KIET GROUP OF INSTITUTIONS, GHAZIABAD

Department of Computer Science

Course Outcomes

Session 2022-23

Department of Computer Science

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KIET GROUP OF INSTITUTIONS,GHAZIABAD

Department of Computer Science

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CO PO and Mapping of CO PO 2nd Year

Session:- 2022-23 Semester:- 3rd

Theory

Course Outcome (Sensor & Instrumentation KOE034)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the use of sensors for measurement of displacement, force and pressure.	**Understand**	**Conceptual, Procedural**
CO 2	Understand the uses of sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow and level.	**Understand**	**Conceptual, Procedural**
CO 3	Apply the concept of virtual instrumentation in automation industries.	**Apply**	**Factual , Procedural**
CO 4	Understand, Identify and use data acquisition methods.	**Understand**	**Conceptual, Procedural**
CO 5	Understand intelligent instrumentation in industrial automation.	**Understand**	**Conceptual, Procedural**

CO-PO Mapping (Sensor & Instrumentation KOE034)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	2	-	-	-	-	-	-	-	-	-	-	3	-
CO 2	3	3	-	-	2	-	-	-	-	-	-	-	2	-
CO 3	3	2	-	-	3	-	-	-	-	-	-	-	2	-
CO 4	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO 5	2	2	-	-	2	-	-	-	-	-	-	-	2	-
PO Target	**2.60**	**2.40**	**-**	**-**	**2.25**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.20**	**-**

Course Outcome (Universal Human Values ,KVE 301)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the process of self-exploration and meaning of natural acceptance.	**Understand**	**Conceptual, Procedural**
CO 2	Explore the concept of harmony in the human being (in Myself) being 'I' & 'body' as separate entity	**Analyze**	**Conceptual, Procedural**
CO 3	Analyze the process of developing harmony in family and society.	**Analyze**	**Conceptual, Procedural**
CO 4	Analyze the process of developing the harmony in nature and existence.	**Analyze**	**Conceptual, Procedural**
CO 5	Apply the role of holistic understanding of harmony of professional ethics.	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (Universal Human Values ,KVE 301)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	-	-	-	-	1	1	1	1	1	1	1	-	1
CO 2	-	-	-	-	-	3	2	3	2	1	1	2	-	-
CO 3	-	-	-	-	-	3	2	3	2	1	1	2	-	2
CO 4	-	-	-	-	-	3	2	3	2	1	1	2	-	-
CO 5	-	-	-	-	-	3	2	3	2	1	1	2	-	2
PO Target	**-**	**-**	**-**	**-**	**-**	**2.60**	**1.80**	**2.60**	**1.80**	**1**	**1**	**1.80**	**-**	**1.66**

Course Outcome (Data Structure,KCS-301)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Implement the concepts of Array and Linked list after understanding the basics of programming, data structure and their memory representation.	**Apply**	**Factual, Conceptual**
CO 2	Understand the primitive operations on various linear data structures like stack & queue along with their variants, and apply them on various applications like Expression Solving, Tower of Hanoi, String methods, etc.	**Apply**	**Conceptual, Procedural**

CO 3	Implementation of various searching and sorting algorithms using data structure concepts.	**Apply**	**Conceptual, Procedural**
CO 4	Implementation of various data structures on different applications and analyse the working in terms of time and space complexity using asymptotic notations	**Analyze**	**Conceptual, Metacognitive**
CO 5	Implementation of Non-linear data structures like Trees and Graphs; and perform various operations on these data structures.	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (Data Structure,KCS-301)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	3	2	-	-	-	-	-	-	-	-	2	3	2
CO 2	3	3	2	-	-	-	-	-	-	-	-	2	3	2
CO 3	3	3	1	-	-	-	-	-	-	-	-	2	3	2
CO 4	3	3	1	2	-	-	-	-	-	-	-	2	3	2
CO 5	3	3	1	-	-	-	-	-	-	-	-	2	3	2
PO Target	3	3	2	-	-	-	-	-	-	-	-	2	3	2

Course Outcome
(Computer Organization and Architecture,KCS 302)

CO No.	**Statement of Course Outcome**	**Bloom's Cognitive Process Level (BL)**	**Knowledge Category (KC)**
After completion of the course, the student will be able to			
CO 1	Relate the fundamental components of the basic computer system with its organization.	**Apply**	**Conceptual, Procedural**
CO 2	Interpret the design of ALU, fixed-floating-point representations and various multiplication, division operations on binary numbers.	**Apply**	**Conceptual, Procedural**
CO 3	Illustrate control unit design and concept of pipelining.	**Understand**	**Conceptual**
CO 4	Apply the concept of different types of memories.	**Apply**	**Conceptual, Procedural**
CO 5	Relate the fundamental components of the basic computer system with its organization.	**Apply**	**Conceptual, Procedural**

CO-PO Mapping
(Computer Organization and Architecture,KCS 302)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	2	-	-	-	-	-	-	-	-	-	2	-	-
CO 2	3	2	-	-	-	-	-	-	-	-	-	2	-	-
CO 3	2	2	-	-	-	-	-	-	-	-	-	2	-	-
CO 4	3	2	-	-	-	-	-	-	-	-	-	2	-	-
CO 5	2	2	-	-	-	-	-	-	-	-	-	2	-	-
PO Target	**2.6**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**

Course Outcome
(Discrete Structures & Theory of Logic,KCS 303)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Illustrate basic mathematical objects such as sets, functions, relations and natural numbers and their properties .	**Analyze**	**Conceptual & Procedural**
CO 2	Examine various structures and properties of modern algebra	**Apply**	**Conceptual & Procedural**
CO 3	Solve substantial experience of formal and logical arguments	**Apply**	**Conceptual & Procedural**
CO 4	Justify the mathematical properties via the formal language ofpropositional and predicate logic.	**Evaluate**	**Conceptual & Procedural**
CO 5	Use graphs and trees, as tools to visualize and simplify the problems.	**Apply**	**Conceptual & Procedural**

CO-PO Mapping
(Discrete Structures & Theory of Logic,KCS 303)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	1	-	-	2	-	-	-	-	-	-	-	1	-	1

CO 2	2	-	-	-	-	-	1	-	-	-	-	1	-	2
CO 3	3	2	1	2	2	-	1	-	-	-	1	2	-	3
CO 4	3	-	3	2	-	-	-	-	-	-	1	1	1	3
CO 5	2	3	-	2	2	-	1	-	-	-	2	2	2	2
PO Target	**2.2**	**2.5**	**2**	**2**	**2**	**-**	**1**	**-**	**-**	**-**	**1.3**	**1.4**	**1.5**	**2.2**

Course Outcome (Computer System Security KNC301)

CO No.	**Statement of Course Outcome**	**Bloom's Cognitive Process Level (BL)**	**Knowledge Category (KC)**
After completion of the course, the student will be able to			
CO 1	Interpret software bugs that pose cyber security threats and their mitigation techniques.	**Understand**	**Factual, Conceptual**
CO 2	Explain confidentiality policies and confinement techniques to secure the system.	**Understand**	**Conceptual**
CO 3	Demonstrate cyber-attack scenarios to web browsers and web servers and their mitigation techniques.	**Understand**	**Conceptual**
CO 4	Apply cryptography techniques and different protocols for secure transfer of data over the network.	**Apply**	**Conceptual, Procedural**
CO 5	Illustrate Internet Security Problems and Protocols used for secure transaction.	**Understand**	**Conceptual**

CO-PO Mapping (Computer System Security KNC301)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	1	2	-	-		3	-	-	-	-	-	-	-	-
CO 2	2		-	-	2	1	-	-	-	-	-	-	-	-
CO 3	2	2	-	-	-	1	-	-	-	-	-	-	-	-
CO 4	3	2	-	-	-	1	-	-	-	-	-	-	-	2
CO 5	2	1	-	-	-	2	-	-	-	-	-	-	-	
PO Target	**2**	**1.7**	**-**	**-**	**2**	**1.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Practical

Course Outcome (DSUC Lab,KCS-351)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the basics of programming and data structure like arrays, linked lists, with their memory representation.	**Understand**	**Conceptual, Procedural**
CO 2	Apply the concept to perform Stack, Queue, Tree and Graph array and Linked List Representation.	**Apply**	**Conceptual, Procedural**
CO 3	Make a solution for the available problem and implement them using data structure concept.	**Apply**	**Conceptual, Procedural**
CO 4	Analyse the working of multiple data structure and help to solve existing problem.	**Analyze**	**Conceptual, Procedural**

CO-PO Mapping (DSUC Lab,KCS-351)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	2	2	2	3	-	-	-	-	-	-	1	3	3
CO 2	3	3	2	2	3	-	-	-	-	-	-	2	2	2
CO 3	3	3	2	2	3	-	-	-	-	-	-	3	2	2
CO 4	3	3	3	2	3	-	-	-	-	-	-	3	3	3
PO Target	**3**			**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**2.25**	**2.5**	**2.5**

Course Outcome (CO Lab,KCS 352)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Build half adder and full adder using basic logic gates and solve code conversions: binary to gray and gray to binary	**Apply**	**Conceptual, Procedural**
CO 2	Construct Multiplexers (4x1, 8x1) and Decoders (2x4, 3x8)	**Apply**	**Conceptual, Procedural**
CO 3	Make use of excitation tables of various flip flops.	**Apply**	**Conceptual, Procedural**
CO 4	Model 8-bit Arithmetic Logical unit	**Apply**	**Conceptual, Procedural**
CO 5	Model 8-bit input output system with four-bit internal registers.	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (CO Lab,KCS 352)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	2	1	1	-	-	-	-	-	-	-	-	1	1	-
CO 2	2	1	1	-	-	-	-	-	-	-	-	1	1	-
CO 3	2	1	1	-	-	-	-	-	-	-	-	1	1	-
CO 4	2	1	1	-	-	-	-	-	-	-	-	1	1	-
CO 5	2	1	1	-	-	-	-	-	-	-	-	1	1	-
PO Target	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**

Course Outcome (DSTL Lab,KCS 353)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Implement various operations of set, Boolean algebra, recursion, and mathematical induction.	**Apply**	**Conceptual & Procedural**
CO 2	Implement the concept of minimum cost spanning tree and shortest path in graphs.	**Apply**	**Conceptual & Procedural**
CO 3	Illustrate permutation, combination, and probability for various problems.	**Apply**	**Conceptual & Procedural**

CO-PO Mapping (DSTL Lab,KCS 353)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	-	-	-	3	-	-	-	2	-	-	2	2	3
CO 2	3	-	-	-	3	-	-	-	2	-	-	2	2	3
CO 3	3	3	-	2	3	-	-	-	2	-	-	2	2	3
PO Target	3	3	-	2	3	-	-	-	2	-	-	2	2	3

Course Outcome (Mini project,KCS354)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Identify the problem to solve and meet its requirements.	**Apply**	**Conceptual**
CO 2	Design the solution of the problem identified by using modern tools.	**Create**	**Metacognitive**
CO 3	Develop a project using advanced technologies.	**Evaluate**	**Metacognitive**
CO 4	Develop analytical thinking and professional skills to prepare for final year project.	**Evaluate**	**Metacognitive**
CO 5	Demonstrate the developed project and its outcome to the evaluators.	**Apply**	**Conceptual**

CO-PO Mapping (Mini project,KCS354)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	3	3	3	3	2	-	-	2	2	2	3	2	2
CO 2	3	3	3	3	3	-	-	-	2	-	2	3	2	3
CO 3	3	3	3	3	2	1	-	-	3	-	2	3	3	2
CO 4	2	3	3	3	3	2	-	2	3	2	2	3	2	2
CO 5	2	-	-	-	3	-	-	2	2	3	2	3	2	2
PO Target	**2.6**	**3**	**3**	**3**	**2.8**	**1.7**		**2**	**2.4**	**2.3**	**2**	**3**	**2.2**	**2.2**

CO PO and Mapping of CO PO 2nd Year

Session:- 2022—23 Semester:- 4th

Theory

Course Outcome (Mathematics IV, KAS 402)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO1	Study the methods to solve Partial Differential Equations	**Apply**	**Conceptual & Procedural**
CO2	Apply the concept of separation of variables to solve wave, heat, Laplace and transmission equations.	**Apply**	**Conceptual & Procedural**
CO3	Evaluate Moments, M, G.F Correlations, linear regression.	**Evaluate**	**Conceptual & Procedural**
CO4	Apply the concept of probability to solve discrete and continuous probability distributions.	**Apply**	**Conceptual & Procedural**
CO5	Apply the concept of sampling to study t-test, F-test and Chi-square test, One-way Analysis of Variance (ANOVA).	**Apply**	**Conceptual & Procedural**

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	2	-	-	-	-	-	-	-	-	-	2	1	2
CO 2	3	3	2	-	-	-	-	-	-	-	-	2	1	2
CO 3	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO 4	3	3	1	1	1	-	-	-	-	-	-	1	1	1
CO 5	3	3	2	3	3	2	2	-	-	-	-	2	2	3
PO Target	3	3	1.75	2.3	2.3	2	2	-	-	-	-	1.8	1.6	3.3

Course Outcome (Technical Communication,KAS 401)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Analyze the nature and objective of Technical Communication relevant for the workplace as Engineers.	**Analyze**	**Conceptual, Procedural**
CO 2	Analyze the nature and objective of Technical Communication relevant for the workplace as Engineers.	**Apply**	**Conceptual, Procedural**
CO 3	Imbibe presentation strategies inputs by presentation skills to enhance confidence in facing diverse audience in required situations at workplace.	**Apply**	**Conceptual, Procedural**
CO 4	Analyze the application of the technical communication to promote their competence for various media like Report generation, Resume design, GD and Interview etc.	**Evaluate**	**Conceptual, Procedural**
CO 5	Evaluate voice-dynamics and select appropriate cues for their own efficacy as fluent & efficient communicators.	**Evaluate**	**Conceptual, Procedural**

CO-PO Mapping (Technical Communication,KAS 401)

C301	**Programme Outcome (PO)**												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1									2	3		3		
CO 2									2	3		3		
CO 3									2	3		3		
CO 4									2	3		3		
CO 5									2	3		3		
PO Target									**2**	**3**		**3**		

Course Outcome (Operating Systems, KCS 401)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the basic concepts, functions, and types of operating systems.	**Understand**	**F, C**
CO 2	Identify process synchronization techniques to achieve better performance of a computer system.	**Understand**	**F, C**
CO 3	Apply different process scheduling algorithms and deadlock management techniques.	**Apply**	**C, P**

CO 4	Illustrate various memory management mechanism used in the operating system.	**Apply**	**C, P**
CO 5	Demonstrate input and output management; and how the operating system performs the disk management.	**Apply**	**C, P**

CO-PO Mapping (Operating Systems, KCS401)

C301	**Programme Outcome (PO)**												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO 2	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 3	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 4	3	2	-	-	-	-	-	-	-	-	-	-	2	-
CO 5	3	2	-	-	-	-	-	-	-	-	-	-	2	-
PO Target	**2.8**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**-**

Course Outcome (Theory of Automata and Formal Languages, KCS 402)

CO_No.	**Statement of Course Outcome**	**Bloom's Cognitive Process Level (BL)**	**Knowledge Category (KC)**
After completion of the course, the student will be able to			
CO 1	Understand basic concepts of automata theory and formal languages.	**Understand**	**C**
CO 2	Construct finite automata and regular expressions for regular languages.	**Apply**	**C, P**
CO 3	Construct regular and context-free grammar for formal languages.	**Apply**	**C, P**
CO 4	Construct the pushdown automata for context-free languages.	**Apply**	**C, P**
CO 5	Construct Turing machines for formal languages.	**Apply**	**C, P**

CO-PO Mapping (Theory of Automata and Formal Languages, KCS402)

C301	**Programme Outcome (PO)**												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO 2	3	2	2	-	-	-	-	-	-	-	1	2	2	-
CO 3	3	2	2	-	-	-	-	-	-	-	1	2	2	-
CO 4	3	2	2	-	-	-	-	-	-	-	1	2	2	-
CO 5	3	2	2	-	-	-	-	-	-	-	1	2	2	-
PO Target														

Course Outcome (Microprocessor, KCS 403)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the fundamental concepts of microprocessor including architecture, addressing modes, etc.	**Understand**	**F,C**
CO 2	Illustrate the detailed architecture of 8085 microprocessor with its instruction set.	**Apply**	**C,P**
CO 3	Illustrate the detailed architecture of 8086 microprocessor with its instruction set.	**Apply**	**C,P**
CO 4	Implement simple programs of 8085/8086 microprocessor using assembly language programming.	**Apply**	**C,P**
CO 5	Understand concepts of peripherals devices interfaced with microprocessor(8085/8086)	**Understand**	**C**

CO-PO Mapping (Microprocessor, KCS 403)

C301	**Programme Outcome (PO)**												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	-	-	-	-	-	-	-	-	-	-	1	1	-
CO 2	3	-	-	-	-	-	-	-	-	-	-	1	1	-
CO 3	3	-	1	-	-	-	-	-	-	-	-	1	2	-
CO 4	3	-	1	-	-	-	-	-		-	-	1	2	-
CO 5	2	-	-	-	-	-	-	-		-	-	1	1	-
PO Target	**2.8**	**-**	**1**	**-**	**-**	**-**	**-**	**-**		**-**	**-**	**1**	**1.4**	**-**

Course Outcome (Python Programming ,KNC 402)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	To read and write simple Python programs.	**Understand**	**C**

CO 2	To understand the basic concept and develop Python programs with conditionals statement and loops.	**Apply**	**C,P**
CO 3	To define Python functions and to use Python data structures –- lists, tuples, dictionaries, set.	**Apply**	**C,P**
CO 4	Apply various method to do input/output with files and file handling in Python	**Apply**	**C,P**
CO 5	Analysis of various searching ,sorting and merging in Python	**Apply**	**C,P**

CO-PO Mapping (Python Programming ,KNC 402)

C301	**Programme Outcome (PO)**												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	1	-	-	-	-	-	-	-	-	2	1	-
CO 2	3	2	1	1	-	-	-	-	-	-	-	2	2	1
CO 3	3	2	1	1	-	-	-	-	-	-	-	2	2	1
CO 4	3	3	2	1	-	-	-	-		-	-	2	2	1
CO 5	3	3	2	1	-	-	-	-		-	-	2	2	1
PO Target	**3**	**2.4**	**1.4**	**1**	**-**	**-**	**-**	**-**		**-**	**-**	**2**	**1.8**	**1**

Practical

Course Outcome (Operating Systems Lab, KCS 451)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand and apply knowledge of basic UNIX/LINUX commands to solve various software problems and to automate real time applications.	**Understand**	**C**
CO 2	Compare and contrast among various CPU scheduling algorithms and apply knowledge to identify the best scheduling algorithm as per software requirement.	**Understand**	**C**
CO 3	Understand and implement the concept of process synchronization tool like semaphore to solve mutual exclusion problem in order to coordinate concurrent processes.	**Apply**	**C**
CO 4	Apply knowledge of process management techniques to design and solve various process synchronization problems like Producer Consumer problem, Reader Writers problem and dining philosophers' problem.	**Apply**	**C**
CO 5	Understand and apply the concepts of deadlock in operating systems to design and implement various deadlock avoidance algorithms like Banker's algorithm	**Apply**	**C**

CO-PO Mapping (Operating Systems Lab, KCS451)

C301	**Programme Outcome (PO)**												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO 2	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 3	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 4	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 5	3	2	-	-	-	-	-	-	-	-	-	2	-	-
PO Target	2.8	2	-	-	-	-	-	-	-	-	-	2	2	-

Course Outcome (Microprocessor Lab, KCS 452)

CO._No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Implement basic arithmetic operations using assembly language on 8085 microprocessor.	**Conceptual,Procedural**	**Apply (BL-3)**
CO 2	Implement advanced arithmetic operations using assembly language on 8085 microprocessor.	**Conceptual,Procedural**	**Apply (BL-3)**
CO 3	Simulate interfacing circuits with microprocessor.	**Conceptual,Procedural**	**Apply (BL-3)**

CO-PO Mapping (Microprocessor Lab, KCS 452)

C301	**Programme Outcome (PO)**												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	-	-	-	-	-	-	-	1	-	-	2	1	-
CO 2	2	-	-	-	-	-	-	-	1	-	-	2	1	-
CO 3	2	-	-	-	-	-	-	-	1	-	-	2	1	-
PO Target	2	-	-	-	-		-	-	1	-	-	2	1	-

Course Outcome (Python Programming Lab,KCS453)

CO._No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand basic syntax of python implementation	**Understand**	**Conceptual**
CO 2	Apply looping and conditional constructs	**Apply**	**Conceptual, Procedural**
CO 3	Develop programs related with list data structure	**Apply**	**Conceptual, Procedural**

CO4	Design programs related to tuples, dictionary and set	**Apply**	**Conceptual, Procedural**
CO5	Illustrate searching, sorting and merging in python	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (Python Programming Lab,KCS453)

C301	**Programme Outcome (PO)**												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	1	2	1	3	-	-	-	-	-	-	1	1	1
CO 2	3	2	2	2	3	-	-	-	-	-	-	2	2	2
CO 3	3	3	2	2	3	-	-	-	-	-	-	2	2	2
CO4	3	2	2	2	3	-	-	-	-	-	-	2	2	2
CO5	3	2	2	3	3	-	-	-	-	-	-	2	2	2
PO Target	**3**	**2**	**2**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**1.8**	**1.8**	**1.8**

CO PO and Mapping of CO PO 3rd Year

Session:- 2020-21 Semester:- 5th

Theory

Course Outcome
(Database Management System,KCS 501)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Illustrate the knowledge of database concepts along with design of database for real world problem.	**Conceptual, Procedural**	**Apply**
CO 2	Apply query processing techniques (relational algebra and relational calculus expressions) with knowledge of relational model and query languages.	**Conceptual, Procedural**	**Apply**
CO 3	Analyze the database redundancy problem using normalization techniques for good database design.	**Conceptual, Procedural**	**Analyze**
CO 4	Implement the database transactions processing concepts and study the broad range of database management issues in concurrent environment.	**Conceptual, Procedural**	**Apply**
CO 5	Apply the different concurrency control techniques on transactions and study of database recovery methods.	**Conceptual, Procedural**	**Apply**

CO-PO Mapping
(Database Management System,KCS 501)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	2	2	-	-	-	-	-	-	-	-	-	1	1	-
CO 2	3	3	-	-	1	-	-	-	-	-	-	1	1	-
CO 3	3	3	-	-	1	-	-	-	-	-	-	1	1	-
CO 4	3	3	-	-	-	-	-	-	-	-	-	1	1	-
CO 5	3	3	-	-	-	-	-	-	-	-	-	1	1	-
PO Target	**2.8**	**2.8**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**

Course Outcome (Compiler Design,KCS 502)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Acquire knowledge of different phases and passes of compiler along with LEX and YACC tool.	**Understand**	**Conceptual**
CO 2	Illustrate various parsing techniques i.e. Top-Down and Bottom-up parsers using LL, SLR, CLR, and LALR parsing table.	**Apply**	**Conceptual, Procedural**
CO 3	Describe the Intermediate code representation using Syntax Tree, DAG as well as use this knowledge to generate the intermediate code in the form of 3-address code.	**Apply**	**Conceptual, Procedural**
CO 4	Discuss data structures used for Symbol Table, Run time organization and error in phases of compiler.	**Understand**	**Conceptual**
CO 5	Apply code optimization and Generation techniques resulting in Target Code.	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (Compiler Design,KCS 502)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	2	1	1	-	-	-	-	-	-	-	1	-	-
CO 2	3	3	1		-	-	-	-	-	-	-	-	-	-
CO 3	3	3	1	-	-	-	-	-	-	-	-	2	-	-
CO 4	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO 5	3	3	2	-	-	-	-	-	-	-	-	1	-	-
PO Target	**3**	**2.4**	**1.25**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.33**	**-**	**-**

Course Outcome
(Design and Analysis of Algorithm,KCS 503)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand different asymptotic performance analysis methods	**Understand**	**Conceptual**
CO 2	Analyze performance analysis methods for sorting and searching algorithms.	**Analyze**	**Conceptual, Procedural**
CO 3	Understand the concept of Advance Data Structures	**Understand**	**Conceptual**
CO 4	Apply different problem solving paradigms to solve computational problems	**Metacognitive**	**Conceptual, Procedural**
CO 5	Understand the concept of NP-Problem, Randomized and Approximations algorithm.	**Understand**	**Conceptual**

CO-PO Mapping
(Design and Analysis of Algorithm,KCS 503)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	-	-	-	-	-	-	-	-	-	-	2	3	-
CO 2	3	2	2	-	-	-	-	-	-	-	-	2	3	-
CO 3	3	2	2	-	-	-	-	-	-	-	-	2	1	-
CO 4	3	2	2	-	-	-	-	-	-	-	-	2	3	-
CO 5	3	2	2	-	-	-	-	-	-	-	-	2	1	-
PO Target	**3**	**1.6**	**1.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2.2**	**-**

Course Outcome (Web Designing,KCS 052)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	**Understand** the principles of web design and different types of websites.	**Understand**	**Conceptual**
CO 2	**Apply** the concepts of HTML & elements and in designing and development of web pages	**Apply**	**Conceptual, Procedural**
CO 3	**Implement** the properties of Cascading Style Sheet (CSS) in designing web pages.	**Apply**	**Conceptual, Procedural**
CO 4	**Apply** the concepts of JavaScript to validate the website and to make it interactive.	**Apply**	**Conceptual, Procedural**
CO 5	**Utilize** the concept of Web Hosting and SEO for the quick response of websites.	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (Web Designing,KCS 052)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	1	2	2	-	-	-	-	-	2	-	-	-	1	-
CO 2	2	2	3	-	-	-	-	-	-	-	-	-	2	-
CO 3	2	2	3	-	-	-	-	-	-	-	-	-	2	-
CO 4	2	2	3	-	-	-	-	-	-	-	-	-	3	-
CO 5	2	3	3	2	3	-	-	-	-	-	-	-	3	-
PO Target	**1.8**	**2.2**	**2.8**	**2**	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2.2**	**-**

Course Outcome (Machine Learning Techniques, KCS055)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	**Understand** the need for machine learning for various problem solving.	**Understand**	**Conceptual**
CO 2	**Analyze** a wide variety of machine learning techniques and learn how these techniques are suitable for solving different real-world problems.	**Apply**	**Conceptual**
CO 3	**Understand** the latest trends in machine learning.	**Understand**	**Conceptual**

CO 4	**Apply** various machine learning algorithms to real-world problems.	**Apply**	**Conceptual, Procedural**
CO 5	**Optimize** the models learned and report on the expected accuracy.	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (Machine Learning Techniques, KCS055)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	1	-	-	-	2	-	-	-	1	1	1	2	-
CO 2	3	2	-	-	-	2	-	-	-	1	1	1	2	-
CO 3	-	1	-	-	-	2	-	-	-	1	1	1	2	-
CO 4	3	2	-	-	-	2	-	-	1	1	1	1	2	-
CO 5	2	2	-	-	-	2	-	-	-	1	1	1	2	-
PO Target	**1.6**	**1.6**	**-**	**-**	**-**	**2**	**-**	**--**	**0.2**	**1**	**1**	**1**	**2**	**-**

Course Outcome (Constitution of India, Law and Engineering KNC501)

CO No.	**Statement of Course Outcome**	**Bloom's Cognitive Process Level (BL)**	**Knowledge Category (KC)**
After completion of the course, the student will be able to			
CO 1	Identify and explore the basic features and modalities about the Indian Constitution.	**Understand**	**Factual, Conceptual**
CO 2	Differentiate and relate the functioning of Indian Parliamentary System at the Centre and State Level.	**Analyze**	**Factual, Procedural**
CO 3	Differentiate different aspect of Indian Legal System and its related Bodies.	**Understand**	**Factual, Conceptual**
CO 4	Discover and apply different laws and regulations related to engineering practices.	**Understand**	**Factual, Conceptual**
CO 5	Correlate the role of Engineers with different Organisations and Governance Models.	**Understand**	**Factual,Conceptual**

CO-PO Mapping (Constitution of India, Law and Engineering KNC501)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	-	-	-	-	3	2	-	-	-	-	-	-	-
CO 2	-	-	-	-	-	3	2	-	-	-	-	-	-	-
CO 3	-	-	-	-	-	3	2	1	-	-	-	-	-	-
CO 4	-	-	-	-	-	3	2	2	-	2	-	-	-	-
CO 5	-	-	-	-	-	2	2	2	2	2	2	2	-	-
PO Target	**-**	**-**	**-**	**-**	**-**	**2.80**	**2**	**1.67**	**2**	**2**	**2**	**2**	**-**	**-**

Practical

Course Outcome (DBMS Lab,KCS 551)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	**Implement** the concepts of table creation, views, indexes and other database objects using Oracle 10g express edition.	**Apply**	**Procedural**
CO 2	**Solve** simple and complex queries using DDL, DML, DCL and TCL.	**Apply**	**Procedural**
CO 3	**Utilize** entity integrity, referential integrity, key constraints and domain constraints on database.	**Apply**	**Procedural**
CO 4	**Implement** the PL/SQL blocks, procedure functions, packages and triggers, cursors.	**Apply**	**Procedural**
CO 5	**Design** a database schema for a real-world problem like Hospital management system.	**Apply**	**Procedural**

CO-PO Mapping (DBMS Lab,KCS 551)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	3	-	1	3	-	-	-	-	-	2	2	-	-
CO 2	3	3	-	3	-	-	-	-	-	-	2	2	-	-
CO 3	3	3	-	3	-	-	-	-	-	-	2	2	-	-
CO 4	3	3	-	3	-	-	-	-	-	-	2	2	-	-
CO 5	3	3	2	3	-	-	-	-	-	-	3	3	2	3
PO Target	**3**	**3**	**2**	**2.6**	**3**	**-**	**-**	**-**	**-**	**-**	**2.1**	**2.1**	**2**	**3**

Course Outcome (CD LAB,KCS 552)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Implement the Lexical Analyzer using C language.	**Apply**	**Conceptual, Procedural**
CO 2	Utilize the LINUX utility LEX tool for Lexical Analysis.	**Apply**	**Conceptual, Procedural**
CO 3	Experiment with the knowledge of different parsers (Operator precedence, shift reduce etc.) using C language.	**Apply**	**Conceptual, Procedural**
CO 4	Implement Intermediate code generation and optimization for various expressions.	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (CD LAB,KCS 552)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	3	-	-	-	-	-	-	1	-	-	1	-	-
CO 2	3	3	-	-	2	-	-	-	1	-	-	1	-	-
CO 3	3	3	-	-	-	-	-	-	1	-	-	1	-	-
CO 4	3	3	-	-	-	-	-	-	1	-	-	1	-	-
PO Target	**3**	**3**	**-**	**-**	**2**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**-**

Course Outcome (DAA LAB,KCS 553)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Implement algorithms to solve problems by iterative approach.	**Apply**	**Conceptual & Procedural**
CO 2	Implement algorithm to solve problems by divide and conquer approach	**Apply**	**Conceptual & Procedural**
CO 3	Implement algorithms to solve problems by the Greedy algorithm approach.	**Apply**	**Conceptual & Procedural**
CO 4	Implement algorithms to solve problems by Dynamic programming, backtracking, branch and bound approach.	**Apply**	**Conceptual & Procedural**

CO-PO Mapping (DAA LAB,KCS 553)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	2	1	2	2	-	-	-	-	-	-	1	3	-
CO 2	3	2	1	2	2	-	-	-	-	-	-	1	3	-
CO 3	3	2	1	2	2	-	-	-	-	-	-	1	3	-
CO 4	3	2	1	2	3	-	-	-	-	-	-	1	3	-
PO Target	**3**	**2**	**1**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**

Course Outcome (Mini Project,KCS 554)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Identify a problem and gather its requirements.	**Apply**	**Conceptual**
CO 2	Design a solution of the problem using latest tools & techniques.	**Create**	**Metacognitive**
CO 3	Develop a project using latest technology.	**Evaluate**	**Metacognitive**
CO 4	Develop professional skills and critical thinking to prepare for major project.	**Evaluate**	**Metacognitive**
CO 5	Demonstrate an ability to present project works to the evaluators.	**Apply**	**Conceptual**

CO-PO Mapping (Mini Project,KCS 554)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	3	3	3	3	2	-	-	2	2	2	3	2	2
CO 2	3	3	3	3	3	-	-	-	2	-	2	3	2	3
CO 3	3	3	3	3	3	1	-	-	3	-	2	2	3	2
CO 4	3	3	3	3	3	2	-	2	3	2	2	3	2	2
CO 5	2	-	-	-	3	-	-	2	2	3	2	3	2	2
PO Target	**2.8**	**2.4**	**-**	**2.4**	**3**	**1**	**-**	**0.8**	**2.4**	**1.4**	**2**	**2.8**	**2.2**	**2.2**

Session:- 2020-21 Semester:- 6th

Theory

Course Outcome (SOFTWARE ENGINEERING, KCS-601)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	**Explain** various software characteristics and different types of software development models.	**K2**	Conceptual
CO 2	**Prepare** the contents of SRS and apply basic software quality assurance practices.	**K3**	Procedural
CO 3	**Apply** various methods for software design techniques.	**K3**	Procedural
CO 4	**Illustrate** various software testing techniques.	**K3**	Procedural
CO 5	**Examine** various software maintenance and project management techniques.	**K3**	Procedural

CO-PO Mapping (SOFTWARE ENGINEERING, KCS 601)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	2	2	1	2	-	-	-	-	-	-	1	-	-	1
CO 2	2	2	1	2	-	-	-	-	-	-	1	-	-	1
CO 3	2	2	2	2	-	-	-	-	-	-	1	-	-	1
CO 4	2	2	2	2	-	-	-	-	-	-	1	-	-	1
CO 5	2	2	2	2	-	-	-	-	-	-	1	-	-	1
PO Target	**2**	**2**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**

Course Outcome (Web Technology, KCS 602)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Develop Java programs for window/web-based applications with understanding of web development Strategies and Protocols governing Web.	**Apply**	**P**
CO 2	Design web pages using HTML, XML, CSS and JavaScript.	**Apply**	**P**
CO 3	Create of web pages using JavaScript & AJAX and client-server environment using socket programming	**Apply**	**P**
CO 4	Build enterprise level applications and manipulate web databases using JDBC	**Apply**	**P**
CO 5	Design interactive web applications using Servlets and JSP	**Create**	**P**

CO-PO Mapping (Web Technology, KCS 602)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	1	2	3	3	-	-	-	-	-	-	-	-	3	-
CO 2	1	1	3	1	-	-	-	-	-	-	-	-	2	-
CO 3	1	2	3	3	-	-	-	-	-	-	-	-	3	-
CO 4	1	2	3	3	-	-	-	-	-	-	-	2	3	-
CO 5	2	2	3	3	-	-	-	-	-	-	-	2	3	-
PO Target	**1.2**	**1.8**	**3**	**2.6**	**-**	**-**	**-**	**--**	**-**	**-**	**-**	**2**	**2.8**	**-**

Course Outcome (Computer Networks, KCS 603)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the basic concepts of networking, networking models, schemes and devices.	**Understand**	**C**
CO 2	Understand the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN. and the recent technologies on networking.	**Understand**	**C**
CO 3	Understand the data link layer and its components like channel allocation, framing, error and flow control techniques in computer networks.	**Understand**	**C**
CO 4	Apply various methods of Logical addressing, subnetting & Routing Mechanism on different practical scenarios.	**Apply**	**C, P**
CO 5	Analysis of various Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism based on the QoS parameters.	**Analyze**	**C, P**

CO-PO Mapping (Computer Networks, KCS 603)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	**3**	**2**	**1**	-	-	-	--	-	-	-	-	**2**	**1**	-
CO 2	**3**	**2**	**1**	**1**	-	-	--	-	-	-	-	**2**	**2**	**1**
CO 3	**3**	**2**	**1**	**1**	-	-	--	-	-	-	-	**2**	**2**	**1**
CO 4	**3**	**3**	**2**	**1**	-	-	--	-	-	-	-	**2**	**2**	**1**
CO 5	**3**	**3**	**2**	**1**	-	-	--	-	-	-	-	**2**	**2**	**1**
PO Target	**3**	**2.4**	**1.4**	**1**		-	--	-	-	-	-	**2**	**1.8**	**1**

Course Outcome (Big Data, KCS 061)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the knowledge of Big Data concepts, its architecture and applications.	**Understand**	**Factual**
CO 2	Demonstrate the components of Hadoop and Map Reduce Framework.	**Apply**	**Procedural**
CO 3	Demonstrate the Hadoop Distributed File System and setting up it's environment.	**Apply**	**Procedural**
CO 4	Demonstrate NoSQL database and tools for job scheduling.	**Apply**	**Procedural**
CO 5	Demonstrate Pig, HIVE and HBASE to abstract Hadoop Eco System.	**Apply**	**Procedural**

CO-PO Mapping (Big Data, KCS 061)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	2	2	-	-	-	-	-	-	--	-	2	-	2
CO 2	3	3	2	-	2	-	-	-	-	--	-	2	2	2
CO 3	3	1	2	-	-	-	-	-	-	--	-	2	-	2
CO 4	3	3	2	-	3	-	-	-	-	--	-	2	2	2
CO 5	3	3	2	-	3	-	-	-	-	--	-	2	1	2
PO Target	**3**	**2.4**	**2**	**-**	**2.7**	**-**	-	-	-	--	-	**2**	**1.7**	**2**

Course Outcome (Software Project Management, KOE068)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the project planning activities and the key phases of project management.	Understand	C
CO 2	Utilize an appropriate management strategy after identifying the different project contexts. .	Apply	C,P
CO 3	Apply different software process models and cost estimation models for development of a project.	Apply	C,P
CO 4	Make use of various project activities to compute critical path for risk analysis.	Apply	C,P
CO 5	Discuss the role of professional ethics in team building for successful software development.	Understand	C

CO-PO Mapping (Software Project Management, KOE068)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	-	-	-	-	-	-	-	-	-2	3	2	-	2
CO 2	1	2	-	-	-	-	-	-	3	-	3	-	-	-
CO 3	2	2	-	-	--	-	-	-	-	-	-	-	-	-
CO 4	2	2	-	-	--	-	-	-	-	-	-	-	-	--
CO 5	-	-	2	-	-	-	-	2	3	2	-	2	-	2
PO Target	1.67	2	2	-	-	-	-	2	3	2	3	2	-	2

Course Outcome
(Indian Tradition, Culture and Society,KNC 602)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	To identify and understand the roots and details of Society State and Polity in India.	Apply	Conceptual
CO 2	To understand the importance of Indian Literature, Culture, Tradition, Practices and to apply in the present system.	Apply	Conceptual
CO 3	To analyze Indian Religion, Philosophy, Practices and in shadow of Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy and to apply in the present system.	Apply	Conceptual
CO 4	To analyze the Science, Management and Indian Knowledge System and to apply in the present system.	Apply	Conceptual
CO 5	To evaluate the Indian Architect, Engineering and Architecture in Ancient India, India's Cultural Contribution to the World and to create an environment in Arts and Cultural for the present system.	Understand	Conceptual

CO-PO Mapping (Indian Tradition, Culture and Society,KNC 602)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1		2	2	1	2	2	2	2	2	1	-	2	2	-
CO 2	2	1	2	-	2	2	2	2	2	1	2	3	1	1
CO 3	1	1	2	-	-	2	2	2	1	2	-	2	-	1
CO 4	2	2	2	-	-	2	2	2	2	2	2	2	1	2
CO 5	2	1	2	2	2	3	2	2	2	2	1	2	1	2
PO Target	**1.75**	**1.4**	**2**	**1.5**	**2**	**2.2**	**2**	**2**	**1.8**	**1.6**	**1.6**	**2.2**	**1.25**	**1.5**

Practical

Course Outcome (SOFTWARE ENGINEERING, KCS 651)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	**Discover** ambiguities, inconsistencies and incompleteness in SRS document and to identify its functional and non-functional requirements.	**K3**	Procedural
CO 2	**Demonstrate** use case diagrams by identifying different actors and use cases from a given problem statement.	**K3**	Procedural
CO 3	**Prepare** a class diagram after identifying classes and association among them.	**K3**	Procedural
CO 4	**Illustrate** UML diagrams and associations among them by identifying the logical sequence of activities undergoing in a system.	**K3**	Procedural
CO 5	**Articulate** the use of modern engineering tools for software specification, design, implementation and testing.	**K3**	Procedural

CO-PO Mapping (SOFTWARE ENGINEERING, KCS 651)

Course Code:	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	2	2	2	2	-	-	-	-	-	-	-	-	1
CO 2	2	2	2	2	2	-	-	-	-	-	-	-	-	1
CO 3	2	2	2	3	2	-	-	-	-	-	-	-	-	1
CO 4	2	2	2	2	2	-	-	-	-	-	-	-	-	1
CO 5	2	2	2	2	2	-	-	-	-	-	-	-	-	1
PO Target	2	2	2	3	2	-	-	-	-	-	-	-	-	1

Course Outcome (WT LAB,KCS 652)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	**Develop** static web pages using HTML.	**K3**	Conceptual,Procedural
CO 2	**Develop** Java programs for window/ web-based applications.	**K3**	Conceptual, Procedural
CO 3	**Design** dynamic web pages using JavaScript and XML.	**K3**	Conceptual, Procedural
CO 4	**Design** dynamic web page using server site programming Ex. ASP/JSP/PHP	**K3**	Conceptual, Procedural
CO 5	**Design** server site applications using JDBC, ODBC and session tracking API	**K6**	Metacognitive

CO-PO Mapping (WT LAB,KCS 652)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	2	3	3	2	-	-	-	-	-	-	2	3	-
CO 2	2	--	3	3	2	-	-	-	-	-	-	2	3	-
CO 3	-	2	3	3	2	-	-	-	-	-	-	2	3	-
CO 4	-	2	3	3	2	-	-	-	-	-	-	2	3	-
CO 5	-	-	3	3	2	-	-	-	-	-	-	2	3	-
PO Target	**2**	**2**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**-**

Course Outcome (CN LAB,KCS 653)

Course Outcome (Computer network LAB, KCS653)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Examine the networking commands and configuring network hardware.	**Understand**	**C**
CO 2	Demonstrate the working of different network topologies.	**Apply**	**C**
CO 3	Apply the concepts of Framing, stop & wait ARQ, Network addressing and routing.	**Apply**	**C**
CO 4	Construct the Transport layer protocols based sockets for various applications.	**Apply**	**C**
CO 5	Implement transport and security mechanisms.	**Apply**	**C**

CO-PO Mapping (Computer network LAB, KCS653)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	2	2	2	3	2	-	-	-	-	-	-	2	1	2
CO 2	2	-	2	2	2	-	-	-	-	-	-	2	2	-
CO 3	2	2	3	3	-	-	-	-	-	-	-	-	1	1
CO 4	3	3	2	3	2	-	-	-	-	-	-	-	1	2
CO 5	3	2	3	2	2	-	-	-	-	-	-	2	1	2
PO Target	**1.8**	**1.6**	**1.8**	**2.6**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**1.2**	**1.4**

KIET GROUP OF INSTITUTIONS, GHAZIABAD
Department of Computer Science

CO PO and Mapping of CO PO 4th Year

Session:- 2022-23 Semester:- 7th

Theory

Course Outcome (Distributed System,KCS 077)

CO No.	Statement of Course Outcome After completion of the course, the student will be able to	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
CO 1	Understand the theoretical foundation of distributed system along with its applications in real world	**Understand**	**Conceptual**
CO 2	Analyze various methods suggested for process synchronization and deadlock handling in context of distributed environment	**Analyze**	**Meta cognitive**
CO 3	Apply agreement protocols to solve various problems in distributed system.	**Apply**	**Conceptual, Procedural**
CO 4	Apply different mechanism developed for recovery from fault and fault tolerance	**Apply**	**Conceptual, Procedural**
CO 5	Understand and solve various issues in distributed transaction	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (Distributed System,KCS 077)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	2	2	-	2	-	-	-	-	-	-	-	2	-	-
CO 2	3	2	-	3	-	-	-	-	-	-	-	2	-	-
CO 3	3	2	-	2	-	-	-	-	-	-	-	1	-	-
CO 4	3	2	-	2	-	-	-	-	-	-	-	1	-	-
CO 5	3	2	-	2	-	-	-	-	-	-	-	2	-	-
PO Target	**2.8**	**2**	**-**	**2.2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.6**	**-**	**-**

Course Outcome (Cloud Computing,KCS713)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.	**Understand**	**Factual, Conceptual**
CO 2	Understand the key and enabling technologies like virtualization in Cloud Computing	**Understand**	**Factual, Conceptual**
CO 3	Interpret the architecture of cloud computing, cloud storage, service and delivery models.	**Understand**	**Factual, Conceptual**
CO 4	Understand the core issues of cloud computing such as resource management and security.	**Understand**	**Factual, Conceptual**
CO 5	Classify cloud technologies for the next generation computing paradigm.	**Analyze**	**Factual, Conceptual, Procedural**

CO-PO Mapping (Cloud Computing,KCS713)

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	2	2	-	2	2	-	-	-	-	-	-	2	2	-
CO 2	2	2	-	2	2	-	-	-	-	-	-	2	2	-
CO 3	2	3	-	2	2	-	-	-	-	-	-	2	2	-
CO 4	2	3	-	2	3	-	-	-	-	-	2	2	2	-
CO 5	2	3	-	3	3	-	-	-	-	-	2	3	3	-
PO Target	**2**	**2.6**	**--**	**2.2**	**2.4**	**-**	**-**	**-**	**-**	**-**	**0.8**	**2.2**	**2.2**	**-**

Course Outcome
(Project Management Entrepreneurship,KHU702)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the theories of entrepreneurship and entrepreneurial development programmes.	**Understand**	**Factual**
CO 2	Explain innovative business ideas and market opportunities for business development.	**Understand**	**Conceptual**
CO 3	Discuss the importance of project life cycle and different types of appraisal techniques.	**Understand**	**Conceptual**
CO 4	Predict different types of project financing requirements on the basis of cash flow statements.	**Apply**	**Conceptual, Procedural**
CO 5	Describe social entrepreneurship opportunities and risk management techniques in social enterprises.	**Understand**	**Conceptual**

CO-PO Mapping
(Project Management Entrepreneurship,KHU702)

CO NO.	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	-	-	-	-	1	-	-	2	-	3	-	-	
CO 2	-	-	-	-	-	1	-	-	3	-	3	-	-	1
CO 3	-	-	-	-	-	2	-	-	3	-	3	-	-	-
CO 4	-	-	-	-	-	1	-	-	3	2	3	-	-	-
CO 5	-	-	-	-	-	3	2	-	2	-	3	-	-	2
PO Target	**-**	**-**	**-**	**-**	**-**	**1.6**	**2**	**-**	**2.6**	**2**	**3**	**-**	**-**	**1.5**

Course Outcome (Renewable Energy Resources, KOE074)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the renewable and non-renewable sources of energy.	Understand	Factual
CO 2	Explain the working principle of various solar energy systems.	Understand	Factual, Conceptual
CO 3	Understand the Geothermal & Tidal energy, its mechanism of production and its applications.	Understand	Factual, Conceptual
CO 4	Interpret and Identify the significance of Winds energy as an alternative form of energy	Remember	Factual, Conceptual
CO 5	Discover the basics of renewable, biomass energy sources and relevant thermodynamics	Understand	Factual, Conceptual

CO-PO Mapping (Renewable Energy Resources, KOE074)

Course Code:	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	3	-	-	-	-	3	-	-	-	-	-	-	-
CO 2	2	2	-	-	-	-	3	-	-	-	-	-	-	-
CO 3	3	3	-	-	-	-	-	-	-	-	-	3	-	-
CO 4	3	3	-	-	-	-	2	-	-	-	-	2	-	-
CO 5	2	2	-	-	-	-	3	-	-	-	-	-	-	-
PO Target	2.4	2.4	-	-	-	-	2.2	-	-	-	-	1	-	-

Practical

Course Outcome (Distributed Systems Lab, KCS751A)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Implement Logical Clock and Vector Clock using Java or C	**Apply**	**Conceptual, Procedural**
CO 2	Implement Distributed Mutual Exclusion using Java or C	**Apply**	**Conceptual, Procedural**
CO 3	Implement file transfer mechanism across network and accessing methods of remote systems using network protocols and sock programs with the use of Java or C	**Apply**	**Conceptual, Procedural**

CO-PO Mapping (Distributed Systems Lab, KCS751A)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	3	2	-	1	-	-	-	-	-	-	-	-	-	-
CO 2	3	1	-	1	-	-	-	-	-	-	-	-	-	-
CO 3	3	1	-	1	-	-	-	-	-	-	-	-	-	-
PO Target	**3**	**1.33**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Course Outcome (Internship Assesment, KCS752)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understanding the modern tools used in the field of Computer science and engineering for product development.	**Understand**	**Conceptual**
CO 2	Demonstrate ethical conduct and professional accountability while working in a team for the benefit of society.	**Analyze**	**Conceptual and Procedural**
CO 3	Understand the resources requirement and planning to facilitate the project success.	**Understand**	**Conceptual**

CO-PO Mapping (Internship Assesment, KCS752)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	2	2	-	-	-	-	-	-	-	-	2	1	-	-
CO 2	2	2	-	-	-	-	-	-	-	-	2	2	-	-
CO 3	2	2	-	-	-	-	-	-	-	-	2	2	-	-
PO Target	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**1.66**	**-**	**-**

Course Outcome (Project Lab, KCS753)

CO No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Select and Summarize all aspects of real life problem through information gathering	**Understand**	**Factual**
CO 2	Apply acquired knowledge to develop a conceptual model	**Apply**	**Conceptual, Procedural**
CO 3	Analyse the outcome of each phase using various tools and techniques	**Analyze**	**Conceptual, Procedural**
CO 4	Justify/ Defend the validity of idea or quality of result with the previous data/ result	**Evaluate**	**Conceptual, Procedural**
CO 5	Test the working model and Integrate all the phases.	**Create**	**Conceptual, Procedural**

CO-PO Mapping (Project Lab, KCS753)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	3	3	3	3	1	2	-	3	2	3	3	3	3
CO 2	-	3	3	3	2	1	2	-	3	2	3	3	3	3
CO 3	-	3	3	3	2	1	2	-	3	2	3	3	3	3
CO 4	-	3	3	3	2	1	2	-	3	2	2	2	3	3
CO 5	-	3	3	3	2	1	2	-	3	2	1	2	3	3
PO Target	**-**	**3**	**-**	**3**	**2.2**	**1**	**2**	**-**	**3**	**2**	**1.8**	**2.6**	**3**	**3**

KIET GROUP OF INSTITUTIONS, GHAZIABAD
Department of Computer Science

CO PO and Mapping of CO PO 4th Year

Session:- 2021-22 Semester:- 8th

Theory

Course Outcome (Quality Management, KOE 085)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Understand the quality concept and its components	**Understand**	**F, C**
CO 2	Understand the concepts of quality management and performance excellence in organization	**Understand**	**F, C**
CO 3	Apply the several techniques and quality management tools.	**Apply**	**C, P**
CO 4	Analyze the defects, reliability and maintainability after the interpretation of test results.	**Analyze**	**C, M**
CO 5	Understand the quality system certification process.	**Understand**	**F, C**

CO-PO Mapping (Quality Management, KOE 085)

Course Code:	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	-	-	-	-	-	1	-	2	2	2	1	1	-	-
CO 2	-	-	-	-	-	-	-	2	2	2	-	1	-	-
CO 3	-	-	-	-	1	-	-	-	-	2	1		-	-
CO 4	-	1	1	-	-	-	-	-	2	2	1	1	-	-
CO 5	-	-	-	-	-	-	-	2	-	2	-	-	-	-
PO Target	-	1	1	-	1	1	-	2	2	2	1	1	-	-

Course Outcome (Rural Development Administration & Planning, KHU 801)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	**Describe** the definitions, concepts and components of Rural Development.	**Understand**	**C**
CO 2	**Explain** the importance, structure, significance, resources of Indian rural economy.	**Understand**	**C/F**
CO 3	**Identify** rural development programmes and their impact.	**Understand**	**C/F**
CO 4	**Explain** the use of different methods for human resource planning.	**Understand**	**C**
CO 5	A**cquire** knowledge about rural entrepreneurship.	**Understand**	**C**

CO-PO Mapping (Rural Development Administration & Planning, KHU 801)

Course Code:	Programme Outcome (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	-	-	-	-	-	3	-	1	-	1	-	1	-	-
CO 2	-	-	-	-	-	3	-	1	2	1	-	1	-	-
CO 3	-	-	-	-	-	2	3	1	2	1	-	1	-	-
CO 4	-	-	-	-	-	3	-	1	1	1	-	1	-	-
CO 5	-	-	-	-	-	1	-	1	-	1	-	1	-	-
PO Target	-	-	-	-	-	2.4	3	1	1.6	1	-	1	-	-

Course Outcome (Digital and Social Media Marketing, KOE 094)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Acquire the knowledge about the Digital Marketing, the various channels through which it operates, and its role in marketing strategy.	Understand	F, C
CO 2	Gain understanding of various social media platforms and the creation of blogs.	Apply	C, P
CO 3	Assess the best practices in digital marketing field across various markets and gain knowledge of various digital marketing tool.	Understand	F, C
CO 4	Formulate Digital marketing Strategies for an organization.	Apply	C, M
CO 5	Analyze the privacy, security, content and ethicality issues associated with digital and social media platforms.	Analyze	C, M

CO-PO Mapping (Digital and Social Media Marketing, KOE 094)

Course Code:	Programme Outcome (PO)												PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	-	-	-	-	2	-	-	--	3	-	1	-	-
CO 2	-	-	-	-	-	1	-	-	1	3	-	1	-	-
CO 3	-	-	-	-	2	1	-	-	2	3	--	1	-	-
CO 4	-	-	-	-	2	2	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	2	-	-	1	3	-	1	-	-
PO Target	**-**	**-**	**-**	**-**	**2**	**1.6**	**-**	**-**	**1.2**	**3**	**-**	**1**	**-**	**-**

Practical

Course Outcome (Project,KCS851)

CO_No.	Statement of Course Outcome	Bloom's Cognitive Process Level (BL)	Knowledge Category (KC)
After completion of the course, the student will be able to			
CO 1	Select and Summarize all aspects of real life problem through information gathering.	**Understand**	**C, P**
CO 2	Apply acquired knowledge to develop a conceptual model.	**Apply**	**C, P**
CO 3	Analyse the outcome of each phase using various tools and techniques	Analyze	**C, P**
CO 4	Justify/ Defend the validity of idea or quality of result with the previous data/ result.	Evaluate	**C, P**
CO 5	Test the working model and demonstrate the results by publishing the idea/outcome.	Create	**C, P**

Course Code:	**Programme Outcome (PO)**												**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO 1	-	3	3	3	3	1	2	-	3	2	3	3	3	3
CO 2	-	3	3	3	2	1	2	-	3	2	3	3	3	3
CO 3	-	3	3	3	2	1	2	-	3	2	3	3	3	3
CO 4	-	3	3	3	2	1	2	-	3	2	2	2	3	3
CO 5	-	3	3	3	2	1	2	-	3	2	1	2	3	3
PO Target	**-**	**3**	**3**	**3**	**1.2**	**1**	**2**	**-**	**3**	**2**	**1.2**	**1.2**	**3**	**3**