GOVT. COLLEGE OF ENGINEERING
AMRAVATI

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

For

B. Tech. Second Year
(Computer Science and Engineering)

2020 – 21

Program Objectives

The Undergraduate students will demonstrate.

I. To create graduates with foundation knowledge of computer science and engineering, who can contribute towards emerging technologies.
II. To develop an ability to identify, formulate and develop solution to solve real life computational challenges.
III. To create graduates with sufficient capabilities in computer science and scientific computing who can become researchers and developers to satisfy the needs of the core computer technology industry.
IV. To inculcate attitude of innovative driven entrepreneurship (IDE).
V. To make the students aware of professional and social ethics and prepare them with basic soft skills essential for working in societal and professional teams.

Program Outcomes (POs):

The Undergraduate Students will have ability to

1. Apply knowledge of fundamental programming, mathematics, algorithms and technologies in Computer Science & Engineering to solve real life problems faced by the industry.
2. Demonstrate knowledge of fundamentals of hardware technology relevant to understanding Computer Science basics.
3. Demonstrate capability to work in teams and in professional, ethical, legal and social responsible framework.
4. An ability to communicate general and technical topics in written and verbal forms with diverse stakeholders.
5. Demonstrate their ability to use the state of the art technologies and tools including Free and Open Source Software (FOSS) tools in developing software.
6. A potential to perform good in the examinations for higher education.
7. Expand their qualities of learning and demonstrating latest technology.

B. Tech. (Computer Science and Engineering)

SEM III													
Category	Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme						Credits
							Theory			Practical		Total	
			Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
ESC	ETU331	Analog and Digital Integrated Circuit	3	---	---	3	30	10	60	---	---	100	3
PCC	CSU321	Data Structure and Algorithms	3		---	3	30	10	60	---	---	100	3
PCC	CSU322	Discrete Mathematics	3		---	3	30	10	60	---	---	100	3
BSC	SHU321B SHU322B	Transform and Linear Algebra Differential Equation and Transform	3	1	---	4	30	10	60	---	---	100	4
MC	SHU323	Introduction to Constitution of India	1	---	---	---	---	20	30	---	---	50	0
HSMC	SHU324	Effective technical communication	3	---	---	3	30	10	60	---	---	100	3
ESC-LC	ETU332	Analog and Digital Integrated Circuit Lab	---	---	4	4	---	---	---	25	25	50	2
PCC-LC	CSU323	Data structure and Algorithms Lab	---	---	4	4	---	---	---	25	25	50	2
PCC-LC	CSU324	IT Workshop (Sci Lab/MATLAB	1	---	4	5	---	---	---	25	25	50	3
	Total		**17**	**1**	**12**	**29**	**150**	**70**	**330**	**75**	**75**	**700**	**23**

B. Tech. (Computer Science and Engineering)

SEM IV													
Category	Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme						Credits
							Theory			Practical		Total	
			Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
PCC	CSU421	Object Oriented Programming	3	1	---	4	30	10	60	---	---	100	4
PCC	CSU422	Computer Organization and Architecture	3	---	---	3	30	10	60	---	---	100	3
PCC	CSU423	Operating System	3	---	---	3	30	10	60	---	---	100	3
PCC	CSU424	Design and Analysis of Algorithms	3	---	---	---	30	10	60	---	---	100	3
HSMC	CSU425	Organizational Behaviour	3	---	---	3	30	10	60	---	---	100	3
MC	SHU421	Environmental ~~Sciences~~ Studies	1	---	---	---	---	20	30	---	---	50	0
PCC	CSU 426	Object Oriented Programming Lab	---	---	4	4	--	--	---	25	25	50	2
PCC-LC	CSU427	Computer Organization and Architecture Lab	---	---	4	4	---	---	---	25	25	50	2
PCC-LC	CSU428	Operating Systems Lab	---	---	4	4	---	---	---	25	25	50	2
PCC-LC	CSU429	Design and Analysis of Algorithms Lab	---	---	4	4	---	---	---	25	25	50	2
	Total		**16**	**1**	**16**	**29**	**150**	**70**	**330**	**100**	**100**	**750**	**24**

B. Tech. (Computer Science and Engineering)

SEM V

Category	Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme						Credits
							Theory			Practical		Total	
			Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
PCC	CSU521	Database Management Systems	3	---	---	3	30	10	60	---	---	100	3
PCC	CSU522	Formal Language and Automata Theory	3	1	---	4	30	10	60	---	---	100	4
PCC	CSU523	Java and Python Programming	3	---	---	3	30	10	60	---	---	100	3
PCC	CSU524	Computer Networks	3	---	---	3	30	10	60	---	---	100	3
PEC	CSU525	Program Elective-I	3	---	---	3	30	10	60	---	---	100	3
BSC	SHU525	Human Values and Ethics	1	--	---	1	---	20	30	---	---	50	0
PCC-LC	CSU526	Database Management Systems Lab	---	---	4	4	---	---	---	25	25	50	2
PCC-LC	CSU527	Java and Python Programming Lab	---	---	4	4	---	---	---	25	25	50	2
	Total		**16**	**1**	**8**	**25**	**150**	**70**	**330**	**50**	**50**	**650**	**20**

B. Tech. (Computer Science and Engineering)

SEM VI													
Category	Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme						Credits
							Theory			Practical		Total	
			Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
PCC	CSU621	Complier Design	3	---	---	3	30	10	60	---	---	100	3
PCC	CSU622	Software Project Management	3	---	---	3	30	10	60	---	---	100	3
PEC	CSU623	Program Elective-II	3	---	---	3	30	10	60	---	---	100	3
PEC	CSU624	Program Elective-III	3	---	---	3	30	10	60	---	---	100	3
OEC	CSU625	Open Elective-I	3	---	---	3	30	10	60	---	---	100	3
PCC-LC	CSU626	Complier Design Lab	---	---	4	4	---	---		25	25	50	2
PCC-LC	CSU627	Computer Networks Lab	---	---	4	4	---	---	---	25	25	50	2
PROJ	CSU628	Minor Project	---	---	6	6	---	---	---	50	50	100	3
	Total		**15**	**0**	**14**	**29**	**150**	**50**	**300**	**100**	**100**	**700**	**22**

B. Tech. (Computer Science and Engineering)

SEM VII													
Category	Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme						Credits
							Theory			Practical		Total	
			Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
ESC	CSU721	Signals and Systems	3		---	3	30	10	60	---	---	100	3
PEC	CSU722	Program Elective-IV	3	---	---	3	30	10	60	---	---	100	3
PEC	CSU723	Program Elective-V	3	---	---	3	30	10	60	---	---	100	3
PCC	CSU724	Cyber Security	3	---	---	3	30	10	60	---	---	100	3
PCC	CSU725	Software Engineering	3	---	---	3	30	10	60	---	---	100	3
PROJ	CSU726	Seminar			2	2	---	---	---	50	---	50	1
	Total		**15**	**0**	**2**	**17**	**150**	**60**	**300**	**50**	**---**	**550**	**16**

B. Tech. (Computer Science and Engineering)

SEM VIII													
Category	Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme						Credits
							Theory			Practical		Total	
			Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
PEC	CSU821	Program Elective-VI	3	---	---	3	30	10	60	---	---	100	3
OEC	CSU822	Open Elective-II	2	---	---	2	30	10	60	---	---	100	2
PROJ	CSU823	A. Project OR B. Industry Internship Project	---	---	24	24		---	---	200	200	400	12
	Total		**5**	**0**	**24**	**29**	**60**	**20**	**120**	**200**	**200**	**600**	**17**

Note: Students going for internship at Industry will complete theory courses through online platform such as MOOCs, NPTL etc or by self-study mode and will either directly appear for ESE only (Total Internal Marks (CT1+CT2) will be awarded proportional to marks secure in ESE) or they can appear for CT1 and CT2. TA marks will be awarded as per industrial project performance.

BSC Basic Science Courses
ESC Engineering Science Courses
HSMC Humanities and Social Sciences including Management courses
PCC Professional core courses
PEC Professional Elective courses
OEC Open Elective courses
LC Laboratory course
MC Mandatory courses
SI Summer Industry Internship
PROJ Project

Program Elective Courses

Program Elective-I	Program Elective-II	Program Elective-III	Program Elective-IV	Program Elective-V	Program Elective-VI
Graph Theory	Advanced Algorithms	Parallel and Distributed Algorithms	Computational Complexity	Computational Geometry	Queuing Theory and Modelling
System Engineering	Distributed Systems	Embedded Systems	Low Power Circuits and Systems	Advanced Operating Systems	Fault Tolerant Computing
Artificial Intelligence	Machine Learning	Data Mining	Soft Computing	Speech and Natural Language Processing	Data Analytics
Electronic Design Automation	Computer Graphics	Cloud Computing	Human Computer Interaction	Digital Signal Processing	Image Processing

Open Elective Courses (To be offered by Computer Science and Engineering Department)

Open Elective-I	Open Elective-II
Web Designing	Network Security
Data structure and Algorithm	Internet of Things

Department of COMPUTER SCIENCE & ENGINEERING

जावक क्र. 08

संगणक विज्ञान व अभियांत्रिकी विभाग
शासकीय अभियांत्रिकी महाविद्यालय
अमरावती. दि. 04/03/2021

Equivalence Scheme

Programme Name: - Computer Science & Engineering

Sr. No.	Course code with Name of course(old)		Credit	Course code with Name of course (new)		Credit
1	CSU 301	Programming Methodology	4	**NO EQUIVALANCE**		
2	CSU 302	Computer Organization & Architecture	4	CSU422	Computer Organization & Architecture	3
3	CSU 303	Discrete Mathematics & Graph Theory	3	CSU322	Discrete Mathematics	3
4	CSU 304	Programming Methodology Lab	1	**NO EQUIVALANCE**		
5	CSU 305	Computer Organization & Architecture Lab	1	CSU427	Computer Organization & Architecture Lab	1
6	CSU 306	Linux Administration-I Lab	1	**NO EQUIVALANCE**		
7	CSU 401	Numerical Methods & Computer Programming	3	**NO EQUIVALANCE**		
8	CSU 402	Data Structure	4	CSU321	Data structure and Algorithms	3
9	CSU 403	Object Oriented Programming	3	CSU421	Object Oriented Programming	3
10	ITU 402	Data Communication	3	**NO EQUIVALANCE**		
11	CSU404	Data Structure Lab	2	CSU323	Data structure and Algorithms Lab	2
12	CSU405	Object Oriented Programming Lab	1	CSU 426	Object Oriented Programming Lab	2
13	ITU403	Data Communication Lab	1	**NO EQUIVALANCE**		.

BOS Chairman
संगणक विज्ञान व अभियांत्रिकी विभाग
शासकीय अभियांत्रिकी महाविद्यालय

Sr. No.	Course code with Name of course(old)		Credit	Course code with Name of course (new)		Credit
14	CSU406	System Administration – II Lab	1	**NO EQUIVALANCE**		
15	**NO EQUIVALANCE**			ETU331	Analog & Digital Integrated Circuit	3
16	**NO EQUIVALANCE**			CSU324	IT Workshop (Sci Lab/MATLAB	3
17	CSU602 Operating System		3	CSU423	Operating System	3
18	ITU501 Design and Analysis of Algorithms		3	CSU424	Design and Analysis of Algorithms	3
19	**NO EQUIVALANCE**			CSU425	Organizational Behaviour	3
20	CSU608 Operating System Lab		1	CSU428	Operating Systems Lab	2
21	CSU606 Design and Analysis of Algorithm Lab		1	CSU429	Design and Analysis of Algorithm Lab	2

PPShelke
BOS Member secretary

विभाग प्रमुख
संगणक विज्ञान व अभियांत्रिकी विभाग
शासकीय अभियांत्रिकी महाविद्यालय
अमरावती.

Department of Computer Science & Engineering

Equivalence Scheme for *online courses*

Programme Name: - Computer Science & Engineering

Sr. No.	Course code with Name of course (old/new)		Credit	Course code with Name of course (online)		Name of Online platform	Credit
1.	CSU302	Computer Organization & Architecture	3	noc20-cs64	Computer Architecture & Organization	NPTL	
2.	CSU303	Discrete Mathematics & Graph Theory	3	noc20-cs82	Discrete Mathematics	NPTL	
3	CSU402	Data Structure	4	noc20-cs70	Programming, Data structure and Algorithms using Python	NPTL	
4	CSU403	Object Oriented Technology	4	noc20-cs59	Object Oriented Analysis & Design	NPTL	
5	ITU502	Database management System	3	noc20-cs60	Database management System	NPTL	
6	ITU601	Design and Analysis of Algorithm	3	noc20-cs71	Design and Analysis of Algorithms	NPTL	
7	CSU602	Operating System Design	3	noc20-cs75	Introduction to operating systems	NPTL	
8	CSU604	Software Project Management	3	noc20-cs68	Software Engineering	NPTL	

Equivalence B. Tech. Second Year SH Courses A.Y. 2020-21

S.N.	Course in old scheme			Equivalent course in new Scheme		
	Course Code	Course name	No. of Credits	Course Code	Course name	No. of Credits
1	SHU301	Engineering Mathematics- III	03	SHU321A	Differential Equations And Probability	03
2		No Equivalence		SHU322A	Integral Calculus And Probability	03
3	SHU304	Engineering Mathematics- III	03	SHU321B	Transform And Linear Algebra	04
4		No Equivalence		SHU322B	Differential Equation And Transform	04
5	SHU303	Engineering Mathematics- III	03	SHU321C	Transform And Statistical Methods	04
6		No Equivalence		SHU322C	Integral Calculus And Probability	04
7		No Equivalence		SHU323	Introduction To Constitution Of India	00
8		No Equivalence		SHU324	Effective Technical Communication	03
9		No Equivalence		SHU325	Human Values And Ethics	00
10	SHU203	Environmental Studies	03	SHU422	Environmental Studies	00
11		No Equivalence		SHU425	Human Values And Ethics	00
12		No Equivalence		SHU525	Human Values And Ethics	00
13		No Equivalence		SHU725	Human Values And Ethics	00
14	SHU305	General Proficiency- II	2		No Equivalence	
15	SHU401	Engineering Mathematics- IV	3		No Equivalence	
16	SHU402	Engineering Mathematics Lab	2		No Equivalence	
17	SHU403	Engineering Mathematics Lab	2		No Equivalence	

Pulkane

F/ **Head, Mathematics**

P. Tale

Member secretary
BoS Science & Humanities

S.V. Shinde

Chairman
BoS Science & Humanities

ETU331 ANALOG AND DIGITAL INTEGRATED CIRCUIT

Teaching Scheme: 03T **Total: 03** **Credits: 03**
Evaluation Scheme: 30 MSE+ 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objective:

I. Understand basic analog and digital electronics.

II. Learn the properties of semiconductor and operational amplifiers.

III. Understand the concept of combinational and sequential logic and their application.

IV. Understand the basics of Timer 555 and memories.

Basic concept and application of BJT & MOSFET:
Metal Oxide Semiconductor Field-Effect Transistors (MOSFET) and their Applications: MOSFET as an amplifier, small-signal equivalent circuits, single-stage MOSFET amplifier (common-source mode); MOSFET as a switch.

Operational amplifiers: Properties and characteristics study of typical opamp, Performance limitations, linear application of opamps, IC 741 opamp and its application, Feedback: basic concepts of negative feedback; four ideal feedback topologies;

Oscillators: basic principles of sinusoidal oscillation; Example circuits; Types and characteristics of voltage series feedback, current series feedback, current shunt feedback, and voltage shunt feedback. Barkhausen criteria, RC oscillators - Wein Bridge and phase shift, LC oscillators-Hartley, colpitt's, clapp and crystal oscillators. General features of a time base signal, UJT relaxation oscillator.

Multivibrator: Monostable , Astable and Bistable multivibrator.

Introduction and application of Ic 555:
Pin configuration, Basic of 555 timer, block diagram, working principle of IC555 and data sheet and its application, waveform generator, important features of 555 timer, 555 timer as astable multivibrator and monostable multivibrator, 555 timer as oscillator, 555 timer as RAMP generator,

Combination digital circuits:
Standard representation for logic functions, K-map representation, and simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator,

code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization

Sequential Digital Circuits:
A 1-bit memory, the circuit properties of Bi-stable latch, the SR flip flop, J- K, T and D types flip-flops, applications of flip-flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

Memories:
Introduction and classification of ROM, ROM organization, Static and Dynamic RAM, DRAM Refreshing, Representative circuits for cells using BJT and FET's, Timing diagrams of memories, Memory expansion using IC's, Flash memory, CCD, Magnetic Memories.

Course Outcomes:
After completion of the course students will able to-
ETU331.1 Describe the functioning and selection of OP-AMP as per application.

ETU331.2 Design and testing of OP-AMP based circuits.

ETU331.3 Design and implement Combinational and Sequential logic circuits.

ETU331.4 Describe the functioning of memories and their application

Text Books:

1. Electronic Devices and Circuits (2nd edition, 2008), by J. Millman, C. Halkias and Satyabrata jit, Tata McGraw Hill.
2. Sedra A. S. and Smith K. C., Microelectronic Circuits, Oxford University Press (2006).
3. The art of electronics. by Paul Horowitz and Winfield Hill (1998)
4. Logic and Computer Design Fundamentals. Morris Menno (2007)

CSU321 DATA STRUCTURE AND ALGORITHM

Teaching Scheme: 03T **Total: 03** **Credits: 03**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objective:

I. To impart the knowledge of data structures and algorithms.
II. To analyse the algorithm with respect to time and space which will prove the efficiency of algorithm.
III. To assess how the choice of data structures and algorithm design methods impacts the performance of programs
IV. To convert algorithms into efficient programs

Basic of Data Structure and Algorithm: Understanding the concept of Problem Solving, Design of Algorithms and Data Structures. Basic Terminologies: Elementary Data Organizations, Data Structures Operations and Types, Abstract Data Type (ADT),Writing Algorithms, Mathematical Notations and Functions, Algorithmic Notation, Introduction to Searching Algorithms: Linear and Binary Search, Analysis of an Algorithm: Complexity and Rate of Growth, Asymptotic Notations, Time-Space Trade-Off, Dictionaries, Introduction to Sorting Algorithms: Bubble, Selection, Insertion, Quick, Merge, Radix

Note: In this unit all the algorithms are implemented through a basic data structure called Array

Linked List: Introduction to Linked List, Types of Linked List, Representation of Linked List in Memory, Algorithms of several operation on Linked List and there analysis, String Processing: Storing Strings, String Operations, Word/Text Processing, String Pattern Matching Algorithms.

Stack and Queue: Introduction to Stack, Representation of Stack in Memory using Array and Linked List, Arithmetic Expression, Polish Notation, Application of Stack, Tower of Hanoi Problem, Recursion, Introduction to Queue, Representation of Queue in Memory using Array and Linked List, Types of Queues, Application of Queues.

Tree: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree, Red Black Tree, Tree operations on each of the trees and their algorithms with complexity analysis, Applications of Binary Trees, Introduction to B Tree (Disk Based Data Structure), Heap Sort.

Graph: Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis, Minimum Spanning Tree Algorithms (Kruskal and Prim), Single Source Shortest Path (Dijkstra's) and Shortest Path Algorithms (Warshalls), Hashing in Data Structures.

Text Book

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al. 2nd edition Computer Science Press

Course Outcomes

CSU321.1 Understand basic terminology of data organization with the available data structures and their behaviour.

CSU321.2 Analysing and understanding, the implementation of data structures on computer memory so that, one must able to choose appropriate data structure for a given specific problem.

CSU321.3 After implementation a student must be capable of doing quantitative analysis of algorithm.

CSU321.4 Demonstrate ability to devise an efficient algorithm and transform into efficient code.

CSU322 DISCRETE MATHEMATICS

Teaching Scheme: 03T **Total: 03** **Credits: 03**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objective:

I. Learn basic terminology, formal logic, proofs, sets, relations, functions, recursion
II. Use formal logic proof and logical reasoning to solve problems
III. Relate the ideas of mathematical induction to recursion and recursively defined structures
IV. Learning graphs, trees and related algorithms ,Relate, interpret and apply these concepts to various areas of computer science

Sets, Relation and Function: Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cartesian Products, Image of a Set, Operations and Laws of Sets, Binary Relation, Partial Ordering Relation, Equivalence Relation, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Cantor's diagonal argument and the Power Set theorem, Schroeder-Bernstein theorem.

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic. Basic counting techniques- inclusion and exclusion, pigeon-hole principle, permutation and combination.

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. **Proof Techniques:** Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

Text Books :

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co. Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

Reference Books:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw - Hill

Course Outcomes

CSU322.1 For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives

CSU322.2 For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference

CSU322.3 Students would be able to classify its algebraic structure for a given a mathematical problem.

CSU322.4 Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra. To develop the given problem as graph networks and solve with techniques of graph theory.

SHU321B TRANSFORM AND LINEAR ALGEBRA

Teaching Scheme: 03TH+01TU **Total: 04** **Credits: 04**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objective:

I. To study about the mathematical tool like z-transform and its properties.
II. To introduce the concept of linear algebra which is important in computer software.
III. To introduce the concept of orthogonally and inner product.
IV. To familiarize the students with basic concepts of probability and conditional probability, continuous and discrete probability distributions.

Z-transform : Definition, Region of Convergence, Properties of Z-transform, Inverse Z-transform: Partial fraction method, Residue method; Convolution Theorem, Application to solution of difference equations with constant coefficients.

Vector spaces: Vector spaces and subspaces, null spaces, column spaces and linear transformations, Linear dependence and independence, bases, coordinate systems, dimensions of vector space.

Random variables and Probability Distributions:

Basic concepts of probability and its properties; Conditional probability and independent events; Random variables, discrete and continuous random variables, distribution functions, Mean and variance of Binomial, Poisson and Normal distributions.

Basic Statistics: (10 lectures)

Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression

Text Books:

1. A text book of Engineering Mathematics, N.P. Bali and Manish Goyal, Laxmi Publications, Reprint, 2010.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 44th edition, 2020.
3. Engineering Mathematics (for semester III), Veerarajan T., Tata McGraw-Hill, New Delhi, 2010.

Reference Books

1. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
2. Introduction to Probability Theory, P. G. Hoel, S. C. Port and C. J. Stone, Universal Book Stall, 2003 (Reprint).
3. A First Course in Probability, S. Ross, 6th Ed., Pearson Education India, 2002.
4. An Introduction to Probability Theory and its Applications, W. Feller, Vol. 1, 3rd Ed., Wiley, 1968.

Course Outcomes

After successful completion of the course the students will be able to

SHU321B.1 use the concept of probability and random variables and various discrete and continuous probability distributions in practical problems.

SHU321B.2 Apply the tool of transform in solving engineering problems.

SHU321B.3 Analyse the problems related to engineering with the knowledge of linear algebra.

SHU322B DIFFERENTIAL EQUATION AND TRANSFORM

Teaching Scheme: 03TH+01TU **Total: 04** **Credits: 04**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objective:

I. To study about the mathematical tool like z-transform and its properties.
II. To introduce the concept of linear algebra which is important in computer software.
III. To introduce the concept of orthogonally and inner product.
IV. To familiarize the students with basic concepts of probability and conditional probability.
V. To study continuous and discrete probability distributions.

Ordinary differential equations of higher orders: (08hours)

Linear differential equation with constant coefficient, complementary function, particular integral, complete solution; method of variation of parameters.

Integral Calculus: (08 hours)
Beta and Gamma functions and their properties; Evaluation of double integrals (Cartesian & polar), change of order of integration.

Z-transform: (08hrs)

Definition, Region of Convergence, Properties of Z-transform, Inverse Z-transform: Partial fraction **method, Residue method; Convolution** Theorem, Application to solution of difference equations with constant coefficients.

Vector spaces: (08hrs)
Vector spaces and subspaces, null spaces, column spaces and linear transformations, Linear dependence and independence, bases, coordinate systems, dimensions of vector Space.

Random variables and Probability Distributions: (08hrs)
Basic concepts of probability and its properties; Conditional probability and independent events; Random variables, discrete and continuous random variables, distribution functions, Binomial, Poisson and Normal distributions.

Course Outcomes

After successful completion of the course the students will be able to

SHU322B.1 Use the concept of probability and random variables and various discrete and continuous probability distributions in practical problems.

SHU322B.2 Apply the tool of transform in solving engineering problems.

SHU322B.3 Analyse the problems related to engineering with the knowledge of linear algebra.

Text Books:

4. A text book of Engineering Mathematics, N.P. Bali and Manish Goyal,Laxmi Publications, Reprint,2010.
5. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 44th edition, 2020.
6. Engineering Mathematics (for semester III), Veerarajan T., Tata McGraw-Hill, New Delhi,2010.

Reference Books:

5. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
6. Introduction to Probability Theory,P. G. Hoel, S. C. Port and C. J. Stone, Universal Book Stall, 2003(Reprint).
7. A First Course in Probability, S. Ross, 6th Ed., Pearson Education India, 2002.
8. An Introduction to Probability Theory and its Applications. Feller, Vol. 1, 3rd Ed., Wiley,1968.

SHU323 INTRODUCTION TO CONSTITUTION OF INDIA

Teaching Scheme: 01 **Total: 01** **Credits: 00**
Evaluation Scheme: 20 TA + 30 ESE **Total Marks: 50**
ESE Duration: 1Hrs. 30 min.

Course Objectives:

I. To acquaint students about constitution of India, Fundamental rights, fundamental duties.
II. To understand electoral process and role of central, state and local government and its administration.
III. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Introduction to Constitution of India
Salient features of the Constitution of India, Preamble of the Constitution, fundamental rights and fundamental duties, Directive Principles of State Policy and relevance of directive principles. Parliamentary Form of Government in India- President, Vice-President, Prime Minister along with council of Minister, Parliament, Supreme court, Electoral process in India. Amendment Procedure.

State executives Governor, chief minister, state legislature, high courts of state

Role and functions of local self-government- Municipalities in India, with special reference to 73rd amendment. Panchayat Raj in India with special reference to 74th amendment.

Text Books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

Course Outcomes:

On the successful completion of this course, Students shall be able to-

SHU322.1 Understand and remember the knowledge of basic information about Indian Constitution.

SHU322.2 Apply the knowledge of fundamental rights and fundamental duties.

SHU324 HUMANITIES (EFFECTIVE TECHNICAL COMMUNICATION)

Teaching Scheme: 03T **Total: 03** **Credits: 03**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objectives

I. **To understand the basics of Technical writing and editing**
II. **To understand and analyse the self-development**

Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.

Technical Writing, Grammar and Editing- Technical writing process, forms of discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Hunan factors, Managing technical communication projects, time estimation, Single sourcing, Localization.

Self-Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity

Communication and Technical Writing- Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids, Personality Development. Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.

Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity.

Text Books:

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)

Course Outcome

SHU323.1. Students will able to speak and communicate English

ETU332 ANALOG & DIGITAL CIRCUITS LAB

Teaching Scheme: 04P **Total: 04** **Credits: 02**
Evaluation Scheme: 25 INT+25 EXT **Total Marks: 50**
ESE Duration: 2Hrs. 30 min.

Course Objective:

I. Understand basic analog and digital electronics.

II. Learn the properties of semiconductor and operational amplifiers.

III. Understand the concept of combinational and sequential logic and their application.

IV. Understand the basics of Timer 555 and memories.

Project-1. Oscillator design, & amplifier design,

Project-2. Sequential design & combinational design

Project-3. Memory design

Project-4. Minor project on Design of LED lighting system for household application; street lighting system; soft starting of DC machine.

Course Outcomes:
After completion of the course students will able to-
ETU332.1 Describe the functioning and selection of OP-AMP as per application.

ETU332.2 Design and testing of OP-AMP based circuits.

ETU332.3 Design and implement Combinational and Sequential logic circuits.

ETU332.4 Describe the functioning of memories and their application

CSU323 DATA STRUCTURE & ALGORITHM LAB

Teaching Scheme: 04P **Total: 04** **Credits: 02**
Evaluation Scheme: 25 INT + 25 EXT **Total Marks: 50**
ESE Duration: 2Hrs. 30 min.

Course Objective:

I. To impart the knowledge of data structures and algorithms.

II. To analyse the algorithm with respect to time and space which will prove the efficiency of algorithm.

III. To assess how the choice of data structures and algorithm design methods impacts the performance of programs

IV. To convert algorithms into efficient programs

Project 1 will be comprised of static sized array data structure involving sorting, searching, ADT such as dictionaries.

Project 2 will be comprised of linked list different types and string pattern matching algorithms

Project 3 will comprise of applications of stack and queue

Project 4 will comprise of Graph algorithm and its applications

Project 5 will comprise of Tree algorithms and its application

Project 6 will be a major application comprises most of the required contents of syllabus.

Note: Project 1 to 5 can be completed individually or group of two students and Project 6 containing at least 4 different modules which can be completed in the group of 3 to 4 students

Course Outcomes

CSU323.1 Understand basic terminology of data organization with the available data structures and their behaviour.
CSU323.2 Analysing and understanding, the implementation of data structures on computer memory so that, one must able to choose appropriate data structure for a given specific problem.
CSU323.3 After implementation a student must be capable of doing quantitative analysis of algorithm.
CSU323.4 Demonstrate ability to devise an efficient algorithm and transform into efficient code.

CSU324 IT WORKSHOP (Sci Lab/MATLAB)

Teaching Scheme: 01 Tut + 04P **Total: 05** **Credits: 03**
Evaluation Scheme: 25 INT + 25 EXT **Total Marks: 50**
ESE Duration: 2Hrs. 30 min.

Course Objective:

I. To understand the basics of matlab
II. To Analyse the different functions of Matlab
III. To analyse different data visualization in matlab

Any three Based on given guidelines

Project 1- Digital Signal Processing using Matlab

Project 2- Identifying Vehicle Number plates using Matlab

Project 3- Automatic Certificate Generation using Matlab

Project-4 JPEG Compression using Matlab

Project-5 Portable Media Player

Project -6 Design a GUI that show the export of students data such as students passed and failed in all subject, placement of students in various department visualize that using Matlab

Course Outcome

CSU324.1 students will able to understand the basic of matlab and design the project using matlab

CSU 421 OBJECT ORIENTED PROGRAMMING

Teaching Scheme: 03T + 1TU **Total: 04** **Credits: 04**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objectives

I. To Understand and demonstrate the concepts of object-oriented design, polymorphism, information hiding, and inheritance
II. Take a problem and develop the structures to represent objects and the algorithms to perform operations.
III. Use class library to develop projects involving several several C++ files and class libraries.
IV. To understand the concept of C#

Classes and Abstract data types and their specification. How to implement an ADT. Concrete state space, concrete invariant, abstraction **function.** Implementing operations, Features of object-

oriented programming. Encapsulation, overloading, object identity, polymorphism, Friend Function,
Inheritance: Types of Inheritance
Polymorphism: Run time polymorphism, Compile time polymorphism, virtual function
Memory management. File Processing
Model-view-controller pattern. Commands as methods and as objects. Implementing OO language features.
Generic types and collections: templates, exceptions, container
Design patterns. Introduction and classification. Singleton Pattern.
Introduction to C#

Text-Book :

1. Object-Oriented Programming in C++ by Robert Lafore , 4th Edition, Pearson Education ,2002.

2. C++ Programming Language by Bjarne Stroustrup,3rd Edition, Addison-Wesley, 2002.

References Book:

1. Complete Reference C++ by Herbert Schildt ,4th Edition,Tata McGrawHill,2004.

COURSE OUTCOMES
On completion of the course the student should be able to

CSU421.1	Understand the relative merits of C++ as an object oriented programming language
CSU421.2	to produce object-oriented software using C++
CSU421.3	Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
CSU421.4	Understand advanced features of C++ specifically stream I/O, templates and operator overloading

CSU422 COMPUTER ORGANIZATION AND ARCHITECTURE

Teaching Scheme: 03T **Total: 03** **Credits: 03**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objective

I. To understand the basic of computer peripherals which computers work
II. To impart the knowledge on micro programming.
III. To analyse how I/O devices are accessed and its principles.
IV. To understand the concept of pipelining techniques.

Introduction: Computer components and its functions, Processing unit, bus architecture, execution of a complete instruction, sequencing of control signals, Computer peripherals, I/O devices such as video terminals, video displays, graphic input devices, printers, magnetic disk, magnetic tape, CDROM systems, Threading and Multithreading .

Addressing modes, their application in implementation of HLL constructs and data structures, instruction formats, expanding op-code method, Micro programmed control, microinstruction format, microinstruction sequencing, bit slice concept.

Arithmetic, number representations and their operations, design of fast address, signed multiplication, Booth's Algorithm, bit-pair recording, division , floating point numbers and operations, guard bits and rounding.

Main memory organization, various technologies used in memory design, higher order memory design, multi module memories and interleaving, cache memory, concept of cache memory, mapping functions, replacement algorithms.

External devices: I/O modules, Programmed I/O, Interrupt I/O, I/O channels
Input-output organization, I/O mapped I/O and memory mapped I/O, Direct Memory Access (DMA), interrupts and interrupt handling mechanisms, device identification, vectored interrupts, interrupt nesting, I/O interfaces, synchronous vs. asynchronous data transfer, I/O channels.

RISC philosophy, pipelining, basic concepts in pipelining, delayed branch, branch prediction, data dependency, influence of pipelining on instruction set design, multiple execution units, performance considerations, basic concepts in parallel processing & classification of parallel architectures. Introduction of Superscalar and vector superscalar.

TextBooks:

1. Computer Organization & Architecture By Stalling W, 6th Edition , Pearson Education 2003

References:

1. Computer Organization & Design, the Hardware/ Software Interface, Patterson D. A, Hennessy J. L.
2. Computer Organization , Hamacher, Carl V. et al, McGraw Hill
3. Structured Computer Organization , Tanenbaum A.S, Prentice Hall of India Ltd

Course Outcomes:

CSU422.1 Students will learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design.

CSU422.2 Students will be able to identify where, when and how enhancements of computer performance can be accomplished.

CSU422.3 Students will learn the sufficient background necessary to read more advance texts as well as journal articles on the field.

CSU422.4 Student will see how to use concepts of computer organization in real-life settings using various PC performance improvements, more recent applications of computer organization in advanced digital systems

CSU423 –OPERATING SYSTEM

Teaching Scheme: 03T **Total: 03** **Credits: 03**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objectives

I. To learn Fundamental, the mechanisms of OS to handle processes, threads and their communication
II. To learn the mechanisms involved in memory management in contemporary OS
III. To gain knowledge on operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
IV. To know the aspects of concurrency management control of asynchronous processes, deadlocks, memory management, processor and disk scheduling and file system organization.

Introduction: Concept of Operating Systems, Goals of Operating System, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Overview of Operating system, multiprogramming, time sharing, real time and distributed operating systems, Concept of Virtual Machine.

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching **Thread:** Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads, **Process Scheduling:** Foundation and Scheduling objectives, Types of Schedulers, Scheduling Criteria, Scheduling algorithms. **Inter-process Communication and Process Synchronization:** Critical Section, Race Conditions, Mutual Exclusion, Semaphores, Classical IPC Problems

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation, fragmentation and Paging, **Virtual Memory**: Hardware and control structures, Page fault, Page Replacement algorithms.

File Management: Access methods, File operation, Directory structure, File System structure, Allocation methods, File Protection.

Case study: UNIX Operating System

Text Books:

1. Operating System concepts and principles, A. Silberschatz & P.B. Galvin, 8th Edition Wiley India, 2009.

2. Modern Operating System ,Tanenbaum, 3rd Edition, Prentice Hall India, ,2003.

Reference Books:

1. Operating Systems: Internals and design Principle, W. Stallings, 6thEdition, Pearson Education(LPE) , 2009.
2. Design of Linux Operating system, M.J. Bach, 3rd Edition, Prentice Hall, 2004.
3. www.nptel.iitm.ac.in
4. www.nptel.iitkgp.ac.in

Course Outcome

Students will able to

CSU423.1 lean, Describe, contrast and compare differing structures for operating systems

CSU423.2 Understand the process management policies and scheduling of processes by CPU

CSU423.3 Evaluate the requirement for Process synchronization, deadlock and memory management.

CSU423.4 Interpret various OS functions used in Linux

CSU424 – DESIGN AND ANALYSIS OF ALGORITHMS

Teaching Scheme: 03T **Total: 03** **Credits: 03**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objectives

I. To write rigorous correctness proofs for algorithms designed using different algorithm design techniques and understand there efficiency using different analysis methods.
II. Synthesize efficient algorithms in common engineering design situations.
III. To emphasize the relationship between algorithms and programming
IV. To demonstrate familiarity with NP-Complete problems

Algorithms: Algorithms as Technology, Algorithm Design Techniques, Asymptotic notations of analysis of algorithms, analysing control structures, complexity, worst case and average case analysis. **Mathematical foundations**: summation of arithmetic and geometric series, bounding summations using integration, recurrence relations.
Sorting Algorithms : Sorting Algorithms and there analysis using incremental approach such as insertion sort, bubble sort, selection sort, sorting in linear time.
Greedy method : basic strategy, application to job sequencing with deadlines problem, Elements of Greedy Methods.
Divide and conquer : Divide and conquer basic strategy, Recurrences, binary search, quick sort, merge sort. Maximum sub array and matrix multiplication problem.
Dynamic programming: basic strategy, Rod Cutting Problem, Elements of Dynamic Programming.

Graph and Tree Algorithms: Elementary Graph Algorithms, DFS, BFS, minimum cost spanning trees, single source shortest path, Network Flow, Topological Sorting
Backtracking basic strategy, 8- Queen's problem, graph colouring, Hamiltonian cycles etc.
Advance Topics: Basic Concepts of NP-hard and NP-complete problems, non-deterministic algorithms, Randomization Algorithms and Approximation Algorithms, RSA Cryptography Algorithm, Compression.

Course Outcomes

CSU424.1 Students will be Analyze the asymptotic performance of algorithms.

CSU424.2 Students will be understood the rigorous correctness proofs for algorithms.

CSU424.3 Students will be Demonstrate a familiarity with major algorithms and data structures.

CSU424.4 Students will be Apply important algorithmic design paradigms and methods of analysis.

Text Books:
1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al. Computer Science Press

Reference Books
1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
3. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.

CSU425 -MANAGEMENT (ORGANIZATIONAL BEHAVIOUR)

Teaching Scheme: 03T **Total: 03** **Credits: 03**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
ESE Duration: 2Hrs. 30 min.

Course Objective

I. To give a basic perspective of Management theories and Practices.
II. To study other functional areas of management and to provide the students with the conceptual framework and the theories underlying Organizational Behaviour.

Role of Management – Concept – Significance – Functions – principles of Management - Patterns of Management: Scientific – Behavioral – Systems – Contingency

Decision Making & Controlling – Process – Techniques. Planning – Process – Problems — Making It Effective. Controlling - System of Controlling – Controlling Techniques – Making Controlling Effective

Organizational Behavior – Introduction to OB – Organizing Process – Departmentation Types – Making Organizing Effective - Understanding Individual Behavior – Perception – Learning – Personality Types – Johor window- Transactional Analysis

Group Dynamics & Motivation – Benefits of Groups – Types of Groups – Group Formation and Development, Motivation – Concept of Motivation - Motivational Theories of Maslow, Herzberg, David Mc Clelland, and Porter and Lawler

Leadership and Organizational Culture and Climate: Leadership – Traits Theory – Managerial Grid – Transactional Vs Transformational Leadership – Qualities of good Leader, Change Management – Conflict Management

TextBook:

1. Organizational Behavior, Stephen P. Robbins, Pearson Education.
2. Management and Organizational behavior, Pierce Gardner, Cengage.

References:

1. Organizational Behavior , Mishra .M.N ,Vikas

2. Management and Organizational Behaviour, Subbarao P, Himalaya Publishing House. Organizational Behaviour, S.S.Khanka, S.Chand

Course Outcome

CSU425.1 Students will learn the principles of Management in management system.

CSU425.2 Students will be able to Organizational Behavior.

CSU425.3 Students will learn the Concept of Motivation.

CSU425.4 Students will learn the Understanding Individual Behavior, Qualities of good Leader, Change Management – Conflict Management

SHU422 ENVIROMENTAL ~~SCIENCES~~ STUDIES

Teaching Scheme: 01 **Total: 01** **Credits: 01**
Evaluation Scheme: 20 TA + 30 ESE **Total Marks: 50**
ESE Duration: 1Hrs. 30 min.

Course Objective

I. To critically evaluate the science and policy ramifications of diverse energy portfolios on air and water quality, climate, weapons proliferation and societal stability;
II. To apply quantitative reasoning skills to environmental problems including basic calculations related to energy, water, and air issues and the use of statistical methods in data analysis and argumentation.

The Multidisciplinary Nature of Environmental Studies:- Definition, scope and importance, Need for public awareness.

Social issues and Environment:- From Unsustainable to sustainable development, urban problems related to energy, Water conservation, rainwater harvesting, and watershed management Resettlement and rehabilitation of people, problems.
Environmental ethics:- Issues and possible solution, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation. Consumerism and Waste products, Environment protection act, Air (prevention & control) act, Water (prevention and control) act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation.
Human population and environment:- Environment and human health, Human rights, Role of Information Technology in Environment and human health, Public awareness.

Natural Recourses:- Conventional energy resources: definition, classification, composition, energy content types: coal, petroleum, natural gases, hydrogeothermal, nuclear, environmental implication of energy uses. Non conventional energy resources: solar energy, wind energy, tidal energy, geothermal energy, hydropowers and biogas.

Ecosystem and Biodiversity:-Concept of ecosystem, Structure and function of ecosystem, Producer, consumer, decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of following ecosystem: Forest ecosystem, Grass land ecosystem, Desert ecosystem Aquatic ecosystem (Rivers and ocean).
Introduction- definition: genetics, species and ecosystem, diversity. Biogeographically classification of India. Conservation of biodiversity- In-situ and Ex-situ conservation of Biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local level. India as mega diversity nation. Hot spot of biodiversity.

Environmental Pollution:- Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste, Management, Causes effects and control measures, Role of individual in prevention of pollution, Hazardous waste management, Biomedical waste management, Disaster management: floods, earthquake, cyclone and landslides.

Text Book

1. The Biodiversity of India, Bharucha Erach ,Marin Publishing Pvt. Ltd., Ahmedabad
2) Brunner R.C., 1989,Hazardous Waste Incineration, McGraw Hill Inc.
3) Marine pollution, Clark R.S., Clanderson Press Oxford (TB)
4) Environmental Chemistry, De A.K. Wiley Estern Lmt.
5) Environmental Chemistry, Sharma B.K., 2001 Goel Publ., House, Meerat.
6) Environmental Management, Wagner K.D., 1998, W.B. Saunders Co., Philadel phia, USA
7) Environmental Studies, Benny Joseph, 1st edition,2005,Tata Mcgraw-Hill Publ.

Course outcome
After studying the course, the students will be able to:

SHU421.1 Convey the Environmental awareness among peoples.

SHU421.2 Apply Conservation of various natural resources and environmental factors.

SHU421.3 Aware about social and environmental issues.

CSU 426 OBJECT ORIENTED PROGRAMMING LAB

Teaching Scheme: 04T **Total: 04** **Credits: 02**
Evaluation Scheme: 25 INT + 25 EXT **Total Marks: 50**
ESE Duration: 2Hrs. 30 min.

Course Objectives

I. To Understand and demonstrate the concepts of object-oriented design, polymorphism, information hiding, and inheritance
II. Take a problem and develop the structures to represent objects and the algorithms to perform operations.
III. Use class library to develop projects involving several several C++ files and class libraries.
IV. To understand the concept of C#

Project-1. To developed Student Information System

Project-2. To Developed Employee information system

Project-3. To Developed Banking System

COURSE OUTCOMES
On completion of the course the student should be able to

CSU426.1 Understand the relative merits of C++ as an object oriented programming language
CSU426.2 to produce object-oriented software using C++

CSU426.3 Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism

CSU426.4 Understand advanced features of C++ specifically stream I/O, templates and operator overloading

CSU 427 COMPUTER ARCHITECTURE LAB

Teaching Scheme: 04T **Total: 04** **Credits: 02**
Evaluation Scheme: 25 INT + 25 EXT **Total Marks: 50**
ESE Duration: 2Hrs. 30 min.

Course Objectives

I. To understand the basic of computer peripherals which computers work
II. To impart the knowledge on micro programming.
III. To analyse how I/O devices are accessed and its principles.
IV. To understand the concept of pipelining techniques.

Project :1 Designing I/O devices such as video terminals, video displays.

Project :3 Designing and organizing main memory

Project :3 Designing and simulations of simple processors.

Project :4 Design ALU using Logisim.

Course Outcomes :

CSU427.1 Students will learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design.

CSU427.2 Students will be able to identify where, when and how enhancements of computer performance can be accomplished.

CSU427.3 Students will learn the sufficient background necessary to read more advance texts as well as journal articles on the field.

CSU427.4 Student will see how to use concepts of computer organization in real-life settings using various PC performance improvements, more recent applications of computer organization in advanced digital systems

CSU 428 OPERATING SYSTEM LAB

Teaching Scheme: 04T **Total: 04** **Credits: 02**
Evaluation Scheme: 25 INT + 25 EXT **Total Marks: 50**
ESE Duration: 2Hrs. 30 min.

Course Objectives

I. To learn Fundamental, the mechanisms of OS to handle processes, threads and their communication
II. To learn the mechanisms involved in memory management in contemporary OS
III. To gain knowledge on operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
IV. To know the aspects of concurrency management control of asynchronous processes, deadlocks, memory management, processor and disk scheduling and file system organization.

Project -1

Create a simulator for scheduling a given set of processes in user space only. The simulator should read from a configuration file a set of parameters for each process: Length of time for which process will execute, priority of the process and the preferred scheduling policy - FIFO or Round Robin, the time at which the process executes and if it is a CPU intensive process _or an I/O intensive process. Apart from this read the quantum of time given to each process and the number of priority levels for scheduling the process. Now simulate a scheduling algorithm which uses FIFO/Round Robin with priority based scheduling. At the end of the run print the following quantities for each process: a. Number of times the process was scheduled. b. A timeline for the process containing the state transitions - Ready, waiting, Running and Terminated and the timestamp for each transition. c. Time taken to complete the process. d. Number of times the process waited for I/O. e. The priority of the process and preferred scheduling algorithm. After printing the above values print the average time of completion for each process. From the calculated parameters determine which scheduling algorithm was better for CPU intensive and I/O intensive processes. Suggest ways in which the scheduling algorithm can be improved and why?

Project -2

Create two processes which communicate using a shared memory segment. The first process finds out the list of all processes running on the system with their name, process id, number of files opened and total time running and creates a linked list containing this data about every process running in the shared memory. The second process reads this linked list and formats it in HTML and saves it in a file. This is done by the processes every half an hour. (Hint: Use jproc file system on Linux to find out process information.)

Project -3

Implement Bankers algorithm for N customer.

Course Outcome

Students will able to

CSU428.1 lean, Describe, contrast and compare differing structures for operating systems

CSU428.2 Understand the process management policies and scheduling of processes by CPU

CSU428.3 Evaluate the requirement for Process synchronization, deadlock and memory management.

CSU428.4 Interpret various OS functions used in Linux

CSU 429 DESIGN AND ANALYSIS OF ALGORITHMS LAB

Teaching Scheme: 04T **Total: 04** **Credits: 02**
Evaluation Scheme: 25 INT + 25 EXT **Total Marks: 50**
ESE Duration: 2Hrs. 30 min.

Course Objectives

I. To write rigorous correctness proofs for algorithms designed using different algorithm design techniques and understand there efficiency using different analysis methods.
II. Synthesize efficient algorithms in common engineering design situations.
III. To emphasize the relationship between algorithms and programming
IV. To demonstrate familiarity with NP-Complete problems

Project 1 will be comprised of solving any particular problem with incremental approach and Divide & conquer design technique

Project 2 will be develop application based on Dynamic Programming design technique

Project 3 will be develop application based on Greedy Method design technique

Project 4 will be develop application based on Back Tracking design technique

Project 5 will be a major application comprises most of the required contents of syllabus.

Note: Project 1 to 4 can be completed individually or group of two students and Project 5 containing at least 4 different modules which can be completed in the group of 3 to 4 students

Course Outcomes

CSU429.1 Students will be Analyze the asymptotic performance of algorithms.

CSU429.2 Students will be understood the rigorous correctness proofs for algorithms.

CSU429.3 Students will be Demonstrate a familiarity with major algorithms and data structures.

CSU429.4 Students will be Apply important algorithmic design paradigms and methods of analysis.