## III Semester B.E. (CSE)

SI.	Category	Subject Code	Subject Title	Subject Title Credits			s/ <	EXAMINATION MARKS			
NO					L	Т	Ρ	CIE	SEE	Total	
1	BSC	21UMA301C	Numerical Techniques and Integral Transforms	3	3	0	0	50	50	100	
2	PCC	21UCS301C	Digital Systems	3	3	0	0	50	50	100	
3	PCC	21UCS302C	Computer Organization	3	3	0	0	50	50	100	
4	PCC	21UCS303C	Data Structures	4	3	2	0	50	50	100	
5	PCC	21UCS304L	Digital Systems Lab	1	0	0	2	50	50	100	
6	PCC	21UCS305L	Data Structures Lab	1	0	0	2	50	50	100	
7	AEC	21UCS306C	Professional Communication	1	0	2	0	100	-	100	
8	UHV	21UHS324C	Universal Human Values II	1	1	0	0	50	50	100	
9	HSMC	21UHS321C	Constitution of India	1	1	0	0	50	50	100	
		21UMA300M	Bridge Course Mathematics-I *	0	<mark>3</mark>	0	0	<mark>50</mark>	<mark>50</mark>	<mark>100</mark>	
*On	ly for Later	al Entry student	18	14	4	4	500	400	900		

BSC	ESC	HSMC	AEC	PCC	PEC	OEC	PROJ	INT	SEMI	MAN(UHV)
03		01	01	12				00		01

B.E (CON	IPUTER SCIENCE AND ENGINEE	RING)				
Outcome Based Education (OBE) and Choice Based Credit System (CBCS) SEMESTER – III						
Numerical Techniques and Integral Transforms						
Course Code:	21UMA301C	CIE Marks	50			
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50			
Credits	03	Hours	40			

#### Course objectives:

- To understand the numerical methods of solving algebraic, transcendental equations.
- To acquired the knowledge about various methods of interpolation
- To understand the basic concepts of numerical differentiation, numerical integration and numerical solutions of ordinary differential equations.
- To understand concepts of Fourier series, Fourier transforms, and z-transforms.

#### Unit -1 (10 hours)

#### Numerical Analysis-I

Introduction to root finding problems, Bisection Method, Newton-Raphson method. Finite differences, forward and backward difference operators (no derivations on relations between operators) Newton-Gregory forward and backward interpolation formulae. (Without proof), Lagrange's and Newton's divided difference interpolation formulae (without proof).

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3 –Applying , L4-
	Analysing
	Unit II ( 10 Hours)

#### Numerical Analysis-II

Numerical differentiation using Newton's forward and backward formulae-problems. Trapezoidal rule, Simpson's one third rule, Simpson's three eighth rule and Weddle's rule (no derivation of any formulae)problems. Euler's and Modified Euler's method, Runge-Kutta 4<sup>th</sup> order method.

Revised Bloom's Taxonomy Level	$ m L_1$ –Remembering, $ m L_2$ – Understanding. L3 –Applying , L4-
	Analysing
	Unit III ( 10 Hours)

#### Fourier series

Periodic functions, Conditions for Fourier series expansions, Fourier series expansion of continuous and functions having finite number of discontinuities, even and odd functions. Half-range series, practical harmonic analysis.

Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$ – Understanding. L3	–Applying	,	L4-
	Analysing			
	Unit IV ( 10 Hours)			

#### Fourier transforms and z-transforms

Infinite Fourier transforms and inverse Fourier transforms- simple properties, Fourier sine and Fourier cosine transforms, Inverse Fourier sine and cosine transforms. Z-transforms-definition, standard forms, linearity property, damping rule, shifting rule-problems. Inverse Z-transforms.

Revised Bloom's Taxonomy Level	${ m L_1}$ –Remembering, ${ m L_2}$ – Understanding. L3 –Applying , L4-
	Analysing

### Course outcomes:

At the end of the course the student will be able to:

- Solve engineering problems using non-linear equations and interpolation techniques.
- Solve problems using numerical differentiation and numerical integration.
- Solve ordinary differential equations using numerical methods.
- Solve Problems using the Fourier series.
- Solve problems using the basic concepts of Fourier transforms and z –transforms.

Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
ence Books:			
Numerical Methods for Engineers	Steven C Chapra &Raymond P Canale		
Higher Engineering Mathematics	Dr. B.S. Grewal	Khanna Publishers, New Delhi	
Advanced Engineering Mathematics	H. K. Das	Chand & company Ltd, Ram Nagar, New Delhi	
Advanced Engineering Mathematics	E Kreyszig	John Wiley & Sons	
	Title of the Book ence Books: Numerical Methods for Engineers Higher Engineering Mathematics Advanced Engineering Mathematics Advanced Engineering Mathematics	Title of the BookName of the Author/sEnce Books:Numerical Methods for EngineersSteven C Chapra &Raymond P CanaleHigher Engineering MathematicsDr. B.S. GrewalAdvanced Engineering MathematicsH. K. DasAdvanced Engineering MathematicsE Kreyszig	Title of the BookName of the Author/sName of the PublisherInce Books:Numerical Methods for EngineersSteven C Chapra & Raymond P Canale

		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	РО 8	РО 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
SI.No	Programme Outcomes Course Outcomes															
				Th	e stu	dents	will	be a	ble to	):						
1	Solve engineering problems using non- linear equations and interpolation techniques.	1												_		
2	Solve problems using numerical differentiation and numerical integration	1	2													
3	Solve ordinary differential equations using numerical methods	1														
4	Solve Problems using the Fourier series.	1	2													
5	Solve problems using the basic concepts of Fourier transforms and z– transforms	1														

B.E (COMPUTER SCIENCE AND ENGINEERING) Outcome Based Education (OBE) and Choice Based Credit System (CBCS) SEMESTER – III Bridge Course Mathematics-I (Mandatory)						
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50			
Credits	03	Hours	40			
Unit -1 (10 hours)						

### Differential Calculus:

Review of elementary calculus, Polar curves - angle between the radius vector and tangent, angle between two curves, pedal equation. Taylor's and Maclaurin's series expansions for one variable ( without proof) problems

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3 –Applying , L4-
	Analysing
	Unit II ( 10 Hours)

**Partial differentiation:** Introduction to function of several variables, Partial derivatives; Euler's theorem - problems. Total derivatives-differentiation of composite functions. Jacobians-problems

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3 —Applying , L4-
	Analysing
	Unit III ( 10 Hours)

## Integral Calculus:

Multiple integrals: Evaluation of double and triple integrals. Area bounded by the curve.

Beta and Gamma functions: Definitions, Relation between beta and gamma functionsproblems.

Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$ – Understanding. L3	–Applying	,	L4-
	Analysing			
	Unit IV ( 10 Hours)			

**Vector Differentiation:** Scalar and vector fields. Gradient, directional derivative; curl and divergence-physical interpretation; solenoidal and irrotational vector fields- problems

Revised Bloom's Taxonomy Level	${ m L_1}$ –Remembering, ${ m L_2}$ – Understanding. L3 –Applying , L4-
	Analysing

#### Course outcomes:

At the end of the course the student will be able to:

- Apply the concepts of polar curves to solve Engineering problems
- Apply the knowledge of partial differentiation to solve Engineering problems.
- Apply the concepts of multiple integrals and their usage in computing the area and volumes.
- Evaluate improper integrals using beta and gamma functions.
- Apply the knowledge of differentiation of vectors to solve the engineering problems.

SI No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Refere	ence Books:			
1	Higher Engineering Mathematics	Dr. B.S. Grewal	Khanna Publishers, New Delhi	2017
2	Advanced Engineering Mathematics	E Kreyszig	John Wiley & Sons , Pvt.Ltd	2014
3	Elementary Differential Equations by	Earl D. Rainville and Phillip E, Bedient		Sixth Edition
4	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons	2014

		PO	РО	РО	РО	РО	РО	PO	PO	РО	PO1	PO1	PO1	PSO	PSO	PSO
		1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
SI.No	Programme Outcomes Course Outcomes															
				The	e stud	lents	will	be al	ble to	):						
1	Apply the concepts of polar curves to solve Engineering problems	1	2													
2	Apply the knowledge of partial differentiation to solve Engineering problems	1	2													
3	Apply the concepts of multiple integrals and their usage in computing the area and volumes	1	2													
4	Evaluate improper integrals using beta and gamma functions.	1	2													
5	Apply the knowledge of differentiation of vectors to solve the engineering problems.	1	2													

B.E (CON	IPUTER SCIENCE AND ENGINE	ERING)						
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)								
SEMESTER – III								
Digital Systems								
Course Code:	21UCS301C	CIE Marks	50					
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50					
Credits 03 Hours 40								
a								

Course objectives:

- 1. Make use of simplifying techniques in the design of combinational circuits.
- 2. Illustrate combinational and sequential digital circuits.
- 3. Demonstrate the use of flip flops.
- 4. Design and test registers and counters.

#### Unit -1 (10 hours)

**Boolean algebra and Combinational Circuits:** Boolean algebra definition, Principle of Duality, Boolean algebra theorems, Boolean formulas and functions, Normal forms. Minterm canonical form, m-notation, Maxterm Canonical form, M-notation.

Manipulation of Boolean expressions. Gates and combinational circuits. Incomplete Boolean functions and don't care conditions, Additional Boolean operations and Gates..

Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$ – Understanding. L3 –Applying , L4-Analysing						
Unit II ( 10 Hours)							

Simplification of Boolean expressions: Karnaugh-maps, Use of Karnaugh-maps to minimize Boolean Expressions. Minimal Expressions of Incomplete Boolean Functions.

The Quine-McCluskey and Decimal methods for generating prime implicants and prime implicates. Map Entered Variables(MEV)

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

#### Unit III ( 10 Hours)

Logic Design using MSI Components: Binary Adders and Substractor, Comparators, Decoders, Encoders, Multiplexers.

Flip Flops and its Applications: Basic bistable element, Latches: SR Latch, S'R' Latch, Gated SR Latch, Gated D Latch, Master Slave SR and JK flip-flops, Master Slave D and T FlipFlops, Edge Triggered flip-flops, Characteristic Equations.

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3 –Applying , L4-Analysing						
Unit IV ( 10 Hours)							

**Registers:** Serial In Serial Out, Circular, Parallel in Parallel Out, Parallel In Serial Out, Universal Shift Registers. **Counters:** Binary Ripple Counter, Synchronous Binary Counters, Mod and Ring counters. Design of Synchronous Counters.

HDL implementations of combinational and sequential circuits.

Revised Bloom's Taxonomy Level	${ m L_1}$ –Remembering, ${ m L_2}$ – Understanding. L3 –Applying , L4-
	Analysing

#### Course outcomes:

At the end of the course the student will be able to:

- Demonstrate the understanding of Boolean algebra.
- Describe the working of Combinational circuits.
- Apply the Boolean theorems, K-Map, Q-M and VEM methods to simplify Boolean expressions.
- Describe the working of Sequential circuits and its applications.
- Simulate combinational circuits using HDL programming.

SI No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year				
Textbo	ooks							
1	Digital Principles and Design	D.D. Givone	McGraw Hill.	8 <sup>th</sup> Edition, 2017				
	Logic Design - A simplified	R. D. Sudhakar Samuel	Sanguine Technical	Revised				
2	approach		Publications	Edition, 2005				
Refere	ence Books:			k				
1	Digital Principles and	Malvino, Leach and	McGraw Hill.	6 <sup>th</sup> Edition,				
_ <b>_</b>	applications'	Saha		2007				
<b>`</b>	Fundamental of digital Logic	Stephen Brown &	Tata McGraw Hill	2 <sup>nd</sup> Edition,				
2	with Verilog Design	Zvonko Vranesic		2002				
Web li	inks and Video Lectures:							
1.	1. https://archive.nptel.ac.in/courses/108/105/108105132							
2.	https://archive.nptel.ac.in/cours	ses/117/106/117106114						
3.	https://nptel.ac.in/courses/108,	/105/108105132/						
4.	4. http://vlabs.iitkgp.ac.in/dec							

		PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
		1	2	3	4	5	6	1	8	9	U	1	2	T	2	3
SI.N o	Programme Outcomes Course Outcomes															
				The	e stud	dents	will	be al	ole to	):						
1	Demonstrate the understanding of Boolean algebra.	3	1	-	-	-	-	-	-	-	-	-	1	1	-	1
2	Describe the working of Combinational circuits.	2	1	-	-	-	-	-	-	-	-	-	1	1	-	1
3	Apply the Boolean theorems, K-Map, Q- M and VEM methods to simplify Boolean expressions.	2	-	-	-	-	-	-	-	-	-	-	1	1	-	1
4	Describe the working of Sequential circuits and its applications.	1	1	2	-	-	-	-	-	-	-	-	1	1	-	2
5	Simulate combinational circuits using HDL programming.	1	1	2	-	-	-	-	-	-	-	-	1	1	-	2

B.E (COMP Outcome Based Educatio	UTER SCIENCE AND ENGINEERI on (OBE) and Choice Based Crea SEMESTER – III	NG) dit System (CBCS)						
Computer Organization								
Course Code:	21UCS302C	CIE Marks	50					
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50					
Credits	03	Hours	40					

#### Course objectives:

- To understand the design and interaction concepts of modern computer subsystem
- To learn the technique for analyzing the performance of computer system.

#### Unit -1 (10 Hours)

**Basic structure of Computers:** Computer types, Functional Units, Basic operational concepts, Bus structures **Machine instructions and programs:** Numbers, Arithmetic operations and characters, Memory locations and addresses, Memory operations, Instructions and instruction sequencing, Addressing modes, Assembly language, assembler directives, number notation, , Stacks and Queues, Subroutines, Encoding of machine instructions

Revised Bloom's Taxonomy Level	$\rm L_1$ –Remembering, $\rm L_2$ – Understanding. L3 –Applying , L4-Analysing						
Unit II (10 Hours)							

Input/output organization: Accessing I/O devices, Interrupts-Interrupt hardware , Enabling and Disabling Interrupts, Handling Multiple devices, controlling device requests, Exceptions, Direct memory access – Bus Arbitrations, Buses- Asynchronous Bus and Synchronous bus

The memory system: Some Basic concepts, Semiconductor RAM memories, Read only memories, speed, size, and cost, cache memories

Revised Bloom's Taxonomy Level	${\rm L_1}$ –Remembering, ${\rm L_2}$ – Understanding. L3 –Applying , L4-Analysing
	Unit III (10 Hours)

Arithmetic Unit: Addition and subtraction of signed numbers, Design of fast adders, Multiplication ofpositive numbers, Signed operand multiplication, Fast multiplication.Integer Division, Floatingpoint numbers and operations – IEEE standard for Floating point numbers, Arithmetic operations on Floatingpoint numbers. Implementingpoint numbers.ImplementingFloating point operations.

Revised Bloom's Taxonomy Level	${ m L_1}$ –Remembering, ${ m L_2}$ – Understanding. L3 –Applying , L4-Analysing					
Unit IV (10 Hours)						

**Basic Processing Unit:** Some fundamental concepts, Execution of complete instruction, Hardwired Control, Micro programmed control, Micro instructions,

**Pipelining:** basic concepts, role of cache memory, pipeline performance

Large computer systems: forms of parallel processing, array processor, the structure of general purpose and multiprocessors

Performance:

Processor Clock, Basic performance equation, pipelining and superscalar operations, Clock rate, Instruction set, compiler, performance measurement

Revised Bloom's Taxonomy Level	$\rm L_1$ –Remembering, $\rm L_2$ – Understanding. L3 –Applying , L4-Analysing
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Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year		
Text Books	:	I				
1	Computer Organization	Hamacher, Zvonko Vranesic, Safwat Zaky	Tata McGraw Hill	Fifth Edition,.2017		
Reference	Book:					
2	Computer Organization and Architecture'	William Stallings,	РНІ	7th Edition, 2007		
Web links	and Video Lecture:	•		•		
<ul> <li>https://onlinecourses.nptel.ac.in/noc20_cs64/course</li> <li>https://www.youtube.com/watch?v=Ol8D69VKX2k</li> <li>https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/</li> </ul>						

		PO									PO	PO	PO	PS	PS	PSO3
		1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	10	11	12	01	02	
	Programme Outcomes															
SI.No	Course Outcomes															
		Т	he sti	udent	s wil	l be a	ble to	<b>):</b>								
1	Explain the design and function of different units of computer	1											1			1
2	Perform the various operations on given data	1					1							1		1
3	Analyze the execution of the program and different organizations of functional units			2									1	1		
4	Develop an assembly programs and micro programs for simple machine instructions			2									1	1		1
5	Design the basic functional units of computer			3									1			3

## **B.E (COMPUTER SCIENCE AND ENGINEERING)**

## Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

#### **SEMESTER – III**

	Data Structures		
Course Code	21UCS303C	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:2:0)	SEE Marks	50
Credits	04	Hours	52

#### **Course Objectives:**

- At the end of the course student will learn/understand/ think/experience/appreciate:
- Foundations of pointers and pointers application, dynamic memory allocation functions and recursion.
- Foundations of data structure operations, design and implementation of data structures to organize data efficiently.
- To design and implement correct solutions for problems.
- To decide the efficient organization of data with and without use of data structure
   **Unit 1 (13 hours)**

**Pointer applications**: Arrays and pointers, pointer arithmetic and arrays, passing an array to a function, Using pointers to functions.

### Memory allocation functions, Array of pointers, pointers to void and pointers to functions.

**Recursion:** iterative and recursive definition iterative and recursive solution, designing recursive functions, limitations of recursion.

Stacks: Basic stack operations: Push, Pop, Stack top,

**Stack linked list:** Implementation, Data structure, Stack head, Stack data node, Stack algorithms, Create Stack, Push Stack, Stack top, Empty Stack, Full Stack, Stack count, Destroy Stack

C language implementations: Insert data, Push Stack , Print Stack, Pop character

**Stack ADT:** Data structure, ADT Implementations, Stack structure, Create stack, Push stack, Pop stack, Stack top, Empty stack, Stack count, Destroy stack

### Stack Implementation using array

Revised Bloom's Taxonomy Level	Remembering, L2: Understanding, L3: Applying, L4: Analyzing
Revised Bloom's Taxonomy Level	Remembering, L2: Understanding, L3: Applying, L4: Analyzing

#### UNIT II (13 hours)

#### Stack applications:

**Reversing data:** Reverse a list, Convert decimal to binary, Infix to postfix transformation, Evaluating postfix expressions

Queues: Queue Operations: Enqueue, Dequeue, Queue front, Queue rear, Queue example,

**Queue Linked list design**: Data structure, Queue head, Queue data node, Queue algorithms, Create queue, Enqueue, Dequeue, Retrieving queue data, Empty queue, Full queue, Queue count, Destroy queue

Revised Bloom's Taxonomy Level	L1: Remembering, L2: Understanding, L3: Applying, L4: Analyzing

#### UNIT III (13 hours)

**General Linear lists:** 

Basic operations, Insertion, Deletion, Retrieval, Traversal,

**Implementation:** Data structure, Head node, Data node, Algorithms, Create list, Insert node, Delete node, List search, Retrieve node, Empty list, Full list, List count, Traverse list, Destroy list,

**List ADT**: ADT functions, Create list, Add node, Internal insertion function, Remove node, Internal delete function, Search list, Internal search function, Retrieve node, Empty list Full list, List count, Traverse, Destroy list,

Circular linked lists and Doubly linked lists: Create list, add node, delete node, retrieve node, search list.

Revised Bloom's Taxonomy Level         L1: Remembering, L2: Understanding, L3: Applying, L4: Analyzing				
UNIT IV (13 hours)				
Non-Linear lists: Trees: Basic tree concepts: Terminology, User representation				

Binary trees: Properties, Height of binary trees, Balance, Complete and Nearly complete binary trees

**Binary tree traversals:** Depth-first traversals, Breadth-first traversals, **Expression Trees**: Infix traversal, Postfix traversal, Prefix traversal **Huffman code**, General trees,

Binary search trees: Basic concepts,

**BST operations**: Traversals, Searches, Insertion Find the smallest and largest node, BST search, Insertion, Deletion

**Binary search tree ADT**, Data structure, Head and node structure, Algorithms, Create a BST, Insert a BST, Internal insert function, Delete a BST, Internal delete function, Retrieve a BST, Internal retrieve function,

Traverse a BST, Internal traverse function, Empty a BST, Full BST, BST count, Desi	troy a BST, Internal destroy
function.	

Graphs: Basic concepts, Operations: Insert vertex, Delete vertex, Add edge, Delete edge, Find vertex,

Graph storage structures: Adjacency matrix, Adjacency list.

, L2: Understanding, L3: Applying, L4: Analyzing
,

#### **Course outcomes:**

At the end of the course, the students will be able to

- Demonstrate the understanding of pointers, dynamic memory allocation, recursion and data structures.
- Explain implementation of data structures with and without ADT
- Identify the data structures needed to solve given problem.
- Design and develop solutions for simple problems using the data structures
- Compare and contrast different data structures

SLNO	Title of the Reak	Nama of the Author/a	Name of	Edition			
		warne of the Author/S	the	and Year			
			Publisher				
Textboo	pks	1	1	1			
1	Computer Science A Structured Programming	Behrouz A,Forouzan&	Cengage	Third			
	Approach Using C, (Chapter 6:6.9 Chapter	Richard F Gilberg,	Learning	Edition,			
	7,Chapter 9,10, Chapter 11:11.3,11.4,11.5,		India				
	Chapter 12, Chapter 13, Chapter 14, Appendix		Private				
	G:G.1,G.2,G.3, Appendix H,I,Appendix J)		Limited				
1	Data Structure A Pseudocode Approach with	Behrouz A. Forouzan and	Cengage	2 <sup>nd</sup>			
	<b>C</b> , (Chapter 1(1.2,1.3,1.5), 2,3,4 (4.1-4.4), 5,	Richard F. Gilberg,	Learning	Edition,			
	6(6.1-6.3)7(7.1-7.3), 11(11.1-11.3),12(12.2-		Publisher,	2005.			
	12.4)13(13.1-13.3)Appendix F.						
Reference Books							
1	Data Structures Using C,	Aaron M. Tenanbaum	Pearson				
		,YedidyahLangsam,					
		Moshe J Augenstein					
2	Data Structures Through C	YeshwantKanetkar	BPB				
Web lin	Web links and Video Lectures:						
•	<ul> <li>NPTEL Course : <u>https://nptel.ac.in/courses/106102064</u>,</li> </ul>						
•	NPTEL Course : <u>https://nptel.ac.in/courses/106106127</u>						
•	https://www.coursera.org/learn/data-structures	5					

	Subject/Subject Code:	P 0 1	Р О 2	PO 3	PO 4	PO 5	PO 6	РО 7	PO 8	РО 9	Р О 10	Р О 11	Р О 12	PS O 1	PSO 2	PSO 3
N	Programme															
0	Course Outcomes															
The	e students will be able to:		·								. <u> </u>					
1	Demonstrate the understanding of pointers, dynamic memory allocation, recursion and data structures		2	2	2	2								3		2
2	Explain implementation of data structures with and without ADT		2	2	2	2								2		2
3	Identify the data structures needed to solve given problem		3	3	3	3								3		3
4	Design and develop solutions for simple problems using the data structures		3	3	3	3							3	3		3
5	Compare and contrast different data structures		3	3	3	3								3		3

B.E (COMP Outcome Based Educati	UTER SCIENCE AND ENGINEER on (OBE) and Choice Based Cre SEMESTER – III	lING) edit System (CBCS)	
	Digital Systems Lab		
Course Code:	21UCS304L	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50
Credits	01	Exam Hours	03
<ul> <li>rse objectives:</li> <li>Make use of simplifying techniques</li> <li>Illustrate combinational and sequer</li> <li>Demonstrate the use of flin flops</li> </ul>	in the design of combinatio ntial digital circuits.	nal circuits.	

• Design and test registers and counters.

#### Practice Assignments using digital I C's :

- Implementation of Boolean Expressions of basic logic gates such as 2-input/3-input AND,OR,NAND,NOR, EX-OR Gates.
- Simplification of simple Boolean Expressions in SOP/POS forms.

#### PART- A (Hardware Implementation)

- 1. Design a Binary to Gray Code converter with K map simplification and ExOR Gate.
- 2. Given any 4-variable logic expression, simplify using K-MAP/Quine McCliskey and realize the simplified logic expression using 8:1 multiplexer IC.
- 3. Realize a full adder using 3-to-8 decoder IC and 4 input NAND gates.
- 4. Realize a full substractor circuit using 3 to 8 line decoder IC and 4 input NAND gate.
- 5. Realize a J-K Master/Slave Flip-Flop using NAND gates and verify its truth table.
- 6. Design and implement a mod-n (n<8) synchronous Up Counter using J-K Flip-Flop and basic gate ICs.
- 7. Design and implement a mod-n (n<8) synchronous Down Counter using J-K Flip-Flop and basic gate ICs.
- Design and implement an asynchronous counter using decade counter IC to count up from 0 to (n<=9) & display the numbers using 7-segment display.</li>
- 9. Design a Ring and Johnson Counter using a 4-bit Shift Register IC.

#### Practice Assignments using Simulation package:

- Implementation of Boolean Expressions of basic logic gates such as 2-input/3-input AND,OR,NAND,NOR, EX-OR gates
- Simplification of simple Boolean Expressions in SOP/POS forms

#### PART- B (Software Implementation)

- 1. Write the Verilog/VHDL code for Binary to Gray Code converter and verify its working.
- 2. Write the Verilog/VHDL code for an 8:1 multiplexer. Simulate and verify its working.
- 3. Write the verilog/VHDL code for a full adder .Simulate and verify its working.
- 4. Write the Verilog/VHDL code for D Flip-Flop with positive-edge triggering. Simulate and verify its working.
- 5. Write a verilog/VHDL code for mod-8 up counter. Simulate and verify its working.

6. Write the verilog/VHDL code for switched tail counter. Simulate and verify its working

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysis

## Note:

- Any simulation package like MultiSim/Active HDL etc. may be used.
- In the examination questions must be given on lots. Each student must be given one question from PART-A and one from PART-B.
- Practice Assignments are not to be considered for SEE Examination.

### Course Outcomes:

#### At the end of the course the student should be able to:

- Design and implement combinational circuits.
- Design and Implement sequential Circuits
- Simulate sequential and combinational circuits using VHDL/Verilog Programming

		PO	PO	PO	PO	PO	PO	PO	PO	PO	<b>PO1</b>	PO1	PO1	PSO	PSO	PSO
		1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
Sl.No	Programme Outcomes Course Outcomes															
The st	udents will be able to:			. <u> </u>				·								
1	Design and implement combinational circuits.	3	1	-	-	-	-	-	-	-	-	-	1	1	-	1
2	Design and Implement sequential Circuits.	2	1	-	-	-	-	-	-	-	-	-	1	1	-	1
3	Simulate sequential and combinational circuits using VHDL	2	1	2	-	-	-	-	-	-	-	-	1	1	-	1

B.E (CC Outcome Based Edu	DMPUTER SCIENCE AND ENG cation (OBE) and Choice Bas SEMESTER – III	GINEERING) sed Credit System (CBCS)	
	Data Structures Lab		
Course Code:	21UCS305L	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50
Credits	01	Exam Hours	03
<b>Course objectives:</b> At the end of the course student will lea	rn/understand/ think/exp	perience/appreciate:	
<ul> <li>To design and implement correct</li> <li>To decide the efficient organization</li> <li>To use appropriate data structukinds of problems.</li> </ul>	ct solutions for given prob tion of data with and with res for representing, organ	lems. out use of data structure nizing and manipulating	e. data for different
	Assignment List:		
1. Write C program to perform the foll	owing using function poin	ter concept.	
<ul> <li>returns the result as void *</li> <li>ii. int_sum() takes two intege</li> <li>iii. float_sum() takes two intege</li> <li>iv. sum_two_nos() that takes invoked on these two operatives</li> <li>v. getfun() that accepts from vi. main() method that invoke</li> <li>Write Recursive function for the foll</li> <li>a. To find sum of first N national b. To print first N Fibonacci c. To convert given decimation d. Write main () to call ab</li> <li>Develop linked stack ADT and create</li> <li>Develop linked Queue ADT and create</li> <li>Develop array Queue ADT and create</li> <li>Create Linked list ADT and use the s</li> <li>Create binary tree and allow followi</li> <li>i. Search an element ii. Insert ar element v. No of nodes, no of</li> </ul>	r operand as void* as para ger operand as void* as para addresses of two operand inds the user appropriate funct s these function based on owings: atural numbers. ci series. al number to binary. bove functions. e stack of integer using the stack of students using the stack of students using the stack of students using the stack of students using the ame to create list of stude ng operations on tree n element iii. Tree is bala	ameters and returns the arameters and returns the arameters and returns the ds and address of the fu tion based on users choi users choice. e ADT's defined. he ADT's defined. he ADT's defined. he ADT's defined. anced or not iv. No or ediate node vi. Find	result as void *. result as void*. Inction that is to be ce. f occurrences of key parent of key node
vii. Traverse in preorder, postorde 9. Create binary search tree of integer	r, inorder, breadth first or s and allow following oper	der viii. To copy tree rations on tree:	
<ul> <li>i. Insert an element</li> <li>ii. Delete</li> <li>v. No of occurrences of key elem</li> <li>vii. Find parent of key node</li> <li>viii. copy tree</li> <li>x. To print elements in</li> </ul>	an element iii. Search ent vi. No of nodes, Traverse in preorder, pos descending order	n an element iv. Tree no of leaf nodes, no of torder, inorder, breadth	e is balanced or not intermediate node first order ix. To
Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$ –	Understanding. L3 – Ap	plying ,L4-Analysis
<ul> <li>Course Outcomes:</li> <li>At the end of the course the student sh</li> <li>Write C programs to use data problem.</li> <li>Design and implement solutions</li> <li>Choose appropriate data struct kinds of problems</li> </ul>	ould be able to: a structures to represent for organization of data u ures for representing, org	, organize and manipu using different data strue anizing and manipulatir	late data for given ctures. ng data for different

No	Programme Outcomes Course Outcomes	PO 1	PO 2	PO 3	РО 4	PO5	PO 6	РО 7	РО 8	РО 9	PO 10	PO 11	PO 12	PS O 1	PS O 2	PS O3
The	e students will be able to:															
1	Write C programs to use data structures to represent, organize and manipulate data for given problem		3	3	3	3								3		3
2	Design and implement solutions for organization of data using different data structures		3	3	3	3							3	3		3
3	Choose appropriate data structures for representing, organizing and manipulating data for different kinds of problems		3	3	3	3							2	3		3

B.E (CON	<b>IPUTER SCIENCE AND ENGINE</b>	ERING)	
Outcome Based Educa	tion (OBE) and Choice Based C SEMESTER – III	Credit System (CBCS)	
Profess	ional Communication and E	Ethics	
Course Code:	21UCS306C	CIE Marks	100
Teaching Hours/Week (L:T:P)	(0:2:0)	SEE Marks	-
Credits	01	Hours	16

#### Course objectives:

- Develop communication skills relevant to engineering as a profession
- Make effective presentations
- Participate confidently in Group Discussions.
- Attend job interviews and be successful in them.
- Develop adequate Soft Skills required for the workplace.

#### Tutorials

- 1. **Communication skills (Verbal and Non Verbal):** Self-Introduction organizing the material Introducing the topic answering questions.
- Listening skills: Exercises based on Listening (audio, speech, lectures, songs, listen and draw/speak etc)
- 3. Conversations and Dialogues- Exercises based on situations, scenarios, skits, telephonic.
- 4. Public Speaking- Exercises based on different topics.
- Presentation skills- individual presentation practice— presenting the visuals effectively, qualities of a good presentation with emphasis on body language and use of visual aids.
- Group Discussions- Participating in group discussions understanding group dynamics brainstorming the topic – questioning and clarifying –GD strategies- activities to improve GD skills, instruction activities.
- Interview skills- Interview etiquette dress code body language attending job interviews– telephone/skype interview -one to one interview &panel interview – FAQs related to job interviews.
- 8. Writing skills(resume,letter)- Letter writing, CV writing, Attending a meeting and Minute Preparation, Vocabulary Building.
- Reading Skills: Speed Reading, Reading with the help of Audio Visual Aids, Reading Comprehension Skills.

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysis

#### Activities

- 1. Communication skills (Verbal and Non Verbal)
  - a) Speaking on the topic given.
- 2. Listening skills:

	a)	Given a topic, a student should speak about it and the others should
		summarize the information using proper listening skills.
	b)	Given instructions from the teacher, students should apply it and exhibit it.
3.	Conver	sations and Dialogues
	a)	Given a situation the students should carry out proper conversation.
	b)	Carrying out telephonic conversations with different categories of persons.
4.	Public	Speaking
	a)	Topics to be given to the student for giving awareness to the public.
5.	Presen	tation skills-
	a)	Presentation on technical topic using proper visual aids.
6.	Group	Discussions
	a)	Participating in group discussions to solve any given situation.
	b)	Carrying out debate.
7.	Intervi	ew skills.
	a)	Carrying out mock face-to-face interview.
8.	Writing	g skills(resume,letter)
	a)	Resume writing.
	b)	Formal letter writing (leave application, job application etc).
9.	Readir	ng Skills:
	a)	Reading Comprehension and answering the questions.
Revised	d Bloom	's Taxonomy Level $L_1$ – Remembering, $L_2$ – Understanding. L3 – Applying , L4-
		Analysis

### **Course Outcomes**

At the end of the course the student should be able to

- Analyze the variety of communication and listening skills.
- Discuss a given technical/non-technical topic effectively in groups.
- Create effective technical presentations.
- Write an impressive resume, technical letters and face the interview confidently.
- Reading clearly and precisely presenting the document.

SI No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text Boo	oks:			
1	Technical Communication	Meenakshi Raman and Sangeet	Oxford University	2004
-	Principles and practices	Sharma	Press	
	Business Communication	Meenakshi Raman and Prakas	Oxford University	2006
2		Singh	Press, ISBN13:	
			9780195676952	
3	Business Communication	Urmila Rainad S,M Rai	Himalaya	2011
			Publishing House	

Refer	ence Book:					
			<b>b c a</b>			and to the
1	Effective Technic	M. Ashraf Rizivi	McGi	aw Hill		2 <sup>nd</sup> Edition,
	Communication					2017
2	Professional Communication	Aruna Koneru	Tata	McGraw-Hill	Education,	2008
2			2008			
<b>Ques</b> Scher 1	tion paper pattern: me of Evaluation: . CIE I - Activity 1- 25 marks Activity 2 – 25 marks . CIE II - Activity 1- 25 marks Activity 2 – 25 marks					

	Subject/Subject Code:	PO	РО	PO	РО	РО	РО	РО	РО	РО	P01	P01	PO1	PSO	PSO	PSO
		1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
N 0	Programme Outcomes Course Outcomes															
Th	e students will be able to:															
1	Analyze the variety of communication and listening skills.		3		2		· · · · · · · · · · · · · · · · · · ·	2	1	2	3		3	3		
2	Discuss a given technical/non- technical topic effectively in groups.		3		2				1	3			3	3		
3	Create effective technical presentations.	3							1	2	3		3	3		
4	Write an impressive resume, technical letters and face the interview confidently.	3						2	1	2	3		3			
5	Reading clearly and precisely presenting the document.								1	2	3		3			

B.E (COMPUT	ER SCIENCE AND ENGINEERI	NG)	
Outcome Based Education	(OBE) and Choice Based Cree	dit System (CBCS)	
	SEMESTER – III		
Univ	versal Human Values-II		
Course Code:	21UHS324C	CIE Marks	50
Teaching Hours/Week (L:T:P)	(1:0:0)	SEE Marks	50
Credits	01	Hours	15

#### Course objectives:

This course will enable students to

- To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.
- Development of commitment and courage to act Thus, this course is intended to provide a much-needed orientational input in value education to the young enquiring mind

#### Unit -1 (4 Hours)

Introduction to Value Education: Right Understanding; Relationship and Physical Facility; Understanding Value Education; Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity - the Basic Human Aspiration-Current Scenario and Method to Fulfill the Basic Human Aspirations.

evised Bloom's Taxonomy Level	${ m L_1}$ –Remembering, ${ m L_2}$ – Understanding. L3 –Applying ,	L4-Analysing
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### Unit II (4 Hours)

Harmony in the Human Being: Understanding Human being as the Co-existence of the Self and the Body, distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health

Revised Bloom's Taxonomy Level	${ m L_1}$ —Remembering, ${ m L_2}$ — Understanding. L3 –Applying , L4-Analysing
	Unit III (4 Hours)

**Harmony in the Family and Society and Nature:** Harmony in the Family – the Basic Unit of Human Interaction; 'Trust' – the Foundational Value in Relationship; 'Respect' – as the Right Evaluation: Other Feelings, Justice in Human-to-Human Relationship; Understanding Harmony in the Society; Vision for the Universal Human Order; Understanding Harmony in the Nature; Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature.

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3	–Applying	, L	4-
	Analysing			
	Unit IV (3 Hours)			

Implications of the Holistic Understanding – a Look at Professional Ethics

Definitiveness of (Ethical) Human Conduct; A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order; Competence in Professional Ethics; Holistic Technologies, Production Systems and Management Models; Strategies for Transition towards Value-based Life and Profession

Revised Bloom's Taxonomy Level  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

#### Course outcomes:

At the end of the course the student will be able to:

- Explore holistic vision of life themselves and their surroundings.
- Develop competence and capabilities for maintaining Health and Hygiene.
- Analyse various problems in life, family, Society and in handling problems with Sustainable Solutions.
- Apply values to their own self in different day-to-day settings in real life and in handling problems with sustainable solutions.
- Adopt the value of appreciation and aspiration for excellence and gratitude for all.

<u>сı</u>		Nome of the Arithmy /-	Nama of the Dublisher	
SI No	litle of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Refe	rences		<u> </u>	- i cui
1	A Foundation Course in Human Values and Professional Ethics	R R Gaur, R Asthana, G P Bagaria,	Excel Books, New Delhi, ISBN 978-93- 87034-47-1	2 <sup>nd</sup> Revised Edition, 2019
2	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics	, R R Gaur, R Asthana,G P Bagaria,	Excel Books, New Delhi, ISBN 978-93- 87034- 53-2	2 <sup>nd</sup> Revised Edition, 2019
3	JeevanVidya :EkParichaya	A Nagaraj,	JeevanVidyaPrakashan, Amarkantak	1999.
4	Human Values	A.N. Tripathi,	New Age Intl. Publishers, New Delhi	1999.
5	The Story of Stuff(book)			
7	The Story of My Experiments with Truth	Mohandas Karamchand Gandhi		
8	Small is Beautiful	E. F Schumacher		
9	Slow is Beautiful	Cecile Andrews		
10	Economy of Permanence	J C Kumarappa		
11	Bharat Mein Angreji Raj	Pandit Sunderlal		
12	Rediscovering India	Dharampal		
13	Hind Swaraj or Indian Home Rule	Mohandas Karamchand Gandhi		
14	India Wins Freedom	Maulana Abdul Kalam Azad		
15	Vivekananda	Romain Rolland		
16	Gandhi	Romain Rolland		
	1	1	1	I

		РО	PO	РО	PO	PS	PS	PS								
	J	1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
SI.	Programme Outcomes															
No	Course Outcomes															
The	e students will be able to:															
1	Explore holistic vision of life - themselves and their surroundings							3	2	3			1			
2	Develop competence and capabilities for maintaining Health and Hygiene.						3	3	1	1			1			
3	Analyze various problems in life, family, Society and in handling problems with Sustainable Solutions.						3	3	2	1			1			
4	Apply values to their own self in different day-to-day settings in real life and in handling problems with sustainable solutions.						2	2	3	2			1			
5	Adopt the value of appreciation and aspiration for excellence and gratitude for all.								3				1			

B.E (0	COMPUTER SCIENCE AND ENGINEER	RING)								
Outcome Based Ec	Outcome Based Education (OBE) and Choice Based Credit System (CBCS)									
	SEMESTER – III									
	Constitution Of India									
Course Code:	21UHS321C/21UHS421C	CIE Marks	50							
Teaching Hours/Week (L:T:P)	(1:0:0)	SEE Marks	50							
Credits	01	Hours	15							

#### Course objectives:

This course will enable students to

- To realize the significance of constitution of India to students from all walks of life and help them to understand the basic concepts of Indian constitution.
- To identify the importance of fundamental rights as well as fundamental duties.
- To understand the functioning of Union, State and Local Governments in Indian federal system.
- To review procedure and effects of emergency, composition and activities of election commission.

### Unit -1 (4 Hours)

**Introduction Indian constitution:** The Salient Features of the Indian Constitution. Preamble to the Constitution of India. Fundamental Rights, Directive Principles of State policy and Fundamental Duties.

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3 —Applying , L4-Analysing
	Unit II (4 Hours)

**The Union and State Governments**: The Union Executive, The Union Legislature and The Union Judiciary - The Supreme Court of India.

Revised Bloom's Taxonomy Level	${ m L}_1$ —Remembering, ${ m L}_2$ — Understanding. L3 –Applying , L4-Analysing
	Unit III (4 Hours)

**The Indian State Government:** The State Executive, The State legislature and The State Judiciary **The Local Government:** Local Government-Panchayat raj system with special reference to 73<sup>rd</sup> and Urban Local Self Govt. with special reference to74<sup>th</sup> Amendment

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3	-Applying	,	L4-
	Analysing			
	Unit IV (3 Hours)			

Election provisions, Emergency provisions, Amendment of the constitution:

Revised Bloom's Taxonomy Level	L <sub>1</sub> –Remembering,	L <sub>2</sub> – Understanding. L3 –	Applying , L4-Analysing
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### Course outcomes:

At the end of the course the student will be able to:

- Understand and explain the significance of Indian Constitution as the fundamental law of the land.
- Exercise his fundamental rights in proper sense at the same time identifies his responsibilities in national building.
- Analyze the Indian political system, the powers and functions of the Union, State and Local Governments in detail.
- Elaborate Electoral Process, Emergency provisions and Amendment procedure.
- Understand and explain the significance of Indian Constitution as the fundamental law of the land.

SI No	Title of the Book	Title of the BookName of the Author/sName of the Publisher				
Text	Book					
1	An introduction to the constitution of India and Profession Ethics	Venkatesh B. R. and Merunandan K. B	Idea International Publication, Bangalore			
2	Introduction to the Constitution of India	M. V. Pylee	Vikaspublication	4 <sup>th</sup> Edition, 2005		
3	The Constitution of India and Profession of Ethics	K. R. Phaneesh	Sudha Publication, Bangalore			
Refe	erences					
1	Introduction to the constitution	Durga Das Basu	Prentice-Hall EEE	(Student Edition),		
	of India			19 <sup>th</sup> edition,2008.		
2	Engineering Ethics	Charles Harries J. R. and Michard and Michael J. Rabins				

		PO	РО	PO	PO	PS	PS	PS								
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
SI.	Programme Outcomes															
No	Course Outcomes															
The	e students will be able to:				·				·	·		·				
1	Understand and explain the significance of Indian Constitution as the fundamental law of the land.	-	-	-	-	-	1	1	-	-	-	-	1			
2	Exercise his fundamental rights in proper sense at the same time identifies his responsibilities in national building.	-	-	-	-	-	3	1	-	-	-	-	2			
3	Analyze the Indian political system, the powers and functions of the Union, State and Local Governments in detail.	-	-	-	-	-	1	1	-	-	-	-	1			
4	Elaborate Electoral Process, Emergency provisions and Amendment procedure.	-	-	-	-	-	-	-	-	-	-	-	1			
5	Understand and explain the significance of Indian Constitution as the fundamental law of the land.	-	-	-	-	-	1	1	-	-	-	-	1			

## IV Semester B.E. (CSE)

SI.No	Category	Subject Code	Subject Title	Credits	HC V	DUF VEE	RS/ :K	EXA	MINAT MARKS	ION
					L	т	Р	CIE	SEE	total
1.	BSC	21UMA401C	Statistics and Probability Distribution	3	3	0	0	50	50	100
2.	PCC	21UCS401C	Database Management System	3	2	2	0	50	50	100
3.	PCC	21UCS402C	Operating Systems	3	2	2	0	50	50	100
4.	PCC	21UCS403C	Object Oriented Programming with Java	3	3	0	0	50	50	100
5.	PCC	21UCS404C	Finite Automata and Formal Languages	3	3	0	0	50	50	100
6.	PCC	21UCS405L	Database Management System Lab	1	0	0	2	50	50	100
7.	PCC	21UCS406L	Object Oriented Programming with Java Lab	1	0	0	2	50	50	100
8.	PCC	21UCS407L	Operating Systems Lab	1	0	0	2	50	50	100
9.	HSMC	21UHS422C 21UHS423C	Samskrutika Kannada Balake Kannada	1	1	0	0	50	50	100
10	INT	21UCS307I	Summer Internship – I	2	-	-	-	100	0	100
		21UMA400M	Bridge Course Mathematics-II *	00	<mark>3</mark>	0	0	<mark>50</mark>	<mark>50</mark>	<mark>100</mark>
* Only	for Lateral	Entry students	Total	21	14	4	6	550	450	1000

BSC	ESC	HSMC	AEC	PCC	PEC	OEC	PROJ	INT	SEMI	MAN(UHV)
03		01		15						

B.E (CON Outcome Based Educa	/PUTER SCIENCE AND ENGINEI ition (OBE) and Choice Based C SEMESTER – IV	ERING) Predit System (CBCS)					
Statis	Statistics and Probability Distribution						
Course Code:	21UMA401C	CIE Marks	50				
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50				
Credits	03	Hours	40				

40

Hours

#### Course objectives:

- To apply the knowledge of Statistics in various Engineering fields
- To be acquired knowledge about predictions preferably on the basis of mathematical equations
- To be understand the principal concepts about probability

## Unit -1 (10 hours)

#### Statistics:

Curve fitting by the method of least squares: y = a + bx,  $y = ab^x$ ,  $y = a + bx + cx^2$ . Correlation, expression for the rank correlation coefficient and regression.

Revised Bloom's Taxonomy Level	${ m L_1}$ –Remembering, ${ m L_2}$ – Understanding. L3 –Applying , L4-Analysing
	Unit II ( 10 Hours)

Probability: addition rule, conditional probability, multiplication rule, Baye's rule. Discrete and continuous random variables-Probability density function, Cumulative distribution function, Problems on expectation and variance.

Revised Bloom's Taxonomy Level	${ m L_1}$ –Remembering, ${ m L_2}$ – Understanding. L3 –Applying , L4-Analysing
	Unit III ( 10 Hours)

#### Probability distributions:

Binomial distributions, Poisson distributions and Normal distributions. Concept of joint probability, Joint probability distributions.

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3 –Applying , L4-Analysing
	Unit IV ( 10 Hours)
Markov chains:	\
Introduction, Probability vectors, St	ochastic Matrices, Fixed Points and Regular stochastic Matrices, Markov
chains, higher transition probabilitie	s, stationary distribution of regular Markov chains and absorbing states.
Revised Bloom's Taxonomy Level	$\rm L_1$ –Remembering, $\rm L_2$ – Understanding. L3 –Applying , L4-Analysing

### Course outcomes:

At the end of the course the student will be able to:

- Apply the least square sense method to construct the specific relation for the given group of data. ٠
- Solve problems on correlation and regression
- Apply the concepts of probability
- Apply the concepts of probability distributions
- Apply the concept of Markov Chain for commercial and industry purpose.

SI No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Refer	ence Books:			
1	Numerical Methods for Engineers	Steven C Chapra & Raymond P Canale		
2	Higher Engineering Mathematics	Dr. B.S. Grewal	Khanna Publishers, New Delhi	
3	Advanced Engineering Mathematics	H. K. Das	S. Chand & company Ltd. Ram Nagar, New Delhi	
4	Advanced Engineering Mathematics	E Kreyszig	John Wiley & Sons	
5	Probability and stochastic processes	Roy D. Yates and David J. Goodman	Wiley India pvt.ltd	2 <sup>nd</sup> edition 2012
6	Theory and problems of probability	Seymour Lipschutz	Schaum's Series)	

	Subject/Subject Code:	РО	РО	РО	РО	РО	PO	РО	PO	РО	PO1	PO1	PO1	PSO	PSO	PSO
		1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
	Programme															
N	Outcomes															
0	Course Outcomes															
			The	stud	lents	will	be a	ble t	:0:							
														·		
1	Apply the least square sense	1	2													
	method to construct the															
	specific relation for the given															
2	Solve problems on correlation	1	2													
-	and regression	-	-													
3	Apply the concepts of	1														
	probability															
4	Apply the concepts of	1														
	probability distributions															
5	Apply the concept of Markov	1														
5	Chain for commercial and	1														
	industry purpose															

Outcome based	(COMPUTER SCIENCE AND ENGINES	ERING) Credit System (CBCS)	
Brid	SEMESTER – IV Ige Course Mathematics-II (Mani	latory)	
Course Code:	21UMA400M	CIE Marks	50
Teaching Hours/Week (I:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Hours	40
Course objectives: This course will enable students to Enhance learning of Enginee Study basic concepts of diffe	ring Mathematics. rential equations and Laplace tra	nsforms	
	Unit -1 (10 hours)		
Ordinary differential equati reducible to exact differential equati	ions of first order: Variable sepa ons. Linear and Bernoulli's equati	rable, Homogeneous. E ion.	xact form and
Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$ – Unde	erstanding. L3 –Applyin	g , L4-Analysing
	Unit II ( 10 Hours)		
Second and higher order linear OD variation of parameters (second orde Revised Bloom's Taxonomy Level	E's with constant coefficients-In er); Cauchy's and Legendre homo $L_1$ – Remembering, $L_2$ – Unde	verse differential oper geneous equations. erstanding. L3 –Applyin	ator, method o
	1 0. 1	0 11 1	
	Unit III ( 10 Hours)		, <u>, , , , , , , , , , , , , , , , , , </u>
Laplace Transform: Introduction, Definition of Laplace T differentiation, Integral and division	<b>Unit III ( 10 Hours)</b> Transform, Laplace Transform of s by t. Periodic function, Heaviside?	standard functions, Pro 's Unit step function.	operties: Shifting
Laplace Transform: Introduction, Definition of Laplace T differentiation, Integral and division Revised Bloom's Taxonomy Level	<b>Unit III ( 10 Hours)</b> Transform, Laplace Transform of s by t. Periodic function, Heaviside L <sub>1</sub> —Remembering, L <sub>2</sub> — Unde	standard functions, Pro 's Unit step function. erstanding. L3 –Applyin	pperties: Shifting
Laplace Transform: Introduction, Definition of Laplace T differentiation, Integral and division Revised Bloom's Taxonomy Level	Unit III ( 10 Hours) Transform, Laplace Transform of s by t. Periodic function, Heaviside L <sub>1</sub> —Remembering, L <sub>2</sub> — Unde Unit IV ( 10 Hours)	standard functions, Pro 's Unit step function. erstanding. L3 –Applyin	pperties: Shifting g , L4-Analysing
Laplace Transform: Introduction, Definition of Laplace T differentiation, Integral and division Revised Bloom's Taxonomy Level Inverse Laplace transforms: Properties, Convolution theorem-pr	Unit III ( 10 Hours) Fransform, Laplace Transform of s by t. Periodic function, Heaviside L <sub>1</sub> —Remembering, L <sub>2</sub> — Unde Unit IV ( 10 Hours) oblems, Solutions of linear differe	standard functions, Pro 's Unit step function. erstanding. L3 –Applyin ential equations	perties: Shifting
Laplace Transform: Introduction, Definition of Laplace T differentiation, Integral and division Revised Bloom's Taxonomy Level Inverse Laplace transforms: Properties, Convolution theorem-pr Revised Bloom's Taxonomy Level	Unit III ( 10 Hours) Fransform, Laplace Transform of s by t. Periodic function, Heaviside L <sub>1</sub> —Remembering, L <sub>2</sub> — Unde Unit IV ( 10 Hours) oblems, Solutions of linear differe L <sub>1</sub> —Remembering, L <sub>2</sub> —	standard functions, Pro 's Unit step function. erstanding. L3 –Applyin ential equations • Understanding. L3 –A Analysing	perties: Shifting g , L4-Analysing

- Solve first order first degree differential equations.
- Solve second and higher order linear differential equations.
- Apply Laplace transforms for standard functions and its properties
- Apply Inverse Laplace transforms for standard functions
- Solve differential equations using Laplace transform method.

SI No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Refere	ence Books:			
1	Higher Engineering Mathematics	Dr. B.S. Grewal	Khanna Publishers, New Delhi	2017
2	Advanced Engineering Mathematics	E Kreyszig	John Wiley & Sons , Pvt.Ltd	2014
3	Elementary Differential Equations by	Earl D. Rainville and Phillip E, Bedient		Sixth Edition
4	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons	2014
	£		4	

		РО 1	РО 2	РО 3	РО 4	PO 5	РО 6	РО 7	РО 8	РО 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
SI.N o The s	Programme Outcomes Course Outcomes															
1	Solve first order first degree differential equations.	1	2													
2	Solve second and higher order linear differential equations.	1	2													
3	Apply Laplace transforms for standard functions and its properties	1	2													
4	Apply Inverse Laplace transforms for standard functions	1	2													
5	Solve differential equations using Laplace transform method	1	2													

B.E (COMPUTER SCIENCE AND ENGINEERING)								
Outcome Based Education (OBE) and Choice Based Credit System (CBCS) SEMESTER – IV								
Database Management Systems								
Course Code:	21UCS401C	CIE Marks	50					
Teaching Hours/Week (L:T:P)	Teaching Hours/Week (L:T:P) (2:2:0) SEE Marks 50							
Credits 03 Hours 40								

#### Course objectives:

This course will enable students to

- Provide for mass storage of relevant data and making easy access to data for the authorized user.
- Eliminate Duplicate data and allow multiple users to be active at one time.
- Provide data integrity and protect the data from physical harm and unauthorized access.
- Serving different types of users and combining interrelated data to generate a report
- Provide multiple views for same data.

#### Unit -1 (7 Hours Teaching+3 Hours tutorial)

#### Introduction and Entity-Relationship Model

Introduction; Characteristics of Database approach; People with databases; Advantages; Disadvantages of DBMS. Data models, schemas and instances; Three-schema architecture and data independence; Database languages and interfaces; The database system environment; Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design for COMPANY database; ER Diagrams, Naming Conventions

Revised Bloom's Taxonomy Level	$L_1$ —Remembering, $L_2$ — Understanding. L3 –Applying , L4-Analysing							
Unit	II (7 Hours Teaching+3 Hours tutorial)							
Relational Model and Relational Alge	Relational Model and Relational Algebra							
Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update								
Operations, Transactions and dealing with constraint violations; Unary Relational Operations: SELECT and								
PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations: JOIN and DIVISION;								
Additional Relational Operations; Exa	imples of Queries in Relational Algebra; Relational Database Design							
using ER- to-Relational Mapping.								
SQL-The Relational Database Standar	d:							
SQL Data Definition and Data Types, Specifying Basic Constraints in SQL, Schema Change Statements in SQL;								
Basic Queries in SQL								
Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$ – Understanding. L3 –Applying , L4-Analysing							
Unit I	II (7 Hours Teaching+3 Hours tutorial)							
Database Design								
Informal Design Guidelines for Relatio	n Schemas; Functional Dependencies; Normal Forms Based on Primary							
Keys; General Definitions of Second ar	nd Third Normal Forms; Boyce-Codd Normal Form; Exercises.Properties							
of relational decomposition, algorithm	for relational database schema design.							
Revised Bloom's Taxonomy Level	$L_1$ – Remembering, $L_2$ – Understanding. L3 – Applying , L4-Analysing							
I	Unit IV (7 Hours Teaching+3Hours tutorial)							
Transaction Management and Recove	ery Techniques							
Introduction to transaction proces	ssing; Transaction and System concepts; The ACID Properties;							
Characterizing Schedules Based or	Characterizing Schedules Based on Recoverability; Two-Phase Locking Technique for concurrency							
Control(2PL); Recovery Concepts; Recovery and backup Techniques Based on Deferred Update and mmediate Update								
Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$ – Understanding. L3 –Applying , L4-							
	Analysing							

## Course outcomes:

At the end of the course the student will be able to:

- Explain the concepts of database and database management system.
- Model Entity-Relationship diagrams for enterprise level databases.
- Formulate Queries using SQL and Relational Formal Query Languages.
- Apply normalization concepts to refine designed database.
- Summarize concurrency control protocols and recovery algorithms.

SI No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text E	Book			
1	Fundamentals of Database	Elmasri and	Addison-Wesley	7 <sup>th</sup> Edition, 2018
1	Systems	Navathe		
Refer	ence Books:			
	Silberschatz, Korth and	Database System	Mc-GrawHill	5 <sup>th</sup> Edition,
1	Sudharshan	Concepts		2006
				rd
	Raghurama Krishnan, Johannes	Database	TATA McrawHill	3 <sup>rd</sup> Edition,
2	Gehrke	Management		2014
_		Systems		
Webl	inks and Video Lectures:			
•	https://www.javatpoint.com/db	ms-tutorial		
•	https://youtu.be/MtOFF91igB0			
•	https://archive.nptel.ac.in/cour	ses/106/105/1061051	75/	

		РО	PO	PO	РО	РО	PO	РО	PO	PO	PO	PO	PO	PS	PS	PS
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
	Programme Outcomes															
SI.No	Course Outcomes															
The s	tudents will be able to:															
1	Explain the concepts of database and database management system.	3											2			
2	Model Entity-Relationship diagrams for enterprise level databases		3	3		2							2	3		2
3	Formulate Queries using SQL and Relational Forml Query Languages	2	3	3	2	3							2	3		3
4	Apply normalization concepts to refine designed database	2	3	3						3		3	2	3		3
5	Summarize concurrency control protocols and recovery algorithms.		2										2			1

B.E (COI Outcome Based Educ	MPUTER SCIENCE AND ENGINEI ation (OBE) and Choice Based C SEMESTER – IV	ERING) Fredit System (CBCS)						
Operating Systems								
Course Code:	21UCS402C	CIE Marks	50					
Teaching Hours/Week (L:T:P)	(2:2:0)	SEE Marks	50					
Credits	03	Hours	40					

Course objectives:

- This course will enable students to
- To explain main components of OS and their working
- To familiarize the operations performed by OS as a resource Manager
- To impart various scheduling policies of OS
- To teach the different memory management and synchronization techniques.

#### Unit -1 (08 Hours Lectures + 04 Hours Tutorials)

**Introduction:** What Operating Systems Do, Computer-System Organization, Computer-System Architecture. Operating-System Operations, Resource Management, Security and Protection Virtualization, Distributed Systems, Computing Environments.

**PROCESS:** Processes Process Concept, Process Scheduling, operations on Processes, Interposes Communication, IPC in Shared-Memory Systems, IPC in Message-passing Systems.

Threads & Concurrency: overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues

**CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multi-Processor Scheduling, Real-Time CPU Scheduling, Operating-System Examples, Algorithm Evaluation

Revised Bloom's Taxonomy Level	$ m L_1$ —Remembering, $ m L_2$ — Understanding. L3 –Applying , L4-Analysing
Unit I	I (08 Hours Lectures : 04 Hours Tutorials)

**Synchronization Tools:** Background, The Critical-Section Problem, Peterson's Solution, Hardware Support for Synchronization, Mutex Locks, Semaphores, Monitors, Liveness, Evaluation, Classic problems of synchronization.

**Deadlocks:** System Model, Deadlock in Multithreaded Applications, Deadlock Characterization, Methods for Handling Deadlocks, Methods for Handling Deadlocks, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

#### Unit III (08 Hours Lectures : 04 Hours Tutorials)

Main Memory: Background, Contiguous Memory Allocation, Paging Structure of the Page Table, Swapping, Example: Intel 32- and 64-bit Architectures,

Virtual Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing

Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$	<sub>2</sub> – Understanding. L3 – Applying , L4-Analysing
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#### Unit IV (08 Hours Lectures : 04 Hours Tutorials)

File-System Interface: File Concept, Access Methods, Directory Structure, Protection, Memory-Mapped Files File-System Implementation: File-System Structure, File-System Operations, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, Example: The WAFL File System

**File-System Internals:** File Systems, File-System Mounting, Partitions and Mounting, File Sharing, Virtual File Systems Remote File Systems, Consistency Semantics

Revised Bloom's Taxonomy Level	$L_1$ – Remembering, $L_2$ – Understanding	. L3 –Applying , L4-Analysing
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#### **Course outcomes:**

At the end of the course the student will be able to:

- List and explain goals, service, and functions of different classes of operating systems.
- Analyse the performances of different process scheduling, memory management, file system implementation, protection, and security mechanisms.
- Apply scheduling and memory allocation policies for solving scheduling and memory management problems.
- Develop simple concurrent applications using processes and threads
- Explain mechanisms for deadlock handling, synchronization and interprocess communication.

		·····						
SI No	Title of the Book	Name of the Author/s	Edition and Year					
Text Bo	ook							
1	Operating System Concepts	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	AbrahamJohn Wiley & Sons, Inc.Silberschatz, PeterISBN 978-1-118-06333-Baer Galvin, Greg0Gagne0					
Refere	nce Books							
1	Operating SystemsA Concept Based Approach	Concept D. M. Dhamdhere McGraw-Hill 3 <sup>rd</sup>						
2	Modern Operating Systems	Andrew S. Tanenbaum and Herbert Bos	Pearson	4th edition, 2014				
	An Introduction to Operating Systems	P.C.P. Bhatt	PHI(EEE),	4th Edition2014.				
	Operating Systems: Internals and Design Principles	William StalingPearsons9th E		9 <sup>th</sup> Edition,2019				
Web liı	nks and Video Lectures:							
•	https://onlinecourses.nptel.ac.i	n/noc21_cs44/						
•	<ul> <li><u>https://onlinecourses.nptel.ac.in/noc22_cs78/</u></li> </ul>							
•	https://www.coursera.org/spec	ializations/codio-introdu	iction-operating-systems					
•	https://www.scs.stanford.edu/2	21w1-cs140/						

		PO	PS	PS	PS											
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
	Programme Outcomes															
SI.No	Course Outcomes															
The st	tudents will be able to:															
1	List and explain goals, service and functions of different classes of operating systems	1	1	1									1	1		
2	Analyse the performances of different process scheduling, memory management, file system implementation, protection and security mechanisms		3	2									1	1		
3	Apply scheduling and memory allocation policies for solving scheduling and memory management problems.	1		3									1	1		1
4	Develop simple concurrent applications using processes and threads	2	1	3									1	1		3
5	Explain mechanisms for deadlock handling, synchronization and inter-process communication.	1	2	2									1			2

Outcome Based Educat	ion (OBE) and Choice Based ( SEMESTER – IV	Credit System (CBCS)	
Object C	Priented Programming Wit	h Java	
Course Code:	21UCS403C	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Hours	40
Course objectives:			
<ul> <li>This course will enable students to</li> <li>Improve the analytical skills throug</li> <li>Understand the fundamentals of objects, invoking methods etc. and</li> </ul>	gh object-oriented program bject-oriented programmin l exception handling mecha	nming. ng in Java, including defi anisms.	ining classes,

- Gain knowledge about Java language syntax and semantics to write Java programs.
- Have an insight of the principles of inheritance, packages and interfaces and other features of java.

### Unit -1 (10 Hours)

Java Programming Fundamentals: Object Oriented programming features

History and evolution of Java: Java's lineage, bytecode , Java Buzzwords.

An overview of Java ,Data Types, Variables and Arrays , Operators , Control Statements

Introducing Classes: Class Fundamentals , Declaring Objects , Introducing Methods , Constructors ,this keyword ,garbage collection, method overloading.

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

Unit II (10 Hours)
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## Inheritance, Packages and Interfaces

String Handling , Type wrappers

**Exception Handling :** Exception-Handling Fundamentals – Exception Classes , Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try Statements, throw and finally statements.

Revised Bloom's Taxonomy Level	$L_1$ –Remembering, $L_2$ – Understanding. L3 –Applying , L4-Analysing
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#### Unit III (10 Hours)

Lambda Expressions : Fundamentals, Block Lambda expressions, Passing Lambda Expressions as argument, Lambda Expressions and Exceptions .

Multithreaded Programming : The Java Thread Model , The Main Thread , Creating a Thread, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Suspending, Resuming and Stopping Threads

Revised Bloom's Taxonomy Level	$L_1$ – Remembering, $L_2$ – Understanding, L3 – Applying , L4-Analysing					
Unit IV (10 Hours)						
JAVA 2 ENTERPRISE EDITION OVERVIEW, DATABASE ACCESS: Overview of J2EE and J2SE. The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement; ResultSet Objects						
Revised Bloom's Taxonomy Level $L_1$ – Remembering, $L_2$ – Understanding. L3 – Applying , L4-Analysing						

### Course outcomes:

At the end of the course the student will be able to:

- Acquire knowledge of underlying concepts of object oriented programming.
- Design Classes and establish relationship among Classes for various applications from problem definition
- Demonstrate the creation & use of Packages & Interfaces and incorporate thread concepts to develop multithreaded programs in Java.
- Use Exception handling, polymorphism and inheritance to develop Java programs.
- Design and develop simple applications using Java and JDBC.

SI No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text B	ook			
1	Java The Complete Reference	Herbert Schildt	MGH Education	9 <sup>th</sup> Edition, 2014
2	J2EE - The Complete Reference	Jim Keogh	Tata McGraw Hill	2007
Refere	ence			
1	Core Java Volume 1- Fundamentals	Cay S Horstmann ,Gary Cornell	Pearson Education	8 <sup>th</sup> Edition, 2007
2	Programming with Java	E Balagurusamy	MGH Education	6 <sup>th</sup> Edition, 2019

		PO	PO	PO	PO	РО	PO	РО	PO	РО	РО	РО	РО	PS	PS	PS
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
	Programme Outcomes															
SI.No	Course Outcomes															
The s	tudents will be able to:															
1	Acquire knowledge of underlying concepts of object oriented programming.		1										3			
2	Design Classes and establish relationship among Classes for various applications from problem definition		3	2	1								3	2		2
3	Demonstrate the creation & use of Packages & Interfaces and incorporate thread concepts to develop multithreaded programs in Java.	2	3	3		3							3	2		2
4	Use Exception handling, polymorphism and inheritance to develop Java programs.	2	3	3		3							3	2		2
5	Design and develop simple applications using Java and JDBC.	2	3	3		3							3	3	1	3

B.E (CON Outcome Based Educa	MPUTER SCIENCE AND ENGIN ation (OBE) and Choice Based SEMESTER – IV	NEERING) d Credit System (CBCS)	
Finite	Automata And Formal Lan	guages	
Course Code:	21UCS404C	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Hours	40
<ul> <li>Course objectives:</li> <li>This course will enable students to <ul> <li>To have an insight into the basic pachines.</li> <li>To develop the proficiency in the</li> </ul> </li> </ul>	orinciples of computation i oretical foundations of Co	including automata, gra mputer Science.	mmars and Turing
	Unit -1 (10 Hours)		
Applications.         Deterministic Finite Accepters: Determin         Languages.         Nondeterministic Finite Accepters: Defin         Equivalence of Deterministic and Nonde         Finite Automata.         Revised Bloom's Taxonomy Level	iistic Accepters and Transi ition of a Nondeterministi terministic Finite Accepte –Remembering, L <sub>2</sub> – Und	tion Graphs, Languages c Accepter rs, Reduction of the Nu lerstanding. L3 –Applyi	and Dfa's, Regular umber of States in ng , L4-Analysing
Regular Languages and Regular Gramma Languages Associated with Regular Expre Connection between Regular Expression Languages, Regular Expressions for Regular Regular Grammars: Right- and Left-Li	ars: Regular expressions; F ssions. on and Regular Languago ar Languages. near Grammars, Right-Liu	Formal Definition of a R <b>es</b> : Regular Expression near Grammars for R	Regular Expression, Is Denote Regular egular Languages
Properties of Regular Languages: Closu Identifying Nonregular Languages: A Pum Povisod Bloom's Taxonomy Lovel	re under Simple Set Oper ping Lemma. – Romomboring L – Und	rations, Closure under	Other Operations;
		erstanding. LS – Appryn	
<b>Context-Free Languages:</b> Context-Free Rightmost Derivations, Derivation Trees. <b>Parsing and Ambiguity:</b> Ambiguity in Gra	Grammars; Examples of mmars and Languages	Context-Free Languag	ges, Leftmost and
Simplification of Context-Free Grammar Productions, Removing $\lambda$ -Productions, Re Two Important Normal Forms: Chomsky Revised Bloom's Taxonomy Level $L_1$	s and Normal Forms: A Us moving Unit-Productions . Normal Form, Greibach No –Remembering, L <sub>2</sub> – Und	seful Substitution Rule, ormal Form. lerstanding. L3 –Applyi	Removing Useless
	Unit IV (10 Hours)		-
Pushdown Automata: Nondeterministic Language Accepted by a Pushdown Autor Pushdown Automata and Context-Free Context-Free Grammars for Pushdown Au Turing Machines: Definition of a Turing I as Transducers. Turing Machine with More Complex Stor	Pushdown Automata: De naton. e Languages: Pushdown utomata. Machine, Turing Machines rage: Multitape and Multic	etinition of a Pushdown Automata for Contex as Language Accepters dimensional Turing Mac	n Automaton, The tt-Free Languages, s, Turing Machines hines.
Revised Bloom's Taxonomy Level $L_1$	-Remembering, $L_2 - Un$	derstanding. L3 –Apply	ving, L4-Analysing

#### Course outcomes:

At the end of the course the student will be able to:

- Demonstrate a fundamental knowledge of the core concepts in automata theory and formal languages.
- Prove the properties of languages, grammars and automata with formal mathematical methods;
- Analyse the closure properties of regular and context-free languages.
- Design finite automata, pushdown automata, Turing machines for solving language pattern recognition problems.
- Apply mathematical and formal techniques for solving problems in Computer Science.

SI No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text l	Book			
1	Introduction to Formal	Peter Linz	Jones and Bartlett	6 <sup>th</sup> Edition, 2015
4	Languages and Automata		Student Edition	
	Introduction to Automata	Hopcroft, Motwani,	Pearson Education	3rd Edition, 2014
1	Theory, Languages, and Computation,	and Ullman	India	
	Introduction to the Theory of	Michael Sipser	Cengage Learning	3 <sup>rd</sup> Edition, 2012
2	Computation			
	Automata, Computability and	E Rich	Pearson Education	1 <sup>st</sup> Edition, 2012
3	Complexity: Theory and Applications		India	
	Introduction to languages and	Martin, John C	McGraw-Hill	4 <sup>th</sup> Edition, 2013
4	the theory of computation.			
	Theory of Computer Science	K L P Mishra, N	PHI Learning Pvt.	3 <sup>rd</sup> Edition, 2012
5		Chandrasekaran	Ltd.	
Web	links and Video Lectures:			
•	http://nptel.ac.in/courses.php?c	disciplineID=111		
•	http://www.class-central.com/s	subject/math(MOOCs	s)	
•	http://academicearth.org/			
•	VTU EDUSAT PROGRAMME – 20			

		PO	PS	PS	PS											
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
	Programme Outcomes															
Sl.No	Course Outcomes															
The st	udents will be able to:															
1	Demonstrate a fundamental knowledge of the core concepts in automata theory and formal languages.	2	3	3	3									3		
2	Prove the properties of languages, grammars and automata with formal mathematical methods.	3	2	2	3											
3	Analyze the closure properties of regular and context-free languages.	1	3	3	2	1								3		
4	Design finite automata, pushdown automata, Turing machines for solving language pattern recognition problems.	3	2	3	2	2										
5	Apply mathematical and formal techniques for solving problems in Computer Science.	1	2	1	3	3										

B.E (COMPUTER SCIENCE AND ENGINEERING)									
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)									
SEMESTER – IV									
Dat	abase Management System Lab								
Course Code:	21UCS405L	CIE Marks	50						
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50						
	1		1						

01

Exam Hours

03

#### Course objectives:

This course will enable students to

Credits

- Design database Schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and manipulation
- Develop solutions for database applications using procedures, cursors and triggers

#### Assignment List

Design the Database for any one of the following applications and implement the SQL Queries on designed database.

- a) Banking System,
- b) Employee Organization
- c) Inventory Processing System
- d) Library Management
- 1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) using CREATE, ALTER, DROP, INSERT statements.
- 2. Implement the queries for Updation, Selection, Deletion operations. Use ROLL BACK, COMMIT & SAVE POINTS Concepts with UPDATE, SELECT, DELETE statements.
- 3. Implement the queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSECT clauses.
- 4. Implement the queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY and HAVING clauses.
- 5. Implement the query to create a view and access the content of view and drop the view.
- 6. Develop PL/SQL program using PROCEDURE.
- 7. Develop PL/SQL program using FUNCTIONS.
- 8. Develop PL/SQL program using CURSOR.
- 9. Develop PL/SQL Programs using TRIGGERS.
- 10. Develop PL/SQL programs using PACKAGES.

Revised Bloom's Taxonomy Level $~~{ m L}_{ m J}$	$_{ m 11}$ –Remembering, $ m L_2$ – Understanding. L3 –Applying , L4-Analysing
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#### Course outcomes:

At the end of the course the student will be able to::

- 1. Create and maintain database using SQL.
- 2. Query the given database to slove given problem
- 3. Design database for given application.

		PO	PS	PS	PS											
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
	Programme Outcomes															
Sl.No	Course Outcomes															
The st	tudents will be able to:															
1	Create and maintain database using SQL.	3	3	3		3				3	1	2	3	3		2
2	Query the given database to solve given problem.	2	3	3		3				2	1	2	3	3		2
3	Design database for given applications	2	3	3		3				3	3	3	3	3		3

#### B.E (COMPUTER SCIENCE AND ENGINEERING)

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

SEMESTER – IV

<u></u>			
Object Or	iented Programming with J	lava Lab	
Course Code:	21UCS406L	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50
Credits	01	Exam Hours	03
Course objectives:			
This course will enable students to			
1. To introduce java compiler and e	clipse platform.		
<ol><li>To impart hands on experience w</li></ol>	/ith java programming.		

#### **Assignment List**

- 1. Develop simple java programs to demonstrate the
- i) Use of conditional statements
- ii) Use of loop statements
- iii) Reading & printing different data types in java
- iv) Operations on arrays(single & multidimensional

#### 2. Develop simple java programs to demonstrate

- i) Inheritance
- ii) Polymorphism
- iii) Packages
- iv) Interfaces

3. Develop simple java programs to demonstrate exception handling

4. Develop simple java programs to demonstrate multithreading concept

- i) Creating threads using extends & runnable technique
- ii) Synchronization
- iii) Interthread Communication

#### 5. Develop simple java programs that demonstrates the use of

i) String library functions

6. Develop simple JDBC programs

- i) Statement Object
- ii) Prepared Statement Object
- iii) Callable Statement Object.

Revised Bloom's Taxonomy Leve	$I_1 - Remembering, L_2 - I_3$	Understanding. L3 – Applying , L4-Analysing
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**Course outcomes:** 

At the end of the course the student will be able to::

- Analyse the problem statement and determine the requirements for solving problem.
- Design and develop effective solution for the problem given.
- Utilize modern tools to create java applications to solve real world problems

		PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PS	PS	PS
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
	Programme Outcomes															
Sl.No	Course Outcomes															
The st	udents will be able to:		·	<u> </u>			•	•	<u> </u>		·			• •		
1	Analyse the problem statement and determine the requirements for solving problem.	2	3	3		3							3	3	1	2
2	Design and develop effective solution for the problem given.	2	3	3		3				2			3	3	1	3
3	Utilize modern tools to create java applications to solve real world problems.	1	2	2	1	3						1	2	1	2	1

#### **B.E (COMPUTER SCIENCE AND ENGINEERING)**

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

SEMESTER – IV

	<b>Operating Systems Lab</b>		
Course Code:	21UCS407L	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50
Credits	01	Exam Hours	03

#### Course objectives:

This course will enable students to

- To have insights into design and implementation of resource management policies of operating systems.
- To have proficiency in concurrent programming.

#### Assignment List

- 1. Implementation of scheduling policies
- 2. Implementation of memory allocation techniques.
- 3. Developing solutions for deadlock problems.
- 4. Implementation of page replacement policies.
- 5. Developing concurrent applications using processes(Petersons algorithm).
- 6. Demonstration of synchronization using semaphores.
- 7. Implementation of Unix like shell commands.
- 8. Developing concurrent applications using Threads.

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

### **Course outcomes:**

At the end of the course the student will be able to::

- Simulate and demonstrate different functionalities of operating system
- Implement Unix like Shell commands.
- Develop simple applications using concurrent programming.

		PO	PS	PS	PS											
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
	Programme Outcomes															
Sl.No	Course Outcomes															
The st	udents will be able to:															
1	Simulate and demonstrate different functionalities of operating system	2	2	2										1		3
2	Implement Unix like Shell commands.	2	2	2										1		3
3	Develop simple applications using concurrent programming	2	3	3										1		3

	B.E (COMPUTER SCIENCE AND E	ENGINEERING)	
	Outcome Based Education (OBE) and Choice	Based Credit System (CBC	CS)
	SEMESTER – IV		
	Summer Internshi	p	
Course Cod	łe: 21UCS402C	CIE Marks	-
No Of Wee	ks: 3	SEE Marks	100
Credits	02	Total Hour	s <b>(7*6)*3</b>
Course obj	ectives:	I	
• To • To	have an insight into the basics of Linux Operating enhance the programming skills using C language.	System and C programm	ning concepts.
	Workshop Schedule de	etails	
Regular stu	idents will undergo Internship after completing first ye	ar,	
ateral entr	y students will undergo Internship after completing th	nird semester	
Duration :3	weeks		
Neek 1:Pai Neek 2 & V	rent department Neek 3 other department		
Timing : Mo	orning Session :9.00 am to 1.00 noon		
/ Tatal avera	Afternoon Session :2.00 pm to 5.30 pm		
Total num	ber of Hours=3weeks*7daya*7 hrs=147 hours		
Course con	itent		
Sl. No.	Topics		Duration in Days
1	Linux basics, Linux commands, Exercise and Pres	sentation on the topics	1
2	Strings: Introduction, Declaring and initializing s	string variables, String-	1
-	handling functions Example programs		1
-	nandining randetionis, Example programs.		-
3	<b>User-defined functions:</b> Introduction, Need for	user-defined functions,	-
3	<b>User-defined functions:</b> Introduction, Need for Elements of user-defined functions, Definition values and their types. Function calls, Function	user-defined functions, of functions, Return	-
3	<b>User-defined functions:</b> Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function de functions: Based on call by value, call by refe	user-defined functions, of functions, Return eclaration, Category of rence arguments and	-
3	<b>User-defined functions:</b> Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function de functions: Based on call by value, call by refe return type and recursion, Example programs.	user-defined functions, of functions, Return eclaration, Category of rence, arguments, and	-
3	User-defined functions: Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function de functions: Based on call by value, call by refe return type and recursion, Example programs. Structures: Defining a structure, declaring	user-defined functions, of functions, Return eclaration, Category of rrence, arguments, and structure variables.	
3	User-defined functions: Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function de functions: Based on call by value, call by refe return type and recursion, Example programs. Structures: Defining a structure, declaring Accessing structure members, Initialization, Arra	user-defined functions, of functions, Return eclaration, Category of rence, arguments, and structure variables, structure, Arrays	1
3	User-defined functions: Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function de functions: Based on call by value, call by refe return type and recursion, Example programs. Structures: Defining a structure, declaring Accessing structure members, Initialization, Arra within structures, Structures within structures, Example	user-defined functions, of functions, Return eclaration, Category of rence, arguments, and structure variables, tys of structure, Arrays ample programs.	1
2 3 4 5	<ul> <li>User-defined functions: Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function defunctions: Based on call by value, call by refereturn type and recursion, Example programs.</li> <li>Structures: Defining a structure, declaring Accessing structure members, Initialization, Arrawithin structures, Structures within structures, Example programs.</li> <li>Pointers: Introduction, pointers for Inter-function</li> </ul>	user-defined functions, of functions, Return eclaration, Category of rence, arguments, and structure variables, sys of structure, Arrays ample programs. etion communication,	1
3 4 5	<ul> <li>User-defined functions: Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function defunctions: Based on call by value, call by refereturn type and recursion, Example programs.</li> <li>Structures: Defining a structure, declaring Accessing structure members, Initialization, Arrawithin structures, Structures within structures, Example programs for Inter-function pointers to pointers, compatibility, Pointer app</li> </ul>	user-defined functions, of functions, Return eclaration, Category of rence, arguments, and structure variables, tys of structure, Arrays ample programs. etion communication, lications, Arrays and	1
3 4 5	<ul> <li>User-defined functions: Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function defunctions: Based on call by value, call by refereturn type and recursion, Example programs.</li> <li>Structures: Defining a structure, declaring Accessing structure members, Initialization, Arrawithin structures, Structures within structures, Example programs for Inter-function pointers to pointers, compatibility, Pointer app pointers, pointer arithmetic and arrays, passing a</li> </ul>	user-defined functions, of functions, Return eclaration, Category of rence, arguments, and structure variables, tys of structure, Arrays ample programs. etion communication, lications, Arrays and an array to a function,	1
3 4 5	<ul> <li>User-defined functions: Introduction, Need for Elements of user-defined functions, Definition values and their types, Function calls, Function d functions: Based on call by value, call by refereturn type and recursion, Example programs.</li> <li>Structures: Defining a structure, declaring Accessing structure members, Initialization, Arrawithin structures, Structures within structures, Example prointers: Introduction, pointers for Inter-function pointers to pointers, compatibility, Pointer app pointers, pointer arithmetic and arrays, passing a Memory allocation functions, Structures and</li> </ul>	user-defined functions, of functions, Return eclaration, Category of rence, arguments, and structure variables, by of structure, Arrays ample programs. etion communication, lications, Arrays and an array to a function, Pointers, Array of	1

Bitwise operators: Exact size integer types, logical bitwise operators,

Files: Text Input/output: files, streams, standard library I/O functions,

Binary files: Text v/s binary stream, standard library function for files,

1

shift operators, masks, Variable argument list functions

formatting I/O functions, character I/O functions

converting file types

6

7

SI. No	Component	Marks	Mode of evaluation
1	Week 1	25	Quizzes
2	Week 2	25	Evaluation by other departments with respective
3	Week 3	25	parameters/assessment methods
4	Presentation and Report	25	Presentation by the student, sharing the experience gained through the internship, supported by the report, in the given format.
Tota		100	

#### **Course outcomes:**

At the end of the course the student will be able to:

- Comprehend and work with the Linux Operating System.
- Understand C programming concepts like pointers, structures, and files.
- Apply the knowledge of C programming concepts to implement the given requirement specification to solve simple problems.
- Implement, interpret, debug and test any given C program.
- Develop simple applications using advanced C programming concepts to solve simple problems.

		PO	PS	PS	PS											
		1	2	3	4	5	6	7	8	9	10	11	12	01	02	03
	Programme Outcomes															
Sl.No	Course Outcomes															
The st	udents will be able to:															
1	Comprehend and work with the Linux Operating System.					2				2			2	3		
2	Understand C programming concepts like pointers, structures, and files.	3	2												2	
3	Apply the knowledge of C programming concepts to implement the given requirement specification to solve simple problems.	3	3	3	3					2			2	3	3	2
4	Implement, interpret, debug and test any given C program.	3	2	3	3					2			2	3	3	2
5	Develop simple applications using advanced C programming concepts to solve simple problems.		3	3	3								3	3	3	3

#### **B.E (COMPUTER SCIENCE AND ENGINEERING)** Outcome Based Education (OBE) and Choice Based Credit System (CBCS) **SEMESTER - IV** Samskruthika Kannada Course Code: 21UHS322C/21UHS422C **CIE Marks** 50 (1:0:0)Teaching Hours/Week (L:T:P) SEE Marks 50 Credits 01 Hours 15

#### Course objectives:

This course will enable students to:

- 'ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ' ಪಠ್ಯದ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ನಾಡು, ನುಡಿ, ಭಾಷೆ, ಮತ್ತು ಕನ್ನಡಿಗರ ಸಾಂಸ್ಕೃತಿಕ ಬದುಕಿನ ಬಗೆಗೆ ಅರಿವು ಮೂಡಿಸುವುದು
- ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆ ಹಾಗೂ ಅದಕ್ಕೆ ಪೂರಕವಾಗಿರುವ ಕನ್ನಡ ವ್ಯಾಕರಣಾಂಶಗಳ ಬಗೆಗೆ ಅರಿವು ಮೂಡಿಸುವುದು. ಪ್ರಾದೇಶಿಕ ಭಾಷೆಯಲ್ಲಿ ಅರ್ಜಿ ಮತ್ತು ಪತ್ರವ್ಯವಹಾರಗಳನ್ನು ಸಮರ್ಥವಾಗಿ ನಿರ್ವಹಿಸಲು ಪ್ರೇರೇಪಿಸುವುದು.
- ತಾಂತ್ರಿಕ ಅಧ್ಯಯನದ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯ ಬರವಣಿಗೆ ಮತ್ತು ಬರವಣಿಗೆಯಲ್ಲಾಗುವ ದೋಷಗಳನ್ನು ಗುರುತಿಸುವ ಸಾಮರ್ಥ್ಯವನು ಬೆಳೆಸುವುದು
- ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಅಡಗಿರುವ ಸುಪ್ತ ಪ್ರತಿಭೆಯನ್ನು ಅನಾವರಣಗೊಳಿಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಅವರಲ್ಲಿ ಕಲೆ, ಬರವಣಿಗೆ ಮತ್ತು ಭಾಷಾಂತರಕಲೆಯಲ್ಲಿ ಆಸಕ್ತಿಯನ್ನು ಮೂಢಿಸುವುದು. ಎಲ್ಲಕ್ಕೂ ಮೇಲಾಗಿ ಮಾನವೀಯ ಮೌಲ್ಯಗಳೊಂದಿಗೆ ಸರ್ವಾಂಗೀಣವಾಗಿ ಸಂವರ್ಧನೆಗೊಳಿಸಿ ಅವರನ್ನು ರಾಷ್ಟದ ಅಮೂಲ್ಯ ಸಂಪತ್ತನ್ನಾಗಿ ರೂಪಿಸಿಸುವುದು

Unit -1 (4 Hours)

ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ : ಹಂಪ ನಾಗರಾಜಯ್ಯ

ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ – ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ

ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ – ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

#### Unit II (4 Hours)

ವಚನಗಳು : ಜೇಡರ ದಾಸಿಮಯ್ಯ, ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ, ಕೀರ್ತನೆಗಳು : ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೆ – ಕನಕದಾಸ ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು – ಶಿಶುನಾಳ ಷರೀಫ ಜನಪದ ಗೀತೆ : ಬೀಸುವ ಪದ

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

Unit III (4 Hours)

ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗ : ಡಿ.ವಿ.ಜಿ.

ಕುರುಡು ಕಾಂಚಾಣಾ : ದ.ರಾ. ಬೇಂದ್ರೆ

ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು

ಚೋಮನ ಮಕ್ಕಳ ಹಾಡು : ಸಿದ್ಧಲಿಂಗಯ್ಯ

ಆ ಮರ ಈ ಮರ : ಚಂದ್ರಶೇಖರ ಕಂಬಾರ

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

Unit IV (4 Hours)

ಡಾ. ಸರ್ ಎಂ ವಿಶ್ವೇಶ್ವರಯ್ಯ – ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ :ಎ ಎನ್ ಮೂರ್ತಿರಾವ್

ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ

'ಕ' ಮತ್ತು 'ಬ' ಬರಹ ತಂತ್ರಾಂಶಗಳು ಮತ್ತು ಕನ್ನಡದ ಟೈಪಿಂಗ್

**Revised Bloom's Taxonomy Level**  $L_1$  – Remembering,  $L_2$  – Understanding. L3 – Applying , L4-Analysing

#### **Course outcomes:**

At the end of the course the student will be able to:

- 1. ವಿದ್ಯಾರ್ಥಿಗಳು ಬೌದ್ಧಿಕವಾಗಿ ಬೆಳೆಯುವುದರೊಂದಿಗೆ ನಮ್ಮ ನಾಡಿನ ಮತ್ತು ದೇಶದ ಸಾಂಸ್ಕೃತಿಕ ವಾರಸುದಾರರಾಗಿ ಬೆಳೆದು ಸ್ವಾವಲಂಬಿಯಾಗಿ ಬದುಕು ಕಟ್ಟಿಕೊಳ್ಳುತ್ತಾರೆ.
- 2. ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಸಮರ್ಥವಾಗಿ ಮಾತನಾಡುವುದರೊಂದಿಗೆ, ಅನ್ಯರನ್ನು ಅರ್ಥೈಸಿಕೊಳ್ಳುವ ಮನೋಬಲ ಬೆಳೆಸಿಕೊಳ್ಳುತ್ತಾನೆ. ಇವತ್ತಿನ ಸಂಕೀರ್ಣವಾದ ಸಾಮಾಜಿಕ ವ್ಯವಸ್ಥೆಯಲ್ಲಿ ಸೌಹಾರ್ದಯುತವಾದ ನಡುವಳಿಕೆಯೊಂದಿಗೆ ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಯಾಗಿ ರೂಪುಗೊಳ್ಳುತ್ತಾನೆ.
- 3. ಜಾಗತಿಕರಣದ ಸಂದರ್ಭದಲ್ಲಿ ವಿದ್ಯಾರ್ಥಿಗಳು ಸ್ವತಂತ್ರವಾಗಿ ಆಲೋಚಿಸುವ, ಸ್ವತಂತ್ರವಾಗಿ ಬರೆಯುವ, ಸ್ವತಂತ್ರವಾಗಿ ಚಿಂತನಶೀಲರಾಗುವ ಸಾಮರ್ಥ್ಯವನ್ನು ಪಡೆದು, ಸಮಯೋಚಿತವಾಗಿ ಸೂಕ್ತ ನಿರ್ಧಾರಗಳನ್ನು ಕೈಗೊಳ್ಳುವಲ್ಲಿ ಈ ಅಧ್ಯಯನ ದೀಪಸ್ಥಂಬವಾಗಿದೆ.
- 4. ವಿದ್ಯಾರ್ಥಿಗಳು ಇಂದಿನ ಜಾಗತಿಕ ವಿದ್ಯಮಾನಗಳನ್ನು ಅರ್ಥೈಸಿಕೊಂಡು, ಸಮಾಜದಲ್ಲಿ ಸಂಘಜೀವಿಯಾಗಿ ಬೆಳೆಯುವ ಮನೋಬಲವನ್ನು ಮತ್ತು ಆತ್ಮಸ್ತೈರ್ಯವನ್ನು ತುಂಬುವಲ್ಲಿ ಈ ಅಧ್ಯಯನ ಸೂಕ್ತವಾದ ಮಾರ್ಗದರ್ಶಿಕೆಯಾಗಿದೆ.
- 5. ತನ್ನ ಅಸ್ಮಿತೆಯ ಹುಡುಕಾಟದಲ್ಲಿರುವ ವ್ಯಕ್ತಿಗೆ, ಅದು ಈ ನೆಲದ ಸ್ವಾಭಿಮಾನ, ಭಾತೃತ್ವ, ಪ್ರೀತಿ, ಸೌಹಾರ್ದಯುತವಾದ ಮನಸ್ಸುಗಳಲ್ಲಿ ಇದ ಎಂಬುದನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳ ಅರಿತಕ್ಕೆತರುತ್ತದೆ. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಪರಿಸರ ಪ್ರಜ್ಞೆಯನ್ನು ಜಾಗೃತಗೊಳಿಸಿ, ದೈವಸೃಷ್ಟಿಯಾದ ಈ ಅಮೂಲ್ಯ ಸಂಪತ್ತನ್ನು ಹಿತ–ಮಿತವಾಗಿ ಬಳಸಿಕೊಂಡು ಮುಂದಿನ ತಲೆಮಾರಿಗೆ ಅದನ್ನು ಬಳುವಳಿಯಾಗಿ ಬಿಟ್ಟುಹೋಗುವಲ್ಲಿ ಜಾಗೃತನಾಗುತ್ತಾನೆ.

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SI	Title of the Book	Name of the	Name of the	Edition and
No		Author/s	Publisher	Year
Text I	Book			
Refer	ences			
	ಪಠ್ಯಮಸ್ತಕ:			
	ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (ಸಂ),			
1	ಡಾ.ಹಿ.ಚೆ.ಬೋರಲಿಂಗಯ್ಯ & ಡಾ.ಎಲ್.ತಿಮ್ಮೇಶ,			
	Prasaranga VTU, Belagavi, Karnataka,			
	2020.			
Eligib	ility criteria :			
For re	egistration of Kannada subject: students wh	o have studied Kan	nada language as on	e of the subjects

## Course Articulation Matrix: Mapping of Course Outcomes (CO) with Programme Outcomes (PO) and Programme Specific Outcomes (PSO)

either in tenth standard or PUC-II have to register Samskruthika Kannada.

Programme Outcomes			PO 2	РО 3	РО 4	РО 5	PO 6	<b>PO</b> 7	РО 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
The s	students will be able to:															
1																
2											2					
3							1									
4							2									
5							1	3								

## Total: L-15Hours

## ಪಠ್ಯಮಸ್ತಕ:

## Prescribed Textbook:

ಬಳಕೆ ಕನ್ನಡ – "BaLake Kannada" -

Author : Dr. L Thimmesha Published by Prasaranga,

Visvesvaraya Technological University, Belagavi, Karnataka.

## ಕೋರ್ಸ್ ಫಲಿತಾಂಶಗಳು:

At the end of the course the student should be able to:

- ವಿದ್ಯಾರ್ಥಿಗಳು ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಸುಲಭವಾಗಿ ಅರ್ಥೈಸಿಕೊಂಡು, ಸಾಮಾಜಿಕವಾಗಿ, ಆರ್ಥಿಕವಾಗಿಆಯಾ ಪ್ರದೇಶದಜನರೊಂದಿಗೆ ಅನ್ಯೋನ್ಯವಾಗಿ ವ್ಯವಹರಿಸುತ್ತಾರೆ.
- ಈ ಪಠ್ಯಾಧ್ಯಯನದಿಂದ ವಿದ್ಯಾರ್ಥಿಯುಆಯಾ ಪ್ರದೇಶಗಳ ನಂಬಿಕೆ, ಸಂಪ್ರದಾಯ ಮತ್ತು ಆಚರಣೆಗಳನ್ನು ಸುಲಭವಾಗಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ.
- 3. ಕನ್ನಡ ಸಂಖ್ಯೆಗಳ ಪರಿಕಲ್ಪನೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಯು ವಾಣಿಜ್ಯ ವ್ಯವಹಾರಗಳನ್ನು ಸುಲಭವಾಗಿ ನೆರೆವೇರಿಸಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ.
- ಹಂತಹಂತವಾಗಿ ವಿದ್ಯಾರ್ಥಿಯು ಕನ್ನಡ ಭಾಷೆಯಲ್ಲಿ ಬರವಣಿಗೆಯಕಲೆಯನ್ನು ಮತ್ತುಓದುವಕಲೆಯನ್ನು ಬೆಳೆಸಿಕೊಳ್ಳುತ್ತಾನೆ.
- 5. ಈ ಭಾಷೆಯ ಸಂಪರ್ಕದಿಂದಾಗಿ ವಿದ್ಯಾರ್ಥಿಯು ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳಾದ ಕತೆ, ಕವನ, ಕಾದಂಬರಿ, ನಾಟಕ ಮುಂತಾದ ಕ್ಷೀತ್ರಗಳಲ್ಲಿ ತನ್ನ ಅಭಿರುಚಿಯನ್ನು ಹೆಚ್ಚಿಸಿಕೊಳ್ಳುತ್ತಾನೆ

## Note:

Eligibility criteria for registration of Kannada subjects: students who have not studied Kannada language as one of the subject in tenth standard or PUC-II have to register Balake Kannada.

## CO-PO Mapping

co	P O	PO 2	PO 3	РО 4	РО 5	PO 6	РО 7	PO 8	PO 9	РО 10	РО 11	РО 12	IOSd	PSO2
C01										2				
CO2										2			9	
CO3		<i>c</i>				4 M				3				
CO4		~			C	6 95				2				
C05										2				

## V Semester B.E. (CSE)

SI. No.	Category Subject Subject Title Code		Credits	HO WE	URS EK	5/	EXAN MAR	MINAT KS	ION	
					L	Т	Р	CIE	SEE	Total
1.	PCC	21UCS501C	Analysis and Design of Algorithms	3	2	0	2	50	50	100
2.	PCC	21UCS502C	Computer Networks	4	4	0	0	50	50	100
3.	PCC	21UCS503C	Web Programming	3	2	0	2	50	50	100
4.	PEC	21UCSXXXE	Professional Elective Course - I	3	3	0	0	50	50	100
5.	OEC	21UCSXXXN	Open Elective-I	3	3	0	0	50	50	100
6.	PCC	21UCS504L	Computer Networks Lab	1	0	0	2	50	50	100
7.	AEC	21UHS521C	Quantitative Aptitude and Professional Skills	2	2	0	0	50	50	100
8.	INT	21UCS505I	Summer Internship - II	3	0	-	-	100	0	100
9.	HSMC	21UBT5XXC	Environmental Studies	1	1	0	0	50	50	100
Total			•	23	17	0	6	500	400	900

## VI Semester B.E. (CSE)

SI. No	Category	Subject Code	bject Subject Title de		HO WE	URS EK	/	EXAMINATION MARKS			
					L	т	Р	CIE	SEE	Total	
1.	BSC	21UCS601C	Theory of Computation (DMS)	3	3	0	0	50	50	100	
2.	PCC	21UCS602C	Compiler Design	4	4	0	0	50	50	100	
3.	PCC	21UCS603C	Machine Learning	3	3	0	0	50	50	100	
4.	PEC	21UCSXXXE	Professional Elective Course - II	3	3	0	0	50	50	100	
5.	OEC	21UCSXXXN	Open Elective – II	3	3	0	0	50	50	100	
6.	OEC	21UCSXXXN	Open Elective – III	3	3	0	0	50	50	100	
7.	PCC	21UCS604L	Machine Learning Lab	1	0	0	2	50	50	100	
8.	MP	21UCS605P	Mini Project	2	0	0	4	50	50	100	
Tota	al	1		22	19	0	6	400	400	800	

## VII Semester B.E. (CSE)

SI.	Category	Subject			HO		/	EXAMINATION MARKS			
NO		Code	Subject Title	Credits	WE	EK		IVIAR	KS		
					L	Т	Р	Cie	See	total	
1.	HSMC	21UCS701C	Management andEntrepreneurship	3	3	0	0	50	50	100	
2.	PCC	21UCS702C	Software Engineering	3	3	0	0	50	50	100	
3.	PEC	21UCSXXXE	Professional Elective Course-III	3	3	0	0	50	50	100	
4.	PEC	21UCSXXXE	Professional Elective Course –IV	3	3	0	0	50	50	100	
5	Project	21UCS703P	Project Work	8	0	0	16	50	50	100	
Tota	al			20	12	0	16	250	250	500	

SI. No	Category	Subject Code	Subject Title	Credits		URS EEK	5/	EXAMINATION MARKS			
					L	т	Р	CIE	SEE	Total	
1.	AEC	21UCSXXX	MOOCs	3	-	-	-		100	100	
2.	Seminar	21UCS801S	Technical Seminar	1	-	-	-	100	0	100	
3.	INT	21UCS802I	Research/Industrial Internship	10	0	0	20	100	0	100	
4.	AEC	21UCS803C	(Open-Source Programming/ Animation / Visualization / Digital Marketing / Cyber Laws)	2	0	2	2	50	50	100	
Tota	al			16	0	2	22	250	150	400	

## VIII Semester B.E. (CSE)

\* 7<sup>th</sup> and 8<sup>th</sup> semesters are swapped between group 1 and group 2 students