B. Tech CSE 3rd Sem

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

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

CO5	C04	CO3	CO2	CO1	CO No.	
Demonstrate the reusability of Data Structures for implementing complex iterative problems	Students will be able to choose appropriate Data Structure as applied to specific problem definition	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;	Student will be able to handle operation like searching, insertion, deletion, traversing on various Data Structures and determine time and computational complexity	For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness;	CO Statements	
ω	3	ω	ω	ω	PO-a	Engineering Knowledge
ω	З	ω	ω	ω	РО-Ь	Problem Analysis
ω	З	ω	N	N	PO-c	Design/development of solutions
ω	ω	ω .	N	ω	РО-М	Conduct investigations of complex problem
2	2	_	-	N	РО-е	Modern tool usage
2	2	-	N	ω	PO-f	The engineer and society
0	0	0	0	0	РО-9	Environment and sustainability
0	0	0	0	0	PO-h	Ethics
u	ω	_	-	0	PO-I	Individual and team work
0	0	0	0	0	PO-J	Communication
ω	ω	_	-	- 4	PO-k	Project management and finance
ω	ω	ω	ω	ω	PO	Life-long Learning
ω	ω	ω .	ω	ω	PSO-m	Honing Domain Knowledge
ω	ω	ω	ω	ω	PSO-n	Innovation and design
	_	_	_	_	PSO-o	Entrepreneurship Skills
0	0	0	0	0	РЅО-р	Ethical values
Demonstrate	Apply	design	Analyze	Analyze	Learning Level(understand/a nalyse/ deisgn etc)	
Employability HOD	Employability	Employability	Employability	Employability	Focus on Assessment Employability / Tools to Measure Entrepreneurship Attainment of CO	
HOD Computer Science & E	+	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

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Department of Computer Science & Engineering

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

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CO5	C 0 4	CO ₃	0000	00	CO No.	
Demonstrate the concept of file operations, streams in C++ and various I/O manipulators	Understand and demonstrate the concept of data encapsulation, inheritance, polymorphism with virtual functions	Create function templates, overload function templates	Demonstrate the concept of constructors and destructors. And create new definitions for some of the operators	Identify classes, objects, members of a class and the relationships among them needed to solve a specific problem operators	CO Statements (UC- BTEC-502-18: Digital Signal Processing)	
ω	ω	u	ω	ω	PO-a	Engineering Knowledge
ω	ω	u	s s	ω	РО-ь	Problem Analysis
ω	ω	ω	ω	ω	РО-с	Design/development of solutions
ω	ω	ы	ω	ω	PO-d	Conduct investigations of complex proble
N	N	4	_	2	пРО-€	Modern tool usage
N	N	1	Ν	ω	PO-f	The engineer and society
0	0	0	0	0	PO-g	Environment and sustainability
0	0	0	0	0	PO-h	Ethics
ω	ω	4	_	0	PO·I	Individual and team work
0	0	0	0	0	Po-j	Communication
ω	ω	→	7	-	PO-k	Project management and finance
ω	ω	ω	ω	ω	POH	Life-long Learning
ω	ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
ω	ω	ω	ъ	ω	PSO-n	Innovation and design
_	_	-	1	_	PSO-o	Entrepreneurship Skills
0	0	0	0	0	PSO-p	Ethical values
Demonstratre	Understand	Apply	Demonstratre	identify	Learning Level(understand/an alyse/ deisgn etc)	
Employability	Employability	Employability	Employability	Employability	Focus on Asses Employability / Measu Entrepreneurship of CO	
mployability	A	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

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

							At the Community of the
	C05	CO4	соз	CO2	001	CO No.	
g	Implement Various searching algorithms and become familiar with their design methods	Choose appropriate Data Structure as applied to specific problem definition;	Use Linear and Non-Linear data structures to solve relevant problems;	Improve practical skills in designing and implementing Non-linear data structure algorithms;	Improve practical skills in designing and implementing basic linear data structure algorithms	CO No. CO Statements	
	з	သ	ယ	ω	ω	PO-a	Engineering Knowledge
	3	S	u	ယ	ω	РО-ь	Problem Analysis
	ω ,	ω	ω	ω	ω	РО-с	Design/development of solutions
	ω	ω	s	ပ	ω	Po-d	Conduct investigations of complex problems
	2	2	_	٠	N	РО-е	Modem tool usage
	2	2	_	2	S	PO-f	The engineer and society
	0	0	0	0	0	PO-g	Environment and sustainability
	0	0	0	0	0	PO-h	Ethics
	ω	ω	4	٠	0	POL	Individual and team work
	0	0	0	0	0	PO-j	Communication
	ω	ω	_	1	7	PO-k	Project management and finance
	ω	ω	ω	ω	ω	POL	Life-long Learning
	ω	ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
	ω	ω	ω	ω	ω	PSO-n	Innovation and design
	1	-		-	_	PSO-o	Entrepreneurship Skills
	0	0	0	0	0	PSO-p	Ethical values
	Implement	Apply	Implement	design	Apply	Learning Level(understand/a nalyse/ deisgn etc)	
	Skill Development	Skill Development	Skill Development	Skill Development	Skill Development	Focus on Employability / Entrepreneurship	

Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

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

B. Tech CSE 4th Sem

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Department of Computer Science & Engineering
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Kapurthala

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering)
BTCS(BTES401-18) : (Computer Organisation and Architecture) lex problems

	CO5	004	соз	CO2	CO1	00 No.	
metrics	Understand the concept of pipelining and its performance	Classify hardwired and microprogrammed control units	Design a memory module and analyze its operation by interfacing with the CPU;	Apply instruction set for Writingassembly language programs	Understand functional block diagram of microprocessor	CO Statements (UC-BTES-401-18: Computer Organisation and Architecture)	
	ω	ω	ω	з	ω	PO _{-a}	Engineering Knowledge
	ω	1	ω	2	1	РО-Ь	Problem Analysis
	ω	2	ω	ω	N	POC	Design/development of solutions
	ω	2	ω	ω	2	POd	Conduct investigations of comple
	ω	ω	2	2	2	РО-е	Modern tool usage
	_	_			1	POY	The engineer and society
		_		4		PO-g	Environment and sustainability
	_					PO-h	Ethics
	ω	1	ω	ω	_	<u>8</u>	Individual and team work
	N		2	2	_	PO-j	Communication
	_	1	-	2		PO-k	Project management and finance
-	ω	ω	ω	ω	ω	<u> </u>	Life-long Learning
	ω	ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
	2	_	ω	1		PSO-n	Innovation and design
	ω	_	2	ω	_	PSO-o	Entrepreneurship Skills
	_	_		_		РЅО-р	Ethical values
	Understand	Apply	Design	Apply	Understand	Learning Level(understand/ analyse/ deisgn etc)	
	Employability	Employability	Employability	Employability	Employability	Focus on	
1			MSTs, ESE, Class/Quiz Tests			Assessment Tools to Measure Attainment of CO	

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

partment Engineering

S(401-18) : Discrete Mathematics Program : B.Tech. (Computer Science and Engineering)

				And the second second second			
Plant Carlotte	CO5	CO4	CO3	CO2	CO1	CO No.	
	To develop the given problem as graph networks and solve with techniques of graph theory.	To evaluate Boolean functions and simplify expressions using the properties of Boolean algebra	For a given a mathematical problem, classify its algebraic structure	To derive the solution for a given problem using deductive logic and prove the solution based on logical inference	To be able to express logical sentence in terms of predicates, quantifiers, and logical connectives	CO Statements (UC-BTEC 502-18: Digital Signal Processing)	
	3	ω	з	ω	ω	РО-а	Engineering Knowledge
	ω	ယ	ω	ω	u	РО-Ь	Problem Analysis
	ω	ω	ω	ω	ω	РО-с	Design/development of solutions
	ω	ω	2	ω	2	PO-d	Conduct investigations of complex problems
	_					ро-е	Modern tool usage
	2	2		_	_	PO-f	The engineer and society
	_				1	PO-g	Environment and sustainability
						PO-h	Ethics
	N	2	_	N	_	POL	Individual and team work
	N	2				PO-J	Communication
	2	_				PO-k	Project management and finance
	2	_		_		PO	Life-long Learning
	2	-+	_	N	2	PSO-m	Honing Domain Knowledge
	12		_			PSO-n	Innovation and design
	2					PSO-o	Entrepreneurship Skills
	1					PSO-p	Ethical values
	Design	Design	Design	Design	Understand	Learning Level (understand/ analyse/ deisgn etc)	
			N. Harrison St.				

Focus on Employability / Entrepreneurship

Assessment Tools to Measure Attainment of CO

Employability

MSTs, ESE, Class/Quiz Tests

Employability

MSTs, ESE, Class/Quiz Tests

HOD

Employability

Class/Quiz Tests

Employability

MSTs, ESE, Class/Quiz Tests

Employability

MSTs, ESE, Class/Quiz Tests

Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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

006	CO5	CO ₄	соз	CO2	CO1	No.	
Appraise high-level operating systems concepts such as file systems, disk-scheduling algorithms and various file systems.	Design and implement file management system;	Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory and thrashing:	Analyze and apply CPU scheduling algorithms, deadlock detection and prevention algorithms;	Distinguish concepts related to processes, threads, process scheduling, race conditions and critical sections;	Explain basic operating system concepts such as overall architecture, system calls, user mode and kernel mode:	CO Statements (UC-BTEC- 502-18: Digital Signal Processing)	Pucs
ω	S	ω	ω	ω	ω	PO-a	Engineering Knowledge
ω	ω	ω	ω	ω	2	РО-Ь	Problem Analysis
ω	ω	ω	ω	ω	N	РО-с	Design/development of solutions
ω	ω	ω	ω	ω	1	PO-d	Conduct investigations of complex problen
ω	з	ω	ယ	3	7	РО-е	Modern tool usage
ω	ω	ω	ω	2	2	PO-f	The engineer and society
Ν	2	_	2	N	_	РО-9	Environment and sustainability
_			ے	-		PO-h	Ethics
N	2	N	22	Ν	2	PO-i	Individual and team work .
N	2	. N	2	Ν	_	PO-j	Communication
20	2	N	2	N	1	PO-k	Project management and finance
ω	ω	ω	ω	ω	N	POL	Life-long Learning
ω	ω	ω	u	ω	N	PSO-m	Honing Domain Knowledge
ω	ω	N	ω	ω	2	PSO-n	Innovation and design
ω	N		N	2		PSO-o	Entrepreneurship Skills
_			7	1 (2		PSO-p	Ethical values
Understand	Design	Analyse	Design	Design	Understand	Learning Level (understand/anal yse/ deisgn etc)	
Entrepreneurship	Entrepreneurship	Entrepreneurship	Skill Development/ Entrepreneurship	Entrepreneurship/ Skill Development	Employability	ij	
MSTs, ESE, Class/Quiz Tests	Class/Quiz Tests		/ MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests		Assessment

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Department of Computer Science & Engineering
WG PTU Main Campus HOD

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS 403-18 : (Design& Analysis of Algorithms)

CO5	CO4	CO3	CO2	CO1	CO No.	No. of Section 1985
Examine the necessity for NP class based problems and explain the use of heuristic techniques	Demonstrate the ways to analyze approximation/randomized algorithms	Explain model for a given engineering problem, using tree or graph, and writethe corresponding algorithm to solve the problems	Explain when an algorithmic design situation calls for which design paradigm (greedy/ divide and conquer/backtrack etc.	For a given algorithms analyze worst- case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms	CO Statements	
ω	ω	ω	ω	ω	PO-a	Engineering Knowledge
ω	ω	ω	ω	ω	РО-ь	Problem Analysis
မ	ω	ω	ω	1	РО-с	Design/development of solutions
ъ	ω	ω	ω	ω	PO-d	Conduct investigations of complex problems
2	2	-			РО-е	Modern tool usage
2	1	_			PO-f	The engineer and society
					PO-g	Environment and sustainability
					PO-h	Ethics
					POL	Individual and team work
	BI C				Fod	Communication
	1				PO-k	Project management and finance
					POL	Life-long Learning
3	ω	ω	з	ω	PSO-m	Honing Domain Knowledge
N	2.	2	2	Ν	PSO-n	Innovation and design
					PSO-o	Entrepreneurship Skills
					РЅО-р	Ethical values
Design	Design	Analyse	Analyse	Understand	Learning Level (understand/ analyse/ deisgn etc)	

Employability

Employability

Assessment
Tools to Measure
Attainment of CO

Employability

Employability

Employability

MSTs, ESE, Class/Quiz Tests

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CO No. CO2 CO3 CO1 CO Statements (UC-BTES-402-18: Computer Organisation and Architecture Lab) Demonstrate the functioning of microprocessor/ microcontroller based systems with I/O interface language problems for basic arithmetic and logical operations Assemble personal compuer mplement the various assembly PO-a w w w Engineering Knowledge PO-6 1 w 2 Problem Analysis PO-c 2 PO-d w w Conduct investigations of complex problems PO-e 2 2 PO-f 1 1 2 The engineer and society PO-g Environment and sustainability 2 PO-h -Ethics PO w w 2 FOd 2 2 1 PO-k w w POL Life-long Learning w 3 PSO-m Honing Domain Knowledge w u PSO-n Innovation and design -PSO-0 Entrepreneurship Skills u 2 Ethical values PSO-p Learning Level
(understand / analyse/
deisgn etc) Demonstrate Understand Focus on Skill development Skill development Skill development Assessment Tools to Measure Attainment of CO MSTs, ESE, Class Quiz Tests

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering Program : B.Tech. (Computer Science and Engineering) BTES(402-18) : (Computer Organisation and Architecture Lab)

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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(404-18): Operating Systems Lab

006	cos	CO4	CO3	CO2	CO1	CO No.	
							The second of
Understand the concepts of deadlock in operating systems and implement them in multiprogramming system.	Simulate file allocation and organization techniques;	Understand and implement the concepts of shell programming;	Implement commands for files and directories;	Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SIF, and Priority;	Understand and implement basic services and functionalities of the operating system;	CO Statements (UC-BTEC-502-18: Digital Signal Processing)	
3	ω	ω	3	ω	ω	PO-a	Engineering Knowledge
w	ω	2	ω	ω	ω	РО-Ь	Problem Analysis
ω	w	ω	3	ω	ω	РО-с	Design/development of solutions
a	w	2	3	3	ω	РО-д	Conduct investigations of complex problems
3	æ	3	3	3	æ	РО-е	Modern tool usage
з	2	3	2	з	2	PO-f	The engineer and society
ω	2	3	2	3	2	РО-8	Environment and sustainability
٠				1		PO-h	Ethics
ω	3	2	2	ω	ω	PO-i	Individual and team work
ω	2	w	2	ω	2	РО-ј	Communication
a	2	2	2	w	ω	PO-k	Project management and finance
ω	2	ω	2	ω	ω	PO-I	Life-long Learning
ω	2	u	u	ω	ω	PSO-m	Honing Domain Knowledge
ω	2	ω	u	ω	ω	PSO-n	Innovation and design
3	2	2	2	w	2	PSO-o	Entrepreneurship Skills
1				1		Р50-р	Ethical values
Design	Understand & Design	Understand & Design	Design	Analyse	Understand	Learning Learning Level[understand/analyse/deisgn etc]	
Entrepreneurship/ Skill MSTs, ESE, Practical development Assignments Tests	Entrepreneurship/ Skill MSTs, ESE, Practical development Assignments Tests	Entrepreneurship/ Skill MSTs, ESE, Practical development Assignments Tests	Entrepreneurship/ Skill MSTs, ESE, Practical development Assignments Tests	Entrepreneurship/ Skill MSTs, ESE, Practical development Assignments Tests	Employability	Focus on	
II MSTs, ESE, Practical Assignments Tests	II MSTs, ESE, Practical Assignments Tests	II MSTs, ESE, Practical Assignments Tests	MSTs, ESE, Practical Assignments Tests	II MSTs, ESE, Practical Assignments Tests	MSTs, ESE, Practical Assignments Tests	Assessment Tools to Measure Attainment o CO	

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Department of Computer Science & Engineering IXG PTU Main Campus Kapurthala

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

	CO4	соз	CO2	CO1	No.	
problems.	Design and Implement heuristics for real world	Implement Various tree and graph based algorithms and become familiar with their design methods;	Understand comparative performance of strategies and hence choose appropriate, to apply to specific problem definition;	Design and implement complex problems with different techniques	CO Statements	Control of Salaring with and finance
			4		P	Engineering Knowledge
	ω	3	3	ω	РО-а	Engineering Knowledge
	ω	သ	ω	ω	РО-Ь	Problem Analysis
	3	3	ယ	ω	РО-с	Design/development of solutions
	з	2	ယ	ω	PO-d	Conduct investigations of complex problems
	ယ	ω	ω	ω	РО-е	Modern tool usage
	2	_	2	2	PO-f	The engineer and society
					PO-g	Environment and sustainability
					PO-h	Ethics
			N	2	PO-i	Individual and team work
					PO-j	Communication
					PO-k	Project management and finance
			r		PO-I	Life-long Learning
	ω	ω	ω	ω	PSO- m	Honing Domain Knowledge
	ω	7	ω	ω	PSO-	Innovation and design
	2	N			PSO-	Entrepreneurship Skills
					PSO-	Ethical values
	Design	Apply	understand	design	Learning Level (understand/ analyse/ deisgn etc)	

Skill
Development/Em
ployability

Development/Em ployability

MSTs, ESE, Class/Quiz Tests Focus on

Assessment
Tools to
Measure
Attainment of
CO

HOD
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Kapurthala

Development/Em ployability

Skill Development/Em ployability

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Kapurthala

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	CO5	CO 4	CO3	CO2 d	CO 2	No. CC	
Serializability of scheduling	Implement the isolation property, including locking, time stamping based on concurrency control and	determine the transaction atomicity, consistency, isolation, and durability	construct the SQL queries for Open source and Commercial DBMS-MYSQL, ORACLE, and DB2.	design the databases using ER method and normalization.	write relational algebra expressions for a query and optimize the Developed expressions	CO Statements (UC-BTCS-501- 18: Database Management System)	E MARINE WORK
	_	_	_	٠	1	ģ	Engineering Knowledge
	N	N	N	ω	ω	РО-ь	Problem Analysis
	N	_	N	ω	ω	PO-c	Design/development of solutions
	2	٦	2	N	N	PO-d	Conduct investigations of complex problems
	_		N	2	0	РО-е	Modern tool usage
	_	0	1	_	0	PO-f	The engineer and society
	ے	0	_	7	0	PO-g	Environment and sustainability
		0	_	_	0	PO-h	Ethics
	ω	ω	N	ω	ω	PO-i	Individual and team work
	ω	ω	2	ω	ω	PO-j	Communication
	2	N	N	2	2	PO-k	Project management and finance
-	N	N	N	N	2	PO-I	Life-long Learning
	ω	ω	ω	ω	ω	pso-	Honing Domain Knowledge
	N	_	N	ω	N	PSO-	Innovation and design
	N	_	ω	ω	_	PSO-	Entrepreneurship Skills
		0	_	_	0	PSO-	Ethical values
	design	understand	design	Analyse	understand	Learning Level (understand/ analyse/ deisgn etc)	
- COU	employability	employability	enterpreneurship	enterpreneurship	employability	Focus on Employability / Entrepreneurship	
Computer Science & Engineering	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Tests	MSTs, ESE, Class/Quiz Tests NACTS ESE Class/Quiz	Assessment Tools to Measure Attainment of CO	HOD Department of Computer Scir IKG PTU Main Kapurthala

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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(type code): BTCS-501-18 Database Management System

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

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	CO7	C06 g	CO5 a	CO4 g	CO3 Fr	CO2 Do	CO1 W		Violent axid cade
	Distinguish between computability and non-computability and Decidability and undecidability.	Write the hierarchy of formal languages, grammars and machines.	Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars	Design context free grammars to generate strings of context free language.	For a given language determine whether the given language is regular or not.	Design finite automata to accept a set of strings of a language.	Write a formal notation for strings, languages and machines.	CO Statements (UC-BTEC-502-18: Digital Signal Processing)	502-48) :Formal Language & Automata Theory
	2	2	ω	ω	ω	ω	ω	РО-а	Engineering Knowledge
	_	1	ω	2	ω	ω	2	PO-b	Problem Analysis
	_	_	ω	ω	ω	ω	2	PO-c	Design/development of solutions
	1	_	ω	2	ω	2	_	PO-d	Conduct investigations of complex problems
			2	_	2		_	РО-е	Modern tool usage
	_	_	_		2	_		PO-f	The engineer and society
	_	_	N	4	_	1		PO-g	Environment and sustainability
			_		_			PO-h	Ethics
	_		2	N	N		1	PO-i	Individual and team work
		_	_		_			PO-j	Communication
		_	_	N	2	_		PO-k	Project management and finance
	_	_	w	٦	2	2	2	POL	Life-long Learning
	2	_	ω	2	ω	2		Y	Honing Domain Knowledge
	_		ω	2	ω	2	, , , , , , , , , , , , , , , , , , ,	PSO-n	Innovation and design
			2	2	2			PSO-o	Entrepreneurship Skills
			_		_			PSO-p	Ethical values
	Understand	Understand	DEsign	Design	Analyse	Design	Understand	,	<u>u</u>
	Employability	Employability	Entrepreneurship	Entrepreneurship	Entrepreneursnip	Employability	Employability	neurship	Focus on 1
	No. of the last of		All the second second			- 0	7 0	7 7	

MSTs, ESE, Class/Quiz Tests

Assessment
Tools to Measure
Attainment of CO

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

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

COS	CO4	CO3	CO2	CO1	CO No.	t i poe in a pe
Proficiently apply standards, CASE tools and techniques for engineering software projects	Identify and apply the principles, processes and main knowledge areas for Software Project Management	Work with various techniques, metrics and strategies for testing software projects.	Analyze various software engineering models and apply methods for design and development of software projects.	Students should be able to identify the need for engineering approach to software development and various processes of requirements analysis for software engineering problems.	CO Statements (UC-BTEC-502-18 (Software Engineering)	Final Control of the
ω	ω	ω	ω	з	РО-а	Engineering Knowledge
ω	ω	ω	ω	2	РО-Ь	Problem Analysis
ω	ω	ω	ω	2	P _C	Design/development of solutions
ω	ω	2	2	2	Po-d	Conduct investigations of complex proble
ω	ω	ω	ω	ь	РО-е	Modern tool usage
ω	ω	2	ω	2	PO-f	The engineer and society
ω	2	1	2	2	РО-в	Environment and sustainability
	1	1	1	2	PO-h	Ethics
2	ω	2	ω	2	Po-i	Individual and team work
2	1	2	2	ω	PO-j	Communication
2	1	2	ω	ω	PO-k	Project management and finance
ω	ω	ω	ω	ω	PO-I	Life-long Learning
ω	ω	ω	w	ω	PSO-m	Honing Domain Knowledge
w	ω	ω	2	N	PSO-m PSO-n	Innovation and design
ω	ω	2	ω		PSO-0	Entrepreneurship Skills
	1	ъ	ь	2	PSO-p	Ethical values
Design	Design	Create	Analyse	Understand	Learning Level PSO-p (understand/ analyse/ deisgn etc)	
Entrepreneurship	Entrepreneurship	Entrepreneurship	Entrepreneurship	Employability	Focus on Employability / Entrepreneurship	
MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

Department Computer Science and Engineering

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

	CO4	CO3	CO2	CO1	CO No.	
tools.	Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and	Develop the network programming for a given problem related TCP/IP protocol	Describe the function of each block of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs)	Explain the functions of the different layer of the OSI Protocol	CO Statements: BTCS 504 -18UC (Computer Network)	Engineering Knowledge Problem Analysis Design/development of solutions Conduct investigations of complex problems Modern tool usage
	ω	з	ω	ω	РО-а	Engineering Knowledge
	ω	ω	2	ω	РО-Ь	Problem Analysis
	ω	ω	3	ω	РО-с	Design/development of solutions
	ω	ω	2	2	PO-d	Conduct investigations of complex problem
	ω	ω	ω	ω	РО-е	Modern tool usage
	ω	ω	ω	ω	PO-f	The engineer and society
	ω	ω	ω	ω	РО-д	Environment and sustainability
	ω	2	2	2	h-0-h	Ethics
		ω	ω	2	PO-i	Individual and team work
	ω	ω	ω	ω	Po-j	Communication
	4	1	2	1	PO-k	Project management and finance
	ω	ω	ω	ω	PO <u>-</u>	Life-long Learning
	ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
	ω	2	ω	2	PSO-n	Innovation and design
	2	2	ь	2	PSO-o	Entrepreneurship Skills
	2	1	1	2	PSO-p	Ethical values
	2	ω	2	2	Learning Level (understand/ analyse/ deisgn etc)	

Entrepreneurship

Measure Attainment of

Tools to Assessment

СО

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Class/Quiz Tests MSTs, ESE,

Focus on Employability /

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MSTs, ESE, Class/Quiz Tests

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MSTs, ESE,

Class/Quiz Tests

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Class/Quiz Tests MSTs, ESE,

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Department of Computer Science & Engineering

NKG PTU Main Campus HOD & Kapurthala

application using suitable CO Statements method, technologies, client side and server side problems using appropriate develop solution to complex web technologies develop web based and content management frameworks, web services BTCS 512-18: (Web and Open Source Technologies Lab) РО-а **Engineering Knowledge** w w РО-Ь **Problem Analysis** 2 w PO-c Design/development of solutions 2 ω PO-d Conduct investigations of complex problems w w РО-е Modern tool usage ω 2 PO-f The engineer and society w PO-g **Environment and sustainability** 2 -PO-h Ethics 2 1 PO-I Individual and team work ω w PO-j Communication 2 PO-K Project management and finance w ω PO-I Life-long Learning ω ω PSO-Honing Domain Knowledge 3 w ω

PSO-n PSO-o PSO-p (understand/analyse/ Employability /

Learning Level

Focus on

deisgn etc)

Entrepreneurship

of CO

Measure Attainment **Assessment Tools to**

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Tests

MSTs, ESE, Class/Quiz

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Tests

MSTs, ESE, Class/Quiz

Innovation and design

Entrepreneurship Skills

Ethical values

Department Computer Science and Engineering

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

No.

CO1

C02

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)

	CO4	CO3	CO2	C01		CO No.		nast love til som of pharmonions	BTCS(612-18UC
	Read and write data from & to files in Python and develop Application using Pygame	Use functions and represent Compound data using Lists, Tuples and Dictionaries	Implement Conditionals and Loops for Python Programs	Write, Test and Debug Python Programs		CO Statements (Programming in Python Lab)		on the start of th	BTCS(612-18UC) Programming in Python Lab
	ω	ω	ω	ω		РО-а	Er	ngineering Knowledge	
	ω	2	ω	ω		РО-Ь	Pi	roblem Analysis	
-	ω	2	2	ω		РО-с	D	esign/development of solutions	
	ω	ω	ω	ω		PO-d	c	onduct investigations of complex problems	
	ω .	2	2	ω		РО-е	N	Modern tool usage	
	ω	ω	ω	w		PO-f	Т	he engineer and society	
	Ь	2	2	2		РО-в	E	nvironment and sustainability	
	.2	ъ	2	1		PO-h	E	Ethics	
	Þ	2	1	1		POL	ı	ndividual and team work	
	2	1	ъ	2		PO_j	(Communication	
	1	2	1	2		PO-k		Project management and finance	
	2	2	ω	1		P <u>P</u>		Life-long Learning	
	2	ω	2	2		m PSO-		Honing Domain Knowledge	
	2	1	2	1		PSO-n I		Innovation and design	
	2	2	2	2		PSO-0 I		Entrepreneurship Skills	
		1				уо-р (Ethical values	
	Design	Apply	Implement	lest and Evaluate		PSO-n PSO-o PSO-p (understand/ analyse/ deisgn etc)			
1	Employability	Employability	Embioxagiiica	riployability	Employability	bility / neurshi	Focus on		
	MSTs, ESE, Class/Quiz Tests	Class/Quiz Tests	Class/Quiz Tests	Class/Quiz Tests MSTs, ESE,	MSTs, ESE,	to Measure Attainment of CO	Tools		

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

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CO No. CO2 01 CO3 COS CO4 programming that make it unique from design and develop sophisticated mobile design pros and cons Critique mobile applications on their programming for other platforms Describe those aspects of mobile CO Statements Deploy applications to the Android Android operating system that use basic Utilize rapid prototyping techniques to marketplace for distribution Program mobile applications for the interfaces, and advanced phone features, BTCS: Mobile Application Development PO-a Engineering Knowledge w w w w w PO-b **Problem Analysis** w w w 3 w PO-c Design/development of solutions w w w ω PO-d Conduct investigations of complex problem ω 2 w w РО-е Modern tool usage w w w w w PO-f The engineer and society 1 2 2 2 PO-g Environment and sustainability PO-h Ethics PO-i Individual and team work 2 2 2 2 PO-Communication PO-k Project management and finance PO-I Life-long Learning PSO-m Honing Domain Knowledge w ω w w w PSO-n Innovation and design w w w

PSO-o

PSO-p (understand/

Focus on

Entrepreneurship Employability /

Attainment of CO to Measure **Assessment Tools**

etc) analyse/ deisgn Learning Level

design

Employability

understand

Entrpreneurship

2

Apply

Employability

Class/Quiz Tests MSTs, ESE, Entrepreneurship Skills

Ethical values

Department Computer Science and Engineering

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

HOD

IKG PTU Main Campus Department of Computer Science & Engineering Kapurthala

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Design

Employability

Design

Employability

Department Program BTCS(type code)

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

obile Ar	B. Tech.
ndication [B.Tech. (Computer Science
Schile Application Development Lab	Science a
it Lab	B. Tech. (Computer Science and Engineering)

Develop an application using basic graphical primitives and databases	Illustrate the android wifi features and advance android development	Demonstrate and Understanding anatomy of an Android application	Demonstrate the android features and create, develop using android	CO Statements	
ω	2	ω	ω -	r di	Engineering Knowledge
ω	۵	ω	ω -	-	Problem Analysis
ω	-	ω	ω	6	Design/development of solutions
ω	N	ω	ω	PO-d	Conduct investigations of complex problems
ω	_	ω	ω	РО-е	Modern tool usage
ω	N	ω	N	PO-f	The engineer and society
ω	_	ω	N	РО-9	Environment and sustainability
N			1	PO-h	Ethics
ω	ω	ω	ω	POL	Individual and team work
ω	ω	ω	ω	PO-j	Communication
ω		2	ω	PO-k	Project management and finance
ω	N	ω	ω	PO-I	Life-long Learning
ω		ω	ω	PSO- m	Honing Domain Knowledge
ω	N	ω	ω	PSO- n	Innovation and design
ω		ω	ω	PSO-	Entrepreneurship Skills
2	4	-	N	PSO-	Ethical values
Design	Analyse	Understand	Design	Learning Level (understand/ analyse/ deisgn etc)	

Focus on Employability / Entrepreneurship

Assessment
Tools to Measure
Attainment of CO

Skill Development

MSTs, ESE, Class/Quiz Tests

CO No.

CO1

CO2

CO3

CO4

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HOD Kapurthala

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Department of Computer Science & Engineering IKG PTU Main Campus

CO4	CO3	CO2	CO1	No.	
To develop real life IoT based projects	To remotely monitor data and control devices	To develop an Interface I/O devices, sensors & communication modules	To understand internet of Things and its hardware and software components	CO Statements	Engineering Knowledge
ω	ω	ω	1	PO-a	Engineering Knowledge
2	ω	ω	1	РО-ь	Problem Analysis
2	ω	ω	ъ	РО-с	Design/development of solutions
ω	ω	ω	2	P-Q-	Conduct investigations of complex problems
ω	ω	ω	ь	РО-е	Modern tool usage
ω	ŭ	ω	1	PO-f	The engineer and society
ω	ь	2	1	ро-е	Environment and sustainability
	ъ			PO-h	Ethics
ω	ω	ω	Ď Ľ	PO-i	Individual and team work .
ь	ω	ω	ŭ	РО-ј	Communication
2	2	2	L	PO-k	Project management and finance
ω	ω	ω	ω	PO-I	Life-long Learning
ω	ω	ω	2	m PSO-	Honing Domain Knowledge
ω	ω	2	1	PSO-	Innovation and design
ω	1	2	ъ	PSO-	Entrepreneurship Skills
1	1	ъ		PSO-	Ethical values
Develop	Analyse	Develop	Understand	Learning Level (understand/ analyse/ deisgn etc)	
Skill Development	Skill Development	Skill Development	Skill Development	Focus on Employability / Entrepreneurship	

MSTs, ESE, Class/Quiz Tests

Attainment of CO to Measure **Assessment Tools**

MSTs, ESE, Class/Quiz Tests

Kapurthala

HOD Department of Computer Science & Engineering IKG PTU Main Campus

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

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

CO4	СОЗ	C02	CO1	CO No.	
To implement a typical graphics pipeline	To apply the fundamentals of animation, virtual reality and its related technologies	To demonstrate the importance of viewing and projections.	To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.	CO No. CO Statements	
ω	ω	ω	ω	РО-а	Engineering Knowledge
ω	ω	ω	ω	РО-Ь	Problem Analysis
ω	ω	ω	ω	РО-с	Design/development of solutions
ω	ω	2	ω	PO-d	Conduct investigations of complex problems
ω	ω	ω	ω	РО-е	Modern tool usage
			2	PO-f	The engineer and society
				PO-8	Environment and sustainability
				PO-h	Ethics
2	2	2	Ν	POL	Individual and team work
				PO-J	Communication
				PO-k	Project management and finance
				PO-I	Life-long Learning
ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
2	ω	2	ω	PSO-n	Innovation and design
	2		2	PSO-0	Entrepreneurship Skills
				PSO-m PSO-n PSO-p	Ethical values
Design	Apply	understand	design	Learning Level (understand/ analyse/ deisgn etc)	
Employability	Employability & Entrpreneurship	Entrpreneurship	Employability & Entrpreneurship	Focus on Employability / Entrepreneurship	
		MSTs, ESE, Class/Quiz Tests		Assessment Tools to Measure Attainment of CO	

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Department of Computer Science & Engineering IXG PTU Main Campus Kapurthala

CO No. C02 CO1 C04 CO3 CO Statements (UC-BTCS-505-18: Database Management System Lab) datatypes implement generation of tables using using SQL retrieve data from relational databases execute triggers, cursors, stored manipulation queries. design and execute the various data procedures etc. BTCS(type code): BTCS-505-18 Database Management System Lab PO-a -Engineering Knowledge 1 1 PO-b Problem Analysis 2 w 2 w PO-c Design/development of solutions 2 2 2 PO-d Conduct investigations of complex problems 2 2 w РО-е Modern tool usage 1 1 2 -PO-f The engineer and society --1 -PO-g Environment and sustainability -1 1 -PO-h Ethics -1 PO-i Individual and team work w w w ω PO-j Communication w 2 w 2 PO-k Project management and finance ω w w w PO-Life-long Learning w w w w PSO-m Honing Domain Knowledge 2 2 2 PSO-n Innovation and design 2 2 2

PSO-0

PSO-p (understand/ analyse/

Focus on

Assessment Tools to Measure Attainment of CO

deisgn etc)

Entrepreneurship Employability /

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Design

enterpreneurship

Practicals

Viva

Assignments

2

1

Design

employability

Practicals

Viva

Assignments

2

Design

enterpreneurship

Practicals

Viva

Assignments

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Analyse

employability

Practicals

Viva

Assignments

Entrepreneurship Skills

Ethical values

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

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Kapurthala IKG PTU Main Campus Department of Computer Science & Engineering

Department Computer Science and Engineering

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

1. RTCS 507 -18UC (Computer Network Lab)

	CO4	CO3	CO2	CO1	No.	The Degineer is a society 2
commands.	Configure routers using various router configuration	Create and configure networks in packet tracer tool using various network devices and topologies.	Create various networking cables and know how to test these cables.	Know about the various networking devices, tools and also understand the implementation of network topologies.	CO Statements	Engineering Knowledge Problem Analysis Design/development of solutions Conduct investigations of complex problems Modern tool usage
	ω	ω	ω	з	ро-а	Engineering Knowledge
		1		1	ро-ь	Problem Analysis
	2	ω	2	ω	РО-с	Design/development of solutions
	2	1	2	2	PO-d	Conduct investigations of complex problems
	ω	ω	3	ω	РО-е	Modern tool usage
	ω	ω	ω	ü	PO-f	The engineer and society
	ω	ω	ω	ω	РО-в	Environment and sustainability
	1	1	1	2	PO-h	Ethics
	2	2	2	2	PO-i	Individual and team work
	ω	ω	ω	ω	PO-j	Communication
	w	2	1	1	PO-k	Project management and finance
	ω	ω	ω	ω	PO-I	Life-long Learning
	ω	ω	ω	ω	PSO-m PSO-n	Honing Domain Knowledge
	2	ω	2	ω		Innovation and design
	Þ	2	2	2	PSO-o	Entrepreneurship Skills
	۲	1	-	2	РЅО-р	Ethical values
	ω	ω	. 2	ω	Learning Level(understand/ analyse/ deisgn etc)	

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MSTs, ESE, Class/Quiz Tests

2

MSTs, ESE, Class/Quiz Tests

Focus on Employability Assessment Tools to
/ Entrepreneurship

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MSTs, ESE, Class/Quiz Tests

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MSTs, ESE, Class/Quiz Tests

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

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

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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(601-18UC) : Compiler Design

						legge-let investigations of complex problems
500	CO4	600	CO2	CO1 -2	CO No.	Macom tool usane the mainear or content Envelopment on australity
Apply for various optimization techniques for dataflow analysis	Convert source code for a novel language into machine code for a novel computer	Construct the intermediate code representations and generation	Develop the parsers and experiment the knowledge of different parsers design	Understand the major phases of compilation including front-end and back-end.	CO Statements	
ω	ω	з	ω	ω	РО-а	Engineering Knowledge
2	ω	2	ω	4	РО-Ь	Problem Analysis
-	ω	2	ω	7	РО-с	Design/development of solutions
2	ω	2	2	_	PO-d	Conduct investigations of complex problems
2	ω	2	ω	ω	PO-e	Modern tool usage
ω	ယ	2	ω	2	PO-f	The engineer and society
ω	2	_	2	2	PO-g	Environment and sustainability
	_	1	1		PO-h	Ethics
Ν	ω	Ν,	ω	2	PO-i	Individual and team work
N	_		1	1	PO-j	Communication
Ν	_	2	2		PO-k	Project management and finance
Ν	ω	2	2	_	PO-I	Life-long Learning
Ν	ω	ω	ω	2	pso-	Honing Domain Knowledge
N	ω	N	N	-	PSO-	Innovation and design
ω	ω	N	ω		PSO-	Entrepreneurship Skills
	_	_	-		PSO-	Ethical values
Create	Create	Create	Create	Understand	Learning Level (understand/ analyse/ deisgn etc)	
Skill Development &Entrepreneurship	Skill Development &Entrepreneurship	Skill Development &Entrepreneurship	Skill Development &Entrepreneurship	Employability	Focus on	
MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	



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

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	CO5	CO4	CO3	CO2	CO1	CO No.	Able recreases
	Apply for various techniques for Expert Systems.	Convert intermediate representation in contest to understand learning.	Construct simple knowledge-based systems and to apply knowledge representation.	Develop different types of various AI search algorithms.	Understand different types of AI agents.	CO Statements	Sthick of the south of the south
	ω	ω	ω	ω	ω	PO-a	Engineering Knowledge
STEEL STEEL	Ν	N	ω	ω	2	7	Problem Analysis
S PLANCE SU	Ν	2	ω	ω	2	T	Design/development of solutions
The same of	ω	Ν	ω	ω	2	PC	Conduct investigations of complex problems
Contract of the	ω	ω	ω	ω	_	PO-e	Modern tool usage
	N	ω	2	2	_	PO-f	The engineer and society
The state of the s	2	Ν	2	2	1	PO-g	Environment and sustainability
The same of		1		1		PO-h	Ethics
	Ν	8	2	2	1	PO-i	Individual and team work
	2	ω	N	2	2	PO-j	Communication
	ω	ω	2	2	2	PO-k	Project management and finance
	ω	ω	З	ယ	2	PO-	Life-long Learning
	ы	3	ω	ω	2	PSO-	Honing Domain Knowledge
-	3	3	ω	ယ	_	PSO- n	Innovation and design
	2	3	_	ω		PSO-	Entrepreneurship Skills
				_		PSO-	Ethical values
	Understand and Design	Understand and Design	Design	Create	Understand	Learning Level (understand/an alyse/ deisgn etc)	
1	Skill Dvelopment &Entrepreneurs hip	Skill Dvelopment &Entrepreneurs hip	Skill Dvelopment &Entrepreneurs hip	Entrepreneurshi p	Employability	Focus on Employability / Entrepreneurs hip	
	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

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Department of Computer Science & Engineering Kapurthala IKG PTU Main Campus

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

BTCS605-18UC : Artificial Intelligence Laboratory

-						linette a tool usage
	CO4	C03	CO2	2 CO1	CO No.	The enimeer and society
	Design and develop an expert system by using appropriate tools and techniques.	Select and apply appropriate algorithms and AI techniques to solve complex problems.	Formulate real-world problems as state space problems, optimization problems or constraint satisfaction problems.	Explain artificial intelligence, its characteristics and its application areas.	CO Statements	indivi i mano urany womi
	ω	ω	ω	ω	РО-а	Engineering Knowledge
	ω	ω	ω	2	PO-6	Problem Analysis
	ω	ω	ω	2	РО-с	Design/development of solutions
	ω	ω	ω	1	PO-d	Conduct investigations of complex problems
	ω	ω	ω	2	РО-е	Modern tool usage
Service of the servic	ω	ω	2	2	90-f	The engineer and society
	ω	2	2	ů S	PO-8	Environment and sustainability
	2		2	2	PO-h	Ethics
	ω	ω	ω	2	PO- <u>i</u>	Individual and team work
	ω	ω	2	2	PO-J	Communication
	ω	ω	2	. 2	PO-k	Project management and finance
	ω	ω	ω	ω	PO_	Life-long Learning
	ω	ω	3	ω	PSO-m PSO-n	Honing Domain Knowledge
	ω	ω	ω	ω	PSO-n	Innovation and design
	ω	ω	З	1	PSO-o	Entrepreneurship Skills
	ω		2	2	PSO-	Ethical values
	Design	Design	Design	Understand	Learning Level(underst and/analyse/ deisgn etc)	
	Entrepreneurship	Entrepreneurship	Skill Development &Entrepreneurship	Employability	Focus on	

Practical Assignments Assessment
Tools to Measure
Attainment of CO

Practical Assignments

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

Assignments Assignments

Practical Assignments

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Department Computer Science and Engineering
Program: B.Tech. (Computer Science and Engineering)
BTCS(type code): BTCS BTCS606-18UC (Network Security and Cryptography)

	CO4	соз	CO2	CO1	CO No.	continues of menorality
	Apply both cryptography and hashing to create digital signatures and certificates for achieving integrity	Design confidential systems with minimum possible threats.	Compare public and private cryptographic algorithms and make use of the same for encryption and decryption of messages.	Understand real time systems for identifying security threats.	CO No. CO Statements	
SOAT HEAT	3	ω	ω	3	РО-а	Engineering Knowledge
		2	1	ω	РО-Ь	Problem Analysis
Treat to play	ω	ω	ω	2	РО-с	Design/development of solutions
HIPPERSON	ω	ω	ω	2	PO-d	Conduct investigations of complex problems
	ω	ω	ω	ω	РО-е	Modern tool usage
Strike Has	ω	ω	ω	ω	PO-f	The engineer and society
	ω	ω	ω	2	РО-в	Environment and sustainability
	1	1	1	1	PO-h	Ethics
TOTAL STREET	2	2	2	. 2	PO-i	Individual and team work
Mark Street	ω	ω	3	3	PO-j	Communication
District of the		1			PO-k	Project management and finance
	3	3	ω	2	PO-I	Life-long Learning
	ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
	2	ω	2	ω	PSO-n	Innovation and design
	2	2	2	2	PSO-o	Entrepreneurship Skills
	1	1	1	1	PSO-p	Ethical values
	АррІу	Design	Understand	Understand	Learning Level(understand/ analyse/ deisgn etc)	
	Skill Development	Employability	Skill Development	Skill Development	Focus on	
	MSTs, ESE Class/Quiz tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

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 BTCS609-18UC (Network Security and Cryptography Lab)

CO3	CO2	CO1	CO No.	Ph. VI
Analyse the vulnerabilities in any computing system and hence be able to design a security solution.	Identify the security issues in the network and resolve it.	Develop and implement a java interface for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms	CO Statements	inuvi. — arream work
ω	з	ω	PO-a	Engineering Knowledge
2	1	ω	PO-b	Problem Analysis
ω	ω	2	PO-c	Design/development of solutions
ω	з	2	PO-d	Conduct investigations of complex problems
ω	3	ω	РО-е	Modern tool usage
ω	3	ω	PO-f	The engineer and society
ω	ω	2	PO-g	Environment and sustainability
	1	1	PO-h	Ethics
2	2	2	PO-i	Individual and team work
ω	3	ŭ	РО-Ј	Communication .
1		1000	PO-k	Project management and finance
ω	3	2	PO-I	Life-long Learning
ω	3	ω	PSO-m	Honing Domain Knowledge
ω	2	ω	PSO-n	Innovation and design
2	2	2	PSO-o	Entrepreneurship Skills
1	1	14	PSO-p	Ethical values
Design	Apply	Implement	Learning Leve (understand/ a deisgn etc)	

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Focus on Employability / Assessment Tools to Entrepreneurship CO

Skill Development Class/Quiz Tests

Skill Development MSTs, ESE,

Class/Quiz Tests

Skill Development 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: (Data minng Lab)

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	CO4	соз	CO2	CO1	CO No.	En crose a saturisticity
	Explore recent trends in data mining such as web mining, spatial-temporal mining	Extract knowledge using data mining techniques on data sets	Execute algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction	Apply data cleaning, pre- processing and integration on data sets	CO No. CO Statements	ting replane to the vegre
40 × 11 × 10	3	ω	ω	ω	РО-а	Engineering Knowledge
	2	3	ω		РО-Ь	Problem Analysis
	3	3	ω	ω	РО-с	Design/development of solutions
	3	ω	ω	ω	РО-А	Conduct investigations of complex problems
	3	З	ω	ω	РО-е	Modern tool usage
SALES AND PARTY		ω	ω		PO-f	The engineer and society
					РО-в	Environment and sustainability
		1	\$	五字章	PO-h	Ethics
	2	2	2	2	PO-i	Individual and team work
					Pog	Communication
	1				PO-k	Project management and finance
					PO- <u>!</u>	Life-long Learning
	з	ω	ω	ω	PSO-m	Honing Domain Knowledge
	2				PSO-n	Innovation and design
			2	2	PSO-o	Entrepreneurship Skills
		1			PSO-p	Ethical values
	Design	Apply	Design	Apply	Learning Level (understan Focus on d/analyse/ deisgn etc)	
	Skill	Skill developmer	Skill developmer	Skill developmen	Focus on	

development Skill

Attainment of CO

Measure

Assessment Tools to

development

MSTs, ESE, Class/Quiz

Tests

HOD

Begartment of Computer Science & Engineering

NKG PTU Main Campus

Capurthala

development

development

BTCS(type code): BTCS-612-18 Cloud Computing Lab **Department** Computer Science and Engineering Program: B.Tech. (Computer Science and Engineering)

	CO5	CO4	CO3	CO2	CO1	CO No.	Services and Autority
	To explore future trends of cloud computing	To develop any one type of cloud	To install cloud computing environments	Implement applications on the Cloud	Use the cloud tool kits.	CO Statements (UC: : BTCS-612-18 Cloud Computing Lab)	Poduar conflean work
Star Star Start	1	1	1	1	1	РО-а	Engineering Knowledge
	1	2	1	ω	1	ро-ь	Problem Analysis
	2	ω	2	ω	2	РО-с	Design/development of solutions
	. 2	1	1	ω	1	PO-d	Conduct investigations of complex problems
	ω	3	ω	ω	ω	РО-е	Modern tool usage
	2	2	1	2	Þ	PO-f	The engineer and society
	2	2	1	2	1	РО-в	Environment and sustainability
	1	1	1	- 1	1	PO-h	Ethics
	ω	ω	2	ω	ъ	PO-i	Individual and team work
	ω	ω	ı	ω	₩ 100 100 100 100 100 100 100 100 100 10	° PO-j ∪	Communication
	2	2	2	ω	1	PO-k	Project management and finance
	ω	ω	ω	ŭ	ω	PO-I	Life-long Learning
	2	ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
	2	2	1	2	1	PSO-n	Innovation and design
	ω	ω	1	ω	1	P\$0-0	Entrepreneurship Skills
	Ъ	1	1	1	1	PSO-p	Ethical values
	Design	Apply	Apply	Apply	Implement	Learning Level(understan d/analyse/ deisgn etc)	
	- 10	- 10	T (0		CS	711	

Skill

Focus on

Assessment Tools

Attainment of CO to Measure

Development

Practicals

Development

Practicals

Department of Computer Science & Endineering IKG PTU Main Campus Kapurthala

HOD

Skill

Development

Practicals

Skill

Development

Practicals

Development

Practicals

Department Computer Science and Engineering

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

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

	cos	CO4	CO3	CO2	CO1	CO No.	tha extenses at the last y
	Apply various coding schemes for text, speech and audio.	Understand and Construct codes using different error control techniques.	Compute the capacity of various types of channels.	Apply source coding techniques	Understand various entropies and Define the information theories.	CO Statements	oviror kent and in inables
	ω	ω	ω	3	з	РО-а	Engineering Knowledge
	2	2	ω	ω	2	РО-Ь	Problem Analysis
	ω	2	ω	ü	2	РО-с	Design/development of solutions
	ω	2	2	ω	2	PO-d	Conduct investigations of complex problems
	ω	ω	ω	ω	1	РО-е	Modern tool usage
	. 2	ω	2	2	1	PO-f	The engineer and society
	2	2	2	2	1		Environment and sustainability
		ļ,		1		PO-h	Ethics
	2	2	2	2	1	PO-i	Individual and team work
	2	2	1	2	2	PO-j	Communication
	з	2	2	2	2	PO-k	Project management and finance
	ω	з	2	ω	1	PO-I	Life-long Learning
	ω	3	3	ω	2	PSO-m	Honing Domain Knowledge
	ω	ω	2	ω	1	PSO-n	Innovation and design
	2	ω	ı	2		PSO-o	Entrepreneurship Skills
				1		PSO-p	Ethical values
	Understand and Design	Understand and Design	Design	Create	Understand	Learning Level(understand/ analyse/deisgn etc)	
1	Entrepreneurship	Entrepreneurship	Entrepreneurship	Entrepreneurship	Employability	Focus on Employability / Entrepreneurship	
	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

HOD

Department of Computer Science & Engineering IKG PTU Main Campus

Capurthala

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

BTCS615-18UC: Information Theory and Coding Lab

CO4	соз	CO2	CO1	CO No.	The state of the s
calculate entropy, joint entropy, relative entropy, conditional entropy, and channel capacity of a system	Illustrate various security oriented coding techniques for Block codes	Implement various error control techniques for Convolutional codes	Compare various capacity reduction based coding techniques for image and video type of data.	CO Statements	Priorition and Advistage of Sty
ω	ω	ω	ω	PO-a	Engineering Knowledge
ω	ω	ω	ω	РО-Ь	Problem Analysis
ω	ω	ω	2	PO-c	Design/development of solutions
ω	ω	ω	2	РО-	Conduct investigations of complex problems
ω	ω	ω	ω	РО-е	Modern tool usage
ω	ω	2	2	PO-f	The engineer and society
ω	ω	2	ω	9-0q	Environment and sustainability
	2	2		PO-h	Ethics
ω	ω	ω	ω	PO-i	Individual and team work
ω	ω	2	ω	PO-J	Communication
ω	ω	2	ω	PO-k	Project management and finance
ω	ω	ω	ω	PO-I	Life-long Learning
ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
ω	ω	ω	ω	PSO-m PSO-n	Innovation and design
ω	ω	3	ω	PSO-o	Entrepreneurship Skills
	2	2		PSO-p	Ethical values
Understand & Design	Understand & Design	Understand & Design	Understand & Design	Learning Level(understan d/analyse/ deisgn etc)	
Skill Developmen t	Skill Developmen t	Skill Developmen t	Skill Developmen t	Focus on	
men Assignments	Practical Assignments	Practical Assignments	Practical Assignments	Assessment Tools to Measure Attainment of CO	

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

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

	CO4	CO3	CO2	CO1	No.	Faul State of the		
	Apply data science concepts and methods to solve problems in real-world context.	Apply Mathematical sciences and recent technologies in Computer Science to solve real life problems	Use data analytics tools towards problem solving and solution analysis.	Plan the projects in the domain of data science.	CO Statements (UC-BTCS-617-18 Data Science Lab)	Lineaging and so saly	BICS(Type code)	
	ω	ω	1	1	Po-a	Engineering Knowledge	0100	
	ω	ω	1	ω	РО-ы	Problem Analysis	B10-01/-10	
	ω	ω	u	2	Po-c	Design/development of solutions	Data	
	ω	ω		ω	PO-d	Conduct investigations of complex problems	Science Lab	
	-	_	ω	2	РО-е	Modern tool usage		
	Ν	2		2	PO-f	The engineer and society		
		_	-7	7	РО-9	Environment and sustainability		
STATE STATE OF	7	_	7	-	PO-h	Ethics		
	2	2	7	ω	PO-i	Individual and team work		
	ω	ω	-	ω	PO-j	Communication		
	ω	ω	2	ω	PO-k	Project management and finance	-	
Bank Att	ω	ω	ω	ω	POL	Life-long Learning		
	ω	ω	ω	ω	PSO-	Honing Domain Knowledge		
	2	ω	2	ω	PSO-	Innovation and design		
	ω	ω	ω	ω	PSO-	Entrepreneurship Skills		
	_	_	_	_	PSO-	Ethical values		

Learning Level(unders tand/analyse/

Assessment Tools to Measure

Attainment of CO

deisgn etc)

Analyze

Skill Development

MSTs, ESE, Class/Quiz Tests

Knowledge

Development

MSTs, ESE, Class/Quiz Tests

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

Apply

Skill Development

MSTs, ESE, Class/Quiz Tests

Apply

Skill

Development

MSTs, ESE, Class/Quiz Tests

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

				0	8	
COS	C04	CO3	C02	61	No.	
Review the various hybrid soft computing techniques and apply in real time problems	Apply the importance of optimization techniques and genetic programming	Construct fuzzy rules and reasoning to develop decision making and expert system	Design suitable neural network for real time problems	Understand various soft computing concepts for practical applications	CO No. CO Statements	Individual work Constraint and team work
ω	ω	ω	з	ω	Po-a	Engineering Knowledge
2	2	2	2	2	Ро-ь	Problem Analysis
ω	ω	ω	з	1	PO-c	Design/development of solutions
ω	ω	ω	ω	ω	PO-d	Conduct investigations of complex problem
2	2	2	2		РО-е	Modern tool usage
2	1	2	1		PO-f	The engineer and society
					PO-g	Environment and sustainability
					РО-ћ	Ethics
				entorse	PO-i	Individual and team work
					9	Communication
					PO-k	Project management and finance
					PO-	Life-long Learning
ω	ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
2	2	2	2	1	PSO-n	Innovation and design
2	ω	2	2	2	PSO-0	Entrepreneurship Skills
					Р50-р	Ethical values
Design	Apply	Apply	Design	understand	PSO-n PSO-o PSO-p (understand/ analyse/ deisgn ett)	

Focus on

Assessment Tools to
Measure Attainment of
CO

Skill development

Skill development

HOD

Skill development

Skill development

Skill development

MSTs, ESE, Class/Quiz

Tests

Department of Computer Science & Engineering

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

-							
	CO5	CO4	CO3	CO2	C01	CO No.	tion to start contention
	Evaluate and compare solutions by various soft computing approaches for a given problem.	Effectively use existing software tools to solve real problems using a soft computing approach	Apply genetic algorithms to combinatorial optimization problems	Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems	Reveal different applications of these model+B7:B11s to solve engineering and other problems.	CO Statements (Soft Computing Lab)	
	ω	w	3	ω	ω	PO-a	Engineering Knowledge
	w	ω	ω	ω	ω	PO-b	Problem Analysis
	ω	ω	з	ω	3	PO-c	Design/development of solutions
	ω	ω	ω	ω	з	PO-d	Conduct investigations of complex problems
	ω	ω	ω	ω	3	РО-е	Modern tool usage
	ω	ω	ω	ω	ω	PO-f	The engineer and society
	2	1	2	2	2	PO-g	Environment and sustainability
	1	1	1	1	1	РО-ћ	Ethics
	1	1	2	1	1	PO-I	Individual and team work
	2	2	1	2	2	PO-j	Communication
	ω	2	2	2	2	PO-k	Project management and finance
	ω	ω	2	. 3	1	P 2	Life-long Learning
	w	ω	ω	ω	2	PSO-m	Honing Domain Knowledge
	2	2	2	2	2	PSO-n	Innovation and design
	1	1	1	1		PSO-o	Entrepreneurship Skills
		1		1		P50-p	Ethical values
	Evaluate	Compute	Design	Apply	Estimate	Learning Level (understand/ analyse/ deisgn etc)	
	Skill Development	Skill Development	Skill Development	Skill Development	Skill Development	Focus on	
	Skill Development MSTs, ESE, Class/Quiz Tests	Skill Development MSTs, ESE, Class/Quiz Tests	Skill Development MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Skill Development MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

Kapurthala

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Department of Computer Science & Engineering

IXG PTU Main Campus

B. Tech CSE 7thSem

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

Department Computer Science and Engineering

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

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

CO4	CO3	CO2	CO1	N C	
Implement unsupervised models through programming language.	Identify the core components of deep neural network model.	Apply various reinforcement algorithms to solve real time complex problems.	Solve problems using the machine learning models.	CO Statements (UC619-18 Machine Learning Lab)	Their Mayer severed lineage
_	-	2	_	PO-a	Engineering Knowledge
N	2	ω	2	PO-b	Problem Analysis
N	2	20	2	РО-с	Design/development of solutions
N	<u> </u>	2	2	PO-d	Conduct investigations of complex problems
ω	ω	ω	ω	РО-е	Modern tool usage
_	_	1	-	PO-f	The engineer and society
	_		_	РО-9	Environment and sustainability
	_	-	_	PO-h	Ethics
2	2	2	2	POL	Individual and team work
_	_	2	_	POJ	Communication
N	2	N	2	PO-k	Project management and finance
ω	ω	ω	ω	PO-I	Life-long Learning
N	2	ω	2	PSO-	Honing Domain Knowledge
N	_	ω	N	PSO-	Innovation and design
N	_	N	N	PSO-	Entrepreneurship Skills
_	_	7	_	PSO-	Ethical values
Apply	Knowledge	Apply	Apply	Learning Level(understand/a nalyse/ deisgn etc)	
Employability	Employability	Enterpreneurship	Employability	Focus on Employability / Entrepreneurship	

Kapurthala

Department of Computer Science & Engineering IKG PTU Main Campus

HOD

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

Assessment Tools to Measure
Attainment of CO

.

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

	CO4	CO3	CO2	01	. ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	y vanner sag sustanability
	Analyze large volume text data generated from a range of realworld applications.	Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions.	Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each.	Describe the fundamental concepts and techniques of natural language processing.	CO Statements	turnes and ore
	2	2	ω	ω	РО-а	Engineering Knowledge
	1	ω	ω	2	РО-Ь	Problem Analysis
	1	ω	ω	ω	РО-с	Design/development of solutions
1	2	ω	ω	2	PO-d	Conduct investigations of complex problem
-	ω	ω	ω	ω	PO-e	Modern tool usage
	2	ω	ω	ω	PO-f	The engineer and society
	2	1	ь	1	PO-g	Environment and sustainability
	1			P	PO-h	Ethics
	2	ω	ω	ω	PO-	Individual and team work
	2	ω	ω	ω	i PO-j	Communication
	2	2	2	2	j PO-k	Project management and finance
	2	2	ω	ω	R PO-	Life-long Learning
	1	2	1	2	pso-	Honing Domain Knowledge
	2	ω	2	2	PSO-	Innovation and design
	2	2	2	ω	PSO-	Entrepreneurship Skills
	1		1	-)- PSO-	Ethical values
	Understand	Design	Apply	Understand	Learning Level (understand/ analyse/ deisgn etc)	
	Skill Development Class/Quiz Tests	Skill Development Class/Quiz Tests	Skill Development Class/Quiz	Skill Development	Focus on	
	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

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

Department Computer Science and Engineering
Program: B.Tech. (Computer Science and Engineering)
BTCS 713Block chain Technology Lab
18UC

	003	CO2	CO1	CO No.	Commerciand so vio
	Evaluate security, privacy, and efficiency of a given blockchain system.	Design, build, and deploy a distributed application.	Interact with a blockchain system by sending and reading transactions.	CO Statements	Lat ridual or I team viork
	ω	ω	ω	PO-a	Engineering Knowledge
	ω	ω	ω	РО-ь	Problem Analysis
	ω	ω	2	PO-c	Design/development of solutions
	ω	ω .	2	PO-d	Conduct investigations of complex problems
	ω	ω	ω	РО-е	Modern tool usage
	ω	ω	ω	PO-f	The engineer and society
	N	ω	ω	PO-g	Environment and sustainability
	ω		N	PO-h	Ethics
	ω	ω	ω	PO-i	Individual and team work
	ω	ω,	2	PO-j	Communication
	ω	ω	2	PO-k	Project management and finance
	ω	ω	ω	PO-I	Life-long Learning
	ω	ω	ω	PSO-	Honing Domain Knowledge
	ω	ω	ω	PSO-	Innovation and design
	ω	ω	Ν	PSO-	Entrepreneurship Skills
	ω		N	PSO-	Ethical values
Ę	Design	Design	Understand	Learning Level (understand/ analyse/ deisgn etc)	

Focus on
Employability / Tools to
Entrepreneurshi Attainment of CO

Skill Development Assignments

Skill Development Assignments

Skill Development Assignments

Department of Computer Science & Engineering ... Kapurthala

HOD

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS 614-18UC : (Software Defined Networks)

THE RESERVE OF THE PARTY OF THE	100000000000000000000000000000000000000	100000000000000000000000000000000000000		The state of the s	41.46 (11.00 (11.		
To identify and analyse various security threats in SDN based networks	To develop various applications and protocols for SDN architecture	To design topologies using Mininet and various APIs	To provide an overview and comparison of various SDN controllers	To describe software defined architecture and open flow protocol for communication between controller and switches	To define and understand terminology involved in the field of software defined networking	CO Statements	tenbyeni sayatek kanang
ω	ω	ω	ω	ω	ω	РО-а	Engineering Knowledge
2	2	2				РО-ь	Problem Analysis
	ω	ω		ω		РО-с	Design/development of solutions
						PO-d	Conduct investigations of complex p
	1	1	1			РО-е	Modern tool usage
1		1				PO-f	The engineer and society
						РО-в	Environment and sustainability
1						PO-h	Ethics
						PO-I	Individual and team work
						PO-j	Communication
		1				PO-k	Project management and finance
						POL	Life-long Learning
ω	w	ω	ω	ω	ω	PSO-m	Honing Domain Knowledge
	2	2				PSO-m PSO-n	Innovation and design
						PSO-o	Entrepreneurship Skills
1						PSO-p	Ethical values
identify	Design	Design	Apply	Design	understand	Learning Level PSO-p (understand/ analyse/ deisgn etc)	
Employability	Employability	Employability	Employability	Employability	Employability	Focus on Employability / Entrepreneursh	

Assessment Tools to
Measure Attainment of
CO

MSTs, ESE, Class/Quiz Tests

CO No.

CO1

CO5

C04

C06

CO3

C02

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

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

	CO ₅	CO4	CO3	CO2	001	CO No	Ander Youlusa
digital images.	Understand various image compression techniques and apply such techniques to compress digital images for reducing the sizes of	Segment digital images and extract various features from digital images	Understand and De-noise Digital Images	Improve the quality of digital images	Understand the basic concepts of DIP	CO Statements (UC-BTEC-502- 18: Digital Signal Processing)	tet ruminer en eus imatamability Linius Longs Comnuelication
	ω	2	2	ω	2	PO-a	Engineering Knowledge
CASA A CASA	Ν	2	ω	2	1	РО-ь	Problem Analysis
TO THE PARTY OF	ω	2	ω	ω	2	Po-c	Problem Analysis Design/development of solutions Conduct investigations of complex problems
	Ν	2	2	ω	_	PO-d	Conduct investigations of complex problems
	ω	ω	7	2	_	РО-е	Modern tool usage
	2	_	٦	_	2	PO-f	The engineer and society
	_		_		ω	PO-g	Environment and sustainability
		_			2.7	PO-h	Ethics
	ω	_	_	_		PO:	Individual and team work
		_		1		Poj	Communication
	Ν	7		1	1	PO-k	Project management and finance
	ω	2	2	2	w	PO-I	Life-long Learning
Ī	ω	ω	. ω	ω	ω	PSO- m	Honing Domain Knowledge
	Ν	2	ω	ω	_	PSO-	Innovation and design
	2	_	٦	7	_	PSO-	Entrepreneurship Skills
			_			PSO-	Ethical values
	Understand	Apply	Understand	Apply	Understand	Learning Level (understand/ analyse/ deisgn etc)	
A	Skill Development	Skill Development	Skill Development	Skill Development	Skill Development	Focus on Employability / Entrepreneursh ip	
	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

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

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

CO4	CO3	CO2	001	CO No	Environment and assistance lifty
Perform image enhancement techniques in spatial and frequency domain	learn different techniques employed for the enhancement of images.	understand the rapid advances in Machine vision.	develop any image processing application.	CO No CO Statements	Engineering Knowledge Problem Analysis Design/development of solutions Conduct investigations of complex problems
N	ω	Ν	2	РО-а	Engineering Knowledge
ယ	2	2	2	РО-ь	Problem Analysis
ω	ω	ω	ω	РО-с	Design/development of solutions
ω	ω	З	ω	PO-d	Conduct investigations of complex problems
N	ω	ω	ω	РО-е	Modern tool usage
2	ω	20	ω	PO-f	The engineer and society
ω	ω	2	N	PO-g	Environment and sustainability
_	2	_	N	PO-h	Ethics
Ν	N	ω	N	PO-i	Individual and team work
N	2	ω	N	PO-j	Communication
ω	ω	ω	2	PO-k	Project management and finance
ω	ω	ω	ω	POI	Life-long Learning
ω	ω	ω	ω	PSO-	Honing Domain Knowledge
ω	2	ω	ω	PSO-	Innovation and design
ω	ω	ω	ω	PSO-	Entrepreneurship Skills
N	N	20	N	PSO-	Ethical values
Design	Apply	Apply	implement	Learning Level(understand/a nalyse/ deisgn etc)	
Skil Development	Skil Development	Skil Development	Skil Development	Focus on Employability / Entrepreneurship	

MSTs, ESE, Class/Quiz Tests

Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

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

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

												t of intages	the charter of the sales	honortine	ocessingi	
Secrement of the second		STATE OF THE PARTY						1	*	1	3				PO-8	Computational Knowledge
			-		-				-					-	F-0-8	Problem Analysis
				-	-				-	4	1	3		-	PO-c	Design /Development of Solutions
						Contract of the			1	2		3		-	PO-d	Conduct investigations of complex Computing problems
					1				-	-				-	POL	Modern Tool Usage
1									1	-				-	100	Professional Ethics
1				-	-			-	1	-	-		3		POL	Life-long Learning
-					1					-				1000	POL	Project management and finance
-								3						1 44	POL	Communication Efficacy
1	-													107	POL	Societal and Environmental Concern
								3		0	-		43	700	400	Individual and Team Work
1	-					-		STATE OF THE PARTY	3	3			Las	104	3	Innovation and Entrepreneurship
-								3	tu	CA			3	rou-m	090	Understand and apply knowledge on a nalysis, design and development of applications in the computing discipline.
				Salar Sa		-		3	w	Cas	-		2	PSO-n	200	Understand and apply Understand and apply Understand and apply technology, still and browledge for development of applications in the with commitment on computing discipline. societal, moral values.
						-		2	w	w	2	-	7	PSO-0		inculcate employability and entrepreseur skills among students who can develop customized enterprise level solutions.
							-							PSO-p		Develop techniques to enhance ability for lifelong learning.
															3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

ing Level(understand/analyse/ delagn etc)

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

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

								ation		loyed for the enhancement of images	dutensent	Salinity to benominal or makes	high can be performed on image!	: Digital Image Processing Labora	
		T	T	T	T			2	3			1		PO.	Computational Knowledge
									3					40g	Problem Analysis
								3	3		3	-	-	PO-4	Design /Development of Solutions
			-			The State of the S			3	3		9	-	PO-d	Conduct investigations of complex Computing problems
	A CONTRACTOR				-			STATE OF THE PARTY	3	3	,			PO-e	Modern Tool Usage
	The second second				-				3					104	Professional Ethics
							No. of London	3	3	3	,	1		PO-a	Life-long Learning
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					1			100 B 100 B					100		Societal and Environmental Concern
	Contraction of the last				-			3		3		3	100	PO-k	Individual and Team Work
	STATE OF THE PARTY		The second					3		3		3	707	LOG	Innovation and Entrepreneurship
								2	Les .	cus	3	3	FOUNI	E 039	Understand and apply fanowledge on analysis, design and development of applications in the computing discipline.
-								3	ts:	3	2	2	Pap-n	Den	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.
							-	2	3	3	2	2	P30-0	000	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
									cs	tu.	2	2	P30-p		Develop techniques to ashince ability for lifelong learning.
							Pesar	Deelor	Design	Design	Design	Design	Learn	1	

Focus on Englaryability (Entrepreneurally p.
Employability and Entrepreneurally p.

Assessment Tools to Ressure Attainment of OO Practical Assignments
Practical Assignments
Practical Assignments
Practical Assignments

CO2 CO3



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Kapurthala

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

							mition and text to speech conversion.		in versautypoon argoritants	dit distance, and regular expressions	Witness of Committee of the Committee of	natural language processing	NLP and Speech Recognition	NLP and Speech Recognition)
		I					w	-	1				Computational Knowledge	PO-a
							w			-	-	-	Problem Analysis	РО-в
							w					-	Design /Development of Solutions	PO-e
				-			3	0	1			-	Conduct investigations of complex Computing problems	PO-4
	-	-					u		,				Modern Tool Usage	P0-e
						-			0			1 47	Professional Ethics	PO4
					-		w			3		. 0	Life-long Learning	PO-g
			-					-	-			1	Project management and finance	PO-h
							u	1				100	Communication Efficacy	POL
					-			3	9			1	Societal and Environmental Concern	Ford
						I	3		3		3	200	Individual and Team Work	POX
						1	w		3		3	104	Innovation and Entrepreneurship	PO
						-	3	Car	w	to	3	POC-III	Understand and apply knowledge on analysis, design and development of applications in the computing disciplines.	PSO-m
	SCHOOL SCHOOL STATE					-	Lai	9	3	w	3	Paun	ent dill and for actice ent on values.	PSO-n
	The state of the s						3	(8)	3	(u)	3	P8U-0	wability wr skills is who op erprise ers.	PSO-o
							3	to	tu	8			ques to ty for ning.	
-	T.		84	25	24	3	5	Un	Un	S	S	5		,

Focus on Engloyability / Entrepreneurship
Employability

Assessment Tools to Heavier Atlantisers of CO
MSTs, ESE, ChandOut Tests

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NKG PTU Main Campus

Department Computer Science and Engineering Program Mester of Computer Applications (MCA) PGCA1967 IOT & Blockchair Technology

ning Level(understand/analyse/ delsgri etc)

MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests

Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests

001

CO Statements (PC-PGCA1967 Discuss the terminology and enablin

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									6	1	4	9	2	1		
									be achieved by applying the models.	Options the models learned and ended on the	And the alcorithms to a restaucted mobile	Evaluate models generated from data	Analyze performise of various learning algorithms	Develop knowledge of various learning models of data	CO Statements (PC- PGCA1968: NLP and Speech Recognition La	
		-	-	-	-				ш	1	-	1	3		PO-4	Computational Knowledge
		-	-	-	1		1		4	1	-	1	3	3	6	Problem Analysis
			-	-	1				3	1	1	-	4			Design /Development of Solutions
	* 1000		-	-	1				(a)	-	0	1				Conduct investigations of complex Computing problems
			-	-	1		THE PERSON NAMED IN		u .	0	-			4	POde	Modern Tool Usage
					-	-				-	0	-	-		PO-4	Professional Ethics
Section Section					-	-			-	3	-	-	-		PO-g	Life-long Learning
					-						-	-	-		POA	Project management and finance
-	No. of Contrasts				-	-	The second					1	-		PO4	Communication Efficacy
					-	-						-	1		Fod	Societal and Environmental Concern
-	THE STATE OF				-	-			ш		1	-	1	3	PO-k	Individual and Team Work
-						1			tue:	3	3		-		109	Innovation and Entrepreneurship
-		STATE OF THE PERSON NAMED IN							w		3	9			PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
-									u u		4	4	-	-	P8O-n	Use of recent technology, skill and knowledge for computing practice with commitment on societal, morel values.
									w	3		u		3	PSO-o	Incideate employability and and entrepreneur skills or among stidents who tite can developed the customized enterrise likes level solutions.
									3	29	3			-	PSO-n	Develop techniques to enhance ability for lifelong tearning.
									Understand and Design	Understand and Design	Understand	Understand		(Any Lifether mediantementalines	1	
											Employability	Employability	Employability	proyamity i grarepresensusing	۱	
								I	P	Pr	Pr	Pr	P	3		

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Practical Assignments
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Practical Assignments

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Department Computer Science and Engineering Program Mester of Computer Applications (MCA) PGCA1968 10T & Blockchain Technology Laboratory

							d based	tions.				ology Lat	
		-	-				3		0	1	11	PO-a	
							3		0	1	2	PO-b	Problem Analysis
						3			,			PO-d	Design /Development of Solutions
	-						3	1	, ,		7	PO-d	Conduct investigations of complex Computing problems
				-		1	12		3	-		PO-e	Modern Tool Usage
				-	-							PO-I	Professional Ethics
		-		-		3	u	3			-	200	Life-long Learning
				-						-	-	POA	Project management and finance
				-								POL	Communication Efficacy
				-	-						-	POY	Societal and Environmental Concern
						2	3		12		-	PO-k	Individual and Team Work
				-	-	2	3		3		-	200	Innovation and Entrepreneurship
						2	9	2		3		PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
						2	W		3	3	1001	PSO-n	Use of recent understand and apply Use of recent developers analysis, technology, still and knowledge for development of computing practice with computing practice with computing practice with computing practice.
Contract of the Contract of th					-	3	ى	6		3	1000	PSO-n	Inculcate employability and entrepreneur skills among students who can develop customkade enterprise level solutions.
The second secon						2		tst	te		1900	PSO-D	Develop techniques to enhance ability for lifelong learning.
						Understand And Design	Understand And Design	Understand And Dealgn	Understand And Design	Understand And Design	Personal Personal Personal Property and Consult and	lawring outlinderstandingship delegant	
						Enip	Entre	Entre	Entre	Emp	1001	-	

Focus on Employability/ Entrepreseurable A Employability/ Entrepreseurable P P Employability

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

CO No.

CO4

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Kapurthala

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

							1	5	2	23	22	01	NO.	
							Explain various correspes of a programming language.	Evoluin various concents of Concentrations to programs.	Choose the right data has and statements for apparatus	Implement programs using C	Design algorithms for solving various real life problems	Express the logical flow used in Programming.	CO Statements (PC-PGCA-B1: Computer Programming using C)	
	I			T		I	3	,,,	, ,	3	3	3	PO-a	Computational Knowledge
					The second second	1	1	1	0	,	2	3	PO-6	Problem Analysis
				-		-	-		, ,	,	3		PO-c	Design /Development of Solutions
							-	-		, ,	,		PO-d	Conduct investigations of complex Computing problems
							2	-		,			PO-e	Modern Tool Usage
		-					-	-	-	1	1		PO-f	Professional Ethics
		-					3	0	0	, ,	3	3	PO-g	Life-long Learning
		-						-	-	1	1		PO-h	Project management and finance
		1						-	-	-	1	2	PO-I	Communication Efficacy
		1							-	1	1		PO-	Societal and Environmental Concer
								2	3	1	1		PO-k	Individual and Team Work
		-			-		3	3	3	3	,		PO-I	Innovation and Entrepreneurship
		-	The second secon		-		3	3	3	3	,,,,	3	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
							3	3	2	3		1	PSO-n	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.
							3	3	3	3	c	J.	PSO-o	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
					The state of the s		2	1	3	ω		3	PSO-p	Develop techniques to enhance ability for lifelong learning.
							Understal Employability	Understa: Employability	Understal Employal MSTs, ESE, Class/Quiz Tests	Understal Employal MSTs, ESE, Class/Quiz Tests	אוטוא, בסבו, כומסא עמוב ופסוס	Undersid Employa Mets Ege Classificity Tosts	Learning Focus or Assessment Tools to Measure Attainment of CO	

CO No. CO2 CO2 CO3 CO3

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Use cloud solutions offered by industry leaders for various applications. Compares and evaluate the virtualization technologies.
Moritor and manage the cloud resources, applications and data while addressing the security concerns. Understand and apply Use of recent Incufers employability browledge on analysis, technology, skill and and entrepreneur skills design and technology, skill and and entrepreneur skills on the skill and and entrepreneur skill and and entrepr PSO-n P\$0-0 Learning Level(understandsgradyse) delegit etc)
Understand
Understand
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Assessment Tools to Measure Attainment of CO
MSTs, ISE, Class-Quiz Tests
MSTs, ISE, Class-Quiz Tests
MSTs, ISE, Class-Quiz Tests
MSTs, ISE, Class-Quiz Tests

MSTs, ESE, Class/Quiz Tests

CO1 CO2 CO5

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

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Kapurthala

Libonatory Po Computational Knowledge

Problem Analysis

Design /Development of Solutions

Conduct investigations of complex Computing problems

Design /Development of Solutions

Conduct investigations of complex Computing problems

Design /Development of Solutions

Design /Dev

Focus on Englishability I Entreprendurable Assessment Tools to Massin Attainment of CO Employability Entreprendurable Practical Assignments
Entreprendurable Practical Assignments
Entreprendurable Practical Assignments

Department Computer Science and Engineering Program Mester of Computer Applications (MCA) PGCA 1938 Cloud Computing Laboratory

Department Computer Science and Engineering
Program Master of Computer Applications (MCA)
PGCA1333 Mobile Application Development

CO No.

Ordine framework of mobile application development

CO2

Ordine framework of mobile application development

CO3

Lott the mobile application

CO4

Virte programs for basic mobile applications

CO5

Unimate development motionment of different appearating systems for mobile applications

Problem Analysis

Design /Development of Solutions

Design /Development of Solutions

Design /Development of Solutions

Conduct investigations of complex

Conduct investigations of complex

Computing problems

Pode / Design /Development of Solutions

Tool Usage

Pode / Design /Development of Solutions

Tool Usage

Pode / Design /Development of Solutions

Tool Usage

Professional Ethics

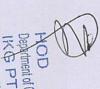
Life-long Learning

Development and finance

Communication Efficacy

Tool Project management and finance

Anolg students will be project an anolg students will be project anolg students will be proje



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Ageansiment Tools to Measure Attainment of CO
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MS1s_ESS_ClassColor Tests
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Learning Level(understandenslyser design etc)
Understand
Understand And Design
Design
Design

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

						th mobile applications.		erent mobile operating systems.	CFUI and Layouts	or partition of the sport and the second sec	d mining mobile analysisticas	: Mobile Application Development	
						3	3	3					Computational Knowledge
			-					3	0	-	-	PO-6	Problem Analysis
		-	1	Manne		3		3			2	PO-6	Design /Development of Solutions
			-	STATE OF THE PARTY					3		-	PO-d	Conduct investigations of complex Computing problems
			1			3	3	3	3		1	PO-a	Modern Tool Usage
Same a											1	1-04	Professional Ethics , .
			-				3	3	3	1	3 4	P-0-9	Life-long Learning
			-				3			3	1	POA	Project management and finance
The state of the s			1								1000	POJ	Communication Efficacy
Contraction of the							3				1	POJ	Societal and Environmental Concern
			-					3			1	PO-k	Individual and Team Work
			-				3		3		107	POJ	Innovation and Entrepreneurship
						w		tar	3	3	FOOTH	PSO-m	Understand and apply Understand and apply knowledge on stallysis, section long, still and design and development of computing practice applications in the with commitment on computing discipline. societal, moral values.
				The same of the sa			3		w	3	Feore	PSO	
				The state of the s	一般の	3	3	19		3	Pau-d	PSO	Incultate employability and entrepreneur skills among students who can develop customised enterprise livel politions.
	NAME OF TAXABLE PARTY OF TAXABLE PARTY.					2	4		4	3	Pau-p	Deor	Develop techniques to archance sbillty for lifelong learning.



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

005	CO4	CO3	002	100	CO NO.	
Highlight features of different simulation modelling softwares	Test the goodness of a simulation by analyzing the simulated data.	Apply concepts of computer simulation for types of inputs, system models, output behavior and performance estimation	Compare different types of simulation, techniques and methods.	identity the paradigms and approaches used to design the simulation.	Co-categoria inc. Pochieso: officialist & Modelling	
	3		3	3	PO-4	Computational Knowledge
	3	3		3	P-0-6	Problem Analysis
2		1,3			PO-0	Design /Development of Solutions
	3		3	3	PO-d	Conduct investigations of complex Computing problems
					PO-e	Modern Tool Usage
		3	3		PO-4	Professional Ethics
	3	3		3	PO-g	Life-long Learning
	3	2	3 1	3	PO-h	Project management and finance
					POJ	Communication Efficacy
					POJ	Societal and Environmental Concern
					PO-K	Individual and Team Work
3	3		3		PO4	Innovation and Entrepreneurship
3	20	(st	20	3	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
2	3	w		3	PSO-n	Use of recent an inchmology, still and an inchmology, still and a knowledge for a computing practice with commitment on societal, morel values.
2	3	Cas .	3	3	P80-0	ulicate employability d entrepreneur akilis mong students who can develop stomized enferprise level solutions.
2	2	2	2		PSO-p	Develop techniques to anhance sbillty for lifelong learning.
Und	Unde	Des	Und	Und	Lea	

Focus on Engloyability/ Enrepreneurship
Employability
Employability
Employability
Employability
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Employability

Assessinger Tools to Reseasure Attainment of CO
MSTs. ESE, Clessour Tees

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Department Computer Science and Engineering Program Master of Computer Applications (MCA) Simulation & Modelling Laboratory

							1		1	1		-	0,	
							Create Simulation Projects	Apply simulation software to construct and exocute goal-driven system models.	model and analyze simple engineering concepts and its importance in engineering applications.	Simulate discrete problems using queuing systems.	engineering application.	The software should be madelline and a few front a few front a few front a few front and a few front a few fro	CO Statements (PC- PGCA1938; Simulation & Modelling Laborate	
	-		-	-	-		3	3				1	Pod	Computational Knowledge
					-		3	3			Lay.	400	PO-h	Problem Analysis
						-	3	w		3	w	. 000	POL	Design /Development of Solutions
						-	2	3		- 3		1000	90.4	Conduct investigations of complex Computing problems
					-		3	G	2	3	w	-	200	Modern Tool Usage
												101	POJ	Professional Ethics
		-						·		3		Boss	POA	Life-long Learning
								3		3		1000	4.00	Project management and finance
												104	POL	Communication Efficacy
												1	8	Societal and Environmental Concern
												PO-R	4.00	individual and Team Work
							2	3		3		PO-	80.1	Innovation and Entrepreneurship
							w	CA	(J)	39	3	PaO-m	Deco at	Understand and apply introduced on analysis, design and development of applications in the computing discipline.
				THE PROPERTY OF THE PARTY OF TH			2	ω	w	LJ.	w	Paum	2001	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.
The second secon		CONTRACTOR OF STREET					2	Ç.	(u)	3	ما	P80-6	200	Inculcate employability and entrepreseur skills among students who can develop customized enterprise lievel solutions.
THE REAL PROPERTY AND ADDRESS OF THE PARTY AND			STATE OF THE PARTY				Cos	tú	Cy	3	tu	PSO-p	200	Develop techniques to anhance ability for lifelong learning.
							Understand And Design	Understand And Design	Design and Analyse	Understand And Design	Understand And Create	Learning Level(understand		

saming Level(understand/artalyse/ delsgn etc)
nderstand And Create

Focus on Employability / Entrepreneurship

Aspessive Atlanement of CO
Practical Assignments
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								channels.	ng for multiple goals within a larger	d marketing strategy and plan	ecommerce loday.	a	241; E-Contineros o Digital marxeting	
	r		T	T	T	T	T	3		1	T	1	B-O-4	
						-					-		10-0	Problem Analysis
								3		3	3		PO-6	Design /Development of Solutions
						-		3			3,		P-0-4	Conduct investigations of complex Computing problems
						-							PO-0	Modern Tool Usage
													POH	Professional Ethics
				-				3	3	3	3	3	PO-g	Life-long Learning
									3		3	3	PO-h	Project management and finance
													PO4	Communication Efficacy
								3	3	3	3	u	PO	Societal and Environmental Concern
									3	3			PO-K	Individual and Team Work
		Ton Section	STATE OF THE PARTY					3		13	3		PO4	Innovation and Entrepreneurship
					September 1			3	2	3	3	2	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
The second secon		STREET, STREET						3	w		tu	3	PSO-n	Use of recent developing on analysis, technology, skill and developing and development of computing parallel computing discipline.
		CONTRACTOR OF THE PARTY OF THE				STEED PLANTS OF THE PARTY OF TH		3	2	Ca .	49	3	P80-0	Incultate employability and entrepreneur skills among students who can develop customized enterprine level solutions.
			THE STATE OF THE S	THE RESERVE OF THE PERSON NAMED IN				2		2			PSO-p	Develop techniques to enhance shifty for lifelong learning.
								Understand	Understand	Understand	Understand	Understand	Learning Level(understand/analyse/ deisgn etc)	
								Emp	Emj	Emp	Emp	Emp	Foc	

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Assessment Tools to Measure Materipant of CO
Employability

MSTs, ESE: Classic Cut Treats
Employability

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Employability

MSTs, ESE: Classic Classic Cut Treats
Employability

MSTs, ESE: Classic Cla

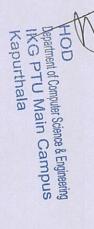
CO No. CO 1 CO 2 CO 3 CO 4 Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1921 E-Commerce & Digital Marketing

HOD Department of Computer Scien

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA 1974 e-Commerce and Digital Marketing Laboratory

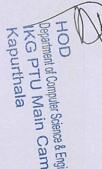
						-	-			Section 1	1000	9.		
						Limplement a project for 13-Commerce and Digital Marketing	commerce.	Disuess social, and security issues concerning the digital marketing and e-	Designe flective digital and social media strategies	Develop digital marketing strategy and plan	Implementat E-Commerce applications.	Constitution of the contract o	CO Statements (PC, PGCA 1974 : e.Commerce and Digital Market	
-											3	п		Computational Knowledge
-					-	,	,	13			3	-	400	Problem Analysis
-					-	-	,		3	3		-	90-e	Design /Development of Solutions
-									3	3	3	-		Conduct investigations of complex Computing problems
-						,	,		3	3	3	-	PO-e	Modern Tool Usage
-					-				3		-	-	PO-I	Professional Ethics
					-	1	1	1	3	3	-		POd	Life-long Learning
				1	-	T			2	1	-		PQ-h	Project management and finance
				-	-	1						-	POL	Communication Efficacy
-				-	-		3		3	4	-		POd	Societal and Environmental Concern
								ů.	3				PO-k	Individual and Team Work
				-				2	3	3		,	POU	Innovation and Entrepreneurship
		-					2	r	3	3		£	PSO-m	Understand and apply knowledge on analysis, design and design and development of applications in the computing discipline.
		-					2	ta	Ca	3		E	PSO-n	Understand and apply Use of recent nowledge on analysis, technology, skill and dealing and development of computing practice applications in the community discipline, scoleral, moral values.
			-				1	u	3	9	9	4	P80-0	nculcate employability and entrepreneur skill and entrepreneur skill among students who can develop customlad enterpriss level solutions.
							2	G	3		-		PSO-p	Sevelop techniques to enhance skilly for lifelong learning.
							Understand	Design	Ceagi	Dellan .	I Industriand and Design	Understand	Learning Level(understand/analyse/ delsgn etc)	

CO1 002 003 004 005



Department Computer Science and Engineering Department Computer Applications (MCA) Program Master of Computer Applications (MCA) Software Testing & Quality Assurptions PGCA1931 Understand and apply
Use of recent Incidente employability
Incidency on analysis, technology, still and and enrepressor ability for eleging and the computing practice computing practice computing practice computing discipline, societal, moral values, level solutions. PSO-m PSO-n P\$0-6 PSO-p

Learning Level(understanddanelydel design etc)
Understand
Understand and Create
Understand and Create
Create



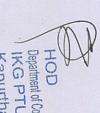
Department of Computer Science & Engineering Neg PTU Main Campus Kapurthala

Department Computer Science and Engineering
Program Master of Computer Applications (MCA)
PGCA1975 Seftware Testing & Quality Assurance Laboratory

	-						Desig	Desig	Creat	Unde	Lean	
						2	3	3	C3	tu.	P90-p	Develop techniques to enhance sollity for lifelong learning.
					The second secon	2	3	3	3	3	P\$0-0	inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
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	-					2	tw.	G)	19	· ·	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
							3	3	3	w	PO4	Innovation and Entrepreneurship
		THE PROPERTY.	The state of the s			3	3	3			WO.	Individual and Team Work
							3		3	(a)	POJ	Societal and Environmental Concer
											PO4	Communication Efficacy
			Section 1			3	3		3	w	PO-h	Project management and finance
	-	San	Section.			3	4		4		PO-g	Life-long Learning
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Department Cotinuter Science and Engineering Program Master of Computer Applications (MCA) PGCA1976 Machine Learning and Data Analytics using Python

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			3	3	tu		3	PSO-m	Understand and apply Lize of recent development of development of applications in the computing discipline, societal, moral values.
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Department Corriputer Science and Engineering Program Master of Corriputer Applications (MCA) PGCA 1958 Advanced Web Technologies

				heir development	rations in a Dynamic Website.	the use of java PHP and MvSQL		ament handling.	le programming.	58 : Advanced Web Technologies)	
1					3	3		3	3	PO-a	Computational Knowledge
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-						3		3		PO-h	Project management and finance
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Department Computer Science and Engineering
Program Master of Computer Applications (MCA)
PGCA1977 Machine Learning and Data Analytics using Python Laboratory



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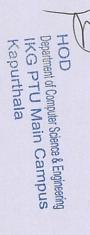
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1932 Information Security and Cyber Law

								Describe the concept of Security policies and Cyber Laws.	Apply Symmetric Encryption techniques.	Demonstrate the concept of Intrusion Detection & Intrusion Prevention.	Explain the key security requirements of Confidentiality, Integrity & Availability.	Identify issues involved in the field of information security.	CO Statements (PC-PGCA1932: Information Security and Cyber Law)	
			-		I					3	3		PO-a	Computational Knowledge
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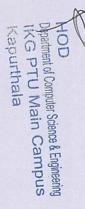


Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1914 Web Technologies Laboratory

							Execute a small web pased project for the benefit of scolety	Implement advanced web designing concepts using java script	Illustrate the movement from one web page to another	Create web pages with Auido and Video content in it.	Design pages with simple tags in HTML	CO Statements (PC- PGCA1914: Web Technologies Laboratory)	
							3	w				PO-a	Computational Knowledge
								3	3	3	3	PO-b	Problem Analysis
							3	3		3	w		Design /Development of Solutions
								3	w	3		PO-d	Conduct investigations of complex Computing problems
								3	3	3	3	PO-e	Modern Tool Usage
							3		33	3		PO-f	Professional Ethics
							3	3		3	3	PO-g	Life-long Learning
							3	3		3	3	PO-H	Project management and finance
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							3	3	3	3	3	PO-k	Individual and Team Work
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							3	3	3	3	3	PSO-n	Use of recent nowledge on analysis, technology, skill and design and knowledge for development of computing practice applications in the with commitment on computing discipline. societal, moral values.
							3	3	3	3	3	PSO-o	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
							3	3	3	3	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1922 Advanced Java Laboratory

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					Hibernate, etc.	Create applications using advanced concepts like JavaBean, Struts,	Outline the concept of SEO.	Implement the concept of database management,	Demonstrate session and cookies management	Implement serviets to handle HTTP requests	CO Statements (PC- PGCA1922: Advanced Java Laboratory)	
Topic Service				-		3	3	3	3		PO-a	Computational Knowledge
				-		2		3			PO-b	Problem Analysis
				-		33		3	3	3	Ċ	Design /Development of Solutions
				-			3		3	3	P-C	Conduct investigations of complex Computing problems
											6	Modern Tool Usage
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				CONTRACTOR		ω	3	3	3	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
					a v	3 t	Understal Employability	Understal Employal MSTs, ESE, Class/Quiz Tests	Understal Employal MSTs, ESE, Class/Quiz Tests	Understan Employat MSTs, ESE, Class/Quiz Tests	Learning Focus or Assessment Tools to Measure Attainment of CO	

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					Execute commands related to grantinf and revoking user priviledges.	Impelment virtualization	Implement C programs using gcc compiler	Write Shell Scripts	Prepare the environment for installation and use of Linux operating system	CO Statements (PC- PGCA1957 : Linux System Administration Laboratory)	
					-		3	3		PO-a	Computational Knowledge
							3	3		PO-b	Problem Analysis
						3	3			PO-c	Design/Development of Solutions
							3	3	3		Conduct investigations of complex Computing problems
					3	31		3	3	PO-e	Modem Tool Usage
						3	3			PO-#	Professional Ethics
						3	3	3	3	PO-g	Life-long Learning
						3	3	3	3	PO-h	Project management and finance
										PO-I	Communication Efficacy
										PO-j	Societal and Environmental Concern
					2	3	3	3	. 3	PO-K	Individual and Team Work
					3	3	3	3	3	PO-I	Innovation and Entrepreneurship
					ω	3	3	3	3	PSO-m	Understand and apply trachnology, skill and development of applications in the computing discipline. societal, moral values
						3	3	3	3	PSO-n	Understand and apply technology, skill and design and development of computing practice applications in the computing discipline. societal, moral values.
					3	33	3	3	3	PSO-0	inculcate employability and entrepreneur skilis among students who can develop customized enterprise level solutions.
						3	3	3	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1957 Linux System Administration Laboratory

OO Statements (PC- PGCA1925: Advanced Computer Networking)
Define computer networks
Identify the role played by different layers of network model
Ouline the concept of Internet protocols and network security.
Highlight the benefits of Adhor networks
Explain the protocols used in wireless communication systems. Problem Analysis Conduct investigations of complex Computing problems Understand and apply Use of recent Inculcate employability knowledge on analysis, technology, skill and and entrepreneur skills design and knowledge for among students who development of computing practice can develop applications in the with commitment on customized enterprise computing discipline. PSO-m PSO-n

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Department Computer Science and Engineering
Program Master of Computer Applications (MCA)
Advanced Computer Networking
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3 3 Understar Employat MSTs, ESE, Class/Quiz Tests

Develop techniques to enhance ability for lifelong learning.

PGCA1926 Department Computer Science and Engineering
Program Master of Computer Applications (MCA)
Artificial Intelligence & Soft Computing

							Determine the use of Genetic algorithm to obtain optimized solutions to problems.	Apply artificial neural networks and fuzzy logic theory for various problems.	Explain neural network theory and fuzzy logic theory.	Examine the useful search techniques; learn their advantages, disadvantages and comparison.	Highlight the significance of Artificial Intelligence in knowledge representation.	CO Statements (PC- PGCA1926: Artificial Intelligence & Soft Computing)	
								3			3	PO-a	Computational Knowledge
								3				PO-b	Problem Analysis
								2	3	3		"	Design /Development of Solutions
							3	2	3		3	PO-d	Conduct investigations of complex Computing problems
							3	2	3	3	3	PO-e	Modern Tool Usage
								3		ų.	2	PO-f	Professional Ethics
							3		3	2	s.	PO-g	Life-long Learning
							3	u		ω	2	PO-h	Project management and finance
							3					PO-I	Communication Efficacy
								3				PO-J	Societal and Environmental Concern
							3		3		3	PO-K	Individual and Team Work
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							3	3	3	3	3	PSO-n	Understand and apply Use of recent technology, skill and design and development of applications in the computing discipline. Use of recent knowledge for knowledge for computing practice with commitment on computing discipline.
							3		3	ω	3	PSO-o	skills skills swho op erprise erprise
							3	3	3	3		PSO-p	Develop techniques to enhance ability for lifelong learning.
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1927 Theory of Computation

					Define complexity and computability concepts	Illustrate how push down automata and Turing Machine can be used to solve computational problems.	Prepare context free grammar for various languages.	Design Finite Automata's for different Regular Expressions and Languages.	Define formal languages and automata.	CO Statements (PC- PGCA1927 : Theory of Computation)	
					3	3	3	W		PO-a	Computational Knowledge
					3	ω	3			PO-b	Problem Analysis
					3		3	w		C	Design /Development of Solutions
						12	3	w		PO-d	Conduct investigations of complex Computing problems
						ω				PO-e	Modern Tool Usage
					-3		3			PO-f	Professional Ethics
					3	ω	1	sa	3	PO-g	Life-long Learning
	N. Statements				3	G	3			PO-h	Project management and finance
				-						PO-I	Communication Efficacy
				-	-					POJ	Societal and Environmental Concern
			-	-						PO-k	Individual and Team Work
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					3	ω	3	ω	3	PSO-n	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.
					ω	ω	w	a	3	PSO-o	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
					3	cu	S	a	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
					Understal Employability	Understal Employability	Understal Employat MSTs, ESE, Class/Quiz Tests	Understal Employal MSTs, ESE, Class/Quiz Tests	3 Understan Employal MSTs, ESE, Class/Quiz Tests	Learning Focus or Assessment Tools to Measure Attainment of CO	The second secon

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							Execute configuration of wireless access points	Implement the confuration of Adhoc networks	Write programs for simulating routing algorithms	Prepate different types of network cables.	Demonstrate sharing of resources of network.	CO Statements (PC- PGCA1928: Advanced Computer Networking Laboratory)	
						T		3	3			PO-a	Computational Knowledge
-							2	3	3			PO-b	Problem Analysis
					-		3	3	3			PO-c	Design /Development of Solutions
-					-			3	3			PO-d	Conduct investigations of complex Computing problems
-			-		-	1		2				PO-e	Modern Tool Usage
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							3	3	3	3	3	PSO-m	Understand and apply knowledge on analysis, knowledge on analysis, design and development of applications in the computing discipline.
				The same of the sa			2	3	3	3	3	PSO-n	nowledge on analysis, technology, skill and knowledge for computing practice applications in the computing discipline.
							1	3	3	3	3	PSO-0	inculcate employability and entrepreneur skills among students who can develope customized enterprise level solutions.
							2	3	3	3	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
							d Y	Understar Employability	Understal Employal MSTs, ESE, Class/Quiz Tests	Understal Employat MSTs, ESE, Class/Quiz Tests	Understan Employat MSTs, ESE, Class/Quiz Tests	Learning Focus on Assessment Tools to Measure Attainment of Co.	

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

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

Implement different operations on fuzzy sets	Design back propogation network	Prepare training data.	Apply artificial neural networks and fuzzy logic theory for various problems.	Write programs for basic AI problems.	CO Statements (PC- PGCA1929: Artificial Intelligence & Soft Computing Laboratory)	
3	2	3 .			PO-a	Computational Knowledge
3		3	3		PO-6	Problem Analysis
3	3		3	3		Design /Development of Solutions
To the second		3	3		PO-d	Conduct investigations of complex Computing problems
		w		3	PO-e	Modern Tool Usage
		3				Professional Ethics
		3	3	3		Life-long Learning
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		13				Communication Efficacy
		33	2			Societal and Environmental Concern
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3		3	2	3	POH	Innovation and Entrepreneurship
		3	3	3	PSO-m	Understand and apply knowledge on analysis, technology, skill and design and development of computing practice with commitment on computing discipline.
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		3	3	3	PSO-0	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
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PGCA1930 Department Computer Science and Engineering
Program Master of Computer Applications (MCA)
U930 Software Project Management

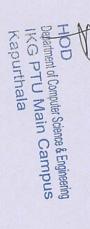
							Apply management and development practices to develop software.	Comment upon risk and quality management.	Explain the fundamentals of Process Planning, effort estimation and quality planning.	Outline the basic concepts of Software projects.	Define the principal tasks of software project management	CO Statements (PC-PGCA1930 : Software Project Management)	SULTA ALC L LUJCE, DALMARGEMENT.
								3	3			PO-a	Computational Knowledge
Section 19									ы	2	3	PO-b	Problem Analysis
								3		3	3	PO-c	Design /Development of Solutions
								3	3				Conduct investigations of complex Computing problems
								3	2	33	3	PO-e	Modern Tool Usage
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							w		ω		3	PO-g	Life-long Learning
							3	3	3		3	PO-h	Project management and finance
							3	3	2	3	3	PO-i	Communication Efficacy
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							2	3		3	w	PO-k	Individual and Team Work
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1971 Optimization Techniques

CD Statements (PC. PGCA1971): Optimization Techniques)
Define the scope of operation research
Solve linear programming problems
Prepare feasible solutions for transportation and assignment problems
Outline the Project Management problems using CPM
Find solution to various optimization problems. utational Knowledge PO-PO knowledge on analysis, design and development of applications in the computing discipline. PSO-m stand and apply s, technology, skill and a knowledge for computing practice with commitment on societal, moral values. Use of recent PSO-n amd entrepreneur skills barmong students who can develop customized enterprise level solutions. PSO-o Develop techniques to enhance ability for lifelong learning. PSO-p

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Department Cohputer Science and Engineering
PGCA1972 Mester of Computer Applications (MCA)
PGCA1972 Data Mining and Business Intelligence

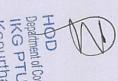
Department of Computer Science & Engineering IKO PTU Main Campus Kapurthala

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

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							Analyze various case studies related to ERP implementation	Discuss the latest trends and domains of ERP.	Explain Implementation Strategies of ERP	Compare different types of ERP functional modules.	Define ERP & Related Technologies	CO Statements (PC- PGCA1973: Enterprise Resource Planning)	
						No. of London	2		3			PO-a	Computational Knowledge
Marie Land							2					PO-b	Problem Analysis
							2	3		3		PO-c	Design /Development of Solutions
							3			3		PO-d	Conduct investigations of complex Computing problems
				O'CONTRACTOR OF		The second	1					PO-e	Modem Tool Usage
						On a Spirite		Contract of the				1-0d	Professional Ethics
						September 1		3	3		ш	PO-g	Life-long Learning
			Section 2		Section Sectio	The same		3			ta.	PO-h	Project management and finance
						The second						POH	Communication Efficacy
			Contract of the Contract of th									PO-J	Societal and Environmental Concern
			TOTAL STREET			To a second			3			PO-k	Individual and Team Work
							3	3				POH	Innovation and Entrepreneurship
							3	3		ω	ta	PSO-m	Understand and apply knowledge on analysis, design and design and development of applications in the computing discipline.
							2	3		3	3	PSO-n	Use of recent trowledge on analysis, technology, skill and design and development of computing practice with commitment on computing discipline.
							2	w	3		3	PSO-a	Use of recent incuicate employability technology, still and and entrepreneur still call periop techniques to computing practice can develop with commitment on cutomized entreprise societal, moral values.
							2			2	2	PSO-p	Develop techniques to enhance ability for lifelong learning.
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| Learning Level(understand/sanalysel delega etc) | Focus on Employability / Entreproreurehip | Employability | Understand and Analyse | Employability | Employability | Employability | Employability | Employability | Understand | Employability | Employab

Assassment Tools to Measure Attainment of Co MSTs, ESE, Class/Out Tests MSTs, ESE, Class/Out Tests MSTs, ESE, Class/Out Tests MSTs, ESE, Class/Out Tests



Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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



				CO5	CO4	CO3	CO2	CO1	CO No.	
				Execute the role of DBA.	Design new database and modify existing ones for new applications and reason about the efficiency of the result.	Develop PL/SQL programs including stored procedures, stored functions, cursors	Analyze integrity constraints on a database	Implement query a database using SQL DML/DDL commands	CO Statements (PC-PGCA1955 : Advanced Database Management System Laboratory)	
				1	3		3	3	PO-a	Computational Knowledge
						3		3	PO-b	Problem Analysis
				3	3	3	3	3	0	Design /Development of Solutions
				3		3		3	PO-d	Conduct investigations of complex Computing problems
				3	u	3		3	PO-e	Modem Tool Usage
				3	3	4	3		P04	Professional Ethics
					3	3	3	з	PO-g	Life-long Learning
				33	ų,	S.	3	3	PO-h	Project management and finance
				3						Communication Efficacy
				3	3	3	3	w	PO-J	Societal and Environmental Concern
									PO-k	Individual and Team Work
				3	3	3	3	3	PO-I	Innovation and Entrepreneurship
				3	æ	æ	3	3	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
				3	а	3	3	3	PSO-n	Inderstand and apply Use of recent nowledge on analysis, technology, skill and design and development of applications in the with commitment on computing discipline. societal, moral values.
				3	з	3	3	3	PSO-o	Use of recent Inculcate employability technology, skill and and entrepreneur skills knowledge for among students who computing practice can develop with commitment on customized enterpise societal, moral values. level solutions.
				3	3	3	3	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
				Understar Employability	Design Employability	Understar Employat MSTs, E	Understar Employat MSTs, E	Understan Employat MSTs, E	Learning Focus or Assessn	

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1908 Technical Communication Laboratory

							eaking skills.		tory)	
					2	2			PO-a	Computational Knowledge
				2	3	2	ta)	2	РО-ь	Problem Analysis
						2		2	PO-c	Design /Development of Solutions
							2	2	PO-d	Conduct investigations of complex Computing problems
									PO-e	Modern Tool Usage
			Name of Street	3	3	3	3	3	PO-f	Professional Ethics
				3	3	3	3	3	PO-g	Life-long Learning
				3		3			PO-h	Project management and finance
				3	3	3	3	ω	PO-I	Communication Efficacy
				3	2	3	u	3	PO-j	Societal and Environmental Concern
				3	3	3			PO-k	Individual and Team Work
				3	. 3				Pod	Innovation and Entrepreneurship
				3	3		2	2	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
				2	2 '	2			PSO-n	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.
					3	3	3	3	PSO-0	inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
The second secon				3	3		2	2	PSO-p	Develop techniques to enhance ability for lifelong learning.
-				Understa	Understa	Understa	Understa	Understan	Learning	
				Understar Employability	Understar Employability	Employal	Employal	Employal	Focus or	
				Ville	oility	MSTs, ES	MSTs, ES	MSTs, ES	Assessm	
						Understar Employat MSTs, ESE, Class/Quiz Tests	Understar Employat MSTs, ESE, Class/Quiz Tests	Inderstan Employat MSTs, ESE, Class/Quiz Tests	Learning Focus on Assessment Tools to Measure Attainment of CO	
									Attainment of CO	

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CO Statements (PC-PGCA1908: Technical Communication Laborator
Demonstrate the benefits of effective communication
Execute proficiency in reading & listening, comprehension, writing and speak
Apply spoken and written English language in their chosen technical field.
Illustrate fluenty in coversation.
Write their own clear and coherent texts.

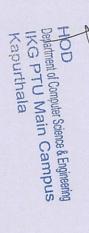
Department of Computer Science & Engineering Department of Compute

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1909 Web Technologies

					Design forms with special controls using HTML	Outline the key web designing concepts using java script	Explain how to link webpages through hypertext or images a links	Design webpages with multiple sections or frames	Create pages with simple tags in HTML	CO Statements (PC-PGCA1999 ; Web Technologies)	
					u	3		1		PO-a	Computational Knowledge
					3		3	3	3	PO-b	Problem Analysis
					3	3	2	3	3	PO-c	Design /Development of Solutions
NAME OF THE OWNER, WHEN					3	12	3	3		PO-d	Conduct investigations of complex Computing problems
The state of the					3	3		3	3	PO-e	Modern Tool Usage
					3		2	ç,		PO-f	Professional Ethics
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								3	3	PO-h	Project management and finance
						33		3		PO-I	Communication Efficacy
					33	S.		2	3	PO-J	Societal and Environmental Concern
					3	2	3	3	3	PO-k	Individual and Team Work
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					3	3	3	3	3	PSO-n	
					3	ω	3	3	3	PSO-0	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
					3	3	3	3	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
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Learning Focus of Assessment Tools to Measure Attainment of CO
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1920 Design & Analysis of Algorithms

				5	4	3	2	1	lo.	
				Categorize problems as P, NP or NP Complete	Design algorithm using an appropriate design paradigm for solving a given	Develop Algorithms using iterative/recursive approach	Categorize problems based on their characteristics and practical importance	Define alforithm and its complexity	CO Statements (PC-PGCA1920 : Design & Analysis of Algorithms)	
				3		3	3		PO-a	Computational Knowledge
						3	S		PO-6	Problem Analysis
						3	3		PO-6	Design /Development of Solutions
					3	3	3			Conduct investigations of complex Computing problems
									PO-e	Modern Tool Usage
									PO-f	Professional Ethics
		N. Carlotte		2	3	3	3	3	PO-g	Life-long Learning
					3	3			PO-h	Project management and finance
									PO-i	Communication Efficacy
									Fod	Societal and Environmental Concern
					3	3	3		PO-k	Individual and Team Work
-					3	3	3		PO-I	Innovation and Entrepreneurship
				3	3	2	3	3	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
					3	w	3	3	PSO-n	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.
				2	3	3	3	2	PSO-o	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
				3	2	ω	w	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
					Understal Employability	Design Employat MSTs, ESE, Class/Quiz Tests	Design Employat MSTs, ESE, Class/Quiz Tests	Understan Employal MSTs, ESE, Class/Quiz Tests	Learning Focus or Assessment Tools to Measure Attainment of CO	

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

							2 Select			
				Illustrate invocation of remote methods	implement database connectivity	Implement web concepts using java server pages	Select the right technology/ tool for problem based solutions	Explain the role of servlets	CO Statements (PC-PGCA1918 : Advanced Java)	
						r pages	m based solutions.		vanced Java)	
					3	3	3		PO-a	Computational Knowledge
				2		3	3	w	PO-b	Problem Analysis
						3	3	3		Design /Development of Solutions
	Salation of the					3	3	3	PO-d	Conduct investigations of complex Computing problems
				3	3	3		3	PO-e	Modern Tool Usage
									PO-f	Professional Ethics
				3		3	3	3	PO-g	Life-long Learning
					2	3	3	3	PO-h	Project management and finance
					-	3			PO-I	Communication Efficacy
-						3			PO-J	Societal and Environmental Concern
-						3	2	3	PO-k	Individual and Team Work
-				3		3	3	3	PO-I	Innovation and Entrepreneurship
				3	1	3	3	3	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
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				2	3	3	2	3	PSO-o	yability ur skills ts who op erprise ons.
				1		3	3	3	PSO-p	Develop techniques to enhance ability for lifelong learning.
				Understand	Understale	Design Entreprer MSTs, ESE, Class/Quiz Tests	Understa Employat MSTs, ESE, Class/Quiz Tests	Understan Employat MSTs, ESE, Class/Quiz Tests	Learning Focus of Assessment Tools to Measure Attainment	
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1956 Linux Administration

						Execute user level priviledges	Write scripts in Linux.	Perform resource management in Linux	Prepare environment for working on open source operating system like	Discuss the evolution of Open Source operating systems.	CO Statements (PC- PGCA1300 - Linux Auministration)	OD Statement IDO DOCATORS I live Administration	KING AUMINISTRATION
								3	3		100	PO-s	Computational Knowledge
								3	L		0.0	PO.h	Problem Analysis
			Manager Street				3	3	2		100	200	Design /Development of Solutions
						2			S.		- 00		Conduct investigations of complex Computing problems
		RIPLOYUL .				2	3	2	3	3		PO-8	Modern Tool Usage
							3	3				PO-f	Professional Ethics
							3	3	3	, 3		PO-a	Life-long Learning
***						-	3	u	, ,	3 4		PO-5	Project management and finance
												PO-I	Communication Efficacy
									-			PO-J	Societal and Environmental Concern
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Department Computer Science and Engineering Program Median of Computer Applications (MCA) PGC A1957 Cloud Computing

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			,		1	3	8	
					3	The second	PO-±	Indevidual and Team Work
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		,	3	3	3	1	P50-m	Understand and apply transleding or analysis. transleding and desalign and desalignment of applications in the computing discipline.
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				3	3	1	PSO-p	Develop techniques to enhance skillry for lifetong learning.
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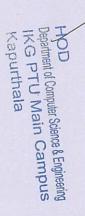
Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA-B2 Computer Science Essentials

						Define various components, modes and topologies of computer networks.	Explain the role of operating system.	Outline the key components of Database Management system	tools	Prepare documents using word processing, Spreadsheet and Presentation	output devices.	Identify various components of computer system including input and	CO Statements (PC- PGCA-B2: Computer Science Essentiats)	
			-		-	2	2	3		w	3		PO-a	Computational Knowledge
			-		-	3				2	2		PO-b	Problem Analysis
The second second			-			3	3	3		2	2		PO-c	Design /Development of Solutions
-			1		1	3	23	2		12			PO-d	Conduct investigations of complex Computing problems
-			1		1	1				2			PO-e	Modern Tool Usage
			1		-	2							PO-f	Professional Ethics
			-		-	3	3	3		33	3		PO-g	Life-long Learning
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	The second second				1								PO-I	Communication Efficacy
	The second second		1		1					2			PO-J	Societal and Environmental Concern
1	The second		-		1								PO-k	Individual and Team Work
1	Section 2				-	3				2	2		PO-I	Innovation and Entrepreneurship
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to different to the same						3	w	2		2	2		PSO-0	Inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
The state of the s					Section State of Section 1985	3	3	3		w			PSO-p	Develop techniques to enhance ability for lifelong learning.
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1917 Discrete Structures & Optimization

						Identify the type of graphs.	rules, permutations, combinations, the pigeon-hole principle.	Applying elementary counting techniques using the product and sum	Write proofs using symbolic logic and Boolean Algebra	Apply rules of inference.	Explain the use of Venn diagrams to solve applied problems.	CO Statements (PC-PGCA1917: Discrete offuctures a Optimization	DO D		017 Discrete Structures & Ontimization
						u		ددا	ts.	2	3	PO-8	-	Computational Knowledge	
						3		3	3	2	3	70-0	+	Problem Analysis	
						w		CJ.	3	3	w	c	1	Design /Development of Solutions	
								32	2	3	2	-	1	Conduct investigations of complex Computing problems	
							-					-	1	Modern Tool Usage	
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					-	0.		3	3	3	3	-	-	Life-long Learning	
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							-			-		-		Communication Efficacy	
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							1	3	3	1	-	+	~	Individual and Team Work Innovation and Entrepreneurship	Total Control of
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						u		w	w				PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.	
						U	0	u		u	,		PSO-n	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.	
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							3	U	3 0	13 (2	PSO-p	Develop techniques to enhance ability for lifelong learning.	The state of the s
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1951 Programming in Python

							Write solutions for Object Oriented Programming Concepts	Design user defined functions, modules, files, and packages and exception	Outline the use of control structures and numerous native data types with	Compare Python with other programming languages.	Explain environment, data types, operators used in Python.	CO Statements (PC- PGCA1951: Programming in Python)	
							3	3	2	3	3	PO-a	Computational Knowledge
							3	2	3	2	3	РО-Ь	Problem Analysis
							3	3	3	3	3	"	Design /Development of Solutions
							3	3	w	s.	3	PO-d	Conduct investigations of complex Computing problems
												PO-e	Modern Tool Usage
												PO-f	Professional Ethics
							2	2	2	2	3	PO-9	Life-long Learning
							2	2	2	2	1	PO-h	Project management and finance
												PO-I	Communication Efficacy
												PO-J	Societal and Environmental Concern
								2			2	PO-k	Individual and Team Work
							3	3	3	3	3	PO-I	Innovation and Entrepreneurship
							3	3	3	3	3	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
							3	3	3	3	2	PSO-n	Inderstand and apply Use of recent rowledge on analysis, design and development of applications in the with commitment on computing discipline. Use of recent Inculcate employability and entrepreneur skills knowledge for computing practice with commitment on computing discipline. Use of recent and entrepreneur skills among students who can develop customized enterprise computing discipline.
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Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1952 Advanced Data Structures

					Select algorithm design approaches in a problem specific manner.	Define proofs of correctness	Design and analyze programming problem statements	Execute the operations of hashing to retrieve data from data structure.	Choose appropriate data structures and algorithms and use it to design	CO Statements (PC-PGCA1952 : Advanced Data Structures)	A AMAINCA JAMA SHIRAMAS
					3	3	L3	3			Computational Knowledge
					33	2	3	2		_	Problem Analysis
					3	3	3 3	3 2	3 3		Design /Development of Solutions Conduct investigations of complex Computing problems
							3				Computing problems Modern Tool Usage
							3			CD .	Professional Ethics
					3	2	3				Life-long Learning
					3	3	3	3	2	PO-h	Project management and finance
					3					PO-I	Communication Efficacy
										PO-J	Societal and Environmental Concern
						3	3	3	3	PO-k	Individual and Team Work
						3	2	3	3	PO-I	Innovation and Entrepreneurship
					3	3	3	3	3	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
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GO Statements (PC. PGCA 1953: Advanced Database Management System)

Express the basic concepts of DBMS and RDBMS.
Apply normalization theory to the normalization of a database Apply normalization theory to the normalization of a database ExplainTransaction Management & Recovery techniques in RDBMS.

Outline characteristics of advanced databases prevailing in market.

Demonstrate No SQL databases (Open Source) Design /Development of Solutions Understand and apply Use of recent knowledge on analysis, technology skill and design and development of computing practice applications in the commitment on current grants of the commitment on current process. PSO-m PSO-n employability and entrepreneur skills I among students who can develop customized enterprise level solutions. P\$0-0 Develop techniques to enhance ability for lifejong learning. PSO-p Learning Focus or Assessment Tools to Measure Att a Indestan Employal MSTs, ESE, Class/Quiz Tests Understal Employal MSTs, ESE, Class/Quiz Tests Understal Employal MSTs, ESE, Class/Quiz Tests Understal Employability

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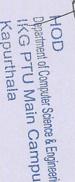
Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA 1953 Advanced Database Management System

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1905 Technical Communication

			While their own clear and conferent texts.	White their care close and acharant taxts	Illustrate flueny in coversation	Apply spoken and written English language in their chosen technical field.	speaking skills	Execute proficiency in reading & listening comprehension writing and	Outline the benefits of effective communication	CO Statements (PC-PGCA1905: Technical Communication)	
	-					-			1	PO-a	Computational Knowledge
					3			3		PO-b	Problem Analysis
										Ċ	Design /Development of Solutions
										PO-d	Conduct investigations of complex Computing problems
										PO-e	Modern Tool Usage
				3	3	3		3	3	PO-1	Professional Ethics
	-			3	3	w		3	3	PO-g	Life-long Learning
				3	3	w		2	2	PO-n	Project management and finance
		No. of the last of		S.	3	(J.)		3	3	PO-i	Communication Efficacy
				33	3	w		3	w	PO-J	Societal and Environmental Concern
				3	3	s		2	2	PO-K	Individual and Team Work
				3	3					PO-I	Innovation and Entrepreneurship
				3	3			2	2	PSO-m	Understand and apply knowledge on analysis, design and development of applications in the computing discipline.
				2	2	2		1	1	PSO-n	Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral values.
				2	3	ŭ	,	ω	3	PSU-0	yability ur skills is who is who perprise erprise
				3	3		,	2	2	-0	ques to y for ling.
			1	Understal Employability	Understa: Employability	Understa Employal MSTs, ESE, Class/Quiz Tests		Understal Employal MSTs, ESE, Class/Quiz Tests	Understan Employad MS Is, ESE, Classicula resis	Legining rooms of Assessment rooms to monage of the control of the	

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Department of Computer Science & Engineering

Research of Computer Science & Engineering

Department of Computer Science & Engineering

Research of Computer Science & En

Department Computer Science and Engineering Program Master of Computer Applications (MCA) PGCA1954 Data Structures using Python Laboratory

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								0	,	2	u			3	PO-a	C	omputational Knowledge
					-			3	3	3	3	2	3	3	PO-b	P	roblem Analysis
					-			1	-	1	3	0	3	3			Design /Development of Solutions
											3	0	2	3	PO-d		Conduct investigations of complex Computing problems
								1	-	1	3				PO-8		Modern Tool Usage
		STATE OF STREET		T				-	2	Section Section 2	2	-			104	3 1	Professional Ethics
	The same of			-				-	,,	3	3	,	3	з	B.O.s.	000	Life-long Learning
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				-			-					1			101	LOG	Societal and Environmental Concern
				1			1		2		0	3	3		1 4 11	PO-k	Individual and Team Work
			1	1			-		3		1	3	3	u		PO-I	Innovation and Entrepreneurship
									3	3			w	U	3	PSO-m	Understand and apply use of recent knowledge on analysis, knowledge for development of applications in the computing discipline.
	-	-	1			-				-	-						y Use s, technol know compu with co societal,
									3	-	3	3		-		PSO-n	
									3	3 4	3	3	u		3	PSO-0	inculcate employability and entrepreneur skills among students who can develop customized enterprise level solutions.
										1	ω	3	ū	2	ω	PSU-P	Develop enhan lifelo
L					-				-	a	0	Analyse	Circiota	Findersta	Understand Employabil MSTs, ESE, Class/Quiz Tests	- Courtilland	Tools to Measure Attainment of CO
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CO2 CO3 CO4 CO5

Implement various operations of all data structures

Illustrate the outcome of various operations with the help of examples.

Write programs to implement various types of searching and sorting algorithms

CO Statements (PC. PGCA1854: Data Structures using Python Laboratory)

Analyze various algorithms based on their time and space complexity.

Create different data structures in C/C++

Kapurthala

HOD
Devartment of Computer Science & Engineering
Devartment of Computer Science & Engineering

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1947 : (Digital Marketing)

		Program Bachelor of Computer Applications (BCA) Program Bachelor of Computer Applications (BCA) UGCA1947 : (Digital Marketing)
ω ω ω ω	PO-	Basic knowledge
w w w e		Discipline knowledge
3 2 2		Experiments and practice
2		Tools Usage
		Profession and society
		Environment and sustainabilit
		Etylca
3 3 2 2		Individual and team work
2	2	Communication
ω ω ω ω		Life-long leaming
2 2 3 3		CONTRACTOR OF THE PROPERTY OF
22		ata ata
2 3		Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems. PSO-m
Understand Understand Understand	Understand E	Learning Level(understand/analyse/ delign etc) Fo
	Highlight the key elements of a digital marketing 3 3 2 3 3 3 Understand	CO Stataments (UC-UGCA1947: Digital Marketing) PO-a PO-b PO-c PO-d

Assassment Tools to Measure Attainment of CO
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) UGCA1948: (Information Security)

Outline the information security risks across de Internet and WWW. Explain different encryption techniques Define erviography	CO. Statements (UC-UGCA1948: Information Security.) Identify issues involved in the field of information security. Categorize various types of viruses.	A1948: (information Security)
3 3	3 JPO-4	Basic knowledge
2 3	PO-b 3	Discipline knowledge
2	9-Q-G	Exberiments and bractic
	PO-d	egesU slooT
2	PO-e	Profession and society
2	Po	Environment and sustain
2	PO-g	Individual and team work
ωωω	1 2	Communication
2	2 2 PO-1	Life-long leaming
ωωω	3 3 PO	
2 2 2	P\$0-k	Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.
NN	PSO-1	Comprehend, explore Able to use latest and build up computer trends in technology programs in the alleid development and areas like Algorithms, thereby build innovate system Software new ideas and Web Design and Data solutions to varied Analytics.
2	PSO-m	Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
Understand Understand	Learning Level(understand/analyse/ delsgn etc) Understand Understand Understand	
Employability MS Employability MS	Focus on Employability / Entrepreneurship Ass Employability MS Employability MS Employability MS	
MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests	

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Appartment of Computer Science & Engineering
ING PTU Main Campus
Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1949 : (Cyber Laws & IPR)

												CO5	004	202	CO3		CO2	00.	001	CO No.			OGEA1949	Dioi to do
											Whole.	Analyze the effects of intellectual property rights on society as a	terms of their key differences and similarities.	Compare the different forms of intellectual property protection in	Outline the primary forms of intellectual property rights.	The technology field.	Categorize case law and common law to current legal dilemmas in	that affect the information technology professional	Identify tatutory, regulatory, constitutional, and organizational laws	CO Statements (UC-UGCA1949: Cyber Laws & IPR)			, (cyren Laws a Brit)	· / Outrant ause & IDD \
-	1		000000000000000000000000000000000000000			T						ω	-	4	3		3		ш	PO-a			Basic knowledge	
1						-						2		3	3	-	2		ω	PO-b			Discipline knowledge	
-	-				-	1				1		2		w	2	-	2	1	2	PO-c		9	Experiments and practic	
-		100000000000000000000000000000000000000	STATE OF STREET		-	1				-	-					-		-		PO-d			egeaU alooT	
1						1			-	-	-	2	-		7	1				PO-e			Profession and society	
					-	-	The second second		-	-					1	,		-		POrt		Ispil	Environment and sustain	
-					-	-	1			-	-	2	-	2	7	,		-		P-0-9	+		Elpica	
					-	-	1			-	-	3	-	3	0	,	2	-	2	1-0-4	+	,	now meat bas laubivibal	
					-	-			-	-	-	2	+	2	1	,		+		1-0-1	+		Communication	
				-	1	-			-	1	-	ω	+	w	0	3	3	-	3	PU-	+		Life-long learning	
				The state of the s	The same of the sa				-		The state of the s	2	-	2		3	3		3	-	4080		Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.	
				-	The state of the s				The second second	- Company		2	-							1007	LOSO		Comprehend, explore and build up computer programs in the allied areas like Algorithms, System Software, Web Design and Data Analytics.	
								The state of the s	The state of the s			2	-		The state of the s	The state of the state of the state of				100111	PSO-m		Able to use latest trends in chnology development and thereby build innovate new ideas and solutions to varied problems.	
P												Understand		Understand		Understand	Understand _		Understand		Learning Level(understand/analyse/ deisgn etc)			
												Employability	1	Employability		Employability			Employability		Focus on Employability / Entrepreneurship			
												MOIS, Lot, Onsownia 1000	MOTE ESE Class/Ouly Tasts	MOIS, LOT, Onservant 1000	MCTe ESE Class/Ouiz Tasts	Mois, Edt, Class/Cuiz Lesis	TOTAL CONTRACTOR OF THE PARTY O	MSTE ESE Class/Ouiz Tests	MOIO, LOL, Cissos destr Cond	MOTE FOR Classifity Tasts	Assessment looks to measure Augunium of Co	Total Marries Attainment of CO		

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Department of Computer Science & Engineering
IKG PTU Main Campus
Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1950 : (Machine Learning)

The state of the s					The state of the s					n the concept of reinforcement learning	n solution for basic problems using machine learning algorithms	are the performace of different machine learning algorithms	e the key characteristics of machine learning algorithms	the concept of machine learning	Contraction of the last section of the last se	tataments (UC-UGCA1950: Machine Learning)					achine Learning)
				The state of the s			T	1		3	-		-			ling) PO-a				Basic knowledge	
Conference of the Con-			-	-			-			3	3	3	1	1	1	a PO-b	H			Discipline knowledge	Section of the sectio
CANDELLE AND ADDRESS OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERS			-				-			3	3	3	,	-	1	PO-c	t		90	Experiments and practic	
いっちゃりのないからいから			-	-			1					1	+	1	Contract of the	PO-d				Tools Usage	
			-	The state of the last									1		Part of the last o	PO-6	4			Profession and society	
								The state of the second					-	-		FOR	2	IIIqi	eu	Environment and sustail	
		-				-						-				PO-9	200			Individual and team work	
		-				-		State of the last		1	1	3	3	u	2	70-0	1		1	notisalinuminos	
	-	-				+			-	-	-	-		2	2	700	1			ite-long leaming	
	-	-			-	-				-	3	4	2	3	3	100	POL			con van cor to h	-
	-					-				-	2	7	3	3	w	1000	PSO-k			Explore reclinical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.	1
					1						2	2					P\$0-1			compehension in and build up computer literals in technology varied areas of programs in the allied development and computer Applications areas like Algorithms, thereby build innovate to help attain skills of System Software, mow ideas and and higher studies. Analytics.	playe bandarana
	-				-				1							-			1	ter trends in the developm is, thereby by new ideas solutions to problems.	TANA to
											3	2				1	PSO-m			r trends in technology development and thereby build innovate new ideas and solutions to varied problems.	iisa istasi
											Understand	Design	Understand	Understand	Circulation	Inderstand	Learning Levelluliderstationalidiyasi delagit otc.	The standard standard delegan of the			
											Employability					Employability		Focus on Employability / Entrepreneurship Assessment			
										の 一		MSTs ESE Class/Quiz Tests	MSTs ESE Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTS, ESE, Class/Quiz Tests	Olios data - core	MCTc ESE ClassiOuiz Tests	Assessment Tools to Measure Attainment of CO			



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)

													-			A1951
								Implement basic Natural Language processing programs.	Outline the use of Bayesian approach to solve uncertain problems.	Represent various real life problem domains using logic based techniques	Develop basic applications using Al tools.	Identify right tool for different Al based problems.	CO Statements (UC-USCATSS): Affincial intelligence Laborate	The state of the s		X1951: (Artificial intelligence Laboratory)
-								3	3	3	3	4	1	-		Basic knowledge
								3	3	3	1	1	- 00	00.5		Discipline knowledge
							-	3	3	3	, 0	1	1	209	9	Experiments and practice
							-	Ca.	u	1	1	, ,	7	P0-0		égasU alooT
The second		and the same				-	-	-	+	-	,	1	+	POde		Profession and society
V-1-1					-	-	-	-	-	,	,		+		abil	Environment and sustain
					-	-	-	1	-	,	3	1	+	P0-0		Ethics
					-	-	-	0	, ,	0	2 1	2	-	PO-h		Individual and team work
			-	-	+	-	-	-	-	-	2		-	PO-1		Communication
	-	-	-	-	+	1	-	-	2	2	3	3		PO-J		Life-long learning
									3	3	3	3	3	PSO-k		Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.
	The state of the s								3	2	3	2		PSO-I		Comprehend, explore. Able to use latest and build up computer itends in technology programs in the alled development and sa areas like Aporthms, thereby build innovate System Software, new ideas and Web Design and Data solutions to varied Analytics.
	-	The second secon							3	3	3	3		PSO-m		Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
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Practical Assignments

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

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1952 : (R Programming Laboratory)

Statements (JoculgeAr 982: R Programming Laboratory) Write programs for array and matrices. Execute that frames and lists. Differentiate between arrays from vectors. Implement factors in R. Execute minor projects using R.		(X1953: (R Programming Laboratory)
w w w w Ç	-	Discipline knowledge V
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		Experiments and practice
+++++	Pod	Took Usage
	PO-e	Profession and society
	PO	Environment and sustaina
	PO-g P	Individual and team work
	PO-h PO-i	Communication
ω ω ω ω ω	FO9 FC	Cife-long learning
/ w w w w	PSO-k	Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.
2 2 2	PBO4	Comprehend, explore Able to use latest and build up computer trends in technology programs in the allied development and sareas like Algorithms, thereby build innovate System Software, Wab new Ideas and Design and Data solutions to varied Analytics.
2 2	PSO-m	Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
Design Design Design Design	ng Level(understandlanalysel deisgn etc)	
Employability Pr Employability Pr Employability Pr Employability Pr Employability Pr	Focus on Employability / Entrepreneurs of Pr	

Assessment Tools to Measure Attainment of CO
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Department of Computer Science & Engineerists
IKIG PTU Main Campus
Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1953 : (Digital Marketing Laboratory)

						Š	4	3	1	2	1	100	5			CA1953
						Develop digital marketing strategy and plan	Design content for digital marketing.	Identity the major digital that setting channels.	DIOPS .	Implement common digital marketing exerciseusing SEO, Social incura and	Highlight the Key cicinents of a digital marketing set a second media and	of division of the state of the	CO Statements (UC-UGCA1953: Digital Marketing Laboratory)			Program Bachelor of Computer Applications (BCA) CA1953 : (Digital Marketing Laboratory)
					I	3		3	3	ω.	1	w	PO-a			Basic knowledge
						3	3	CU	3	2		2	PO-0	2		Discipline knowledge
						-	3	ω	3	w			70-6	2		Exberiments and bractice
					T	-	7	2					70-0	00.4		Tools Usage
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		1	1	-		1							100	1.00	lidi	Environment and sustains
		1	-	-									-	PO-d		Ethics
		+	-				w	3	3		,	1	1	PO-h		Individual and team work
		1	1				2	2	2	, ,	2	-	+	POd		Communication
		1					3	3		-	u	-	-	PO-		Urie-long learning
							u		3	3	3			PSO-K		Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thinking career and higher studies.
							1		3	. 2				F00-4	500	Explore technical Comprehend, explore and build up computer transfs in technology varied areas of compate Applications areas time. Apportune, the allied computer Applications areas time. Apportune, thereby build innovate to help attain skills to System Software, Web new ideas and purse thriving career Design and Data Analytics. Analytics.
								2	2	2				1	PSOJ	Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
)								Design	Design	Design	Design		Cunaistain	The description of the second	Learning Level(understand/analyse/ deisgn etc)	

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Focus on Employability / Entrepreneurship Employability

Assessment Tools to Measure Attainment of CO
Practical Assignments

BY

Department of Computer Science & Engineeric)
IKG PTU Main Campus
Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1954: (Information Security Laboratory)

							Implement Encyption Techniques	Review security policy	Preparae solutions to various threats	Categorize various types of viruses.	Outline various types of attacks.	or ommitted to coor took. Inditioned decintly rapolate	CO Statements (I IC A 1954) Information Security I show	
			I	I		I	3	3	3	3	3	1	000	Basic knowledge
							3	3	3	2	2	10-0	200	Discipline knowledge
							3	3	3	2		70-6	3	Experiments and practice
							3					20-0	3	egesU slooT
								2				P.O.4	4	Profession and society
								2				104	200	Environment and sustainabilit
								2				P-0-9	200	Ethics
							w	a	B	2	2	PO-B	-	hodividual and team work
The state of the s	Section Section 1				STATE STATE			2			2	PO-1		Communication
POTENTIAL PROPERTY.							3	3	3	3	3	PO-	2	Lifte-long learning
							2	2	2	ω	w	PSO-*	200	Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thirking career and higher studies.
							2	2	2		No. of the last of	PSO-I		Comprehend, explore and build up compute programs in the allied areas like Algorithms, System Software, Web Design and Data Analytics.
							2	2				PSO-m		Able to use latest riverds in technology development and thereby build innovate new ideas and solutions to varied problems.
							Design	Design	Understand	Understand	Understand	Learning Level(understand/analyse/ deison etc)		
											Employability	Focus on Employability / Entrepreneurship		
							Practical Assignments	Practical Assignments	Practical Assignments	Practical Assignments	Practical Assignments	Assessment Tools to Measure Attainment of CO	The same of the sa	

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Department of Computer Science & Engineeria;
IKG PTU Main Campus Kapurthala

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

Analyze the effects of intellectual property rights on society as a whole.	Compare the different forms of intellectual property protection in terms of their key differences and similarities.	Outline the primary forms of intellectual property rights.	Categorize case law and common law to current legal dilemmas in the technology field.	Identify tatutory, regulatory, constitutional, and organizational laws that affect the information technology professional	o. CO Statements (UC-UGCA1955: Cyber Laws & IPR Laboratory	
3	3	3	3	3	PO-a	Basic knowledge
2	ω	3	2	3	PO-b	Discipline knowledge
2	ы	2	2	2	PO-c	Exberiments and bractice
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2		2			PO-e	Profession and society
		2			POd	Environment and sustainabilit
2	2	2			PO-g	Ethics
w	3	3	2	2	PO-h	show meet bnd leubividual
2	2	2			PO-1	Communication
ω	3	3	ω	3	PO-	Life-long leaming
2	2	3	w	3	PSO-k	Explore technical comprehension in varied areas of Computer Application to help attain skills to purse thirking career and higher studies.
2					P\$0-I	Comprehend, explore Able to use latest and build up computer trends in technolog programs in the alled development and areas like Algorithms, thereby build innov System Software, new ideas and Web Design and Data isolutions to varied Analytics.
2					PSO-m	Explore technical Comprehend, explore Able to use latest comprehension in and build up computer trends in technology varied areas of programs in the allied development and Computer Applications areas like Aporthms, to help attain skills to System Software, purse thirving career Web Design and Data solutions to varied and higher studies. Analytics.
Understand	Understand	Understand	Understand	Understand	Learning Level(understand/analyse/ deisgn etc)	
Employability	Employability	Employability	Employability	Employability	Focus on Employability / Entrepreneurship	
Practical Assignments	Practical Assignments	Practical Assignments	Practical Assignments	Practical Assignments	Assessment Tools to Measure Attainment of CO	

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Department of Computer Science & Engineericity IKG PTU Main Campus Kapurthala

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

				1							
				Apply Machine Learning algorithms to solve real world problems	Choose the right algorithm for different problems.	Compare different machine lacrning algorithms.	Implement programs for various Learning algorithms	Differentiate between various data types.	CO Statements (UC-UGCA1956: Machine Learning Laboratory)		The state of the s
				3	3	3	3	3	PO-a	Basic knowledge	
				3	3	3	2	2	PO-b	Discipline knowledge	
				3	2	3	2	2	PO-c	Experiments and practice	
				2		2	2		PO-d	Tools Usage	
				2					90-e	Profession and society	
		Section 1		2					PO4	lidanisteus bna finemionivn3	
				1					PO-g	Ethics	
				2	2	3	3	2	PO-h	How meet bee subivibili	
						2	2	2	PO-I	Communication	
				3	3	3	3	3	F04	Brimsel broi-elil	
				2	2	3	3	3	PSO-k	Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thirwing career and higher studies.	
				2	2	2	2		PSO-I	Explore technical Comprehend, explore Able to use latest comprehension in and build up computer trends in technology varied areas of programs in the allied development and Computer Applications areas like Algorithms, to help attin stills to System Software, Web new ideas and purse thriving career. Analytics. Design and Data and higher studies. Analytics.	
				3	2				PSO-m	Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.	
				Design	Design	Understand	Design	Understand	Learning Level(understand/analyse/ deisgn etc)		
			To see the	Er	E	En	E	E	Fo		

Focus on Employability / Entrepreneurship Employability Employability Employability Employability Employability

Assessment Tools to Measure Attainment of CO
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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) UGCA1957 : (Software Project Management)

											0.	
						Apply management and development practices to develop software.	Comment upon risk and quality management.	Explain the fundamentals of Process Planning, effort estimation and quality planning.	Outline the basic concepts of Software projects.	Define the principal tasks of software project managers, and basic concepts in software projects.	CO Statements (UC-UGCA1957: Software Project Management)	
	Bell School					3	3	3.	3	ų	PO-a	Basic knowledge
No. of the last of						w	w	3	2	2	PO-6	Discipline knowledge
					The same of the sa	3					PO-c	Experiments and practice
						2					PO-d	egesU slooT
											PO-e	Profession and society
											PO4	Environment and sustainabili
											PO-g	Ethics
						2	2	ω	3	2	PO-h	show meet bne teubivibril
											PO-	Communication
						3	3	3	3	3	FO _d	Life-long learning
						2	2	3	3	2	PSO-K	Explore technical comprehension in varied areas of Gomputer Applications to help attain skills to purse thirking career and higher studies.
						2		2			P\$0-I	Explore technical Comprehend, explore Able to use latest comprehension in and build up computer trends in echnology varied areas of programs in the alfield development and Computer Applications areas like Algorithms, thereby build innovate to help attain stills to System Software, Vielo new Abass and purse thinking career. Design and Data solutions to varied and higher studies. Analytics.
						3	2				PSO-m	Able to use latest trends in technology development and the reby build innovate solutions to varied problems.
						Understand	Understand	Understand	Understand	Understand	Learning Level(understand/analyse/deisgn etc)	

Employability
Employability
Employability
Employability

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests

Focus on Employability / Entrepreneurship

Assassment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

CO No. CO1 CO2 CO3 CO3



HOD
Department of Computer Science & Engineeria;

JKG PTU Main Campus Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1901 : Mathematics

Prepare solutions for various real life problems.	Organize data in various models.	Illustrate various operations and formulas used to solve mathematical problems.	Explain different terms used in basic mathematics.	Define various mathematical notions.	o. CO Statements (UC-UGCA1901: Mathematics)		en au . maintinaisse
4	3	3	3	3	PO-a		Basic knowledge
4	2	w	3	2	PO-b		Discipline knowledge
4	1	w	3	1	b PO-c		Experiments and practice
	-			-	c PO-d	-	egesU slooT
		2		-	d PO-e		Profession and society
	1				e PO-	MIIGE	Environment and sustain
	-	-			PO-9		Ethics
	2 2	w	w	2	-		Individual and feam work
	-	-			+	-	Communication
	-			-	104	-	Life-long learning
	1	w	3	4	POJ		Expl com varie Com to he purs and
	2	3	3	3	POU-K	200	Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.
	3	2			Food	Deep	Explore technical Comprehend, explore Able to use latest comprehension in and build up computer trends in technology varied areas of programs in the allied development and programs in the allied development and computer, Applications areas like Aponthrms, thereby build innovate to hep attain skills to System Software, purse thriving career Verb Design and Data solutions to varied and higher studies. Analytics.
	3			-	1001	Beol	Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
	Design	Understand	Onceisand	Hadadad	Understand	carning evel(understand/analyse/ delson etc)	
	Employability	Employability	Employability	Employability	Employability	Focus on Employability / Entrepreneurship	
	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	MSTs, ESE, Class/Quiz Tests	Assessment Tools to Measure Attainment of CO	

CO No. CO2 CO2 CO3

HOD
Department of Computer Science & Engineeria;
IKG PTU Main Campu's
Kapurthala

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

								Bulding interface of application with various devices	Designing small IoT applications	Outline the use of bluetooth for connectivity of mobile application with 10 T device	Analyze sensor generated data	Identify different types of IOT devices and sensors.	CO Statements (UC-UGCA1939: Internet of Things Laboratory	
Section and	100 100	B CONTRACTOR OF THE PARTY OF TH		No. of Contrasts			10.05 ASS	3	3	3	3	3	PO-a	Basic knowledge
	Section 18			THE RESERVE			Section 1	3	3	а	3	3	РО-Ь	Discipline knowledge
				Contraction of the Contraction o	C. U.S. S.	N. W. L. S.		3	3	з	3		PO-c	Exberiments and bractice
					S. Carlon	1000		3	3	ω	w		PO-d	egesU slooT
		STATE SAME	S. Carriera										PO-e	Profession and society
	100000					St. Control						No.	PO-f	illdanistaua and sustainabilit
THE PARTY OF	Colonial Col		000000000000000000000000000000000000000	300000		No. of Street, or other Persons and Street, o					1000000		PO-g	Ethics
	No.		(A. 10) (B. 10)		100			w	w	ω	2	2	PO-h	Individual and team work
The state of	No. of Street, or other Persons	150	Salara and	2000				2	2	2		2	PO-1	Communication
								3	3	3	3	3	PO-J	Life-long learning
								3	3	ω	3	3	PSO-k	Mind the college of the same and
								3	3	3	2	2	PSO-I	explore imputer allied allied rithmis, re, ad Data
								3	2	w	2	2	PSO-m	Able to use latest trends in technology development and thereby build impovate new ideas and solutions to varied problems.
								Design	Design	Design	Analyse	Understand	Learning Level(understand/analyse/ deisgn etc)	

Entrepreneurship Entrepreneurship

Practical Assignments
Practical Assignments

Focus on Employability / Entrepreneurship Entrepreneurship Entrepreneurship

Assessment Tools to Measure Attainment of CO Practical Assignments
Practical Assignments

CO4 CO3 CO3

Department of Com

Department of Computer Science & Engineeria; IKG PTU Main Campus Kapurthala

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

										Desi	Deve	Desig	Write	Medicin	Total	cos	
										Design a small gaming project	Develop programs for basic animations using C or C++	Design basic shapes for logo's	Write programs to implement 2-D and 3-D corrdibate transformations.	implement argorithms for an awair order strates take effects, this aim point.	mad elegathme for drawing basic shapes libe girels line and point	CO Statements (UC-UGCA1940: Computer Graphics Laboratory)	
F	Don't had	and the same		T			100 TO THE REAL PROPERTY.		I	· ·	3	3	3	-		PO-a	Basic knowledge
-		No.					CASCA MANDER TO			3	3	3	3	1		90-ь	Discipline trowledge
-					1		SECTION AND SECTION			3	w	3	3	,	2	PO-c	Experiments and practice
		THE STATE OF THE S								3	3	2	1	,	2	PO-d	egasU alooT
	Sept. 1884	Section of the second	Sandan					1000					-		The second	PO-e	Profession and society
					-	STREET, STREET									Service of the	PO-f	Environment and sustainabili
						Registration					200			-		PO-g	Ethlics
			O CONTRACTOR		-					3	w	3	1	1	2	PO-h	Individual and team work
				-			Trong Took			2	2	2		-	2	PO-I	Communication
				-		ALC: NO.				3	w	3		,	3	PO-J	Brinnsəl Broil-Əli.
										3	3	3	,,,	u	3	PSO-k	Explore technical comprehension in varied areas of comprehension in varied areas of to computer Applications to help attain skills to purse thriving career and higher studies.
			- Committee of the comm	The second second	The state of the s					3	, 4		3	2	2	PSO-I	Explore technical Comprehend, explore Able to use latest comprehension in the architecture for the comprehension of programs in the allied development and computer Applications areas like Algorithms, thereby build innovate to help attain skills to System Sodware, Web new ideas and purse thriving career Analytics. Analytics.
				The second second second	Annual Species of the Secretary of the S					9	-	,	3	2	2	PSO-m	Able to use latest trends in technology development and the reby build innovate new ideas and solutions to varied problems.
									1	Case	Design	Design	Desirin	Design	Understand	Learning Level(understand/analyse/ deisgn etc)	And the party was represented the party of t
										-	F	-	T)	E	DI DI		

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Department of Computer Science & Engineeria's
ING PTU Main Campus
Kapurthala

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1941: (Linux Operating System Laboratory)

	CO Statements (UC-UGCA1941: Linux Operating System Labo	Prepare the environment for installation and use of Linux operating	Write Shell Scripts	Implement C programs using acc compiler	Impelment virtualization	Execute commands related to grantinf and revoking user priviledges.						
Basic knowledge	PO-a	3	3	3	3	ω	T	T			1	
Discipline knowledge	РО-ь	3	3	3	3	u		1				
Experiments and practice	PO-c	2	GJ.	3	3	3		1				
agesU slooT	PO-d		2	2	2	ω		1				
Profession and society	PO-e							1				
Environment and sustaina	-											
Elpics	PO-g						-					
show meet bns leubivibrii	PO-h	2	2	2	2	2	-	1				
Communication	h PO-I								Spring Series	DESCRIPTION OF THE PARTY OF THE		The second
Enimasi gnol-siti	- PO-J	3	3	3	3	3	1	1				1000 TO 1000
com vari con to h	I						-		100			
Explore technical comprehension in varied areas of Computer Applications to help atlain skills to to help atlain skills to purse thriving career and higher studies.	PSO-k	3	3	3	3	з						
Comprehend, explore Ade to use larest and build up completer trends in technology programs in the allied development and areas like Algorithms, thereby build innovati System Software, new ideas and Web Design and Data solutions to varied Analytics.	POS4			3	3	з						
Comprehend, exploire 'Able to use latest and build up computer trends in technology programs in the allied development and areas like Algorithms, thereby build innovation system Software, new ideas and Web Design and Data solutions to varied Analytics.	PSO-m			2	2	2						
	Learning Leve	Understand	Design	Design	Design	Design						

ning Level(understand/analyse/ delsgn etc)

Focus on Employability / Entrepreneurship

Assessment Tools to Measure Attainment of CO

Practical Assignments

Entrepreneurship
Entrepreneurship
Entrepreneurship
Entrepreneurship

Practical Assignments
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Practical Assignments Practical Assignments

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Department of Computer Science & Engineeric) Kapurthala

PO-g PO-h PO-I PO-J 2 3 Explore technical Compréhend, explore Able to use latest comprehension in and build up computer trends in technology varied areas of programs in the ailled development and Computer Applications areas like Appoiltims, line viet by build innovaire to help attain skills to System Software, new ideas and purse thriving career. Web Design and Data solutions to varied and higher studies. Analytics. PSO-I PSO-m Learning Level(understand/analyse/ delsgn otc)
Understand
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Design
Understand

Focus on Employability / Entrepreneurship Employability
Employability
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Employability

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

CO4 CO5

| CO-Statements (UC-UGCA1942: Cloud Computing Laboratory PO-a Ideally major commercial projects in the field of doud computing 3 Design basic cloud applications 3 Execute basic functionalities of open source tools like Open Stack. 3 Implement virtualization 3 Define major services provided by cloud service provider. 3

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1942: (Cloud Computing Laboratory)

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

	DO OSCILIANO IL INCOMPANIA DE SANCIA	CO Statements (UC-UGCA1943: Android Programming)	Prapare environment for working on Android OS.	Highlight various security issues in Android platform.	Design innovative User Interface and develop activity for android app.	Outline the steps for creating database applications.	Write programs for basic Android based applications.							
Basic knowledge	80	PO-a	3	3	ω	3	3	I	Charles Annual Control	1000	The same of	Total Control		-
Discipline knowledge	5	PO-6	2	3	3	3	3		March 1				No. State of	
Exberiments and practice	9	PO-c	2		ω	3	3					Appending.		-
agasU alooT	0	PO-d	2		2	2	2		Section (Section)		State of the state		State of the state of	
Profession and society	800	PO-e		2					Sec. 1834.80		Mark Con	Periodicus.		
Environment and sustain	allida	PO-f		2					STREET COST	Della Article	SHAPE ALE	mental de la constante de la c		
Elhics	000	PO-g		2										-
Individual and team work	00.5	PO-h	2	2	2	3	3			1000	CHINATON CONT		A. Harrison	
Communication	0	PO-I		2		2	2				Service Control	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Vine Acous	
Life-long learning	BOL	PO-	3	3	3	3	3				S. S. Parker			
Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.	BSO F	PSO-k	3	3	3	3	3							The state of the s
Comprehend explore Able to use latest and build up computer trends in technology programs in the allied development and areas like Algorithms, thereby build innova System Software, new ideas and Web Design and Deta. Solutions to varied Analytics.	LOBA	PSO-I			2	2	3				No. of the last of			The state of the s
Comprehend, explore: Able to use latest and build up computer trends in technology programs in the allfed development and areas like Algorithms, thereby build innovate System Software, new ideas and Web Design and Data solutions to varied Analytics.	PSO-m	PSO-m			2 .	2	3							The second secon
	Learning Level(understand/analyse) deison etc)	Learning Level(understand/analyse/ delsgn etc)	Understand	Understand	Design	Understand	Design							

Employability
Employability

MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests

Focus on Employability / Entrepreneurship Employability Employability

Assessment Tools to Measure Attainment of CO MSTs, ESE, Olass/Quiz Tests MSTs, ESE, Class/Quiz Tests

CO3 CO3 CO3



Department of Computer Science & Engineeria: J HOD Kapurthala

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

	1														
Basic knowledge	PO-a	3	3	2	3	3								1	1
Discipline knowledge	PO-6	2	2	3	3	2						1		-	-
eothorid and practice	PO-c	-	ω	3	3	w									-
Fools Usage	PO-d		2	2	w w	W						-			-
Profession and society	PO-e			2					S. September				-		1
lidenisteus bns Inemnorivn∃				2											1
Ethics	P-O-g		Section 1	2											
hodividual and feam work	g PO-h		2	3	3	3									
Communication	h PO-I				2	2	A 100 C			Sec. 27.2	Statist my				
Life-long learning			3	3		u		10.79							-
m o s o s o m	1		100												-
Explore technical comprehension in varied areas of Computer Application to help attain skills to purse thriving career, and higher studies.	PSO-k	w	3	3	32	3									
Comprehend, explore Able to use little and build up computer trends in techn programs in the allied development a areas fixe Algorithms, thereby build in System Software, Web prevides and Design and Data solutions to var Analytics.	PSO-I		2	3	2	3								The second secon	
Able to use latest trends in technology development and thereby build innovate bnew/ideas and solutions to varied problems.	PSO-m		Le2	43	3	ω									The state of the s
6	Learning Level(understand/analyse/ deisgn etc)	Understand	Design	Design	Design	Design									

Assesment Tools to Measure Attainment of CO
Pradical Assignments
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Pradical Assignments
Pradical Assignments
Pradical Assignments

OG Statements (UC-UGCA1944s: Avidroid Programming Laboratory)
Pranance environment for working on Android OS.
Program basic Android based applications.
Highlight various security issues in Android platform.
Implement database applications.
Design innovative User Interface and develop activity for android app.



Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1945 : (Artificial Intelligence)

Life-long leaming	CO Statements (UC-UGCA1945: Artificial Intelligence) PO-a PO-b PO-c PO-d PO-d PO-f PO-g PO-d	ts of Artificial Intelligence and 3 3	d disadvantages of various search 3 3 2	rious Expert Systems and Al applications. 3 3 2	em Recognition 3 3 3	er the righ AI tool for different AI based applications. 3 3 3 3 3								
ഉദിന്നുക്ക് ഉദരി-ചിപ	PO-f	2	the same of the sa	3	a u	w w w		w w w	W W W		U U U W	ىت يى يى		
0 = 0 0 0	PO-i PO-j		2 3											
		PSO-m	PSO-m	PSO-m 2	PSO-m 2 2	PSO-m 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 3 3 3 3	2 2 2 2 3 3 3 3 3 3	2 2 2 2 3 3 3 3	2 2 2 3 3 3 3	2 2 2 3 3	2 2 2 3 3 3 3	2 2 2 2 3 3 3	2 2 2 2 3 3 3 3
Comprehend, explore Able to use latest and build up computer trends in technology programs in the allied development and areas like Algorithms, berieby build innovate System Software, new ideas and Analytics. Analytics.		Learning Level(understand/analyse/ delsgr	Learning Level(understand/analyse/ delsgn Understand	Learning Level(understand/analyse/ delson Understand Understand	Learning Level(understand/analyse/ delsgn Understand Understand Design	Learning Level(understand/analyse/ delson- Understand Understand Design Understand	Learning Level(Inderstand/analyse/ delsgn. Understand Understand Design Understand Design	Learning Level(understand/analyse/ delsgn. Understand Understand Design Understand Design	Learning Level(understand/analyse/ delsgn. Understand Understand Design Understand Design	Learning Level(understand/analyse) delson. Understand Understand Design Understand Design	Learning Level(Inderstand/analyse) delign Understand Understand Design Understand Design	Learning Level(Indenstand/analyse) delign. Understand Understand Design Understand Design	Learning Level (Inderstand/analyse) delson. Understand Understand Design Understand Design	Learning Level(Inderstand/analyse/ delsgn_etc) Understand Understand Design Understand Design

Employability
Employability
Employability

Focus on Employability / Entrepreneurship

Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests

Employability

Employability

MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests

CO2

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CO1



Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1946 : (R Programming)

	0		-	-	s o	-					
	CO Statements (UC-UGCA1946: R Programming)	Identify the key componencts of R programming Language.	Define the concept of data Science.	Differentiate between vectors and arrays.	Outline the usage of data frames, lists, factors, tables and R structures.	Explain the need and utilization of vacrious visualization tools.					
Basic knowledge	PO-a	æ	3	3	s	з		T			
Discipline knowledge	РО-Ь	2	3	w	3	3		1			
Experiments and practice	PO-c			2	з	ω			100 m		ALC: NO.
agesU alooT	PO-d					·w		1		Service Servic	
Profession and society	PO-e							1		Sandard B	
Environment and sustainable	PO-f		1				T			N (1977)	
Ethics	PO-g						-	1			
Individual and feam work	PO-h	2	2	2	ω	ü					
Communication	PO-1	100,00	02780	2	2	2				B 10-05	
Buimsəl gnol-əfi.	PO-J	ω.	3	£	ω	a			100000		
explore technical comprehension in varied areas of Computer Applications to hop attain skills to purse thriving career and higher studies.	PSO-k	w	ω	3	u	3					
comprehent, septone when to use mans, and build up computer trends in the chindley programs in the allied development and areas like Algodinats, thereby build innovate System Software, wheb Design and Data solutions to varied Analytics.	PSO-I			2	2	3					
Aute to use mises trends in technology development and thereby build innovate new ideas and solutions to varied problems.	PSO-m				2	ω					
	Learning Level(understand/analyse/ delsgn etc)	Understand	Understand	Understand	Understand	Design					

Employability

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

Employability Employability Employability Employability

MSTs, ESE, Class/Quiz Tests

Focus on Employability / Entrepreneurship

Assessment Tools to Measure Attainment of CO

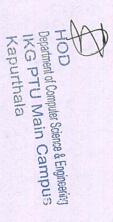
MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests

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CO4 003 CO2

CO5



												0.000			1	1	
										Implement specification, design, implementation, and testing process using latest tools	Design a software engineering process life cycle.	Compute software complexity using latest tools	Create data flow diagrams	lidentify the scope and objective of different domains that have impact on society	Company of the control of the contro	CO Statements (IIC-IICCA1924: Software Engineering Laboratory)	
1		New Agent			I					ω	3	9	3	-	+	PO-a	Basic knowledge
	100	Street Co.	Section 5		1		0	San San	-	w	w	w	u			PO-b	Discipline knowledge
		04 meta	(Sea 1) 65		-		CARROLL SE		100	w	u	u	4		1	PO-c	Experiments and practice
					1			100	8	w	3	3	4		+	po-d	Pools Usage
	A STATE OF THE PERSON		Part of the same			Control Total		Sec. 1000		2	-				+	d PO-e	Profession and society
	STATE OF THE PERSON	THE REAL PROPERTY.			-	Total Control	1200			2	-		-		- 1	- 1	Hidenistaus bus finamonivn∃
10000	THE REAL PROPERTY.	The same	88							1	-		-		-	PO-g	Ethics
1000	Street Miles	100			0.00	No.	STATE OF STREET			(u)	2	2	-	1	2	g PO-h	how meet bne laubivibni
1000	STATE STATE	Sept Sept			0	HANN AVEN					+		1	-			Communication
THE REAL PROPERTY.				-		STATE AND A			-	2	1	-	1	-		PO-I F	Life-long learning
2000	The state of									w	4	0	1	-	3	PO-J	ap #0<9 m
										u	3		,	3	2	PSO-k	Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thinking career, and higher studies.
· · · · · · · · · · · · · · · · · · ·				The second second second						2	-	3	-			PSOH	oplore oplore allied allied thms, e, Web
										2	-	2	4	2		PSO-m	Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
The second second	L	1	1			1		I Comment	1	Design	- Secondar	Design	Design	Design	Understar	Learning	

g Level(understand/analyse/ deisgn etc)

Employability

Practical Assignments

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

CO2 CO3 CO5

Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1921 : (Software Engineering Laboratory)

HOD

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Department of Computer Science & Engineering

Department of Computer Science & Engineering

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Kapurthala

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

										Implement rusqu.	Turbund BI (SOI	Design Databases and Tables in relational model for some project related to society welfare	Write integrity constraints on a database	Implement DDL, DML and DCL commands	Distribute or well but, with any byte Community	Differentiate between DDI DMI and DCI commands	CO Statements (UC-UGCA1925: Database Management Systems Laboratory)	
					STATE OF THE PARTY					-	2	ω	3	u		w	PO-u	Basic knowledge
-		SAL BENEFIT			100	100					3	ω	3	0		3	PO-b	Discipline knowledge
-	100	A STORES			No. of the last			1	1	-	ш	ш	CH.	3		u	PO-c	Experiments and practice
		S. S. S. S. S.			Total Printers	700000					3	w	3	2	1	w	PO-d	egsaU alooT
				1	STATE OF THE PARTY OF	2000				1		ω					PO-e	Profession and society
				1	The second second	100			-	1		w					PO-f	Environment and sustainabil
	STATE OF	Section 1			The state of			-	-	1		2		-	1		PO-9	Ethics
				1	No. of the last of		-	-	-	-	u)	ω	2	-	-	2	PO-h	show meat bas leubivibal
		A STATE OF		-	Personal de	C Comp	-	-	1	-		w		-	1		PO-I	Communication
1	(A) (A) (A) (B) (B)			-	Section 2		-	1	1	-	2	w	to		0	Lo	PO-	Enimes learning
The second secon				The state of the s							3	3	3		1	S. S. L. S.	PSO-k	Explore technical comprehension in varied areas of the Varied areas of Computer Applications to help attain skills to purse thinking carefer and higher studies.
The state of the s											N	2	-				PSO-I	Explore technical Comprehend explore I Able to use latest and build up computer trends in technology varied areas of programs in the allied development and Computer Applications areas like Algoritims, thereby build innovate to help attain skills to System Software. The Applications areas like Algoritims, thereby build innovate many lighter studies. Analytics, and Davis and Davis solutions to varied and higher studies. Analytics.
1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -											2	2:		4	7		PSO-m	Able to use intest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
		1	1			1	1	1	1	-	Desi	Desi	Des		Das	Ana	Lear	

Focus on Employability / Entrepreseurship.
Employability
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Assessment Tools to Measure Attainment of CO
Practical Assignments
Practical Assignments
Practical Assignments
Practical Assignments
Practical Assignments

CO 4 CO 5

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NAG PTU Main Campus

Kapurthala

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

326 : (Operating Systems Laboratory)
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Basic knowledge
Discipline knowledge
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Profession and society
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Ethics
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Life-long leaming
Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.
Explore technical Comprehend, explore and build up computer trends in technology varied ereas of computer Applications areas like Algorithms, to help attain stills to System Software, purse thirting career. Web Design and Data and problems. Analytics. Analytics.
Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.

Focus on Employability / Entrepreneurablp Assessment Tools to Measure Attainment of CO

Practical Assignments

Practical Assignments
Practical Assignments
Practical Assignments
Practical Assignments

Employability

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Department Computer Solence and Engineering Program Bachelor of Computer Applications (BCA) UGCA1927 : (Web Designing)

								Design forms with special controls using HTML	Outline the key web designing concepts using java script	Explain how to link webpages through hypertext or images a links	Design webpages with multiple sections or frames	Create pages with simple tags in HTML	CO Statements (UC-UGCA1927: Web Designing	y · (went-been naw)
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								3	з	3	E.	3	PSO-k	Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.
一日 の の 日本						-		ts:	B	3			P80-1	Comprehend, explore and build up computer programs in the allied areas like Agordhms, System Software, Web Design and Data Analytics.
								2	2	2			PSO-m	Able to use latest trends in technology development and thereby build impovate new ideas and solutions to varied problems.
_				1	1			Design	Design	Design	Design	Understand	Learning Leve	

Focus on Employability / Entrepreneurship

Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests

Employability

Entrepreneurship

Entrepreneurship

MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests

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CO3 CO2

CO4

CO5

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

	Learnin	Design	Design	Design	Design	Design							
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ata	PSO-I	3	3	u	3	3							
comprehension in and build up computed areas of programs in the all programs in the all programs in the all programs in the all programs areas like Algorithm to help attain skills to System Software, purse thriving career Vkb Design and Digher studies. Analytics.	PSO-k	3	3	3	3	3							
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seriments and practice	PO-c	3	3	3	3	3	0.00					4	100000000000000000000000000000000000000
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sic knowledge	PO-a	3	u	3	3	3			A	N. 5 C. 1958	STATE OF THE STATE OF		
	No. CO Statements (UC-UGCA1928: Web Designing Laboratory)				O4 Implement advanced web designing concepts using java script	O5 Execute a small web pased project for the benefit of scoiety							
	CON	co	co	co	004	CO							

ning Level(understand/analyse/ deisgn etc)



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

						No.				1		
						Implement the database concepts in PHP	Illustrate the concept of static and dynamic websites	Differentiate between client side and server side scripting	Design the work flow of web page with the help of various control statements	Write scripts for basic web page designs	CO Statements (UC-UGCA1930: Programming in PHP Laboratory)	
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						3	3	3	3	3	PSO-k	Explore technical comprehension in varied areas of Computer Applications to help attent skills to purse thinking career and higher studies.
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						3	2	3			PSO-m	Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
						Design	Design	Design	Design	Design	Learning Level(understand/analyse/ deisgn etc)	

Entrepreneurship

Assessment Tools to Measure Affairment of Confederation Assignments

Practical Assignments
Practical Assignments
Practical Assignments
Practical Assignments

CO2 CO3 CO4 CO5



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

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										600	204	003	202	100	No.	
										Explain the role of visualization in data representation and analysis:	Apply different data mining algorithms on wide range of data sets.	Identify the real life applications where data mining can be applied	Differentiate between the Transactional and Analytical data models.	Highlight the need of Data Warehousing & Mining	CO Statements (UC-UGCA1931: Data Warehouse and Mining)	
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				-	-			-	-	2	3	2	2		PO-c	Experiments and practice
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	0.000				-					-		2			PO-e	Profession and society
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The second second	100				1					-		2			PO-g	Ethics
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The second secon										3	2	2			PSO-I	Competend, explore. Able to use listed and build up computer trends in technolo programs in the allied development and si areas like Algorithms, thereby build inno System Software, Web new ideas and Design and Data solutions to varied Analytics.
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Focus on Employability / Entrepreneurship
Employability
Entrepreneurship
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Entrepreneurship

Assessment Tools to Measure Attainment of CO
MSTs, ESE, Class/Quiz Tests



Department of Computer Science & Engineering IKG PTU Main Campus Kapurthala

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1902 : (Fundamentals of Computer and IT)

005	CO4	CO3	002	001	CO No.	
Highlight the Internet safety, legally, and and other issues.	Prepare documents using word processing. Spreadsheet and Presentation Graphics Softwares.	Define the role of Operating system	Uitline the functioning of various components of computer system	Identify of input and output devices of Computers	CO Statements (UC-UGCA1902: Fundamentals of Computer and	
u ع		3	3	3	PO-a	Basic knowledge
		100			PO-b	Discipline knowledge
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ω	2	2			PO-f	Environment and sustainabilit
2					PO-g	Ethics
ω					PO-h	individual and team work
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Employability	Employability	Employability	Employability	Employability	Focus on Employ	

Assessment Tools to Measure Attangment of CO

MSTs, ESE, Class/Quiz Tests

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

									Explain various concepts of C programming language.	Choose the right data type and statements for programs.	Implement programs using C.	Design algorithms for solving various real life problems	Express the logical flow used in Programming.	CO Statements (UC- UGCA1903: Problem Solving using C)	
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		100000000000000000000000000000000000000				The State of					Section 2			PO-g	Elhics
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											3	2		PSO-m	Comprehend, explore Able to use latest and build up computer trends in technology rograms in the alled development and reast like Algorithms, thereby build impovate System Software, new ideas and Web Design and Data solutions to varied 4 hallytics.
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arning Level(understand/analyse/ deisgn etc)

Employability

Focus on Employability / Entrepreneurship Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA†904 : (Workshop on Desktop Publishing)

										Express the messages through graphical content	Prepare different types of graphic related documents.	Apply knowledge in designing various documents.	Identify the right componets for designing documents.	Outline the characteristes of desktop publishing tools.	CO Statements (UC-UGCA1904; Workshop on Desktop Publishing)	
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-	-												1		PO-b	Discipline knowledge
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	The state of the s	The second second second second second								3	3	3	2		PSO-m	Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.
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										Entrepreneurship	Entrepreneurship	Entrepreneutship	Entrepreneurship	Employability	Focus on Employability / Entrepreneurship	

MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests

Assessment Tools to Measure Attaigment of CO

MSTs, ESE, Class/Quiz Tests

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1905: (Problem Solving using C Laboratory)

	CO Statements (UC-UGCA1905: Problem Solving using C Laboratory)	Select the right statement for the program.	Experiment with different input values.	Test the output with boundary conditions.	Distinguish between various control statements and data types.	Implement programs for various problems								
Basic knowledge	PO-a	2	3	Li)	3	3	Ī					THE PERSON NAMED IN		
Discipline knowledge	PO-b	20 CASA	u	2	2	2		10000	Second Second	Section 18		Sept. Conf.	21.50 Carlo	Sandan Sanda
Experiments and practice	PO-c	1	3	3	3	3			S	1000000				Section 1
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Ethics	PO-g	40.00		1000000		100		100	000000			1000000	100000	Section 10
Individual and team work	PO-h		ш	3	3	3			1000000	10000	10 miles		Appropries	
Communication	POH		10 Sec. 10			2			Section 1				Section of Se	Supplied S
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Explore technical comprehension in varied areas of comprehension in varied areas of computer. Applications to help attain skills to purse thriving career and higher studies.	PSO-k		3	3	3	3								
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Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.	PSO-m				2	3								
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Focus on Employability / Entrepreneurable
Employability
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Assessment Tools to Measure Attainmett (CO)
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Practical Assignments



Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1996: (Fundamentals of Computer and IT Laboratory)

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Profession and society	PO-e				16000	2		100000	Tale Says	0/2000 C	BUTTER	SUMBOLE		The second	
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Individual and team work	PO-h		ш	3	(3)	ω		The Control		200 Mars	dimension of	Sanctification of	100	STATISTICS OF THE PARTY OF THE	
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Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse thriving career and higher studies.	PSO-k	2	3	3	3	3						SALES SECTION SECTIONS	Control of the second second	O DESCRIPTION OF SECOND	
Comprehend, explore and build up computer programs in the allied areas like Algorithms, System Software, Web Design and Data Analytics.	PSO-I	1	w	3		4		THE REAL PROPERTY AND ADDRESS OF						の一般の一個の一個の一個の一個の一個の一個の一個の一個の一個の一個の一個の一個の一個の	Wedler Wilding
Able to use intest trends in technology development and thereby build innovate new ideas and solutions to varied problems.	PSO-m	2			2	3			The same of the sa						
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Employability
Employability
Employability

Employability / Entrepreneurship

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

CO2 CO3 CO4 CO5

software.

Prepare documents and apply formatting, select the right tool for different requirements. Apply various operations.

CO Statements (UC-UGCA1906: Fundamentals of Computer and IT Laboratory)
Highlight the features of nord processing, spreadshed and presentation tools
Identify the right componets for its documents on editor, spread sheet and presentation



Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1907 : (Fundamentals of Stat(stics)

Focus on Employability / Entrepreneurship

Assessment Tools to Measure Attainment of CO
Employability

Employability

MSTs, ESE. Class/Quiz Tests

Employability

MSTs, ESE. Class/Quiz Tests

CO1 CO2 CO3 CO3

CO Statements (UO-UGCA1907: Fundamentals of Statistics)
Hisblight the need of studying & analyzing numbers.
Identify visualization tools for representing data.
Describe various statistical formulas.
Compute various statistical measures.
Compute various statistical measures.



Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1908: (Computer System Architecture)

Comment on the design of Combinational & Sequential circuits	Identify micro-operations.	Outline the role of various components of computer system.	Categorize different number system.	identify the various internal and peripheral components of computer system	CO Statements (UC-UGCA1908: Computer System Architecture)	sus : (Computer System Arizmercute)
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u	3	3	3	ω	PSO-k	Explore technical comprehension in varied areas of (Computer Applications to help attain skills to purse thriving career and higher studies.
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					PSO-m	Comprehend, explore Able to use latest and baid up computer trends in technology programs in the allied development and areas like Algorithms, thereby build innovate System Software, Web new Ideas and Design and Data solutions to varied Analytics.
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Focus on Employability / Entrepreneurship

Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests
MSTs, ESE Class/Quiz Tests
MSTs, ESE Class/Quiz Tests

CO1

CO2 CO2

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

									Review different solutions for a common problem.	Select the right Object Orinted Concept for optimal solution	Implement computer based solutions to various real-world problems using C++	Explain Object oriented approach for finding Solutions to various problems with the help of C++ language.	Outline the role of programming for solving real world problems.	CO Statements (UC-UGCA1909: Object Oriented Programming using C++)	
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The Control of the Co			100						HOUSE ST	1000000	1	ž.		PO-g	Ethics
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									G)	3	S	w	68	PSO-m	Able to use intest trends in technology development and thereby baid innovate b new ideas and solutions to varied problems.
									Review	Design	Design	Design	Understand	Learning Level(understand/analyse/ deisgn etc)	
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Focus on Employability / Entrepreneurship Employability

Assessment Tools to Measure Attainment of CO MSTs, ESE, Class/Quiz Tests

MSTs, ESE, Class/Quiz Tests
MSTs, ESE, Class/Quiz Tests
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									Select the right data types to represent class properties.	Implement file handling in C++	Implement programs using OOP concepts for various problems.	Illustrate the concept of memory representation for objects	Design the classes	CO Statements (UC-UGCA1910: Object Oriented Programming using C++ Laboratory)	
-				The state of					3	3	3	3	3	PO-a	Basic knowledge
	100	The second	Service St				1	1000	2	2	3	2		PO-b	Discipline knowledge
					100	Salan Salan			Lo	3	w	Lo	Lo	PO-c	Experiments and practice
		Control State	100000		A STATE OF THE PARTY OF T	10000	100			3	3		2	PO-d	Tools Usage
											2	1	Total Control	PO-e	Profession and society
											2			PO-1	Environment and sustainabil
						100000	1				1		17.00	PO-g	Ethilos
į					To the second				. 2	2	2	2	2	PO-h	Individual and team work
		1870						State of the state	2		w	2		PO-I	Communication
			Share Comment					The street	w	B	3	3	3	PO-	Enimesi gnoi-sit.
									3	3	3	2	2	PSO-k	Explore technical comprehension in varied areas of Computer Application to help attain skills to purse thirking career and higher studies.
the state of the s									3	w	w	3	3	PSO-I	Compret and build and build program programs areas like System Web De Analytica
									(se	3	3			PSO-m	Able to use latest trends in technology development and thereby bulld innovating indicate to varied problems.
						The same of the sa			Design	Design	Design	Design	Design	Learning Level(understand/analyse/ deisgn etc)	
									Employability	Employability	Employability	Employability	Employability	Focus on Employability / Entrepreneurship	
									Fra	PTB	FIB	Pia	Pia	ASS	

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

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

					Write solutions for Object Oriented Programming Concepts.	Design user defined functions, modules, files, and packages and exception handling methods.	Outline the use of control structures and numerous native data types with their methods.	Compare Python with other programming languages.	Explain environment, data types, operators used in Python.	CO Statements (UC-UGCA1914: Programming in Python)	
I					3	ω	ы	3	3	PO-a	Basic knowledge
			The section		3	w	ω	w	2	PO-b	Discipline knowledge
			Section .		3	3	3	3	3	PO-c	Experiments and practice
			TO THE PERSON NAMED IN		2	w	s.	3	2	PO-d	egasU alooT
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			100					A Real Street			show meat bne laubivibril
		1000	SALVE BURNER	1000	2	2	ω	2	2	PO-h P	Communication
					3	3	3	2	2	PO-1	Life-long learning
					3	ω	3	3	3	PO-j	ap & O < om
					3	ω	3	3	3	PSO-k	Explore technical comprehension in varied areas of Computer Applications to help attain skills to purse triving, career and higher studies.
					w	ω	3	ω	3	PSO-I	
			Control of the Contro		3	ω	ы	3	3	PSO-m	Comprehend, explore Able to use latest and build up computer trends in technology programs in the alled development and areas like Agorithms, thereby build innovate Nystem Software, new ideas and Web Design and Data solutions to varied Analytics.
					Understand	Design	Design	Design	Understand	Learning Leve	

arning Level(understand/analyse/ deisgn etc)

Focus on Employability / Entrepreneurship

Assessment Tools to Measure Attainment of CO

MSTs, ESE, Class/Quiz Tests MSTs, ESE, Class/Quiz Tests

Employability

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1915 : (Data Structures)

	CO Statements (UC-UGCA1915 : Data Structures)	Apply appropriate constructs of Programming language, coding standards for application development	Select appropriate data structures for problem solving and	Illustrate the outcome of various operations on data structures.	Identify appropriate searching and/or sorting techniques for wide range of problems and data types.	Differentiate between various types of data structures					
Basic knowledge	PO-a	3	ω ω	3	3	3	П	1		1000	
Discipline knowledge	РО-ь										
Exberiments and bractice	PO-c	S	<u>u</u>		3	3	Ħ			10 Kyr. 11	
Fools Usage	PO-d	1	-	3	ω	3				100	A STATE OF THE STA
Profession and society	PO-e			2	ш	w		-			
Environment and sustainable											
Ethics	PO-g					1	1	-			
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Communication	PO-I	2	ω	2	ω	S.			1		
Erife-long leaming	PO-	2	ω	3	3	2					
Explore technical comprehension in varied areas of Computer Application to help attain skills to purse thirving career and higher studies.	PSO-k	ω	ω a	3	ш	3					
Explore technical Comprehend, explore Abdi to use latest comprehension in and build up computer frends in technology varied areas of programs in the allied development and Computer Applications areas like Agorithms, thereby build innovate to help attain skills to System Software used the program of the provides and and higher studies. Analytics.	PSO-I	2	3 2	2	2	3					
Able to use latest trends in technology development and thereby build innovate new ideas and solutions to varied problems.	PSO-m		2	2	2	2					
	Learning Level(understand/analyse/ deisgn etc)	Understanding	Understanding	2 Understanding	Understanding	Understanding					

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Assessment Tools to Measure Attainment of CO

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Department Computer Science and Engineering Program Bachelor of Computer Applications (BCA) UGCA1923: (Operating Systems)

Competered, explore Able to use iterast and build up computer trends in technology programs in the alled development and areas like Apportuns, thereby build unrovate new ideas and vyeb Design and Data solutions to varied Analytics. PSO-m Learning Level(understandlanalyse/ delsgn etc) Understand 2 PSO-m Understand Understand 2 Understand 3 Understand	and build up computers and build up computers programs in the allied programs in the allied atlons areas like Algorithms, is to System Software, ever Web Design and Data Analytics. PSOJ PSOJ 3 3 3 3 3 3 3 3 3 3 3 3 3	POJ BOO-K BO BO BOO BOO BOO BOO BOO BOO BOO BOO	uogeojunuwog	Allow meat bas feubivibre	SO(U)	alidentistsue bne inemnotivni	voiession and society	2 ω 2 λ δ. οθesη 900.	ω ω ω ω ο σ φ φ φ φ φ φ φ φ φ φ φ φ φ	agbalwons enlidices	COO Statements (UC-UGCA1923: Operating Systems) Discuss the evaluation of operating environments by operating system Explain different resource managements performed by operating system Describe the architecture in terms of functions performed by different types of coordinate systems. Analyze the performance of different algorithms used in design of operating system components. Compare the key properties of different types of Operating Sysytems.
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