 J A Kher	Div 7 J A Kher	Div 8 N V Iyer	Div 9 M Y Khaladkar	Div 10 K S Suranje	Div 2 M YK	Div3 MYK	Div 4 NVI	**Avg of 8 divisions**	Avg of 5 div
CO a	86.78	91.07	90.35	78.75	83.57	64.11	67	82.8	**75.00**	86.10
CO b	84.21	84.73	90.52	100	77.36	67	69.4	77.6	**75.34**	87.36

CO c	87.5	85	82	80	76.5	67	65	55.7	**67.47**	82.2
CO d	73.75	91.25	98.11	87.85	85.62	53.39	65	61.9	**66.9**	87.31
CO e	85.88	89.41	95.29	77.64	74.11	100	85.6	56.9	**81.74**	84.46

Applied Chemistry FYBTechSemII (2017-18)

Course outcome	Div 1	Div 2 M YK	Div3 MYK	Div 4 NVI	Div 5	Avg
CO a	-	64.11	67	82.8%	-	**71.30**
CO b	-	67	69.4	77.6%	-	**71.30**
CO c	-	67	65	55.7%	-	**62.56**
CO d	-	53.39	65	61.9%	-	**58.03**
CO e	-	100	85.6	56.9%	-	**80.83**

Applied Chemistry FYBTech Sem I (2018-19) Division 6-10

Table 1: CO Assessment with different evaluation modes

Course outcome	Div 6 Ganesh Agawane %	Div 7 M Y Khaladkar %	Div 8 Deepika Agrawal %	Div 9 N V Iyer %	Div 10 K.S. Suranje %	Avg of 5 div %
CO a	92.8	85.6	98.2%	91.6	91.2	**91.88**
CO b	82.66	86.5	75.3%	75	73.79	**78.65**
CO c	81.0	79	68.5%	80	80.5	**77.8**
CO d	91.5	90.5	86.5%	85.5	82.5	**87.3**
CO e	88.0	69	76%	84	74	**78.2**

Applied Chemistry FYBTechSem II (2018-19) Division 1-5

Course outcome	Div 1	Div 2	Div3	Div 4	Div 5	Avg
CO a	69.10	70	78.5	82.8	72	**74.48**
CO b	60.00	46.11	80	77.6%	66	**65.94**
CO c	57.54	60.68	55	55.7%	55	**56.86**
O d	85.70	61.5	70	61.9%	65	**68.82**
CO e	66.00	80.76	58.8	56.9%	59	**64.29**

Applied Chemistry FYBTechSem I (2019-20) Division 6-10

Course outcome	Div 6 Reshma B	Div 7 KSS	Div8	Div 9 DSA	Div 10	Avg
CO a	60.67	62.62	69.12	70.0	66.68	**65.81**
CO b	48.13	54.47	44.61	58.1	59.83	**53.028**
CO c	86.98	89.05	67.93	64.0	72.37	**76.06**
CO d	60.81	64.50	57.16	64.4	58.23	**61.02**

CO attainment calculation for ACH19001 course.

C1= (65.8*0.8)+(97.3*0.2)= 52.64+19.46 = 72.1

C2=(53.028*0.80)+(95.1*0.20) = 42.42+ 19.02= 61.44

C3= (76.06*0.8) +(80.4*0.2)= 60.848+ 16.08= 76.93

C4= (61.02*0.8) + (95.1*0.2)= 48.816+ 19.02= 67.83

CO attainment calculation with direct and indirect weightage

co	T1+T2+ESE * 0.8	Exit survey responses* 0.2	Final CO attained	Target achievement 60%
CO1	65.8 X 0.8	97.3	72.1	Attained
CO2	53.028 X 0.8	95.1	61.44	Attained
CO3	76.06 X0.8	80.4	76.93	Attained
CO4	61.02X0.8	95.1	67.83	Attained

CO attainment calculation for the year 17-18 (both semesters combined)

co	T1+T2+ESE * 0.8	Exit survey responses* 0.2	Final CO attained	Target achievement 60%
CO1	**75.00 X 0.8=60**	88.8X0.2=17.76	77.76	Attained
CO2	**75.34 X 0.8=60.27**	83.4X0.2= 16.68	76.95	Attained
CO3	**67.47X 0.8=53.97**	92X0.2=18.4	72.37	Attained
CO4	**66.9X0.8= 53.52**	78.1X0.2=15.62	69.14	Attained
CO5	**81.74X 0.8= 65.39**	90.9 X0.2 =18.18	83.57	Attained

F.Y. B.Tech. 2020-2021 Odd Sem

Course outcome	Div 6	Div 7	Div 8	Div 9	Div 10	Avg
CO a	79.77	68.07	79.30	74.47	71.75	**74.67**
CO b	76.14	66.57	62.14	64.78	61.83	**66.30**
CO c	68.42	55.14	66.67	57.43	63.02	**62.13**
CO d	70.81	57.28	62.01	56.90	59.77	**61.35**
CO e	71.52	64.00	65.07	63.05	64.92	**65.71**

F. Y. B. Tech. 2020-2021 Even Sem

Course outcome	Div 1	Div 2	Div 3	Div 4	Div 5	Avg
CO a	62.59	66.51	67.68	68.03	59.16	**64.79**
CO b	58.52	65.45	69.40	62.77	57.30	**62.69**
CO c	61.11	69.28	70.88	64.33	63.32	**65.78**
CO d	60.02	61.09	59.68	61.65	60.79	**60.65**
CO e	58.91	61.98	65.74	62.25	63.26	**62.43**

F.Y. B.Tech. 2021-22 Odd Sem

Course outcome	Div 6	Div 7	Div 8	Div 9	Div 10	Avg
CO a	66.38	72.5	78.29	64.47	69.37	**70.20**
CO b	57.7	57.76	65.92	60.26	72.5	**62.83**
CO c	70	59.21	76.58	73.16	81.58	**72.11**
CO d	75	78.86	87.95	74.55	84.09	**80.09**
CO e	67.14	67.14	84.76	68.1	82.14	**73.86**