

**Program and Course  
Structure  
Bachelor in Computer  
Application(BCA)**

**School of Engineering and Technology**  
**BCA-Bachelor in Computer Application**  
**Batch: 2018 Onwards**  
**TERM: I**

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Remarks
				L	T	P		
<b>THEORY SUBJECTS</b>								
1.	16005	BCA160	Introduction to C Programming	3	1	0	4	
2.	16006	BCA161	Basics of Digital Electronics	3	1	0	4	
3.	16007	BCA162	Fundamental of Information Technology	3	0	0	3	
4.	25046	EVS105	Environmental Studies	2	0	0	2	
5.		MTH119	Mathematics in Computer Applications	3	1	0	4	
6.	15987	FEN101	Functional English Beginners-I	0	0	2	1	
	15988	FEN103	Functional English Intermediate-I					
<b>Practical/Viva-Voce/Jury</b>								
1.	16008	BCP160	Introduction to C Programming Lab	0	0	2	1	
2.	16009	BCP162	Basics of Digital Electronics Lab	0	0	2	1	
3.	15228	ENP 102	Functional English-I Lab	0	0	2	1	
<b>TOTAL CREDITS</b>							<b>21</b>	

**School of Engineering and Technology**  
**BCA-Bachelor in Computer Application**  
**Batch: 2018 Onwards**  
**TERM: II**

S. No.	Paper ID	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
				L	T	P		
<b>THEORY SUBJECTS</b>								
1.		BCA163	Advance Concept in C Programming	3	0	2	4	
2.		BCA164	Computer Hardware and Trouble Shooting	3	0	2	4	
3.		HMM303	Organizational Behavior	3	0	0	3	
4.		BCA165	System Analysis & Design	3	0	0	3	
5.		BCA166	Graph Theory	3	1	0	4	
6.		FEN102	Functional English Beginners-II	0	0	2	2	
		FEN104	Functional English Intermediate-II					
<b>Practical/Viva-Voce/Jury</b>								
1.		BCP163	Advance Concept in C Programming Lab	0	0	2	1	
2.		BCP164	Computer Hardware and Trouble Shooting Lab	0	0	2	1	
3.		ENP 103	Functional English-I I Lab	0	0	2	1	
<b>TOTAL CREDITS</b>							<b>20</b>	

**School of Engineering and Technology**  
**BCA-Bachelor in Computer Application**  
**Batch: 2018 Onwards**  
**TERM: III**

S. No.	Paper ID	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
				L	T	P		
<b>THEORY SUBJECTS</b>								
1.		BCA260	Computer Organization	3	0	0	3	
2.		BCA261	Operating Systems	3	1	0	4	
3.		BCA262	Web and Its Application	3	0	0	3	
4.		BCA263	Principles of Data Structures	3	1	0	4	
5.		HMM111	Values and Ethics	2	0	0	2	
<b>Practical/Viva-Voce/Jury</b>								
6.		BCP260	Computer Organization Lab	0	0	2	1	
7.		BCP262	Web and Its Application Lab	0	0	2	1	
8.		BCP263	Principles of Data Structures Lab	0	0	2	1	
9.		BCP201	Introduction to LINUX	0	0	2	1	
<b>TOTAL CREDITS</b>							<b>20</b>	

**School of Engineering and Technology**  
**BCA-Bachelor in Computer Application**  
**Batch: 2018 Onwards**  
**TERM: IV**

S. No.	Paper ID	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
				L	T	P		
<b>THEORY SUBJECTS</b>								
1.		BCA264	Basics of Computer Network	3	1	0	4	
2.		BCA265	Database Management Systems	3	0	0	3	
3.		BCA266	Web Designing	3	1	0	4	
4.		BCA267	Introduction to Software Engineering	3	0	0	3	
5.		ENG202	Communication practices -I	2	0	0	2	
<b>Practical/Viva-Voce/Jury</b>								
6.		BCP2655	Database Management Systems Lab	0	0	2	1	
7.		BCP266	Web Designing Lab	0	0	2	1	
8.		ENP202	Communication practices -I Lab	0	0	2	1	
<b>TOTAL CREDITS</b>							<b>19</b>	

**School of Engineering and Technology**  
**BCA-Bachelor in Computer Application**  
**Batch: 2018 Onwards**  
**TERM: V**

S. No.	Paper ID	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
				L	T	P		
<b>THEORY SUBJECTS</b>								
1.		BCA360	Introduction to OOP using Java	3	1	0	4	
2.		BCA361	E Commerce	3	1	0	4	
3.			Program Elective-1	3	1	0	4	
4.			Program elective-2	3	1	0	4	
5.		BCA314	Essentials of Digital Marketing	3	0	0	3	
<b>Practical/Viva-Voce/Jury</b>								
6.		BCA360	Introduction to OOP using Java	0	0	2	1	
<b>TOTAL CREDITS</b>							<b>20</b>	

**School of Engineering and Technology**  
**BCA-Bachelor in Computer Application**  
**Batch: 2018 Onwards**  
**TERM: VI**

S. No.	Paper ID	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
				L	T	P		
<b>THEORY SUBJECTS</b>								
1.		BCP362	Introduction to PHP	3	0	0	3	
2.		BCA363	Information Security	3	1	0	4	
3.			Program Elective -4	3	0	0	3	
4.			Program Elective-3	3	0	0	3	
<b>Practical/Viva-Voce/Jury</b>								
5.		BCP362	Introduction to PHP	0	0	2	1	
6.		BCA399	Project	0	0	12	6	
<b>TOTAL CREDITS</b>							<b>20</b>	

Program Electives			
Computer Graphics BCA 364	Multimedia & Animation BCA366	Python Programming BCA368	Data Encoding and Compression BCA370
Client Server Computing BCA365	Introduction to Distributed System BCA367	ERP BCA369	Introduction to Cloud BCA371

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:CS/IT</b>		<b>Semester:1</b>	
1	Course Code	<b>BCA 160</b>	Course Name: Introduction to C programming
2	Course Title	Introduction to C programming	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status	UG	
5	Course Objective	<ol style="list-style-type: none"> <li>1. Learn basic programming constructs –data types, decision structures, control structures in C</li> <li>2. learning logic aptitude programming in c language</li> <li>3. Developing software in c programming</li> </ol>	
6	Course Outcomes	Students will be able to: CO1: Illustrate Flowchart and Algorithm to the given Problem CO2: Understand core concept of c Programming CO3: Implement Array and String CO4: Implement Functions CO5: Use Union and Structure CO6: Understand and implement Pointers	
7	Course Description	Basic concepts of C programming, logic building in C programming	
8	Outline syllabus	CO Mapping	
	<b>Unit 1</b>	<b>Introduction</b>	
	A	<b>Introduction</b> How to develop a program, Algorithms, Flow-charts, Types of Programming Languages,	CO1, CO2
	B	Compiler and Linker,	CO2
	C	Testing and Debugging a program, Documentation	CO2
	<b>Unit 2</b>	<b>Constants, Variables &amp; Data Types</b>	
	A	Identifiers and Keywords, Constants, Variables, Data types,Declaration of variables,	CO3
	B	declaration of storage class, assigning values to variables, defining symbolic constants, declaring a variable as constant, declaring a variable as volatile,.	CO3
	C	overflow and underflow of data	CO3
	<b>Unit 3</b>	<b>Operators &amp; Expressions</b>	



A	Arithmetic operators, Relational, Logical operators, Assignment, increment and decrement operators,	CO4	
B	conditional operators, bitwise operators, special operators, arithmetic expressions, evaluation of arithmetic expressions, precedence of arithmetic expressions	CO4	
C	type conversion in expressions, operator precedence and associativity, mathematical functions.	CO4	
<b>Unit 4</b>	<b>Decision Making – Branching &amp; Looping</b>		
A	Decision making with IF statement, switch statement, ? : operator	CO5	
B	While statement, do-while statement,	CO5	
C	for statement, Jumps in loops,	CO5	
<b>Unit 5</b>	<b>Functions</b>		
A	Top down approach of problem solving	CO6	
B	standard library functions, passing values between functions, scope rules of functions	CO6	
C	Function calling, return type of functions, call by value and call by reference, recursive functions.	CO6	
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE
	30%	20%	50%
Text book/s*	Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>		
Other References	<ol style="list-style-type: none"> <li>1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004.</li> <li>2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999</li> </ol>		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Illustrate Flowchart and Algorithm to the given Problem	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
2.	CO2: Understand core concept of c Programming	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
3.	CO3: Implement Array and String	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
4.	CO4: Implement Functions	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
5.	CO5: Use Union and Structure	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
6.	CO6: Understand and implement Pointers	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5

### **PO and PSO mapping with level of strength for Course**

B C A 1 6 0	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
	CO1	3	2	3	-	-	-	-	-	-	-	2	1	3	2	2	1	2
	CO2	3	2	3	-	-	-	-	-	-	-	2	1	3	2	2	1	2
	CO3	3	2	3	-	-	-	-	-	-	-	1	1	2	3	2	1	2
	CO4	3	2	3	-	-	-	-	-	-	-	3	2	3	2	1	1	1
	CO5	3	2	3	-	-	-	-	-	-	-	3	1	2	2	2	1	3
CO6	3	2	3	-	-	-	-	-	-	-	2	1	3	2	2	1	2	

<b>School: SET</b>		<b>Batch: 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch: CS/IT</b>		<b>Semester: I</b>	
1	Course Code	BCP160	
2	Course Title	Introduction to C programming Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	UG	
5	Course Objective	4. Learn basic programming constructs –data types, decision structures, control structures in C 5. learning logic aptitude programming in c language 6. Developing software in c programming	
6	Course Outcomes	Students will be able to: CO1: Illustrate Flowchart and Algorithm to the given Problem CO2: Understand core concept of c Programming CO3: Implement Array and String CO4: Implement Functions CO5: Use Union and Structure CO6: Understand and implement Pointers	
7	Course Description	Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	<b>CO1</b>
		Write a c program to swap two numbers	
		Write a c Program to Add Two Integers	
		Write a program to create a calculator	CO1
	<b>Unit 2</b>	<b>Constants, Variables &amp; Data Types</b>	<b>CO1, CO2</b>
		Write a c program to convert length meter to cm	
		Write a c program to convert temp	
		Write a c program to swap two numbers	
		Write a c program to concatenate two strings	
	<b>Unit 3</b>	<b>Operators &amp; Expressions</b>	<b>CO1, CO2</b>
		Write a c program to calculate interest , for p, r & t	
		Write a c program to calculate area & circumference of triangle	<b>CO1, CO2</b>
		Write a c program to calculate area of rectangle	<b>CO1, CO2</b>
	<b>Unit 4</b>	<b>Decision Making – Branching &amp; Looping</b>	<b>CO3, CO5</b>
		Write a c program to find a given number is even or not	

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		Write a c program to check whether given year is leap year or not	CO3, CO5
	<b>Unit 5</b>	<b>Functions</b>	<b>CO4</b>
		Write a c program to create a function to count number of vowels in a string	
		Write a function to calculate factorial of a number	
		Write a recursive function for Fibonacci series	CO4
Mode of examination	Practical		
Weightage Distribution	CA	MTE	ETE
	60%	0%	40%
Text book/s*	Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>		
Other References	3. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 4. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999		

### Course outline

This course implements array and pointer and Recursive applications. The course talks primarily about Array, string, functions, structure & union and Pointers etc.

### Course Evaluation

Attendance	None
Any other	CA judged on the practicals conducted in the lab , weightage may be specified
References	
Text book	Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>
Other References	1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999
Softwares	Turbo C

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Illustrate Flowchart and Algorithm to the given Problem	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5

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2.	CO2: Understand core concept of c Programming	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
3.	CO3: Implement Array and String	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
4.	CO4: Implement Functions	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
5.	CO5: Use Union and Structure	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
6.	CO6: Understand and implement Pointers	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5

### PO and PSO mapping with level of strength for Course

B C A 1 6 0	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
	CO1	3	2	3	-	-	-	-	-	-	-	2	1	3	2	2	1	2
	CO2	3	2	3	-	-	-	-	-	-	-	2	1	3	2	2	1	2
	CO3	3	2	3	-	-	-	-	-	-	-	1	1	2	3	2	1	2
	CO4	3	2	3	-	-	-	-	-	-	-	3	2	3	2	1	1	1
	CO5	3	2	3	-	-	-	-	-	-	-	3	1	2	2	2	1	3
	CO6	3	2	3	-	-	-	-	-	-	-	2	1	3	2	2	1	2

<b>ool: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch: CS/IT</b>		<b>Semester: I</b>	
1	Course Code	BCA161	Course Name:
2	Course Title	Basics of Digital Electronics	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	UG	
5	Course Objective	To provide students with an overview of digital electronics that forms the basic foundation of digital computer. It includes the number system, binary logic circuit and k-maps, evaluating circuit designs within the context of digital and combinational circuits.	

6	Course Outcomes	<p>After the successful completion of the course, the student will:</p> <ol style="list-style-type: none"> <li>1) Understand the basic concepts of digital electronics and number system. Convert numbers between decimal, binary, octal, and hexadecimal number systems.</li> <li>2) Define the basic logic operations; AND, OR, NAND, NOR, INVERTER and flip-flop circuits. Predict the output response as either an expression or truth-table.</li> <li>3) To evaluate and simplify using Boolean algebra and/or Karnaugh mapping techniques, sum of products (SOP) and product of sums (POS) that helps in simplifying the derivation of the function to be implemented.</li> <li>4) Identify combinatorial logic circuits and sequential logic circuits, and explain their operation.</li> <li>5) Design &amp; implement different types of sequential logic circuits using Flip Flops.</li> <li>6) 6. Design &amp; implement different types of Counters, a, c, k Registers, and Programmable Logic Devices</li> </ol>	
7	Course Description	This course covers the core concepts of digital electronics that include AND, OR, NAND, NOR, NOT logic functions and integrated circuits, combinational and sequential logic circuits. The course also provides a study of Boolean algebra, binary and hexadecimal number systems, binary codes, and the analysis of the basic components and circuits used in semiconductor switching.	
8	Outline syllabus	CO Mapping	
	<b>Unit 1</b>	<b>Introduction to Number System</b>	
	A	Number System Concepts- Decimal Number System, Binary Number System, Octal Number System, Hexadecimal Number System	CO1
	B	Conversion from One Number System to another.	CO1
	C	Arithmetic Operation without Changing the Base, 1's Complement and 2's Complement.	CO1
	<b>Unit 2</b>	<b>Logic Gates</b>	
	A	AND, OR, NOT, NAND, NOR, XOR, XNOR	CO2
	B	NAND & NOR as Universal Gates	CO2
	C	Logic Gates Applications	CO2
	<b>Unit 3</b>	<b>Boolean Algebra</b>	
	A	Introduction, Theorems, Simplification of Boolean Expression using Boolean Algebra	CO2, CO3
	B	SOP & POS Forms, Realization of Boolean Expression using Gates	CO2, CO3
	C	K-Maps, Simplification of Boolean Expression using K-Maps.	CO2, CO3
	<b>Unit 4</b>	<b>Combinational Logic Circuits</b>	
	A	Half Adder & Half Subtractor, Full Adder & Full Subtractor, Parallel Binary Adder, Binary Adder/Subtractor.	CO2,CO3, CO4,CO6

	B	Multiplexers & Demultiplexers, Implementation of Boolean equations using Multiplexer and Demultiplexer			CO2,CO3, CO4,CO6
	C	Encoders & Decoders			CO2,CO3, CO4
	<b>Unit 5</b>	<b>Sequential Logic Circuits</b>			
	A	Latch, Flip Flops- R-S Flip-Flop, J-K Flip-Flop			CO2,CO3, CO4,CO5
	B	Master-Slave J-K Flip-Flop, Race Condition, Removing Race Condition			CO2,CO3, CO4,CO5
	C	D Flip-Flop, T Flip-Flop, Applications of Flip-Flops			CO2,CO3, CO4,CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. Moris Mano, "Digital Logic and Computer Design", PHI Publications, 2002 2. Fundamental of Computers – By V.Rajaraman B.P.B. Publications			
	Other References	1. Digital Electronics (TMH) 1998 : Malvino and Leach 2. Computer Organization and Architecture : William Stallings			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Understand the basic concepts of digital electronics and number system. Convert numbers between decimal, binary, octal, and hexadecimal number systems	PO1,PO2,PO3, PO6, PSO1
2.	CO 2: Describe the basic logic operations; AND, OR, NAND, NOR, INVERTER and flip-flop circuits. Predict the output response as either an expression or truth-table.	PO1,PO2,PO3,PO5,PO6, PO12, PSO1,PSO2
3.	CO 3: Given a digital circuit, expression or truth table, evaluate and simplify using Boolean algebra and/or Karnaugh mapping techniques, sum of products (SOP) and product of sums (POS) that helps in simplifying the derivation of the function to be implemented.	PO1,PO2, PO3, PO4, PO10, PO12, PSO1,PSO2
4.	CO 4: Identify combinatorial logic circuits and sequential logic circuits, and explain their operation.	PO1,PO2, PO3,PO4, PO5, PO6, PO8, PO9, PO10, PO12 PSO1, PSO3, PSO4

5	CO5: Design & implement different types of sequential logic circuits using Flip Flops.	PO1,PO2, PO3,PO4, PO5, PO6, PO8, PO9, PO10, PO12 PSO1, PSO3, PSO4
6.	CO6: Design & implement different types of Counters, a, c, k Registers, and Programmable Logic Devices	PO1,PO2, PO3,PO4, PO5, PO6, PO8, PO9, PO10, PO12 PSO1, PSO3, PSO4

**PO and PSO mapping with level of strength for Course Name Basics of Electronics (Course Code )**

CSE	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
	CO1	3	3	2	-	-	1	-	-	-	-	-	-	2	-	-	-
	CO2	3	3	3	-	3	2	-	-	-	-	-	3	3	3	-	2
	CO3	3	3	2	2	-	-	-	-	-	2	-	1	2	3	-	2
	CO4	3	3	2	3	3	3	-	2	2	3	-	3	3	-	2	3
	CO5	3	3	2	3	3	3	-	2	2	3	-	3	3	-	2	3
	CO6	3	3	3	-	3	2	-	-	-	-	-	3	3	3	-	2

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:CS/IT</b>		<b>Semester:I</b>	
1	Course Code	BCA162	Course Name-
2	Course Title	<b>Fundamentals of IT</b>	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status	UG	
5	Course Objective	<ul style="list-style-type: none"> <li>The main objective is to introduce IT in a simple language to all undergraduate students, regardless of their specialization.</li> <li>The focus of the subject is on introducing skills relating to IT basics, computer applications</li> </ul>	



		<ul style="list-style-type: none"> <li>To understand the basic knowledge of computer</li> </ul>
6	Course Outcomes	Students will be able to: <b>CO1:</b> Identify categories of computers. <b>CO2:</b> Have a basic understanding of personal computers and their operations. <b>CO3:</b> be able to identify computer hardware components and describe their function; <b>CO4: Identify the role of software Operating system overview</b> <b>CO5:</b> The focus of the subject is on introducing skills relating to IT basics, computer applications <b>CO6:</b> Understand basic concepts computer arithmetic
7	Course Description	The course Fundamentals of Information Technology has become essential the present age of computer technology and information, as the applications of information technology can be found in all aspects of our lives.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Introduction to Computers</b>
	A	Characteristics of Computers, Evolution of computers, Capabilities and limitations of computers, Generations of computers, Types of computers(micro, mini, main frame, supercomputers),
	B	Block diagram of computer, Basic components of a computer system- Input unit, output unit, Arithmetic logic Unit, Control unit, central processing unit, Instruction set, registers, processor speed, type of processors,
	C	Memory- main memory organization, main memory capacity, RAM, ROM, EPROM, PROM, cache memory, PCs specifications.
	<b>Unit 2</b>	<b>Basic Computer Organization:</b>
	A	Input devices- Keyboard, Pointing Devices-mouse, Touch Screens, Joystick, Electronic pen, Trackball, Scanning Devices-Optical Scanners, OCR, OMR, Bar Code Readers, MICR, Digitizer, Electronic card reader, Image Capturing Devices-Digital Cameras. Output devices- Monitors- CRT, LCD/TFT
	B	Printers- Dot matrix, Inkjet, Laser, Plotters- Drum, Flatbed, Screenimage projector.
	C	Secondary Storage Devices- Magnetic Tape, Magnetic Disks-Internal Hard Disk, External Hard Drives, Floppy Disks, Optical Disks-CD, VCD, CD-R, CD-RW, DVD, Solid State Storage-Flash Memory, USB Drives.
	<b>Unit 3</b>	<b>Storage</b>
	A	Computer Software- Software and its Need, Types of software-

		System software, Application software, System software-operating system, utility program, programming languages, assemblers, compilers and interpreter	
B		introduction to operation system for PCs-DOS, windows, linux, file allocation table (FAT & FAT32), files & directory structure and its naming rules, programming languages-machine, assembly, high level, 4GL, their merits and demerits,	CO1, CO2, CO3, CO4
C		application software and its types ? word-processing, spreadsheet, presentation graphics, Data Base Management Software, Characteristics, Uses and examples and area of application of each of them, Virus working, feature, types of viruses, virus detection prevention and cure.	CO2, CO4
<b>Unit 4</b>	<b>Software</b>		
A		Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language,	CO1, CO2, CO3
B		High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing,	CO1, CO2, CO3
C		Spread Sheets Presentation, Graphics, DBMS s/w.	CO1, CO2, CO3
<b>Unit 5</b>	<b>Computer Arithmetic:</b>		
A		Binary, Binary Arithmetic, Number System: Positional & Non Positional, Binary	CO1 CO4
B		Octal, Decimal, Hexadecimal, Converting from one number system to another	CO, CO4
C		Converting from one number system to another , Converting from one number system to another.	CO1, CO2, CO4
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE
	30%	20%	50%
Text book/s*	5. Computer Fundamentals by P.K.Sinha		
Other References	1.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1: : Identity categories of computers.</b>	

2.	<b>CO2:</b> Have a basic understanding of personal computers and their operations.	PO1,PO2,PO3,PO4,PSO1
3.	<b>CO3:</b> be able to identify computer hardware components and describe their function;	PO1, PO3, PO4, PSO2
4.	<b>CO4:</b> Identify the role of softwareOperating system overview	PO1, PO3, PO4, PSO2
5.	<b>CO5:</b> Understand basic concepts and terminology of information technology.	PO1,PO2,PO3,PO4
6.	<b>CO6:</b> Understand basic concepts computer arithmetic	PO9, PO10,PO11, PSO5

**PO and PSO mapping with level of strength for Fundamentals of IT (Course Code BCA 162)**

C S E	Cos	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO	PSO	PSO
		1	2	3	4	5	6	7	8	9	0	1	2	1	2	3	4	5
	CO 1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
	CO 2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
	CO 3	3	2	3	3	-	-	-	2	1	2	3	2	1	2	1	2	2
	CO 4	3	3	3	2	--	--	--	2	1	3	2	2	1	2	1	2	2

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:</b>		<b>Semester:II</b>	
1	Course Code	BCA163	Course Name: Advance Concept in C programming
2	Course Title	Advance Concept in C programming	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status	UG	
5	Course Objective	7. Learn basic programming constructs –data types, decision structures, control structures in C 8. learning logic aptitude programming in c language 9. Developing software in c programming	
6	Course Outcomes	Students will be able to: CO1: Implement Array CO2: Implement String CO3: Understand and implement Pointers CO4: Crete Program using Structure	

Prepared by : Department of Computer Science and Engineering

		CO5: Understand the difference between Structure and Union CO6: Creating Applications in C language		
7	Course Description	Basic concepts of C programming, logic building in C programming		
8	Outline syllabus	CO Mapping		
	<b>Unit 1</b>	<b>Arrays</b>		
	A	Arrays	CO1,	
	B	Two Dimensional Arrays	CO1	
	C	Multi Dimensional Arrays	CO1	
	<b>Unit 2</b>	<b>Strings</b>		
	A	String Handling Functions	CO2	
	B	enum, Typedef, String Formatting	CO2	
	C	Logic building based on strings	CO2	
	<b>Unit 3</b>	<b>Pointers</b>		
	A	Introduction, declaration of pointer variables, Operations on pointers:	CO3	
	B	Pointer arithmetic,	CO3	
	C	Arrays of pointers, pointer of array	CO3	
	<b>Unit 4</b>	<b>Structures &amp; Union</b>		
	A	Structures - Array of Structures -	CO4	
	B	Arrays within Structures - Structures within Structures -	CO4	
	C	Structures and Functions - Unions Size of Structures.	CO4,CO5	
	<b>Unit 5</b>	<b>Applications</b>		
	A	Calculator, Bill generator	CO6	
	B	Searching	CO6	
	C	Sorting	CO5,CO6	
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>		
	Other References	6. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 7. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999		

### CO and PO Mapping

Prepared by : Department of Computer Science and Engineering

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Understand core concept of c Programming	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
2.	CO2: Implement Array and String	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
3.	CO3: Implement Functions	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
4.	CO4: Crete Program using Structure	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
5.	CO5: Understand the difference between Structure and Union	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
6.	CO6: Understand and implement Pointers	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5

**PO and PSO mapping with level of strength for Course Name OOPs using java (Course Code BCA 163)**

CSE10 7	Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
	CO 1	3	2	3	-	-	-	-	-	-	-	-	2	1	3	2	2	1
CO 2	3	2	3	-	-	-	-	-	-	-	-	2	1	3	2	2	1	2
CO 3	3	2	3	-	-	-	-	-	-	-	-	1	1	2	3	2	1	2
CO 4	3	2	3	-	-	-	-	-	-	-	-	3	2	3	2	1	1	1
CO 5	3	2	3	-	-	-	-	-	-	-	-	3	2	3	2	1	1	1
CO 6	3	2	3	-	-	-	-	-	-	-	-	3	1	2	2	2	1	3

<b>School: SET</b>		<b>Batch: 2018</b>
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>
<b>Branch: CSE</b>		<b>Semester: II</b>
1	Course Code	BCP 163
2	Course Title	Advance Concept in C programming
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2

Prepared by : Department of Computer Science and Engineering

	Course Status	Compulsory		
5	Course Objective	10. Learn basic programming constructs –data types, decision structures, control structures in C 11. learning logic aptitude programming in c language 12. Developing software in c programming		
6	Course Outcomes	Students will be able to: CO1: Understand core concept of c Programming CO2: Implement Array and String CO3: Implement Functions CO4: Crete Program using Structure CO5: Understand the difference between Structure and Union  CO6: Understand and implement Pointers		
7	Course Description	Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm		
8	Outline syllabus			CO Mapping
	<b>Unit 1</b>	<b>Arrays</b>		<b>CO1</b>
		Write a c program to calculate the average using arrays		
		Write a c program to find the largest element of the array		
		Write a c program to add two matrix		CO1
	<b>Unit 2</b>	<b>Strings</b>		<b>CO2</b>
		Write a c program to concatenate two strings		
		Write a c program to find the length of strings		
		Write a c program to count vowels in a strings		
	<b>Unit 3</b>	<b>Pointers</b>		<b>CO3</b>
		Write a c program to swap two values using pointers		
		Write a c program to find largest number from array using pointers		
	<b>Unit 4</b>	<b>Structures &amp; Union</b>		<b>CO4</b>
		Write a c program to store information of a student using structure		
		Write a c program to store information of a student using union		CO3, CO5
	<b>Unit 5</b>	<b>Applications</b>		<b>CO5</b>
		Write a c program to sort numbers		
		Write a c program to create a linked list for storing student details		
				CO4
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>		

	Other References	8. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 9. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999	
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<b>Course outline</b> This course implements array and pointer and Recursive applications. The course talks primarily about Array, string, functions, structure & union and Pointers etc.	
<b>Course Evaluation</b>	
Attendance	None
Any other	CA judged on the practicals conducted in the lab , weightage may be specified
References	
Text book	Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>
Other References	3. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 4. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999
Softwares	Turbo C

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018</b>	
<b>Branch:CS/IT</b>		<b>Semester:II</b>	
1	Course Code	BCA164	Course Name-
2	Course Title	<b>Computer Hardware and Trouble shooting</b>	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status	UG	
5	Course Objective	1. The course covers topics related to personal computer components, its functions and characteristics, occupational health and safety policies and procedures 2. This course will develop essential troubleshooting and problem diagnosis skills for common personal computer systems. 3. Course work will focus on configuration	

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		4. Installation, upgrade and preventative maintenance of personal computer systems.		
6	Course Outcomes	Students will be able to: <b>CO1:</b> Know the fundamentals of Computer Networking. <b>CO2:</b> Recognize computer components and accessories. <b>CO3:</b> Describe various standard network models. <b>CO4:</b> Analyze the underlying protocols in transport layer. <b>CO5:</b> Describe basic computer software troubleshooting <b>CO6:</b> Describe basic network troubleshooting		
7	Course Description	The course covers topics related to personal computer components, its functions and characteristics, occupational health and safety policies and procedures		
8	Outline syllabus	CO Mapping		
	<b>Unit 1</b>	<b>Introduction to Computers</b>		
	A	Identifying the major components of a PC: System unit, Monitor, Keyboard, Mouse devices,	CO1, CO2	
	B	Handling PC connections. Identifying the internal components of a PC: Opening a system unit, handling expansion cards.	CO1, CO2	
	C	Purpose of RAM, Types of RAM Technologies: SDRAM, DDRSDRAM, RDRAM, Adding and Upgrading RAM.	CO1, CO2	
	<b>Unit 2</b>	<b>Basic Computer Storage</b>		
	A	How hard drives store data: Partitions and File Systems. Installing a Hard Drive,	CO1, CO2	
	B	Configuring a Hard Drive: Partitioning, Formatting	CO1, CO2	
	C	Hard Drive Maintenance and Troubleshooting: ScanDisk, Defragmentation, Disk Cleanup.	CO1, CO2	
	<b>Unit 3</b>	<b>Basic networking concepts,</b>		
	A	Network topologies: LAN, WAN, MAN, PAN, CAN. Networking Model .	CO1, CO2, CO3	
	B	The OSI model . TCP/ IP Model , Network adapters.	CO1, CO2, CO3, CO4	
	C	Introducing protocols. Cabling and troubleshooting.	CO4, CO5, CO6	
	<b>Unit 4</b>	<b>Information to networking devices</b>		
	A	Introduction to various networking devices:	CO1, CO2, CO3	
	B	Routers, Switches, Modems,	CO1, CO2, CO3	
	C	Hubs Wired and Wireless technology.	CO1, CO2, CO3	
	<b>Unit 5</b>	<b>Network basic and troubleshooting</b>		
	A	Network basic and configuration:	CO1, CO2, CO3	
	B	Setting IP addresses, Sharing files and folders.	CO1, CO2, CO3	
	C	Network troubleshooting. PING test, ipconfig etc.	CO1, CO2, CO3, CO6	
	Mode of examination	Theory		
		CA	MTE	ETE



Weightage Distribution	30%	20%	50%	
Text book/s*	10. Data Communications And Networking 4th Edition, McGrawHill, 2017 11. Assembling and troubleshooting by James Perozzo 12. Troubleshooting and Repairing Computer Printers by Stephen J. Bigelow.			
Other References	2.			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> Know the fundamentals of Computer Networking.	PO1,PO2,PO3,PO4,PSO1
2.	<b>CO2:</b> Recognize computer components and accessories.	PO1, PO3, PO4, PSO2
3.	<b>CO3:</b> Describe various standard network models.	PO1,PO2,PO3,PO4
4.	<b>CO4:</b> Analyze the underlying protocols in transport layer.	PO9, PO10,PO11, PSO5
5.	<b>CO5:</b> Describe basic computer software troubleshooting	PO9, PO10,PO11, PSO5
6.	<b>CO6:</b> Describe basic network troubleshooting	PO1,PO2,PO3,PO4

### **PO and PSO mapping with level of strength for Course Name Computer Hardware and Trouble shooting (Course Code BCA164)**

CSE	Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
		CO 1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1
CO 2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2	
CO 3	3	2	2	2	--	--	--	2	1	3	2	3	2	2	1	2	2	
CO 4	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2	
CO 5	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2	
CO 6	2	2	2	2	--	--	--	1	1	2	2	3	3	3	3	2	2	

<b>School: SET</b>		<b>Batch: 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:CS/IT</b>		<b>Semester:II</b>	
1	Course Code	BCP 164	
2	Course Title	COMPUTER HARDWARE AND TROUBLESHOOTING LAB	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	1. To understand the components on the motherboard 2. To perform system administration tasks 3. To understand different storage media 4. To understand system related problems and methods of troubleshooting	
6	Course Outcomes	<b>CO1:</b> Know the fundamentals of Computer Networking. <b>CO2:</b> Recognize computer components and accessories. <b>CO3:</b> Describe various standard network models. <b>CO4:</b> Analyze the underlying protocols in transport layer. <b>CO5:</b> Describe basic computer software troubleshooting <b>CO6:</b> Describe basic network troubleshooting	
7	Course Description	This course is designed to enable the students to get a detailed knowledge of all the hardware components that make up a computer and to understand the different interfaces required for connecting these hardware devices.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Practical based on semi-conductors</b>	
		Study and identification of standard desktop personal computer	CO1, CO2
		Understanding of Motherboard and its interfacing components	CO1, CO2
		Install and configure computer drivers and system components.	CO1, CO2
	<b>Unit 2</b>	<b>Practical related to --</b>	
		Disk formatting, partitioning	CO1, CO2
		Disk operating system commands-I	CO1, CO2
		Disk operating system commands-II	CO1, CO2
	<b>Unit 3</b>	<b>Practical related to---</b>	
		Install, upgrade and configure.	CO1,CO2,CO3
		Windows operating systems	CO1,CO2,CO3
		Remote desktop connections and file sharing	CO4
	<b>Unit 4</b>	<b>Practical related to---</b>	
		Identify, install and manage network connections Configuring IP address and Domain name system	CO1,CO2,CO3
		Install, upgrade and configure Linux operating systems.	CO1,CO2,CO3
		Installation Antivirus and configure the antivirus	CO1,CO2,CO3

	<b>Unit 5</b>	<b>Practical related to---</b>		
		Installation of printer and scanner software.		CO1,CO2,CO3
		Disassembly and Reassembly of hardware.		CO1,CO2,CO3
		Troubleshooting and Managing Systems		CO1,CO2,CO3
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	1. Craig Zacker & John Rourke, "The complete reference:PC hardware", Tata McGrawHill, New Delhi, 2001. 2. Mike Meyers, "Introduction to PC Hardware and Troubleshooting", Tata McGrawHill, New Delhi, 2003.		
	Other References			

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:CS/IT</b>		<b>Semester:2</b>	
1	Course Code	BCA-165	Course Name BCA
2	Course Title	System Analysis and Design	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ol style="list-style-type: none"> <li>1. Systems Analysis is a central part of systems development.</li> <li>2. It comprises the process of turning a set of user requirements into a logical system specification and encompasses various activities to achieve this end.</li> <li>3. The traditional systems lifecycle has been challenged by alternative models, for example the spiral (iterative and incremental) lifecycle and rapid application development.</li> </ol>	
6	Course Outcomes	Students will be able to: <b>CO1:</b> To understand the role of systems analysis within various systems development life cycles. <b>CO2:</b> To develop an awareness of the different approaches that may be taken to systems analysis. <b>CO3:</b> To understand the systems analyst's activities, and apply current tools and techniques. <b>CO4:</b> Describe different life cycle models and explain the contribution of systems analysis within them.	

7	Course Description	This course introduces the concepts of distributed operating system, algorithms and design issues and challenges in Distributed system, identify the problems, and choose the relevant models and algorithms to apply.		
8	Outline syllabus	CO Mapping		
	<b>Unit 1</b>	<b>Fundamental of System Development:</b>		
	A	System concept-characteristics-elements of system, types of system.		CO1, CO2
	B	Modern approach to system analysis and design, system development life cycle, approaches to improve the system development.		CO1, CO2
	C	Tools for system development, role of system analyst.		CO1, CO3
	<b>Unit 2</b>	<b>System Analysis:</b>		
	A	Determining system requirements, traditional methods, modern methods.		CO1, CO2,CO4
	B	Structuring system requirements, process modeling, data flow diagram.		CO1, CO2,CO4
	C	Logic modeling-conceptual data modeling, E-R modelling.		CO1, CO2,CO4
	<b>Unit 3</b>	<b>System Design:</b>		
	A	The Process and Stages of System Design, Design Methodologies, Development Activities.		CO1,CO2,CO3
	B	Input Design, Output Design.		CO1,CO2,CO3
	C	Types of Forms, Basics of Form Design.		CO4
	<b>Unit 4</b>	<b>Implementation:</b>		
	A	System implementation, software application testing installation.		CO1,CO2,CO3
	B	Documentation, training and support.		CO1,CO2,CO3
	C	Organizational issues in system implementation.		CO1,CO2,CO3
	<b>Unit 5</b>	<b>Maintenance:</b>		
	A	Maintaining information system.		CO1,CO2,CO3
	B	Types of maintenance.		CO1,CO2,CO3
	C	Conducting system maintenance.		CO1,CO2,CO3
	Mode of examination	Theory		
	Weightage Distribution	CA 30%	MTE 20%	ETE 50%
	Text book/s*	Elias M. Awad, System Analysis & Design, Galgotia.		
	Other References	1. Rajaraman V, Analysis & Design of information system, PHI Jefferey A Hoffer, Modern System Analysis & Design, Pearson Education. 2. Information Systems, ANAND PUBLICATIONS.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
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Prepared by : Department of Computer Science and Engineering

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
CO 2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
CO 3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
CO 4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3
1.	<b>CO1:</b> Students will identify the core concepts of distributed systems.												PO1,PO2,PO3,PO4,PSO1				
2.	<b>CO2:</b> the way in which several machines orchestrate to correctly solve.												PO1, PO3, PO4, PSO2				
3.	<b>CO3:</b> Students will examine how existing systems have applied the concepts of distributed systems in designing large system.												PO1,PO2,PO3,PO4				
4.	<b>CO4:</b> Can additionally apply these concepts to develop distributed systems.												PO9, PO10,PO11, PSO5				

**PO and PSO mapping with level of strength for Course Name Introduction to Distributed System (Course Code BCA 165)**

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program:BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch:CS/IT</b>		<b>Semester:2</b>	
1	Course Code	BCA166	Course Name: Graph Theory
2	Course Title	Graph Theory	

Prepared by : Department of Computer Science and Engineering

3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Status	UG
5	Course Objective	Objective of this course is to: <ol style="list-style-type: none"> <li>1. Explain basic concepts in graph theory,</li> <li>2. Define how graphs serve as models for many standard problems,</li> <li>3. Discuss the concept of graph, tree, Euler graph and cut set and</li> <li>4. Learn and apply concepts in the applications of graphs in science, business and industry.</li> </ol>
6	Course Outcomes	Students will be able to: CO1: Demonstrate some of the most important notions of graph theory and develop their skill in solving basic exercises CO2: Understand the basic concepts of graphs, connected and disconnected graphs, and interpret the fundamentals of graphs and trees and to relate them with the use in computer science applications CO3: Apply spanning trees concept to solve the classical problems like TSP etc. CO4: Explore the concepts and applications of cut-sets and circuits in graph CO5: Explore a graph with the help of matrices and to find a minimal spanning tree for a given weighted graph CO6: Apply graph-theoretic algorithms and methods used in computer science
7	Course Description	The course will cover the fundamental concepts of Graph Theory: simple graphs, digraphs, Eulerian and Hamiltonian graphs, trees, networks, paths and cycles, Cut-sets and circuit.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>
	A	Introduction: Finite and Infinite graphs, Incidence & Degree, Isolated vertex, Pendant Vertex
	B	Null Graph, Various types of graph, sub graphs, handshaking lemma
	C	special properties of graphs and various operations on graphs, walks, Path, and circuits connected graph
	<b>Unit 2</b>	<b>Trees</b>
	A	Disconnected graphs and Components, Euler graphs, Operations on graphs more on Euler Graphs
	B	Hamiltonian paths and cycles, Trees, some properties of trees
	C	pendant Vertices in a tree, Distance and centers in a tree
	<b>Unit 3</b>	<b>Binary Trees</b>
	A	Basic terminology related to Rooted and Binary trees
	B	Importance of binary tree, Binary search tree

	C	Finding all spanning tree of a graph, , algorithms to find spanning trees in a weighted graph (Kruskal& Prim)	CO3	
	<b>Unit 4</b>	<b>Cut-Sets</b>		
	A	Cut-Set, Some Properties of Cut-Set, All Cut-Sets in a graph, concept of planar graph	CO4	
	B	Path-Sets, some properties of paths sets in a graph.	CO4	
	C	Fundamental Circuits & Cut-Sets, Connectivity and separability.	CO4, CO6	
	<b>Unit 5</b>	<b>Matrix representation of graphs</b>		
	A	Directed graph, undirected graph, circuit matrix, fundamental circuit matrix and finding their Ranks.	CO5	
	B	Matrix representation of graph, incidence matrix A(G), sub matrices of A(G), Rank of A(G),	CO5	
	C	Circuit matrix, fundamental circuit matrix and finding their Ranks, Relationship among Af , Bf , and Cf and its deduction.	CO5, CO6	
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	13. Deo, N, <i>Graph theory with applications to Engineering and Computer Science</i> , Prentice Hall India		
	Other References	1. Wilson R J, <i>Introduction to Graph Theory</i> , Pearson Education 2. Harary, F, <i>Graph Theory</i> , Narosa 3. Bondy& Murthy, <i>Graph theory and application</i> . Addison Wesley.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> Demonstrate some of the most important notions of graph theory and develop their skill in solving basic exercises.	PSO1
2.	<b>CO2:</b> Understand the basic concepts of graphs, directed graphs, and weighted graphs and interpret the fundamentals of graphs and trees and to relate them with the use in computer science applications	PSO1, PSO2
3.	CO3: Apply spanning trees concept to solve the classical problems like TSP etc.	PSO2
4.	<b>CO4:</b> explore the concepts and applications of cut-sets and circuits in graph	PSO2, PSO3
5.	<b>CO5:</b> explore a graph with the help of matrices and to find a minimal spanning tree for a given weighted graph	PSO2

6	CO6: Apply graph-theoretic algorithms and methods used in computer science	PSO2, PSO3
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**PO and PSO mapping with level of strength for Course Name Graph Theory(Course Code BCA 166)**

Cos	PS O1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	2	1
CO2	3	3	1	2	2
CO3	2	3	1	2	1
CO4	2	3	3	1	2
CO5	2	3	2	1	1
CO6	2	3	3	2	2

<b>School: SET</b>		<b>Batch: 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-2019</b>	
<b>Branch: CS</b>		<b>Semester: III</b>	
1	Course Code	BCA260	Course Name
2	Course Title	Computer Organization	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status	Compulsory	
5	Course Objective	To understand the building blocks of computer and study various design issues.	



6	Course Outcomes	Upon successful completion of this course, the student will be able to: CO1. Identify the basic structure and functional units of a digital computer. CO2. Study the design of arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations CO3. Understand basic processing unit and organization of simple processor including instruction sets, instruction formats and various addressing modes CO4. Describe hierarchical memory systems including cache memories CO5. Select appropriate interfacing standards for I/O devices.		
7	Course Description	This course discusses the basic structure of a digital computer and used for understanding the organization of various units such as control unit, Arithmetic and Logical unit and Memory unit and I/O unit in a digital computer.		
8	Outline syllabus	CO Mapping		
	<b>Unit 1</b>	<b>Basic Computer Organization and Design</b>		
	A	Basic of Computer, Von Neumann Architecture, Generation of Computer		CO1
	B	Classification of Computers, Digital computer: functional units and their interconnections, buses		CO1
	C	Bus architecture, types of buses and bus arbitration. Bus and memory transfer, micro-operations		CO1
	<b>Unit 2</b>	<b>Data Representation and Basic Computer Arithmetic</b>		
	A	Number systems, complements		CO1, CO2
	B	Fixed and Floating-point representation, character representation		CO1, CO2
	C	Addition, Subtraction, magnitude comparison		CO1, CO2
	<b>Unit 3</b>	<b>Control Unit</b>		
	A	Processor organization: general register organization, stack organization and addressing modes.		CO1, CO3
	B	Instruction types, formats, instruction cycles and sub cycles (fetch and execute etc), micro-operations, execution of a complete instruction.		CO1, CO3
	C	Hardwire and microprogrammed control		CO1, CO3
	<b>Unit 4</b>	<b>Memory Unit</b>		
	A	Basic concept and hierarchy, semiconductor RAM memories and types, ROM memories and types.		CO3, CO4
	B	Cache memories: concept and design issues (Performance, address mapping and replacement)		CO3, CO4
	C	Virtual memory: concept implementation		CO3, CO4
	<b>Unit 5</b>	<b>I/O Organization</b>		
	A	Peripheral devices, I/O interface, I/O ports		CO1, CO3, CO5
	B	Interrupts: interrupt hardware, types of interrupts		CO1, CO3, CO5
	C	Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access		CO1, CO3, CO5
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%

	Text book/s*	14. M. Morris Mano, Computer System Architecture, Pearson	
	Other References	<ol style="list-style-type: none"> <li>1. C. Hamacher, Z. Vranesic and S. Zaky, "Computer Organization", McGrawHill, 2002.</li> <li>2. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002.</li> <li>3. D. A. Patterson and J. L. Hennessy, "Computer Organization and Design - The Hardware/Software Interface", Morgan Kaufmann, 1998.</li> <li>4. J.P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.</li> </ol>	

### CO and PO Mapping

S. No.	Course Outcome	Program Educational Objectives (PEOs)& Program Specific Outcomes (PSO)
1.	CO1. Identify the basic structure and functional units of a digital computer.	PEO1, PEO2, PEO3
2.	CO2. Study the design of arithmetic and logic unit and implementation of fixedpoint and floating-point arithmetic operations	PEO 1, PEO 2, PEO 3
3.	CO3. Understand basic processing unit and organization of simple processor including instruction sets, instruction formats and various addressing modes	PEO 1, PEO 2, PEO 3, PSO 2
4.	CO4. Describe hierarchical memory systems including cache memories	PEO 1, PEO 2, PEO 3, PSO 2
5.	CO5. Select appropriate interfacing standards for I/O devices.	PEO 1, PEO 2, PEO 3, PSO 3

### **PEO and PSO mapping with level of strength for Course Name Computer Organization (Course Code BCA260)**

BCA (CS)	COs	PEO1	PEO2	PEO3	PSO1	PSO2	PSO3
	CO1	3	2	2	-	-	-
	CO2	2	2	2	-	-	-

	CO3	3	2	2	-	2	-
	CO4	3	2	2	-	2	-
	CO5	3	2	2	-	-	2

<b>School: SET</b>		<b>Batch: 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-2019</b>	
<b>Branch: CS</b>		<b>Semester: III</b>	
1	Course Code	BCP260	
2	Course Title	Computer Organization Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	The objective is to gain knowledge of basic concepts of computer and organization.	
6	Course Outcomes	Upon successful completion of this course, the student will be able to: CO1. Identify the basic components of computer and their working. CO2. Explain the importance types of memory and ports. CO3. Explain the importance types of mother board. CO4. Review and explain the basic operations performed on numbers CO5. Identify computer registers and their functions	
7	Course Description	Computer Organization Lab covers the complete understanding of the computer components like microprocessor, registers, memory units, motherboard, number system etc.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Computer Anatomy</b>	
		1. To recognize various components of Personal Computer 2. Dismantling and Assembling of a Personal Computer	CO1
	<b>Unit 2</b>	<b>Computer Anatomy part - Memory and ports</b>	
		1. Demonstrate different ports computer and their working. 2. Explain the importance types of memory and ports.	CO2
	<b>Unit 3</b>	<b>Computer Anatomy part - Motherboard and cards</b>	
		Study of Motherboard	CO3
	<b>Unit 4</b>	<b>Numbering systems</b>	
		Demonstrate the importance types of numbering systems types.	CO4

	<b>Unit 5</b>	<b>Registers types</b>		
		Explain the distinct types of computer registers and their functions		CO5
	Mode of examination	Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	1. M. Morris Mano, Computer System Architecture, Pearson		
	Other References	3. C. Hamacher, Z. Vranesic and S. Zaky, "Computer Organization", McGrawHill, 2002. 4. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002. 5. D. A. Patterson and J. L. Hennessy, "Computer Organization and Design - The Hardware/Software Interface", Morgan Kaufmann, 1998. 6. J.P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.		

<b>School:</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:</b>		<b>Semester: II</b>	
1	Course Code	BCA261	
2	Course Title	Introduction to Operating System	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Non Elective	
5	Course Objective	<ul style="list-style-type: none"> <li>• Provide students with an overview of the application and requirements of Operating system</li> <li>• Gain insight into the challenges and limitations of resource management</li> <li>• Provide the students with practice on applying algorithms</li> <li>• Prepare students understand the principles of design of operating system</li> <li>• Enhance students skills to operate multi user multi-tasking operating system</li> </ul>	
6	Course Outcomes	Students will be able to:	

		<b>CO1:</b> To understand and implement algorithms in resource allocation and utilization. <b>CO2:</b> To Understand the strengths and weaknesses of the algorithms. <b>CO3:</b> To identify the challenges and apply suitable algorithms for them. <b>CO4:</b> To implement tools and utility of operating system.
7	Course Description	This course introduces the requirement and utilization of operating system encompassing the principles to design operating systems, identify the challenges and choose the relevant and algorithms to apply.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>
	A	Operating System Concepts and functions, Comparison of different Operating system. Open-Source Operating Systems.
	B	Types of Operating Systems (Batch, Multiprogramming, Multi Tasking)
	C	Operating System Services, System Boot
	<b>Unit 2</b>	
	A	<b>Process Management</b> Process Concepts (PCB, Process States , Process Operations),
	B	CPU Scheduling: Concept , Types of schedulers( Short term, Long term, Middle term), Dispatcher,
	C	Performance Criteria CPU Scheduling Algorithms( FCFS, SJF, Priority, Round Robin, Multilevel Queue, Multilevel feedback Queue)
	<b>Unit 3</b>	<b>Deadlock Handling</b>
	A	Race condition, Critical sections, Mutual exclusion,
	B	Deadlock concepts & Handling Techniques: Avoidance, Prevention
	C	Deadlock Detection & Recovery
	<b>Unit 4</b>	<b>Memory Management</b>
	A	Memory Hierarchy, Memory Management technique: Paging
	B	Segmentation, Paged segmentation
	C	Virtual memory concept, demand paging, Page replacement algorithms(FCFS, Optimal, LRU)
	<b>Unit 5</b>	<b>File and Disk Management Management</b>
	A	Disk structure, Disk scheduling(FCFS, SSTF, SCAN, LOOK, C-SCAN, C-LOOK).

	B	File Concept, File operations, File Directories			CO1, CO2, CO3
	C	Using process & file handling Linux commands.			CO1, CO2, CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. Silberschatz G, Operating System Concepts, Wiley			
	Other References	2. W. Stalling, "Operating System", Maxwell Macmillan			
		3. Tannenbaum A S, Operating System Design and Implementation, Prentice Hall India			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> To understand and implement algorithms in resource allocation and utilization.	PO1, PO2, PO3, PO4, PSO1
2.	<b>CO2:</b> To assess the strengths and weaknesses of the algorithms.	PO1, PO3, PO4, PSO2
3.	<b>CO3:</b> To identify the challenges and apply suitable algorithms for them.	PO1, PO2, PO3, PO4
4.	<b>CO4:</b> To implement tools and utility of operating system.	PO9, PO10, PO11

### **PO and PSO mapping with level of strength for Course Name Introduction to operating system (Course Code BCA 261)**

C S E	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
	CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1
CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	
CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	
CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch:</b>		<b>Semester: 2</b>	
1	Course Code	BCA262	Course Name
2	Course Title	Web and its application	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status		
5	Course Objective	This course is intended to teach the basics involved in publishing content on the World Wide Web.	
6	Course Outcomes	Students will be able to: CO1: To Understand Web Application Terminologies, Internet Tools, CO2: To Configure telnet server and login remotely using putty. CO3: To Set up FTP server for sharing files over network and establish session between ftp client and server. CO4: To Identify and discuss the security risk of a Web application	
7	Course Description	This course is an overview of the modern Web technologies used for the Web development. The purpose of this course is to give students the basic understanding of how things work in the Web world.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to web</b>	
	A	<b>Introduction to Web: History of Internet, WWW, Client or Browser</b>	CO1
	B	Locating resource on internet- URI, URL, URN	CO1
	C	Working of http, http response code	CO1
	<b>Unit 2</b>	<b>Web Architecture</b>	
	A	Web Architecture: Server, Type of server, database server, mail server, web server	CO1, CO2
	B	Components of web, usage of Web, client-server architecture, Domain Name System	CO1, CO2
	C	type of DNS servers, Example of DNS query and response	CO1, CO2
	<b>Unit 2</b>	<b>Email and Telnet</b>	
	A	<b>mail structure, Composition of mail, component of Email, Working of email</b>	CO1, CO2

	B	Concept of remote login, remote Login methods, Setting environment for putty	CO1,CO2						
	C	login to remote system using putty	CO1, CO2						
	<b>Unit 4</b>	<b>FTP</b>							
	A	<b>FTP:</b> FTP protocol, Usage of FTP	CO1,CO3						
	B	anonymous ftp, FTP Commands	CO1,CO3						
	C	Setting FileZilla server and client	CO1,CO3						
	<b>Unit 5</b>	<b>Security</b>							
	A	<b>Security:</b> Security metrics congeniality, authenticity, integrity,	CO1,CO4						
	B	Security threats, types of threats, Cryptography	CO1,CO4						
	C	Symmetric and Asymmetric Cryptography	CO1,CO4						
	Mode of examination	Theory							
	Weightage Distribution	<table border="1"> <tr> <td>CA</td> <td>MTE</td> <td>ETE</td> </tr> <tr> <td>30%</td> <td>20%</td> <td>50%</td> </tr> </table>	CA	MTE	ETE	30%	20%	50%	
CA	MTE	ETE							
30%	20%	50%							
	Text book/s*	1. Douglas Comer "The Internet Book - Pearson Education", Asia							
	Other References	7. Douglas E. Comer "Internetworking with TCP/IP", Volume-I, PHI. 8. P.K. Sinha, "Introduction of Basic Computer"							

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Have a Good grounding of Web Application Terminologies, Internet Tools	PO3,PO5,PO8,PO12,PSO2,PSO3,PSO4
1.	CO2: Configure telnet server and login remotely using putty.	PO3,PO4,PO5,PO8,PO12,PSO2,PSO3,PSO4
2.	CO3: Set up FTP server for sharing files over network and establish session between ftp client and server.	PO2,PO5,PO6,PO8,PO10,PSO3,PSO5
3.	CO4: Identify and discuss the security risk of a Web application	PO4,PO5,PO8,PSO3,PSO5

### **PO and PSO mapping with level of strength for Course Name Web and its application (Course Code BCA262)**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5



CO1	2	2	3	2	3	2	1	3	2	1	2	3	2	3	3	3	2
CO2	2	2	3	3	3	2	1	3	2	1	2	3	2	3	3	3	2
CO3	2	3	2	2	3	3	1	3	2	3	2	2	2	2	3	2	3
CO4	2	2	2	3	3	2	1	3	2	2	2	2	2	2	3	2	3

<b>School: SET</b>		<b>Batch: 2018</b>
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>
<b>Branch: CS/IT</b>		<b>Semester: 2</b>
1	Course Code	BCP262
2	Course Title	Web and its Application
3	Credits	3
4	Contact Hours (L-T-P)	1-2-0
	Course Status	Compulsory/Elective
5	Course Objective	This course is intended to teach the basics involved in publishing content on the World Wide Web.
6	Course Outcomes	Students will be able to: CO1: Have a Good grounding of Web Application Terminologies, Internet Tools,  CO2: To Configure telnet server and login remotely using putty.  CO3: Set up FTP server for sharing files over network and establish session between ftp client and server.  CO4: Identify and discuss the security risk of a Web application
7	Course Description	This course is an overview of the modern Web technologies used for the Web development. The purpose of this course is to give students the basic understanding of how things work in the Web world.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Practical based on Introduction to web</b>
		1. Explore Web browser and its component. 2. Analyse URL, URI, and URN. 3. How to check the version of running Apache Web Server?
		CO1 CO1 CO1
	<b>Unit 2</b>	<b>Web Architecture</b>

		<ol style="list-style-type: none"> <li>Analyse client server Architecture.</li> <li>Install a web server.</li> <li>Configure and identify the IP address of the web server.</li> </ol>	CO1, CO2 CO1, CO2 CO1, CO2						
	<b>Unit 3</b>	<b>Email and Telnet</b>							
		<ol style="list-style-type: none"> <li>Analyse the component of Email.</li> <li>Installing Putty.</li> <li>Establish a Telnet Session with the ENE.</li> <li>Creating a log file of your session using Putty.</li> </ol>	CO1, CO2 CO1, CO2 CO1, CO2						
	<b>Unit 4</b>	<b>Practical related to FTP</b>							
		<ol style="list-style-type: none"> <li>Analyse the component of Email.</li> <li>Installing Filezilla server.</li> <li>To upload the file using Filezilla FTP client.</li> </ol>	CO1,CO3 CO1,CO3 CO1,CO3						
	<b>Unit 5</b>	<b>Practical related to Security</b>							
		<ol style="list-style-type: none"> <li>Analysis of symmetric cryptography.</li> <li>Analysis of symmetric cryptography</li> </ol>	CO1,CO4 CO1,CO4						
	Mode of examination	Jury/Practical/Viva							
	Weightage Distribution	<table border="1"> <tr> <td>CA</td> <td>MTE</td> <td>ETE</td> </tr> <tr> <td>60%</td> <td>0%</td> <td>40%</td> </tr> </table>	CA	MTE	ETE	60%	0%	40%	
CA	MTE	ETE							
60%	0%	40%							
	Text book/s*	Douglas Comer "The Internet Book - Pearson Education", Asia							
	Other References	<ol style="list-style-type: none"> <li>Douglas E. Comer "Internetworking with TCP/IP", Volume-I, PHI.</li> <li>P.K. Sinha, "Introduction of Basic Computer"</li> <li>Internet as a source.</li> </ol>							

<b>School:</b> SET	<b>Batch :</b> 2018-2021
<b>Program:</b> BCA	<b>Current Academic Year:</b> 2018-19
<b>Branch:</b> CS/IT	<b>Semester:</b> III
1 Course Code	BCA263
2 Course Title	Principles of Data Structures
3 Credits	4
4 Contact Hours (L-T-P)	3-1-0
Course Status	Core

5	Course Objective	<ol style="list-style-type: none"> <li>1. Learn the systematic way of solving problems, various methods of organizing large amounts of data.</li> <li>2. Be familiar with writing recursive methods.</li> <li>3. Solve problems using data structures such as linear lists, stacks, queues, linked list binary trees, heaps binary search trees, and graphs and writing programs for these solutions.</li> <li>4. Efficiently implement the different data structures and solutions for specific problems.</li> <li>5. Choose the appropriate data structure and algorithm design method for a specified application.</li> </ol>	
6	Course Outcomes	<p>CO1: Understand the concepts of data structure, data type and ADT.</p> <p>CO2: Handle operations like traversing, insertion, deletion, searching etc. on various data structures.</p> <p>CO3: Implement and know when to apply standard algorithms for searching and sorting.</p> <p>CO4: Implement linked list data structure to solve various problems.</p> <p>CO5: Understand and apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C-programming language.</p> <p>CO6: Choose the data structure that efficiently model the information in a problem</p>	
7	Course Description	<p>This course starts with an introduction to data structures with its classification, array and pointer based implementations. As the course progresses the study of Linear and Non-Linear data structures are studied. The course talks primarily about Linked list, stacks, queue, Tree structure, Graphs etc. This Course also deals with the concept of searching, sorting and hashing methods.</p>	
8	Outline syllabus	CO Mapping	
	<b>Unit 1</b>	<b>Introduction</b>	
	A	Introduction to Data Structure, Basic Terminology: Data and information	CO1, CO2
	B	ADT, Data Organization. Data Structure – Definition	CO1, CO2
	C	Data Structure –Operations, Applications and types.	CO1, CO2
	<b>Unit 2</b>	<b>ARRAYS</b>	
	A	Definition, Representation of Linear Arrays in Memory, Types and implementation of Arrays: 1D, 2D & M-D Concept	CO2, CO5
	B	Operation on Arrays, Pointer Arrays. Applications of Arrays, Address Calculation, Matrix Operations,	CO2, CO5
	C	Sorting & Searching Algorithms-Bubble sort, Selection sort, Merge sort, linear and binary search.	CO3

<b>Unit 3</b>	<b>LINKED LIST</b>			
A	Concept of Linked List, Representation of linked List in memory, Memory Allocation, Garbage Collection, Overflow and Underflow			CO2, CO4
B	Traversing a linked list, Searching a linked list, Insertion & Deletion in Linked List			CO2, CO4,
C	More types of linked list: Doubly Linked list, Header Linked List, Two way List and Circular linked list.			CO4, CO6
<b>Unit 4</b>	<b>STACKS, QUEUES</b>			
A	Concepts of Stack, Operation on Stack, Array Representation of Stack, Arithmetic Expression POLISH Notation			CO2, CO5
B	Concepts of Queue, Operation on Queue, Representation of queues			CO2, CO5
C	Other types of queue: Priority Queues, Deque and Circular queue.			CO2, CO5
<b>Unit 5</b>	<b>TREES AND GRAPH</b>			
A	Trees: Terminologies, Binary tree, Binary tree Representation, Applications			CO5, CO6
B	Binary Search Trees, Tree Traversals			CO5, CO6
C	Graphs: Terminology, Types, Traversal			CO5, CO6
Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	30%	20%	50%	
Text book/s*	1. Lipschutz, "Data Structures" Schaum's Outline Series, TMH			
Other References	1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++", PHI 2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication 3. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill 4. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education 5. G A V Pai, "Data Structures and Algorithms", TMH			

### CO and PO Mapping

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
BCA263	Principles of Data Structures																	
	CO1	2		3												2		
	CO2	3	2											2				
	CO3		3	3	2					3				3	3	3		
	CO4		3	2						3				3	3			
	CO5		2		3					2					2			
	CO6	2		1	2								2		3		3	
S. No.	Course Outcome												Program Outcomes (PO) & Program Specific Outcomes (PSO)					
1.	Understand the concepts of data structure, data type and ADT.												PO1, PO3, PSO1					
2.	Handle operations like traversing, insertion, deletion, searching etc. on various data structures.												PO1, PO2, PSO1					
3.	Implement and know when to apply standard algorithms for searching and sorting.												PO2, PO4, PO9, PSO2					
4.	Implement linked list data structure to solve various problems.												PO2, PO3, PO4, PO9, PSO1, PSO2					
5.	Understand and apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C-programming language.												PO2, PO3, PO9, PSO1, PSO2, PSO3					
6.	Effectively choose the data structure that efficiently model the information in a problem												PO3, PO4, PO11, PSO1, PSO3					

**PO and PSO mapping with level of strength for Course Name Principles of Data Structures (BCA263)**

Course Code	Course Name	PO 1	PO 2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
BCA263	Principles of Data Structures	1	3	3	3	1				2		1		3	3	2		

<b>School: SET</b>		<b>Batch: 2018-2021</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch:</b>		<b>Semester: III</b>	
1	Course Code	BCP263	

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2	Course Title	Principles of Data Structure Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	<ol style="list-style-type: none"> <li>1. Learn the systematic way of solving problems, various methods of organizing large amounts of data.</li> <li>2. Be familiar with writing recursive methods.</li> <li>3. Solve problems using data structures such as linear lists, stacks, queues, linked list binary trees, heaps binary search trees, and graphs and writing programs for these solutions.</li> <li>4. Efficiently implement the different data structures and solutions for specific problems.</li> <li>5. Choose the appropriate data structure and algorithm design method for a specified application.</li> </ol>	
6	Course Outcomes	<p>CO1: Understand the concepts of data structure, data type and ADT.</p> <p>CO2: Handle operations like traversing, insertion, deletion, searching etc. on various data structures.</p> <p>CO3: Implement and know when to apply standard algorithms for searching and sorting.</p> <p>CO4: Implement linked list data structure to solve various problems.</p> <p>CO5: Understand and apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C-programming language.</p> <p>CO6: Choose the data structure that efficiently model the information in a problem</p>	
7	Course Description	<p>This course starts with an introduction to data structures with its classification, array and pointer based implementations. As the course progresses the study of Linear and Non-Linear data structures are studied. The course talks primarily about Linked list, stacks, queue, Tree structure, Graphs etc. This Course also deals with the concept of searching, sorting and hashing methods.</p>	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	
		Program on Loops and Functions.	CO1
	<b>Unit 2</b>	<b>Arrays</b>	
		Program to implement Operation on Array such as Traversing, Insertion & Deletion operation	CO1, CO2
		Program on different Searching Algorithm.	CO3
		Program on different Sorting algorithm.	CO3
	<b>Unit 3</b>	<b>Linked List</b>	

		Program to implement different operation on the following linked list: Singly, Doubly.	CO2, CO4, CO6
<b>Unit 4</b>	<b>Stack &amp; Queue</b>		
	Program to implement stack operation using array and linked list		CO2, CO5
	Program to convert infix expression to post fix expression		CO2, CO5
	Program on Evaluation of Post fix expression		CO2, CO5
	Program to implement queue operation using array and linked list		CO2, CO5
	Program to implement circular queue and deque.		CO2, CO5
<b>Unit 5</b>	<b>Tree &amp; Graphs</b>		
	Program to implement binary tree .		CO5, CO6
	Program to implement BST.		CO5, CO6
Mode of examination	Practical		
Weightage Distribution	CA	MTE	ETE
	60%	0%	40%
Text book/s*	1. Lipschutz, "Data Structures" Schaum's Outline Series, TMH		
Other References	1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++" , PHI 2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication 3. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill 4. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education 5. G A V Pai, "Data Structures and Algorithms", TMH		

### Course outline

This course starts with an introduction to data structures with its classification, array and pointer based implementations. As the course progresses the study of Linear and Non-Linear data structures are studied. The course talks primarily about Linked list, stacks, queue, Tree structure, Graphs etc. This Course also deals with the concept of searching, sorting and hashing methods.

### Course Evaluation

Attendance	None
Any other	CA judged on the practicals conducted in the lab , weightage may be specified
References	

Text book	1. Lipschutz, "Data Structures" Schaum's Outline Series, TMH
Other References	1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++", PHI 2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication 3. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill 4. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education 5. G A V Pai, "Data Structures and Algorithms", TMH
Softwares	Turbo C/C++

<b>School: SET</b>		<b>Batch: 2018-2022</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch: CSE</b>		<b>Semester:III</b>	
1	Course Code	BCP201	
2	Course Title	Linux Programming Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	Introduces the UNIX/Linux operating system, including: task scheduling and management, memory management, input/output processing, internal and external commands, shell configuration, and shell customization. Explores the use of operating system utilities such as text editors, electronic mail, file management, scripting, and C/C++ compilers	
6	Course Outcomes	On completion of this course the student should be able to: <ol style="list-style-type: none"> <li>1. To Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.</li> <li>2. To accomplish typical personal, office, technical, and software development tasks.</li> <li>3. To Analyze system performance and network activities. Effectively use software development tools including libraries, preprocessors, compilers, linkers, and make files.</li> <li>4. Comprehend technical documentation, prepare simple readable user documentation and adhere to style guidelines.</li> </ol>	
7	Course Description	This courses introduces Linux Operating System	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Practical based on Basic Linux Commands</b>	CO1, CO2, CO4



		Introduction to Unix, Unix architecture, Features of Unix, Internal & External Commands, Basic unix commands: pwd, cd, mkdir, rmdir, ls, help, man, whatis		
	<b>Unit 2</b>	<b>Practical based on File Management</b>		CO1, CO2, CO3, CO4
		Unix file system, file permission, file handling commands: cat, touch, cp, rm, mv, more/less, lp, wc, cmp, diff, comm., dos2unix & unix2dos, gzip&gunzip, zip & unzip, tar		
	<b>Unit 3</b>	<b>Practical based on process Management</b>		CO2, CO3, CO4
		Process basics: PID, PPID, ps, process states, zombies, foreground and background processes, nice, kill.		
	<b>Unit 4</b>	<b>Practical Based on Filters</b>		CO2, CO3, CO4
		Simple filters: pr, head, tail, cut, paste, sort, nl, tr, grep		
	<b>Unit 5</b>	<b>Practical Based on Shell Scripting</b>		CO1, CO2, CO3, CO4
		Shell scripts, execution of shell scripts, using command line arguments, loops, condition		
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	1. Sumitabha Das, "Unix Concepts and Applications", Tata McGraw Hill.		
	Other References	1. Unix Shell programming by Stephen G. Kochan and Patric Wood 2. Unix and shell programming by Richard F. Gilberg and Behrouz A. forouzan		

<b>School: SET</b>		<b>Batch :2018-2021</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-2019</b>	
<b>Branch:NA</b>		<b>Semester:4</b>	
1	Course Code	BCA264	Course Name:BCA
2	Course Title	<b>Basics of Computer Network</b>	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	UG	

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5	Course Objective	<ol style="list-style-type: none"> <li>1. Familiarize with working of all levels of networking reference models</li> <li>2. Prepare the student for entry Advanced courses in computer networking.</li> <li>3. Enhance students communication and problem solving skills</li> </ol>
6	Course Outcomes	Students will be able to: <b>CO1:</b> Demonstrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model <b>CO2:</b> To explore fundamental issues driving network design <b>CO3:</b> Determine data communication methods suitability for application needs
7	Course Description	This course provides detailed concepts of computer networking .Familiarize the student with the basic taxonomy and terminology of the computer networking area.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Introduction:</b>
	A	Overview, networks in daily life, Network Topologies- Bus, Star, Ring, Mesh, Hybrid
	B	Connecting devices-Hub, Amplifier, Repeater, Router, Switch, Gateway, Modem, Multiplexers
	C	Transmission Media- Coaxial cables, twisted pair cables- Unshielded, shielded, Modes of Transmission-Simplex, half duplex and Full duplex
	<b>Unit 2</b>	<b>Reference Models</b>
	A	Network Architecture and structure, OSI reference model and detailed functions of each layer ,
	B	TCP/IP protocol Suite
	C	Types of networks- LAN, MAN, WAN, Broadcast, Point to Point, Peer to peer Networks
	<b>Unit 3</b>	<b>Data Link Layer</b>
	A	Framing , Errors in communication, Types of Error-Single Bit error, Burst error
	B	Flow Control- simplex protocol and stop and Wait protocol
	C	Random Access- Aloha, CSMA
	<b>Unit 4</b>	<b>Network Layer&amp; Transport Layer</b>
	A	IPV4 addressing basics and Header format
	B	Transport layer Basics, Process to Process delivery, TCP services and header format
	C	UDP: services, features, header format
	<b>Unit 5</b>	<b>Application Layer</b>
	A	DNS namespace, distribution of namespace, DNS in internet, resolution
	B	Email Architecture, services and Features Network Security: Definition of -symmetric, Asymmetric
	C	Cryptography, Digital signature, Message Digest

	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. Forouzan, B., "Communication Networks", TMH, Latest Edition			
	Other References	2. Tanenbaum, A.S." Computer Networks", 4th Edition, PHI 3. W. Stallings, "Data and Computer Communication" Macmillan Press			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:CO1:</b> Demonstrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model	PO11,PO12,PSO2,PSO3,PSO4
2.	<b>CO2:</b> Investigate and explore fundamental issues driving network design	PO1,PO3,PO5,PO7,PO10,PO11,PO12 PSO4,PSO5
3.	<b>CO3:</b> Determine data communication methods suitability for application needs	PO2,PO4,PO6,PO8,PO10,PSO1,PSO3

### **PO and PSO mapping with level of strength for Course Name Basics of Computer Network (BCA264)**

C S E	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
	CO1												1	3		2	3	1
CO2		3		3		2		3			3	1	2				1	2
CO3			3		2		2		2		2			1		3		

<b>School: SET</b>		<b>Batch : 2018-</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:CSE</b>		<b>Semester:4</b>	
1	Course Code	BCA 265	Course Name
2	Course Title	<b>Data base Management System</b>	

Prepared by : Department of Computer Science and Engineering

3	Credits	4
4	Contact Hours (L-T-P)	3-0-2
	Course Status	Core
5	Course Objective	<b>The objective of this course is to:</b> <ol style="list-style-type: none"> <li>1. To learn about basic concepts of databases, terms,</li> <li>2. Introduce students to build data base management systems</li> <li>3. Apply DBMS concepts to various examples and real life applications</li> </ol>
6	Course Outcomes	<b>At the end of the course student will be able to:</b> <ol style="list-style-type: none"> <li>1. Understand the basics concepts of data base.</li> <li>2. Understand and apply the knowledge of databases to E-R modelling.</li> <li>3. Apply major components of Relational Database model to database design.</li> <li>4. Apply Structured Query Language for data definition and data manipulation.</li> <li>5. Design a normalized database.</li> </ol>
7	Course Description	This course introduces basic aspects of data
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>INTRODUCTION TO DATABASES</b>
	A	Concept & Overview of DBMS, Traditional method vs Modern method of DBMS, Data Models
	B	Database languages, Database Administrator, Database Users
	C	Three Schema architecture of DBMS, Data Models ,Hierarchical, Network Data Modeling
	<b>Unit 2</b>	<b>INTRODUCTION TO ENTITY-RELATIONSHIP (ER) MODEL</b>
	A	Relational data model concepts, Concept of keys,Entity Types, Entity Sets, Attributes, and Keys
	B	Relationship Types, Relationship Sets, Roles, and Structural Constraints,Weak Entity Types
	C	Refining the ER Design for the COMPANY Database, ER Diagrams, Naming Conventions, and Design Issues.
	<b>Unit 3</b>	<b>INTRODUCTION TO SQL</b>
	A	Overview of the SQL Query Language,SQL Data Definition ,
	B	Basic Structure of SQL Queries, Additional Basic Operations
	C	Set Operations , Null Values, Aggregate Functions
	<b>Unit 4</b>	<b>NORMALIZATION IN DESIGN OF DATABASES</b>
	A	Functional Dependency, Different anomalies in designing a Database,

	B	Normalization first, second and third normal forms, BoyceCodd normal form	CO1,CO4	
	C	loss less join decompositions	CO1,CO4	
	<b>Unit 5</b>	<b>TRANSACTION MANAGEMENT</b>		
	A	Transaction processing system, schedule and recoverability, Testing of serializability,	CO5	
	B	Serializability of schedules, Conflict & view serializable schedule,	CO5	
	C	Recovery from transaction failures,, Concurrency Control	CO5	
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	15. Korth , Silberschatz& Sudarshan, Data base Concepts, Tata McGraw-Hill 16. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education Inc.		
	Other References	12. Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education, Latest Edition. 13. Jeffrey D. Ullman, Jennifer Windon, A first course in Database Systems, Pearson Education. 14. Date C.J., An Introduction to Database Systems, Addison Wesley. 15. Richard T. Watson, Data Management: databases and organization, Wiley.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Understand the basics concepts of data base.	PO1,PO2,PO3,PSO1
2.	CO2:Understand and apply the knowledge of databases to E-R modelling.	PO1, PO3, PO9, PSO3
3.	CO3: Apply major components of Relational Database model to database design	PO1,PO2,PO9,PO4
4.	CO4: Apply Structured Query Language for data definition and data manipulation. Design a normalized database.	PO2, PO3,PO5, PO9, PSO2

### **PO and PSO mapping with level of strength for Course Name Data base Management System(Course Code BCA 265)**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	--	1	--	1	2	1	2	1	3	2	2	1	2
CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
CO4	3	3	3	2	3	--	--	2	3	2	2	1	2	2	2	1	3

<b>School: SET</b>		<b>Batch: 2018</b>
<b>Program: BCA</b>		<b>Current Academic Year:</b>
<b>Branch:</b>		<b>Semester: 4</b>
1	Course Code	BCP-265
2	Course Title	Data Base Management System Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	<ul style="list-style-type: none"> <li>To Develop efficient SQL programs to access Oracle databases</li> <li>Build database using Data Definition Language Statements</li> <li>Perform operations using Data Manipulation Language statements like Insert, Update and Delete</li> </ul>
6	Course Outcomes	<p>By the end of this course you will be able to:</p> <p>CO1: Understand the concept of SQL commands in DBMS</p> <p>CO2: Create SQL SELECT statements that retrieve any required data</p> <p>CO3: Perform operations using Data Manipulation Language statements like Insert, Update and Delete</p> <p>CO4: Manipulate your data to modify and summaries your results for reporting</p>
7	Course Description	An introduction to the design and creation of relational databases. Create database-level applications and tuning robust business applications. Lab sessions reinforce the learning objectives and provide participants the opportunity to gain practical hands-on experience.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Practical based Data types</b>
		Classification SQL, Data types of SQL/Oracle
	<b>Unit 2</b>	<b>Practical based on DDL commands</b>
		CO1,CO2

		Create table , Alter table and drop table	CO1,CO2
<b>Unit 3</b>	<b>DML commands and Aggregate functions</b>		
	Introduction about the INSERT, SELECT , UPDATE & DELETE command.,sum,avg,count,max,min		CO2,CO4
<b>Unit 4</b>	<b>Practical based on Grouping Clauses GROUP BY ORDER BY &amp; GROUP BY HAVING</b>		CO1,CO4
	Briefly explain Group by, order by , having clauses with examples.		
<b>Unit 5</b>	<b>Practical based on Sub- queries, JOINS</b>		CO1,CO4
	Related example of Sub- queries, Joins and related examples		
Mode of examination	Jury/Practical/Viva		
Weightage Distribution	CA	MTE	ETE
	60%	0%	40%
Text book/s*	1. Korth , Silberschatz& Sudarshan, Data base Concepts, Tata McGraw-Hill		
Other References	16. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education Inc. 17. Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education, Latest Edition. 18. Jeffrey D. Ullman, Jennifer Windon, A first course in Database Systems, Pearson Education.		

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch:</b>		<b>Semester:4</b>	
1	Course Code	BCA266	Course Name: Web Designing
2	Course Title	Web Designing	
3	Credits	5	
4	Contact Hours (L-T-P)	3-1-2	
	Course Status		
5	Course Objective	The objective of this course is to provide a foundation of technologies and technical skills in web development. Based upon the development of a web, this course provides an insight of computer and networking technologies, and hands on experience in web programming.	
6	Course Outcomes	1) Design and develop a simple interactive web application 2) Demonstrate the ability to design web sites utilizing multiple tools and techniques.	

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		3) Build dynamic web pages using JavaScript 4) Apply the network programming knowledge to setup a web site		
7	Course Description	This course is an overview of the modern Web technologies used for the Web development. The purpose of this course is to give students the basic understanding of how things work in the Web world from the technology point of view as well as to give the basic overview of the different technologies.		
8	Outline syllabus	CO Mapping		
	<b>Unit 1</b>	<b>Introduction</b>		
	A	Web Page: Static and dynamic sites, client and server end technology, URL syntax, open source web design tools overview.		CO1,CO2
	B	HTML basic tags, image map, implementation of links, table, form design.		CO1
	C	Page layout design: using frame, div and span tag, iframes, DHTML		CO1,CO2
	<b>Unit 2</b>	<b>HTML5</b>		
	A	New elements, semantic, canvas, offline webpage, canvas, SVG		CO1
	B	HTML Media: video, audio, HTML API: geolocation		CO2
	C	Location storage, Migration from HTML to HTML5.		CO2
	<b>Unit 3</b>	<b>CSS</b>		
	A	CSS: Introduction, syntax, selector, text formatting, margin, align, Positioning, background formatting, Navigation bar, and image gallery.		CO2,CO3
	B	CSS3: Introduction, colors, text formatting, fonts formatting, Background formatting		CO2
	C	2D transform, Transition, animation, user interface		CO4
	<b>Unit 4</b>	<b>XML</b>		
	A	XML: Introduction, syntax, well form XML document		CO1,CO2
	B	DTD, schema, XML Technology: xlink, xpath, xpointer, xslt		CO1,CO2
	C	displaying XML file data into HTML file		CO2
	<b>Unit 5</b>	<b>Java Script</b>		
	A	Syntax, comment, statement, variable, operators, conditional statements, looping statements		CO3,CO4
	B	functions, object, events, Accessing form elements		CO3,CO4
	C	History, pop up windows, cookies, $\{ \dots \}$		CO3,CO4
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	4. Ivan Bayross, "HTML, DHTML, JavaScript, Perl & CGI", BPB Publication 5. Rick Delorme, "Programming in HTML5 with JavaScript and CSS3", Microsoft		
	Other References	3. Burdman, "Collaborative Web Development" Addison Wesley.		

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		4. Chris Bates, “Web Programing Building Internet Applications”, 2nd Edition, WILEY. 5. Steven Holzner, “PHP: The Complete Reference”, TataMcGraw Hill Publication	
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### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Design and develop a simple interactive web application	PO3,PO8,PO12,PSO3
2.	CO2: Demonstrate the ability to design web sites utilizing multiple tools and techniques.	PO3,PO5,PO10,PO12,PSO1,PSO2
3.	CO3:Build dynamic web pages using JavaScript	PO3,PO12
4.	CO4: Apply the network programming knowledge to setup a web site	PO10,PO12

### **PO and PSO mapping with level of strength for Course Web Designing (Course Code BCA 266 )**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CSE311 CO1	1	2	3	1	1	1	2	3	2	2	1	3	2	2	3	3
CO311 CO2	1	2	3	2	3	1	2	2	2	3	2	3	3	3	1	1
CSE311 CO3	1	2	3	--	2	1	2	2	2	2	--	3	2	2	1	3
CSE311 CO4	1	2	2	1	2	1	2	2	--	3	1	3	2	1	1	2

<b>School: SET</b>		<b>Batch:</b>
<b>Program: BCA</b>		<b>Current Academic Year:</b>
<b>Branch:</b>		<b>Semester:</b>
1	Course Code	<b>BCP266</b>
2	Course Title	Web Designing
3	Credits	4
4	Contact Hours (L-T-P)	3-0-2
	Course Status	Provide the knowledge to design and develop web application with and without database. Students will gain the skills and project-based experience needed for entry into web application and development careers. It provides information about web technologies that relate to the interface between web servers and their clients.
5	Course Objective	On successful completion of this module students will be able to: 1. Design interactive web pages

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		<ol style="list-style-type: none"> <li>2. Design web pages/site having validation on user data access.</li> <li>3. Develop web site for small business and organization or for individual</li> <li>4. Client server communication RMI</li> </ol>	
6	Course Outcomes	This course is an overview of the modern Web technologies used for the Web development. The purpose of this course is to give students the basic understanding of how different computers and devices to communicate and share resources as well as to give the basic overview of the different technologies.	
7	Course Description		
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>HTML</b>	
		<ol style="list-style-type: none"> <li>1. Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.</li> <li>2. Create your class timetable using table tag.</li> <li>3. Create user Student feedback form (use textbox, text area , checkbox, radio button, select box etc.)</li> </ol>	CO1, CO2
	<b>Unit 2</b>	<b>HTML</b>	
		<ol style="list-style-type: none"> <li>4. Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right hand side.</li> <li>5. Write html5 code to develop a webpage having two navigations</li> <li>6. Create your resume using HTML tags also experiment with colors, text , link , size and also other tags you studied</li> </ol>	CO1,CO2
	<b>Unit 3</b>	<b>CSS &amp; CSS3</b>	
		<ol style="list-style-type: none"> <li>7. Defining CSS using various types of selectors</li> <li>8. Design a web page of your home town with an attractive background color, text color, an Image, font etc. (use internal CSS).</li> <li>9. Use Inline CSS to format your resume that you created.</li> <li>10. Use External CSS to format your class timetable as you created.</li> </ol>	CO2, CO3,CO4

		11. Use External, Internal, and Inline CSS to format college web page that you created.	
	<b>Unit 4</b>	<b>XML &amp; DTD</b>	
		12. Write XML code for displaying student information 13. Write DTD for student schema	CO1,CO2,CO3
	<b>Unit 5</b>	<b>Java Script</b>	
		14. Develop a JavaScript to display today's date. 15. Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript 16. Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN. 17. Create HTML Page that contains form with fields Name, Email, Mobile No , Gender , FavoriteColor and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked. 18. Implement Validation in above Feedback Form. 19. Use regular expression for validation in Feedback Form. 20. Using ajax retrieve data from a TXT file and display it	CO3,CO4
	Mode of examination	Jury/Practical/Viva	
	Weightage Distribution	CA	MTE
		60%	0%
	Text book/s*	1. Ivan Bayross,"HTML,DHTML, JavaScript, Perl & CGI", BPB Publication 2. Schildt H, "The Complete Reference JAVA2", TMH 3. Schildt H, "The Complete Reference J2EE", TMH	
	Other References	1. Rick Delorme," Programming in HTML5 with JavaScript and CSS3", Microsoft	

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-2019</b>	
<b>Branch: BCA</b>		<b>Semester:4</b>	
1	Course Code	BCA267	Course Name: Introduction to Software Engineering
2	Course Title	Introduction to Software Engineering	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	<ol style="list-style-type: none"> <li>1. Provide students with an overview of the Software development life cycle for software development methodologies.</li> <li>2. Provide students with insights on requirement gathering activities and provide the students with design methodology practices.</li> <li>3. Gain Insights about testing techniques.</li> <li>4. Apply Quality management and reliability measurement techniques.</li> </ol>	
6	Course Outcomes	Students will be able to: CO1: Illustrate software characteristics and Implement different software development methodologies. CO2: To gather requirement from different sources. CO3: Design practices for development of a software and apply testing techniques using test cases and test suites. CO4: Explore all aspects of software maintenance process.	
7	Course Description	The objective of this course is to provide fundamental knowledge of software engineering, and make student aware of best software engineering practices, and contemporary software engineering tools.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to software engineering</b>	
	A	Software Engineering Paradigms : Software Characteristics, Software myths, Software Applications,	CO1
	B	Software Engineering Definitions, System Development Life Cycle, Software Process Models,	CO1
	C	Feasibility Analysis, Technical Feasibility, Cost- Benefit Analysis.	CO1
	<b>Unit 2</b>	<b>Software requirement Specification</b>	

A	<b>Software Requirement Engineering:</b> System/ Software Requirement Specification,			CO2
B	Prototyping - Specification Functional and non- functional requirements, User requirements, Data Flow Diagram (DFD),			CO2
C	Data Dictionary, and ER diagram.			CO2
<b>Unit 3</b>	<b>Software Design</b>			
A	<b>System Design:</b> System Design, Problem Partitioning, Top-Down and Bottom-Up design, Decision tree, decision table,			CO3
B	Software design: -Abstraction - Modularity - Software Architecture, Effective modular design – Cohesion and Coupling,			CO3
C	Functional vs. Object- Oriented approach.			CO3
<b>Unit 4</b>	<b>Software Testing</b>			
A	<b>Testing:</b> Testing: -Levels of Testing, Integration Testing, and Structures testing, ,			CO3
B	Black Box testing and white box testing, Unit testing, system testing, Validation and system testing and Software Maintenance.			CO3
C	Validation and Verification, test cases, overview of debugging.			CO3
<b>Unit 5</b>	<b>Software maintenance</b>			
A	<b>Software maintenance:</b> Software maintenance, types of maintenance,			CO4
B	Issues, techniques for maintenance, Project management, roles and responsibilities,			CO4
C	CASE Tools.			CO4
Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	30%	20%	50%	
Text book/s*	1. Pressman R S, “ <i>Software Engineering: A Practitioners Approach</i> ”, McGraw Hill.			
Other References	1. Sommerville, Ian. “Software Engineering”, Pearson (Latest Ed). 2. Jalote, Pankaj, “Software Engineering”New Delhi: Narosa (Latest Ed.) 3. SADSE (System Analysis Design) - Prof. Khalkar and Prof. Parthasarathy. 4. Schaum’s Series, “Software Engineering” TMH			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Illustrate software characteristics and Implement different software development methodologies.	PO1,PO2,PO7,PO9,PO10, ,PSO1
2.	CO2: Perform requirement gathering in requirement analysis.	PO2, PO3, PO4, PO5, PSO2
3.	CO3: Design practices for development of a software and apply testing techniques using test cases and test suites.	PO1,PO2,PO3,PO4, PO6, PO9, PO11, PO12
4.	CO4: Conduct all aspects of software maintenance process.	PO6,PO11, PSO5

**PO and PSO mapping with level of strength for Course Name Introduction to Software Engineering(Course Code BCA267)**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	--	--	3	-	2	2	-	-	3	-	-	-	-
CO2	1	2	3	3	3	--	--	1	1	1	-	-	1	2	-	-	-
CO3	3	3	3	3	--	2	--	1	2	1	3	2	-	-	-	-	-
CO4	1	1	1	1	-	3	--	1	1	-	3	1	1	1	1	1	3

<b>School:</b> <b>SET</b>	<b>Batch : 2018</b>		
<b>Program:</b> <b>BCA</b>	<b>Current Academic Year:</b>		
<b>Branch:CS/IT</b>	<b>Semester: V</b>		
1 Course Code	<b>BCA360</b>	Course Name	
2 Course Title	Introduction to OOP using Java		
3 Credits	5		
4 Contact Hours (L-T-P)	3-1-2		
Course Status	UG		

Prepared by : Department of Computer Science and Engineering

5	Course Objective	Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm
6	Course Outcomes	<p>Students will be able to:</p> <p>CO1: Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.</p> <p>CO2: Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.</p> <p>CO3: Have the ability to write a computer program to solve specified problems.</p> <p>CO4: Be able to use the Java SDK environment to create, debug and run simple Java programs.</p> <p>CO 5: Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.</p> <p>CO 6 : Understand the principles of inheritance, packages and interfaces</p>
7	Course Description	Basic <i>Object Oriented Programming (OOP)</i> concepts, including objects, <i>classes</i> , methods, parameter passing, information hiding, inheritance and polymorphism are introduced and their implementations <i>using Java</i> are discussed.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Introduction to Object Oriented Paradigm</b>
	A	History, The meaning of Object Orientation, Features of Java, OOPs concept object identity,
	B	Encapsulation, information hiding, polymorphism inheritance, Java virtual machine,
	C	ByteCode, Architecture of JVM, ClassLoader Execution Engine, Garbage collection.
	<b>Unit 2</b>	<b>Introduction to Java</b>
	A	Java development Kit (JDK), Introduction to IDE for Java development, Setting Java environment (steps for path and CLASSPATH setting).
	B	Constants, Variables, Data Types, Operators, Expressions.
	C	Decision Making Branching, Loops, command line argument.
	<b>Unit 3</b>	<b>Class &amp; Object</b>
	A	Arrays, Type conversion & casting, Input from keyboard, Classes Objects
	B	Methods Method overloading, Constructors, Constructors overloading.
	C	static keyword, Access Modifiers, String handling. keyboard, Classes Objects.

<b>Unit 4</b>	<b>Inheritance, package and Interface Inheritance Implementation</b>			
A	Multilevel Hierarchy, Overriding methods, Polymorphism, use of this and super, Constructor call in inheritance, Abstract class and method,			CO1,CO2,CO3
B	Final class, method and variable, Implementing Interface, Concept of multiple inheritance in Java, Wrapper class			CO1,CO2,CO3
C	Packages: User defined packages, built-in packages (java.lang package).			CO1,CO2,CO3
<b>Unit 5</b>	<b>Exception and Multithreading</b>			
A	Input/output: Exploring java.io, File, Stream, Classes, Byte Stream, Classes and Character stream Classes.			CO1,CO2,CO3, CO6
B	reading and writing in file, Introduction to Exception Handling, Introduction to try, catch, Finally, throw and throws, Checked and Unchecked exceptions, User define exception			CO1,CO2,CO3
C	Introduction to Multithreading: Creating thread using Runnable interface and Thread class, Thread life cycle.			CO1,CO2,CO3, CO6
Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	30%	20%	50%	
Text book/s*	1.Schildt H, "The Complete Reference JAVA2", TMH			
Other References	6. Balagurusamy E, "Programming in JAVA", TMH 7. Professional Java Programming: Brett Spell, WROX Publication			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism	PO1,PO2,PO3,PO4,PSO1
2.	CO2: Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections.	PO1, PO3, PO4, PSO2
3.	CO3: How to take the statement of a business problem and from this determine suitable logic for solving the problem; then be able to proceed to code that logic as a program written in Java.	PO1,PO2,PO3,PO4



4.	CO4: How to test, document and prepare a professional looking package for each business project using javadoc.	PO9, PO10, PO11, PSO5
5.	CO 5: Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms	PO1, PO2, PO3, PO4
6.	CO 6 : Understand the principles of inheritance, packages and interfaces.	PO1, PO3, PO4, PSO2

**PO and PSO mapping with level of strength for Course Name Introduction to OOPs using java (Course Code BCA360)**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3

<b>School: SET</b>		<b>Batch: 2018</b>
<b>Program: BCA</b>		<b>Current Academic Year:</b>
<b>Branch: CSE</b>		<b>Semester: V</b>
1	Course Code	BCP360
2	Course Title	Introduction to OOP using Java
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm
6	Course Outcomes	Students will be able to:  CO1: Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.  CO2: Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.

		CO3: Have the ability to write a computer program to solve specified problems. CO4: Be able to use the Java SDK environment to create, debug and run simple Java programs.  CO 5: Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.  CO 6 : Understand the principles of inheritance, packages and interfaces		
7	Course Description	Basic <i>Object Oriented Programming (OOP)</i> concepts, including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are introduced and their implementations <i>using Java</i> are discussed.		
8	Outline syllabus			CO Mapping
	<b>Unit 1</b>	<b>Practical based on classes and objects</b>		CO1, CO2
		Sub unit - a, b and c detailed in Instructional Plan		
	<b>Unit 2</b>	<b>Practical based on Arrays and inheritance</b>		CO1,CO2,CO3
		Sub unit - a, b and c detailed in Instructional Plan		
	<b>Unit 3</b>	<b>Practical based on package and interface</b>		CO2,CO3,CO4
		Sub unit - a, b and c detailed in Instructional Plan		
	<b>Unit 4</b>	<b>Practical based on polymorphism</b>		CO1,CO3
		Sub unit - a, b and c detailed in Instructional Plan		
	<b>Unit 5</b>	<b>Practical based on exception handling</b>		CO1,CO2,CO3
		Sub unit - a, b and c detailed in Instructional Plan		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	1.Schildt H, “The Complete Reference JAVA2”, TMH		
	Other References	1. Balagurusamy E, “Programming in JAVA”, TMH 2. ProfessionalJavaProgramming:BrettSpell,WRO X Publication		

<b>School: SET</b>	<b>Batch : 2018</b>
<b>Program: BCA</b>	<b>Current Academic Year:Computer Graphics</b>
<b>Branch:CS/IT</b>	<b>Semester: V</b>
1 Course Code	BCA364 Course Name
2 Course Title	Computer Graphics
3 Credits	4
4 Contact Hours	3-1-0

	(L-T-P)	
	Course Status	DE-1
5	Course Objective	This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends. A thorough introduction to computer graphics techniques, focusing on 3D modeling, image synthesis, and rendering. Topics cover: geometric transformations, geometric algorithms, 3D object models (surface, volume and implicit), visible surface algorithms, image synthesis and anti-aliasing. The interdisciplinary nature of computer graphics is emphasized in the wide variety of examples and applications.
6	Course Outcomes	Students will be able to: <b>CO1:</b> Understand the technology requirement for graphics system. <b>CO2:</b> Construct various object to create various application. <b>CO3:</b> Formulate proficiency in 2D and 3D computer graphics API programming. <b>CO4:</b> Differentiate between 2D and 3D display schemes. <b>CO5:</b> Discuss various animation methodology. <b>CO6:</b> Compare various animation techniques to formulate various models.
7	Course Description	Computer Graphics I is a study of the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts, 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Introduction (Graphic System Primitives)</b>
	A	Concept of computer graphics, Application areas, and Display devices-CRT
	B	Raster scan and Random scan display, Color display techniques
	C	frame buffer and display file, Interactive input devices
	<b>Unit 2</b>	<b>Raster Algorithms</b>
	A	Line drawing algorithms -- DDA and Bresenham's algorithm
	B	circle generation algorithm—Midpoint & Bresenham's algorithm, ellipses and other curves generation
	C	Area filling-Inside and Outside test, Scan line algorithm, aliasing techniques
	<b>Unit 3</b>	Two-dimensional Transformation
	A	Basic transformations-Translation, rotation
	B	scaling and reflection, coordinate system
		CO1, CO2
		CO1, CO2
		CO1, CO2
		CO1, CO2
		CO3, CO4
		CO3, CO4

	C	windowing and clipping-point, line and polygon clipping, Segments		CO3,CO4
	<b>Unit 4</b>	Three-dimensional Transformation		
	A	Basic transformations-Translation		CO3,CO4
	B	3 D Rotation		CO3,CO4
	C	rotation, scaling and reflection		CO3,CO4
	<b>Unit 5</b>	Hidden surface removal Algorithm and Animation		
	A	Z-Buffer, Painter's Algorithm, Wornock's Algorithm, Scan line Algorithm.		CO5,CO6
	B	Introduction to Animation, Principles of Animation		CO5,CO6
	C	Types of Animation		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA 30%	MTE 20%	ETE 50%
	Text book/s*	1.Hearn, M. Baker, "Computer Graphics – C Version", 2nd Edition, Pearson Education, 2002		
	Other References	1. D. Rogers, J. Adams, "Mathematical Elements for Computer Graphics", 2 <sup>nd</sup> Edition, Tata McGraw-Hill Publication, 2002.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:CO1:</b> Understand the technology requirement for graphics system.	PO1,PO2,PO3,PO4,PSO1
2.	<b>CO2:</b> Construct various object to create various application.	PO1, PO3, PO4, PSO2
3.	<b>CO3:</b> Formulate proficiency in 2D and 3D computer graphics API programming.	PO1,PO2,PO3,PO4
4.	<b>CO4:</b> Differentiate between 2D and 3D display schemes.	PO9, PO10,PO11, PSO5
5.	<b>CO5:</b> Discuss various animation methodology.	PO1,PO2,PO3,PO4,PSO1
6.	<b>CO6:</b> Compare various animation techniques to formulate various models.	PO1,PO3,PO4,PSO2

### **PO and PSO mapping with level of strength for Course Name Computer Graphics (Course Code BCA364)**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
BCA205 CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
CO311 CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
BCA205 CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1

BCA205 CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3
BCA205 CO5	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
BCA205 CO6	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch: CS/IT</b>		<b>Semester: V</b>	
1	Course Code	BCA 365	Course Name
2	Course Title	<b>Client-Server Computing</b>	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Elective	
5	Course Objective	<ul style="list-style-type: none"> <li>• Provide students with an overview of the methodologies and approaches to client server computing</li> <li>• Gain insight into the components of Client Server Application</li> <li>• Provide the students with practice of client server systems</li> <li>• Prepare students for research in the area of client server computing and related applications</li> <li>• Enhance students communication and problem solving skills</li> </ul>	
6	Course Outcomes	<p>Students will be able to:</p> <p><b>CO1:</b> To understand and implement client server computing</p> <p><b>CO2:</b> To understand the client server components</p> <p><b>CO3:</b> To identify the application area of client server computing</p> <p><b>CO4:</b> To know how to develop client server network and data storage is used in client server architecture.</p> <p>CO 5:To understand basic network and Internet protocols including sockets, stream and packet protocols such as TCP, UDP, HTTP, FTP and SMTP protocols for creating simple two tier client server applications;</p> <p>CO 6: To Identify multi-tier client server computing systems with remote and web services protocols for creating distributed client server systems;</p>	
7	Course Description	This course introduces advanced aspects of data warehousing and data mining, encompassing the principles, to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.	
8	Outline syllabus	CO Mapping	
	<b>Unit 1</b>	<b>Client/Server Computing</b>	

Prepared by : Department of Computer Science and Engineering

A	DBMS concept and architecture, Single system image, Client Server architecture	CO1, CO2
B	mainframe-centric client server computing, downsizing and client server computing	CO1, CO2
C	Preserving mainframe applications investment through porting, client server development tools, and advantages of client server computing.	CO1, CO2
<b>Unit 2</b>	<b>Components of Client/Server application</b>	
A	The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA)	CO1, CO2,
B	<b>The server:</b> Detailed server functionality, the network operating system, available platforms	CO1, CO2
C	Network operating system, available platform, the server operating system.	CO1, CO2
<b>Unit 3</b>	<b>Client/Server Network</b>	
A	<b>Client/Server Network:</b> connectivity, communication interface technology, Interposescommunication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network management,	CO1,CO2,CO3
B	<b>Client-Server system development:</b> Software, Client-Server System Hardware: Network Acquisition, PC-level processing unit, Macintosh, notebooks, pen	CO1,CO2,CO3
C	UNIX workstation, x-terminals, And server hardware.	CO1,CO2,CO3
<b>Unit 4</b>	<b>Client Server Systems Development</b>	
A	Services and Support, system administration, Availability, Reliability, Serviceability	CO1,CO2,CO3
B	Software Distribution, Performance, Networkmanagement, Help Disk, Remote Systems Management Security	CO1,CO2,CO3
C	LAN and NetworkManagement issues. Training, Training advantages of GUI Application, System Administrator Training, Database Administrator Training, End-user training.	CO1,CO2,CO3
<b>Unit 5</b>	<b>Data Storage</b>	
A	Magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance	CO1,CO2,CO3 CO4
B	RAID, RAID-Disk network interface cards. Network protectiondevices, Power Protection Devices, UPS, Surge protectors	CO1,CO2,CO3 CO4
C	The future of client server Computing Enabling Technologies, The transformationalsystem.	CO1,CO2,CO3 CO4
Mode of examination	Theory	

	Weightage Distribution	CA	MTE
		30%	20%
	Text book/s* Other References	1. Patrick Smith & Steve Guengerich, "Client / Server Computing", PHI 2. Dawna Travis Dewire, "Client/Server Computing", TMH 3. Majumdar & Bhattacharya, "Database management System", TMH 4. Korth, Silberchatz, Sudarshan, "Database Concepts", McGraw Hill 5. Elmasri, Navathe, S.B, "Fundamentals of Data Base System", Addison Wesley	

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> To understand and implement client server computing	PO1, PO2, PO4, PSO1
2.	<b>CO2:</b> To understand the client server components	PO1, PO3, PO4, PSO2
3.	<b>CO3:</b> To identify the application area of client server computing	PO1, PO2, PO3, PO4
4.	<b>CO4:</b> To know how to develop client server network and data storage is used in client server architecture.	PO9, PO10, PO11, PSO5
5.	CO 5: To understand basic network and Internet protocols including sockets, stream and packet protocols such as TCP, UDP, HTTP, FTP and SMTP protocols for creating simple two tier client server applications.	PO1, PO3, PO4, PSO2
6.	CO 6: To Identify multi-tier client server computing systems with remote and web services protocols for creating distributed client server systems.	PO1, PO2, PO3, PO4

### **PO and PSO mapping with level of strength for Course Name Client-Server Computing (Course Code BCA 365)**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	--	--	--	2	2	1	2	1	1	2	2	1	2
CO2	2	2	3	3	--	--	--	2	2	2	1	1	1	3	2	1	2
CO3	3	3	1	3	--	--	--	1	1	1	1	2	1	2	1	1	1

Prepared by : Department of Computer Science and Engineering

CO4	2	2	2	2	1	--	--	2	3	1	3	1	2	2	2	1	3
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<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch:CS/IT</b>		<b>Semester: V</b>	
1	Course Code	BCA366	Course Name: Multimedia and Animation
2	Course Title	<b>Multimedia and Animation</b>	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	DE-2	
5	Course Objective	This course emphasizes the design and implementation of 2D animation for a wide variety of multimedia products.	
6	Course Outcomes	<p>On successful completion of the course students will be able to:</p> <p>CO1. Design and create animation using computerized animation tools.</p> <p>CO2. Design and create 2D models.</p> <p>CO3. To Understand Principle of Animation</p> <p>CO4. Include layout and designing</p>	
7	Course Description	Multimedia is the combined use of text, graphics, sound, animation, and video. A primary objective of this workshop is to teach participants how to develop multimedia programs. Another objective is to demonstrate how still images, sound, and video can be digitized on the computer.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to computers &amp; networks</b>	
	A	Multimedia hardware and Multimedia software	CO1
	B	Multimedia operating system	CO1
	C	Multimedia communication systems.	CO1
	<b>Unit 2</b>	<b>Image and Video</b>	
	A	Image: Creation of image(BMP & vector), image color models, Image file format, Image compression.	CO1
	B	Video: video broadcast standard(PAL, NTSC), shooting and editing video.	CO1



	C	Video file formats. Video tips, video compression: MPEG standards.		CO1
	<b>Unit 3</b>	<b>Animation</b>		
	A	Principle of Animation. Animation techniques: cell animation, computer animation.		CO3
	B	Kinematics, morphing, anti-aliasing, animation files formats.		CO3
	C	Different animation packages: Acrobat Photoshop, flash.		CO3
	<b>Unit 4</b>	<b>2D Animation</b>		
	A	Introduction to 2D animation.		CO2
	B	Drawing concept and color theory & basics		CO2
	C	Incorporating sound into 2D animation		CO2
	<b>Unit 5</b>	<b>Layout &amp; Designing</b>		
	A	Basic of sketching still and assignment of basic drawing, composition of basic elements.		CO4
	B	Work in different media, such as drawing, collage and painting		CO4
	C	Pixel and resolution: vector and bitmap Graphics.		CO4
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	8. Multimedia Making It Work-by Tay Vaughan, Tata Mcgrwa Hills. 9. Multimedia Systems: John F, Koegel Buford Pearson.		
	Other References	6. Multimedia In Action-James E Shuman-Vikas Publishing House 7. Multimedia basic-Volumes-1 Technology.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Design and create animation using computerized animation tools.	PO9, PO10, PO11, PSO5
2.	Design and create 2D models.	PO1, PO3, PO4, PSO2
3.	To Understand Principle of Animation	PO3, PO4, PSO2

4.	Include layout and designing	PO1,PO2,PO3,PO4

**PO and PSO mapping with level of strength for Course Multimedia and Animation  
(Course Code BCA 366 )**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	--	--	--	2	2	1	2	1	1	2	2	1	2
CO2	2	2	3	3	--	--	--	2	2	2	1	1	1	3	2	1	2
CO3	3	3	1	3	--	--	--	1	1	1	1	2	1	2	1	1	1
CO4	2	2	2	2	1	--	--	2	3	1	3	1	2	2	2	1	3

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:</b>		<b>Semester: V</b>	
1	Course Code	BCA367	Course Name: BCA
2	Course Title	Introduction to Distributed System	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Compulsory	
5	Course Objective	4. This course provides an introduction to the fundamentals of distributed computer systems, 5. Designing Algorithms used in Distributed system. 6. Various issues and challenges used in Distributed System.	
6	Course Outcomes	Students will be able to: <b>CO1:</b> Students will identify the core concepts of distributed systems. <b>CO2:</b> the way in which several machines orchestrate to correctly solve. <b>CO3:</b> Students will examine how existing systems have applied the concepts of distributed systems in designing large system. <b>CO4:</b> Can additionally apply these concepts to develop distributed systems.	
7	Course Description	This course introduces the concepts of distributed operating system, algorithms and design issues and challenges in Distributed system, identify the problems, and choose the relevant models and algorithms to apply.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to Distributed System</b>	

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	A	Introduction: definition, characteristics and challenges of distributed systems,		CO1, CO2
	B	architectural models (client-server)Time: Physical and logical time, event ordering,		CO1, CO2
	C	clock synchronization, message delivery ordering		CO1, CO3
	<b>Unit 2</b>	<b>Synchronization</b>		
	A	Limitation of Distributed system		CO1, CO2,CO4
	B	absence of global clock, shared memory,		CO1, CO2,CO4
	C	Logical clocks ,Lamport's& vectors logical clocks.		CO1, CO2,CO4
	<b>Unit 3</b>	<b>Distributed Algorithm</b>		
	A	classification of Agreement Problem,Byzantine agreement problem,		CO1,CO2,CO3
	B	Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem,		CO1,CO2,CO3
	C	Application of Agreement problem, Atomic Commit in Distributed Database system.		CO4
	<b>Unit 4</b>	<b>Distributed Transactions</b>		
	A	<b>Transactions and Concurrency Control:</b> Transactions, Nested transactions,		CO1,CO2,CO3
	B	Locks, Optimistic Concurrency control, Timestamp ordering,		CO1,CO2,CO3
	C	Comparison of methods for concurrency control.		CO1,CO2,CO3
	<b>Unit 5</b>	<b>Security</b>		
	A	Security protocol in distributed system		CO1,CO2,CO3
	B	main threats and techniques for ensuring security (secure channels & firewalls		CO1,CO2,CO3
	C	Fault tolerance and availability		CO1,CO2,CO3
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill		
	Other References	1. Ramakrishna,Gehrke," Database Management Systems", Mc Grawhill 2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education. 3. Tenanuanbaum, Steen," Distributed Systems", PHI. 4. Gerald Tel, "Distributed Algorithms", Cambridge University Press.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> Students will identify the core concepts of distributed systems.	PO1,PO2,PO3,PO4,PSO1
2.	<b>CO2:</b> the way in which several machines orchestrate to correctly solve.	PO1, PO3, PO4, PSO2
3.	<b>CO3:</b> Students will examine how existing systems have applied the concepts of distributed systems in designing large system.	PO1,PO2,PO3,PO4
4.	<b>CO4:</b> Can additionally apply these concepts to develop distributed systems.	PO9, PO10,PO11, PSO5

### **PO and PSO mapping with level of strength for Course Name Introduction to Distributed System (Course Code BCA 367)**

C S E	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
	CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
	CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
	CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
	CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch: BCA</b>		<b>Semester: 5</b>	
1	Course Code	BCA361	Course Name
2	Course Title	<b>E-COMMERCE</b>	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	

5	Course Objective	<b>Students will try to learn:</b> <ol style="list-style-type: none"> <li>1. Understand the basic working principles of information systems and enterprises</li> <li>2. Equip the students with preliminaries of technologies used in business information systems</li> <li>3. Familiarize students with the Business applications and e-commerce initiatives</li> <li>4. Enable the students to build decision support systems</li> <li>5. Enhance the knowledge of the student about the management Security challenges in IT sector</li> </ol>	
6	Course Outcomes	After Successful completion of this course the student will be able to: <ol style="list-style-type: none"> <li>1. Understand the fundamentals of a computer based information systems and enterprises</li> <li>2. Analyze the technologies associated with business information systems</li> <li>3. Apply e-commerce initiatives in various Business applications</li> <li>4. Evaluate significance of support systems in enterprises</li> <li>5. Align to security control measures in IT sector</li> </ol>	
7	Course Description	The concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general.	
8	Outline syllabus	CO Mapping	
	<b>Unit 1</b>	<b>Introduction to Information Systems in Business</b>	
	A	The Fundamental Roles of Information Systems, Internet and Business	CO1, CO2
	B	Globalization and Information Technology	CO1, CO2
	C	Components of an Information System, Types of Information Systems	CO1, CO2
	<b>Unit 2</b>	<b>Computer Hardware and Software</b>	
	A	Computer Hardware – Trends in Computer Systems, Storage Trends and Trade Offs;	CO1, CO2
	B	Computer Software – Software Suites and Integrated Packages, Programming Packages	CO1, CO2
	C	Business Telecommunication – Networking the Enterprise, Managing Organizational Change	CO1, CO2,
	<b>Unit 3</b>	<b>e-commerce and Enterprise Collaboration</b>	

	A	Foundations of eCommerce, Business-to-Consumer eCommerce			CO1, CO3
	B	Business-to-Business eCommerce, Online Transaction Processing,			CO1, CO3, CO4
	C	Enterprise Collaboration, Groupware for Enterprise Collaboration, (Case studies)			CO1, CO3, CO4
	<b>Unit 4</b>	<b>Information Systems for Decision Support, Strategic Advantages</b>			
	A	Introduction, Decision Support Systems (DSS), Executive Information Systems			CO1,CO5
	B	Competitive Strategy Concepts, Strategic roles of Information Systems			CO1,CO5
	C	Challenges of Strategic Information systems, Sustaining strategic success			CO1,CO5
	<b>Unit 5</b>	<b>Management Security Challenges &amp; Controls</b>			
	A	Organization and Information Technology			CO1,CO2,CO3, CO4,CO5
	B	Security and Ethical Challenges: Information systems controls, its need, Audit information systems			CO1,CO2,CO3, CO4,CO5
	C	Ethical dimensions, Computer Crime, Societal solutions, you and ethical responsibility			CO1,CO2,CO3, CO4,CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, E-Commerce: Fundamentals and Applications, John Wiley & Sons, 2003, ISBN : 9780471493037 2. James A O'Brien and George M Marakas, Management Information System, Tata McGraw Hill, 10th Edition, 2008, ISBN -13 : 978-1-25-902671-3, ISBN-10 : 1-25- 902671-X			
	Other References	1. Kenneth C. Laudon, Jane P. Laudon, Management of Information Systems, Pearson, Dorling Kindersley(India) Pvt. Ltd, 12th edition, 2013, ISBN 9780132142854			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO-1 Understand the fundamentals of a computer based information systems and enterprises	PO1,PO2,PO3,PO4
2.	CO-2 Analyze the technologies associated with business information systems	PO9, PO10,PO11, PSO5
3.	CO-3 Apply e-commerce initiatives in various Business applications	PO1, PO3, PO4, PSO2
4.	CO-4 Evaluate significance of support systems in enterprises	PO1,PO2,PO3,PO4
5.	CO-5 Align to security control measures in IT sector	PO9, PO10,PO11, PSO5

### PO and PSO mapping with level of strength for e-commerce (Course Code BCA361)

Course Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	--	--	--	2	2	1	2	1
CO2	3	2	3	3	--	--	--	2	2	2	1	1
CO3	3	3	3	3	--	--	--	1	1	1	3	2
CO4	2	2	2	2	1	--	--	2	3	3	3	1
CO5	2	2	2	2	1	--	--	2	3	3	3	1

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 18-19</b>	
<b>Branch:</b>		<b>Semester: VI</b>	
1	Course Code	BCA362	Course Name
2	Course Title	Introduction to PHP	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status		
5	Course Objective	To design & develop secure web pages using server side scripting (frontend and backend)	
6	Course Outcomes	On successful completion of the course, the student will: <ol style="list-style-type: none"> <li>1. Apply logical processing and error handling to design and develop web pages/site.</li> <li>2. Develop PHP scripts to handle HTML forms.</li> </ol>	

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		3. Develop dynamic website with database connectivity. 4. Develop Websites for Small business and organization or for individual	
7	Course Description	This course introduces Concepts for PHP and learns Form handling, Session Management. How we can develop dynamic websites. It will also help students to build applications according to their problem statements.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>PHP Basics</b>	
	A	Introduction to PHP , Working with PHP, Why PHP?, Basic Syntax of PHP	CO1
	B	PHP statement terminator and case insensitivity, Embedding PHP in HTML	CO1,CO4
	C	Comments, Variables, Assigning value to a variable, Constants, Managing Variables, Understanding variable scope, Global Variables, Static Variables	CO1
	<b>Unit 2</b>	<b>Operators, Control Structures and Functions in PHP</b>	
	A	Arithmetic Operators, Bit-wise Operators, Comparison Operators, Logical Operators, Concatenation Operator, Incrementing/Decrementing Operator, Ternary Operator	CO1,CO4
	B	Conditional Control Structures: If statement, If- else statement, If- else if statement, Nested If, Switch statement, Looping Control Structures: For loop, While loop, Do-While loop, For-each	CO1,CO4
	C	Functions, User-Defined function, Function Definition, Function with arguments, Function with return value, Call by value and call by references, Built-in functions in PHP.	CO1,CO4
	<b>Unit 3</b>	<b>Array and Form Handling</b>	
	A	Array: single, multi dimensional, numeric array, associative array	CO2,CO4
	B	Accessing form elements using GET and POST, Assigning value to form elements	CO2,CO4
	C	Form validation: validation, required, validate url, validate email Sending email, dealing with uploaded file, error handling	CO2,CO4
	<b>Unit 4</b>	<b>File Handling &amp; Session Management</b>	
	A	Opening files in different modes, handling file open error	CO1,CO4
	B	File Operation: Reading & writing data on web page from file, deleting file, renaming file	CO1,CO4
	C	Session Management: introduction, creation, destroying and login session management	CO1,CO4
	<b>Unit 5</b>	<b>PHP Database Connectivity</b>	
	A	SQL Basic query: create, insert, select, delete, update, truncate, drop	CO3,CO4
	B	Introduction to ODBC, ODBC connection, connecting to ODBC	CO3,CO4
	C	Retrieving records, retrieving fields from record, closing connection	CO3,CO4



	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Peter MacIntyre, Rasmus Lerdorf, Kevin Tatroe, "Programming PHP", O'Reilly Publication		
	Other References	1. Steven Holzner, "Php: The Complete Reference", TMH publication 2. Ivan Bayross, "Web Enabled Commercial Applications Development Using HTML, JavaScript, DHTML and PHP", 4 <sup>th</sup> revised Edition, BPB Publication		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> Apply logical processing and error handling to design and develop web pages/site.	PO4,PO9,PO12,PSO2
2.	<b>CO2:</b> Develop PHP scripts to handle HTML forms	PO3,PO9,PSO5
3.	<b>CO3:</b> Develop dynamic website with database connectivity.	PO3,PO9,PO12,
4.	<b>CO4:</b> Develop Websites for Small business and organization or for individual	PO3,PO4,PO7,PO9,PSO2,PSO5

### **PO and PSO mapping with level of strength for Course Name Introduction to PHP(Course Code BCA362)**

C S E	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO 3	PSO 4	PSO 5
	CO1	2	2	2	3	2	2	1	2	3	2	2	3	2	3	2	2	1
	CO2	1	2	3	2	1	2	-	2	3	2	1	2	2	2	2	2	3
	CO3	2	2	3	2	1	-	-	1	3	2	-	3	2	2	1	2	2
	CO4	2	2	3	3	1	1	3	2	3	2	2	2	2	3	2	2	3

<b>School:</b> SET		<b>Batch :</b> 2018-2021	
<b>Program:</b> BCA		<b>Current Academic Year:</b> 2018-19	
<b>Branch:</b> CS/IT		<b>Semester:</b> VI	
1	Course Code	BCA368	Course Name
2	Course Title	Python Programming	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	

Prepared by : Department of Computer Science and Engineering

	Course Status	Department Elective	
5	Course Objective	<b>The objective of this course is to:</b> 13. Explain the basic syntax of Python Program 14. Explain various programming constructs –data types, decision structures, control structures in python 15. Know how to use in-built data structures in python – Lists, Tuples, Dictionary 16. Know how to use libraries for string manipulation and File handling 17. Learn the fundamental principles of Object-Oriented Programming	
6	Course Outcomes	<b>At the end of this course students will be able to:</b> CO1: Use the variety of data types appropriate to specific programming problems. CO2: Understand and use data structures like Lists, tuples and dictionaries. CO3: Familiarize with python string handling techniques, user defined functions& recursion CO4: Understand the concepts of math and random module, Exception handling and file handling CO5: Utilize the OOPs concepts of the Language CO6: Design small software application in Python language with extensive data processing.	
7	Course Description	This course starts with an introduction to Python, History of Python and basics syntax for writing Python Program. As the course progresses the study of decision structure, control structure and in-built data structure are studied in detail. This course mainly focuses on OOPs concepts. This course also deals with File handling, Exception Handling and Module concept.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to Python</b>	
	A	History, Features, Working with Python, Installing Python, basic syntax to write a program, The concept of data types	CO1
	B	Variables, Constants, Identifiers, keywords, Arithmetic and Logical operators and Boolean expressions. Debugging, comments in the program	CO1
	C	Conditional Statements : If, If-else, Nested if-else; Looping: For, While, Nested loops; Control Statements: Break, Continue, Pass	CO1, CO2
	<b>Unit 2</b>	<b>Lists, Tuples and Dictionaries</b>	

	A	Lists; Creation, Attributes, Accessing, Operations, Searching and sorting in Lists; Linear, Binary; Bubble, Selection, Insertion		CO2, CO3
	B	Tuple; Accessing, operations, working with Tuples		CO2, CO6
	C	Dictionaries; Notations, Accessing, Operations, Working with Dictionaries		CO2, CO3
	<b>Unit 3</b>	<b>Functions, Recursion &amp;String</b>		
	A	Defining, Calling, Types of functions , Passing parameters with call by value and call by reference, Global and local variables		CO2, CO3
	B	Recursion, Writing recursive functions, Factorial Using recursion , Fibonacci series Using Recursion		CO2, CO3, CO6
	C	String; Accessing, Manipulation /Operation, String methods, Slicing.		CO3, CO4
	<b>Unit 4</b>	<b>Module, File Handling &amp; Exception Handling</b>		
	A	Importing Module, Creating Module, Packages, Math and Random Module		CO4, CO6
	B	Need of File Handling, Different modes of operation, Opening, Writing, Reading, Closing and Appending Data in file, Accessing and Manipulating Files		CO3, CO4
	C	Exception, Exception Handling, Try and Except clause, Finally clause, User defined Exceptions		CO4, CO6
	<b>Unit 5</b>	<b>Object Oriented Programming Concepts</b>		
	A	Overview of OOP concepts, Class and objects, Attributes		CO2, CO3, CO5, CO6
	B	Adding methods to a class, Passing an Object as Parameter to a method, Overloading; Method Overloading and Operator Overloading		CO2, CO3, CO5, CO6
	C	Inheritance; Types of inheritance and Overriding		CO5, CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Tony Gaddis, Starting Out with Python, 3rd edition, Pearson 2. Y. Daniel Liang, Introduction to Programming Using Python, Pearson 3. Jason R .Briggs, Python For Kids, San Francisco 4. E Balagurusamy, Introduction to Computing & Problem solving Using Python, TMH		

	Other References	1. Downey, Allen B., Think Python: How to Think Like a Computer Scientist. O'Reilly, 2012. Obtain free PDF at <a href="http://www.greenteapress.com/thinkpython/">http://www.greenteapress.com/thinkpython/</a> 2. Python Programming: An Introduction to Computer Science (Second Edition) John Zelle, ISBN 978-1-59028-241-0-9, Franklin, Beedle & Associates Inc., 2003. 3. Budd T A, Exploring Python , 2011, Tata McGraw Hill Education	
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### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Use the variety of data types appropriate to specific programming problems.	PO1, PO12, PSO3
2.	Understand and use data structures like Lists, tuples and dictionaries.	PO2, PO9, PSO2
3.	Familiarize with python string handling techniques, user defined functions& recursion	PO3, PO5, PO9, PSO2
4.	Understand the concepts of math and random module, Exception handling and file handling	PO1, PO2, PO4, PO9, PSO2
5.	Utilize the OOPs concepts of the Language	PO2, PO3, PO4, PO5, PO9, PSO1, PSO2
6.	Design small software application in Python language with extensive data processing.	PO2, PO3, PO4, PO9, PSO1

### **PO and PSO mapping with level of strength for Course Name Python Programming (Course Code BCA 368)**

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE	Python Programming															
	CO1	2										1				2
	CO2		2							2					2	
	CO3		3	2		1									2	
	CO4	3	3	3	2					3					3	
	CO5		3	2	3	2				3				2	3	
	CO6					1				2				2		

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch:</b>		<b>Semester: VI</b>	
1	Course Code	BCA369	Course Name
2	Course Title	<b>ENTERPRISE RESOURCE PLANNING</b>	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Departmental Elective	
5	Course Objective	<b>Students will try to learn:</b>	

		6. With the basic concepts of ERP systems for manufacturing or service companies, and the differences among ( Material Requirement Planning) MRP, MRP II, and ERP systems; 7. Apply the principles of ERP systems, their major components, and the relationships among these components; 8. With the knowledge of typical ERP systems, and the advantages and limitations of implementing ERP systems. 9. To comprehend the technical aspects of ERP systems 10. To be able to map business processes using ERP concepts and techniques.
6	Course Outcomes	After Successful completion of this course the student will be able to: <ol style="list-style-type: none"> <li>1. <b><i>Classify</i></b> different processes of the organization and relationship among all processes .</li> <li>2. <b><i>Examine</i></b> systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components;</li> <li>3. To <b><i>describe</i></b> the Generic Model of ERP and General ERP Implementation Methodology.</li> <li>4. To <b><i>apply</i></b> the concepts of BPR, SCM and CRM.</li> <li>5. To <b><i>demonstrate</i></b> knowledge of SAP and Oracle Apps.</li> </ol>
7	Course Description	This course will explore the concepts, principles, and state-of-the-art methods insuccessfully integrating Enterprise Resource Planning (ERP) systems into extantenterprise architectures. The course will help both functional area and IT managersunderstand the respective role of users, enterprise architects, developers and managersin the selection, preparation, implementation and management of large and complexenterprise applications.
8	Outline syllabus	CO Mapping
	<b>Unit 1</b>	<b>Introduction to Enterprise Resource Planning</b>
	A	Introduction of the term Business Process Reengineering(BPR) ,BPR Methodology, Current BPR Tools
	B	Introduction to material requirement planning (MRP), Definition of Enterprise Resource Planning (ERP); Evolution of ERP; Characteristics, Features
	C	Components and needs of ERP; ERP Vendors; Benefits & Limitations of ERP Packages
	<b>Unit 2</b>	<b>Enterprise Modeling and Integration of ERP</b>

	A	Need to focus on Enterprise Integration/ERP; Information mapping		CO1, CO2
	B	Role of common shared Enterprise database; System Integration, Logical vs. Physical System Integration		CO1, CO2
	C	Benefits & limitations of System Integration, ERP's Role in Logical and Physical Integration		CO1, CO2,
	<b>Unit 3</b>	<b>ERP Architecture and Implementation Methodology of ERP</b>		
	A	Generic Model of ERP system; Core Modules functionality; Types of ERP architecture		CO1, CO3
	B	Difficulty in selecting ERP, Approach to ERP selection, Request for Proposal approach		CO1, CO3, CO4
	C	Evaluation Criteria of ERP packages; Project Implementation Team Structure		CO1, CO3, CO4
	<b>Unit 4</b>	<b>Introduction to SAP , Oracle APPS</b>		
	A	SAP, Integrated SAP Model, SAP Architecture		CO1,CO5
	B	Oracle Apps, Oracle AIM Methodology		CO1,CO5
	C	A Comparative assessment of ERP Packages		CO1,CO5
	<b>Unit 5</b>	<b>Supply Chain Management and Customer Relationship Management</b>		
	A	Definition of Supply Chain Management (SCM); Aims of SCM; Benefits of SCM; ERP Vs SCM		CO1,CO2,CO3, CO4,CO5
	B	Definition of Customer Relationship Management (CRM); CRM Evolution; CRM Component		CO1,CO2,CO3, CO4,CO5
	C	Case Study		CO1,CO2,CO3, CO4,CO5
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	<b>1. Enterprise Systems For Management, Luvai F. Motiwalla, Jeff Thompson, Pearson Education., 2nd Ed., 2011. ISBN-10: 0132145766   ISBN-13: 978-0132145763</b> <b>2. Enterprise Resource Planning, Ravi Shankar, S.Jaiswal, Galgotia Publication Pvt. Ltd., 1st Ed., 1999. ISBN 81-203-0417-9</b>		
	Other References	Enterprise Resource Planning by Mary Sumner , Prentice Hall , 2005		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO-1 <b><i>Classify</i></b> different processes of the organization and relationship among all processes	PO1,PO4, PO6
2.	CO-2 <b><i>Examine</i></b> systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components	PO1,PO2,PSO2
3.	CO-3 To <b><i>describe</i></b> the Generic Model of ERP and General ERP Implementation Methodology.	PO1,PSO1,PSO2
4.	CO-4 To <b><i>apply</i></b> the concepts of BPR, SCM and CRM.	PO2,PSO2
5.	CO-5 To <b><i>demonstrate</i></b> knowledge of SAP and Oracle Apps.	PO1,PO2,PSO2

### PO and PSO mapping with level of strength for Enterprise Resource Planning (Course Code BCA 369)

Course Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1	1	2	1	1	1	1	2	2
CO2	3	3	2	2	2	1	2	2	1	1	2	2
CO3	3	2	1	2	1	2	1	1	2	1	1	2
CO4	2	3	2	1	1	2	1	1	1	2	2	1
CO5	3	3	2	1	1	2	1	1	1	1	2	2

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch:</b>		<b>Semester: VI</b>	
1	Course Code	BCA363	Course Name:
2	Course Title	<b>Information Security</b>	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status		
5	Course Objective	Introduce to Information Security theories, techniques & applications that are often required.	
6	Course Outcomes	On successful completion of this module students will be able to: <b>CO1:</b> Understand basic concepts of information security & Apply different symmetric and asymmetric key ciphers	

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		<b>CO2:</b> Apply basic mathematical methods of modular arithmetic. <b>CO3:</b> Understand types and objectives of virus <b>CO4:</b> Evaluate the different firewall design principles.		
7	Course Description	This course introduces basic concepts of Information security & public key cryptography. Also imparts the knowledge of types of virus & system security.		
8	Outline syllabus	CO Mapping		
	<b>Unit 1</b>	<b>Introduction</b>		
	A	Information Security Concepts, Elements of security, security policy, security techniques, Models, terminology		CO1,CO2
	B	encryption methods, cryptography, cryptanalysis & steganography		CO1,CO2
	C	Mathematics of cryptography- GCD, Euclidian , Extended Euclidian algorithm		CO1,CO2
	<b>Unit 2</b>	<b>Symmetric key Cryptosystem</b>		
	A	Introduction to symmetric key cryptography, Substitution Cipher		CO1
	B	Mono-alphabetic substitution cipher:- Caesar cipher, additive and multiplicative cipher		CO1
	C	Polyalphabetic substitution cipher- playfair cipher, hill cipher, Transposition cipher- rail fence cipher, column cipher		CO1
	<b>Unit 3</b>	<b>Public key cryptosystem &amp; Authentication</b>		
	A	Public key cryptosystem, authentication , application , symmetric vs asymmetric cryptosystem		CO1
	B	RSA-key generation , encryption and decryption		CO1,CO2
	C	Authentication – introduction , methods-password based, two factor, biometrics, MD2		CO1,CO2
	<b>Unit 4</b>	<b>Virus</b>		
	A	Malicious software- virus, worms, zombie, logic bombs, trapdoors, spyware, Trojan horse		CO3
	B	Phases of virus and worm propagation		CO3
	C	Types of virus , worms, Attacks –Hoax , backdoor, brute force, denial of service, distributed denial of service, spoofing , sniffing, replay, traffic analysis		CO3
	<b>Unit 5</b>	<b>System Security</b>		
	A	Intruders, intrusion detection , introduction detection system, password management		CO4
	B	Anomaly based intrusion detection system , rule based intrusion detection system		CO4
	C	Firewalls- firewall design principles, firewall types		CO4
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	<ol style="list-style-type: none"> <li>1. V. Pachghare” cryptography and Information security”- PHI</li> <li>2. Behrouz A. Forouzan, “Cryptography And Network Security”- McGraw Hill</li> </ol>		

<b>Other References</b>	<ol style="list-style-type: none"> <li>1. Bruce Schneier, "Applied Cryptography", John Wiley &amp; Sons Inc, 2001.</li> <li>2. William Stallings, "Cryptography And Network Security – Principles and Practices", Prentice Hall of India, Fourth Edition</li> </ol>
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### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> Understand basic concepts of information security & Apply different symmetric and asymmetric key ciphers	PO1, PO2, PSO2
2.	<b>CO2:</b> Apply basic mathematical methods of modular arithmetic.	PO1, PO2, PSO2
3.	<b>CO3:</b> Understand types and objectives of virus	PO1, PSO1, PSO2
4.	<b>CO4:</b> Evaluate the different firewall design principles.	PO2, PSO2

### **PO and PSO mapping with level of strength for Course Name Information Security (Course Code BCA 363)**

C S E	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
	CO1	3	3	2	1	1	2	1	1	1	1	2	2	2	3	1	1	2
CO2	3	3	2	2	2	1	2	2	1	1	2	2	2	3	1	1	2	
CO3	3	2	1	2	1	2	1	1	2	1	1	2	3	3	2	2	1	
CO4	2	3	2	1	1	2	1	1	1	2	2	1	2	3	2	2	1	

<b>School: SET</b>		<b>Batch : 2018</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2018-19</b>	
<b>Branch:</b>		<b>Semester: VI</b>	
1	Course Code	BCA 370	Course Name
2	Course Title	<b>Data Encoding and Compression</b>	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Departmental Elective	

5	Course Objective	<ul style="list-style-type: none"> <li>• Provide students with an overview of the methodologies and approaches to data encoding</li> <li>• Gain insight into the challenges and limitations of different data encoding techniques</li> <li>• Provide the students with practice on applying data coding solutions</li> <li>• Prepare students for research in the area of data encoding and compression ,related applications</li> <li>• Enhance students communication and problem solving skills</li> </ul>	
6	Course Outcomes	Students will be able to: <b>CO1:</b> To understand mathematical preliminaries and lossy and lossless compression. <b>CO2:</b> To learn the simple lossless encoding techniques. <b>CO3:</b> To understand the fundamentals of information theory and algorithms. <b>CO4:</b> To learn about various lossless compression standards with image and video compression.	
7	Course Description	This course introduces advanced aspects of data encoding and compression, encompassing the fundamental principles, to analyze the encoding, identify the appropriate compression, and choose the relevant algorithms to apply.	
8	Outline syllabus	CO Mapping	
	<b>Unit 1</b>	<b>Introduction</b>	
	A	Mathematical Preliminaries	CO1
	B	Lossy and Lossless compression	CO1
	C	Application of compression	CO1
	<b>Unit 2</b>	<b>Simple lossless encoding</b>	
	A	Run length encoding Huffman coding	CO1, CO2
	B	LZW coding, Run length encoding,	CO1, CO2
	C	Arithmetic coding	CO1, CO2
	<b>Unit 3</b>	<b>Fundamentals of Information Theory</b>	
	A	Concepts of entropy, probability models	CO1,CO2,CO3
	B	Markova models, Fundamentals of coding theory,	CO1,CO2,CO3
	C	Algorithmic information theory & Minimum description	CO1,CO2,CO3
	<b>Unit 4</b>	<b>Lossless Compression standards</b>	
	A	zip, gzip,	CO1,CO2,CO3 ,CO4
	B	bzip, unix compress	CO1,CO2,CO3 ,CO4
	C	GIF, JBIG	CO1,CO2,CO3 ,CO4
	<b>Unit 5</b>	<b>Image &amp; Video compression</b>	
	A	Basis functions and transforms from an intuitive point	CO1,CO2,CO3 ,CO4
	B	JPEG, MPEG, Vector Quantization	CO1,CO2,CO3 ,CO4

	C	case study of WinZip, WinRar			CO1,CO2,CO3,CO4
	Mode of examination	Theory			
	Weightage Distribution	CA			MTE
		30%			20%
	Text book/s* Other References	17. Introduction to Data Compression, 3rd Edition, Khalid Sayood, Morgan Kauffman			
		18.		ETE	
				50%	

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> To understand mathematical preliminaries and lossy and lossless compression.	PO1,PO2,PO3,PO4,PSO1
2.	<b>CO2:</b> To learn the simple lossless encoding techniques.	PO1, PO2, PO4, PSO2
3.	<b>CO3:</b> To understand the fundamentals of information theory and algorithms.	PO1,PO2,PO4
4.	<b>CO4:</b> To learn about various lossless compression standards with image and video compression.	PO8,PO9, PO10,PO12, PSO5

### **PO and PSO mapping with level of strength for Course Name Data encoding and compression (Course Code BCA370)**

C S E	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
	CO1	3	3	3	3	--	--	--	--	2	1	2	1	3	1	1	1	1
CO2	3	2	1	3	--	--	--	2	2	2	1	1	1	3	2	1	1	2
CO3	3	3	1	3	--	--	--	1	1	1	3	2	1	1	1	1	1	1
CO4	2	2	2	2	1	--	--	1	1	1	1	1	1	1	1	1	1	3

<b>School: SET</b>	<b>Batch : 2018</b>
<b>Program: BCA</b>	<b>Current Academic Year: 2018-19</b>
<b>Branch: -CS/IT</b>	<b>Semester: VI</b>

Prepared by : Department of Computer Science and Engineering

1	Course Code	BCA371	Course Name
2	Course Title	<b>Introduction to Cloud</b>	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Departmental Elective	
5	Course Objective	<ul style="list-style-type: none"> <li>• Provide students with an overview of the fundamental concepts of Cloud Computing.</li> <li>• Gain insight into the challenges and limitations Models of cloud computing.</li> <li>• To learn the various technologies of the cloud computing paradigm and learn about recent advances in Cloud Computing and enabling technologies.</li> <li>• Prepare students for research in the area of cloud Computing risks and cloud security challenges.</li> <li>• Enhance students communication and problem solving skills</li> </ul>	
6	Course Outcomes	Students will be able to: <b>CO1:</b> To understand the cloud computing Concepts. <b>CO2:</b> Explain how and why this paradigm came about and the influence of several enabling technologies like Google file systems <b>CO3:</b> Build cloud based applications using Amazon AWS and/or Google App Engine. <b>CO4:</b> Understanding of Cloud Computing risk issues.	
7	Course Description	This course introduces advanced aspects of Cloud Computing, encompassing the principles, to analyze the cloud, identify the problems, and choose the relevant models and algorithms to apply.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction Cloud Computing</b>	
	A	Introduction to distributed systems, Defining Cloud Computing, Understanding of Cloud Architecture: Infrastructure, Platform, Virtual Appliances, Communication Protocols, Applications, Understanding Services: SaaS, PaaS, IaaS	CO1, CO2
	<b>Unit 2</b>	<b>Understanding Abstraction and Virtualization</b>	
	A	Advanced Load Balancing, the Google Cloud, Virtual machine types <b>Storage in the Cloud:</b> Google file system.	CO1, CO2, CO4
	<b>Unit 3</b>	<b>Cloud Computing with the Titans</b>	

A	Google Web Services: Google app Engine, Google Web Toolkit. Amazon: Amazon Elastic Cloud Computing, Amazon Simple Storage System	CO1,CO2,CO3
<b>Unit 4</b>	<b>Cloud Computing Risk Issues</b>	
A	The CIA Triad: Confidentiality, Integrity, And Availability. Common Threats and Vulnerability: Logon Abuse, Inappropriate System Use, Eavesdropping, Denial-of-service (DoS) Attack, Session Hijacking Attack. Cloud Service Provider (CSP) Risks: Back Door, Spoofing, Replay Attack, Social Engineering Attack, Dumpster Diving, Trojan Horse and Malware.	CO1,CO2,CO3
<b>Unit 5</b>	<b>Cloud Computing Security Challenges</b>	
A	Security Policy Implementation, Policy Types: Senior Management Statement of Policy, Regulatory Policies, Advisory Policies, And Informative Policies.	CO1,CO2,CO3
Mode of examination	Theory	
Weightage Distribution	CA	MTE
	30%	20%
Text book/s* Other References	19. Barrie Sosinsky “ <i>Cloud Computing (Bible)</i> ”,Wiley 20. Anthony T.Velte, Toby J. Velte, Robert Elsenpeter” <i>Cloud Computing: A Practical Approach</i> ” TATA McGRAW-HILL Edition. 21. Ronald L. Krutz and Russell Dean Vines, “ <i>Cloud Security: A comprehensive Guide to Secure Cloud Computing</i> ”, WILEY.	

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> To understand and implement classical algorithms in data mining and data warehousing.	PO1,PO2,PO3,PO4,PSO1
2.	<b>CO2:</b> To assess the strengths and weaknesses of the algorithms.	PO1, PO3, PO4, PSO2
3.	<b>CO3:</b> To identify the application area of algorithms, and apply them.	PO1,PO2,PO3,PO4
4.	<b>CO4:</b> To integrating and interpreting the data sets and improving effectiveness, efficiency and quality for data analysis.	PO9, PO10,PO11, PSO5

**PO and PSO mapping with level of strength for Course Name Introduction to Cloud  
 (Course Code BCA371)**

C S E	Cos	PO1	PO 2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO 11	PO12	PS O1	PSO2	PSO3	PSO4	PSO5
	CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
	CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
	CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
	CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3