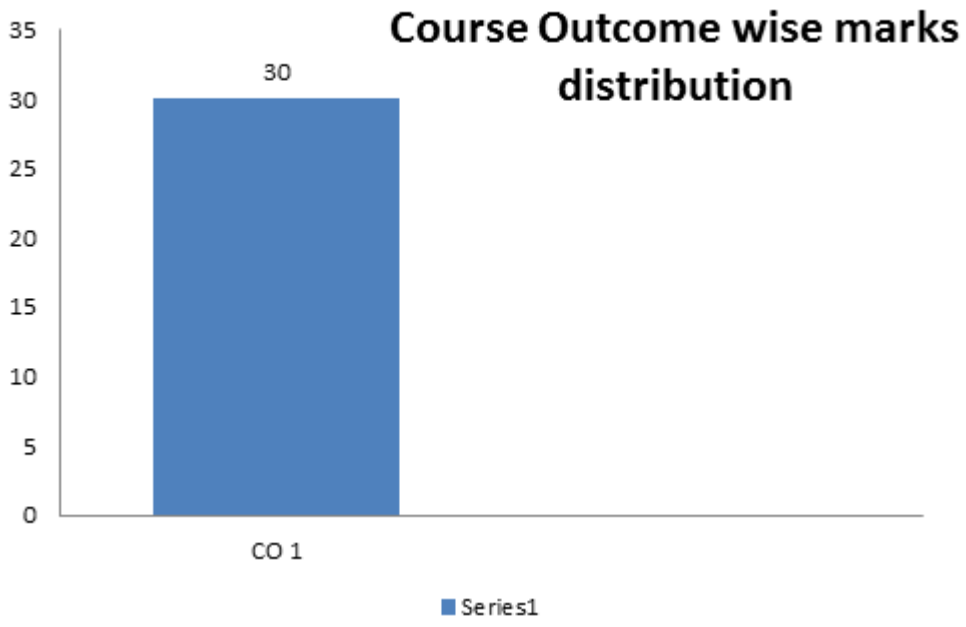
United College of Engineering and Research, Prayagraj
Department of Computer Science

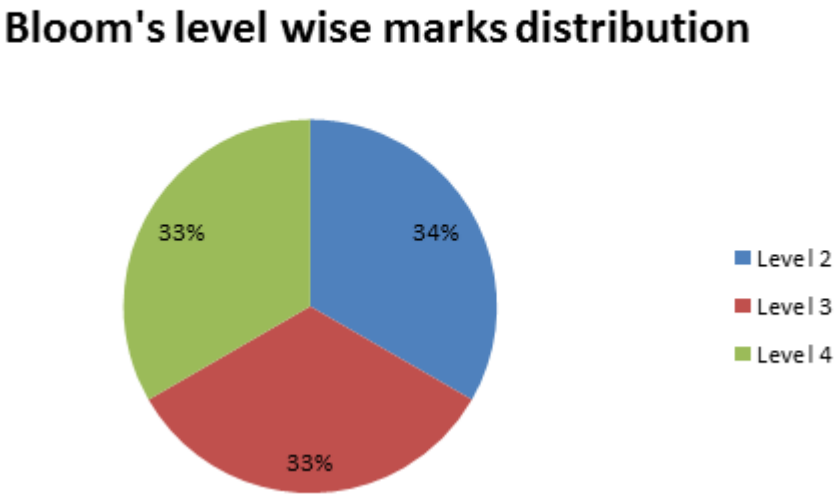
B.Tech(2020-21)
Discrete Structures and Theory of Logic(KCS 303)
Assignment-1

QNo.	Question	CO Type	Bloom's level
1	Show that the relation R on the set Z of integers given by R = {(a,b): 3 divides (a-b)}, is an equivalence relation.	CO1	L3
2	Let R be a relation on the set of natural numbers N, as R = {(x,y) ! x,y ∈ N, 3x+y = 19}. Find the domain and range of R. Verify whether R is reflexive.	CO1	L2
3	Prove that $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \ldots\ldots\ldots\ldots\ldots\ldots + \frac{1}{n.(n+1)} = \frac{n}{(n+1)}$	CO1	L4
4	If set A has 3 elements then find the number of symmetric relations defined on set A.	CO1	L3
5	If f : A → B is one-one onto mapping, then prove that f^{-1}: B → A will be also one-one onto mapping.	CO1	L4
6	If D(n) is the set positive odd integers i.e. D(n) = {1,3,5,7,.....}, then prove with the help of mathematical induction P(n) = $1+3^n$ is divisible by 4.	CO1	L4
7	Determine whether each of these functions are bijective from R to R. 1. f(x) = $x^2 + 1$ 2. f(x) = x^3 3. f(x) = $\frac{x^2+1}{x^2+2}$	CO1	L4
8	Prove that $(A \cup B) \cap C = A \cup (B \cap C)$ if and only if A ⊆ C	CO1	L3
9	Show that (A-B)∩(B-A) = ϕ	CO1	L2
10	Let A be a set of 10 distinct elements. Determine the following:- 1. Number of different binary relations on A. 2. Number of different reflexive binary relations on A.	CO1	L2
11	Prove that the relation "congruence modulo m" defined as ≅ = { (a,b) ! (a-b) is divisible by m } over the set of positive integers is an equivalence relation. Show that if a ≅ b and c ≅ d, then (a+c) ≅ (b+d).	CO1	L2
12	Prove that for any two sets A and B, $(A \cup B)'$ = A'∩B'	CO1	L2
13	If f: A → B and g: B → C are invertible functions then show that gof: A → C is invertible. And $(gof)^{-1} = f^{-1}og^{-1}$	CO1	L3
14	Prove by principle of mathematical induction method that the sum of finite number of terms of geometric progression, $a + ar + ar^2 + ar^3 + \ldots\ldots\ldots\ldots\ldots + ar^{n-1} = \frac{a(r^n-1)}{r-1}$ if r ≠ 1.	CO1	L4
15	Let A = {1,2,3,4,.....,13}. Consider the equivalence relation on A×A defined by (a,b)R(c,d) if a+d = b+c. Find the equivalence class of (5,8).	CO1	L3

Bloom's Taxonomy levels (1- Remembering, 2- Understanding, 3- Applying, 4- Analyzing, 5- Evaluating, 6- Creating)

CO - Course Outcome


Course Outcome wise marks distribution
35
30
25
20
15
10
5
0
30
CO 1
Series1


Bloom's level wise marks distribution
33%
34%
33%
Level 2
Level 3
Level 4