Supporting Documents

1.1.3 & 1.2.1

Department of Computer Science Engineering

S. No.	Documents attached
1	Mapping of Courses to Employability/ Skill Development



I.K. Gujral Punjab Technical University, Kapurthala (Main Campus) Department of Computer Science & Engineering

B. Tech CSE 3rd Sem

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS() : (Data Structure)

000033	BTCS()	: (Data Str.	ructure)													1	A CONTRACTOR OF	4		
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
:0 No.	. CO Statements	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	- Logaritur	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/a nalyse/ deisgn etc)		Assessment Tools to Measure p Attainment of CO
C01	For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness;	3	3	2	3	2	3	0	0	0	0	1	3	3	3	1	0	Analyze	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Student will be able to handle operation like searching, insertion, deletion, traversing on various Data Structures and determine time and computational complexity	3	3	2	2	1	2	0	0	1	. 0	1	3	3	3	1	0	Analyze	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity;		3	3	3	1	1	0	0	1	0	1	3	3	3	1	0	design	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Students will be able to choose appropriate Data Structure as applied to specific problem definition	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0	Apply	Employability	7
C05	Demonstrate the reusability of Data Structures for implementing complex iterative problems	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0	Demonstrate	Employability HOD	Computer Science & Engine
						.×.	<	0							×. •				Departureau IKG F Kapt	nt of Computer Science & Engineer PTU Main Gampu urthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS(type code) : (Object oriented programming)

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		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC- BTEC-502-18: Digital Signal Processing)	PO-a	РО-Ь	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	P0-1	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/an alyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	Identify classes, objects, members of a class and the relationships among them needed to solve a specific problem operotors	3	3	3	3	2	3	0	0	0	O	1	3	3	3	1	O	identify :	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Demonstrate the concept of constructors and destructors. And create new definitions for some of the operators	3	3	3	3	1	2	0	0	1	0	1	3	3	3	1	0	Demonstratre	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Create function templates, overload function templates	3	3	3	3	1	1	0	0	1	0	1	3	3	3	1	0	Apply	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Understand and demonstrate the concept of data encapsulation, inheritance, polymorphism with virtual functions	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0	Understand	Employability	
CO5	Demonstrate the concept of file operations, streams in C++ and various I/O manipulators	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0	Demonstratre	Employability	Science & Engineering

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) PTOP() : (Deta structures Lab)

	BTCS()	: (Data str	uctures Lat) .		marine	1	and the second second		-		0004 - 20 Min		Carlos a second	AND DESCRIPTION OF	12131128/1	autorenter			
		Engineering Knowledge	Problem Analysis	esign/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	РО-Ь	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/a nalyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Improve practical skills in designing and implementing basic linear data structure algorithms	3	3	3	3	2	3	0	0	0	0	1	3	3	3	1	0	Apply.	Skill Development	MSTs, ESE, Class/Quiz Tests
CO2	Improve practical skills in designing and implementing Non-linear data structure algorithms;	3	3	3	3	1	2	0	0	1	0	1	3	3	3	1	0	design	Skill Development	MSTs, ESE, Class/Quiz Tests
СОЗ	Use Linear and Non-Linear data structures to solve relevant problems;	3	3	3	3	1	1	0	0	1	0	1	3	3	3	1	0	Implement	Skill Development	MSTs, ESE, Class/Quiz Tests
C04	Choose appropriate Data Structure as applied to specific problem definition;	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0	Apply	Skill Development	
CO5	Implement Various searching algorithms and become familiar with their design methods	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0	Implement	Skill Development	

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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I.K. Gujral Punjab Technical University, Kapurthala (Main Campus) Department of Computer Science & Engineering

B. Tech CSE 4thSem

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Department of Computer Science & Engineering IKG PTU Main Cant. Kapurthala r,

	Department Program	: B.Tech. (Computer :	Science an	d Engineer	ring)	and and an	weeks a	runio			·	erione.	a carrier			-	en en de la composition de	privera :	The second state of the second state of the
1	BTCS(BTES401-18)	: (Compute	ar Organisa	ation and A	rchitecture)					1			idados	CHINES!					
		Engineering Knowladga	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	fodern tool usage	The engineer and society	Ervironment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC-BTES-401-18: Computer Organisation and Architecture)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/ analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
C01	Understand functional block diagram of microprocessor	3	1	2	2	2	1			1	1		3	3	*	1		Understand	Employability	
CO2	Apply instruction set for Writingassembly language programs	3	2	3	3	2		1		3	2	2	3	3	1	3	1	Apply	Employability	
соз	Design a memory module and analyze its operation by interfacing with the CPU;	3	3	3	3	2		-		3	2	1	3	3	3	2		Design	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Classify hardwired and microprogrammed control units	2	1	2	2	3	1	1		1		1	3	3	1	1	1	Apply	Employability	
CO5	Understand the concept of pipelining and its performance metrics	3	3	3	3	3	1		1	3	2	1	3	3	2	3	1	Understand	Employability	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Program : B.Tech. (Computer Science and Engineering)

S(401-18) : Discrete Mathematics

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<u>1401-10</u>		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Aodem tool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC-BTEC 502-18: Digital Signal Processing)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	To be able to express logical sentence in terms of predicates, quantifiers, and logical connectives	3	3	3	2		1	1		1				2				Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	To derive the solution for a given problem using deductive logic and prove the solution based on logical inference	3	3	3	3		1			2			1	2				Design	Employability	MSTs, ESE, Class/Quiz Tests
соз	For a given a mathematical problem, classify its algebraic structure	3	3	3	2					1				1	1			Design	Employability	MSTs, ESE, Class/Quiz Tests
CO4	To evaluate Boolean functions and simplify expressions using the properties of Boolean algebra	3	3	3	3	1.000	2			2	2	1	1	1				Design	Employability	MSTs, ESE, Class/Quiz Tests
CO5	To develop the given problem as graph networks and solve with techniques of graph theory.	3	3	3	3	1	2	1	1	2	2	2	2	2	2	2	1	Design	Employability	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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rogram : B.Tech. (Computer Science and Engineering) 402-18) : Operating Systems

)2-18)	: Operating Systems		11.000													Solutions!				
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC-BTEC- 502-18: Digital Signal Processing)	ਿ ⊡PO-a	РО-Ь	PO-c	PO-d	PO-e	₽O-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	(understand/anal	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Explain basic operating system concepts such as overall architecture, system calls, user mode and kernel mode;	3	2	2	1	1	2	1		2	1	1	2	2	2		F	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Distinguish concepts related to processes, threads, process scheduling, race conditions and critical sections;	3	3	3	3	3	2	2	1	2	2	2	3	3	3	2	1	Design	Entrepreneurship/ Skill Development	MSTs, ESE, Class/Quiz Tests
соз	Analyze and apply CPU scheduling algorithms, deadlock detection and prevention algorithms;	3	3	3	3	3	3	2	1	2	2	2	3	3	3	2	1	Design	Skill Development Entrepreneurship	
CO4	Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory, and thrashing;	3	3	3	3	3	3	1		2	2	2	3	3	2			Analyse	Entrepreneurship	Glass/Quiz Tests
CO5	Design and implement file management system;	3	3	3	3	3	3	2		2	2	2	3	3	3	2		Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO6	Appraise high-level operating systems concepts such as file systems, disk- scheduling algorithms and various file systems.	3	3	3	3	3	3	2	1	2	2	2	3	3	3	3	1	Understand	Entrepreneurship	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering MG PTU Main Campus Apurthala

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering)

	BTCS 403-18		& Analysis	s of Algori	thms)					1. and		-		and the second se	-	COLUMN TWO IS NOT		THE STATE		
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problem	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	РО-Ь	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PQ-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
CO1	For a given algorithms analyze worst- case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms	3	3	1	3									3	2			Understand	Employability	
CO2	Explain when an algorithmic design situation calls for which design paradigm (greedy/ divide and conquer/backtrack etc.	3	3	3	3			1.45						3	2			Analyse	Employability	MSTs, ESE,
соз	Explain model for a given engineering problem, using tree or graph, and write the corresponding algorithm to solve the problems	3	3	3	3	1	1							3	2			Analyse	Employability	Class/Quiz Tests
CO4	Demonstrate the ways to analyze approximation/randomized algorithms	3	3	3	3	2	1				4			3	2.			Design	Employability	
CO5	Examine the necessity for NP class based problems and explain the use of heuristic techniques	3	3	3	3	2	2							3	2			Design	Employability	

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		: B.Tech.	Computer	Science an	d Engineer														and the second	
	BTES(402-18)	: Common edge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	(det a cool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC-BTES-402-18: Computer Organisation and Architecture Lab)	PO-a	РО-Б	PO-c	PO-d	РО-е	PO-f	PO-g	PO-h	PO-I	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level (understand / analyse/ delsgn etc)	Focus on	Assessment Tools to Measure Attainment of CD
C01	Assemble personal compuer	3	2	2	3	2	2	2	1	3	1	1	3	3	1	2	1	Understand	Skill development	MSTs, ESE, Class/Quiz Tests
CO2	Implement the various assembly language problems for basic arithmetic and logical operations	3	3	3	3	2	1			3	2	3	3	3	1	1		implement	Skill development	MSTs, ESE, Class/Quiz Tests
соз	Demonstrate the functioning of microprocessor/ microcontroller based systems with I/O interface	3	1	3	3	1	1			2	2	3	3	3	2	3	1	Demonstrate	Skill development	MSTs, ESE, Class Quiz Tests

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Department Computer Science and Engineering

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS(404-18) :Operating Systems Lab

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		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-Jong Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC-BTEC-502-18: Digital Signal Processing)	PO-a	РО-Ь	PO-c	PO-d	РО-е	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	P50-0	PSO-p	Learning Level(understand/ analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understand and implement basic services and functionalities of the operating system;	3	3	3	3	3	2	2		3	2	3	3	3	3	2		Understand	Employability	MSTs, ESE, Practical Assignments Tests
CO2	Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority;	3	3	3	3	3	з	3	1	3	3	з.	3	3	з	3	1	Analyse	Entrepreneurship/ Skill development	MSTs, ESE, Practical Assignments Tests
CO3	Implement commands for files and directories;	3	3	3	- 3	3	2	2		2	2	2	2	3	3	2		Design	Entrepreneurship/ Skill development	MSTs, ESE, Practical Assignments Tests
CO4	Understand and implement the concepts of shell programming;	3	2	3	2	3	3	3		2	3	2	3	3	3	2		Understand & Design	Entrepreneurship/ Skill development	MSTs, ESE, Practical Assignments Tests
COS	Simulate file allocation and organization techniques;	3	3	3	3	3	2	2		3	2	2	2	2	2	2		Understand & Design	Entrepreneurship/ Skill development	MSTs, ESE, Practical Assignments Tests
CO6	Understand the concepts of deadlock in operating systems and implement them in multiprogramming system.	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3	1	Design	Entrepreneurship/ Skill development	MSTs, ESE, Practical Assignments Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS : (DAA Lab)

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	BICS	: (DAA	Lab)											HELET.		SANGA-	HAN T			
	ter autoriter average	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
D).	CO Statements	PO-a	РО-Ь				PO-f	PO-g		PO-i	PO-j	PO-k	PO-I	PSO- m	PSO- n	PSO- o		Learning Level (understand/ analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
1	Design and implement complex problems with different techniques	3	3	3	3	3	2		0.1	2	-			3	3			design	Skill Development/Em ployability	
2	Understand comparative performance of strategies and hence choose appropriate, to apply to specific problem definition;	3	3	3	3	3	2			2				3	3			understand	Skill Development/Em ployability	MSTs, ESE, Class/Quiz
3	Implement Various tree and graph based algorithms and become familiar with their design methods;	3	3	3	2	3	1							3	1	2		Apply	Skill Development/Em ployability	Tests
4	Design and Implement heuristics for real world problems.	3	3	3	3	3	2	-						3	3	2		Design	Skill Development/Em ployability	E

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

I.K. Gujral Punjab Technical University, Kapurthala (Main Campus) Department of Computer Science & Engineering

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS(type code) : BTCS-501-18 Database Management System

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	Department C Program : BTCS(type code) :	B Tech	n. (Com	puter S	Science	and En	gineerir ent Syst	ng) . tem												e & Engineering Campus
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			HOD HOD Department of Computer Science & Engineering Department of Computer Science & Engineering Main Campus It&G PTU Main Campus Kapurithala
No	CO Statements (UC-BTCS-501- 18: Database Management System)		РО-Ь		PO-d			PO-g	PO-h		PO-j	PO-k	PO-I	PSO- m	PSO- n	PSO- o		Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	write relational algebra expressions for a query and optimize the Developed expressions	1	3	3	2	0	0	0	0	3	3	2	2	3	2	1	0	understand	employability	MSTs, ESE, Class/Quiz Tests
CO2	design the databases using ER method and normalization.	1	3	3	2	2	1	1	1	3	3	2	2	3	3	3	1	Analyse	enterpreneurship	MSTs, ESE, Class/Quiz Tests
СОЗ	construct the SQL queries for Open source and Commercial DBMS-MYSQL, ORACLE, and DB2.	1	2	2	2	2	1	1	1	2	2	2	2	3	2	3	1	design	enterpreneurship	MSTs, ESE, Class/Quiz Tests
CO4	determine the transaction atomicity, consistency, isolation, and durability	1	2	1	1	1	0	0	0	3	3	2	2	3	1	1	0	understand	employability	MSTs, ESE, Class/Quiz Tests
COS	Implement the isolation property, including locking, time stamping based on concurrency control and	1	2	2	2	1	1	1	1	3	3	2	2	3	2	2	1	design	employability	MSTs, ESE, Class/Quiz Tests
	Serializability of scheduling						-	-				_				1			dOL trant of C	omputer Science & Engineering

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artment Computer Science and Engineering rogram : B.Tech. (Computer Science and Engineering) 502-18) :Formal Language & Automata Theory

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502-	18) :1	Formal Language & Automata Theory		T			Т						R BIR			1994		TE SAL			
			Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CN	0	CO Statements (UC-BTEC-502-18: Digital Signal Processing)	ш РО-а	<u>с</u> РО-b	P0-c	PO-d	≥ P0-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO- m	PSO-n	PSO-o	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
		Write a formal notation for strings,	3	2	2	1	1				1			2	. 1	1			Understand	Employability	MSTs, ESE, Class/Quiz Tests
C	01	languages and machines.	3	2	2		1									-		1.44.3	Design	Employability	MSTs, ESE, Class/Quiz Tests
c	02	Design finite automata to accept a set of strings of a language.	3	3	3	2	1	1	1		1	1182	1	2	2	2			Design		MSTs, ESE,
C	03	For a given language determine whether the given language is regular or not.	3	3	3	3	2	2	1	1	2	1	2	2	3	3	2	1	Analyse	Entrepreneurship	Class/Quiz Tests
C	04	Design context free grammars to generate strings of context free	3	2	3	2	1		1		2		2	1	2	2	2		Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
C	:05	language Determine equivalence of languages accepted by Push Down Automata and languages generated by context free	3	3	3	3	2	1	2	1	2	1	1	3	3	3	2	1	DEsign	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
		grammars	-			-		-						1	1		130		Understand	Employability	MSTs, ESE, Class/Quiz Tests
0	06	Write the hierarchy of formal languages, grammars and machines.	2	1	1	1		1	1			1	1	-	-						MSTs, ESE,
(07	Distinguish between computability and non-computability and Decidability and undecidability.	2	1	1	1		1	1		1		1	1	2	1			Understand	Employability	Class/Quiz Tests

HOD Department of Semputer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS(503-18) : Software Engineering

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		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problen	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC-BTEC-502-18 (Software Engineering)	160		PO-c	A CONTRACT		PO-f	PO-g		PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	P5O-0	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Students should be able to identify the need for engineering approach to software development and various processes of requirements analysis for software engineering problems.	3	2	2	2	1	2	2	2	2	3	3	3	3	2		2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Analyze various software engineering models and apply methods for design and development of software projects.	3	3	3	2	3	3	2	1	3	2	3	3	3	2	3	1	Analyse	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO3	Work with various techniques, metrics and strategies for testing software projects.	3	3	3	2	3	2	1	1	2	2	2	3	3	3	2	1	Create	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO4	Identify and apply the principles, processes and main knowledge areas for Software Project Management	3	3	3	3	3	3	2	1	3	1	1	3	3	3	3	1	Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO5	Proficiently apply standards, CASE tools and techniques for engineering software projects	3	3	3	3	3	3	3		2	2	2	3	3	3	3		Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests

Department of Computer Science & Englifeening IKG PTU Main Campus Kapurthala

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Program : B.Tech. (Computer Science and Engineering)

BTCS(type code) : BTCS 504 -18UC (Computer Network)

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	BTCS(type code) 3	BICS 50	14 - 1800	c (comp	uter ne	LWOIK)				T			1	CTURE AND IN	Chill Restored	10 10 10 10 TO				
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problem	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements: BTCS 504 -18UC (Computer Network)	ъ PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	100	PSO-m	PSO-n	PSO-o		Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	Explain the functions of the different layer of the OSI Protocol	3	3	3	2	3	3	3	2	2	3	1	3	3	2	2	2	2	2	MSTs, ESE, Class/Quiz Tests
CO2	Describe the function of each block of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs)	3	2	3	2	3	3	3	2	3	3	2	3	3	3	1	1	2	2	MSTs, ESE, Class/Quiz Tests
CO3	Develop the network programming for a given problem related TCP/IP protocol	3	3	3	3	3	3	3	2	3	3	1	3	3	2	2	1	• 3	3	MSTs, ESE, Class/Quiz Tests
CO4	Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.	3	3	3	3	3	3	3	3		3	1	3	3	3	2	2	2	3	MSTs, ESE, Class/Quiz Tests

17.

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Program : B.Tech. (Computer Science and Engineering) .

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BTCS 512-18 : (Web and Open Source Technologies Lab)

Lap	BICS 512-18	. (web	and Op	ch Jour		Interio Bri	/			T		and service of		4300	The state	53 EX 1977	A States			
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements				PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO- m	PSO-n	PSO-o	PSO-p	Learning Level (understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	develop web based application using suitable client side and server side web technologies	3	2	2	3	3	3	2	2	3	2	3	3	3	3	3	2	3	3	MSTs, ESE, Class/Quiz Tests
CO2	develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management	3	3	3	3	2	1	1	1	3	2	3	3	3	3	3	2	3	3	MSTs, ESE, Class/Quiz Tests

17.

E HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering)

CS(612-18UC	C) Programming in Python Lab				SIL									T. I						
and the second se		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (Programming in Python Lab)	- Casa	PO-b	100		<u>≥</u> PO-e		No con to				PO-k	1	PSO- m	PSO-n	PSO-o	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurshi p	Assessment Tool to Measure Attainment of Co
c01	Write, Test and Debug Python	3	3	3	3	3	3	2	1	1	2	2	1	2	1	2		Test and Evaulate	Employability	MSTs, ESE, Class/Quiz Tests
CO1	Programs							1.2					1	1		12.5			Employability	MSTs, ESE,
CO2	Implement Conditionals and Loops for Python Programs	3	3	2	3	2	3	2	2	1	1	1	3	2	2	2		Implement	Employaomey	Class/Quiz Test
соз	Use functions and represent Compound data using Lists, Tuples and Dictionaries	3	2	2	3	2	3	2	1	2	1	2	2	3	1	2	1	Apply	Employability	MSTs, ESE, Class/Quiz Test
CO4	Read and write data from & to files in Python and develop Application using Pygame	3	3	3	3	3	3	1	.2	1	2	1	2	2	2	2		Design	Employability	MSTs, ESE, Class/Quiz Tes

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS : Mobile Application Development

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	BTCS :	Mobile	Applica	tion Dev	C	1								- 442	Contraction of the	12131	11423			
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problem	Modern tool usage	e engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
		Eng	Pro	De	3	ž	The	<u>5</u>	벖	<u><u> </u></u>	Ŭ	d.	Selves 1	- Andrew	in the second	AUR!	- DU	Learning Level (understand/	Focus on	Assessment Tools
CO No.	CO Statements	PO-a	РО-Ь	РО-с	PO-d	РО-е	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	analyse/ deisgn etc)	Employability / Entrepreneurship	Attainment of CO
					10273	EV Her		ELCIE.	34		100000									
C01	Describe those aspects of mobile programming that make it unique from programming for other platforms	3	3	3	3	3			1	2				3	3			design	Employability	
	Critique mobile applications on their	3	3	3	3	3	2		when	2				3	3			understand	Entrpreneurship	
CO2	design pros and cons	3																		LICT. FEF
соз	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,	3	3	3	2	3	1			2				3	1	2		Apply	Employability	MSTs, ESE, Class/Quiz Test
CO4	Program mobile applications for the Android operating system that use basic	3	3	3	з	3	2				2			3	3		2	Design	Employability	-
C05	and advanced phone features, Deploy applications to the Android marketplace for distribution	3	3	3	3	3	2			2				3	3		2	Design	Employability	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Computer Science and Engineering : B.Tech. (Computer Science and Engineering)

Department Program

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BTCS(type code)

Mobile Application Development Lab

	Bico(type code)				a l									Sec.	85-80-					
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problem:	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	-				≥ PO-e						PO-k	142941	PSO- m	PSO- n	PSO- o		Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Demonstrate the android features and create, develop using android	3	3	3	3	3	2	2	1	3	3	3	3	3	3	3	2	Design	Skill Development	MSTs, ESE, Class/Quiz Tests
CO2	Demonstrate and Understanding anatomy of an Android application	3	3	3	3	3	3	3		3	3	2	3	3	3	3	1	Understand	Skill Development	MSTs, ESE, Class/Quiz Tests
СОЗ	Illustrate the android wifi features and advance android development	2	1	1	2	1	2	1	1	3	3	1	2	1	2	1	1	Analyse	Skill Development	MSTs, ESE, Class/Quiz Tests
CO4	Develop an application using basic graphical primitives and databases	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	Design	Skill Development	MSTs, ESE, Class/Quiz Tests

17.

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering)

18.

BTCS(type code) Internet of Things

	Brts(type code) -	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	PO-b	PO-c	A.	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO- m	PSO- n	PSO- o	PSO- p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
c01	To understand internet of Things and its hardware and software components	1	1	1	2	1	1	1		1	- 3	1	3	2	1	1		Understand	Skill Development	MSTs, ESE, Class/Quiz Tests
CO2	To develop an Interface I/O devices, sensors & communication modules	3	3	3	3	3	3	2		3	3	2	3	3	2	2	1	Develop	Skill Development	MSTs, ESE, Class/Quiz Tests
соз	To remotely monitor	3	3	3	3	3	3	1	1	3	3	2	3	3	3	1	1	Analyse	Skill Development	MSTs, ESE, Class/Quiz Tests
c04	To develop real life	3	2	2	3	3	3	3		3	1	2	3	3	3	3	1	Develop	Skill Development	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Program : B.Tech. (Computer Science and Engineering) BTCS : (Computer Graphics Lab)

	BTCS :	(Compu	uter Gra	phics La						- 1	1			URPER			A CONTRACTOR			
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	Control (C)	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.	3	3	3	3	3	2			2				3	3	2		design	Employability & Entrpreneurship	
CO2	To demonstrate the importance of viewing and projections.	3	3	3	2	3				2				3	2			understand	Entrpreneurship	MSTs, ESE, Class/Qui Tests
CO3	To apply the fundamentals of animation, virtual reality and its related technologies	3	3	3	3	3				2				3	3	2		Apply	Employability & Entrpreneurship	
CO4	To implement a typical graphics pipeline	3	3	3	3	3				2				3	2			Design	Employability	- F

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Program : B.Tech. (Computer Science and Engineering) BTCS(type code) : BTCS-505-18 Database Management System Lab

	BTCS(type code)	: BICS-S	05-180	atabase	Ivialiage	enteric by	Stern Lt	10						23 3	Carlos A.							
A PART IN THE PART OF		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values					
CO No.	CO Statements (UC-BTCS-505-18: Database Management System Lab)	PO-a		PO-c		PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k		PSO-m	PSO-n	PSO-o	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship		ainmen	s to Measure t of CO
CO1	retrieve data from relational databases using SQL	1	3	2	2	1	1	1	1	3	2	3	3	2 .	2	2	1	Analyse	employability	Practicals	Viva	Assignments
CO2	impiement generation of tables using datatypes	1	2	2	2	1	1	1	1	3	3	3	3	2	2	2	1	Design	enterpreneurship	Practicals	Viva	Assignments
СОЗ	design and execute the various data manipulation queries.	1	2	2	2	1	1	1	1	3	2	3	3	2	2	2	1	Design	employability	Practicals	Viva	Assignments
CO4	execute triggers, cursors, stored	1	3	3	3	2	1	1	1	3	3	3	3	2	2	2	1	Design	enterpreneurship	Practicals	Viva	Assignments
		1		1000						1	- Contraction		-	-	_	_	-				1111	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Program : B.Tech. (Computer Science and Engineering) BTCS(type code) : BTCS 507 -18UC (Computer Network Lab)

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	BTCS(type code) :	BTCS 5	07-180	L (Comp	uter ne	LWOIK La	10)				T	T	-	State and and	A ATTAC	ALL DO	and the second			
· · · · · · · · · · · · · · · · · · ·	Athletication	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	PO-b	PO-c		PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	Know about the various networking devices, tools and also understand the implementation of network topologies.	3	1	3	2	3	3	3	2	2	3	1	3	3	3	2	2	3	3	MSTs, ESE, Class/Quiz Tests
CO2	Create various networking cables and know how to test these cables.	3		2	2	3	3	3	1	2	3	1	3	3	2	2	1	2	2	MSTs, ESE, Class/Quiz Tests
соз	Create and configure networks in packet tracer tool using various network devices and topologies.	3	1	3	1	3	3	3	1	2	3	2	3	3	3	2	1	3	2	MSTs, ESE, Class/Quiz Tests
CO4	Configure routers using various router configuration commands.	3		2	2	3	3	3	1	2	3	3	3	3	2	1	1	3	3	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

I.K. Gujral Punjab Technical University, Kapurthala (Main Campus) Department of Computer Science & Engineering 4

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS(601-18UC) : Compiler Design

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	c) : Complier Design	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements				PO-d		PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO- m	PSO- n	PSO- o	PSO- p	Learning Level (understand/ analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understand the major phases of compilation including front-end and back-end.	3	1	1	1	3	2	2		2	1	1	1	2	1			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Develop the parsers and experiment the knowledge of different parsers design	3	3	3	2	3	3	2	1	3	1	2	2	3	2	3	1	Create	Skill Development &Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO3	Construct the intermediate code representations and generation	3	2	2	2	2	2	1	1	2		2	2	3	2	2	1	Create	Skill Development &Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO4	Convert source code for a novel language into machine code for a novel computer	3	3	3	3	3	3	2	1	3	1	1	3	3	3	3	1	Create	Skill Development &Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO5	Apply for various optimization techniques for dataflow analysis	3	2	1	2	2	3	3		2	2	2	2	2	2	3		Create	Skill Development &Entrepreneurship	MSTs, ESE, Class/Quiz Tests

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) Artificial Intelligence

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		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	PO-b	PO-c	PO-d	РÖ-е	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO- m	PSO- n	PSO- o	PSO- p	Learning Level (understand/an alyse/ deisgn etc)	Employability /	Assessment Tools to Measure Attainment o CO
CO1	Understand different types of AI agents.	3	2	2	2	1	1	1	Tarity	1	2	2	2	2	1			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Develop different types of various AI search algorithms.	3	3	3	3	3	2	2	1	2	2	2	3	3	3	3	1	Create	Entrepreneurshi p	MSTs, ESE, Class/Quiz Tests
CO3	Construct simple knowledge-based systems and to apply knowledge representation.	3	3	3	- 3	3	2	2		2	2	2	3	3	- 3	1		Design	Skill Dvelopment &Entrepreneurs hip	MSTs, ESE, Class/Quiz Tests
CO4	Convert intermediate representation in contest to understand learning.	3	2	2	2	3	3	2	1	2	3	3	3	3	3	3		Understand and Design	Skill Dvelopment &Entrepreneurs hip	MSTs, ESE, Class/Quiz Tests
CO5	Apply for various techniques for Expert Systems.	3	2	2	3	3	2	2		2	2	3	3	3	3	2		Understand and Design	Skill Dvelopment &Entrepreneurs hip	MSTs, ESE, Class/Quiz Tests

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Program : B.Tech. (Computer Science and Engineering)

17.

BTCS605-18UC :Artificial Intelligence Laboratory

	The regimeer and used in the second s		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
The second second second	CO No.	CO Statements	PO-a	PO-b	PO-c	PO-d	РО-е	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO- P	Learning Level(underst and/analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
	CO1	Explain artificial intelligence, its characteristics and its application areas.	3	2	2	1	2	2 :-	- 3.	2	2	2	2	3	3	3	1	2	Understand	Employability	Practical Assignments
	CO2	Formulate real-world problems as state space problems, optimization problems or constraint satisfaction problems.	3	3	3	3	3	2	2	2	3	2	2	3	3	3	3	2	Design	Skill Development &Entrepreneurship	Practical Assignments
	C03	Select and apply appropriate algorithms and AI techniques to solve complex problems.	3	3	3	3	3	3	2		3	3	3	3	3	3	3		Design	Entrepreneurship	Practical Assignments
	CO4	Design and develop an expert system by using appropriate tools and techniques.	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	Design	Entrepreneurship	Practical Assignments

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Program : B.Tech. (Computer Science and Engineering)

BTCS(type code) : BTCS BTCS606-18UC (Network Security and Cryptography)

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anna a annaithe		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	PO-b	PO-c			PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	Sitte at	PSO-m	PSO-n	PSO-o		Learning Level(understand/ analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understand real time systems for identifying security threats.	3	3	2	2	3	3	2	1	2	3		2	3	3	2	1	Understand	Skill Development	MSTs, ESE, Class/Quiz Tests
CO2	Compare public and private cryptographic algorithms and make use of the same for encryption and decryption of messages.	3	1	3	3	3	3	3	1	2	3		3	3	2 .	2	1	Understand	Skill Development	MSTs, ESE, Class/Quiz Tests
соз	Design confidential systems with minimum possible threats.	3	2	3	3	3	3	3	1	2	3	1	3	3	3	2	1	Design	Employability	MSTs, ESE, Class/Quiz Tests
c04	Apply both cryptography and hashing to create digital signatures and certificates for achieving integrity	3		3	3	3	3	3	1	2	3		3	3	2	2	1	Apply	Skill Development	MSTs, ESE Class/Quiz Tests

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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. Program : B.Tech. (Computer Science and Engineering)

BTCS(type code) : BTCS BTCS609-18UC (Network Security and Cryptography Lab)

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		Engineering Knowladge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Madem tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	РО-Ь	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
	Develop and implement a java interface for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms	3	3	2	2	3	3	2	1	2	3	eland J.C.	2	3	3	2	1	Implement	- Skill Development	MSTs, ESE, Class/Quiz Tests
CO2	Identify the security issues in the network and resolve it.	3	1	3	3	3	3	3	1	2	3		3	3	2	2	1	Apply	Skill Development	MSTs, ESE, Class/Quiz Tests
CO3	Analyse the vulnerabilities in any computing system and hence be able to design a security solution.	3	2	3	3	3	3	3	1	2	3	1	3	3	3	2	1	Design	Skill Development	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Program : B.Tech. (Computer Science and Engineering)

BTCS : (Data minng Lab)

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		Engineering Knowledge	Problem Analysis	Design/development.of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o		Learning Level (understan d/analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
C01	Apply data cleaning, pre- processing and integration on data sets	3		3	3	3		art.		2	nt.			3		2		Apply	Skill development	
CO2	Execute algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction	3	3	3	3	3	3			2				3		2		Design	Skill development	MSTs, ESE, Class/Quiz Tests
	Extract knowledge using data mining techniques on data sets	3	3	3	3	3	3		1	2				3			1	Apply	Skill development	
	Explore recent trends in data mining such as web mining, spatial-temporal mining	3	2	3	3	3				2		1		3	2			Design	Skill development	

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HOD Department of Computer Science & Engineering 'KG PTU Main Campus Capurthala

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Program : B.Tech. (Computer Science and Engineering)

BTCS(type code) : BTCS-612-18 Cloud Computing Lab

	BICS(type code)	. 0103-0	115-19 (louu co		Lau	1		-					Concession of the	in the second second	The state of the s	ALC: THE REAL			
	the feat work	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problem	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC- : BTCS-612-18 Cloud Computing Lab)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	⊧ PO-j .	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understan d/analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
C01	Use the cloud tool kits.	1	1	2	1	3	1	1	1	1	1	1	3	3	1	1	1	Implement	Skill Development	Practicals
CO2	Implement applications on the Cloud	1	3	3	3	3	2	2	1	3	3	3	3	3	2	3	1	Apply	Skill Development	Practicals
соз	To install cloud computing environments	1	1	2	1	3	1	1	1	2	1	2	3	3	1	1	1	Apply	Skill Development	Practicals
CO4	To develop any one type of cloud	1	2	3	1	3	2	2	1	3	3	2	3	3	2	3	1	Apply	Skill Development	Practicals
CO5	To explore future trends of cloud computing	1	1	2	2	- 3	2	2	1	3	3	2	3	2	2	3	1	Design	Skill Development	Practicals

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

17,

Program : B.Tech. (Computer Science and Engineering)

BTCS(612-18UC) : Information Theory and Coding

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1800		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	ndividual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level{understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	Understand various entropies and Define the information theories.	3	2	2	2	1	1	1		1	2	2	1	2	1			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Apply source coding techniques	3	3	3	3	3	2	2	1	2	2	2	3	3	3	2	1	Create	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO3	Compute the capacity of various types of channels.	3	3	3	2	3	2	2		2	1	2	2	3	2	1		Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO4	Understand and Construct codes using different error control techniques.		2	2	2	3	3	2	1	2	2	2	3	3	3	3		Understand and Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO5	Apply various coding schemes for text, speech and audio.	3	2	3	3	3	2	2		2	2	3	3	3	3	2		Understand and Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests

HOD Department of Computer Science & Engineering IKG PTU Main Campus Capurthala

17,

Program : B.Tech. (Computer Science and Engineering)

BTCS615-18UC : Information Theory and Coding Lab

Tanada M. manganga		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	РО-Ь	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understan d/analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
C01	Compare various capacity reduction based coding techniques for image and video type of data.	3	3	2	2	3	2	3		3	3	3	3	3	3	3		Understand & Design	Skill Developmen t	Practical Assignments
CO2	Implement various error control techniques for Convolutional codes	3	3	3	3	3	2	2	2	з	2	2	3	3	3	3	2	Understand & Design	Skill Developmen t	Practical Assignments
CO3	Illustrate various security oriented coding techniques for Block codes	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	Understand & Design	Skill Developmen t	Practical Assignments
CO4	calculate entropy, joint entropy, relative entropy, conditional entropy, and channel capacity of a system	3	3	3	3	3	3	3		3	3	3	3	3	3	3		Understand & Design	Skill Developmer t	Practical Assignments

HOD Department of Computer Science's Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS(type code) : BTCS-617-18 Data Science Lab

	BTCS(type code)	BICS	-61/-18	Data	science	Lab								-						
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	_ife-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
	CO Statements (UC-BTCS-617-18 Data Science Lab)				PO-d			PO-g		PO-i	PO-j		ist alls	PSO- m	PSO- n	PSO- o		Learning Level(unders tand/analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
	Plan the projects in the domain of data science.	1	3	2	3	2	2	1	1	3	3	3	3	3	3	3	1	Analyze	Skill Development	MSTs, ESE, Class/Quiz Tests
	Use data analytics tools towards problem solving and solution analysis.		1	3	1	3	. 1	1	1	1	1	2	3	3	2	3	1	Knowledge	Skill Development	MSTs, ESE, Class/Quiz Tests
CO3	Apply Mathematical sciences and recent technologies in Computer Science to solve real life problems	3	3	3	3	1	2	1	1	2	3	3	3	3	3	3	1	Apply	Skill Development	MSTs, ESE, Class/Quiz Tests
CO4	Apply data science concepts and methods to solve problems in real-world context.		3	3	3	1	2	1	1	2	3	3	3	3	2	3	1	Apply	Skill Development	MSTs, ESE, Class/Quiz Tests
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Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering

Program : B.Tech. (Computer Science and Engineering) BTCS 614-18UC : (Soft Computing)

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	BTCS 614-18UC	(Soft C	omputin	ng)										Sol Land	transfer 1	Contraction in	TO STORE OF			
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problem	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
C01	Understand various soft computing concepts for practical applications	3	2	1	3					i ane				3	1	2		understand	Skill development	
CO2	Design suitable neural network for real time problems	3	2	3	3	2	1							3	2	2		Design	Skill development	
соз	Construct fuzzy rules and reasoning to develop decision making and expert system	3	2	3	3	2	2							3	2	2		Apply	Skill development	MSTs, ESE, Class/Quiz Tests
C04	Apply the importance of optimization techniques and genetic programming	3	2	3	3	2	1							3	2	3		Apply	Skill development	
COS	Review the various hybrid soft computing techniques and apply in real time problems	3	2	3	3	2	2							3	2	2		Design	Skill development	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS(612-18UC) Soft Computing Lab

		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (Soft Computing Lab)	PO-a	РО-Ь	PO-c	PO-d	athing	PO-f	PO-g		PO-i	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	Р50-р	Learning Level (understand/ analyse/ deisgn etc)	Focus on	Assessment Tools to Measure Attainment of CO
C01	Reveal different applications of these model+B7:B11s to solve engineering and other problems.	3	3	3	3	3	3	2	1	1	2	2	1	2	2			Estimate	Skill Development	MSTs, ESE, Class/Quiz Tests
CO2	Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems	3	3	3	3	3	3	2	1	1	2	2	. 3	. 3	2	1	1	Apply	Skill Development	MSTs, ESE, Class/Quiz Tests
соз	Apply genetic algorithms to combinatorial optimization problems	3	3	3	3	3	3	2	1	2	1	2	2	3	2	1		Design	Skill Development	MSTs, ESE, Class/Quiz Tests
CO4	Effectively use existing software tools to solve real problems using a soft computing approach	3	3	3	3	3	3	1	1	1	2	2	3	3	2	1	1	Compute	Skill Development	MSTs, ESE, Class/Quiz Tests
CO5	Evaluate and compare solutions by various soft computing approaches for a given problem.	3	3	3	3	3	3	2	1	1	2	3	3	3	2	1		Evaluate	Skill Development	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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I.K. Gujral Punjab Technical University, Kapurthala (Main Campus) Department of Computer Science & Engineering

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering)

BTCS(type code) : BTCS-619-18 Machine Learning Lab

		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements (UC619-18 Machine Learning Lab)			PO-c		PO-e	PO-f	Cherry The		PO-i	PO-j	PO-k	PO-I	PSO- m	PSO- n	PSO- o		Learning Level(understand/a nalyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Solve problems using the machine learning models.	1	2	2	2	3	1	1	1	2	1	2	3	2	2	2	1	Apply	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Apply various reinforcement algorithms to solve real time complex problems.	2	3	2	2	3	1	1	.1	2	2	2	3	3	3	2	1	Apply	Enterpreneurship	MSTs, ESE, Class/Quiz Tests
СОЗ	Identify the core components of deep neural network model.	1	2	2	1	3	1	1	1	2	1	2	3	2	1	1	1	Knowledge	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Implement unsupervised models through programming language.	1	2	2	2	3	1	1	1	2	1	2	3	2	2	2	1	Apply	Employability	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering

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(Internet)

Program : B.Tech. (Computer Science and Engineering) BTCS(type code) Speech and Natural Language Processing

	BICS(type code)	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	РО-Ь	PO-c	PO-d	РО-е	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO- m	PSO- n	PSO- o	PSO- p	Learning Level (understand/ analyse/ deisgn etc)	and the second of the part of the second second	Assessment Tools to Measure Attainment of CO
CO1	Describe the fundamental concepts and techniques of natural language processing.	3	2	3	2	3	3	1	1	3	3	2	3	2	2	3	1	Understand	Skill Development	MSTs, ESE, Class/Quiz Tests
CO2	Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each.	3	3	3	3	3	3	1		3	3	2	3	1	2	2	1	Apply	Skill Development	MSTs, ESE, Class/Quiz Tests
соз	Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions.	2	3	3	3	3	3	1		3	3	2	2	2	3	2		Design	Skill Development	MSTs, ESE, Class/Quiz Tests
CO4	Analyze large volume text data generated from a range of real- world applications.	2	1	1	2	3	2	2	1	2	2	2	2	1	2	2	1	Understand	Skill Development	MSTs, ESE, Class/Quiz Tests

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

. 5.

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering)

BTCS 713-18UC Block chain Technology Lab

		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			Assessment
CO No.	CO Statements	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO- m	PSO- n	PSO- o	PSO- P	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurshi P	Tools to Measure Attainment of CO
C01	Interact with a blockchain system by sending and reading transactions.	3	3	2	2	3	3	3	2	3	2	2	3	3	3	2	2	Understand	Skill Development	Practical Assignments
CO2	Design, build, and deploy a distributed application.	3	3	3	3	3	3	3		3	3	3	3	3	3	3		Design	Skill Development	Practical Assignments
CO3	Evaluate security, privacy, and efficiency of a given blockchain system.	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	Design	Skill Developmen	t Practical Assignments

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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13.

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering)

BTCS 614-18UC : (Software Defined Networks)

		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problem	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honling Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statements	PO-a	РО-Ь	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-i	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	To define and understand terminology involved in the field of software defined networking	3												3				understand	Employability	
CO2	To describe software defined architecture and open flow protocol for communication between controller and switches	3		3										3				Design	Employability	
	To provide an overview and comparison of various SDN controllers	3				1								3				Apply	Employability	MSTs, ESE, Class/Quiz Tests
	To design topologies using Mininet and various APIs	з	2	3		1	1					1		3	2			Design	Employability	
	To develop various applications and protocols for SDN architecture	3	2	3		1								3	2			Design	Employability	
	To identify and analyse various security threats in SDN based networks	3	2				1		1					3			1	identify	Employability	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS712-18UC : (Digital Image Processing)

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dovin total usar		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No	CO Statements (UC-BTEC-502- 18: Digital Signal Processing)	PO-a	PO-b	PO-c		PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-I	PSO- m	PSO- n	PSO- o	PSO- p	Learning Level (understand/ analyse/ deisgn etc)	Focus on Employability / Entrepreneursh ip	Assessment Tools to Measure Attainment of CO
CO1	Understand the basic concepts of DIP	2	1	2	1	1	2	3	1.20	1		1	3	3	1	1		Understand	Skill Development	MSTs, ESE, Class/Quiz Tests
CO2	Improve the quality of digital images	3	2	3	3	2	1			1	1	1.	2	3	3	1		Apply	Skill Development	MSTs, ESE, Class/Quiz Tests
СОЗ	Understand and De-noise Digital Images	2	3	3	2	1	1	1		1			2	3	3	1	1	Understand	Skill Development	MSTs, ESE, Class/Quiz Tests
CO4	Segment digital images and extract various features from digital images	2	2	2	2	3	1		1	1	1	1	2	3	2	1	1	Apply	Skill Development	MSTs, ESE, Class/Quiz Tests
CO5	Understand various image compression techniques and apply such techniques to compress digital images for reducing the sizes of digital images.	3	2	3	2	3	2	1		3	1	2	3	3	2	2		Understand	Skill Development	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTCS715-18UC) : (Digital Image Processing Lab)

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where the frequencies of	BIC3/13-180C)	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No	CO Statements	ш PO-a		Corelling Corelling	PO-d	ACT OF		DIN'S A	PO-h	PO-i		PO-k		PSO- m	PSO- n	PSO- o		Learning Level(understand/a nalyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	develop any image processing application.	2	2	3	3	3	3	2	2	2	2	2.	3	3	3	3	2	implement	Skil Development	MSTs, ESE, Class/Quiz Tests
CO2	understand the rapid advances in Machine vision.	2	2	3	3	3	2	2	1	3	3	3	3	3	3	3	2	Apply	Skil Development	MSTs, ESE, Class/Quiz Tests
соз	learn different techniques employed for the enhancement of images.	3	2	3	3	3	3	3	2	2	2	3	3	3	2	3	2	Apply	Skil Development	MSTs, ESE, Class/Quiz Tests
CO4	Perform image enhancement techniques in spatial and frequency domain	2	3	3	3	2	2	3	1	2	2	3	3	3	3	3	2	Design	Skil Development	MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1963 Digital Image Processing

CO No. CO Statements IPC- POCA1953 : Distat Impire Procession	Computati	Problem J	Conduct	Modern	Professio	Life-loty	Project n	Commun	Societal a	adividua.	anovatio		 societal, moral values. 	level solutions.				
CO No. CO Statements (PC-POCA1983 ; Digital image Processing) CO1 Discuss the need of various image transforms along with properties	PO-a P	O-b PO-	C PO-d	PO-e	PO-I	PO-g	PO-h	POI	PO-J	PO-k	POL	PSC-m	P\$O-n	PSO-o	PSC-p	Learning Level(understand/analyse/ delsgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
GO2 Learn different techniques employed for the enhancement of images		1				3				3	3	1	2	2	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3 Describe the rapid advances in Machine vision	1		-			1 1			-			3	2	2	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO4 Analyze images in multiresolution environment	1	1	2							3	4	3	3	3	3	Understand	Employability	MSTs, ESE, Class/Quiz Tests
										1	3	3	3	3	3	Analyse Understand	Employability Employability Employability	MSTs, ESE, Class/Quiz Tests
CO5 Evaluate image compression techniques								4	and the second second	1	111-0-0		3	1	3	Linderstand	Emissionality	
GO5 [[[valuate_image_compression techniques				(Internet)	12/463		(A. 10.10	102.00	Yes Contract						a local de la constante de la c	And the second s	Employading	MSTs, ESE, Class/Quiz Tests

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Department Computer Science and Engineering Program Master of Computer Applications (MCA)

		oduloz	'troble	New	onpo	foder	Poles	ide-los	e l'acteur e	ocictal	adrvidue	movatic									
CO No.	CO Statements (PC- PGCA1964: Digital Image Processing Labo	PC-a	PO-b	PO-c	PO-d	PO-e	P04	P0-0	PO-h PO	I PO	PO.	P04	PSO-m	P80-n	P\$0-0	PSO-p	Versenheiten die state die second and all and a	The second s	The local data in the second se		
CO1	Implement the various operations which can be performed on images.				3	1		1	the second is the second is the		3	1	1	2	190-0		Learning Level(understand/analyse/ deisgn etc) Design	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO		
C02	Apply filters on images as per the requirement	1		3		3	-	1				-	8	2	2		Design	Employability and Entrepreneurship	Practical Assignments		
003	Implement different techniques employed for the enhancement of images	3	1000		3	3		1		10/10/00	3	3	8	-	1		Cesqui	Employability and Entrepreneurahip	Practical Assignments		-
10				1		1					1.23	1		-			Design	Employability and Entrepreneurship	Practical Assignments	S 199 5 199	
	Implement image compression	3	3	3	3	3	1	1	1000	Contractor			3	3	3	1	Design	Employebility and Entrepreneurship	Practical Assignments		1
54					the second s			100		100	1	1	2	3	2		Design		Pracodal Assignments		
205	Develop an Image Processing Application	2					_					-	and an owner where the second s					Employability and Entrepreneurship			

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Ð HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department: Computer Science and Engineering Program Master of Computer Applications (MCA) 1965 NLP and Speech Recognition PGCA1965

Describe the concept of speech recognition and text to speech conversion

CO No.

CO2

003

C04

005

Understand and apply Use of recent Inculcate employability knowledge on analysis, technology, skill and and entrepreneur skills Develop techniques to design and knowledge for among students who enhance ability for development of computing practice applications in the with commitment on can develop lifelong learning. ustomized enterprise computing discipline, societal, moral values, level solutions.
 CD Statements (PC- PGCA1965: NLP and Speech Recognition)
 PO-a.
 PO-b.
 PO-d.
 PO-g PO-h PSO-m РЗО-р 3 3 POJ PO-k PSO-n PSO-o PO-i 3 3 3 3 3 3 explain text normalization, use of odit distance, and regular expressions 3 3 3 Implement Naive bayes and sentiment classification algorithms Faudiance with chatbots and phonetics

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PSO-p	Learning Level(understand/analyse/ delsgri etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO	 	T
3	Understand	Employability	MSTs, ESE, Class/Quiz Tests		-
3	Understand	Employability	MSTs, ESE, Class/Quiz Tests		
3	Understand	Employability	MSTs, ESE, Class/Quiz Tests		+
3	Understand	Employability	MSTs, ESE, Class/Quiz Tests	 	-
1	Understand	Employability	MSTs, ESE, Class/Quiz Tests		
			which we down as the state of t		

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department: Consulter Science and Engineering Program: Master of Computer Applications (MCA) PGCA1967 IOT 4: Blockchein Technology

		tempstational Knowledge	boblem Analysis	Neign Development of Solutions	ordinet investigations of complex computing problems	fodem Toel Usage	refessional Ethics	ik-leng Leaning	roject management and finance	osumerication Efficacy ocicial and Environmental Consern	dividual and Team Work	movation and Entrepresentation	Understand and apply knowledge on analysis design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on	can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.				
CO No.	CO Statements (PC-PGCA1967 ; IOT & Blockshain Technology)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g	PO-h	PO- PO-	PO-	POI	P5O-m	P80-n	P50-0	PSO-p	Learning Level(understand/analyse/ delage etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO	-
C01	Discuss the terminology and enabling technologies of JoT and Blockehain						3	2			1	3	1	,	and a star		Understand	Employability	MSTs, ESE, Glass/Quiz Tests	
		3		3				3	3	1000	3		3			1				
CO2 .	Identify various element of IoY.										- Harrison	in the second			the second s	-	Understand	Employability	MSTs, ESE, Class/Quiz Tests	
C03	Enumerate the steps involved in IoT, restam design methodology		3	2			2	3	1000		3	-		3	3		Understand	Employability		
A COLORED IN COLOR		3	3	2	3		2	3	1		3	- 3	3	3	3			Employability Employability Employability	MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests	

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4 HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1966 NLP and Speech Recognition Laboratory

		Computational Knowledge	Problem Analysis	Design (Development of Sc	Conduct investigations of e Computing problems	Modern Tool Usage	Professional Lithics	Me-long Louning	hojoot management and fin	communication Efficacy	ocidal and Environmental oficidant and Trans Work	parto stant, and a com work.	design and development of applications in the		among students who can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.					
CO1	CO Statements (PC- PGCA1966: NLP and Speech Recognition La	PO-a	PO-b	PO-c	PO-d	PD-4	PO-I	PO-g	PO-h	POH	POJ PO	A PO	PSO-m	PSO-n	P50-0	PSO-p	Learning Level(understand/analyse/ delagn etc)	Focus on Employability / Entreprene-urship	Assessment Tools to Measure Attainment of GO		-
	Develop knowledge of various learning models of data	- 1	3	-	1	3	10 10 10	3			3	1		1	3		Understand	Employability	Practical Assignments	Martin and a	
002	Analyze performnce of various learning algorithms.	3	2	3	4	A	A	3	1	P. Contraction		3	3	3	3	1 2 3	Understand	Employability	Practical Assignments		
C03	Evaluate models generated from data	3	3	3	3	A	3	1			3	1 2	3	3	and the second second	3	Understand	Employability	Practicel Assignments	The second second	-
C04	Apply the algorithms to a real-world problems	1	3	3		3		3				3			3		Understand and Design	Employability	Practical Assignments		-
C05	Optimize the models learned and report on the expected accuracy that can be achieved by applying the models.	1	3	3	3	3		1					3			,	Understand and Design	Employability	Practical Assignments		
				-														And the second		,	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department: Computer Science and Engineering: Program: Master of Computer Applications (MCA) 1968 IOT & Blockchain Technology Laborat PGCA1968

PGCA1968	101 & Biockchain Technology Laboratory	-	-	1	F		-				-	-				providence in the	and the second			a frank i na a dhuaistaith
		omputational Knowledge	tobiem Analysia	Neign (Development of Solutiona	onduct investigations of complex omputing problems	dodem Tool Usage	rofessional Ethios	ite-lerra Laurning	rojoch management and limmor	ocumunication Efficacy	coldal and Environmental Concern	dividual and Team Work	movation and Entroprenouchip	Understand and apply knowledge on a naysis, design and development of applications in the computing discipline.		can develop customized enterprise				
CO No.	CO Statements (PC- PGCA1965 ; K/T & Blockshain Technology L	PO-a	PO-b	PD-c	PO-d	PO-e	PD-I	PO-g	PO-h	POI	PO-	PO.k	POI	PSO-m	PSO-n	PSO-a	PSO-p	Learning Level(understand/analyze/ deisgri etc)	Focus on Employability / Entrepreneurship	The second se
C01	Use IoT sensors and remotely monitor data and control devices.		- 3	1000	1		1.2.2.2	2	2					3	1	1000	racep	Understand And Design		Assessment Tools to Measure Attainment of CO
002	Develop real life to T based projects.	3	3	10000	3	3		1	1	1		2	1						Employability	Practical Assignments
6.03		1	-	1	2			1									3	Understand And Design	Entrepreneurship	Practical Assignmets
CO3	Discuss blockchain technology and develop blockchain based solutions,	-	1	10.00	-			-		1				1			3	Understand And Design	Entrepreneurship	Practical Assignmets
CO4	Deploy IoT based blockohain applications for on-premise and cloud based	3	3	2	3	2		1		-		1					the second second			
0.04	architecture.													4	3	3		Understand And Design	Entrepreneuratio	Practical Assignmets
C05	Create docker based application			3		1		1		1000										
		-	-	and the second				the second s	Annal Street in	Second Second		And the Party of t	Acres Maria	And a state of the	2		2	Understand And Design	Employability	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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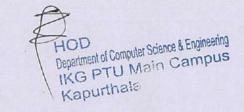
Understand And Design

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Employability

Department: Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA-B1 Computer Programming using C

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concern	Individual and Team Work	Innovation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on	among students who can develop customized enterprise	Develop techniques to enhance ability for lifeloos learning	
CO No.	CO Statements (PC- PGCA-B1 : Computer Programming using C)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
CO1	Express the logical flow used in Programming.	3	3					3		2		ber m		2	1	3	3	Learning Focus or Assessment Tools to Measure Attainment of CO ORDERSE Employed MSTs, ESE, Class/Quiz Tests
CO2	Design algorithms for solving various real life problems	3	3	3	3			3			1 Constant		3	3	3	3		Understa Employat MSTs, ESE, Class/Quiz Tests
CO3	Implement programs using C	3	3	3	3	3		3			1	3	3	3	2	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO4	Choose the right data type and statements for programs.	2		3	1	1 1	1	3		Contraction of		2	3	3	3	3	1	Understai Employability
CO5	Explain various concepts of C programming language.	3		1	1	2	1	3					3	3	3	3	2	Understai Employability
			1201		-			1		tere aller								



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Department	Computer Science and E	

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1937 Cloud Comparison

CO1 Discuss the basic cencept and injection of cload ecologities 3 - <th< th=""><th></th><th></th><th>computational Knowledge</th><th>troblens Analysis</th><th>beign /Development of Solutions</th><th>conduct investigations of complex, ontputing problems</th><th>fodern Tool Usage</th><th>rofessional Eldrica</th><th>ite-long Learning</th><th>reject transgement and finanese ommunetion, Effency</th><th>ociotal and Environmental Concern</th><th>wheelast and Team Work.</th><th>Understand and apply knowledge on analysis design and development of applications in the computing discipline.</th><th>technology, skill and knowledge for computing practice with commitment on</th><th>Inculizate employability and entrepreneur skills among students who can develop sustomized enterprise Sevel solutions.</th><th></th><th>5</th><th></th><th></th><th></th><th></th></th<>			computational Knowledge	troblens Analysis	beign /Development of Solutions	conduct investigations of complex, ontputing problems	fodern Tool Usage	rofessional Eldrica	ite-long Learning	reject transgement and finanese ommunetion, Effency	ociotal and Environmental Concern	wheelast and Team Work.	Understand and apply knowledge on analysis design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on	Inculizate employability and entrepreneur skills among students who can develop sustomized enterprise Sevel solutions.		5				
COT Decision transmit rescoreding and mychanic of construction	CO No.	CO Statements (PC- PGCA1937 : Cloud Computing)		FO-D	PO-c	PO-d	PO-e	P0-1	PO-g P	O-h PO-I	PO-J	PO-k P	PSO-m	PSO-n	PSO-o	PSO-n	Learning Lovelhords retand/sealured risis on etc)	Form on Employability / Entrangene unblo	Anonexperient Totals to Use source All showed of CO		-
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			the second second		Contraction of the			3	1	3			1	3	3	1					
CO3 Compare and evaluate the visualization redundogies 3	002	Explain the process of inigrating to a cloud solution for different applications.	1		3	1000			3	,		3	3	3	3	3	Understand	and a state of the second s			
COA Normal names the sound respected, applications and data while 3 3 3 5 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	10.00																				
addressing the security concerns CO5 Use clead addition efford by industry leaders for various aminations	CO3	Compare and evaluate the virtualization technologies.	- 3	3	3	3					1		4		and states in the second states		Understand	and the second sec		and a second	
CO5 Use claims offered by industry (cluders for various applications) 3 3 2 3	and the second second	Monitor and manage the cloud resources, applications and data while	3	3	3	3		3		,			3			3		Employability	MSTs, ESE, Class/Quiz Tests		
		Monitor and manage the cloud resources, applications and data while	3	3	3	3		3		3			3	3		а					
	C04	Monitor and manage the cloud resources, applications and data while addressing the security concerns.	3) 1	3	3		3	3	3			3	3		3	Understand And Design	Employability	MSTs, ESE, Class/Quiz Tests		

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department: Computer Science and Engineering Program Mester of Computer Applications (MCA)

	Cloud Computing Laboratory	Computational Knowlodge	Problem Analysis	Design (Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	Life-iona Learning		Dojoot management and feature	Constal and Fusionmental Concern	Societal and Environmental Concern	Indiruting and Lenn Work	od Lottepenic	Understand and apply mowledge on analysis, design and development of applications in the computing discipline.	The second second second second second	among students who can develop customized enterprise	Develop techniques to anharce ability for litelong lierning.						
CO No.	CO Statements (PC- PGCA 1938: Cloud Computing Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	P0-1	PO	-g 2	O-h PC	H PC	OJ PC	Dik Pr	04	PSO-m	PSO-n	P80-0	PSO-p	Learning Leveljunderstandianalyse/ delsgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO	and the second second	1	
																								And and a state of the local division of the
CO1	Create applications for SaaS.	3	1	1		3	1.00	3		2					1	3	3	3	Understand	Employability	Practical Assignments			
CO2	Develop cloud applications using popular cloud platforms.	1	,	3	3	3	3	3		3					1	3	3			Enterteneunitio	Practical Assignments Practical Assignments			
C02 * C03	Develop cloud applications using popular cloud platforms. Create virtual parchines on the cloud.	3	3	3	3	3	3	3		3			5	3	3	8 3 3	3	2	Understand And Design	Entrepreneurship	Practice/Assignments			
CO2	Develop cloud applications using popular cloud platforms.	3	1	3	3	3	3	3		2 3 2 3			5	3	3	8 3 3	3	2						

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department: Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1933 Mobile Application Development

		Computational Knowledge	Problem Analysis	Deagn /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Jühnes	Life-long Learning	Project management and finance	Communication Efficiency	Societal and Environmental Concert	adriddual and Team Work	movation and Entroprementatio	Understand and apply knowledgie on analysis, design and development of applications in the computing discipline.		customized enterprise				
CO No.	CO Statements (PC- PGCA1933 : Mobile Application Development)	PO-a	PO-b	PO-c	PO-d	PO-	PO-1	PO-	PO-h	PO-	PO-	PO-k	P04	PSO-m	P\$O-n	PSO-0	PSO-p	Learning Level(understand/analyser deison etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
001		and the second s	and the second se											Fault						
CO No. CO1	Define framework of mobile application development							1	3		3		104	3	3	3	100.0	Understand	Employability	MSTs. ESE. Class/Coiz Tasts
CO2	Define framework of mobile application development comment upon the building blocks of mobile computing	3		3				1	3		3	1	3	3	3	3	3	Understand	Employability	MSTs, ESE, Class/Quiz Tests
C02 C03	Define framework of mobile application development comment upon the building blocks of mobile computing test the mobile applications	1.2	3	3	3			3	3	3	3	3	3	3 3 3	3	3	3	Understand Understand And Design	Employability Entrepreneurship	MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests
CO2	Define framework of mobile application development comment upon the building blocks of mobile computing text the mobile applications	1.2	3	3	3			3 3 3	3	3 3 2	3	3	3	3 3 3 3 3	3 3 3 3	3 3 3 3	3	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2 CO3 CO4	Define framework of mobile application development comment user the building blocks of mobile compating test the mobile application Compare development windrom with of different sperating systems for mobile applicatio	3	3	3	3			3	3	3 3 2	3	3	3	3 3 3 3 3	3 3 3 3	3 3 3	3	Understand Understand And Design Design	Employability Entrepreneurahip Entrepreneurahip	MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests
CO2 CO3 CO4	Define framework of mobile application development comment user the building blocks of mobile compating test the mobile application Compare development windrom with of different sperating systems for mobile applicatio	3	3	3	3			3	3	3 3 2	3	3	3	3 3 3 3	3 3 3 3	5 3 3 3 3	3	Understand Understand And Design Design Design 	Employability Entrepreneurahip Entrepreneurahip	MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests

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P HOD Department of Computer Science & Engineering IK& PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1934 Mobile Applications Development Laboratory

CONs		Computational Knowlodge	Problem Analysis	Devign Development of Solutions	Conduct Investigations of complex Computing problems	Modem Tool Usage	Professional Ethica	di ife-hee Leanine	Project management and finance	Communication Efficacy	Security and Environmental Conce	Individend and Team Work	fanovation and Entrepreneurship	1.4.2.9.	 technology, skill and knowledge for computing practice with commitment on societal, moral values. 	among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning.				
CON	CO Stataments (PC- PGCA1934 : Mobile Application Development Prepare environment for coding and running mobile applications	PO-a	PD-6	PO-c	PO-d	P0-4	PO-	PO	g PO	h PQ	1 PD	PO.	K POJ	P80-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO	A CONTRACTOR OF STREET
CO2	Develop mobile applications using GUI and Layouts	1	1.74		1	1 1	-			-		1000		3	3	3	3	Understand	Employability	Practical Assignments	
	Develop mobile applications for different mobile operating systems.	3	1	-	-	1 2	-	-	-	-	-	-	+	3	3	3		Understand And Design	Enfrepreneurship	Practical Assignments	
004	Test Mohile Applications				-	1 2	-		-	-	-	3	-	3		3		Design Design and Analyse	Entrepreneurahip	Practical Assignments	
	Instantione Applications Implement database connectivity with mobile applications.	1	f'			3	-	- 3	3		3	_	3	and the second s	3	3	3	Design and Analyse	Entrapreneurship	Practical Assignments	production and the sec
CO5			(-	1-1-	-	-	-	-	-	1111		3		3	2				

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program Moster of Concuter Applications (MCA) PGCA1935 Simulation & Modelling

ODI Mentify the participant and approaches used to design the simulation. 3			Computational Knowledge	Problem Analysis	Design (Development of Solutions	Conduct investigations of complex	-outputting processing	adies // host minocia	Professional Ethics	Ain-long Lourning	hojoct management and finance	Commission Efficacy	locietal and Environmental Conce	adividual and Team Work	movation and Primeronaurahin	Understand and ap knowledge on analy design and development of applications in th computing disciplin	isis, technology, skill and knowledge for computing practice	among students who can develop customized enterprise					
Old Mentify the networks and approaches used to design the simulation 3	CO No.	CO Statements (PG- PGCA1935 ; Simulation & Modelling)	PO-a	PO-b	PO-c	PO	d P	0.0	1-04	PO-a	PO-b	PO.	PO	I PO	k PC	PSO-m	PSC-n	PSO-o	P80.0	Learning Levelin derstand/anat.se/ delens etc.	Easur on Employability / Eatronanaurchia	Assassment Tools to Bassius Altabased of CO	Contraction of the local division of the loc
Compare different types of simulation, techniques and methods 3 <th< td=""><td>CO1</td><td></td><td>3</td><td>3</td><td></td><td>3</td><td>10 200</td><td>110</td><td>Cart of</td><td>1</td><td>1</td><td>-</td><td></td><td>-</td><td>-</td><td>3</td><td>3</td><td>1</td><td>2</td><td></td><td></td><td></td><td></td></th<>	CO1		3	3		3	10 200	110	Cart of	1	1	-		-	-	3	3	1	2				
Co3 Apply conceptor of comparison simulation for types of finance, system models, 3 3 3 3 2 1 3 9 9 9 2 Design Engloyability MSTs. ESE. Class/Quiz Tests 204 Test the associates of 2 signalation by analyzing the vignalation of tests 3	CO2	Compare different types of simulation, techniques and methods.	3			3	111	0.000	3	1000	3		11 12		3			1			Employed		
205 Distriction of the second se	CO3			3	3				3	3	2		-			3	3	3	2		and the second sec		
		The difference of the second states in the second states and the second states and the second states and the second states and the second states are set of the second states and the second states are set of the second states are second states are set of the second states are second	1	3	1	3				3	1	1	-	-	1			3	7	Linderstand	Employabile	MSTa CSC Classificat Tasta	
	CO4																statement in the second s	the second se	the second second second		Language and and a second seco	THE CO. LINES. SHEEPS AND LINES.	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program Master of Computer Applications (MCA)

CA 1936	Simulation di Modelling Laboratory	lomputational Knowledge	robiem Analysis	beign (Development of Solutions	Ondust investigations of complex computing problems	fødem Tool Uage	tofcessenal Ethics	ite iong Loming	reject management and finance	oumunication Filicacy	ooldal and Environmental Concern	udividual and Toam Work.	movation and Entreprenetarship			can develop customized enterprise	Develop techniques to enhance ability for lifelong fearning.			
CO No.	CO Statements (PC- PGCA1938: Simulation & Modelling Laborat	PO-a	PO-b	PO-c	PO-d	PO-e	1-04	PO-0	PO-h	POI	POJ	PO-k	POI	P80-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/analyse/ delsgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
001	Use software fools for modelling and analysis of methematical concepts fo engineering application.		3	3		3									1		, and the second	Understand And Create	Entrepreneurship	Practical Assignments
002	Simulate discrete problems using queuing systems.			3	- 3	3		3	1				3	3	3	3	8	Understand And Design	Entrepreneurship	Practical Assignments
003	Model and analyze simple engineering concepts and its importance in engineering applications.	3				2		3	1					3	3	3	3	Design and Analyse	Entrepreneurship	Practical Ausignments
004	Apply simulation software to construct and execute goal-driven system models.	3	3	3	3	3		3	3			1	3	3	3	3	3	Understand And Design	Entrepreneurship	Practical Assignmenta
005	Create Simulation Projects	3	1	3	2	3				200			2	3	2	2	3	Understand And Design	Entrepreneurship	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA)

	E-Commerce & Digital Markering	apetational Knowledge	blem Analysis	ign (Development of Solutions	iduct investigations of complex, nputing problem	dem Teol Usage	consonal Ethics	-lang Learning	ect management and finance	umuistation Efficacy	otal and Environmental Concern	videal and Team Work	wation and Entirepreneurship	Understand and spply knowledge on analysis, design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on	can develop customized enterprise	Develop techniques to enhance ability for					
		8	E.	8	88	Ŵ	4	1	- E	Con	See	Ind	- E		and the second s	Construction of the second						
CO No.	CO Statements (PC+ PGCA1921 : E-Commerce & Digital Marketic)	PO-a	PO-b	PO-c	PO.d	PO-a							1 DOU	DCO.m	Decto	000 -	D0/0.m				The second se	
CO No. CO1	CO Statements (PC- PGCA1921 : E-Commerce & Digital Marketin) Discuss the scope of economerce.	PO-a	PO-b	PO-c	PO-d	P0-0	PO-1	PO-g	PO-h	1 PO-I	PO	PO-K	POH	PSO-m	PSO-n 3	PSO-o	Р\$0-р	Learning Level(understand/analyse/ delsgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO		
		PO-a	PO-b	PO-0	3	PO-e	POI	1 3	PO-h	POL		PO-k	2	2 2 3	P80-n 3	PSO-o	РЗО-р	Understand	Employability	MSTs, ESE, Class/Quiz Tests		
CO1	Discuss the scope of ecommerce.	PO-a	PO-b	3 3	3.	PO-e	PC-	3 3	3 3	PO4	1 3 3	PO-k	3	2 2 3	P80-n 3 3	PSO-0 3 3	PSO-p	Understand Understand	Employability Employability	MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests		
C01 C02	Discuss the scope of econometee Explain payment modes used in econometee today.	PO-a	PO-b	3 3	3	PO-e	POA	90.g	3 3	POH	904 3 3 3	3 3	3 3	PSO-m 2 3 3 2	980-n 3 3 3	P80-e 3 3 2	PSO-p	Understand	Employability	MSTs, ESE, Class/Quiz Tests		
CO1 CO2 CO3	Discuss the scope of economece. Explain payment modes used in economece today. Execute a comprehensive digital marketing strategy and plan Describe the use digital marketing for multiple goals within a larger	P0-a	FO-b	3 3 3	3	PO-e	PCł	90-9 3 3 3	3	1 PO4	PO4 3 3 3	3 3	3 3 3	PSO-m 2 3 3 2 2 3	PSO-n 3 3 3	PSO-0 3 3 2 3	2 2	Understand Understand Understand	Employability Employability Employability	MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests		

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Prograf	nt Cologudar Solence and Engineering m Masker of ConsolerApplications (MCA) e-Compierce and Digital Marketing Laboratory	omputational Knowledge	obleen Analysis	cign Tevelopment of Solutions	induct investigations of complex imputing problems	odom Tool Usage	ofessional Ethics	ie-long Leanung	ojost management and finance	oumanication. Efficacy	sectal and Environmental Concern	dividual and Team Work	design and development of applications in t	ysis, technology, skill and knowledge for computing practice	among students who can develop customized enterprise							
-	CO Statements (PG-PGCA 1974 : e Continence and Digital Market	20.0	E DO D	00.0	PO-d	PO-e	PO-I	PO-g	PO-h	PO4	POI	C-k P	PSO-m	PSO-n	P\$0-0	PSO-p	Learning Level(understand/analyse/ delsgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Altainment of CO			4
CD No.		PU-a	100	Phose .	FUR	- CVIE	100	1 1	- Corts	191	2		3	3	1	1	Understand	Employability	Practical Assignments		- Alexandra	4
CO1	Implementat E-Commerce applications	3	the state of the s						1		-	-		1	3	3	Understand and Design	Entrepreneutablp	Practical Assignments			4
CO2	Develop digital marketing strategy and plan		-	1	1		-	-	1 1		-	1 2			4		Design	Entrepreheurship	Practical Assignments	1	- change	Aire
003	Designe ffective digital and social mitdla strategies			3	3	,		-			-						the second se		Practical Assignments			
004	Distances social, and scentily issues concerning the digital marketing and e- commerce.		2					3				3	L				Design	Entrepreneurship	Priscular Mange Riverse			
005	Implement a project for E-Commerce and Digital Marketing	1551	2 2	2		2	100000	3		10.00 D	3		2	2	1	12	Understand	Entrepreneurship				
	Therefore and the state of the				1																	
1.00110100											TRACTOR CONT	and the second	STATISTICS IN CONTRACTOR OF STATISTICS	THE REPORT OF A DESCRIPTION OF A DESCRIP	the first starting of the first starting of	and the second se						
		5.000		Cherry Street		0 1000							a second s	and the second of the second second second	and the second data in the second data	and the second sec						
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Departmer Program PGCA 1931	nt Computer Science and Engineering m Master of Computer Applications (MCA) Software Testing & Quality Asses	ance																1			
		spatiational Knowledge	dem Analysis	gn Development of Solutions	duct investigations of complex aputing problems	iam Tool Usage	essional Ethics	-long Learning	oct munipernent and finance	municition Efficacy	ictal and Environmental Concern	rridaal and Team Work	ovation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on	Incultate employability and entrepreneur skills a mong students who can develop customizad enterprise fevel solutions.	Develop techniques to enhance ability for lifelong learning.				
		Con	Prof	Dea	Con	te	Prot	T. He	of the	Coe	N.	Int	E			P\$0-0	PSO-p	Learning Level(understand/analysel deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO	
CO No.	CO Statements (PC+ PGCA1931: Software Testing & Guality Asso	PO-a	PO-b	PO-C	PO-d	PO-e	PO-I	PO-g	PO-h	P04	P0-1	PO-k	PO-	PSO-m	PSO-n	PBU-0			Employability	MSTs, ESE, Class/Quiz Tests	1000
CO1	services and a service approximation of a service and and an and a service of		1.000	1000		C. Company		1		1		12	1	1	3	1 and		Understand		MSTs. ESE, Class/Quiz Tests	1220
C02	Create test strateures, design test cases, prioritize and execute them.	1.1.1	1	3	3	1000000	3	3	3	Complete a	38	2	3			3		Understand and Create	Enlyepreneurship	MSTs, ESE, Glass/Quiz Tests	
	Identify various risks involved with software projects and build risk			1		100000	1	1		17.500	1	3	1000	3		3		Understand and Create	Entrepreheurship	MSTs. ESE, Class/Quiz Tests	100
CO3							-	4	1			1		3	and the second se		3	Create	Enbepreneurship	mola, con, Gaparade Teara	-
100	Plan anthease man thement and configuration activities.	Party and a lot	A CONTRACTOR OF	1		Contraction of the local division of the loc	100 C	State of the second sec					and in case of the local division of the loc	the second se	and the second se						

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Create test strategies, design test coses, prioritize nul execute them. Identify various risks involved with software project and build risk. Plan software management and confinuention activities. Discuss the fish management involved in software development.

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department, Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1975 Software Testing & Quality Assurance Labor

		Computational Knowledge	Problem Analysis	Design Development of Solutions	Conduct investigations of complex Comparing problems	Modern Tool Usage	Professional Ethios	Éile-long Leaning	Project management and finance	Communication Efficacy	Societal and Environmental Concern	Individual and Team Work	Janovation and Entreprenouship		technology, skill and knowledge for computing practice with commitment on societal, moral values.	among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning.					
CO No.	CO Statements (PC- PGCA1975 : Software Testing & Quality Asso	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g	PO-h	PO4	POJ	PD4	PCH	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/analyse/ delsgn etc)	Focus cin Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO	And the second second second	
001	Explain various approaches of software testing and quality assumance for software development.		1	1.14	1	3			3		3		1	3	3	3	3	Understand	Employability	Practical Assignments		
	Create test strategies, design test cases, prioritize and execute them	3	10	3	3.	3		1	3		3	No.	3	3	3	3	3	Create	Entrepreneuratup	Practical Assignments		10000
003	Identify various risks involved with software projects and build risk management	3	3	3		3	1			1		3	3	3	3	3	3	Design	Entrepreneurship	Practical Assignments		
CO4	Plan software management and configuration activities.	- 3		3	3	3	100	3	3		1	3	3	3	3	3	3	Design	Entrepreneurship	Practical Assignmets		
0.05	Diouss the risk management involved in software development.		2				101.001	1	1 1 1			3		2	2	2	2				A	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1976 Machine Learning and Data Analytics using Python

		Computational Knowledge	Problem Analysis	Design Thevelopment of Solutions	Conduct investigations of complex Computing problema	Modern Teol Usage	Professional Ethics	Life-long Learning	Communication, Efficacy	Societal and Environmental Concern	Individual and Team Work	od Entreprene			among students who can develop customized enterprise	Develop techniques to enhance shillity for lifelong iteming.					
GO No.		PO-a	PO-b	PO-c	PO-d	PD-0	PO-1	PO-g P	h PO	PO-	PO-k	PO-I	PSO-m	PSO-n	PSO-a	PSO-p	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO		
Q01	Explain Machine Learning concepts	3	Parent Par				1	1		10000	3	3	1				Understand	Employability Employability	MSTs, ESE, ClassiQuiz Tests	Contract Internet	
002	Differenciate between supervised and unsupervised learning			3	3	and the second		3		1.53.6		3		and the second	An a Special statute		Understand	Employability	MSTs, ESE, Class/Quiz Testa	and the second sec	
and the second sec			1	1	and the second s	1		1	and the second	the second second			Contraction of the second second second	and the state of the		In the second of the second se	Understand	Englishability	MSTs, ESE, Class/Quiz Tests		A STATISTICS OF
003	Discuss clustering and classification algorithms	1 2 1	and the second sec	ALC: NOT THE REAL PROPERTY OF	and a second second						and the second s					1	O CONTRACT IN	Critical actions of the second s			
003 004	Discuss clustering and classification algorithms Analyse data using Python Numpy, Panda Liberries	3		3	3	3	111	3	5		3		3	1	3	3	Analyse	Employability	MST6, ESE, ClassQuiz Tests		
003		3	1	3	3	3		1	5		3			3	3	8	Analyse Understand	Employability Employability Employability			

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Department Computer Science and Engineering Program Master of Computer Applications (MCA)

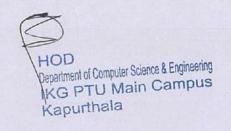
		outro	Problem	Design	admo	Modern	micro	ife-lon	hojaci n	Communit	iocictal a	habividad	movelion	computing discipline.	societal, moral values.	customizad enterprise level solutions.	iifelong laarning.					
CO No.	CO Statements (PC- PGCA 1958 Advanced Web Technologies)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g F	Oh F	POI	POJ	PO-A	POI	PSO-m	PSO-n	PSO-a	PSÓ-p	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneursitip	Assessment Tools to Measure Attainment of CO		
CO1	Explain client-side and server-side programming.	1		19. 19. 19. 19. 19. 19. 19. 19. 19. 19.			3	1			1000	1000	3	1	1	3	1	Understand	Employability	MSTs, ESE, ClassiQuiz Tests	100000	
CO2	Discuss web data and XML document handling.	3				3		3	3			3					3	Understand	Employability Employability Employability	MSTs ESE Class/Quiz Tests		
CO3	Describe the role of AJAX	1000	8	3	3	2		3		1000		3	(El Colora	3	3	3	Charles Colors Bas	Understand	Employability	MSTs, ESE, Class/Quiz Tests	0.027	
C04	Develop a dynamic webcage by the use of lava PHP and MySQL.	3	3	3	3	1		3	1				3	3	Contract Report of the		3	Understand And Design	Entrapreneurship	MSTs, ESE, Class/Quiz Tests		
C05	Apply basic CRUD database operations in a Dynamic Website.	3	3		2			3				3	0.000	1	1	3	3	Understand And Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests	1923	A32
COB	Discuss basic web services and their development.			3	3	3		3					1000	3			Contraction of the local distance	Understand And Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests		
000		-	1																			

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CONS		Computational Knowledge	iProben Andynis	itDesign (Development of Solutions	Conduct investigations of complex Computing problems	bbodern Teol Usage	Professional Ethics	di ife-long Leminy	Project management and finance	Communication Efficacy	Societal and Environmental Concern	Individual and Learn Werk	Innovation and Entreprets		technology, skill and knowledge for computing practice with commitment on societal, moral values.	emong students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning.					
CO1	CO Statements (PC- POCA1977 : Machine Learning and Data Anal	PO-A	PD-b	PO-c	PO-d	PO-4	PO-I	PO-g	PO-h	PO4	PG-	PO-k	PO-I	PSQ-m	PSO-n	PSO-c	PSO-p	Learning Level(understand/analyse/ ddisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO	and the second second	and the second
001	Develop knowledge of various learning models of data	in the second	3	3	3			3	1	1	-	3		3	3	3	in the second	Design	Entrepreneurahip	Practical Assignmets	the state of the s	
	Implement a wide variety of learning algorithms		1		3	1		3	1	1	-	1	1 3	3	3	3	3	Create	Entrepreneurship	Practical Assignmets		
C03	Evaluate models generated from data	3	3	3		3	1		1	1.1.1		. 3	3	3	3			Understand	Entroprenourship	Practical Assignmets		
CO4	Apply the algorithms to a real-world problems	1			3		1		1	1.1.1			Constant of		State Party	3	3	Understand	Entrepreneurship	Practical Assignmets		
CO5	Optimize the models learned and report on the expected accuracy that can be achieved by applying the models.	1	3	1		3	-	,				3		1	3			Design	Entrepreneurship	Practical Assignmets		



 Department
 Computer Science and Engineering: Program

 Program
 Master of Computer Applications (MCA)

 PGCA1977
 Machine Learning and Data Analytics using Python Laboratory

Department: Computer Science and Engineering Program PGCA 1990 Advanced Web Technologies Laboratory

		Comput	Probler	Delign	Condu	Moder	Life-Ju	Phoject	Commu	Societal	Individu	Innovatio								
CO No.	CO Statements (PC- PGCA 1980 Advanced Web Technologies L	PO-a	PO-b	PO-t	PO-d P	O-s PC	PO-	g PO-h	P04	POI	PO-k	PO-I	PSO-m	PSO-n	PSO-a	PSO-p	Learning Level(understand/analyse/ dologn etc)	Focus on Employability / Entropreneurship	Assessment Tools to Measure Attainment of CO	Name and Address of the Owner, or other
CO1	Understand the advance concepts of website development	1000				1	1	1				1	1	3	3	1	Understand -	Entrepreneurship	Practicel Assignmets	18513 11904 2005
002	Design dynamie web sites.	3		3	100	3	1	3			. 3	1.1.1/2	3	3	3		Design	Entrepreneurship	Practical Assignmets	
CO3	Implement database programming for web applications		3	3	3	1	- 1	DE STREET	1000	S 150 S 13	3	3	3	3	3	3	Design	Entrepreneurship	Practical Assignmets	and the second second
CO4	Inciencest iQuery methods, AJAX, Bootstrap and REACT	3		3	3	3	3	1			3		3	3		3	Understand And Design	Entrepreneurship	Practical Assignments	
	(Perform basic CRUD ecentions	3	3		100 B	3	3	211	1.126	1000	1000	3	1	1	3	3	Understand And Design	Entrepreneurship	Practical Assignments	
C05			2	3	3 1	3	- 3		1.	1	3.	3		3	3	3	Understand And Design	Entrepreneurship	Practicel Assignments	
	Deselop market ready website, to be used by clients.	. 3	1 A																	

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1932 Information Security and Cyber Law

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	ife-long Learning	Project management and finance	Communication Efficacy	societal and Environmental Concern	ndividual and Team Work		Understand and apply knowledge on analysis, design and development of applications in the computing discipline.		among students who can develop customized enterprise			
CO No.	CO Statements (PC- PGCA1932 : Information Security and Cyber Law)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-j	PO-k	PO-	PSO-m	PSO-n	PSO-o		Learning Focus on Assessment Tools to Measure Attain	ment of CC
CO1	Identify issues involved in the field of information security.		3		3				3		3.		3	3	3	3	3	Understan Employat MSTs, ESE, Class/Quiz Tests	1
CO2	Explain the key security requirements of Confidentiality, Integrity & Availability	3	3	3			1000			1.1.1.1.1.1.1.1.1	3	3	1	3	3	3	3	Understar Employab MSTs, ESE, Class/Quiz Tests	
CO3	Demonstrate the concept of Intrusion Detection & Intrusion Prevention.	3	3	3	3	3		3	3		3		3	3	3	3	3 -	Understal Employat MSTs, ESE, Class/Quiz Tests	
CO4	Apply Symmetric Encryption techniques	a subject of	S. 19 695	3	a the state	10,500		3	1999	1995.00	3	3	3	3	3	3	3	Understar Employability	
CO5	Describe the concept of Security policies and Cyber Laws.			3	3	3		3	3		3			3	.3			Understar Employability	
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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGC 11914 Web Technologies Laboratory

		Computational Knowledge	roblem Analysis	Development of Solutio	Conduct investigations of comp Computing problems	Modern Tool Usage	rofessional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	societal and Environmental Cor	ndividual and Team Work	nnovation and Entrepreneurshi	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning.	
CO No.	GO Statements (PC- PGCA1914 : Web Technologies Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-o		Learning Focus or Assessment Tools to Measure Attainment of GC
CO1	Design pages with simple tags in HTML		3	3		3		3	3	1 and 1	3	З	-	3	3	3		Understan Employat MSTs, ESE, Class/Quiz Tests
CO2	Create web pages with Auido and Video content in it.		3	3	3	3	3	3	3		19.51	3	3	3	3	3		Design Employat MSTs, ESE, Class/Quiz Tests
CO3	Illustrate the movement from one web page to another		3		3	3	3		1 - 2 4		3	3	3	3	3	3	3	Design Entreprer MSTs, ESE, Class/Quiz Tests
CO4	Implement advanced web designing concepts using java script	3	3	3	3	3		3	3		3	3	3	3	3	3	3	Understan Employability
C05	Execute a small web pased project for the benefit of scolety	3		3			3	3	3		2	3	3	3	3	3	3	Understan Employability

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

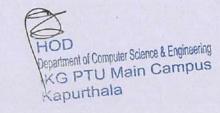
Department Computer Science and Engineering Program Master of Computer Applications (MCA) PCCA1922 Advanced Java Laboratory

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concern	Individual and Team Work	Innovation and Entrepreneurship		technology, skill and knowledge for computing practice with commitment on societal, moral values.	can develop customized enterprise level solutions.	enhance ability for	Learning Focus or Assessment Tools to Measure Attainment of CO
CO No.	CO Statements (PC- PGCA1922 : Advanced Java Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-j	PO-K	PO-I	PSO-m	PSO-n	PSO-o		
CO1	Implement servlets to handle HTTP requests	-		3	3		3	3		-		3	3	3	3	3		Understan Employat MSTs, ESE, Class/Quiz Tests Understal Employat MSTs, ESE, Class/Quiz Tests
CO2	Demonstrate session and cookies management	3		3	3			3	3	10000	1	3	3		3	3		
CO3	Implement the concept of database management,	3	3	3				3	Property in	and have the		a service and		3	3	3		Understal Employat MSTs, ESE, Class/Quiz Tests
CO4	Outline the concept of SEO	3			3		3	3	3	a marine		3	3	3	3	3	3	Understal Employability
C05	Create applications using advanced concepts like JavaBean, Struts, Hibernate, etc.	3	2	3			3	3	3			3	3	3	3	3	3	d y

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1957 Linux System Administration Laboratory

PGCA19	57 Linux System Administration Laboratory	-			1	1	1		-	1		-		The second second				
		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modem Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concern	Individual and Team Work	Innovation and Entrepreneurship	design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on societal, moral values.	level solutions.		
CO No.	CO Statements (PC- PGCA1957 : Linux System Administration Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g	PO-h	PO-I	PO-	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
CO1	Prepare the environment for installation and use of Linux operating system			10		3	1		3	3	1	. 3	in the set	3 3	3	3		3 Inderstan Employat MSTs, ESE, Class/Quiz Tests
CO2	Write Shell Scripts	3	3	1.0	3	3		3	3			3	3	3	3	3		Understas Employat MSTs, ESE, Class/Quiz Tests
CO3	Implement C programs using gcc compiler	3	3	3	3	a survey	3	3	. 3			3	3	3	3	3	3	Understa Employat MSTs, ESE, Class/Quiz Tests
CO4	Impelment virtualization			3		3.4	3	3	3			3	3	3	3	3	3	Understal Employability
CO5	Execute commands related to grantinf and revoking user priviledges.	1				3					1.8	2	3	3		3		
		14.4		1		-	12100								- Andrew Andrew Andrew			
			1	1 Parate	-			1			1 1 1 1 1 1			a standard and a				
		-	20070			-	1000	12102		-	-	-			and share have been been been			
			-					-										

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1925 Advanced Computer Networking

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concern	ndividual and Team Work	innovation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.		among students who can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.	
CO No.	CO Statements (PC- PGCA1925 : Advanced Computer Networking)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g	PO-h	PO-I	PO-	PO-k	PO-I	PSO-m	PSO-n	PSO-o		Learning Focus on Assessment Tools to Measure Attainment of Co
CO1	Define computer networks	Contraction of				1000	Marie Marie	1		12.2300	10000	3	1 3	3	3	3	3	Inderstan Employat MSTs, ESE, Class/Quiz Tests
CO2	Identify the role played by different layers of network model	1997					1	3		15 Years	1 2 2 2 3	3	3	3	3	3	3	Understar Employat MSTs, ESE, Class/Quiz Tests
CO3	Online the concept of Internet protocols and network security.	3	3	3	3	中以自然社会		3	A STATISTICS		R. Lak		The second	3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO4	Highlight the benefits of Adhoc networks	3	3	3	3	3	A Second	3		Distance for		3	3	3	3	3	3	Understar Employability
CO5	Explain the protocols used in wireless communication systems.	2	-	3				3	-			2	2	2	2	3		

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HOD Aepartment of Computer Science & Engineering IKG PTU Main Campus Apurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA) CA1926 Artificial Intelligence & Soft Computing

		omputational Knowledge	toblem Analysis	Design /Development of Solutions	conduct investigations of complex computing problems	Aodern Tool Usage	rofessional Ethics	sie-long Learning	roject management and finance	Communication Efficacy	octetal and Environmental Concer	ndividual and Team Work	nnovation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	knowledge for computing practice with commitment on	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning.	
CO No.	CO Statements (PC- PGCA1926 : Artificial Intelligence & Soft Computing)	PO-a	PO-b	PO-C	PO-d	PO-e	PO-I	PO-g	PO-h	PO-I	PO-J	PO-K	PO-I	PSO-m	PSO-n	PSO-0		Learning Focus or Assessment Tools to Measure Attainment of C
CO1	Highlight the significance of Artificial Intelligence in knowledge representation.	3			3	3	2	3	2			3	in the second	3	3	3	and the second second	Understan Employat MSTs, ESE, Class/Quiz Tests
C02	Examine the useful search techniques; learn their advantages, disadvantages and comparison.			3		3	3	2	3			1000	3	3	3	3		Understal Employat MSTs, ESE, Class/Quiz Tests
CO3	Explain neural network theory and fuzzy logic theory.	in an and		3	3	3		3				3	3	3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO4	Apply artificial neural networks and fuzzy logic theory for various problems.	3	3	2	2	2	3		3		3	1.1	-		3			Understal Employability
CO5	Determine the use of Genetic algorithm to obtain optimized solutions to problems.				3	3	-	3	3	3		3	3	3	3	3,	3	Understai Employability

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Department Computer Science and Engineering Program Master of Computer Applications (MCA)

		nputational Knowledge	biem Analysis	ign /Development of Solutions	iduct investigations of complex uputing problems	dem Tool Usage	tessional Ethics	-long Learning	lect management and finance	imunication Efficacy	ictal and Environmental Conce-	ividual and Team Work	ovation and Entrepreneurship	development of applications in the	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.		Develop techniques to enhance ablitty for lifelong learning.	
		Cor	Pro	Des	Cor	Mo	Pro	Life	Pro	Cor	Soc	pui	E PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning Focus of Assessment Tools to Measure Attainment of C
CO No. CO1	CO Statements (PC- PGCA1927 : Theory of Computation) Define formal languages and automata.	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-J	PO-k	POI	PSO-m	P50-n	2		Understan Employat MSTs, ESE, Class/Quiz Tests
CO2	Design Finite Automata's for different Regular Expressions and Languages.	3		3	3			3					3	3	3	3		Understaa Employat MSTs, ESE, Class/Quiz Tests
CO3	Prepare context free grammar for various languages.	3	3	3	3		3	1	3					3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO4	Illustrate how push down automata and Turing Machine can be used to solve computational problems.	3	3		2	3		3	3				3	3	3	3	3	Understal Employability
CO5	Define complexity and computability concepts	3	3	3			3	3	3				3	3	3	3	3	Understar Employability

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1928 Advanced Computer Networking Laboratory

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modem Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concer	Individual and Team Work	Innovation and Entrepreneurship		knowledge for computing practice with commitment on societal, moral values.	among students who can develop customized enterprise level solutions.		
CO No.	CO Statements (PC+ PGCA1928: Advanced Computer Networking Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-a	PO-	PO-g	PO-h	PO-I	POJ	PO-k	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
CO1	Demonstrate sharing of resources of network.							3				3		3	3	3	3	Inderstan Employal MSTs, ESE, Class/Quiz Tests
CO2	Prepate different types of network cables.							3	3	2	1	3	3	3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO3	Write programs for simulating routing algorithms	3	3	3	3			2	2	2		2	3	3	3	3		Understal Employal MSTs, ESE, Class/Quiz Tests
CO4	Implement the confuration of Adhoc networks	3	3	3	3	2	3	3	3	3	2	3	. 1	3	3		3	Understai Employability
<u>C05</u>	Evecute configuration of wireless access points		2	3				3				2	3	3	2	1	2	a y

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1929 Artificial Intelligence & Soft Computing Laboratory

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concern	Individual and Team Work	Innovation and Entrepreneurship	development of applications in the		can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.	
CO No.	CO Statements (PC- PGCA1929 : Artificial Intelligence & Soft Computing Laboratory)	PD-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	POI	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
CO1	Write programs for basic AI problems.	A CONTRACTOR	1.00	3	Concerned in	3		3	3			3	3	3	3	3	3	Inderstan Employat MSTs, ESE, Class/Quiz Tests
CO2															the second s	and the second se		
002	Apply artificial neural networks and nizzy logic theory for various problems.		3	3	3			3	3		2	2	2	3	3.	3	3	Understar Employat MSTs, ESE, Class/Quiz Tests
C02	Apply artificial neural networks and fuzzy logic theory for various problems. Prepare training data.	3	3	3	3	3	3	3	3	3	2	2	2 3	3	3.	3 3	3	Understar Employat MSTs, ESE, Class/Quiz Tests Understar Employat MSTs, ESE, Class/Quiz Tests
		3.	3	3	3	3	3	3	3	3	2 3	2 3 2	2 3	3	3.	3 3	3 3	Understar Employat MSTs, ESE, Class/Quiz Tests Understar Employat MSTs, ESE, Class/Quiz Tests
CO3	Prepare training data.	3.23	3	3	3	3	3	3	3	3	2 3	2 3 2	2 3	3	3.	3.3	3	Understat Employat MSTs, ESE, Class/Quiz Tests Understat Employat MSTs, ESE, Class/Quiz Tests

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA) A1930 Software Project Management

PGCA1930

		omputational Knowledge	robiem Analysis	ocsign /Development of Solutions	conduct investigations of complex computing problems	Aodern Tool Usage	rofessional Ethics	ife-long Learning	roject management and finance	Communication Efficacy	focietal and Environmental Concer-	ndividual and Team Work	movation and Entrepreneurship	development of applications in the	technology, skill and knowledge for computing practice	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for	
CO No.	CO Statements (PC- PGCA1930 : Software Project Management)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-J	PO-k	PO-I	PSO-m	PSQ-n	PSO-o		Learning Focus or Assessment Tools to Measure Attainment of CO
CO1	Define the principal tasks of software project management		3	3		3		3	3	3		3	3	3	3	3	3	Inderstan Employat MSTs, ESE, Class/Quiz Tests
CO2	Outline the basic concepts of Software projects.		2	3	1.1.5	3	3	No. Com	and the second	3	1	3	3	3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO3	Explain the fundamentals of Process Planning, effort estimation and quality planning.	3	3		3	2	3	3	3	2		and a	2	3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO4	Comment upon risk and quality management.	3		3	3	3	10000		3	3	17.000	3	3	3	3	3	3	Understar Employability
CO5	Apply nanagement and development practices to develop software.						3	3	3	3	2	2	1	3	2	11	3	Understai Employability

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Department Computer Science and Engineering Program Master of Computer Applications (MCA)

PGCA1971	Optimization rechniques	

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concer	Individual and Team Work	Innovation and Entreprencurship		technology, skill and knowledge for computing practice with commitment on societal, moral values.	among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning		
CO No.	CO Statements (PC- PGCA1971: Optimization Techniques)	PO-a	PD-b	PO-c	PO-d	PO-e	P0-1	PO-g	PO-h	PO-I	PO	PO-K	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/analyse/ deisgn atc)	Focus on Assessment Tools to Measure Attainment of CC
COI	Define the scope of operation research			3	3	3	- and the	3	3	-		3		3	3	3	2	Understand	Employat MSTs, ESE, Class/Quiz Tests
CO2	Solve linear programming problems		3	3		3		3				3	3	2	3	3	3	Understand	Employat MSTs, ESE, Class/Quiz Tests
CO3	Prepare feasible solutions for transportation and assignment problems	3	1000	3	3	3	1.1.1	3		1000			3	.3	3	2	3	Understand	Employab MSTs, ESE, Class/Quiz Tests
CO4	Outline the Project Management problems using CPM	2	3	3		3	1	3	3			3	3	3	3	3	3	Understand	Employability Employability
C05	Find solution to various optimization problems	1	2	3	1	1						3	3	2	2		2	Understand	Employability

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

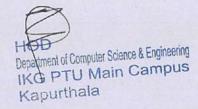
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Department Computer Science and Engineering PGCA1972 Master of Computer Applications (MCA)

GCA1972	Data Mining and Business Intelligence		1	-	1	1	1	-		1			1	provident and and	Line and the same	the water of the	particular and	1		
		omputational Knowledge	roblem Analysis	esign (Development of Solutions	ondust investigations of complex omputing problems	fodem Teol Usage	rofeneional Ethios	delong Lourning	roject management and finance	ounnusiation Efficacy	ocietal and Environmental Concern	alividual and Term Work	movation and Entropementship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.		among students who can develop customizéd enterprise				
CO No.	CO Statements (PC- PGCA1972: Data Mining and Business Intellig	PO-a	PO-b	PD-c	PO-d	PO-e	PO-1	PO-g	PO-h	POI	POJ	POA	POI	PSO-m	PSO-n	P\$0-0	PSQ-p	Learning Level(understand/analyse/ delsgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	Highlight the need of Data Warehousing & Mining	3	1	-	1		10 East	1	1			-	- Carlos	1	3	3	1	Understand	Employability	MSTs, ESE, Class/Quiz Tests
C02	Differentiate between the Transactional and Analytical data models.	1	1	3		1000		1	1	1	1000	3	3	3	3	. 3	1	Understand And Design	Entrepreneurship	MSTs, ESE, Class/Quiz Testa
C03	Identify the real life applications where data mining can be applied.	3	3	1	3			1	1000	100.00			3	3	3	3	3	Analyse	Entrepreneurship	MSTs. ESE, Class/Quiz Tests
CO4	Apply different dats mining algorithms on wide range of data sets.	1. 1. 1.		1	1	100,000		1	1		Para Indiana	3		3	3	.3		Understand And Design	Entrepreneurship	MSTs, ESE, Class/Quiz Testi
C05	Comment on latest tools for data mining and big data analysis	1		3	2			2										Undertsned and Design	Entrepreneurship	
												-								
					1				1000	1000	-		-	The second second	THE REAL PROPERTY.					
				1			1101000													
		1000	1000				1000	1223	1.000	0	en la la	10	1	1						
			1000	1000	and the second second			and the second second	a ser a s	Direction of the	Open and a				and the second se	A CONTRACTOR OF A CONTRACTOR	A CONTRACTOR OF THE OWNER			



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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1973 Enterprise Resource Planning

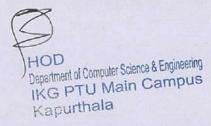
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-		emputational Knowled	oblem Amilyan	sagn (Development of	oduct investigations o suputing problems	odern Tool Usage	ofessional Fahics	fe-long Learning	oject management and	ermanucation Billicacy	cictal and Environment inschalt and Team West	Dovation and Entropren	knowledge on analysis, design and development of applications in the computing discipline.	knowledge for computing practice with commitment on	can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.			
CO No.	CO Statements (PC- PGCA 1973 : Enterprise Resource Planning)	PO-a	PO-b	PD-c	PO-d	PO-e	PO-1	PO-g	PO-h	PO-	PO-J PO	X PO-	PSO-m	PSO-n	PSO-o	PSO-p	Learning Level(understand/analyse/ delsgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Altainment of 0
	Define ERP & Related Technologies			1	1.24	-		3	3				3	3	3		Understand and Analyse	Employability	MSTs, ESE, Class/Quiz Tests
	Compare different types of ERP functional modules.		1	1	1		1000						3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
	Explain Implementation Strategies of ERP	3		-	The second		Statistics of the	3			3	1		STATISTICS CONTRACTOR	3	Consider the second second	Design	Employability	MSTs, ESE, Class/Quiz Tests
	Discuss the latest trends and domains of ERP.	-		1			The second	3	3			1	3	3	3		Understand	Employability	MSTs, ESE, Class/Quiz Tests
C05	Analyze various case studies related to ERP implementation	2	2	2	3							3	3	2	2	2	understand	Employability	

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1955 Advanced Database Management System Laborator:

to the survey of the second states of stern endorated.		1	1		1	1	T	1	1	-			1				
	Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modem Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concern	Individual and Team Work	Innovation and Entrepreneurship	knowledge on analysis, design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on societal, moral values.	and entrepreneur skills among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning.	
CO Statements (PC- PGCA1955 : Advanced Database Management System Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
Implement query a database using SQL DML/DDL commands.	3	3	3	3	3	1	3	3	111-1-1	3	1.000	3	3	3	3	3	Understan Employat MSTs, ESE, Class/Quiz Tests
Analyze integrity constraints on a database	3		3	1000		3	3	3		3	COLUMN IN	3	3	3	3	3	Understar Employat MSTs, ESE, Class/Quiz Tests
Develop PL/SQL programs including stored procedures, stored functions, cursors	and the set	3	3	3	3	3	3	3		3	1000	3	3	3	3	3	Understar Employat MSTs, ESE, Class/Quiz Tests
Design new database and modify existing ones for new applications and reason about the efficiency of the result.	3		3		3	3	3	14	1.10~	3		3	3	3	3	3	Design Employability
Execute the role of DBA	1		3	3	3	3		3	3	3		3	3	3	3	3	Understar Employability
	Implement query a database using SQL DML/DDL commands. Analyze integrity constraints on a database. Develop PL/SQL programs including stored procedures, stored functions, cursors Design new database and modify existing ones for new applications and reason about the efficiency of the result.	CO_Statements (PC-PGGA1985 : Advanced Database Management System Laboratory) PC-a Implement guery a database using SQL DML/DDL commands. 3 Analyze integrity constraints on a database. 3 Develop PL/SQL programs including stored procedures, stored functions, cursors 3 Design new database and modify existing ones for new applications and reason about the efficiency of the result. 3	CO Statements (PC-PGCA1965 : Advanced Database Management System Laboratory) PCI-4 PO-5 Implement guery a database using SQL DML/DDL commands. 3 3 3 Analyze integrity constraints on a database 3 3 3 Design new database and modify existing ones for new applications and reason about the efficiency of the result. 3 3	CO_Statements (PC-PGGA1965 : Advanced Database Management System Laboratory) PC-4 PO-b PC-2 Implement query a database using SQL DML/DDL commands 3 <td>CO_Statements (PC-PGGA1955 : Advanced Database Management System Laboratory) PC4-a PO-b PO-c PO-d Implement query a database using SQL DML/DDL commands. 3 3 3 3 3 Design new database using stored procedures, stored functions, cursors 3 3 3 3 3 3</td> <td>CO Statements (PC-PGCA1955 : Advanced Database Management System Laboratory) PC-4 PO-b PO-c PO-d <</td> <td>CO Statements (PC-PGCA1955: Advanced Database Management System Laboratory) PC-a PO-b PO-c PO-d <t< td=""><td>OC Statements (PC-PGCA1985: Advanced Database Management System Laboratory) PC4 PO-ce PO-ce</td><td>OO Statements (PC-PGCA1965: Advanced Database Management System Laboratory) PC-4 PO-5 PO-6 PO-7 PO-7</td><td>CO Statements (PC-PGGA1985 : Advanced Database Management System Laboratory) PC-4 PO-4 <</td><td>CO Statements (PC-PGCA1955 : Advanced Database Management System Laboratory) PO-4 PO</td><td>Very product of the result. Notice of t</td><td>Procession Procession Procession</td></t<><td>Very properties Sector properis Sector properties Sector</td><td>CO_Statements (PC-PGGA1865: Advanced Database Management System Laboratory) Deal d-D d</td><td>CO_Statements (PC-PGCA1565: Advanced Database Management System Laboratory) PC4 PO-b PO-b<</td><td>CO Statements (PC-PGCA1985: Advanced Database Management System Leboratory) PC - PO- <th< td=""></th<></td></td>	CO_Statements (PC-PGGA1955 : Advanced Database Management System Laboratory) PC4-a PO-b PO-c PO-d Implement query a database using SQL DML/DDL commands. 3 3 3 3 3 Design new database using stored procedures, stored functions, cursors 3 3 3 3 3 3	CO Statements (PC-PGCA1955 : Advanced Database Management System Laboratory) PC-4 PO-b PO-c PO-d <	CO Statements (PC-PGCA1955: Advanced Database Management System Laboratory) PC-a PO-b PO-c PO-d PO-d <t< td=""><td>OC Statements (PC-PGCA1985: Advanced Database Management System Laboratory) PC4 PO-ce PO-ce</td><td>OO Statements (PC-PGCA1965: Advanced Database Management System Laboratory) PC-4 PO-5 PO-6 PO-7 PO-7</td><td>CO Statements (PC-PGGA1985 : Advanced Database Management System Laboratory) PC-4 PO-4 <</td><td>CO Statements (PC-PGCA1955 : Advanced Database Management System Laboratory) PO-4 PO</td><td>Very product of the result. Notice of t</td><td>Procession Procession Procession</td></t<> <td>Very properties Sector properis Sector properties Sector</td> <td>CO_Statements (PC-PGGA1865: Advanced Database Management System Laboratory) Deal d-D d</td> <td>CO_Statements (PC-PGCA1565: Advanced Database Management System Laboratory) PC4 PO-b PO-b<</td> <td>CO Statements (PC-PGCA1985: Advanced Database Management System Leboratory) PC - PO- <th< td=""></th<></td>	OC Statements (PC-PGCA1985: Advanced Database Management System Laboratory) PC4 PO-ce PO-ce	OO Statements (PC-PGCA1965: Advanced Database Management System Laboratory) PC-4 PO-5 PO-6 PO-7 PO-7	CO Statements (PC-PGGA1985 : Advanced Database Management System Laboratory) PC-4 PO-4 <	CO Statements (PC-PGCA1955 : Advanced Database Management System Laboratory) PO-4 PO	Very product of the result. Notice of t	Procession Procession	Very properties Sector properis Sector properties Sector	CO_Statements (PC-PGGA1865: Advanced Database Management System Laboratory) Deal d-D d	CO_Statements (PC-PGCA1565: Advanced Database Management System Laboratory) PC4 PO-b PO-b<	CO Statements (PC-PGCA1985: Advanced Database Management System Leboratory) PC - PO- PO- <th< td=""></th<>

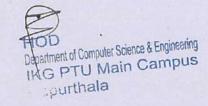
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PCCA 1998 Technical Computer Applications (MCA)

		Computational Knowledge	Problem Analysis	Design /Development of Solution	Conduct investigations of comple Computing problems	Modern Tool Usage	Professional Ethics	.ife-long Learning	, Project management and finance	Communication Efficacy	societal and Environmental Cone	ndividual and Team Work		Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on	among students who can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.	
CO No.	CO Statements (PC-PGCA1908 : Technical Communication Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-I	PO-g	PO-h	PO-I	PO-J	PO-k	PO-1	PSO-m	PSO-n	PSO-0		Learning Focus or Assessment Tools to Measure Attainment of G
CO1	Demonstrate the benefits of effective communication		2	2	2		3	3		3	3			2		3	2	Understan Employad MSTs, ESE, Class/Quiz Tests
CO2	Execute proficiency in reading & listening, comprehension, writing and speaking skills.		3		2		3	3		3	3			2		3	2	Understar Employat MSTs, ESE, Class/Quiz Tests
CO3	Apply spoken and written English language in their chosen technical field.	2	2	2	and a second	10100	3	3	3	3	3	3	a training		2	3		Understar Employab MSTs, ESE, Class/Quiz Tests
CO4	Illustrate flueny in coversation.	2	3		1		3	3		3	2	3	3	3	2 -	3	3	Understar Employability
CO5	Write their own clear and coherent texts.		2		1909		3	3	3	3	3	3	3	3	2	AND STREET, ST	3	Understar Employability

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGC 4 1999 Web Technologies

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concer	Individual and Team Work	Innovation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.		among students who can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.	
CO No.	CO Statements (PC-PGCA1909 : Web Technologies)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CC
CO1	Create pages with simple tags in HTML		3	3	1	3		3	3		3	3		3 3	3	3	3	Inderstan Employal MSTs, ESE, Class/Quiz Tests
CO2	Design webpages with multiple sections or frames		3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO3	Explain how to link webpages through hypertext or images a links		3	2	3		2	3				3	2	3	3	3	3	Design Entreprer MSTs, ESE, Class/Quiz Tests
CO4	Outline the key web designing concepts using java script	3		3	2	3		2		3	3	2	3	3	3	3	. 3	Design Entrepreneurship
<u>CO5</u>	Design forms with special controls using HTML	3	3	3	3	3	3	3			3	3	3	3	3	3	3	Design Entrepreneurship

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1920 Design & Analysis of Algorithms

		Computational Knowledge	Problem Analysis	Design /Development of Solution	Conduct investigations of comple Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Conc	Individual and Team Work		Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice	among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning.	
CO No.	CO Statements (PC- PGCA1920 : Design & Analysis of Algorithms)	PO-a	PO-b	PO-d	PO-d	PO-0	PO-	PO-g	PO-h	PO-	PO-	PO-k	PO-I	PSO-m	PSO-n	PSO-o		Learning Focus or Assessment Tools to Measure Attainment of CC
CO1	Define alforithm and its complexity							3						3	3	2	3	Understan Employat MSTs, ESE, Class/Quiz Tests
CO2	Categorize problems based on their characteristics and practical importance	3	3	3	3			3				3	3	3	3	3	3	Design Employat MSTs, ESE, Class/Quiz Tests
CO3	Develop Algorithms using iterative/recursive approach	3	3	3	3			3	3			3	3	2	3	3	3	Design Employab MSTs, ESE, Class/Quiz Tests
CO4	Design algorithm using an appropriate design panadigm for solving a given				3			3	3			3	3	3	3	3	2	Understal Employability
CO5	Categorize problems as P, NP or NP Complete	3						2						3		2		

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1918 Advanced Java

		omputational Knowledge	roblem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	rotessional Ethics	ife-long Learning	roject management and finance	Communication Efficacy	societal and Environmental Concern	ndividual and Team Work	nnovation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.		among students who can develop customized enterprise		
CO No.	CO Statements (PC- PGCA1918 : Advanced Java)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-I	PO-g	PO-h	PO-I	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
CO1	Explain the role of serviets	A Contraction of the second	3	3	3	3		3	3	10-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		3	3	3	3	3	3	Understan Employat MSTs, ESE, Class/Quiz Tests
CO2	Select the right technology/ tool for problem based solutions.	3	3	3	3	(Daymond and a	1 million	3	3			2	3	3	3	2	3	Understa Employat MSTs, ESE, Class/Quiz Tests
CO3	Implement web concepts using java server pages	3	3	3	3	3	Contract.	3	3	3	3	3	3	3	3	3	3	Design Entreprer MSTs, ESE, Class/Quiz Tests
CO4	Implement database connectivity	3				3		In case	2	1				1		3		Understal e
CO5	Illustrate invocation of remote methods		2		-	3		3					3	3	2	2	1	Understand
															-			

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PCCA1056 Linux Administration

		omputational Knowledge	oblem Analysis	esign /Development of Solution	onduct investigations of comple omputing problems	, todem Tool Usage	rofessional Ethics	ife-long Learning	roject management and finance	ommunication Efficacy	ocietal and Environmental Conc	ndividual and Team Work	nnovation and Entrepreneurship			among students who can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.	
		U	<u>A</u>	8	00	PO-e	PO-1	PO-g	PO-h	PO-I	PO-j	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
CO No.	CO Statements (PC- PGCA1956 : Linux Administration)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-I	PU-g	PUA	104	FOG	- CO-R	1001	2 3	3	3	3	Jnderstan Employat MSTs, ESE, Class/Quiz Tests
CO1	Discuss the evolution of Open Source operating systems.	0	-		-	3		3	3		- Sector	2	1	3	9	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CQ2	Prepare environment for working on open source operating system like	3	3	2	3	3		3	3			3		3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO3	Perform resource management in Linux	3	3	3		2	3	3	3			3	3	2	3	3		Understar Employability
CO4	Write scripts in Linux.	-		3	No. and	3	3	3	3			3	2	2		2		Understal Employability
CO5	Execute user level priviledges			1	2	2		-					2					

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Department: Computer Balance and Explorering Program Median of Computer Applications (MCA)

GCA1937	Chaol Coopung	anguational Namebulge	schien Andyris	triga Devisioner of Solution	induct in mighting a singlest	talen Trei Dage	oftenional Ethors	de-insgl.esmag	inject management and finance	termentical a Million	webi ad limiten ppi Cenem	Markins and Tenne Wald	nov stim and Entrepreneurably	krænde der åpal	estand and spoly adaptor temiyals, designs and resizement of Registers in the score discipline.	Des of recent technology, still and knowledge for consoling-precision with commitment on societal, moral values.	who can develop bustomized enterprise	Develop textoligaec.lo antiana.adiliej for bielling laensing					
00 Na.	CO Studaments (PC-PGCA 1837 Cleant Consenting)	POr	PG-b	HOL	Port	20.0	104	PO-9	20-1	PD4	POH	POH	PO	H.	P\$0-m	PSO-A	P\$0-0		Learning Level understand analyzer delage etc)	Poore en Engleyability : Entreprineumbip	Assessment Tools to Blassie Attainment of CO		
COT	Discass the basic oncept and interstance of sloud orservices.	3.	10000	1 Mar 10	6 . C	100.04	10/800	1	3.		122		1		3	1	1	1	Understand	Encloyability	MSTR ESE ClassiQue Tech		
cos	Explose the process of expering to a shoul scholars for different productions.	3		3		1			1.4			,	1		3	,		1	Understand	Employability	MST& ESE Cassiful Teels "		Ē
CCS	Compare and traducts the virtualization to-brothesizes	3	3	3	1				1	1000			1		3		Contraction of the local distance of the loc	1	Understand	Employedulty	MST& ESE Cless/Culg Testa	200	í
COI	Mention and manage the cloud resonance, applications and data while addressing the security concerns.				3	26			5				3	0.2	3			1-11-1	Understand And Design	Employetvity	MIST& EHE, Classificate Texts	_	
COS	Use struct artistizes offend by indexty leaders for version speciations.			2	j.			.,					1		i	3		Level 4	Understand And Delige	Employability	MISTA, ESE, Chass/Dole Testa		
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA-R2 Computer Science Feantials

-		Computational Knowledge	Problem Analysis	Design /Development of Solution	Conduct investigations of comple Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Conc	Individual and Team Work	Innovation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	technology, skill and	among students who can develop customized enterprise level solutions.	enhance ability for lifelong learning.				
CO No.	CO Statements (PC- PGCA-B2 : Computer Science Essentiais)	PO-a	PO-b	FO-c	PO-d	PO-e	PO-1	PO-g	PO-h	PO-I	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning	Focus or Assessment	t Tools to Measure At	ainment of C
CO1	Identify various components of computer system including input and output devices.	3	2	2				3				2		2 1		2	2	Indersta	Employat MSTs, ESE,	Class/Quiz Tests	
CO2	Prepare documents using word processing, Spreadsheet and Presentation tools.	3	2	2	2	2		3			2		2	2	2	2	3	Alexandra during	Employat MSTs, ESE,	State of the State	
CO3	Outline the key components of Database Management system	3		3	2		1	3	3					2	2	2			Employat MSTs, ESE,	Class/Quiz Tests	
CO4	Explain the role of operating system.	2	Section Section	3	2		don of the second	3	2					2	2	3	3	Underst	a Employability		
C05	Define various components, modes and topologies of computer networks.	2	3	3	3	1	2	3	2				3	2	2	3	3	d	Ŷ		

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Department Computer Science and Engineering Program Master of Computer Applications (MCA)

		omputational Knowledge	roblem Analysis	esign /Development of Solution	enduct investigations of comple omputing problems	fodern Tool Usage	rofessional Ethics	ife-long Learning	roject management and finance	bommunication Efficacy	octetal and Environmental Con	ndividual and Team Work	nnovation and Entrepreneurship	design and development of applications in the	technology, skill and knowledge for computing practice	among students who can develop customized enterprise	Develop techniques to enhance ability for lifelong learning.	
CO No.	CO Statements (PC-PGCA1917 : Discrete Structures & Optimization	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-o	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CC
CO1	Explain the use of Venn diagrams to solve applied problems.	3	3	3	2			3				2	3			3	3	Jnderstan Employat MSTs, ESE, Class/Quiz Tests
CO2	A STATE OF THE REAL PROPERTY AND ADDRESS OF THE PARTY OF	2	2	1	1			3	-			2	3		3	3		Understar Employat MSTs, ESE, Class/Quiz Tests
CO2 CO3	Apply rules of inference. Write proofs using symbolic logic and Boolean Algebra	3	3	3	2	-		3		-	3	3	3	3		3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO4	Applying elementary counting techniques using the product and sum rules, permutations, combinations, the pigeon-hole principle.	3	3	3	3			3			1	3	3	3	3	Э	3	Analyse Employability
CO5	Identify the type of graphs.	3	3	3		1		3				1	1	3	3	3	3	Design Employability

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Department Computer Science and Engineering Program Master of Computer Applications (MCA)

		Computational Knowledge	Problem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	Life-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concer	Individual and Team Work	finnovation and Entrepreneurship	design and development of applications in the computing discipline.	technology, skill and knowledge for computing practice with commitment on societal, moral values.		Develop techniques to enhance ability for lifelong learning.	Learning Focus of Assessment Tools to Measure Attainment of G
CO No.	CO Statements (PC- PGCA1951: Programming in Python)	PO-a	РО-Ь	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-	PO-k	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Inderstan Employat MSTs, ESE, Class/Quiz Tests
CO1	Explain environment, data types, operators used in Python.	3	3	3	3			3	1			2	3	3	2	5	3	Understal Employal MSTs, ESE, Class/Quiz Tests
CO2	Compare Python with other programming languages	3	2	3	3			2	2				3	3	3	2		MSTs, ESE, Class/Quiz Tests
CO3	Outline the use of control structures and numerous native data types with	2	3	3	3			2	2				3	3	3			
CQ4	Design user defined functions, modules, files, and packages and exception	3	2	3	. 3			2	2			2	3	3	3	2	3	
CO5	Write solutions for Object Oriented Programming Concepts	3	3	3	3				2				3	3	3			



Department Computer Science and Engineering Program Master of Computer Applications (MCA) PCCA1952 Advanced Data Structures

		computational Knowledge	roblem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	rofessional Ethics	ife-long Learning	roject management and finance	Communication Efficacy	societal and Environmental Conce	ndividual and Team Work	innovation and Entrepreneurship	design and development of applications in the	technology, skill and knowledge for computing practice	among students who can develop customized enterprise	Develop techniques to enhance ability for	
CO No.	CO Statements (PC, PGCA1952 : Advanced Data Structures)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-J	PO-k	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of
CO1	CO Statements (PC-PGCA1952 : Advanced Data Structures) Choose appropriate data structures and agorithmis and use it to design	4	3	3	3	2	2	3	2			3	3	3	3	3	3	Analyse Employat MSTs, ESE, Class/Quiz Tests
C02	Execute the operations of hashing to retrieve data from data structure.	1	2	1	1	3	2	3	3			3	3	3	3	3	з	Analyse Employat MSTs, ESE, Class/Quiz Tests
CO3		1	3	3	2	1		3	3			3	2	3	3	3	3	Design Employat MSTs, ESE, Class/Quiz Tests
and the second s	Design and analyze programming problem statements	1	2	2				2	3			3	3	2	3	3	3	Understal Employability
CO4 CO5	Define proofs of correctness Select algorithm design approaches in a problem specific manner			2				2	2	2				2	3	3	3	Understai Employability

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) BCCA 1983 Advanced Database Master Sciences

	3 Advanced Database Management System	omputational Knowledge	obiem Analysis	esign /Development of Solutions	onduct investigations of complex omputing problems	odem Tool Usage	ofessional Ethics	fe-long Learning	oject management and finance	ommunication Efficacy	ocietal and Environmental Concern	idividual and Team Work	movation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	knowledge for computing practice with commitment on	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.	lifelong learning.	
CO No.	GO Statements (PC- PGCA 1953 : Advanced Database Management-System)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g	PO-h	POI	POJ	PO-k	PO-I	PSO-m	PSO-n	P\$O-0	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
COND.	Express the basic concepts of DBMS and RDBMS.	row	100	100	1.0.4	100	3	3	3			3		3 3	3	1	1	a Jnderstan Employat MSTs, ESE, Class/Quiz Tests
and the second sec				3	3	1	1	1	1	1		3	3	3	3	3	3	Understal Employat MSTs, ESE, Class/Quiz Tests
CO2 CO3	Apply normalization theory to the normalization of a database	3	3		3		1	3	1		3		2	3	3	3	3	Understa Employat MSTs, ESE, Class/Quiz Tests
and the second s	ExplainTransaction Management & Recovery techniques in RDBMS.		7		2	1	3	1		1		3	3	3	3	3	3	Understai Employability
CO4	Outline characteristics of advanced databases prevailing in market.	-					2			frank and		1	3	3	3	3	3	Understai Employability
<u>C05</u>	Demonstrate No SQL databases (Open Source)				3													

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Capurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA)

		Jomputational Knowledge	roblem Analysis	Design /Development of Solutions	Conduct investigations of complex Computing problems	Modern Tool Usage	Professional Ethics	ife-long Learning	Project management and finance	Communication Efficacy	Societal and Environmental Concern	Individual and Team Work	Innovation and Entrepreneurship	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.		among students who can develop customized enterprise level solutions.	Develop techniques to enhance ability for lifelong learning.	
CO No.	CO Statements (PC-PGCA1905 : Technical Communication)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-n	PO-I	PO-J	PO-K	PO-I	PSO-m	PSO-n	PSO-0	PSO-p	Learning Focus or Assessment Tools to Measure Attainment of CO
CO1	Outline the benefits of effective communication	1					3	3	2	3	3	2	-	2	1	3	2	Understan Employat MSTs, ESE, Class/Quiz Tests
CO2	Execute proficiency in reading & listening, comprehension, writing and speaking skills.	-	3				3	3	2	3	3	2		2	1	3	2	Understai Employat MSTs, ESE, Class/Quiz Tests
CO3	Apply spoken and written English language in their chosen technical field.	1	1				3.	3	3	3	3	3			2	3	2	Understal Employat MSTs, ESE, Class/Quiz Tests
			2				-	7	1	2	3	3	3	3	2	3	3	Understal Employability
CO4	Illustrate flueny in coversation.								2		2	3	3	3	2	2	3	Understai Employability
<u>CO5</u>	Write their own clear and coherent texts.																	

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F HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Master of Computer Applications (MCA)

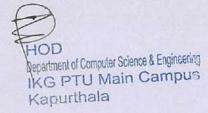
		omputational Knowledge	oblem Analysis	esign /Development of Solutions	orduct investigations of complex omputing problems	fodem Tool Usage	rofessional Ethics	ife-long Learning	roject management and finance	ommunication Efficacy	ocietal and Environmental Concen	ndividual and Team Work	d Entreprene	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.		level solutions.	enhance ability for lifelong learning.		g Lifecus on EAssessment Tools to Measure Attainment of CO
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-I	PO-g	PO-h	PO-I	PO-	PO-k	PO-I	PSO-m	PSO-n	P\$0-0	PSO-p	Learnin	and Employabil MSTs, ESE, Class/Quiz Tests
CO No.	CO Statements (PC-PGCA1954 : Data Structures using Python Laboratory)	3	2	3	3			3	1		100 C 100	200	3	3	the second se	3	3	Understa	and Employabili MSTs, ESE, Class/Quiz Tests
CO1	Analyze various algorithms based on their time and space complexity.	1.0	2	3	1			3	Contraction of the	-		3	3	3	- data - provident	3	3	Understi	and Employabil MSTS, ESC, Classicular Tosts
CO2	Create different data structures in C/ C++		3		2	2	2		1			3	3	3	3	3	3	Analyse	Employabil MSTs, ESE, Class/Quiz Tests
CO3	implement various operations of all data structures		3	- 3	3	3	4			-	1			3	2	3	3	•	Y
CO4	Illustrate the outcome of various operations with the help of examples.	2	3	1		1 . A.	2					2	3	3	3	3	1	d	Y
CO5	Write programs to implement various types of searching and sorting algorithms	3	3	1	-		1			-					and the second se	and the subjects			
							-				-							_	

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P NOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1947 : (Digital Marketing.)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Ex sourcest and sustainal	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications	Comprehend, explore and build up computer programs in the allied areas like Algorithms, System Software, Web Design and Data Analytics.	trends in technology development and thereby build innovate new ideas and solutions to varied problems.		Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
		1	1		-	PO-f	PO-g	PO-h	PO-	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc) Understand	Employability	MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests
CO No. CO Statements (UC-UGCA1947 : Digital Marketing)	PO-a	PO-b	PO-c	PO-d	PO-e	PUA	PU-y	2	2	3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO1 Usebliebt the kny elements of a digital marketing strategy.	3	2	2	1100	0.00	an ora		2	2	3	3			Understand	Employability Employability	MSTs, ESE, Class/Quiz Tests
Chapter the right platform for digital marketing	3	3	2			an an		2	-	3	2	2	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3 Identify the major disitial marketing channels. CO4 Design content for digital marketing.	3	3	3	2				3	-	3	2	2	3	Understand		
CO4 Design content for digital marketing. CO5 Develop digital marketing strategy and plan.	3	3	3	2		10-11				1200		and the second	the second second			
	1	-	1			10.10		1.33		-	the state of the					
		1. 1. 2. 2. 2		-			-		1	1			1			
		-			-	1.40	3.200			1				The second s		
		-	1	19972			100			-	1 (
			1 2.00		-	1		- (-	1			Contraction of the			
	1 1 2 2 2 2	All son all	all and and	-				1000	1 1 1 1 1 1 1							

Program	nt Computer Science and Engineering m Bachelor of Computer Applications (BCA) is : (Information Security)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustaina	Ethics	Individual and team work	Communication	1.00	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career	System Software, Web Design and Data	trends in technology development and thereby build innovale new ideas and			
						1	DE		-	PO-I	PO-j	PSO-k	PSO4	PSO-m	Learning Level(understand/analyse/ delson etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO MSTs, ESE, Class/Quiz Tests
CO No.	CO Statements (UC-UGCA 1948: Information Security)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PUA	100	1		Sub- Destant - alt	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO1	Identify issues involved in the field of information security.	3	3		A Street Street		2 hours	-	2	4					Understand	Employability	
CO2	Categorize various types of viruses.	3	2				1		2	4	3					Employability	MSTs, ESE, Class/Quiz Tests
A CONSTRUCTION			2	1		2	2	2	3	2	3	3	2	2	Understand		MSTs, ESE, Class/Quiz Tests
CO3	Outline the information security risks across de Internet and WWW.	3	3	1	6	-		-						2	Understand	Employability	MSTS, ESE, Class/Quiz Tests
CO4	Explain different encryption techniques	3	3	3	12 74	1000	N Brocket		3	and a	3			2	Understand	Employability	MOTS, Edit, Gidsardulz, 1040
CO5	Define ervtography	3	2	2			Part and	-	3	- Common	3		the second second				



Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1949 : (Cyber Laws & IPR) Explore technical Comprehend, explore Able to use latest comprehension in and build up computer trends in technology programs in the allied development and varied areas of Computer Applications areas like Algorithms, thereby build innovate to help attain skills to System Software, new ideas and and purse thriving career Web Design and Data solutions to varied and prac 8 problems, and higher studies. Analytics. Learning Level(understand/analyse/ delagn atc) Focus on Employability / Entrepreneurship P\$0-1 PSO-m PSO-k PO-d PO-e PO-f PO-g PO-h PO-i PO-i CO Statements (UC-UGCA1949: Cyber Laws & IPR) PO-a PO-b PO-c CO No. Identify tatutory, regulatory, constitutional, and organizational laws Employability 3 Understand 3 3 2 2 3 CO1 that affect the information technology professional Categorize case law and common law to current legal dilemmas in Employability Understand 3 3 2 3 2 2 CO2 the technology field.

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Outline the primary forms of intellectual property rights. Compare the different forms of intellectual property protection in

Analyze the effects of intellectual property rights on society as a

terms of their key differences and similarities.

CO3

CO4

CO5

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Understand

Understand

Understand

2

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Employability

Employability

Employability

Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests

Program 8	Computer Science and Engineering Bachelor of Computer Applications (BGA) (Machine Learning:)	Basic knowledge	Discipline knowledge	Experiments and pradice	Tools Usage	Profession and society	Environment and sustaina	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career	Comprehend, explore and build up computer programs in the allied areas like Algorithms, System Software, Web Design and Data Analytics.	trends in technology development and thereby build innovale new ideas and			
					-		Dill.		-	-	00	PSO-k	P\$0-1	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneu/ship	Assessment Tools to Measure Attainment of Co MSTS, ESE, Class/Quiz Tests
CO No.	CO Statements (UC-UGCA1950 : Machine Learning)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-I	PO-g	PO-h	PO-I	PO-j	roux	roon		Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO1	Define the concept of machine learning	3	2						2	4	3				Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Outline the key characteristics of machine learning algorithms	3	2		_				3	1	3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Compare the performace of different machine learning algorithms	3	3	3	2				3	-	- 3		2	2	Design	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Design solution for basic problems using machine learning algorithms	3	3	3					1			1	7	3	Understand	Employability	IMOTS, COL, O'BOO'GUL TOBO
CO5	Explain the concept of reinforcement learning	3	3	3	1				2	-	3						
				-			- the second	12			-						
		-		-		-					-						
		A manin	-							1 100		A PACING STREET SKIE	Diversity of the state				
		-		-	-				1-20-10	1000000	1000	and the second second	California and				
		4 miles	-	-	-				1.5								
		Service -				and the second s	110 million	in the second se				and the second second second					
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P HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1951 : (Artificial Intelligence Laboratory)

CO No.

CO1 CO2 CO3 CO4

COS

ram pachelor of configure Applications (COA) 1951 : (Artificial Intelligence Laboratory)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainabli	Ethics	Individual and team work	Communication	re-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.	System Software, Web Design and Data Analytics.	trends in technology development and thereby build innovate new ideas and solutions to varied problems.	Learning Level(understand/enalyse/ delagn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO Statements (UC-UGCA1951: Artificial Intelligence Laborat	PO-4	PO-b	PO-0	PO-d	PO-e	PO-f	PD-g	PO-h	PO-i	PO-j	PSO-k	P304		Understand	Employability	Practical Assignments
Identify right tool for different Al based problems.	3	2	2	2		1000		2	2	3	3			Design	Employability	Practical Assignments
Develop basic applications using Al tools.	3	2	3	2				2		3	3	3		Design	Employability	Practical Assignments Practical Assignments
Represent various real life problem domains using logic based techniques	3	3	3	2	2	2	2	3	4	3		3		Design	Employability	Practical Assignments
Outline the use of Bayesian approach to solve uncertain problems.	3	3	3	3				3		3	3	1	3	Design	Employability	Practical Assignments
Implement basic Natural Language processing programs.	3	3	3	3				3		3						

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA)

COS Statements (UC-UGCA1952; R Programming Laboratory) PO-s PO-s<	CO Statements (UC)/UGCA1952; R Programming Laboratory) PO-a PO-b PO-c PO-c<	CO Na.CO Statements (UC-UGCA1952): R Programming Laboratory)PO-sPO-dPO	CONe. CO Statements (UC4)GCA1952; R Programming Laboratory) PO-b PO-b<	ONe. CO Statements (UC-UGGA1962: R Programming Laboratory) PO-a PO-d PO-d </th <th>UGCA1952 : (R Programming Laboratory)</th> <th>Basic knowledge</th> <th>Discipline knowledge</th> <th>Experiments and practice</th> <th>Tools Usage</th> <th>Profession and society</th> <th>Environment and sustainal</th> <th>Ethics</th> <th>Individual and team work</th> <th>Communication</th> <th>Life-long learning</th> <th>comprehension in varied areas of</th> <th></th> <th>development and thereby build innovate</th> <th></th> <th></th> <th>Assessment Tools to Measure Attainment of Co</th>	UGCA1952 : (R Programming Laboratory)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainal	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of		development and thereby build innovate			Assessment Tools to Measure Attainment of Co
ONA CO Statements (UC-UGCA1952; R Programming Laboratory) PG-a PG-a <th>CO Statements (UCJUGCA1952: R Programming Laboratory) PG-a PG-a</th> <th>CON. CO Statuments (UCJ/GCA1952: R Programming Laboratory) PG-a PO-a PO-a<!--</th--><th>CO Statements (UCJUGCA1952: R Programming Laboratory) PG-a PG-a<!--</th--><th>ON. CO Statements (UC-UGCA/962: R Programming Laboratory) PO-a PO-b PO-c PO-c<th></th><th></th><th>1</th><th></th><th></th><th>200 -</th><th>E POI</th><th>20-4</th><th>POA</th><th>PO-</th><th>I PO</th><th>PSO-K</th><th>PSO-I</th><th>PSO-m</th><th>Learning Level(understand/analyse/ deisgn etc)</th><th>Focus on Employability / Entrepreneurship</th><th>Practical Assignments</th></th></th></th>	CO Statements (UCJUGCA1952: R Programming Laboratory) PG-a PG-a	CON. CO Statuments (UCJ/GCA1952: R Programming Laboratory) PG-a PO-a PO-a </th <th>CO Statements (UCJUGCA1952: R Programming Laboratory) PG-a PG-a<!--</th--><th>ON. CO Statements (UC-UGCA/962: R Programming Laboratory) PO-a PO-b PO-c PO-c<th></th><th></th><th>1</th><th></th><th></th><th>200 -</th><th>E POI</th><th>20-4</th><th>POA</th><th>PO-</th><th>I PO</th><th>PSO-K</th><th>PSO-I</th><th>PSO-m</th><th>Learning Level(understand/analyse/ deisgn etc)</th><th>Focus on Employability / Entrepreneurship</th><th>Practical Assignments</th></th></th>	CO Statements (UCJUGCA1952: R Programming Laboratory) PG-a PG-a </th <th>ON. CO Statements (UC-UGCA/962: R Programming Laboratory) PO-a PO-b PO-c PO-c<th></th><th></th><th>1</th><th></th><th></th><th>200 -</th><th>E POI</th><th>20-4</th><th>POA</th><th>PO-</th><th>I PO</th><th>PSO-K</th><th>PSO-I</th><th>PSO-m</th><th>Learning Level(understand/analyse/ deisgn etc)</th><th>Focus on Employability / Entrepreneurship</th><th>Practical Assignments</th></th>	ON. CO Statements (UC-UGCA/962: R Programming Laboratory) PO-a PO-b PO-c PO-c <th></th> <th></th> <th>1</th> <th></th> <th></th> <th>200 -</th> <th>E POI</th> <th>20-4</th> <th>POA</th> <th>PO-</th> <th>I PO</th> <th>PSO-K</th> <th>PSO-I</th> <th>PSO-m</th> <th>Learning Level(understand/analyse/ deisgn etc)</th> <th>Focus on Employability / Entrepreneurship</th> <th>Practical Assignments</th>			1			200 -	E POI	20-4	POA	PO-	I PO	PSO-K	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Practical Assignments
CO1 Write programs for array: and matrices. 3 2 3 2 3 3 2 3 3 9 Design Design Employability Practical Assignments CO2 Execute data frances and lists. 3 2 3 2 3 3 2 3 3 2 3	CO1 Write programs for arrays and matrices. 3 2 3 2 3 3 3 3 9 1000000000000000000000000000000000000	CO1 Write programs for arrays and matrices. 3 2 3 2 3 3 2 3 3 3 9 100 programs Design Design Employability Practical Assignments CO2 Execute data frances and lists. 3 3 2 3 3 3 3 3 7 2 Design Employability Practical Assignments CO3 Differentiate between arrays from vectors. 3 3 2 3 3 7 2 Design Employability Practical Assignments CO3 Differentiate between arrays from vectors. 3 3 3 3 2 2 Design Employability Practical Assignments CO3 Informating between arrays from vectors. 3 3 3 3 2 2 Design Employability Practical Assignments CO4 Implement factors in R 3 3 3 3 2 2 Design Employability Practical Assignments	CO1 Write programs for anary and matrices. 3 2 3 2 3 3 3 9 1000000000000000000000000000000000000	CO1 Write programs for arrays and matrices. 3 2 3 2 3 2 3 3 3 0 Obegain Design Employability Practical Assignments CO2 Execute data frances and lists. 3 2 3 2 3	CO No. CO Statements (UC-UGCA1952: R Programming Laboratory)	PO-	a PO-l	PO-	PD-0	POle	PU-1	FUry	2		3	3	2		Design		
CO2 Exceptidata frances and lists. 3 4 3 4 3 2 3 3 3 Costant Design Design Employability. Practical Assignments CO3 Differentiate between arrays from vectors. 3 2 2 Design Employability. Practical Assignments CO4 Implement fictors in R. 3 3 3 3 2 2 Design Employability. Practical Assignments	CO2 Exceptidata frances and lists. 3 4 3 4 3 2 1 3 3 4 3 4 3 2 2 Design Employability Practical Assignments CO4 Implement fictors in R 3 3 3 3 3 2 2 Design Employability Practical Assignments	CO2 Exceptidata frances and lists. 3 4 3 4 3 2 1 3 3 4 3 4 3 2 2 Design Employability Practical Assignments CO4 Implement fictors in R 3 3 3 3 3 2 2 Design Employability Practical Assignments	CO2 Exceptidata frances and lists. 3 4 3 4 3 2 1 3 3 4 3 4 3 2 2 Design Employability Practical Assignments CO4 Implement fictors in R 3 3 3 3 3 2 2 Design Employability Practical Assignments	CO2 Execute data frances and lists. Design Design Practical Assignments CO3 Differentiate between arrays from volots in R 3 2 2 Design Employability. Practical Assignments Assignments CO4 Implement fixed set in R 3 3 3 3 2 2 Design Employability. Practical Assignments	CO1 Write programs for arrays and matrices.	3	2	1 1	2	-		-	2		3	3					
CO3 Differentiate between arrows from vectors. 0	CO3 Differentiate between arrows from vectors. 0	CO3 Differentiate between arrows from vectors. 0	CO3 Differentiate between arrows from vectors. 0	CO3 Differentiate between arrows from vectors. 0	202 Execute data frames and lists	3	4	3	2				3		3	3					
					203 Differentiate between arrays from vectors.	3	3	3	3				3		3	3	2	1		Employability	Practical Assignments
	COS Execute minor protects using K.						3	3	3				3	_	3	3			- Coogli		

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P HOD Department of Computer Science & Engineering IKIG PTU Main Campus Kapurthala

Program	Computer Science and Engineering Bachelor of Computer Applications (BCA) : (Digite! Marketing Laboratory)	Basic knowledge	Discipline knowledge	Experiments and practic	Toots Usage	Profession and society	Environment and sustain	Ethics	Individual and team work	Communication	Buo	comprehension in varied areas of Computer Applications to help attain skills to	programs in the allied areas like Algorithms, System Software, Web Design and Data	trends in technology development and thereby build innovate			Assessment Tools to Measure Attainment of CO
				10	1.000	-	abia	and the second			-	PSO-k	P80-1	PSO-m	Learning Level(understand/analyse/ deison etc)	Focus on Employability / Entrepreneurship	Practical Assignments
	CO Statements (UC-UGCA1953: Digital Marketing Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g	PO-h	PO-i	PO-	Fau-R	1.004	The second second second	Understand	Employability	
CO No. CO1	Highlight the key elements of a digital marketing strategy.	3	2						2		2				Design	Employability	Practical Assignments
the second s	Implement common digital marketing exerciseusing SEO, Social media and		2	1					2	2	3	3	and and the second second		Design		Practical Assignments
CO2	Bloor	3	. K.	-	and the	-					1	1	- 2	2	Design	Employability Employability	Practical Assignments
CO3	Identify the major digital marketing channels.	3	3	3	1		-		2	2	1 1	3	2	2	Design	Employability	Practical Assignments
CO4	Design content for digital marketing	3	3	3	2				1 2	2	1	3	2	2	Design	Trutholanad	
CO5	Develop digital marketing strategy and plan	3	3	3	2						-	and the second second					
								-		-	1		11				
						1000					2		the state of the s	The second second second			

HDD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UCCA 1954 : (Information Security Laboration)

UGCA195		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainable	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career		trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1954: Information Security Labo	prato PO-a	PQ-b	PO-C	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deison etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of C
CO1	Outline various types of attacks.	3	2	1.8					2	2	3	3		Lassing Language	Understand	Employability	Practical Assignments
CO2	Categorize various types of viruses.	E	2	2					2		E	3			Understand	Employability	Practical Assignments
CO3	Preparae solutions to various threats	3	3	3					3	Carlos Color	3	2	2		Understand	Employability	Practical Assignments
CO4	Review security policy	3	3	3		2	2	2	3	2	3	2	2	2	Design	Employability	Practical Assignments
CO5	Implement Encyption Techniques	3	3	3	3	Section 1			3	- ENTROPY	3	2	2	2	Design	Employability	Practical Assignments

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P HOD Department of Computer Science & Engincerist; IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1955 : (Cyber Laws & IPR Laboratory)

	So (Cyber Laws a wrk Laborgiory)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainablin	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.	programs in the allied areas like Algorithms, System Software, Web Design and Data Analytics.	r trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1955: Cyber Laws & IPR Laboratory	PO-a	PO-b	PO-c	PO-d	PO-e	PO-r	PO-g	PO-h	PO-I	PO	PSO-k	PSO-1	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Identify tatutory, regulatory, constitutional, and organizational laws that affect the information technology professional	3	3	2					z		3	3		A March 1	Understand	Employability	Practical Assignments
002	Categorize case law and common law to current legal dilemmas in the technology field.	3	2	2					2		3	3			Understand	Employability	Practical Assignments
CO3	Outline the primary forms of intellectual property rights.	3	3	2		2	2	2	3	2	3	3			Understand	Employability	Practical Assignments
CO4	Compare the different forms of intellectual property protection in terms of their key differences and similarities.	3	Э	Э				2	3	2	3	2		A STREET	Understand	Employability	Practical Assignments
CO5	Analyze the effects of intellectual property rights on society as a whole.	3	2	2		2		2	3	2	3	2	2	2	Understand	Employability	Practical Assignments

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1956 : (Machine Learning Laboratory)

		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainab	Ethics	Individual and team work	Communication	Life-long learning	varied areas of Computer Applications to help attain skills to purse thriving career		trends in technology development and thereby build innovate			
CO No.	CO Statements (UC-UGCA1966: Machine Learning Laboratory)	PO-a	PO-b	PO-C	PO-d	PO-e	PO-	PO-g	PO-h	PO-I	PO-	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deison atc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Differentiate between various data types.	3	2	2	a later the				2	2	3	3	A CALLER OF COMPANY	Construction of the	Understand	Employability	Practical Assignments
CO2	Implement programs for various Learning algorithms.	E	2	2	2				1	2	3	3	2		Design	Employability	Practical Assignments
CO3	Compare different machine laerning algorithms.	3	3	3	2			1.1.1.1.1.1	3	2	3	3	2		Understand	Employability	Practical Assignments
CO4	Choose the right algorithm for different problems.	3	3	2	THE LOC				2		3	2	2	2	Design	Employability	Practical Assignments
C05	Apply Machine Learning algorithms to solve real world problems.	3	3	3	2	2	2	1	2	100	3	2	2	3	Design	Employability	Practical Assignments

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HOD Department of Computer Science & Engineeristy IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1957 : (Software Project Management)

		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainabil	Ethics	Individual and team work	Communication	Life-long learning	varied areas of Computer Application		trends in technology development and thereby build innovate			
CO No.	CO Statements (UC-UGCA1957: Software Project Management)	PO-a	PO-6	PO-c	PO-d	PO-e	PO-	PO-g	PO-h	PO-I	PO	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deison etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
C01	Define the principal tasks of software project managers, and basic concepts in software projects.	3	2						2		3	2		The second s	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Outline the basic concents of Software projects	3	2					State State	3	10 20 10	3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Explain the fundamentals of Process Planning, effort estimation and quality planning	3	3						3		3	3	2		Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Comment upon risk and quality management.	3	3					-	2		3	2		2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO5	Apply management and development practices to develop software.	3	3	3	2				2		3	2	2	3	Understand	Employability	MSTs, ESE, Class/Quiz Tests

P HOD Department of Computer Science & Engincerity IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA)

UGCA19	01 : Mathematics	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainal	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Application to help attain skills to purse thriving career	Web Design and Data	trends in technology development and thereby build innovate new ideas and			
			PO-b	00.0	PO-d	00.0	E PO(PO-g	Poh	POL	POH	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO No.	CO Statements (UC-UGCA1901: Mathematics)	PO-a	РО-В	PO-c	PU-a	PQ-e	PO-I	PU-g	PO-II	F04	101	100%	1001		Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO1	Define various mathematical notions.	E	2	1					4	-	3				Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Explain different terms used in basic mathematics.	3	3	3				and the second	3		3	3		The second second	Understand		
	Illustrate various operations and formulas used to solve mathematical					1	1000000		1200000				and the second second	the second second second	Design	Employability	MSTs, ESE, Class/Quiz Tests
CO3	problems	3	3	3		2		and the second	3	11111	3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Organize data in various models.	3	2	1					2	_	-		2		Design	Employability	MSTs, ESE, Class/Quiz Tests
CO5	Prepare solutions for various real life problems.	3	3	3		3	100		3		2	3	8	3	Ceagu	The Date of the Da	

D HPD Department of Computer Science & Engincerity IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program: Bachelor of Computer Applications (BCA) UGCA1939 : (Internet of Things Laboratory)

		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustaina	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to	Comprehend, explore and build up computer programs in the allied a areas like Algorithmis, System Software, Web Design and Data Analytics.	trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1939: Internet of Things Laboratory	PO-a	РО-Ь	PO-c	PO-d	PO-e	POI	PO-0	PO-h	PO-I	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ delegn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Identify different types of IOT devices and sensors	1	3	1	11. 2011	1			2	2	3	3	2	2	Understand	Entrepreneurship	Practical Assignments
CO2	Analyze sensor generated data	3	3	3	3	10000000	1.		2		3	3	2	2	Analyse	Entrepreneurship	Prectical Assignments
CO3	Outline the use of bluetooth for connectivity of mobile application with IOT device	3	3	3	3.				3	2	3	Э	3	3	Design	Entrepreneurship	Practical Assignments
CO4	Designing small IoT applications	1	3	3	3	1.1.1.1	1000	1000	3	2	3	3	3	2	Design	Entrepreneurship	Practical Assignments
COS	Building interface of application with various devices	3	3	3	3	1		-	3	2	3	3	З	3	Design	Entrepreneurship	Practical Assignments

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1940 : (Computer Graphics Laboratory)

IGCAIS	40 : (Computer Graphics Laboratory)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainal	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career	Comprehend, explore and build up computer programs in the allied areas like Algorithms, System Software, Web Design and Data Analytics.	trends in technology development and thereby build innovate			
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	POH	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO No.	CO Statements (UC-UGCA1940: Computer Graphics Laboratory)	Privel.	2	POrt	2	rung	1.64	C.a.N	2	2	3	3	2	2	Understand	Entrepreneurship	Practical Assignments
CO1	Implement algorithms for drawing basic shapes like circle, line and point	2	3		-	-	-		2	-	3	3	2	2	Design	Entrepreneurship	Practical Assignments
CO2	Write programs to implement 2-D and 3-D corrdibate transformations.	2	3			-			1	2	2	1	3	3	Design	Entrepreneurship	Practical Assignments
CO3	Design basic shapes for logo's	3	3		4	-	-		1	2	2		3	2	Design	Entrepreneurship	Practical Assignments
CO4	Develop programs for basic animations using C or C++	3	1	3	1 3		-	1 11 2 2		2		1	3	3	Design	Entrepreneurship	Practical Assignments
<u>CO5</u>	Design a small samine project,																

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1 HOD Department of Computer Science & Engineerially ING PTU Main Campus Kapurthala

	nf Computer Science and Engineering n Bachelor of Computer Applications (BCA). 1 : (Linux Operating System Laboratory)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainat	Elhics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career	System Software, Web Design and Data	trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1941: Linux Operating System Labo	PO-a	PO-b	PO-C	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Prepare the environment for installation and use of Linux operating	3	3	2					2		3	3	Service and service		Understand	Entrepreneurship	Practical Assignments
the state of the s	Write Shell Scripts	з	3	3	2		Cherry Contract		2	Contraction of the	3	3			Design	Entrepreneurship	Practical Assignments
CO2																	
CO2 CO3		3	3	3	2				2		3	3	3	2	Design	Entrepreneurship	Practical Assignments
CO2 CO3 CO4	Implement C programs using gee compiler	3	3	3	2				2		3	3	3		Design Design	Entrepreneurship Entrepreneurship	Practical Assignments Practical Assignments
CO3		3 3 3	3 3 3	3	2				2 2 2		3 3 3	3 3 3	3 3 3	2			

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department: Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA 1942 : (Cloud Computing Laboratory)

		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainable	Ethics	Individual and team work	vication	aming	to help attain skills to purse thriving career and higher studies.	Web Design and Data Analytics.	trends in technology development and thereby build innovate new ideas and solutions to varied problems.	Transford and estimation (Align of)	Focus on Employability / Entrepreneu(ship	Assessment Tools to Measure Attainment of C
CO No.	CO Statements (UC-UGCA1942; Cloud Computing Laborator)	PO-a	PO-b	PO-C	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-	PSO-k	PSO-I		Learning Level(understand/analyse/ delsgn etc)		Practical Assignments
CO1	Identify major commercial projects in the field of cloud computing	3	2	11-11-11-1			30.75	2110100	2	2	3	3			Understand	Employability	Practical Assignments
CO2	Design basic cloud applications	3	2	3	2		S. 19-1		2	Contraction of	3	3	1 million and the second		Design	Employability	
CO3	Execute basic functionalities of open source tools like Open Stack.	3	3	3	2	1 1000	1000	1 - 3 - 3	2	101122000	3	3	2	2	Design	Employability	Practical Assignments
CO4	Implement virtualization	3	3	3	2	C State of the	190723331	12010100	2	1.000	3	3	2	2	Design	Employability	Practical Assignments
COS	Define major services provided by cloud service provider.	3	2	-	-	2	2	2	2	2	3	3			Understand	Employability	Practical Assignments

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department: Computer Science and Engineering Program: Bachelor of Computer Applications (BCA). UGCA1943: (Android Programming)

UGCAB	43 : (Android Programming)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainable	Ethics	Individual and team work	Communication	Life-long learning	to help attain skills to		trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1943: Android Programming)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-I	PO-a	PO-h	PO-I	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of Co
CO1	Prapare environment for working on Android OS.	3	2	2	2			1	2	1000	3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Highlight various security issues in Android platform.	3	3	1. 1. 1. 1.	0.001	2	2	2	2	2	3	3	a second a second		Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Design innovative User Interface and develop activity for android	3	3	3	2		1982	12142	2		3	3	2	2 .	Design	Employability	MSTs, ESE, Class/Quiz Tests
G04	Outline the steps for creating database applications.	3	1	1	2	1	1000	1000	3	2	3	3	2	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
	Write programs for basic Android based applications.	3	3	3	2		2.17		3	2	3	3	3	3	Design	Employability	MSTs, ESE, Class/Quiz Tests

HOD Department of Computer Science & Engineeriation IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1944 : (Android Programming Laboratory)

CO No. CO1 CO2 CO3 CO4 CO5

(1944 : ((Anacod Programming Laboratory)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainab	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied ureas of Computer Applications	and build up computer programs in the allied areas like Algorithms, System Software, Web Design and Data	development and thereby build innovate	
CO Statements (UC-UGCA1944: Andtoid Programming Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-I	PO-g	PO-h	PO-I	PO-	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)
Prapure environment for working on Android OS	3	2	2	2		1		2	2	3	3			Understand
Program basic Android based applications.	3	2	3	2	192.62	21.65.1		2	1000	3	3	2	3	Design
Highlight various security issues in Android platform	3	3	3	2	2	2	2	3		3	3	3	3	Design
Implement database applications.	3	3	3	3		0 0 0 0 0	10000	3	2	3	3	2	3	Design
Design innovative User Interface and develop activity for android app.	3	2	3	3		1	12 1 15	3	2	3	3	3	3	Design

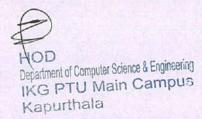
HOD Detartment of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Focus on Employability / Entrepreneurship Employability Employability Employability Employability Employability

Assessment Tools to Measure Attainment of CO Practical Assignments Practical Assignments Practical Assignments Practical Assignments Practical Assignments

Department	Computer Science and Engineering	
Program	Bachelor of Computer Applications (BCA)	
CCA1945	· (Artificial Intelligence)	

GCA1945	: (Artificial Intelligence)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainab	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to	System Software,	trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1945: Artificial Intelligence)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of
GO1	Highght the significance and domains of Artificial Intelligence and knowledge representation.	3	3						2	2	3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Ouline the advtantages and disadvantages of various search techniques	3	3	2		101		and and	3	2	3	з	2	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests
CO3	Identify various Expert Systems and AI applications.	3	3	2		1 auron	1.2	1.67784	3	120.84	3	3	2	2	Design	Employability	and the second
CO4	Define the role of AI in different areas like NLP, Pattern Recognition	3	3	3		1923		1000	3	2	3	3	Z	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO5	Select the righ AI tool for different AI based applications.	3	3	3	3		1		3	2	3	3	3	<u>a</u>	Design	Employability	MSTs, ESE, Class/Quiz Tests



Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA)

UGCA194	46 : (R Programming)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainal	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career	System Software,	trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1948 : R Programming)	PO-a	PO-b	PO-c	POid	PO-e	PO-f	PO-g	PO-h	PO-I	PO-	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ delegn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of C
CO1	Identify the key components of R programming Language.	3	2						2		3	3		(and a set	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Define the concept of data Science.	3	3		1		1		2		3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Differentiate between vectors and arrays.	3	3	2		1	1	1000	2	2	3	3	2	Contraction of the second	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Outline the usage of data frames, lists, factors, tables and R structures.	3	3	3			1		3	2	3	3	2	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO5	Explain the need and utilization of vacrious visualization tools.	3	3	3	3	1	1	1	3	2	3	3	3	3	Design	Employability	MSTs, ESE, Class/Quiz Tests

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1924 : (Software Engineering Laboratory.)

UGCA19	24 : (Software Engineering Leboratory)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustaina	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to		trends in technology development and thereby build innevate			
CO No.	CO Statements (UC-UGCA1924: Software Engineering Laboratory)	80-2	PO-b	PO-c	PO-d	PO-e	PO-	PO-g	PO-h	PO-I	POI	PSO-k	PSOI	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO Practical Assignments
CO1	Identify the scope and objective of different domains that have impact on society	2	3	-	-	3	3	2	2	1	3	2			Understand	Employability Employability	Practical Assignments
CO2	Create data flow diagrams	3	3	3	3	V CLEAR	Pastala		2	2	3	2		2	Design		Practical Assignments
C03	Compute software complexity using latest tools	3	3	3	3	1000	-	1	2	3	3	3	2	3	Design	Employability	Practical Assignments
C04	Design a software engineering process life cycle.	3	3	3	3	-	1000	1	2	2	3	3	2	2	Design	Employability	
C05	Implement specification, design, implementation, and testing process using latest						2	1		1	1	3	7	2	Design	Employability	Practical Assignments
	100015																
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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1925 : (Database Management Systems Laboratory)

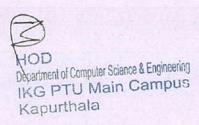
		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and austainabi	Ethics	Individual and team work	Communication	samin	varied areas of Computer Application to help attain skills to		 trends in technology development and thereby build innovate new ideas and a solutions to varied problems. 			
CO No.	CO Statements (UC-UGCA1925: Database Management Systems Laboratory)	PO-4	PO-b	PO-c	PO-d	PO-e	PO-I	PO-q	PO-h	PO-I	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO Practical Assignments
CO1	Differentiate between DDL, DML and DCL commands	3	3	3	3		- interest	1	2	C. C	3	2			Analyse	Employability	Practical Assignments
CO2	Implement DDL, DML and DCL commands	3	3	3	3	State 1	2/2/2		2		3	2	and the second	2	Design Design	Employability	Practical Assignments
CO3	Write integrity constraints on a database	3	3	3	3				2	100.000	3	3	2	3	Design	Employability	
CO4	Design Databases and Tables in relational model for some project related to noticity welfare		2	4	2	3	3	2	3	3	3	3	2	2	Design	Employability	Practical Assignments
CO5	L. L. MINON		3	3	3			-	3		3	3	2	Z	Design	Employability	Practical Assignments
	Implement PL/SQL.																

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HOD Department of Computer Science & Engineering ING PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1926 : (Operating Systems Laboratory)

		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainable	Ethics	Individual and team work	Communication	nin	varied areas of Computer Application to belo attain skills to	System Software, Web Design and Data	trends in technology development and thereby build innovate new ideas and solutions to varied problems.			Assessment Tools to Measure Attainment of OC
CO No.	CO Statements (UC-UGCA1926: Operating Systems Laborator	PO-a	PO-b	PO-c	PO-d	PO-8	PO-f	PO-g	PO-h	PO-I	PO-j	PSO-k	2	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	
CO1	Implement the installation and configuration of different operating								2	2	1		3	3	Design	Employability	Practical Assignments
	systems	3	3	1 3	3	-		1.10000	2		1 7	1	8	E	Design	Employability	Practical Assignments
CO2	Write programs for different scheduling algorithms.	3	3	3			a de			1 11-1		1	2		Design	Employability	Practical Assignments
CO3	Execute various commands in Vi editor	3	3	3	3			-	3		3		2		Design	Employability	Practical Assignments
CO4	Implement the dual boot installation	3	3	3	3	the second	- Andrew	1.00	3	3	3				Design	Employability	Practical Assignments
CO5	Execute commands in shell programming	3	3	3	3				3								



Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA)

UGCA192	17 : (Web Designing)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustaina	Ethics	Individual and team work	Communication	Life-long learning	to help attain skills to	Comprehend, explore and build up computer programs in the allied a reas like Algorithms, System Software, Web Design and Data Analytics.	trends in technology development and thereby build innovale new ideas and			
CO No.	CO Statements (UC-UGCA1927 ; Web Designing)	PO-a	РО-Ь	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-J	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of C
CO1	Create pages with simple tags in FFTML	3	3	3	3				3	2	3	3			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Design webpages with multiple sections of frames	3	3	3	3		1	1	3	2	3	3			Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO3	Explain how to link webpages through hypertext or images a links	3	3	3	3.	-			3	2	3	3	3	2	Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO4	Outline the key web designing concepts using java script.	3	1	3	3	1.2	1999		3	2	3	3	3	2	Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
COS	Design forms with special controls using HTML	3	3	3	3				3	3	3	3	3	2	Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
			-		1	-	-	-	-		1	Constant of the					

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HDD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1928 : (Web Designing Laboratory)

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		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainat	Ethics	Individual and team work	Communication	Life-long learning	Explore technical comprehension in varied areas of Computer Application to help attain skills to purse thriving career and higher studies.	Comprehend, explore and build up computer programs in the allied a areas like Algorithms, System Software, Web Design and Data Analytics.	trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1928: Web Designing Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of C
COI	Design pages with simple tags in HTML	3	3	3	2	1000			2	2	3	3	3		Design	Entrepreneurship	Practical Assignments
CO2	Create web pages with Auido and Video content in it.	3	3	3	3		1		2	3	3	3	3		Design	Entrepreneurship	Practical Assignments
CO3	Illustrate the movement from one web page to another	3	3	3	2	1 2 3	1	-	3	3	3	3	3	3	Design	Entrepreneurship	Practical Assignments
CO4	Implement advanced web designing concepts using java script	3	3	3	3	1	A State	1000	3	2	3	3	3	2	Design	Entrepreneurship	Practical Assignments
COS	Execute a small web pased project for the benefit of seciety	3	3	3	3	2	2	2	3	2	3	3	3	3	Désign	Entrepreneurship	Practical Assignments

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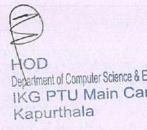
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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1930 : (Programming in PHP Laboratory)

		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainabi	Ethics	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Application to help attain skills to purse thriving career	programs in the allied areas like Algorithms,	trends in technology development and thereby build innovate			
CO No.	CO Statements (UC-UGCA1938: Programming in PHP Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g	PO-h	P04	PO-	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Afgirment of C
CO1	Write scripts for basic web page designs	3	3	3	2				2	2	3	3	3		Design	Entrepreneurship	Practical Assignments
CO2	Design the work flow of web page with the help of various control statements	3	3	3	2				2	3	з	3	3		Design	Entrepreneurship	Practical Assignments
CO3	Differentiate between clieat side and server side scripting	3	3	3	3	-	-	Contract of	3	3	3	3	3	3	Design	Entrepreneurship	Practical Assignments
CO4	Illustrate the concept of static and dynamic websites	3	3	3	3		1 8112		3	2	3	3	3	2	Design	Entrepreneurship	Practical Assignments
CO5	Implement the database concepts in PHP	3	3	3	3	1	1 2		3	2	3	3	3	3	Design	Entrepreneurship	Practical Assignments

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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department: Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1931 : (Data Warehouse and Mining)

		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainabilit	Ethics	Individual and team work	Communication	Life-long learning	to help attain skills to purse thriving career and higher studies.	System Software, Wel	r trends in technology development and thereby build innovate			
CO No.	CO Statements (UC-UGCA1931: Data Warehouse and Mining)	PO-a	PO+b	PO-c	PO-d	PO-e	PO-I	PO-a	PO-h	POI	PO-I	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
CO1	Highlight the need of Data Warehousing & Mining	3	3				Calls 24	100000	2	1000000	3	2			Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Differentiate between the Transactional and Analytical data models.	3	3	2	10.00		122 0 20	C. Stat	2		. 3	2	Contraction of the second second	1	Design	Entrepreneutship	MSTs, ESE, Class/Quiz Tests
CO3	Identify the real life applications where data mining can be applied.	3	3	2		2	2	2	3	2	3	3	2	2	Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO4	Apoly different data mining algorithms on wide range of data sets.	в	3	3	3	1.2.7	1002		2	2	3	3	2	3	Deskin	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
COS	Explain the role of visualization in data representation and analysis.	3	3	2	3			1. 21. 3	2	2	3	3	3	3	Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
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HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Progra	Inf Computer Science and Engineering Inf Bachelor of Computer Applications (BCA). 02 : (Fundamentals of Computer and IT)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainab	Ethios	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career	System Software, Web Design and Data	trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1902: Fundamentals of Computer an	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attailinent of C
CO1	Identify of input and output devices of Computers		3	3	3	2	1							3	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Utiline the functioning of various components of computer system	1		1	-	-	1	1000			1		1		Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Define the role of Operating system		3	3	3	3	2	1	-	-	2	3	1	1	1 Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Prepare documents using word processing, Spreadsheet and Presentation Graphics Softwares.		3	2	3	3	2		1	3		3	1		Understand	Employability	MSTs, ESE, Class/Quiz Tests
	Highlight the Internet safety, legally, and and other issues.		1	10000	a free and the	1	Concers	1	a construction		a sures	an som other the close of the	and the second sec	A State of the second second	Understand	Employability	MSTs, ESE, Class/Quiz Tests

HOD Department of Computer Science & Engineering ING PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1903 : (Problem Solving using C)

		asic knowledge	iscipline knowledge	operiments and practice	ools Usage	rofession and society	nvironment and sustainab	Inics	idividual and team work	ommunication	ife-long learning	Explore technical comprehension in varied areas of Computer Application to help attain skills to purse thriving career and higher studies.		trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC- UGCA1903: Problem Solving using C)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of C
CO1	Express the logical flow used in Programming.			, ,			1000			323	1999		1		Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Design algorithms for solving various real life problems	3		2 3	1	1 1 1		1.11	3		1	3	2	3 2	2 Design	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Implement programs using C .	3	3	3	3		1000	Section of	3	100000	1 1 1 1 2 2	3	3		3 Design	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Choose the right data type and statements for programs.	3	3	2	2	1000		1.1.5.1.4.3		1.584		3	2	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO5	Explain various concepts of C programming language.	3	3	2 2		1			12 V.S.	1	1	3	2		Understand	Employability	MSTs, ESE, Class/Quiz Tests

HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

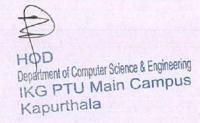
Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1904 : (Workshop on Desktop Publishing)

	04 : (Workshop on Desktop Publishing)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainab	Ethics	Individual and team work	Communication	le-long learnin	Explore technical comprehension in varied atreas of Computer Application to help attain skills to purse thriving career and higher studies.	programs in the allies areas like Algorithms	er trends in technology d development and thereby build innovate			
CO No.	CO Statements (UC-UGCA1904: Workshop on Desktop Publishing)	PO-a	РО-Ь	PO-c	PO-d	PO-e	P0-1	PO-g	PO-h	PO-I	PO-j	P50-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Atlainment of
C01	Outline the characteristics of desktop publishing tools.	3									3		Sec.		Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Identify the right componets for destening documents.	3	1	2	1	1	1	11/1		100	3	2	1 1 1 1 1 1 1 1 1 1	2	Understand & Design	Entrepreneutship	MSTs, ESE, Class/Quiz Tests
CO3	Apply knowledge in designing various documents.	3	1	3	2	-	1	1000	2	1000	3	2	2	3	Understand & Design	Entrepreneutship	MSTs, ESE, Class/Quiz Tests
CO4	Prepare different types of graphic related documents	3	1000	3	2	1852011	2	1000	3	121.2	3	2	2	3	Understand & Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests
CO5	Express the messages through graphical content	3	33.11.1	3	2		2	Constant State	2	2	3	2	2	3	Understand & Design	Entrepreneurship	MSTs, ESE, Class/Quiz Tests

> HOD Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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		Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainabi	Ethios	Individual and team work	Communication	Life-long learning	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career	and build up computer programs in the allied	trends in technology development and thereby build innovate	
	CO Statements (UC-UGCA1905: Problem Solving using C Laboratory)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-g	PO-h	PO-I	PO	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)
22	Select the right statement for the program.	2	1.00	1	153.072.5			1000	1000	1.1		A Transfer of the second	In the second second		Understand
12	Experiment with different input values.	3	3	3	2		12410.	100000	3	12.2.2	3	3	3		Understand And Design
	Test the output with boundary conditions.	3	2	3	3	1.23.20		10.010	3	1752.01	3	3	3		Design
	Distinguish between various control statements and data types.	3	2	3	3	1.01.5	NUCL	120 1910	3	1.5	3	3	3	2	Design
10	Implement programs for various problems.	3	2	3	3	2	2	1.5.1.5.7	3	2	3	3	3	3	Design



Focus on Employability / Entrepreneurablp Employability Employability Employability Employability Employability

Assessment Tools to Measure Attainmett (d)CO Practical Assignments

Practical Assignments Practical Assignments Practical Assignments Practical Assignments

CO No. CO1 CO2 CO3 CO4 CO5 .0

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1906 : (Fundamentals of Computer and IT Laboratory)

Comprehend, explore Able to use latest trends in technology programs in the alled development and Explore technical comprehension in varied areas of Usa Computer Applications areas like Appointment and Computer Applications areas like Appointment, thereby build innovate to help attain akills to System Software, purse thriving career and higher studies. Analytics, problems. 202 15 and prac CO No. CO1 CO Statements (UC-UGCA1906: Fundamentals of Computer and IT Laboratory) PO-a PO-b PO-c PO-d PO-e PO-f PO-g PO-h PO-i PO-j 3 3 1 PSO-k PSO-m PSO-I Learning Level(understand/analyse/ deisgn etc) Highlight the features of word processing, spreadsheet and presentation tools Understand Identify the right componets for its documents on editor, spread sheet and presentation CO2 Understand And Design 3 3 3 3 3 software. 3 3 3 CO3 Prepare documents and apply formatting select the right tool for different requirements. 3 2 3 3 3 3 Design 3 CO4 3 2 3 3 3 2 3 3 3 3 Design Design CO5 Apply various operations. 3 2 3 2 2

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Assessment Tools to Measure Attainment of CO

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Practical Assignments

Focus on Employability / Entrepreneurship

Employability

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Employability

Employability

	17 : (*undementalis of attactoria)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainability	Ethics	Individual and team work	Communication	Life-long learning	to help attain skills to		trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1907: Fundamentals of Statistics)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneu(ship	Assessment Tools to Measure Attainment of C
CO1	Highlight the need of studying & analyzing numbers.	3	3	1	March 1	1000	11 11	2	2	2	3				Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Identify visualization tools for representing data.	3	3	3	3	12077	101.3	1933	2	2	3	2		3	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Describe various statistical formulas.	3	3	3	2		10000	1	2	1.000	3	2	3	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Compute various statistical measures.	3	3	3	2	1 1 1 1 1 1 1	10.000	1	2	1000	3	2	3	2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
COS	Compare result of different statistical measures.	3	3	3	100000	2	2	10000	2	2	3	2	2		Understand	Employability	MSTs, ESE, Class/Quiz Tests

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA). UGCA 1907 : (Fundamentals of Statistics)

UGCAIN	8 : (Computer System Architecture)	Basic knowledge	Discipline knowledge	Experiments and practic	Tools Usage	Profession and society	Environment and sustain	Ethics	Individual and team work	Communication	Life-long learning	Explore technical comprehension in varied areas of Computer Application to help attain skills to purse thriving career and higher studies.	Design and Data	trands in technology development and thereby build innovate			
W. Carl		-	001	PO-c	DO 4	00.	abia	DO n	POL	POI	PAJ	PSO-k	PSO-4	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment
00 No.	CO Statements (UC-UGCA1908: Computer System Architecture)	PO-a	PO-0	PU-C	PU-0	PU-e	PUA	PO-g	EQ.4	rea	101	100.5			Understand	Employability	MSTs, ESE, Class/Quiz Tests
COI	Identify the various internal and peripheral components of computer system		100				1	1		1.			a second second		Cinternative		
	and the second s	3		3		1-1-10	1000	1000			2	1	3 3		3 Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Categorize different number system	3	1	3	-		1100	1	-	2	2	3	3 3	1	3 Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Outline the role of various components of computer system.	3	-	3				1. 1.	-		2	2		and an and a second	3 Design	Employability	MSTs, ESE / Class/Quiz Tests
CO4 CO5	Identify micro-operations. Comment on the design of Combinational & Sequential circuits	3		3		-			1		2				3 Design	Employability	MSTs, ESE, Class/Quiz Tests
	COMMENSION OF THE SECOND OF CONTRACTORIES OF OCCUPATION OF COMP																

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96) 1 Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1909 : (Object Oriented Programming using C++)

Chented Programming using C++)													
	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainabil	Ethics	Individual and team work	Communication	fe-long learn	comprehension in varied areas of Computer Applications to help attain skills to purse thriving career	System Software, Web	trends in technology development and thereby build innovate
the second se		-	-	-	-	2	-		-		10001	DOC 1	000

CO No.	GO Statements (UC-UGCA1909: Object Oriented Programming using C++)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-1	PO-	PO-	h PO	0-1	PO-	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attanuant of C
CO1	Outline the role of programming for solving real world problems.	3	2	3	2	2	2				2	3	3	3	3	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Explain Object oriented approach for finding Solutions to various problems with the help of C++ language.	3	3	3	3	2	2	1	2		2	3	3	3	3	Design	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Implement computer based solutions to various real-world problems using C++	3	3	3	3	2	2	1	3	1 2	3	3	3	3	3	Design	Employability	MSTs; ESE, Class/Quiz Tests
CO4	Select the right Object Orinted Concept for optimal solution	3	3	3	1.000	1 - 2 - 2 - 2	11151		2	1 1	3	3.	3	3	3	Design	Employability	MSTs, ESE, Class/Quiz Tests
CO5	Review different solutions for a common problem.	3	3	3	2	1.1.1	11.12	1202	2	3	3	3	3	3	3	Review	Employability	MSTs, ESE, Class/Quiz Tests
1222 40122		21/21-3		S	1000	1 1 1 1 1	1	-	1 2 2 2	12	22				and the second			
		12.1				-	-	-	-	-				and the second s	the second second			
		1000				-		1000		-				a second a second a second	et divedired ret			

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1910 : (Object Oriented Programming using C++ Laboratory)

UULAD	10 : (Object Oriented Programming using C++ Laboratory)	Basic knowledge	Discipline knowledge	Experiments and practice	Toois Usage	Profession and society	Environment and sustainabl	Ethics	Individual and team work	Communication	Life-long learning	Explore technical comprehension in varied areas of Compute: Application to help attain skills to purse thriving career and higher studies.	programs in the alled areas like Algorithms,	r trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1910: Object Oriented Programming using C++ Laboratory)	PO-a	PO-b	POit	PO-d	PO-	PO-	PO-	PO-	PO-i	PO	PSO-k	PS0-I	PSO-m	Learning Level(understand/analyse/ deisgn.etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment
CO1	Design the classes	3	100000	3	2	11 - C	ST COLUMN	1. 1. 1. 1.	2		3	2	3	and the second	Design	Employability	Practical Assignments
CO2	Illustrate the concept of memory representation for objects	3	2	3		1	1	1 1 1 1 1	2	2	3	2	3		Design	Employability	Practical Assignments
CO3	Implement programs using OOP concepts for various problems.	3	3	3	3	2	2	1	2	3	3	3	3	3	Design	Employability	Practical Assignments
CO4	Implement file handling in C++	3	2	3	3				2	2	3	3	3	3	Design	Employability	Practical Assignments
CO5	Select the right data types to represent class properties.	3	2	3	-	1	-		2	2	3	3	3	3	Design	Employability	Practical Assignments

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1914 : (Programming in Python)

	14 : (Programming in Python)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainab	Ethics	Individual and team work	Communication	Life-long learning	to help attain skills to purse thriving career	System Software,	trends in technology development and thereby build innovale new ideas and			
CO No.	CO Statements (UC-UGCA1914: Programming in Python)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-J	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of
CO1	Explain environment, data types, operators used in Python.	3	2	3	z	2	2	1	2	2	3	3	3	3	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Compare Python with other programming languages.	3	3	3	3	1212	110	1000	2	2	3	3	3	3	Design	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Outline the use of control structures and numerous native data types with their methods.	3	3	3	3	12			3	3	3	3	з	3	Design	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Design user defined functions, modules, files, and packages and exception handling methods.	3	3	3	3				2	3	3	3	3	з	Design	Employability	MSTs, ESE, Class/Quiz Tests
CO5	Write solutions for Object Oriented Programming Concepts.	3	3	3	2		123	1. 1. 17	2	3	3	3	3	3	Understand	Employability	MSTs, ESE, Class/Quiz Tests



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U U U U U	15 : (Data Structures)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Profession and society	Environment and sustainat	Ethics	Individual and team work	Communication	Life-long learning	Explore technical comprehension in varied areas of Computer Application to help attain skills to purse thriving career and higher studies.	System Software,	trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1915 : Data Structures)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-a	PO-h	PO-I	PO	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ deisgn etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CC
CO1	Apply appropriate constructs of Programming language, coding standards for application development.		3	3	1			,	2	2	2	3	3	2	Understanding	Employability	MSTs, ESE, Class/Quiz Tests
CO2	Select appropriate data structures for problem solving and programming		-		12	1 ANNUAL PROPERTY				3	1	3	3	2	2 Understanding	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Ellustrate the outcome of various operations on data structures.		3	3	3	2	1000	1000	1	2	3	3	3	2	2 Understanding	Employability	MSTs, ESE, Class/Quiz Tests
CO4	Identify appropriate searching and/or sorting techniques for wide range of problems and data types.		-				A LEADER	1		3	3	3	3	2	2 Understanding	Employability	MSTs, ESE, Class/Quiz Tests
005	Differentiate between various types of data structures		3	3	3	1				3	2	3	3	3	2 Understanding	Employability	MSTs, ESE, Class/Quiz Tests

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) LICCA1915 : (Data Structures)

UGCA192	23 : (Operating Systems)	Basic knowledge	Discipline knowledge	Experiments and practice	Tools Usage	Protession and society	Environment and sustainabl	Ethics	Individual and team work	Communication	Life-long learning	to help attain skills to		trends in technology development and thereby build innovate new ideas and			
CO No.	CO Statements (UC-UGCA1923: Operating Systems)	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-I	PO-j	PSO-k	PSO-I	PSO-m	Learning Level(understand/analyse/ delson etc)	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of MSTs, ESE, Class/Quiz Tests
CO1	Discuss the evaluation of operating systems.	3		Calls Fre			1.000		1	E.	a und	3	2		Understand	Employability	
CO2	Explain different resource managements performed by operating system.	3		2 2	2				1		2	3	z	1	Understand	Employability	MSTs, ESE, Class/Quiz Tests
CO3	Describe the architecture in terms of functions performed by different types of operating systems.	3		2 2				N.	2	1	2	3	3	2 2	Understand	Employability	MSTs, ESE, Class/Quiz Tests
°004	Analyze the performance of different algorithms used in design of operating system components.	3	3	3 3	2				2		2	3	3	2	Analyse	Employability	MSTs, ESE, Class/Quiz Tests
CO5	Compare the key properties of different types of Operating Sysytems.			3 2					2		2	3	3	3	Understand	Employability	MSTs, ESE, Class/Quiz Tests

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