

Annasaheb Dange College of Engineering and Technology
Ashta, Dist: Sangli-416301 (An Autonomous Institute Affiliated to Shivaji University,
Kolhapur)

Department of Computer Science and Engineering

Vision & Mission of Institute

Vision: To be a Leader in preparing professionally competent engineers

Mission: We, at Annasaheb Dange College of Engineering and Technology, Ashta, are committed to achieve our vision by

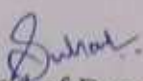
- Imparting effective outcome based education.
- Preparing students through skill oriented courses to excel in their profession with ethical values.
- Promoting research to benefit the society.
- Strengthening relationship with all stakeholders.

Vision & Mission of Department

Vision: To be a leader at serving society by producing professionally competent Computer Engineers.

Mission: We at department of Computer Science and Engineering are committed to achieve our vision by,

- Imparting academic excellence through outcome-based education.
- Transforming students through skill oriented courses with ethical values.
- Grooming students for employment, higher studies and entrepreneurial ventures.
- Strengthening relationship with stakeholders for continuous development.


Head of Department

Annasaheb Dange College of Engineering and Technology

Ashta, Dist: Sangli-416301 (An Autonomous Institute Affiliated to Shivaji University,
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Department of Computer Science and Engineering

Program Educational Objectives (PEOs)

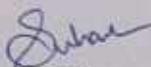
Graduates of Computer Science and Engineering possess:

PEO 1: Knowledge of Computer Science that will act as a foundation for solving real life problems with the help of team work, critical thinking and effective communication.

PEO 2: Ability to solve hardware and software engineering problems by their knowledge in core computer science and allied engineering.

PEO 3: Awareness of environmental and societal issues in computer science and engineering while they get engaged into employment, higher studies or entrepreneurial ventures.

PEO 4: Ability to adapt to changing environment by making use of contemporary technologies and tools.


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Department of Computer Science and Engineering

Program Outcomes (POs)

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

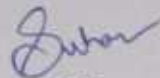
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Department of Computer Science and Engineering

Program Specific Outcomes (PSOs)

PSO 1	An ability to adapt to latest trends in software engineering practices and strategies in real-time software development lifecycle using open-source programming environment or commercial environment.
PSO 2	An ability to get acquainted with contemporary trends in industrial / research areas and thereby provide solutions to real life problems, by specifically using knowledge and skills in the areas of Data Analytics, Machine Learning, Internet of Things, Cloud Computing and Security.



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Curriculum Structure and Syllabus

**S.Y. B. Tech.
COMPUTER SCIENCE AND ENGINEERING**

SEM III & SEM IV

(Academic Year 2020-21)

Teaching and Evaluation Scheme
B. Tech: III Semester

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory Marks		Practical Marks	
							Max.	Min. for Passing	Max.	Min. for Passing
1CSBS201	Discrete Mathematics	3	1	0	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC202	Data Structures	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC203	Computer Networks	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC204	Processor Architecture	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC205	Software Engineering	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC251	Data Structures Laboratory	0	0	2	1	ISE	--	50	20	
1CSPC252	Computer Networks Laboratory	0	0	2	1	ESE	POE	50	20	
						ISE	--	50	20	
1CSPC253	Processor Architecture Laboratory	0	0	2	1	ESE	POE	50	20	
						ISE	--	50	20	
1CSPC254	Programming Laboratory- I	2	0	2	3	ESE	POE	50	20	
						ISE	--	50	20	
Total		17	1	8	22		500		350	
Total Contact Hours/ Week: 26 Hrs										

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	-	4	-	18	-	-	-
Cumulative Sum	3	20	19	21	-	-	-

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Teaching and Evaluation Scheme
B. Tech: IV Semester

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory Marks		Practical Marks	
							Max.	Min. for Passing	Max.	Min. for Passing
1CSBS206	Fuzzy Set Systems and Operation Research	3	1	0	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC207	Theory of Computation	3	1	0	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC208	Operating Systems	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC209	Database Engineering	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC210	Computer Architecture	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC255	Operating Systems Laboratory	0	0	2	1	ISE	--	50	20	
						ESE	POE	50	20	
1CSPC256	Database Engineering Laboratory	0	0	2	1	ISE	--	50	20	
						ESE	POE	50	20	
1CSPC257	Programming Laboratory- II	2	0	4	4	ISE	--	50	20	
						ESE	POE	50	20	
1CSMC211	Environmental Studies	2	0	0	-	ISE	Grade			
Total		19	2	8	23		500		300	
Total Contact Hours/ Week: 29Hrs										

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	-	4	-	19	-	-	-
Cumulative Sum	3	24	19	40	-	-	-

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Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	B. Tech., Sem. III
Course Code and Course Title	1CSBS201- Discrete Mathematics
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/1
Credits	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSBS201_1	Define and reason about fundamental mathematical concepts and terminology. (K1)
1CSBS201_2	Explain the notion of mathematical thinking, concepts and proofs. (K2)
1CSBS201_3	Apply appropriate formulas to calculate permutations and combinations. (K3)
1CSBS201_4	Apply mathematical concepts, equivalence formulas and laws to solve the problems.(K3)
1CSBS201_5	Proficiently use knowledge in Discrete Mathematics to solve and demonstrate the problem. (S3)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Permutations, Combinations and Discrete Probability: Permutations and Combinations: rule of sum and product, Permutations, Combinations, Discrete Probability, Conditional Probability, Bayes' Theorem	05 Hrs.
Unit 2	Mathematical logic: Introduction, statements and notations, connectives – negation, Conjunction, disjunction, conditional, bi-conditional, Statement formulas and truth tables, well formed formulas, Tautologies, Equivalence of formulas, Dualitylaw,	08 Hrs.


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	Tautological implications, functionally complete sets of connectives, other connectives, Normal and principle normal forms, completely parenthesized infix and polish notations	
Unit 3	Set theory: Basic concepts of set theory, types of operations on sets, ordered pairs, Cartesian Product, representation of discrete structures, relation, properties of binary relations, matrix and graph representation, partition and covering of set, equivalence relation, composition, POSET and Hasse diagram, Function – types, composition of functions, Inverse function.	08 Hrs.
Unit 4	Algebraic systems: Semi groups and Monoids, properties and examples, Groups: Definition and examples, subgroups and homomorphism.	06 Hrs.
Unit 5	Lattices and Boolean algebra: Lattice as POSETs, definition, examples and properties, Lattice as algebraic systems, Special lattices, Boolean algebra definition and examples, Boolean functions, representation and minimization of Boolean functions.	08 Hrs.
Unit 6	Graph theory: Basic concepts of graph theory, Storage representation and manipulation of Graphs, PERT and related techniques.	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Discrete Mathematical Structures with application to Computer Science (For Unit 2-6)	J. P. Tremblay & R. Manohar	Tata MGH International	-	2007
2	Elements of Discrete Mathematics (For Unit 1)	C. L. Liu and D. P. Mohapatra	SiE Edition, TataMcGraw-Hill	4 th	2013
3	Theory of Computation	Sushilkumar Azad	DhanpatRai and Co.	2 nd	2005
4	Discrete mathematical Structures	Bernard kolman, Robert Busby, S. C. Ross and NadeemurRehman	Person Education	2 nd	2009


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Discrete Mathematics and its Applications	Kenneth H. Rosen (AT&T Bell Labs) (mhhe.com/rosen)	Tata McGraw Hill	7 th	2012
2	Discrete Mathematics, Schaum's outlines.	Semyour Lipschutz, Marc Lipson	Tata McGraw Hill	3 rd	2012
3	Discrete Mathematical Structures	Bernard Kolman, Robert Busby, S.C. Ross	PHI Learning Pvt Ltd	6 th	2009
4	Foundation of Discrete Mathematics	K. D. Joshi	New Age International Ltd	5 th	2003


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Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	S Y B. Tech Sem III
Course Code & Course Title	1CSPC202 Data Structures
Prerequisite/s	1CSES156-Computer Programming
Teaching Scheme (Lecture/Practical/Tutorial/Drawing)	03/00/00/00
Total Contact Hours: Theory/Practical/Tutorial/Drawing	42/00/00/00 Hours
Credits	03
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs) : The students will be able to:

1CSPC202_1	Describe fundamentals in data structures. (K2)
1CSPC202_2	Explain the fundamental concepts of structuring, managing and organizing the data using linear data structures with ADTs. (K2)
1CSPC202_3	Apply appropriate linear data structure to solve the problems. (K3)
1CSPC202_4	Explain the fundamental concepts of structuring, managing and organizing the data using non-linear data structures with ADTs. (K2)
1CSPC202_5	Apply appropriate non-linear data structure to solve the problems. (K3)
1CSPC202_6	Compare and analyze different data structure algorithms and searching, sorting methods. (K4)

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	Basics of Data Structures: Algorithm, ADT, Space and Time Complexity, Direct and Indirect recursion, analysis of recursive functions e.g. Towers of Hanoi	4 Hrs
Unit 2	Lists Definition, representation, operations, implementation and applications of singly, doubly and circular linked lists.	9Hrs
Unit 3	Stack and Queue Stacks as ADT, operations, representation using static and dynamic structures, applications of stack Queue as ADT, operations, representation using static and dynamic structures, circular queue, priority queue, double ended queue.	8Hrs

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Department of Computer Science & Engineering

Unit 4	Searching and Sorting Techniques Linear search, binary search, Internal and External Sorts, bubble sort, selection sort, insertion sort, merge sort, quick sort, radix sort, heap sort. Hashing – Definition, hash functions, overflow, collision, Collision resolution techniques, Open addressing, Chaining.	9Hrs
Unit 5	Trees Basic terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, Heaps- Operations and their applications, Introduction to M-way trees.	7Hrs
Unit 6	Graphs Basic concept of graph theory, storage representation: adjacency matrix, adjacency list, adjacency multi-lists, graph traversal techniques- BFS and DFS	5Hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structures- A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzon	Cengage Learning	2 nd	2004
2	Data Structures with C Schaum's Outlines Series	S. Lipschutz	Tata McGraw-Hill	-	2017
3	Data Structure using C	ReemaThareja	Oxford	2 nd	2014

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structure using C	A. M. Tanenbaum, Y. Langsam, M. J. Augenstein	Prentice-Hall Of India Pvt. Limited	-	2003
2	Understanding Pointers in C	YashavantKanetkar	BPB Publication	1 st	2009
3	C and Data Structures	N. B. Venkateshwarlu, E. V. Prasad	S. Chand and Company	-	2010
4	Let Us C	YashavantKanetkar	BPB Publication	15 th	2016

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SY-CSE-05/43



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Department of Computer Science & Engineering

Course Details:

Class	B. Tech., Sem. III
Course Code and Course Title	1CSPC203- Computer Networks
Prerequisite/s	1CSPC107- Data Communication
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC203_1	Explain the fundamental concepts of computer networks. (K ²)
1CSPC203_2	Apply various error detection/correction and IP addressing mechanisms. (K ³)
1CSPC203_3	Describe different protocols from TCP/IP suite (K ²)
1CSPC203_4	Identify the design issues, class of IP addresses, and routing algorithms of network. (K ²)
1CSPC203_5	Relate the functionalities of different layers, different types of network devices and protocols in TCP/IP suite. (K ³)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Basics of Computer Network Computer Networks, Advantages and Disadvantages of Computer Networks, Interconnection Devices: Hub, Bridges, Switch, Routers, Repeater, Gateway, etc.	05 Hrs.
Unit 2	Data Link Layer Error detection & correction:- Introduction, Block coding, Linear block codes, cyclic codes, checksum Data Link Control:- Framing, Flow & error control, Noisy and Noiseless channels Protocols, HDLC protocol. Point to Point Protocol.	09 Hrs.
Unit 3	Network Layer Logical Addressing: IPv4 Addresses: IPv4-Address Space, Notation, Classful, Classless Addressing, NAT, IPv6 Addresses – Structures, Address Space. Internet Protocol: IPv4, IPv6, Transition from IPv4 to IPv6	07 Hrs.
Unit 4	Network Layer : Routing Algorithms Network Layer Design Issues, Routing Algorithms – Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing.	05 Hrs.

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Unit 5	Transport layer Process-to-Process Delivery UDP: Introduction , User Datagram , Services ,UDP operation, Use of UDP TCP : Services ,Features, Segment ,Connection ,Flow control, Error Control SCTP: Introduction, Services, Features, Packet Format	08 Hrs.
Unit 6	Application Layer: DNS, FTP, WWW DNS: Name space, Domain Name Space, Distribution of Name Space, DNS in the Internet, Resolution, DNS message, Types of Records. FTP: Control connection and Data connection WWW: Architecture , Web Documents& HTTP	08 Hrs.

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	DataCommunications andNetworking	BehrouzA , Forouzan	TataMcGraw-Hill	4 th	2012
2	ComputerNetworks	AndrewS. Tanenbaum	PrenticeHall	5 th	2011
3	TCP/IPprotocolsuite	B AForouzan	TMG Hill	4 th	2010
4	ComputerNetworking:ATop-DownApproach Featuringthe Internet	Kurose,J.F.and Ross,K.W.,"	AddisonWesley	3 rd	2004

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Data&computer communications	WilliamStallings	PearsonEducation	8 th	2011
2	Datacommunicationand computerNetworks	AjitPal	PHILearning	1 st	2014
3	Computer Networking:Principles, technologies andprotocols ofnetwork design	Natalia Oliferandvictor Olifer	WileyIndiaEdition	1 st	2009
4	ComputerNetworks andInternet	Comer,D.E. and Droms,R.E	Prentice-Hall	4 th	2004


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SY-CSE-07/43



Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	B. Tech, Sem. III
Course Code and Course Title	1CSPC204- Processor Architectures
Prerequisite/s	----
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I/ MSE/ ISE II/ ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC204_1	Explain architectures of Microprocessors with its pin configuration. (K2)
1CSPC204_2	Illustrate different interrupt mechanisms and stack operations in microprocessors. (K2)
1CSPC204_3	Explain concepts of interfacing peripheral devices with microprocessors. (K2)
1CSPC204_4	Differentiate functions of various microprocessors. (K2)
1CSPC204_5	Write an assembly language program using 8085 microprocessor instruction set (K3)
1CSPC204_6	Design a microprocessor with its physical, logical and segment address structure. (K3)

Course Contents:

Unit 1	Microprocessor Architecture and Microcomputer System Microprocessor Architecture and its operation- Microprocessor initiated operations, internal operation, and Peripheral operation. Memory- Flip-flop or latch as storage element, memory map and addresses, memory and instruction fetch, memory classification, Input and output devices.	07 Hrs.
Unit 2	8085 Microprocessor Architecture The 8085 MPU, Microprocessor communication and bus timing, De- multiplexing address and Data bus, Generating control signals, The 8085 Architecture, and 8085 based microcomputer-machine cycles and bus timing, op-code fetch machine cycle, memory read and write machine cycle.	07 Hrs.


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Unit 3	8085 assembly language programming The 8085 programming model, instruction classification, instruction and data format, Writing and execution of assembly language program. The 8085 instruction-data transfer operations, addressing modes, Arithmetic operation, Flag concept and cautions, Logic operations, Branch operations.	07 Hrs.
Unit 4	Stack and interrupt Stack, Instruction related to stack, Important concept in stack, execution of CALL and RET. The 8085 interrupt, RST instructions, vectored interrupts.	07 Hrs.
Unit 5	8086 and The 80386 Microprocessor Pin-Outs and Pin Function of 8086, Architecture of 8086, The 80386 Microprocessor: The memory System, 80386 Memory Management, Virtual 8086 Mode.	07 Hrs.
Unit 6	Pentium , Pentium Pro and Pentium 4 Microprocessor The Pentium Microprocessor: The Memory System, Special Pentium Registers, Pentium Memory Management, The Pentium Pro Microprocessor: Internal structure of the Pentium Pro, The Pentium 4: Memory Interface.	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Microprocessor Architecture – programming and applications with 8085	Ramesh Gaonkar	Penram International	4 th	2007
02	The INTEL Microprocessors - Architecture ,Programming and Interfacing	Barry B. Brey Seventh Edition	PHI Ltd	8 th	2010
03	Microprocessors and Microcontrollers	N. Senthikumar, M. Saravanan and S. Jeevananthan	Oxford University Press	2 nd	2001
04	Introduction to Microprocessors and Microcontrollers	John Crisp	ELSEVIER	2 nd	1998


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Microcomputer system – The 8086/8088 family	Liu & Gibson	PHI	1 st	2001
02	Advanced microprocessors & peripherals	A K Ray & K M Bhurchandi	Tata McGrawHill	2 nd	2012
03	Microprocessors &	Douglas Hall	Tata McGraw	2 nd	2005

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
	Interfacing		Hill		
04	Microprocessor 8086 : Architecture, Programming and Interfacing	Mathur Sunil	PHI Publication	4 th	2011


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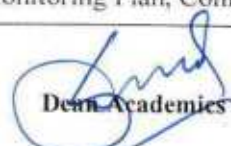
Course Details:

Class	B. Tech, Sem. III
Course Code and Course Title	1CSPC205- Software Engineering
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I/ MSE/ ISE II/ ESE	10/30/10/50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1CSPC205_1	Illustrate basic concepts and principles of software engineering. (K ²)
1CSPC205_2	Explain analysis, planning & requirement specifications of software project development. (K ²)
1CSPC205_3	Construct structure & function-oriented design for software project development. (K ³)
1CSPC205_4	Determine the cost of software w.r.t. development efforts, quality and cost. (K ³)
1CSPC205_5	Describe standards related to software reliability and quality management. (K ²)

Course Contents:		
Unit No.	Unit Name	Contact Hrs
Unit 1	Software Processes Software Process, Desired Characteristics of Software Process, Software Development Process Models, Other Software Processes, Agile software development - Agile methods, Plan-driven and agile development, Extreme programming, Scaling agile methods	07 Hrs
Unit 2	Software Requirements Analysis and Specification Software Requirement, Problem Analysis, Requirements Specification, Functional Specification with Use Cases, validation, metrics, Distributed software engineering	06 Hrs
Unit 3	Planning a Software Project Process Planning, Effort Estimation, Project Scheduling and Staffing, Software Configuration Management Plan, Quality Plan, Risk Analysis & Management, Project Monitoring Plan, Configuration management	08 Hrs


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Unit 4	Function Oriented Design Design Principles, Module-Level Concepts, Design Notation and Specification, Structured Design Methodology, Verification	07 Hrs
Unit 5	Coding and Testing Programming Principles and Guidelines, Coding Process, Testing Fundamentals, Black-Box Testing, White-Box Testing, Testing Process, Defect Analysis and Prevention, Metrics—Reliability Estimation	09Hrs
Unit 6	Software Reliability and Quality Management Software Reliability, Statistical testing, Software Quality, Software Quality Management System, ISO 9000, SEI CMM , The CMMI process improvement framework	05 Hrs

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	An integrated approach to S/W engineering	PankajJalote	Narosa Publishers	3 rd	2011
2	Fundamentals of Software Engineering	Rajib Mall	PHI	3 rd	2009
3	Software Engineering	Jawadekar W.S.	TMGH	7 th	2007

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Software Engineering	Ian Sommerville	Pearson	10 th	2016
2	Software Engineering: Practitioner's Approach	Roger S. Pressman	McGraw Hill	7 th	2010
3	Software Engineering principles and practices	RohitKhuran	Vikas Publishing House Pvt. Ltd	2 nd	2010


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Course Details:

Class	B. Tech, Sem. III
Course Code and Course Title	1CSPC251- Data Structures Laboratory
Prerequisite/s	1CSES156- Computer Programming Laboratory
Teaching Scheme: Practical	2
Credits	01
Evaluation Scheme: ISE / ESE	50/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC251_1	Demonstrate fundamentals in data structures.(K3)
1CSPC251_2	Apply appropriate data structures like stack, queue, trees and graphs for solving problems.(K3)
1CSPC251_3	Analyze searching and sorting techniques for data identification and retrieval (K4)
1CSPC251_4	Utilize skills for demonstrating mini project to solve problems (S3)
1CSPC251_5	Proficiently use data structures to design solutions and solve problems.(S3)

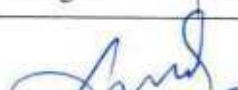
Course Contents:


Expt. No.	Title of Experiment	Contact Hours
1	Programs based on array, function, pointer, structures	2 Hrs
2	Singly Linked List	2 Hrs
3	Doubly Linked List	2 Hrs
4	Circular Linked List	2 Hrs
5	Stack ADT – Static and Dynamic	2 Hrs
6	Queue ADT – Static and Dynamic	2 Hrs
7	Stack application, circular and double ended queue	2 Hrs
8	Searching – Linear, Binary and Hashing	2 Hrs
9	Sorting – Bubble, Selection, Insertion,	2 Hrs
10	Sorting – Merge and Quick	2 Hrs
11	Binary Search Tree, Traversal of Trees	2 Hrs
12	Graph using adjacency list and traversal	2 Hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structures- A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzon	Cengage Learning	2 nd	2004
2	Data Structures with C Schaum's Outlines Series	S. Lipschutz	Tata McGraw-Hill	-	2017
3	Data Structure using C	ReemaThareja	Oxford	2 nd	2014


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structure using C	A. M. Tanenbaum, Y. Langsam, M. J. Augenstein	Prentice-Hall Of India Pvt. Limited	-	2003
2	Understanding Pointers in C	Yashavant Kanetkar	BPB Publication	1 st	2009
3	C and Data Structures	N. B. Venkateshwarlu, E. V. Prasad	S. Chand and Company	-	2010
4	Let Us C	Yashavant Kanetkar	BPB Publication	15 th	2016


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Annasaheb Dange College of Engineering and Technology, Ashta
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Course Details:

Class	B. Tech, Sem. III
Course Code and Course Title	1CSPC252- Computer Networks Laboratory
Prerequisite/s	-
Teaching Scheme: Practical	2
Credits	01
Evaluation Scheme: ISE / ESE	50/ 50


Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

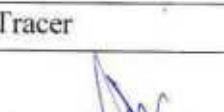
1CSPC252_1	Simulate , configure and analyze the performance of various network protocols & various routing algorithms using simulation tools. (K ³)
1CSPC252_2	Demonstrate the installation and various features of different computer network tools.(K ³)
1CSPC252_3	Make use of transport layer protocol and execute the communication between computer nodes using TCP/UDP socket.(K ³)
1CSPC252_4	Follow the given instructions during practical performance.(A ²)
1CSPC252_5	Communicate effectively in lab with orally and writing journals.(S ³)

Exp.No.	Title of Experiment
1	Design types of Network cables and Practically implement the cross-wired cable and straight through cable using crimping tool.
2	Make use of basic network command and Network configuration commands
3	Configure Host IP, Subnet Mask and Default Gateway in a System in LAN (TCP/IP Configuration) and Connect the computers in Local Area Network.
4	Installation of Cisco Packet tracer tool.
5	Configuring and Working of networking control devices using CISCO packet tracer tool
6	Design a topology of Computer Networks using CISCO packet tracer tool.
7	Design a LAN by using CISCO packet tracer tool.
8	Configure a network using distance vector routing protocol, link state vector routing algorithm
9	Implementation of TCP/UDP Socket program.
10	DNS, SMTP, FTP, and WEB Server configuration in packet tracer
11	How to Configure DHCP, DNS, HTTP, HTTPS, FTP in Cisco Packet Tracer


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12	Installation of network analyzer tool(Wire-shark). Wire-shark Lab: HTTP, DNS
13	Case study: To study network of any organization and submit report.

TextBooks:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Computer Networks	Andrew S. Tanenbaum	Prentice Hall	5 th	2011
2	Cisco Packet Tracer for Beginners	Kalyan Chinta	CCNA	--	--
3	TCP/IP protocols suite	B A Forouzan	TMGHill	4 th	2010
4	Unix network programming vol.1	Richard Steven	Pearson	3 rd	2015
5	Wireshark Network Analysis	Laura Chappell	Chappell University Kindle Edition	2 nd	2012

ReferenceBooks:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Networking	Jeffery S. Beasley	New Riders Press.	2 nd	2011
2	Computer Networks	Larry L. Peterson, Bruce S. Davie	Morgan Kaufmann	5 th	2011
3	Computer Networking: Principles, Technologies and protocols of network design	Natalia Olifer and Victor Olifer	Wiley India Edition	1 st	2009
4	TCP/IP Volume 1,2,3	W. Richard Stevens	Wiley India Edition	5 th	2015


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Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	B. Tech, Sem. III
Course Code and Course Title	1CSPC253- Processor Architectures Laboratory
Prerequisite/s	---
Teaching Scheme: Practical	2
Credits	01
Evaluation Scheme: ISE / ESE	50/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC253_1	Identify the basic elements and functions of Microprocessors. (K1)
1CSPC253_2	Describe the architecture of Microprocessors and its peripheral devices. (K2)
1CSPC253_3	Design flowchart and Data flow diagrams for 8085 assembly language program for microprocessor system, (K3)
1CSPC253_4	Proficient in the assembly language programming for 8085 microprocessor. (S3)
1CSPC253_5	Compare 8085 and 8086 microcomputer software and Hardware aspects, including the Microprocessor structure, and its operation and controls. (A4)

Laboratory Plan

Expt. No.	Title of Experiment	Planned Week	CO	PO
	Introduction to 8085 8-bit Microprocessor lab.	1 st	1CSPC253_1, 1CSPC253_2	1
1.	Program based on Addition Operation of two 8 bit Numbers.	2 nd	1CSPC253_3, 1CSPC253_4	4,5
2.	Program based on Subtraction Operation of two 8 bit Numbers.	3 rd	1CSPC253_3, 1CSPC253_4	4,5
3.	Program based on Addition Operation of two 16 bit	4 th	1CSPC253_3,	4,5


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	Numbers.		1CSPC253_4	
4.	Program based on Subtraction Operation of two 16 bit Numbers.	5 th	1CSPC253_3, 1CSPC253_4	4,5
5.	Program based on Logical Operations.	6 th	1CSPC253_3, 1CSPC253_4	4,5
	Introduction to 80386 32-bit Microprocessor lab.	7 th	1CSPC253_1, 1CSPC253_2, 1CSPC253_5	1,12
6.	Program based on Branching Operations.	8 th	1CSPC253_3, 1CSPC253_4	4,5
7.	Program based on Microprocessor using Simulator.	9 th	1CSPC253_3, 1CSPC253_4	4,5
8.	Program based on 16 bit Hexadecimal numbers.	10 th	1CSPC253_3, 1CSPC253_4	4,5
9.	Program to perform one byte BCD addition.	11 th	1CSPC253_3, 1CSPC253_4	4,5
10.	Program to move a string of data Words from one offset address to another offset address.	12 th	1CSPC253_3, 1CSPC253_4	4,5
	Revision	13 th	---	---
	Submission	14 th	---	---

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Microprocessor Architecture – programming and applications with 8085	Ramesh Gaonkar	PenramInternational	4 th	2007
02	The INTEL Microprocessors - Architecture ,Programming and Interfacing	Barry B. Brey Seventh Edition	PHI Ltd	8 th	2010
03	Microprocessors and Microcontrollers	N. Senthikumar, M. Saravanan and S. Jeevananthan	Oxford University Press	2 nd	2001
04	Introduction to Microprocessors and Microcontrollers	John Crisp	ELSEVIER	2 nd	1998


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Microcomputer system – The 8086/8088 family	Liu & Gibson	PHI	1 st	2001
02	Advanced microprocessors & peripherals	A K Ray & K M Bhurchandi	Tata McGraw-Hill	2 nd	2012
03	Microprocessors & Interfacing	Douglas Hall	Tata McGraw Hill	2 nd	2005
04	Microprocessor 8086 : Architecture, Programming and Interfacing	Mathur Sunil	PHI Publication	4 th	2011


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Course Details:

Class	B. Tech, Sem. III
Course Code and Course Title	1CSPC254- Programming Laboratory - I
Prerequisite/s	1CSES156 - Computer Programming
Teaching Scheme: Lecture/Tutorial /Practical	02/00/02
Credits	03
Evaluation Scheme: ISE / ESE	50/50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1CSES254_1	Explain the fundamentals of object oriented programming.(K2)
1CSES254_2	Apply the concept of class, object, array, pointers inheritance and polymorphism in C++, (K3)
1CSES254_3	Apply various library utilities and advanced features- template, STL, RTTI (K4)
1CSES254_4	Develop programming skills to solve real world problems using object oriented concept in turbo C++ (S3)
1CSES254_5	Communicate effectively, both orally and in writing journals, (S3)
1CSES254_6	Follow given instructions during practical performance. (A2)

Course Contents:		
Unit No.	Unit name	Contact Hrs.
Unit 1	Fundamentals of Object Oriented Programming The Origins of C++, C++ key words, Abstraction, Encapsulation, Polymorphism, Inheritance, Constructors & Destructors, Classes & Objects - Relation of Classes, Structures & Union, Friend Functions, Friend Classes, Inline Functions, Parameterized constructors, Static class members, Scope resolution operators, Passing objects to functions, nested classes, and local classes.	05 Hrs.
Unit 2	Arrays & Pointers Arrays, Pointers, Arrays of objects, Pointers to objects, This Pointer, Pointers to derived types, Pointers to class members, Dynamic Memory Allocation Operators - new & delete operators. Function Overloading, Operator Overloading, Copy Constructors & Default Arguments, Overloading constructor function, Operator overloading using friend function, Overloading new & delete operators, overloading some special operators like [],(),->,Comma, operator.	06 Hrs.

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Unit 3	Inheritance: Single Inheritance, multilevel Inheritance, multiple Inheritance, hybrid Inheritance, hierarchical Inheritance,	03 Hrs.
Unit 4	Polymorphism- Virtual base classes. Virtual functions, Pure virtual function, calling virtual function through a base class, Abstract classes, Early vs Late binding.	03 Hrs.
Unit 5	File and Streams: Overview of C++ Stream classes, String I/O, Character I/O, Object I/O, I/O with multiple objects, File pointers and redirections. Exception Handling: Fundamentals, Handling derived class exceptions, exception handling options: catching, throwing.	06 Hrs.
Unit 6	Templates: Generic classes, Generic functions, Applying generic functions, type name & export keyword, power of templates. Namespace fundamentals, Standard Template Library: STL containers, STL algorithms, STL iterative & C++ streams, Run-Time Type ID (RTTI)	05 Hrs.

Laboratory list

It should consist of minimum 10-12 experiments based on the following list.

Expt. No.	Title of Experiment
--	Introduction to course
1	Implement student grading system using class and object concept in C++.
2	Implement concept of Constructor & Destructor. (Create Object Dynamically)
3	Implement Function Overloading and Constructor Overloading concept.
4	Implement program for unary and binary Operator Overloading.
5	Implement Multilevel and Multiple Inheritance concept.
6	Implement program for Hierarchical and Hybrid Inheritance.
7	Implement Friend Function and Friend Class concept in C++
8	Implement Virtual Function and Virtual Class concept in C++
9	Implement of student database using concept of File Handling. (Read Write Operations)
10	Implement concept of Exception Handling.
11	Implement concept of bubble sort and selection sort algorithm using Function Template
12	Implement Stack and Queue using Class Template.
	Internal POE and Submission


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Complete Reference: C++	Herbert Schildt,	Tata McGraw-Hill,	4 th	2010
02	C++ Programming with language	Bjarne Stroustrup	AT & T	4 th	2013
03	Programming with C++	E Balagurusammy	TMGH	4 th	2010
04	Object oriented programming in C++	Rajesh K Shukla	Wiley	1 st	2008

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Object Oriented Programming in Turbo C++	Robert Lafore	Galgotia		2010
02	C++ Programming	John Thomas Berry	PHI	2 nd	1992
03	Programming with C++	D. Ravichandran,	TMGH	3 rd	2011
04	Test your C++ Skills	Yashwant Kanetkar	BPB	1 st	2010

Other Books/E-material			
Sr. No	Title	Author	Publisher
01	NPTEL video lectures	NPTEL Author	www.nptel.ac.in


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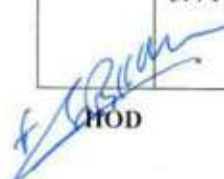
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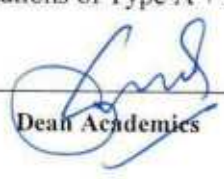
Course Details:

Class	B. Tech., Sem.-III
Course Code and Course Title	1CSBS206, Fuzzy Set Systems and Operation Research
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/1
Credits:	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1CSBS205_1	Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions (K ₃)
1CSBS205_2	Solve examples on the principle in performing fuzzy sets and fuzzy number arithmetic operations such as Addition, Multiplication, division & fuzzy equations. (K ₃)
1CSBS205_3	Solve different types of assignment problems by using different techniques. (K ₃)
1CSBS205_4	Solve examples on Game Theory. (K ₃).
1CSBS205_5	Solve examples on PERT and CPM. (K ₃)

Course Contents:		
Unit No.	Name of the Unit	Contact Hours
Unit 1	Probability Distribution 1.1 Random variable (Discrete & Continuous) 1.2 Binomial Distribution 1.3 Poisson Distribution 1.4 Normal Distribution.	07 Hrs.
Unit 2	Introduction to Fuzzy sets. 2.1 Basic concepts of Fuzzy Sets 2.2 Crisp Set and Fuzzy Set 2.3 Membership Functions 2.4 Basic operations on fuzzy sets 2.5 Properties of fuzzy sets.	07 Hrs.
Unit 3	Fuzzy Arithmetic 3.1 Fuzzy Numbers 3.2 Fuzzy Cardinality 3.3 Operations on Fuzzy Numbers 3.4 Fuzzy Equations of Type $A + X = B$ and $A.X = B$.	07 Hrs.


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Unit 4	Assignment Problems 4.1 Introduction, Definition 4.2 Hungarian method of solving balanced assignment problems 4.3 Hungarian method of solving unbalanced assignment problems 4.4 Traveling salesmen problem.	07 Hrs.
Unit 5	Game Theory 5.1 Introduction 5.2 Two Person Zero Sum Game 5.3 Use of Dominance Principle 5.4 Use of Sub-Game Method 5.5 Use of Graphical Method	07 Hrs.
Unit 6	Project Management: PERT and CPM 6.1 Introduction, Basic Difference Between PERT and CPM 6.2 Phases of Project Management 6.3 Critical Path Analysis 6.4 Project Scheduling with Uncertain Activity Times 6.5 Project Time-Cost Trade-Off	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A Text Book of Engineering Mathematics (For Unit 1)	N. P. Bali, Manish Goyal	Laxmi Publications(P) Ltd	8	2011
02	Fuzzy Sets & Fuzzy Logic Theory and Applications (For Unit 2&3)	George J. Klir and Bo Yuan	PHI Learning Private Limited	-	2013
03	Operation Research (For Unit 4, 5 & 6)	S Kalavathy	Vikas Publishing House PVT LTD	2	2008
04	Operations Research: Theory and Applications(For Unit 4, 5 & 6)	J. K. Sharma	Macmillan Publishers India Ltd.	4	2009

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Probability and Statistics for Computer Science	James L. Johnson	Wiley	1	2008
02	Fuzzy Logic with Engineering Applications	Timothy J. Ross	Wiley	3	2013
03	Operations Research: Theory, Methods and Applications	S. D. Sharma, Himanshu Sharma	KedarNath Ram Nath	15	-
04	Higher Engineering Mathematics	Dr. B. S Grewal	Khanna Publishers	44th	2018

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List of Tutorials	
Sr. No.	Title of Tutorials
1	Probability Distribution-I
2	Probability Distribution-II
3	Introduction to Fuzzy sets.
4	Fuzzy Arithmetic
5	Assignment Problems -I
6	Assignment Problems -II
7	Game Theory
8	Project Management: PERT and CPM


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SY-CSE - 25/43



Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	S Y B. Tech Sem IV
Course Code & Course Title	ICSPC207 Theory of Computer Science
Prerequisite/s	ICSBS201 Discrete Mathematics
Teaching Scheme (Lecture/Tutorial)	03/01
Total Contact Hours: Theory/Tutorial	42/14 Hours
Credits	04
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs) : The students will be able to:

ICSPC207_1	Explain basic terminologies related to theory of computation. (K2)
ICSPC207_2	Construct regular expressions and build machines to recognize those regular expressions and vice versa. (K3)
ICSPC207_3	Demonstrate finite state systems, build them as per the requirement and transform them into different types of finite state systems (K3)
ICSPC207_4	Construct context-free grammars for languages, demonstrate derivations and parse trees for specified inputs. (K3)
ICSPC207_5	Demonstrate pushdown automata, its connection with context-free grammars and formulate conversion between them. (K3)
ICSPC207_6	Demonstrate various Turing machines for different kinds of formal languages and illustrate their variants. (K3)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Mathematical Induction, Regular Languages & Finite Automata Proofs and Types of Proofs, Recursive Definitions, Definition & types of grammars & languages, Regular expressions and corresponding regular languages, examples and applications, unions, intersection & complements of regular languages, Finite automata-definition and representation, Non-deterministic F.A.,NFA with null transitions, Equivalence of FA's , NFA's and NFA's with null transitions.	10Hrs
Unit 2	Kleene's Theorem Part I & II statements and proofs, minimum state of FA for a regular language, minimizing number of states in Finite Automata	4 Hrs
Unit 3	Grammars and Languages Derivation and ambiguity, Union, Concatenation and *'s of CFLs, Eliminating production & unit productions from CFG, Eliminating useless variables from a context Free Grammar. CNF Notation.	7 Hrs
Unit 4	Push Down Automata Definition, Deterministic PDA & types of acceptance, Equivalence of CFG's & PDA's. Parsing Top Down Parsing, Recursive Descent Parsing, Bottom up Parsing	9Hrs
Unit 5	Turing Machines Models of computation, definition of Turing Machine as Language acceptors, combining Turing Machines, Computing a function with a TM	8 Hrs

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Unit 6	Variations in Turing Machines Turing machines with doubly-infinite tapes, more than one tape, Non-deterministic TM and Universal TM	4Hrs
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Introduction to languages & theory of computations	John C. Martin	Tata McGraw Hill Edition	3 rd	2007
2	Introduction to Automata Theory, Languages and computation	John E. Hopcraft, Rajeev Motwani, Jeffrey D. Ullman	Pearson Edition	3 rd	2006
3	Introduction to theory of computations	Michael Sipser	Cengage Learning	3 rd	2012
4	Theory of Computation- A problem solving Approach	Kavi Mahesh	Wiley india	1 st	2005

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Discrete Mathematical Structures with applications to computer science	J.P. Trembley & R. Manohar	Tata McGraw Hill Edition	-	1997
2	Elements of the Theory of Computation	Harry Lewis, Christos H. Papadimitriou	Prentice-Hall Publications	2 nd	1997
3	Theory of Computation	Vivek Kulkarni	Oxford University Press	1 st	2013


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Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	B. Tech, Sem. IV
Course Code and Course Title	1CSPC208- Operating Systems
Prerequisite/s	0CSES156
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC208_1	Explain basic concepts of operating system, system structure, services, and operations in OS. (K ²)
1CSPC208_2	Illustrate process, Thread scheduling algorithm and interprocess communication. (K ²)
1CSPC208_3	Apply appropriate solution to solve critical section problem. (K ³)
1CSPC208_4	Solve thoroughly how to handle a deadlock. (K ³)
1CSPC208_5	Identify memory management strategies and apply various page replacement policies. (K ³)
1CSPC208_6	Explain basic concepts of file handling and I/O subsystem. (K ²)

Course Contents:

Sr. No.	Unit Name	Contact Hours
Unit 1	Overview Introduction to Operating Systems, System structures, what operating systems do, Computer System organization, Operating System structure, Operating System operations, Types of Operating Systems, Operating System Services, User - Operating System interface, System calls, Types of system Calls, System programs, Kernel, Types of kernel.	06 Hrs.
Unit 2	Process Management Process concept: Process scheduling, Operations on processes, Inter- process communication, Multi-Threaded Programming: Overview, Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple-Processor scheduling, Thread scheduling.	09 Hrs.
Unit 3	Process Synchronization Background, the critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of Synchronization	06 Hrs.
Unit 4	Deadlock System model, deadlock characterization, methods for handling deadlocks, deadlock preventions, deadlock avoidance, deadlock detection, deadlock recovery.	07 Hrs.

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Unit 5	Memory Management Memory Management Strategies: Background, swapping, contiguous memory allocation, paging, structure of the page table, Segmentation. Virtual Memory Management: Background, demand paging, copy-on- write, page replacement	07 Hrs.
Unit 6	Storage Management& I/O Subsystem File System: File concept, access methods, directory and disk structure, file-system mounting, file sharing, protection, Overview of I/O system, I/O hardware, Application I/O interface, Kernel I/O subsystem.	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Operating System Concepts Gagne	Silberschatz, Galvin,	John Wiley	8	2009
02	Operating Systems - A Concept Based approach	Dhananjay M Dhamdhere	Tata McGraw Hill	3	2007
03	Understanding Operating System	Understanding Operating System	Ann McHoes& Ida M. Flynn,(Thomson)	6	2014

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Operating System A Design Oriented Approach	Charles Crowley	Tata McGraw Hill	1	2001
02	Operating System with Case Studies in Unix, Netware and Windows NT	Achyut S. Godbole	Tata McGraw Hill	5	2007
03	Operating Systems: Internals and Design Principles	Willim Stallings	Pearson Education International	8	2014


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Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	1CSPC209- Database Engineering
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC209_1	Explain concepts of database system, conceptual database design, relational algebra, SQL, normalization (K ²)
1CSPC209_2	Design ER diagram for the enterprise as well as prepare the relational database schema for the enterprise using integrity constraints, validate the design applying normalization techniques and theoretical knowledge (K ³)
1CSPC209_3	Write queries in pure languages, SQL to extract required information from the database. (K ³)
1CSPC209_4	Comprehend file organization, concepts of indexing for efficient system performance, transaction management, concurrency control and recovery of databases (K ²)
1CSPC209_5	Demonstrate concepts of indexing, concurrency protocols and recovery algorithms with real-world illustrations. (K ³)

Course Contents:

Unit 1	<p>Introduction to databases and ER Model Introduction: General introduction to database systems, its advantages and applications, View of Database – Levels of data abstraction, Data models, Database languages, Database System Architecture, Database users and Administrator ER Model: Entity set, Entity types, attributes, Notations, Relationship sets, Relationship types, Keys- super key, candidate key, primary key, Extended Features of ER Model-Generalization, Specialization and aggregation</p>	06 Hrs.
Unit 2	<p>Relational Model and SQL Relational Model: Structure of Relational Database, Reduction of ER model into Relational schemas, Schema-instance distinction, Referential integrity and foreign keys, Pure languages, Relational algebra, Example queries SQL: Introduction to SQL, Data definition statements with constraints, Insert, Update and Delete, Set Operations, Aggregate functions group by and having clauses, Nested Queries, Views, Complex Queries, Joins.</p>	10 Hrs.
Unit 3	<p>Functional Dependency and Normalization Importance of a good schema design, Motivation for normal forms, Atomic domains and 1NF, Dependency theory - functional dependencies, Closure of a set of FD's, Definitions of 2NF, 3NF and BCNF, Decomposition algorithms and desirable properties of them, Multivalued dependencies and 4NF, Join dependencies and definition of 5NF, Temporal Functional Dependencies</p>	07 Hrs.

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Unit 4	Data Storage & Indexing File organization, Organization of records in files, Data Dictionary, Database Buffer Indexing: Concept, Ordered Indices-Primary, Secondary, Multilevel, B+ Tree Index, Hashing, Hash Indices, Dynamic hashing, Multiple key access, Bitmap Indices	07 Hrs.
Unit 5	Transaction Management & Concurrency Control Transaction Processing: Concept, ACID properties, Transaction states, Storage Structure, Implementation of atomicity, isolation and durability, Serializability, Testing of Serializability. Concurrency Control: Lock-based protocols, Timestamp - based Protocols, Validation -based Protocols, Multiple Granularities, Deadlock handling.	07 Hrs.
Unit 6	Recovery System Failure classification, Storage structure, Implementation of stable storage, Recovery and Atomicity, Log based recovery, Checkpoints, Shadow Paging, Buffer management in crash recovery.	05 Hrs.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	McGraw Hill Education	6	2011
02	Database Systems- A practical approach to Design, Implementation	Thomos Connolly, Carolyn Begg	Pearson Education.	4	2009
03	Database Systems – Design, Implementation and Management	Rob & Coronel	Thomson Course Technology	5	2008
04	Database Management Systems	Raghu Ram Krishnan	McGraw Hill	3	2002

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Database Systems	RamezElmasri and ShamkantNavathe	Pearson Education	4	2007
02	Database Systems: Design, Implementation and management	Peter Rof, Carlos Coronel	Cengage Learning	7	2014
03	Principles of Database Systems	J. D. Ullman	Galgotia publications	1	2011
04	SQL: A Complete Reference	Alexis Leon, Mathews Leon	McGraw Hill Education	1	2002


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Department of Computer Science & Engineering

Course Details:

Class	B. Tech, Sem. IV
Course Code and Course Title	1CSPC210- Computer Architecture
Prerequisite/s	1CSPC204
Teaching Scheme: Lecture/Tutorial	3
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

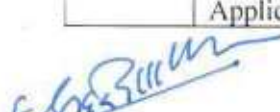
Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC210_1	Explain evolution of computer and basics of computer organization (K2)
1CSPC210_2	Solve arithmetic, memory and parallel processing operation (K3)
1CSPC210_3	Illustrate Control design and memory organization (K2)
1CSPC210_4	Explain concepts of parallel processing and vector processing architecture (K2)
1CSPC210_5	Comprehend various distributed architecture (K2)

Course Contents:

Unit 1	Basic Computer Organization Evolution of computers - Mechanical era, Electronic computers, CPU organization, Data representations, Instruction Sets, RISC & CISC, definition, comparison and Examples	06 Hrs.
Unit 2	Computer Arithmetic: Number representation : Signed Integers ,Fixed point numbers, Floating point numbers Multipliers and Dividers, Floating point arithmetic's: Rounding Modes, Special Value and Exceptions, floating point addition, other Floating point operations, Booth's Algorithm, IEEE Standards for Floating point representations(Single Precision Format)	10 Hrs.
Unit 3	Control Design and memory organization: Basic concepts, Hardwired control Unit, Microprogrammed control unit, Memory Technology, Memory Systems, Caches: Main features	05 Hrs.
Unit 4	Introduction to Parallel Processing : Introduction, architectural classification schemes. Evolution of parallel processors, current & future trends towards parallel processors, Principles of pipelining and array processing, Scalar and vector pipelines, Classification of pipelined processors, performance evaluation factors. Vector processing concepts Systolic arrays and their Applications	08 Hrs.


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Unit 5	Different parallel processing architectures: Introduction to Associative memory processors, Principles of multithreading, Latency hiding techniques.	06 Hrs.
Unit 6	Distributed Memory Architecture :	07 Hrs.
	Loosely coupled and tightly coupled architectures, Cluster computing as an application of loosely coupled architecture. Examples–CM* Dataflow Architectures: Concepts of data flow computing, static and dynamic dataflow architectures.	

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Computer Architecture and Organization (Unit 1,2,3)	John P Hayes	McGraw-Hill	3	-
02	Computer Architecture and parallel processing (Unit 4, 5,6)	Kai Hwang and Faye A Briggs	McGraw-Hill	-	3
03	Advanced computer architecture (Unit 4,5,6)	Kai Hwang	McGraw-Hill	-	-

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Computer Systems Organization and Architecture	John D. Carpinelli	PEARSON Education	3	2008
02	Parallel Computer Architecture	David E. Culler	Morgan Kaufmann Publishers	1	200
03	Advanced Computer Architecture: A Design Space Approach	DezsoSima, Terence Foundation, Peter karsuk	Pearson	--	--
04	Computer Architecture: A Quantitative Approach	John L. Hennessy & Devid A. Patterson	Morgan Kaufmann Publishers	3	2003
05	Computer Organization	Carl Hamacher, Zvonko Vranesic, Safwat Zaky	McGraw-Hill	5	2002


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Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Contents:

Class	B. Tech, Sem. IV
Course Code and Course Title	1CSPC255- Operating Systems Laboratory
Prerequisite/s	1CSES156
Teaching Scheme: Practical	2
Credits	01
Evaluation Scheme: ISE / ESE	50/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC255_1	Demonstrate the installation and various features of operating systems. (K ²)
1CSPC255_2	Identify CPU scheduling algorithms and resolve problems related to deadlock, critical section. (K ³)
1CSPC255_3	Test for appropriate commands on Unix, Linux platform and identify their use to perform various operations. (K ⁴)
1CSPC255_4	Follow the given instructions during practical performance. (A ²)
1CSPC255_5	Proficiently Develop and debug, C programs created on Linux and Unix platforms(S ³)

Course Contents:

1.	Installation of windows operating system.
2.	Installation of Linux operating system.
3.	Program based on CPU Scheduling Algorithms.
4.	Program based on Bankers algorithm for Deadlock Avoidance.
5.	Program based on Bankers Algorithm for Déadlock Prevention.
6.	Program based on Page Replacement Policies.
7.	Program based on various system calls of UNIX operating system.
8.	Program based on various I/O System calls of UNIX operating System.
9.	Program based on various UNIX commands.
10.	Program to solve Producer-Consumer problem using semaphores (Using UNIX system calls)


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Annasaheb Dange College of Engineering and Technology, Ashta
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The design of Unix Operating System	Maurice J. Bach	(PHI)	1	2006
02	A practical Guide to Linux commands, Editors and shell programming	Mark G. Sobell	Pearson Education India	3	2013
03	Operating Systems concepts and design	Milan Milenkovic	TMGH	2	2001

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Linux System Programming	Robert Love	SPD, O' REILLY	2	2007
02	Unix concepts and administration	Sumitabha Das	TMGH	4	2006
03	A practical Guide to Unix system V	Mark G. Sobell	Benjamin cummings Pub.	2	2005


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SY-CSE-35/43



Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	B. Tech, Sem. IV
Course Code and Course Title	1CSPC256- Database Engineering Laboratory
Prerequisite/s	--
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50/ 50

Course Outcomes (COs):

Upon successful completion of laboratory practice, the student will be able to:

1CSPC256_1	Interpret the problem statement of an enterprise, identify the need, analyses the problem and design ER model for the enterprise as well as prepare the relational database schema for the enterprise identifying integrity constraints for efficient design. (K ³)
1CSPC256_2	Make use of appropriate SQL construct to write the query with justification. (K ³)
1CSPC256_3	Apply the Structured Query language for database definition and manipulation and also use PL/SQL constructs. (S ³)
1CSPC256_4	Experiment with hashing techniques, transaction processing, concurrency control etc. (K ³)
1CSPC256_5	Follow professional and ethical principles during laboratory work in a team for laboratory activities. (A ²)

Course Contents:

1	Drawing an E-R Diagram for any organization.
2	Converting E-R diagram into Relational Tables.
3	Installation and Demonstration of DBMS Oracle / MySQL / SQL Server / PostgreSQL etc.
4	Study and Implementation of Data Definition Language (DDL) Queries (e.g. create, alter and drop tables).
5	Study and Implementation of Data Manipulation Language (DML) Queries (e.g. insert, delete, update and select statements).
6	Study and Implementation of Basic SQL SELECT statement for displaying / extracting data from single table or multiple tables.
7	Study and implementation of SQL constructs for aggregating data, use of group by, having clauses.
8	Study and implementation of nested sub-queries, complex queries, views and Joins.
9	Study and Implementation of Triggers.
10	Study and Implementation of Functions and Stored Procedures.
11	Implementation of Database connectivity with object oriented language (Java).
12	Few aspects of authorization such as creating and managing users, roles, granting and revoking of privileges etc.
13	Creating Indices for the tables, implementing static hashing.
14	Study of Transaction processing and concurrency control techniques.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	McGraw Hill Education	6	2011
02	Database Systems- A practical approach to Design, Implementation and Management	Thomos Connolly, Carolyn Begg	Pearson Education.	4	2009
03	Database Systems – Design, Implementation and Management	Rob & Coronel	Thomson Course Technology	5	2008
04	Database Management Systems	Raghu Ram Krishnan	McGraw Hill	3	2002

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Database Systems	RamezElmasri and ShamkantNavathe	Pearson Education	5	2007
02	Database Systems: Design, Implementation and management	Peter Rof, Carlos Coronel	Cengage Learning	7	2014
03	Principles of Database Systems	J. D. Ullaman	Galgotia publications	1	2011
04	SQL: AComplete Reference	AlexisLeon,Mathews Leon	McGraw Hill Education	1	2002


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SY-CSE - 37/43



Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	B. Tech, Sem. IV
Course Code and Course Title	1CSPC257- Programming Laboratory II
Prerequisite/s	1CSPC254 - Programming Laboratory -I
Teaching Scheme: Theory / Tutorial / Practical	2/0/4
Credits	04
Evaluation Scheme: ISE / ESE	50 / 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC257_1	Apply various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve specified problems. (K3)
1CSPC257_2	Make use of Multi-threading, I/O operations, Exception and Networking to solve specified problems. (K3)
1CSPC257_3	Develop programs using Applet and Swing with database connectivity (K4)
1CSPC257_4	Identify and correct syntax, logic errors, and runtime errors in the programs. (S3)
1CSPC257_5	Follow professional and ethical principles during practical performance. (A2)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Fundamental Programming in Java Object-Oriented Programming Concepts, JVM, JIT Compiler, Byte Code,, Data Types, Strings, Input and Output, Arrays- JaggedArray. Objects and Classes: Declaring Classes, Declaring Member Variables, Defining Methods, Constructor, Creating and using objects, Access Modifiers, Static Fields and Methods.	04 Hrs.
Unit 2	Inheritance, Interface and Packaging Inheritance: Definition, Types of Inheritance, Polymorphism, Super keyword, Final Classes and Methods, Abstract Classes and Methods, garbage collection. Interfaces: Defining an Interface, Implementing an Interface, Using an	05 Hrs.


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	Interface as a Type. Packages: Creating a Package, Class importing, Using Package Members.	
Unit 3	Exception and I/O Streams Exception: Definition, The Classification of Exceptions, Declaring Checked Exceptions, Throw an Exception, Creating Exception Classes, Catching Exceptions. I/O Streams: Byte Stream – Input Stream, Output Stream, Data Input Stream, Data Output Stream, File input Stream, File Output Stream, Character Streams, File.	05 Hrs.
Unit 4	Graphical User Interfaces using Swing: Introduction to the Swing, Swing features, Creating a Frame, Positioning a Frame, The JComponent Class – JLabel, JTextField, JButton etc, Displaying Information in a Frame, The Model-View-Controller Design Pattern, Layout Management: Border Layout, Flow Layout, Grid Layout Event Handling: Basics of Event Handling, The AWT Event Hierarchy, Key Events, Mouse Events, Introduction to JApplet.	05 Hrs.
Unit 5	Networking and Multithreading Multithreading: Processes and Threads, Runnable Interface and Thread Class , Defining and Starting a Thread, Thread States, Thread Properties, Networking: Overview of Networking, Networking Basics, Reading from and Writing to a URL Connection, Sockets, Reading from and Writing to a Socket.	05 Hrs.
Unit 6	Collection and Database Programming Collections: Collection Interfaces, Concrete Collections- List, Queue, Set, Map, the Collections Framework. Database Programming: The Design of JDBC, The SQL, Basic JDBC Programming Concepts, Query Execution.	04 Hrs.

Course Content:

Perform Minimum 16-18 Experiments based on following list:

Exp. No.	Title of Experiment
1	Program based on Variables, Operators, Strings, Input and Output.
2	Program based on concept of Class and Object.
3	Program based on Static Fields and Static Methods.
4	Program based on concept of Inheritance like single inheritance, multilevel inheritance, hierarchical inheritance etc.
5	Program based on Multiple inheritance using Interface.
6	Program based on concept of Polymorphism.
7	Program based on concept of super keyword, final classes and final methods.
8	Program based on Abstract classes and methods.
9	Program based on concept of Package and sub packages


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10	Program based on concept of Exception and Custom exception
11	Program based on File read and write operation.
12	Program to develop GUI using swing.
13	Program to develop GUI using JApplet
14	Program based on concept of Key and mouse event.
15	Program based on Socket programming using Swing GUI.
16	Program based on Threading.
17	Program based on Database.
18	Program to demonstrate Collection classes.

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Core Java- Volume I Fundamentals	Cay Horstmann	Pearson	8 th	2011
2	Core Java- Volume II Advanced Features	Cay Horstmann, Gary Cornell	Pearson	8 th	2011
3	Let Us Java	Yashavant Kanetkar	BPB	3 rd	2017
4	Programming with Java	Balagurusamy	TMH	4 th	2009

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Java 2 Complete Reference	Herbert Schildt	TMGH	9 th	2014
2	JAVA HOW TO PROGRAM	Deitel Paul, Deitel Harvey	PHI Learning	10 th	2016
3	Thinking in Java	Bruce Eckel	Prentice Hall	4 th	2006
4	A Programmer's guide to JAVA SCJP Certification	Khaleed Mughal and Rolf W. Rasmussen	Addison Wesley	3 rd	2008


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SY-CSE-40/43



Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering

Course Details:

Class	S. Y. B. Tech. Semester-III
Course Code and Course Title	1CSMC211, Environmental Studies
Prerequisite/s	--
Teaching Scheme: Lecture	02
Credits	--
Evaluation Scheme: ISE	50 (Grade)

Course Outcomes (COs)	
Upon successful completion of the course students will be able to:	
1CSMC211_1	Explain importance of environmental studies with necessary of acts.(K ²)
1CSMC211_2	Explain importance of public awareness on environmental problems (K ²)
1CSMC211_3	Write a technical report in team regarding course and impacts of environment related issues.(S ²)
1CSMC211_4	Discuss current concern of environment issues.(A ²)
1CSMC211_5	Describe the need of environment protection and ethics.(A ²)

Course Contents:	
Unit 1: Nature of Environmental Studies	
Definition, scope and importance. Multidisciplinary nature of environmental studies, Need for public awareness.	
(02Hrs)	
Unit 2: Natural Resources and Associated Problems	
a) Forest resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people; b) Water resources: Use and over-utilization of surface and groundwater, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Usage and exploitation. Environmental effects of extracting and using mineral resources. d) Food resources: World food problem, changes caused by agriculture effect of modern agriculture, fertilizer-pesticide problems. e) Energy resources: Growing energy needs, renewable and non renewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy, f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources.	
(04Hrs)	
Unit 3: Ecosystems	
Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics features, structure and function of the following ecosystem :- a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	
(04Hrs)	
Unit 4: Biodiversity and its conservation	


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SY-CSE-41/43



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Introduction- Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega- diversity nation. Western Ghat as a biodiversity region. Hot-spots of biodiversity. Threats to biodiversity habitat loss, poaching of wildlife, man- wild life conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
(05Hrs)
Unit 5: Environmental Pollution
Definition: Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.
(04Hrs)
Unit 6: Social Issues and the Environment
Disaster management: floods, earthquake, cyclone, tsunami and landslides Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products.
(03Hrs)
Unit 7: Environmental Protection
From Unsustainable to Sustainable development Environmental Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Population Growth and Human Health, Human Rights
(06Hrs)

Mini Project	<p>Mini project based on : Environmental assets River/Forest/Grassland/Hill/Mountain. OR A local polluted site Urban/Rural/Industrial/Agricultural. OR Study of common plants, insects, and birds. OR Study of simple ecosystems - ponds, river, hill slopes, etc. (Mini Project report is Mandatory.)</p>
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Assessment Method:

1. Mini Project report – 05 marks
2. Seminar – 05 marks
3. ISE question paper format will be Multiple Choice Questions- 40 Marks

Unit No.	Topic Name	Weightage
1	Nature of Environmental Studies.	4 Marks
2	Natural Resources.	7 Marks
3	Ecosystems	7 Marks
4	Biodiversity and its conservation	7 Marks
5	Environmental Pollution	7 Marks
6	Social Issues and the Environment	8 Marks

IMPORTANT NOTES:

1. ISE will be conducted in 14th week of semester.
2. Mini Project report will be submitted to course coordinator in 10th week of semester.
3. Students should get minimum 40% marks to get PP (PASS) grade.
4. Students getting less than 40% marks will be offered NP (NOT PASS) grade.
5. To get B. Tech. Degree PP grade in Environmental Studies is mandatory.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Environmental Studies	Dr. B. S. Chauhan	University Science Press, New Delhi	1 st	2008
2	Environmental Studies	Dr. P. D. Raut	S. U. Kolhapur	3 rd	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Principals of Environmental Science and Engineering	Raman Sivakumar	Cengage learning Singapore	2	2005
02	Elements of Environmental Science and Engineering	P. Meenakshi	Prentice Hall of India Private Limited, New Delhi	-	2006
03	Environmental Science – working with the Earth	G.Tyler Miller Jr	Thomson Brooks /Cole	11	2006


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**Annasaheb Dange College of Engineering and Technology, Ashta
Department of Computer Science & Engineering**



Annasaheb Dange College of Engineering and Technology, Ashta

(An Autonomous Institute affiliated to Shivaji University, Kolhapur.)

Curriculum

T.Y. B. Tech.

COMPUTER SCIENCE AND ENGINEERING

SEM V & SEM VI

(Academic Year 2021-22)

Teaching and Evaluation Scheme
B. Tech: V Semester

CourseCode	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory Marks		Practical Marks	
							Max.	Min. for Passing	Max.	Min. for Passing
1CSOE3**	Open Elective- I	3	0	0	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	20		--	--
1CSPC304	System Programming and Compilers	3	1	0	4	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	20		--	--
1CSPC305	Design and Analysis of Algorithms	3	0	0	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	20		--	--
1CSPC306	Internet of Things	3	0	0	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	20		--	--
1CSPE3**	Professional Elective- I	3	0	0	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	20		--	--
1CSPC351	Design and Analysis of Algorithms Laboratory	0	0	2	1	ISE	--	50	20	
1CSPC352	Web Programming	2	0	2	3	ISE	--	50	20	
						ESE	POE	50	20	
1CSPE3**	Professional Elective - II	2	0	2	3	ISE	--	50	20	
						ESE	POE	50	20	
1CSPR356	Mini Project	0	0	2	1	ISE	--	50	20	
						ESE	OE	50	20	
1CSPR357	Internship/ Intra institute / Inter institute activities	-	-	-	1*	ISE	--	50	20	
1CSMC310	Technical Writing	1	1	0	0	ISE	Grade			
Total		20	2	8	25		500		400	
Total Contact Hours/ Week: 30 Hrs										

*Students shall undergo Internship/ Intra institute / Inter institute activities after B. Tech Semester IV examination during summer vacation for 2 weeks. Assessment shall be carried out in B. Tech V Semester.

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Professional Elective- I 1. Storage Networks - 07 2. Ad Hoc Networks - 08 3. Cyber Security - 09	Professional Elective – II 1. Advanced Programming - 53 2. Computer Graphics & Multimedia Techniques - 54 3. Unix and Shell Programming - 55
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Open Elective – I

Course Code	Course Name	Department
1AEOE311	Introduction to Flight	Aeronautical Engineering
1AEOE312	Introduction to Experimental Aerodynamics	
1AEOE313	Introduction to Gas Dynamics and Jet Propulsion	
1AEOE314	Introduction to Unmanned Aerial Vehicles	
1AUOE301	Product Design and Development	Automobile Engineering
1AUOE302	Automotive Refrigeration and Air Conditioning	
1CVOE301	Air Pollution & Control	Civil Engineering
1CVOE302	Remote Sensing & GIS Applications	
1CSOE301	Database Essentials and Business Intelligence	Computer Science and Engineering
1CSOE302	Software Engineering and Project Management	
1CSOE303	Data Structures and Algorithms	
1EEOE301	Electrical Technology	Electrical Engineering
1EEOE302	Electrical and Electronics Measurements	
0FTOE311	Packaging Technology	Food Engineering
1MEOE301	Industrial Automation and Robotics	Mechanical Engineering
1MEOE302	Composite Materials	
1MEOE303	Solar Technology	

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	-	-	-	14	6	3	2
Cumulative Sum	3	24	19	54	6	3	2


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Teaching and Evaluation Scheme

B. Tech: VI Semester

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory Marks		Practical Marks	
							Max.	Min. for Passing	Max.	Min. for Passing
1CSOE3**	Open Elective-II	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSHS313	Entrepreneurship Development and Planning	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC314	Advanced Database System	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC315	Machine Learning	3	1	0	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPE3**	Professional Elective- III	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC358	Advanced Database System Laboratory	0	0	2	1	ISE	--		50	20
						ESE	POE		50	20
1CSPC359	Object Oriented Modeling and Design	2	0	2	3	ISE	--		50	20
						ESE	POE		50	20
1CSPE3**	Professional Elective- IV	2	0	2	3	ISE	--		50	20
						ESE	POE		50	20
1CSPR363	Internship/ Intra institute / Inter institute activities	-	-	-	1*	ISE	--		50	20
1CSMC319	Constitution of India	2	0	0	-	ISE	Grade			
Total		21	1	6	24		500		350	
Total Contact Hours/ Week: 28 Hrs										

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*Students shall undergo Internship/ Intra institute / Inter institute activities after B. Tech Semester V examination during winter vacation for 2 weeks. Assessment shall be carried out in B. Tech VI Semester.

Professional Elective- III 1. Software Testing and Quality Assurance - 16 2. Advanced Data Structures - 17 3. Real Time System - 18	Professional Elective – IV 1. Augmented and Virtual Reality - 60 2. Digital Image Processing - 61 3. Open Source Technologies - 62
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Open Elective – II

Courses Code	Course Name	Department
IAEOE321	Lighter Than Air Systems	Aeronautical Engineering
IAEOE322	Airline and Airport Management	
IAEOE323	Flight Scheduling and Operations	
IAUOE310	Vibration based fault diagnosis	Automobile Engineering
IAUOE311	Engineering Tribology	
ICVOE310	Operation Research	Civil Engineering
ICVOE311	Economics And Management	
ICSOE311	Internet of Things	Computer Science and Engineering
ICSOE312	Cyber Laws and Ethical Hacking	
IEEOE306	Electrical Wiring Harnessing	Electrical Engineering
IEEOE307	Electrical Economics & Energy Audit	
0FTOE321	Process Modeling and Simulation	Food Engineering
IMEOE304	Industrial Management and Operation Research	Mechanical Engineering
IMEOE305	Non-Destructive Testing	
IMEOE306	Computational Fluid Dynamics	

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	3	-	-	11	6	3	1
Cumulative Sum	6	24	19	65	12	6	3

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Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	ICSOE301 Database Essentials and Business Intelligence
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSOE301_1	Explain concepts of database system, conceptual database design, relational database model and SQL (K ²)
ICSOE301_2	Design ER diagram for the enterprise as well as prepare the relational database schema for the enterprise using integrity constraints (K ³)
ICSOE301_3	Write queries in SQL (DDL and DML) to design database and extract required information from the database. (K ³)
ICSOE301_4	Explain and Interpret the basic concepts in Business Intelligence (K ²)
ICSOE301_5	Explain concepts of data integration with various approaches demonstrating various case studies (K ²)

Course Contents:

Unit 1	Introduction to databases General introduction to database systems, its advantages and applications, View of Database – Levels of data abstraction, Data models, Database languages, Database System Architecture, Database users and Administrator	05 Hrs.
Unit 2	Database Models ER Model: Entity set, Entity types, attributes, Notations, Relationship sets, Relationship types, Keys- super key, candidate key, primary key, Extended Features of ER Model-Generalization, Specialization and aggregation Real-world problem designs Relational Model: Structure of Relational Database, Reduction of ER model into Relational schemas, Schema-instance distinction, Referential integrity and foreign keys	07 Hrs.
Unit 3	Structured Query Language Introduction to SQL, Data definition statements with constraints, Insert, Update and Delete, Set Operations, Aggregate functions group by and having clauses, Nested Queries, Views, Complex Queries, Joins.	09 Hrs.
Unit 4	Introduction to Business Intelligence Introduction: Introduction to digital data and its types – structured, semi-structured and unstructured, Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLAP). Basics of BI: BI Definitions & Concepts, BI Framework, Data Warehousing concepts and its role in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI	10 Hrs.


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Unit 5	Data Integration & Data Processing Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data –types and sources. Introduction to data quality, data profiling concepts and applications	06 Hrs.
Unit 6	Case study of open source / commercial BI tools Oracle / IBM / Microsoft BI suite, tools: architectures, design and deployment of BI in different domains using these tools.	05 Hrs.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	McGraw Hill Education	6	2011
02	Database Systems- A practical approach to Design, Implementation	Thomos Connolly, Carolyn Begg	Pearson Education.	4	2009
03	Database Systems – Design, Implementation and Management	Rob & Coronel	Thomson Course Technology	5	2008
04	Fundamentals of Business Analytics	R.N. Prasad and Seema Acharya	Wiley publication	2	

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Database Systems: Design, Implementation and management	Peter Rof, Carlos Coronel	Cengage Learning	7	2014
02	Principles of Database Systems	J. D. Ullman	Galgotia publications	1	2011
03	SQL: A Complete Reference	Alexis Leon, Mathews Leon	McGraw Hill Education	1	2002
04	White papers and manuals / documentation from Oracle / IBM / Microsoft site on BI suite / tools.				



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Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	ICSOE302- Software Engineering and Project Management
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/0/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSOE302_1	Illustrate basic concepts and principles of software engineering. (K ²)
ICSOE302_2	Explain analysis, planning & requirement specifications of software project development. (K ²)
ICSOE302_3	Disseminate project management framework and involved in each phase(K ²)
ICSOE302_4	Classify the importance of project plan.(K ⁴)
ICSOE302_5	Apply the relationship between scope, cost, time in project(K ³)

Course Contents:

Unit No.	Unit Name	Contact Hrs
Unit 1	Software Processes Software Process, Desired Characteristics of Software Process, Software Development Process Models, Other Software Processes, Agile software development - Agile methods, Plan-driven and agile development, Extreme programming, Scaling agile methods	07 Hrs
Unit 2	Software Requirements Analysis and Specification Software Requirement, Problem Analysis, Requirements Specification, Functional Specification with Use Cases, validation, metrics, Case study: SRS of library management system.	06 Hrs
Unit 3	Planning a Software Project Process Planning, Effort Estimation, Project Scheduling and Staffing, Software Configuration Management Plan, Quality Plan, Risk Analysis & Management, Project Monitoring Plan, Configuration management, Case Study: Course Scheduling.	08 Hrs
Unit 4	Introduction to Project Management Project and Project Management (PM), Role of project Manager, System view of PM, Organization, Stakeholders, Project phases and lifecycle, Context of IT projects, process groups, mapping groups to Knowledge areas, Case study: JWD consulting's project management intranet site project.	06 Hrs


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Unit 5	Project Integration Management Strategic planning and project selection, Developing a Project Management Plan, Directing and Managing Project Work, Monitoring and Controlling Project Work, Performing Integrated Change Control, Closing Projects or Phases, Case study: Health coverage cost business model	06 Hrs
Unit 6	Project Scope, Time and Cost management Planning Scope Management, Collecting Requirements, Defining Scope, Validating Scope, Controlling Scope, Case study: Scope management plan of Information Technology upgrade project. Planning Schedule Management, Defining Activities, Sequencing and Estimating Activity, Resources & Duration, Developing & Controlling Schedule, Case study: Gantt chart for software launch project. Basic Principles of Cost Management, Planning Cost Management, Estimating Costs, Case study: Surveyor pro project cost estimation	09 Hrs

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	An integrated approach to S/W engineering	Pankaj Jalote	Narosa Publishers	3 rd	2011
2	Fundamentals of Software Engineering	Rajib Mall	PHI	3 rd	2009
3	Information Technology Project Management.	Kathy Schwalbe	Thomson Course Technology	7 th	2007
4	A guide to the Project Management Body of Knowledge	Andrew S. Tanenbaum	Prentice Hall	5 th	2011

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Software Engineering	Ian Sommerville	Pearson	10 th	2016
2	Software Engineering: Practitioner's Approach	Roger S. Pressman	McGraw Hill	7 th	2010
3	Project Management Core Textbook	Mantel Jr., Meredith, Shafer, Sutton with Gopalan	Wiley	1 st	2006
4	Project Management	Harold Kerzner	Wiley	10 th	2013

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Course Details:

Class	B. Tech SemV
Course Code & Course Title	ICSOE303 Data Structures and Algorithms
Prerequisite/s	ICSES156-Computer Programming
Teaching Scheme (Lecture/Practical/Tutorial/Drawing)	03/0/0
Credits	03
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs) : The students will be able to:

ICSOE303_1	Describe fundamentals in data structures. (K ²)
ICSOE303_2	Explain the fundamental concepts of structuring, managing and organizing the data using linear data structures with ADTs. (K ²)
ICSOE303_3	Apply appropriate linear data structure to solve the problems. (K ³)
ICSOE303_4	Explain the fundamental concepts of structuring, managing and organizing the data using non-linear data structures with ADTs. (K ²)
ICSOE303_5	Apply appropriate non-linear data structure to solve the problems. (K ³)
ICSOE303_6	Compare and analyze different data structure algorithms and searching, sorting methods. (K ⁴)

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	Basics of Data Structures: Algorithm, ADT, Space and Time Complexity, Direct and Indirect recursion, analysis of recursive functions e.g. Towers of Hanoi	4 Hrs
Unit 2	Lists Definition, representation, operations, implementation and applications of singly, doubly and circular linked lists.	9 Hrs
Unit 3	Stack and Queue Stacks as ADT, operations, representation using static and dynamic structures, applications of stack Queue as ADT, operations, representation using static and dynamic structures, circular queue, priority queue, double ended queue.	8 Hrs
Unit 4	Searching and Sorting Techniques Linear search, binary search, Internal and External Sorts, bubble sort, selection sort, insertion sort, merge sort, quick sort, radix sort. Introduction to hashing and hash functions.	9 Hrs
Unit 5	Trees Basic terminology, representation, binary tree, traversal methods, binary search tree, Introduction to Heap.	7 Hrs
Unit 6	Graphs Basic concept of graph theory, storage representation: adjacency matrix, adjacency list, graph traversal techniques- BFS and DFS	5 Hrs


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structures- A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzon	Cengage Learning	2 nd	2004
2	Data Structures with C Schaum's Outlines Series	S. Lipschutz	Tata McGraw-Hill	-	2017
3	Data Structure using C	ReemaThareja	Oxford	2 nd	2014

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structure using C	A. M. Tanenbaum, Y. Langsam, M. J. Augenstein	Prentice-Hall Of India Pvt. Limited	-	2003
2	Understanding Pointers in C	YashavantKanetkar	BPB Publication	1 st	2009
3	C and Data Structures	N. B. Venkateshwarlu, E. V. Prasad	S. Chand and Company	-	2010
4	Let Us C	YashavantKanetkar	BPB Publication	15 th	2016

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TY CSE - 06169

Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	1CSPC304- System Programming and Compiler
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/1
Credits	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC304_1	Explain the fundamentals of language processing. (K ²)
1CSPC304_2	Design an assembler and macro preprocessor. (K ³)
1CSPC304_3	Identify a language processor for specific needs. (K ¹)
1CSPC304_4	Explain various stages of compiler construction. (K ²)
1CSPC304_5	Design a parser using different techniques. (K ³)

Course Contents:

Unit 1	Language Processors Introduction, language processing activities, Fundamentals of language processing, Toy Compiler, Fundamentals of language Specifications	06 Hrs.
Unit 2	Assemblers and macro preprocessor Elements of assembly language programming, a simple assembly scheme, pass structure of assemblers, design of a two pass assembler Macro definition and call, Macro Expansion, Nested macro calls, Advanced macro facilities, Design of macro preprocessor	10 Hrs.
Unit 3	Interpreters, Linkers and Loaders Interpreters, Relocation and linking concepts, design of a linker, Self-relocating programs, linking for overlays, Loaders.	05 Hrs.
Unit 4	Introduction to Compiling Compilers, Phases of a compiler, Compiler construction tools Lexical Analysis: Role of a Lexical analyzer, input buffering, specification and recognition of tokens, finite automata implications, designing a lexical analyzer generator.	07Hrs.
Unit 5	Syntax Analysis Role of Parser, Top- down parsing, Recursive descent and predictive parsers (LL), Bottom-Up parsing, Operator precedence parsing, LR, SLR and LALR parsers models, Syntax directed definitions,	10 Hrs.
Unit 6	Code Generation Code Optimizing transformations, Issues in design of Code Generation, target language, addresses in target code, Basic blocks and flow graph, optimization of basic blocks, A simple code generator	04 Hrs.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	System Programming	D M Dhamdhare	Tata McGraw-Hill	First Reprint	2011
02	System Programming and Operating System	D M Dhamdhare	Tata McGraw-Hill	2	2006
03	Compilers - Principles, Techniques and Tools	A.V. Aho, R. Shethi and J.D. Ullman	Pearson Education	1	1999
04	Crafting A Compiler with C	Charles Fischer, Richard LeBlanc	Pearson Publication	1	2007

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Compiler Construction-Principles and Practices	Kenneth C.Louden	Vikas Publication House	1	2003
02	Compiler Construction using Java, Javacc and Yacc	A. J. DosReis	Wiley	1	2015
03	System Programming	J. J. Donovan	Tata McGraw-Hill	1	2001
04	Writing compilers and Interpreters	Ronald Mak	Wiley	3	2015

Tutorial List

Tut. No.	Title of Tutorial	Compulsory or Optional	PO Mapped
1	Toy Compiler Intermediate code generation for given program	Compulsory	3
2	Symbol table generation Symbol table generation by applying Pass-I of assembler	Compulsory	4
3	Mnemonic Verification Verification of mnemonic operands using mnemonic table by applying Pass-I of assembler	Compulsory	4
4	Intermediate Code generation Intermediate code generation by applying Pass-I of assembler	Compulsory	4
5	Pass-II of assembler Machine language code generation by applying Pass-I of assembler	Compulsory	4
6	Macro Call and Nested Macro calls Write macro for given statement and write expanded statements after calling that macro	Compulsory	4
7	Macro Preprocessor Apply algorithm of processing of macro definition and macro expansion on given program	Compulsory	4


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8	Linker Binary program generation for given program by applying linking and relocation algorithm	Compulsory	4
9	Loader Study of different types of loaders	Compulsory	4
10	Top Down Parsing Design of top down parser	Compulsory	4
11	Bottom up Parsing Design of bottom up parser	Compulsory	4
12	Code Optimization Apply optimizing transformations on given program	Compulsory	4



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TY CSE - 09/69

Course Details:

Class	B. Tech, Sem. V
Course Code & Course Title	1CSPC305-Design and Analysis of Data
Designation as	Compulsory
Prerequisite/s	1CSPC202
Teaching Scheme (Lecture/Practical/Tutorial/Drawing)	3/0
Total Contact Hours: Theory/Practical/Tutorial/Drawing	42 Hours
Credits	03
Evaluation Scheme: ISE/ESE	10/30/10/50

Course Outcomes (COs) :

Upon successful completion of the course, the students will be able to:

1CSPC305_1	Explain different design methods of algorithm. (K ²)
1CSPC305_2	Explain solvability, unsolvability of a problem and computational models of parallel algorithm. (K ²)
1CSPC305_3	Apply different design methods of algorithm. (K ³)
1CSPC305_4	Apply different search techniques for efficient graph traversal. (K ³)
1CSPC305_5	Analyze complexity of different algorithm designs. (K ⁴)

Course Contents:

Unit 1	Divide and Conquer Method Recurrence Equations and their solution, Randomized Algorithms, The general method, Binary search, Finding the maximum and minimum, Merge sort, Quick sort, Selection, Convex Hull.	08 Hrs.
Unit 2	The Greedy Method The general method, Knapsack problem, Job sequencing with deadlines, minimum-cost spanning trees – Prim's and Kruskal's Algorithms, Optimal storage on tapes, Graph coloring problem, Single source shortest path.	06 Hrs.
Unit 3	Dynamic Programming The general method, Multistage graphs, All pair shortest paths, Optimal binary search trees, 0/1 knapsack, Reliability design, Traveling Sales person problem.	07 Hrs.
Unit 4	Basic Traversal and Search Techniques Techniques for Graphs, AND/OR graphs, Connected components and Spanning Trees, Biconnected components and depth first search	07 Hrs.
Unit 5	Backtracking and Infeasibility Backtracking: The general method, 8-queen problem, sum of subsets, Hamiltonian Cycle, Graph Coloring Infeasibility: P and NP-classes, NP-hard problems	09 Hrs.
Unit 6	Parallel Computational models PRAM, MESH, HYPERCUBE - Fundamental Algorithms	05 Hrs.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Computer Algorithms	Ellis Horowitz, Satraj Sahani, Saguthevar Rajasejaram	University Press	2	2008
02	Introduction to Algorithms	Thomas Cormen, Charles Leiserson, Ronald Rivest, Clifford Stein	PHI	3	2009
03	Algorithms in a Nutshell	G. T. Heineman, G. Pollice, S. Selkow	O'Reilly	1	2008
04	Fundamentals of algorithms	G. Brassard, P. Bratley	Pearson Education	1	2015

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Design and Analysis of Algorithms	Aho, Hopcraft and Ullman	Pearson Education	1	2000
02	Algorithms	Kenneth Berman, Jerome Paul	CENAGE Learning	1	2010
03	Algorithms	Robert S., Kevin W.	Pearson Education	4	2014
04	Introduction to Design and Analysis of Algorithms	Anany Levitin	Pearson Education	1	2008



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TYCSE-11/69

Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	1CSPC306-Internet of Things
Prerequisite/s	1CSPC107-Data Communication 1CSPC203-Computer Networks
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC306_1	Describe fundamental mechanisms of Internet of Things. (K ²)
1CSPC306_2	Function of RFID technology with respect to components & its working. (K ⁴)
1CSPC306_3	Design applications of Internet of Things. (K ³)
1CSPC306_4	Summarize the different wireless technologies for the IoT. (K ²)
1CSPC306_5	Analyze the components needed to prototyping of various application. (K ⁴)

Course Contents:

Unit 1	Introduction to IoT Introduction, Physical design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Level and Deployment Templates.	07 Hrs.
Unit 2	Fundamental IoT mechanisms & key technologies Identification of IoT objects and services, Structural aspects of the IoT, Environment Characteristics, Traffic characteristics, scalability, Interoperability, Security and Privacy, Open architecture, Key IoT Technologies, Device Intelligence, Communication capabilities, Mobility support, Device Power, Sensor Technology, RFID technology, Satellite Technology.	05 Hrs.
Unit 3	Radio Frequency Identification Technology Radio Frequency Identification Technology: Introduction, Principles of RFID, Components of an RFID system, Reader, RFID tags, RFID middleware, Issue. Wireless Sensor Networks: History and context, The node, connecting nodes, networking nodes, securing communication.	09 Hrs.
Unit 4	Layer ½ Connectivity: Wireless Technologies for the IoT WPAN Technologies for IoT/M2M: Zigbee /IEEE 802.15.4, Radio Frequency for consumer Electronics (RF4CE), Bluetooth and its low-energy profile, IEEE 802.15.6 WBANS, IEEE 802.15 WPAN TG4j, MBANS, NFC, dedicated short range communication (DSRC) & related protocols. Comparison of WPAN technologies Cellular & mobile network technologies for IoT/M2M. Overview and Motivations, Universal Mobile Telecommunication System, LTE	06 Hrs.
Unit 5	Prototyping Thinking about prototyping: Sketching, familiarity, Costs versus Ease of Prototyping, Prototypes and Production, Open Source versus Closed Source Prototyping Embedded Devices: Electronics: Sensors, Actuators, Scaling up the Electronics; Embedded computing basics, Arduino, Raspberry Pi	07 Hrs.


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Unit 6	Case studies Illustrating IoT design: Home automation: Smart lighting, Home intrusion detection, Cities: Smart parking, Environment: Whether monitoring system, Weather reporting bot, Air pollution monitoring, Forest fire detection, Agriculture: Smart irrigation, Productivity applications: IoT printer	08 Hrs.
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	"Internet of Things: A Hands-On Approach"	Vijay Madiseti, ArshdeepBahga	Universities Press (India) Private Limited	1st edition	2016
02	The Internet of Things, Connecting Objects to the Web	HakimaChaouchi	Wiley Publications	1st edition	2010
03	Building the Internet of Things with IPv6 and MIPv6 The Evolving World of M2M Communications	Daniel Minoli	Wiley Publications	1st edition	2015
04	Designing the Internet of Things	Adrian McEwen, hakim Cassimally	Wiley	Reprint	2015

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Architecting the Internet of Things	Bernd Scholz-Reiter, Florian Michahelles	ISBN 978-3842-19156-5, Springer.	1 st	2011
02	The Internet of Things: Key Applications and Protocols	Olivier Hersent, David Boswarthick, Omar Elloumi	ISBN 978-1-119-99435-0, Wiley Publications.	2 nd	2012
03	Internet of Things, A Hands on Approach	ArshdeepBahga, Vijay Madiseti	University Press,	1st edition.	2015
04	"Sensors Handbook",	SabrieSoloman,	McGraw Hill,	2nd edition	2015

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TY CSE-19/169

Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	1CSPE307- Professional Elective- I Storage Networks
Prerequisite/s	1CSPC203,1CSPC208
Teaching Scheme: Lecture/Tutorial	03
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPE307_1	Explain different storage system and its components. (K ²)
1CSPE307_2	Apply different techniques to evaluate the performance of storage system.(K ³)
1CSPE307_3	Distinguish different storage network virtualization technologies. (K ⁴)
1CSPE307_4	Identify business continuity, backup & recovery process of storage network. (K ³)
1CSPE307_5	Describe replication and storage security mechanisms. (K ²)

Course Contents:

Unit 1	Introduction to information storage and Storage System Environment Evolution of storage technology and architecture, Data Center Infrastructure, Key Challenges in Managing Information, Information Lifecycle, Components of Storage, System Environment, Disk Drive Components, Disk Drive Performance, Laws governing disk Performance, Logical Components of Host, Application requirements and disk Performance.	07 Hrs
Unit 2	Intelligent Storage System Components of Intelligent Storage System, Intelligent Storage Array. Direct attached Storage – types, benefits and limitation, Disk drive Interface, Introduction to parallel SCSI, SCSI command model. RAID - Implementation of RAID, RAID array components, RAID levels, Hot Spares	05 Hrs
Unit 3	Storage Area Network and Network Attached Storage SAN – Evolution, Components of SAN, Fibre Channel Protocol Stack Links, ports and topologies, Fibre Channel SAN – point-to- point topology, Fabric topology, Arbitrated loop topology. NAS - Local File Systems, Network File System and File Servers, Benefits of NAS, NAS file I/O, Components of NAS, NAS Implementations, NAS File sharing Protocols, NAS I/O operations, Factors affecting NAS Performance.	09 Hrs
Unit 4	Storage Virtualization Definition of Storage virtualization; Implementation Considerations; Storage virtualization on Block and file level; Storage virtualization on various levels of the storage Network; Symmetric and Asymmetric storage virtualization in the Network.	06 Hrs

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Unit 5	Business Continuity, Backup and Recovery Introduction, Information Availability, Cause of Information unavailability, Measuring information Availability, Consequences of down time, BC terminology, BC planning life cycle, Failure Analysis, BC Technology Solutions, Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods, Backup Process, Backup and Restore Operations, Backup Topology, Backup in NAS environment, Backup Technologies	09 Hrs
Unit 6	Replication and Storage Security Local Replication, Uses of Local Replicas, Data Consistency, Local Replication Technologies, Restore and Restart Considerations, Storage Security Framework, Risk Triad, Storage Security Domains, Security Implementations in Storage Networking	06 Hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Information Storage and Management	G. Somasudaram	EMC Education Services (Wiley India Edition)	1	2010
2	Storage Networks Explained	Ulf Troppen, Rainer Erkens, Wolfgang Müller	(Wiley India Edition)	1	2008
3	Storage Networks-The Complete Reference	Robert Spalding	Tata McGraw Hill	1	2003
4	Storage Network Management and Retrieval	Vaishali D. Khairnar, Nilima M. Dongre	Wiley	1	2016

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Storage Networking Fundamentals: An Introduction to Storage Devices, Subsystems, Applications, Management, and File Systems (Vol 1)	Marc Farley	Cisco Press	1	2005
2	Information Storage and Retrieval	R. Korfhage	Wiley	1	1997
3	Storage Area Network Essentials: A Complete Guide to Understanding and Implementing SANs	Richard Barker and Paul Massiglia	Wiley	1	2001
4	Using SANs and NAS	W. Curtis Preston,	O'Reilly	1	2002


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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	1CSPE308- Professional Elective- I Ad hoc Networks
Prerequisite/s	
Teaching Scheme: Lecture/Tutorial	3/1
Credits	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPE308_1	Explain basic cellular and ad hoc wireless network and its applications. (K ²)
1CSPE308_2	Analyze issues, goals and challenges for designing ad hoc wireless network (K ⁴)
1CSPE308_3	Summarize security in ad hoc wireless network (K ²)
1CSPE308_4	Describe QoS and energy management schemes in ad hoc wireless networks.(K ²)
1CSPE308_5	Distinguish different types of ad hoc wireless network protocols (K ⁴)

Course Contents:

Unit 1	Introduction to Ad-hoc wireless networks: Cellular and Ad Hoc wireless networks, Applications, Issues in Ad Hoc wireless networks, Ad hoc wireless Internet. Introduction to vehicular ad hoc networks and its applications.	06 Hrs.
Unit 2	MAC Protocols for Ad-hoc wireless networks Introduction, Issues in designing MAC protocol, Design goals of MAC protocol, Classification of MAC protocols, Contention based protocols :- MACAW, Busy Tone Multiple Access, MACA-By Invitation, Media Access with Reduced Handshake.	07 Hrs.
Unit 3	Routing protocols for Ad-hoc wireless networks Introduction, Issues in designing a routing protocol for ad hoc wireless networks, Classification of routing protocols, Table driven protocols :- DSDV, WRP, CGSR; On-Demand :- DSR, AODV, LAR, ABR, SSA, Hybrid routing protocols:-ZRP, ZHLS.	08 Hrs.
Unit 4	Multicast Routing in Ad hoc wireless networks Introduction, Issues in designing a multicast routing protocol, Operation of multicast routing protocols, An architecture reference model for multicast routing protocols, Classification of multicast routing protocols, Tree-based Multicast Routing Protocols:- BEMR, MZRP, ABAM MAODV; Mesh-based multicast routing protocols:- ODMRP, DCM, NSMP, CAMP.	08 Hrs.
Unit 5	Transport layer and security protocols for ad hoc wireless networks Introduction, Design issues and goals, Classification of transport layer solutions,	08 Hrs.

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	TCP over ad hoc wireless networks: - TCP-F, Ad Hoc TCP, Split TCP; Security in ad hoc wireless networks:- Network security requirements, Issues and challenges in security provisioning, Network security attacks, Secure routing protocol - SAR, Security-Aware AODV Protocol	
Unit 6	Quality of service & Energy Management :- Introduction, Issues and challenges, Need, Classification of QoS solutions and energy management scheme, QoS framework – INSIGNIA, System Power Management schemes	05 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Ad Hoc wireless Networks – Architecture and Protocols	C.S.R.Murthy& B.S. Manoj	Pearson Education	11	2012
02	Ad Hoc Networking	Charles E. Perkins	Pearson Education	3	2011
03	Mobile AD HOC Networking, Student Edition	Stefano Basagni, Marco Conti, Silvia Giordano, Ivan Stojmenovic	Pearson Publication	1	2010
04	The Handbook of Ad Hoc Wireless Networks	Mohammad Ilyas Florida Atlantic University Boca Raton, Florida	CRC Press LLC	1	2003

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Ad Hoc Wireless Networks – A communication Theoretic perspective	O.K.Tonguz&G.Ferrari	Wiley India	1	2013
02	Introduction to Wireless and Mobile Systems	Dharma Prakash Agrawal & Qing-An Zeng	CENGAGE Learning	3	2012
03	Mobile AD HOC Networking, Student Edition	Stefano Basagni, Marco Conti, Silvia Giordano, Ivan Stojmenovic	Pearson Publication	1	2010
04	The Handbook of Ad Hoc Wireless Networks	Mohammad Ilyas Florida Atlantic	CRC Press LLC	1	2003


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Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	ICSPE309 Professional Elective- I Cyber Security
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial	3
Credits	03
Evaluation Scheme: ISE I / MSE/ISE II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE309_1	Explain concepts of cyber security and classify different cyber-attacks. (K2)
ICSPE309_2	Describe different cyber security safeguards including intrusion detection and prevention and firewalls. (K3)
ICSPE309_3	Illustrate different web services, applications and related cyber-attacks and crimes. (K3)
ICSPE309_4	Analyze different types of possible attacks in a real world cyber world scenario. (K4)
ICSPE309_5	Apply the scientific method to cyber forensics and ethical Hacking. (K3)
ICSPE309_6	Review and justify the penalty from IT Act-2000 for a cybercrime in a given situation. (K5)
ICSPE309_7	Communicate effectively cybercrime terminologies and security mechanisms in both oral and written form during tutorial sessions. (A2)

Course Contents:

Unit 1	<p>Basics of Cyber Crimes</p> <p>Overview of Cyber Space/World- Cyber Crime/Offense, Cyber Defence, Cyber Warfare, Cyber terrorism, Cyber Espionage, Recent Cyber Crime Cases, Impact on Society, Reasons for Commission of Cyber Crimes</p> <p>Vulnerabilities and Threats - Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Weak Authentication, Poor Cyber Security Awareness.</p> <p>Attacks - SQL Injections, Cross-site scripting, Virus dissemination, Logic bombs, Denial-of-Service attack, Phishing, Computer vandalism, Email bombing and spamming, Web jacking, Cyber stalking, Data diddling, Identity Theft and Credit Card Fraud, Salami slicing attack, Cyber-squatting, Software Piracy, case studies of real world attacks</p> <p>Internet Governance – What is it? Actors, Challenges and Constraints, Need for a Comprehensive Cyber Security Policy, Need for an International convention on Cyberspace.</p>	07 Hrs.
Unit 2	<p>Cyber Security Safeguards:</p> <p>Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters,</p> <p>Authentication and Remote Access - User, Group, and Role Management - Password Policies - Single Sign-On - Security Controls and Permissions -</p>	07 Hrs.

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	Preventing Data Loss or Theft - The Remote Access Process - Remote Access Methods Intrusion Detection Systems- IDS Overview - Network-Based IDSs - Host-Based IDSs- Intrusion Prevention Systems - Honeypots and Honey nets Firewalls – Types, Security policy, Threat Management, case studies.	
Unit 3	Prevention of Cybercrimes and Legal Perspectives Preventing Cyber Crime – Password Protection guidelines, Cyber Security Guidance for Business, Smartphone security Guidelines, Safe browsing guidelines for social networking sites, Operational and Organizational Security- Cyber Security Awareness and Training, Policies, Procedures, Standards, and Guidelines – with case studies. Introduction to Cyber Laws, E-Commerce and E-Governance, Need of Cyber laws- The Indian context, counter cyber security initiatives in India, Certifying Authority and Controller, Offences under IT Act 2000, Digital signature and the Indian IT Act, Computer Offences and related penalties under IT Act 2000, Amendments in Indian IT Act 2008	07Hrs.
Unit 4	Securing Web Application, Services and Servers Threats to web assets, Overview of Web services, Basic security for HTTP Applications and Services- Basic Authentication, Transport Layer Security, Server Authentication, Application to REST Services- GSS-API Negotiated Security, Basic Security for SOAP Services- SOAP-based Web Services, WS-Security Overview, Identity Management and Web Services- Security Assertion Markup Language, Advanced HTTP Security, Authorization Patterns , Avoiding Common Errors, Challenges.	07Hrs.
Unit 5	Digital Forensics Introduction to Cyber Forensics, Computer Equipment and associated storage media, Role of forensics Investigator, Handling Preliminary Investigations, Forensics Investigation Process, Controlling an Investigation, Conducting disk-based analysis, Investigating Information hiding, Collecting Network based Evidence, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Writing Computer Forensics Reports- case studies,	07Hrs.
Unit 6	Ethical Hacking Ethical hacking Terminology, types of hacking technologies, phases of ethical hacking, Foot Printing, Social Engineering, Scanning and enumeration, Understanding the password hacking techniques, Session hijacking, Google Hacking, Windows Hacking, Linux Hacking, Email hacking with case studies, Incident handling and response with case studies.	07Hrs.



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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Cyber Security	Nina Godbole&SunitBelapure,	Wiley India	1	2011
02	Cyber Space and Cyber Security	George K. Kostopoulous	CRC Press	1	2013
03	Computer Forensics and Investigations	Nelson Phillips and EnfingerSteuart	Cengage Learning, New Delhi,	1	2009
04	Hacking Exposed Web Application	Joel Scambray, Vincent Liu, Caleb Sima	McGraw-Hill Education	3	2010

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Cyber Security Essentials	James Graham, Richard Howard, Ryan Olson, CRC Press, Taylor	An Auerbach Book	1	2010
02	Computer Forensics and Cyber Crime	Marjie T. Britz,	Pearson	3	2013
03	Cyber Law Simplified	VivekSood	TMH	1	2002
04	Cryptography and Security	CK Shyamala et el.,	Wiley India Pvt. Ltd	4	2018

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TY CSE-20/69

Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	1CSPC351- Design and Analysis of Algorithm Laboratory
Prerequisite/s	1CSPC202
Teaching Scheme: Practical	2
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC351_1	Apply different design methods of algorithm. (K ²)
1CSPC351_2	Analyze complexity of different algorithm designs. (K ⁴)
1CSPC351_3	Communicate effectively and work in a team for laboratory activities. (S ²)
1CSPC351_4	Practice rules to provide the solution for designing algorithms.(A ³)
1CSPC351_5	Follow professional and ethical principles during laboratory. (A ²)

Course Contents:

1	Programs based on Finding the maximum and minimum using iterative version and divide & conquer method. Compare the time complexity of both.
2	Program based on Convex Hull.
3	Program based on general method of Greedy Method.
4	Program based on Greedy Method.
5	Program based on minimum-cost spanning trees.
6	Program based on General method of Dynamic Programming.
7	Program based on Dynamic Programming.
8	Program based on general method of backtracking.
9	Program based on backtracking.
10	Program based on AND/OR graph.
11	Using OpenMP, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Let Us C	YashwantKanetkar	BPB	3	2011
02	Fundamentals of Computer Algorithms	Ellis Horowitz, SatrajSahani, SaguthevarRajasejaram	University Press	2	2008
03	Data Structures- A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzon	PWS Publishing Company	2	2004
04	Introduction to Algorithms	Thomas Cormen, Charles Leiserson, Ronald Rivest, Clifford Stein	PHI	3	2009


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Design and Analysis of Algorithms	Aho, Hopcraft and Ullman	Pearson Education	1	2000
02	Algorithms	Kenneth Berman, Jerome Paul	CENAGE Learning	1	2010
03	Algorithms	Robert S., Kevin W.	Pearson Education	4	2014
04	Introduction to Design and Analysis of Algorithms	AnanyLevitin	Pearson Education	1	2008



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Course Detail:

Class	B. Tech, Sem. VI
Course Code and Course Title	ICSPC352 Web Programming
Prerequisite/s	ICSES254, 0CSES256
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	03
Evaluation Scheme: ISE/ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPC352_1	Develop web page using different web programming techniques. (K ³)
ICSPC352_2	Build web application using Javascript and JQuery. (S ³)
ICSPC352_3	Build responsive Web Page.(S ³)
ICSPC352_4	Build simple websites by using CMS.(S ³)
ICSPC352_5	Examine the observations and determine the result of experiment. (A ²)

Course Contents:

Unit 1	Responsive web design with HTML5 and CSS3 Getting started with HTML 5, CSS3 and Responsive web design, Media Queries: Supporting Differing Viewports, Embracing Fluid Layout, HTML 5 for Responsive Design, CSS3: Selectors, Typography and color Modes, Stunning Aesthetics with CSS3, CSS3 Transitions, Transformations and Animations, Conquer Forms HTML5 and CSS3.	06 Hrs
Unit 2	JavaScript & JQuery Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: JavaScript and objects, JavaScript own objects, the DOM and web Browser environments, Manipulation using DOM, forms and validations, DHTML: Combining HTML, CSS and JavaScript, Events and buttons. Introduction to JQuery, basics of JQuery, syntax selectors, events, JQuery HTML, JQuery examples.	04 Hrs
Unit 3	XML Introduction to XML, uses of XML, simple XML, and XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT.	04 Hrs.
Unit-4	Basics of PHP Introducing PHP: History, General Language Feature PHP Basics: Embedding PHP code in Your Web Pages, Commenting Your Code, Outputting Data to the Browser, PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures Functions: Invoking a Function, Creating a Function, Function Libraries Array: What is Array?, Creating an array, outputting an Array, Merging, slicing, splicing and Dissecting Arrays, Other useful Array Functions	06 Hrs.


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Unit 5	Advanced Topics in PHP Strings and Regular Expressions: Regular Expressions, Other String-Specific Functions, Alternatives for Regular Expression Functions Working with HTML Forms: PHP and Web Forms, Validating Form Data Handling File Uploads: Uploading Files with PHP Using PHP with MySQL: Installation Prerequisites, Using the MySqli Extension, Interacting with the Database, Executing Database Transactions Session Handlers: What Is Session Handling, Configuration Directives, Working with Sessions,	04 Hrs.
Unit 6	Content Management System Exploring CMS terminology, installation of CMS (Drupal/WordPress/Joomla), extending CMS, CMS theming, User management and permissions in CMS.	04 Hrs.

Experiment List:

1	Programs based on newly introduced elements of HTML5.
2	Programs based on Typography and background properties of CSS3, animation effect by using the transition feature of CSS.
3	Programs based on JavaScript operators, functions and objects.
4	Programs based on JQuery selectors, JQuery events.
5	Program to demonstrate concept of DTD and its types.
6	XSLT styles-sheet to convert XML document to HTML.
7	program to implement PHP variables, Expression, arrays, control structure
8	Design a web form and validate it using PHP using regular expressions
9	Design a web page to perform CRUD operations on MySQL database using PHP
10	Write a program to manage session in PHP
11	Installation of CMS and designing web pages using CMS.
12	CMS theming and plugins

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Advanced Internet Technology	Deven Shah	Dreamtech Press	1	2015
02	XML in a Nutshell	ElliotteRustyHarold, W. Scott Means	O'Reilly Publication	3	2004
03	Web Technologies: Black book	Kogent Learning Solutions Inc.	Dreamtech Press	1	2009
04	Web Content Management	Deane Barker	O'Reilly Media	1	2016

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Learning PHP, MySQL, Java Script, CSS and HTML5	Robin Nixon	O'really	3	2014
02	Learning PHP, MySQL, Java Script with JQuery, CSS and HTML5	Robin Nixon	O'really	4	2012
03	Search Engine Optimization All-in-One For Dummies	Bruce Clay	John Wiley & Sons	3	2015
04	Learning Responsive Web Design: A Beginner's Guide	Clarissa Peterson	O'Reilly Media, Inc.	1	2014



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Course Details:

Class	B. Tech, Sem.V
Course Code and Course Title	ICSPE353 – Advanced Programming
Prerequisite/s	1CSES257
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	03
Evaluation Scheme: ISE/ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE353_1	Apply programming basics of Python and Ruby on Rails. (K ³)
ICSPE353_2	Build applications for data manipulation using Python programming language. (S ³)
ICSPE353_3	Build an applications using control structures in Python Programming language. (S ³)
ICSPE353_4	Make use of OOP concepts using Python and Ruby on Rails programming language. (K ³)
ICSPE353_5	Examine the observations and determine the result of experiment. (A ²)

Course Contents:

Unit 1	Basics of Python Features of Python, Identifiers, Reserved Keywords, Variables, Comments, Indentation in Python, Multi-line Statements, Quotes, Input-Output-import functions, Operators, Data Types and Operations	03 Hrs.
Unit 2	Flow control, Functions and database Decision making, Loops, control statements, Function definition, Function calling arguments, Exception Handling python collections, Decorators, Database Programming -Connecting to database , Files I/O,	05 Hrs.
Unit 3	Python Advanced Classes/Object, Python Data Model, Regular Expressions, lambda function, Multithreading, XML parsing, socket, python Design Patterns-decorator, generator, single ton, switcher, GUI Programming, CGI Programming(Django)	06 Hrs.
Unit 4	Introduction of Ruby Introduction to Ruby, Ruby installation with RVM, IRB-Ruby Shell, Ruby Operators and Expressions, Numeric Methods, string methods, Ruby Data Types, Types of Variables, Ruby Naming Convention, control structures, Loops	03 Hrs.
Unit 5	Classes and Objects in ROR Ruby Methods, class methods, OOPs, Methods Advanced: Arguments, Visibility, Constants, Arrays, Hashes, Ruby class, creating Ruby object, Ruby methods, String Classes, Regular expression, Modules, Inheritance, Exception handling, simple web application using rails.	07 Hrs.
Unit 6	Ajax on Rail and File uploading Layout: Adding Style Sheet, How Rails Implements Ajax, AJAX Example, Creating an Application ,Creating an Ajax ,file uploading	04Hrs.


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Experiments List:	
1	Simple program for introduction with python and their data types
2	Program based on loops and control statements with Python collections
4	Program Based on Exception Handling
3	String operations, indexes and lambda functions
4	program for OOPs
5	Program based on Design Patterns
6	Program based on multithreading and multiprocessing
7	Program based on Socket and Socket I/O
8	Python GUI programming with PyQT5
9	Program Based on Django
10	Installation of Ruby and study of ruby framework
11	Implement program on variable declaration and control structure and looping.
12	Implement program on arrays and hashes
13	Implement program on classes , objects a and methods
14	Implement program on Inheritance
15	Implement program on exception handling in ruby
16	Implement program for creating web application using rails.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to computing and Problem Solving with Python	Jeeva Jose and SojanLal	Khanna Book Publishing Co. (P) Ltd	1	2016
02	Programming Python	Mark Lutz	O'reilly	2	2001
03	Ruby Cookbook	Lucas Carlson and Leonard Richardson	O'reilly	2	2006
04	Ruby on Rails For Dummies	Barry Burd	Wiley	Paperback	2007

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	RUBY ONRAILS TUTORIAL: Learn Web Development with Rails	Michael Hartl	Addison Wiley	4 th	2016
02	Introducing Python Modern Computing in Simple Packages	LubanovicBil	O'reilly	1 st	2014



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TY CSE - 27/69

Course Details:

Class	B.Tech-Sem-V
Course Code and Course Title	ICSPE354- Professional Elective- II Computer Graphics & Multimedia Techniques
Designated as	Compulsory
Prerequisite/s	IBSES112
Teaching Scheme (Lecture/ Practical)	02/02
Total Contact Hours: Theory/Practical	28/14/00/00 Hours
Credits	03
Evaluation Scheme: ISE/ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE354_1	Explain graphics primitives and core concepts of computer graphics. (K ²)
ICSPE354_2	Apply computer graphics concepts and algorithms for problem solving (K ³)
ICSPE354_3	Apply various curve theorems and animation techniques for real time problems (K ³)
ICSPE354_4	Demonstrate programs for various graphics algorithms. (A ³)
ICSPE354_5	Proficiently use knowledge in computer graphics to build various computer animations. (S ³)

Course Contents

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction: Introduction of OpenGL, Glut, Function of OpenGL, Glut, Glut Library	02 Hrs.
Unit 2	Transformations Basic 2D & 3D transformations: Translation, Rotation, Scaling, Reflection, Multiple Transformations, Homogenous Coordinate, Rotation about an axis parallel to a coordinate axis, rotation about an arbitrary axis in space.	06 Hrs.
Unit 3	Raster Scan Graphics DDA Line drawing Algorithm, Bresenham's line and circle drawing algorithms, Frame Buffer, Anti-aliasing, Seed fill algorithms.	06 Hrs.
Unit 4	Viewing and clipping: Introduction, Windowing and View-porting, Introduction to clipping, Point clipping, and line clipping: Sutherland - Cohen line clipping algorithm, polygon clipping algorithm	03 Hrs.
Unit 5	Curves and Surfaces : Curve Representation, Non-parametric and parametric curves, Bezier curves and B-spline curves, Z- buffer, Warnock algorithm..	06 Hrs.
Unit 6	Computer Animation: Introduction, Key frame animation, Construction of an animation sequence, Motion control methods, Procedural animation, Introduction to Morphing, Warping techniques, Multimedia Technique.	05 Hrs.

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Laboratory list

Expt. No.	Title of Experiment
1.	Introduction to OpenGL and GLUT Menu
2.	Installation of OpenGL
3.	Implementation of 2D transformation
4.	Implementation of 3D transformation
5.	Implementation of DDA line drawing algorithm
6.	Implementation of Bresenham's line algorithm
7.	Implementation of Bresenham's circle algorithm
8.	Implementation of flood fill algorithm.
9.	Implementation of Boundary fill algorithm.
10.	Implementation of Cohen Sutherland line clipping algorithm
11.	Implementation of Sutherland- Hodgman polygon clipping algorithm
12.	Implementation of Bezier curve and its properties.
13.	Miniproject -Implementation of Moving Object (Animation)

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Principles of Computer Graphics Theory and Practice Using OpenGL-(For Units 1)	Maya, ShaliniGovil-Pai	Springer	Personal Learning Edition	2009
2	Mathematical elements for Computer Graphics-(For Units 2)	David F. Rogers, J. Alan Adams	MGH Int.	Second	2002
3	Procedural elements for Computer Graphics-(For Units 3,4)	David F. Rogers	MGH Int.	Second	2008
4	Computer Graphics-(For Unit 5,6)	Rajesh Maurya	WILEY India	-	-

Reference Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Principles of Interactive Computer Graphics	Newman Sproul	MGH	Second	1995
2	Computer Graphics	Zhigang Xiang & Roy Plastock (Schaum's	Outline Series, TMGH).	Second Edition	2009
3	Computer Graphics Using OpenGL	F.S. Hill Jr. Stephen M. Kelley,	Pearson Education	-	-
4	Computer Graphics C	Donald D. Hearn, M. Pauline Baker	(Pearson)	Second	-

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Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	ICSPE355 - Unix and Shell Programming
Prerequisite/s	1CSPC208, 1CSPC255
Teaching Scheme: Lecture/Practical	02/02
Credits	03
Evaluation Scheme: ISE/ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE355_1	Explain Unix Architecture, File system and use of Basic Commands. (K ²)
ICSPE355_2	Demonstrate UNIX commands for file handling and process control.(K ³)
ICSPE355_3	Illustrate Shell Programming and to write Shell Scripts.(K ³)
ICSPE355_4	Analyze a given problem and apply requisite facets of SHELL Programming in order to devise a SHELL script to solve the problem.(K ⁴)
ICSPE355_5	Perform different UNIX commands and SHELL Programming to solve problem. (S ²)
ICSPE355_6	Follow professional and ethical principles during laboratory work in a team for laboratory activities. (A ³)

Course Contents:

Unit 1	Introduction The UNIX operating system, Linux and GNU, The UNIX architecture, features of UNIX, POSIX and Single UNIX specification, Internal and External commands, Command structure, man browsing and manual pages on-line. File System: The parent – child relationship, the HOME variable, pwd, cd, mkdir, absolute pathname, relative pathname.	06 Hrs
Unit 2	Vi editor: Basics, input mode, saving text and quitting, Basic file attributes: ls: listing directory contents, the UNIX file system, ls -l, -d option, file ownership, file permissions, chmod, directory permissions, changing file ownership.	04 Hrs
Unit 3	Process basics: ps: process status, system processes (-e or -a), mechanism of process creation, process states and zombies, running jobs in background, nice:job execution, job control.	04Hrs
Unit 4	Simple filters: filters: pr, head, tail, cut, paste, sort, uniq, tr. sed: the stream editor, line addressing using multiple instructions (-E and -F) context addressing, writing selected lines to a file (w), text editing, substitution (s), basic regular expression revisited.	06 Hrs
Unit 5	The shell: The shell's interpretive cycle, shell offerings, pattern matching, escaping and quoting, redirection, pipes,tee, command substitution, shell variables.	04 Hrs
Unit 6	Essential shell programming: Shell scripts, read using command line arguments, exit and exit status of command, the logical operators and , the if conditional	04 Hrs

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Laboratory list

It should consist of minimum 8-10 experiments based on the following list.

Expt. No.	Title of Experiment
1.	Introduction to Unix operating system- Basic Commands and Processing Environment a. fork, vfork, wait, wait pid(),exec (all variations exec), and exit
2.	IPC: Interrupts and Signals: signal(any fives type of signal), alarm, kill, signal, sigaction, pause
3.	File system Internals a. Stat, fstat, ustat
4.	File system Internals b. Threading concept: clone, threads of java.
5.	Study of vi editor. - The vi editor. Basics. The .exrc file. Different ways of invoking and quitting vi. Different modes of vi. Input mode commands. Command mode commands.
6.	Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
7.	a) Write a shell script program to display list of user currently logged in. b) Write a shell script program to display "HELLO WORLD". c) Write a shell script program to develop a scientific calculator. d) Write a shell Script program to check whether the given number is even or odd. e) Shell script Program to search whether element is present is in the list or not.
8.	a) Shell script program to check whether given file is a directory or not. b) Shell script program to count number of files in a Directory. c) Shell script program to copy contents of one file to another. d) Create directory, write contents on that and Copy to a suitable location in your home directory. e) Use a pipeline and command substitution to set the length of a line in file to a variable. Write a program using sed command to print duplicated lines of Input.
9.	Write a grep/egrep script to find the number of words character, words and lines in a file. Write an awk script to develop a Fibonacci series.
10.	a) Write a shell script program to display the process attributes. b) Write a shell script to change the priority of processes. c) Write a shell script to change the ownership of processes. d) Write a program to send back a process from foreground. e) Write a program to retrieve a process from background. f) Write a program to create a Zombie process. g) Write a program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen
11.	a) Write a shell script program to check variable attributes of file and processes. b) Write a shell script program to check and list attributes of processes. c) Shell Script program to implement read, write, and execute permissions. d) Shell Script program for changing process priority.



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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Design of Unix Operating System	Maurice J. Bach	Pearson	1 st	2015
02	Introduction to Unix and shell Programming	Venkateshmurthy	Pearson	3 rd	2005
03	Shell Programming in Unix, Linux and OS X	Stephen G. Kochan, Patrick Wood	Addison-Wesley	4 th	2016
04	Unix and Shell Programming	YashwantKanetkar	BPB	1 st	• 2003

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Unix Concepts and Applications	Sumitabha Das	TMGH	3 rd	2005
02	Unix Network Programming	W. Richard Stevens	PHI	2 nd	1990
03	UNIX and Shell Programming	Behrouz A. Forouzan ,Richard F. Gilberg	THOMSON	1st	2003
04	Learning Linux Shell Scripting	Ganesh SanjivNaik	Packt	2 nd	2018



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Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	1CSPR356- Mini Project
Prerequisite/s	-
Teaching Scheme: Practical	2
Credits	1
Evaluation Scheme: ISE /ESE	50/50

Course Outcomes: Students should be able to	
1CSPR356_1	Identify specific problem statement from a selected domain.(K ³)
1CSPR356_2	Analyze the hardware and/or software requirements of the proposed work (K ⁴)
1CSPR356_3	Identify and use relevant tools and technologies for documentation, designing, coding, testing and debugging the software / hardware pertaining to their major project (K ³)
1CSPR356_4	Defend or argue or appraise the results obtained during project work (K ⁵)
1CSPR356_5	Design and construct a software system, component, or process to meet desired needs.(K ⁶)
1CSPR356_6	Improve writing skills to compose project report professionally. (S ³)
1CSPR356_7	Follow given instructions during practical performance. (A ²)

Course Contents:	
Platforms: Free and Open source software.	
1	Three students (Maximum) in a group shall carry out a mini project. A batch of practical / shall be divided into mini project groups.
2	Mini project topics and the work for these groups in the batch shall be guided by a teacher for the batch, preferably on one of the topics which is selected by the students in his/her domain.
3	Alternatively, a group may select another topic of relevance in consultation with senior students and teachers.
4	A group shall undertake IBM TGMC (The Great Mind Challenge) projects, past Smart India Hackathon, KPIT Sparkle topic Or the topic related to the courses the students have studied/studying.
5	The teacher shall periodically assess the performance of individual student in the mini project, jointly with a teacher of another batch. This assessment will be used for determining ISE marks of the mini project.
6	Project group shall submit hardcopy of project report along with related code and documentation in soft form at the end of the semester..



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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	ICSPR363- Internship/Intra institute /Inter institute activity
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial	--
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPR363_1	Make use of technology for solving real world problem (K3)
ICSPR363_2	Take part in developing solutions by examining the situations (K4)
ICSPR363_3	Justify the solutions for given problem (K5)
ICSPR363_4	Plan and create the detailed module for proposed solution (K5)

Course Contents:

The Internship Program allows T.Y. students to gain practical experience in the workplace before receiving their undergraduate degrees. The internship is a required academic course. The student identifies companies willing to hire him/her on a full time basis for 2 Weeks (80-90 hrs) period (minimum required). The Internship Program supervises the students and awards academic credits (1) upon successful completion of all the required assignments.

After completion of Internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period. The student may contact Industrial Supervisor/ Faculty Mentor/TPO for assigning special topics and problems and should prepare the final report on the assigned topics.

Daily diary will also help to a great extent in writing the industrial report since much of the information has already been incorporated by the student into the daily diary. The training report should be signed by the Internship Supervisor, TPO and Faculty Mentor.

The Internship report will be evaluated on the basis of following criteria:

- i. Originality.
- ii. Adequacy and purposeful write-up.
- iii. Organization, format, drawings, sketches, style, language etc.
- iv. Variety and relevance of learning experience.
- v. Practical applications, relationships with basic theory and concepts taught in the course.

And/Or

If student has an innovative idea then he/she can work on that idea as step towards a technical Startup. Student is expected to enroll in pre incubation/incubation center to work on his idea.

Activity will be evaluated on the basis of following criteria

- i. Market analysis
- ii. Business plan/module
- iii. IP ownership (Patent Search) etc.

He/she has to prepare a detailed report under guidance of mentor provided by department and submit the report of the activity carried out.



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And/Or

Student is expected to participate in any technical national / international competition like Programming hackathon / Project competition with a significant achievement anytime during the semester during weekends or holidays.

Activity will be evaluated on the basis of following criteria

- i. Participation in National / International technical symposium or hackathon/ Programming / Project Competition.
- ii. Achievement in the event if any with evidence of certificates
- iii. Demonstration of the same work at department with a report of the event and/or project report



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Course Details:

Class	B. Tech, Sem. V
Course Code and Course Title	ICSMC310 – Technical Writing
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	1/1
Credits	-
Evaluation Scheme: -	Grade

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSMC310_1	Apply knowledge of what goes into the key sections of a report to produce your own report (K3)
ICSMC310_2	Apply the skills for abstract writing and summarizing technical documents (S3)
ICSMC310_3	Communicate clearly and effectively in written, verbal, visual, and interpersonal contexts. (S3)
ICSMC310_4	Impart the ethics in scientific and technical communication (A3)
ICSMC310_5	Use various tools for preparing reports, drawing flowcharts, diagrams etc. (S3)
ICSMC310_6	Evaluate what a good report looks like (S5)

Course Contents:

1	Introduction to Technical Writing, Types of Technical Documents
2	Components of Technical Report
3	TOC vs Index, Use of Language and Tense
4	Writing Introduction to the topic, defining problem statement, writing objectives and Limiting the scope
5	Carrying out Literature Survey and identifying research gaps, Citing and referencing
6	Writing Methodology
7	Presenting equations and nomenclature, Figures, diagrams and labelling
8	Reporting results: Graphs and Charts (Gantt Chart), Tables in Technical Writing
9	Images in Technical Writing and Tools to draw HD images
10	Writing abstract, identifying keywords
11	Writing Conclusion, Future scope, Bibliography and References
12	Ethics in Technical writing, plagiarism, indexing and metrics of journals/proceedings

Note: The assignments will be strictly written/ completed using LATEX

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Technical Report Writing for Engineers	Andrew Garrard	The University of Sheffield		-
02	Technical Writing Essentials		Alison		-
03	Technical Writing		Coursera - Moscow Institute of Physics and Technology		-
04	Handbook of Technical	David A.	Cengage Learning	1 st	2008


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	Writing	McMurrey, Joanne Buckley			
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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Technical Writing – A practical Guide for Engineers and Scientists	Phillip A. Laplante	CRC Press	1 st	2015
2	LaTeX		en.wikibooks.org		2016
3	Learn LaTeX		http://www.learnlatex.org/en/		

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TY CSE - 37169

Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	1CSOE311- Internet of Things
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSOE311_1	Describe fundamental mechanisms of Internet of Things. (K ²)
1CSOE311_2	Describe components and working of RFID technology. (K ²)
1CSOE311_3	Design applications of Internet of Things. (K ³)
1CSOE311_4	Make use of principles for IoT communication to solve real life problems. (K ³)
1CSOE311_5	Analyze the components needed to prototyping of various application. (K ⁴)

Course Contents:

Unit 1	Basics of IoT: What is the Internet of Things? History of IoT, About objects/Things in the IoT, Overview and Motivations, Examples Internet of things Definition and Framework: IoT Definition General Observations, ITU-T views , Working Definition IoT Framework.	07 Hrs.
Unit 2	Fundamental IoT mechanisms & key technologies Identification of IoT objects and services, Structural aspects of the IoT, Environment Characteristics, Traffic characteristics ,scalability, Interoperability, Security and Privacy, Open architecture, Key IoT Technologies ,Device Intelligence, Communication capabilities, Mobility support ,Device Power, Sensor Technology, RFID technology, Satellite Technology.	05 Hrs.
Unit 3	Radio Frequency Identification Technology Radio Frequency Identification Technology: Introduction, Principles of RFID, Components of an RFID system, Reader, RFID tags, RFID middleware, Issue. Wireless Sensor Networks: History and context, The node, connecting nodes, networking nodes, securing communication.	09 Hrs.
Unit 4	Internet Principles for IoT Communication: Internet communication overview, IP addresses , MAC addresses , TCP and UDP ports, Application Layer Protocols.	06 Hrs.
Unit 5	Prototyping Thinking about prototyping: Sketching, familiarity, Costs versus Ease of Prototyping, Prototypes and Production, Open Source versus Closed Source Prototyping Embedded Devices: Electronics: Sensors, Actuators, Scaling up the Electronics; Embedded computing basics, Arduino, Raspberry Pi	07 Hrs.
Unit 6	Domain Specific IoT: Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agricultural Industry and Health and Lifestyle.	08 Hrs.



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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Internet of Things: A Hands-On Approach	Vijay Madiseti, ArshdeepBahga	Universities Press (India) Private Limited	1st edition	2016
02	The Internet of Things, Connecting Objects to the Web	HakimaChaouchi	Wiley Publications	1st edition	2010
03	Building the Internet of Things with IPv6 and MIPv6 The Evolving World of M2M Communications	Daniel Minoli	Wiley Publications	1st edition	2015
04	Designing the Internet of Things	Adrian McEwen, hakim Cassimally	Wiley	Reprint	2015

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Architecting the Internet of Things	Bernd Scholz-Reiter, Florian Michahelles	ISBN 978-3842-19156-5, Springer.	1st Edition	2011
02	The Internet of Things: Key Applications and Protocols	Olivier Hersent, David Boswarthick, Omar Elloumi	ISBN 978-1-119-99435-0, Wiley Publications.	2 nd Edition	2012
03	Internet of Things, A Hands on Approach	ArshdeepBahga, Vijay Madiseti	University Press	1st Edition	2015
04	Sensors Handbook	SabrieSoloman	McGraw Hill	2nd Edition	2015



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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	1CSOE312- Cyber Law & Ethical Hacking
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):


Upon successful completion of this course, the student will be able to:

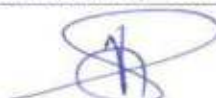
1CSOE312_1	Describe issues pertaining to cyberspace and cybercrime. (K ²)
1CSOE312_2	Evaluate and Interpret the IT Act and others laws associated with the cyberspace. (K ²)
1CSOE312_3	Show the ethical Hacking tools and its type. (K ³)
1CSOE312_4	Demonstrate various social techniques. (K ³)

Course Contents:

Unit 1	Overview of Cyber Space/World Cyber Crime/Offense, Cyber Defence, Cyber Warfare, Cyber terrorism, Cyber Espionage, Recent Cyber Crime Cases, Impact on Society, Reasons for Commission of Cyber Crimes. Vulnerabilities and Threats vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Poor Cyber Security Awareness. Attacks SQL Injections, Cross-site scripting, Virus dissemination, Logic bombs, Denial-of-Service attack, Phishing, Computer vandalism, Email bombing and spamming, Web jacking, Cyber stalking, Data diddling, Identity Theft and Credit Card Fraud, Salami slicing attack, Cyber squatting, Software Piracy	08 Hrs.
Unit 2	Introduction to Cyber Laws E-Commerce and E-Governance, Need of Cyber laws- The Indian context, Certifying Authority and Controller, Offences under IT Act 2000, Freedom of Speech and Expression in Cyberspace, Data Protection and Privacy, Digital Forgery, Identity Theft & Fraud, Digital signature and the Indian IT Act, Computer Offences and its penalty under IT Act 2000, Amendments in Indian IT Act 2008	06 Hrs.
Unit 3	IPR in Cyber Space Intellectual Property Rights in Cyberspace, Trademarks & Domain Names Related issues, Software Piracy, Software - Copyrights vs. Patents debate, Copyright in Internet, Interface with Copyright Law, Multimedia and Copyright issues, Idea/Expression dichotomy, Infringement and Remedies, Cyber Jurisprudence at International and Indian Level, International Law and Jurisdictional Issues in Cyberspace	07 Hrs.
Unit 4	Ethical Hacking Ethical hacking Terminology, types of hacking technologies, phases of ethical hacking, Foot Printing and Reconnaissance, Scanning and enumeration,	06 Hrs.


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	Understanding the password hacking techniques, Session hijacking, Evading IDS, Firewalls and Honeypots, IoT Hacking, Proxy & Incident handling and response.	
Unit 5	Ethical Hacking Tools Scanning Networks, scanning TCP ports; NMAP, Angry IP Scanner, Basic penetration tests- Metasploit, Hacking Web Servers / Web Applications, Security testing of web applications- Burp Suit, Password recovery tools- Cain & Abel, Network security tool for Man-in-the-Middle attacks-Ettercap, Packet Filtering and tools, Packet sniffing and Tools, Hacking Wireless Networks, Network stumbler, Password cracking, Email hacking.	10 Hrs.
Unit 6	Social Hacking Techniques Social engineering attack stages, social engineering techniques, Whaling attack, Pretexting, Baiting and quid pro quo attacks, Dumpster Diving, Roleplaying, Spear Phishing, Watering hole, Techniques for Hacking mobile phones, Social engineering prevention.	05 Hrs.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Cyber Law – The Indian Perspective	PavanDuggal	Saakshar Law Publications		
02	Cyber Laws and IT Protection	Harish Chander	PHI Learning Pvt. Ltd		2012
03	Hacking Exposed Web Application	Joel Scambray, Vincent Liu, Caleb Sima	McGraw-Hill Education	3	2010

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Cyber Security	Nina Godbole&SunitBelapure,	Wiley India	1	2011
02	Cyber Security Essentials	James Graham, Richard Howard, Ryan Olson, CRC Press, Taylor	An Auerbach Book	1	2010
03	Cyber Law Simplified	VivekSood	TMH	1	2002
04	Information Technology: Law and Practice	Vakul Sharma	Universal Law Publishing Co., India		2011


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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	1CSHS313- Entrepreneurship Development and Planning
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSHS313_1	Explain the nature and function of entrepreneurship (K ³)
1CSHS313_2	Explain what characterizes an attractive business opportunities and common pitfalls during the entrepreneurial process (K ³)
1CSHS313_3	Identify Finance and marketing solutions for Business (K ³)
1CSHS313_4	Explain Concept and Characteristics of Small Scale Industry(K ²)
1CSHS313_5	Develop Business plan (K ³)

Course Syllabus

Course Contents:

Unit 1	Entrepreneur and Entrepreneurship The Entrepreneur : Definition and Concept, Entrepreneurship : scope in local and global Market, Charms of becoming an intrapreneur/ Entrepreneur. Entrepreneurial Traits, Characteristics and skills, Classification of entrepreneurship, Entrepreneur vs Professional Manager, The role of entrepreneurship in economic development, Concept of entrepreneurship, Theories of entrepreneurship, Forms of Business Ownership, mistakes of entrepreneurship and how to avoid them; entrepreneurial failure. Available Governments schemes to support entrepreneurship promotion like startup India, Mudra Yojana, ATAL Innovation Mission , Software Technology Park (STP) etc.	08 Hrs.
Unit 2	Identification of Business Opportunities Introduction, An Illustration: choice of product, Project ideas, Scanning of Business Environment and Identifying business idea, Selection of Product/ Service, core competence, product life cycle, new product development process, mortality curve, creativity and innovation in product modification/development. Concept of Project, Importance of Project Identification, Project Profile	07 Hrs.
Unit 3	Sources of Finance Sources of Finance, identifying the sources of finance; angel investing and venture finance; managing cash flow, Project Financing, Institutional Finance to Entrepreneurs, Financial Intuitions, Role of consultancy organization	06 Hrs.
Unit 4	Marketing Methods of Marketing, Functions of marketing, Marketing strategies, 5 Essential Steps for a Successful Strategic Marketing Process, Marketing Mix, Marketing Channels, Marketing Institutions and Assistance, E-Commerce, Digital Marketing.	07 Hrs.


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Unit 5	Concept and Characteristics of Small Scale Industry Introduction, SSI Units, Characteristics of SSI, Importance of Small Enterprise, Advantages of Small-scale Enterprises, Challenges and Opportunities, Role of SSI in economic Development, Components of macro and micro business environment;	06 Hrs.
Unit 6	Business Plan Development Creativity and Business idea, Legal issues for entrepreneur, protection of intellectual property involving patents, trademarks, and copyrights., Trade secrets, Licensing Creating business plan, Feasibility analysis, Technical or Operational analysis, Production/Operation plan, Organizational Plan, Business model canvas, Guidelines by Planning Commission for Project report, Project report preparation and Evaluation, Starting the venture	08 Hrs.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Dynamics of Entrepreneurial Development and Management	Vasant Desai	Himalaya Publishing House	6 th	2018
02	Small-Scale Industries and Entrepreneurship – In the twenty-first century	Vasant Desai	Himalaya Publishing House	9 th	2011

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Entrepreneurship	Dean Shepherd, Michael Peters	Tata McGraw Hill Edition Pvt Ltd	6 th	2008
02	Entrepreneurship : Successfully Launching New Ventures	Barringer and Ireland	Pearson	3 rd	2006
03	All In Startup : Launching a new Idea when Everything Is on the Line	Diana Kander	Wiley	3 rd	2014
04	Disciplined Entrepreneurship : 24 Steps to a Successful Startup	Bill Aulet	Wily	3 rd	2013


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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	ICSPC314 Advanced Database System
Prerequisite/s	ICSPC209- Database Engineering
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPC314_1	Describe modeling and development methods/techniques in Object-Relational Databases.(K ²)
ICSPC314_2	Explain knowledge on the need, issues, design and application of both parallel and Distributed databases.(K ²)
ICSPC314_3	Describe different issues in application development and advanced transaction processing.(K ²)
ICSPC314_4	Apply different database security, PL/SQL, NoSQL and OLAP queries on various databases. (K ³)
ICSPC314_5	Compare and illustrate methods/technologies in developing data warehouses (K ²)

Course Contents:

Unit 1	Object and Object Relational Databases Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational.	07 Hrs.
Unit 2	Parallel and Distributed Databases Database System Architectures: Centralized and Client-Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Network Types, Parallel Databases: I/O Parallelism, Inter and Intra Query Parallelism, Inter and Intra operation Parallelism, Design of Parallel Systems, Distributed Database Concepts - Distributed Data Storage, Commit Protocols, Concurrency Control, Distributed Query Processing	08 Hrs.
Unit 3	Advanced Transaction Processing Transaction-processing monitors, transactional workflows, E-commerce, main-memory databases, real-time transaction systems, long-duration transactions.	05 Hrs.
Unit 4	Database Security and Advanced SQL Discretionary Access Control, Mandatory Access Control, Audit Trails in Databases, Statistical Databases , PL SQL- A Basic introduction, Functions and Procedure, Packages, Synonyms, Database Links, Embedded SQL and Dynamic SQL	08 Hrs.
Unit 5	NoSQL The NoSQL – Introduction, Difference between SQL and NoSQL, List of NoSQL Databases, Characteristics of NoSQL	07 Hrs.


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	MongoDB - Advantages, Installation, Data Model of MongoDB, Creating database, Drop Database, Create collection, Drop collection - Data types, Insert document, Update document, Query document, Delete document, Sorting records, Indexing, Aggregation	
Unit 6	Data Warehouse and OLAP Data Warehousing, Creating and maintaining a warehouse. OLAP: Multidimensional data Model, Star Schemas, OLAP Queries, Database design for OLAP, Implementation Techniques for OLAP Bitmap Indexes, Join Indexes, Views and decision support, Top N Queries, Online Aggregation.	07 Hrs.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	Mc Graw Hill Education	6	2011
02	Database Systems- A practical approach to Design, Implementation	Thomos Connolly, Carolyn Begg	Pearson Education.	4	2009
03	Getting Started with NoSQL	Gaurav Vaish	Packet	2	2012
04	Database Management Systems	Raghu Ram Krishnan	McGraw Hill	3	2002

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Database Systems	RamezElmasri and ShamkantNavathe	Pearson Education	4	2007
02	Database Systems: Design, Implementation and management	PeterRof, Carlos Coronel	Cengage Learning	7	2014
03	Principals of Database Systems	J. D. Ullman	Galgotia publications	1	2011
04	Sql: A Complete Reference	Alexis Leon	McGraw Hill Education	1	2002


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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	ICSPC315 Machine Learning
Prerequisite/s	Basic Programming, Probability theory and linear algebra
Teaching Scheme: Lecture/Tutorial	3/1
Credits	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPC315_1	Explain the fundamentals, challenges of machine learning (K2)
ICSPC315_2	Describe various machine learning algorithms (K2)
ICSPC315_3	Demonstrate the working of various machine learning algorithms with mathematical justifications for sample real-world data (K3)
ICSPC315_4	Demonstrate and implement various machine learning algorithms and models (K3)
ICSPC315_5	Comprehend strengths and weaknesses of various machine learning approaches and use appropriate machine learning algorithms for real-world applications. (K4)

Course Contents:

Unit 1	Introduction Introduction to Machine Learning, Applications, History of machine learning, Types of Learning, Hypothesis space, inductive bias, Data partitioning methods, Performance Evaluation	6 Hrs.
Unit 2	Regression and Decision Trees Types of Regression, Simple, Multiple, Linear, Non-linear, Gradient Descent and Normal Equations, Polynomial Regression, Logistic Regression, Regularization Decision Tree representation – ID3 algorithm, Issues	8 Hrs.
Unit 3	Instance Based Learning and Feature Selection k-nearest neighbor, Distance weighted nearest neighbor algorithm, Curse of Dimensionality, Feature selection – filter methods, wrapper methods, Feature extraction – PCA	7 Hrs.
Unit 4	Probability and Bayes Learning Probability Concepts, Bayes Theorem, MAP Hypothesis, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Network	6 Hrs.
Unit 5	Support Vector Machines and Neural Network <i>Support Vector Machines:</i> Introduction to support Vector Machine, Linear SVM – Optimal Margin Classifier, Soft Margin Classifier/maximum margin with noise, non-linear SVM, Kernel Functions, Multi-class SVMs <i>Neural Network:</i> Introduction to neural network, Perceptron, Perceptron Learning, Multilayer neural network, backpropagation, Introduction to deep neural network.	9 Hrs.


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Unit 6	Clustering, Recommender Systems and Ensemble Learning Introduction to clustering, k-means clustering, Hierarchical Clustering, Recommender Systems – Content based and Collaborative Filtering, Introduction to ensemble learning, Bagging and boosting, Random Forest Algorithm	6 Hrs.
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Machine Learning	Tom Mitchell	McGraw-Hill	1 st	1997
02	Introduction to Machine Learning	EthemAlpaydin	The MIT Press	2 nd	2010

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Elements of Statistical Learning	T. Hastie, R. Tibshirani, J. Friedman		2 nd	2008
02	NPTEL course Introduction to Machine Learning	Prof. Sudeshna Sarkar	NPTEL	-	-
03	Coursera Machine Learning	Prof. Andrew Ng	Coursera / Stanford university	-	-



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TYCSE-47169

Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	1CSPE316- Professional Electives- III Software Testing & Quality Assurance
Prerequisite/s	1CSPE205 Software Engineering
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	03
Evaluation Scheme: ISE I/MSE/ISE II/ ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPE316_1	Explain the basic concepts of testing process & measurement.(K ²)
1CSPE316_2	Summarize the fundamentals software verification & creating test cases from SRS.(K ²)
1CSPE316_3	Apply different methods of regression testing.(K ³)
1CSPE316_4	Classify different testing web applications. (K ⁴)
1CSPE316_5	Analyze various test data generation tools. (K ⁴)

Course Contents:

Unit 1	Introduction: Some Software Failures, Testing Process, Some Terminologies, Limitations of Testing, The V Shaped software life cycle model Measurement- what is it and why do it?: Measurement in everyday life, Measurement in software engineering, scope of software metrics	08 Hrs.
Unit 2	Software Verification: Verification Methods, SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit	07 Hrs.
Unit 3	Creating test cases from SRS and Use cases: Use Case Diagram and Use Cases, Generation of test cases from use cases, Guidelines for generating validity checks, strategies for data validity, Database testing	06 Hrs.
Unit 4	Regression Testing: What is regression testing?, Regression Test cases selection, Reducing the number of test cases, Risk analysis, Code coverage prioritization techniques	07 Hrs.
Unit 5	Testing Web applications: What is web testing?, functional testing, UI testing, Usability testing, configurations and compatibility testing, security testing, performance testing, database testing, post deployment testing, web metrics.	09 Hrs.
Unit 6	Automated Test data generation: Automated Test Data generation, Approaches to test data generation, Test data generation tools	05 Hrs.


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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Software Testing	Yogesh Singh	Cambridge University Press	1	2012
02	Software Metrics – A rigorous & practical approach	Norman Fenton, Shari Lawrence Pfleeger	Thomson – Brooks	3	2014
03	Software Quality Engineering	Jeff Tian	Wiley India Ltd.	1	2006
04	Software Testing	RenuRajani, Pradeep Oak	Tata McGraw-Hill Education	1	2004

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Foundations of Software testing	Aditya P. Mathur	Pearson	2	2013
02	Software Testing	Ron Patton	Pearson (SAMS)	2	2006
03	Software Quality Assurance, Testing And Metrics	BASU, ANIRBAN	PHI Learning Pvt. Ltd.,	1	2015
04	Software Testing and Quality Assurance Theory and Practice	SagarNaik, PiyuTripathy	John Wiley & Sons, 2011	1	2011



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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	ICSPE317- Professional Elective- III Advanced Data Structures
Prerequisite/s	Data Structures, Computer Algorithms
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE317_1	Describe various advanced data structure techniques such as advanced linked list, advanced trees, graphs. (K ²)
ICSPE317_2	Describe various hashing techniques and collision resolution techniques. (K ²)
ICSPE317_3	Demonstrate the knowledge of advanced data structures in solving problems. (K ³)
ICSPE317_4	Analyze the algorithms and compare the working of various data structures (K ⁴)
ICSPE317_5	Evaluate the performance of various data structures with help of different case studies (K ⁵)

Course Contents:

Unit 1	Advanced Linked List Memory Efficient Doubly Linked List, XOR Linked List, Skip List, Self-Organizing List	6Hrs.
Unit 2	Advanced Trees Segment Tree, Binary Indexed Tree, Binary Search Tree, Self-Balancing BST, Red Black Tree, Splay Tree	9Hrs.
Unit 3	Data Structure Transformations Making Structures Dynamic, Making Structures Persistent Data Structures for Strings Tries and Compressed Tries, Dictionaries Allowing Errors in Queries, Suffix Trees, Suffix Arrays	6Hrs.
Unit 4	Graph Problem: Edge Coloring, Vertex coloring, Max flow- mincut theorem, Probabilistic models	7Hrs.
Unit 5	Dynamic Graphs: Link Cut Trees, Preferred Path Decomposition, Dynamic Connectivity, Euler Tour Trees.	8Hrs.
Unit 6	Hashing Hashing, Collision resolution techniques, Cuckoo Hashing	6Hrs.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Algorithms	Thomas H Cormen, Charles Leiserson, Ronald Rivest	PHI	3rd	2009
02	Computational Geometry- Algorithms and Application	Mark De Berg, Otfried Cheong, Mark Overmars	Springer	3rd	2008
03	Advanced Data Structure	Erik Demaine	MIT Open Courseware	-	-

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Computational Geometry in C	Joseph O'Rourke	Cambridge University Press	-	-
02	Graph Theory	Reinhard Diestel	Spinger-Verlag	-	2000
03	Advanced Data Structures	Peter Brass	Cambridge University Press	-	-


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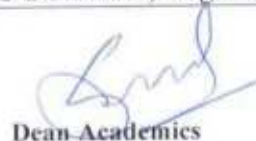
Course Details:

Class	B. Tech -CSE(Sem- VI)
Course Code & Course Title	ICSPE318 Real Time System
Prerequisites	1CSPC208-Operating Systems, 1CSPC210- Computer Architecture, 1CSPC205- Software Engineering, 1CSPC254 PL-I, 1CSPC257-PL-II
Teaching Scheme (Lecture/Practical/Tutorial/)	03/00/00
Total Contact Hours: Theory/Practical/Tutorial/	03/00/00
Cradits	03
Evaluation Scheme: ISE-i/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs) After successfully completion of course students will be able to	
ICSPE318_1	Explain the basic terminologies, Hardware considerations, and working principles of real-time system with examples. (K2)
ICSPE318_2	Explain working principles of commercial RTOS like RT Linux with neat sketch architecture diagram. (K2)
ICSPE318_3	Use software engineering concepts required to sketch real Time systems (K3)
ICSPE318_4	Illustrate the programming languages which are required to design real-time system.(K4)
ICSPE318_5	Analyze the performance of real time system using different RTS concepts & models (K4)

Course Contents:		
Unit 1	Basic Real Time Concepts and Hardware Considerations: Terminology, Real Time System Design issues, Examples of Real-Time Systems Hardware Considerations: Basic Architecture, Hardware Interfacing, Central Processing Unit, Memory, Input / Output, Other special devices	6 Hrs.
Unit 2	Study of Commercial RTOS: Overview and Architecture of RT Linux, Overview and Architecture of LynxOS, Overview and Architecture of Deos (DDC-I), Overview and Architecture of embOS, Overview of Other Popular RTOS	6 Hrs.
Unit 3	Real-Time Operating System: Real-Time Kernels, Theoretical Foundation of Real-Time Operating System, Scheduling ,Inter Task Communication and synchronization, System Services for Application Programs, Memory Management, Selecting Real Time Operating Systems,Casestudy POSIX.	9 Hrs.
Unit 4	Software Requirements Engineering: Requirements - Engineering process, Types of Requirements, Requirements Specification for Real-Time Systems, Formal Methods in Software Specification, Structured Analysis and Design, Object-Oriented Analysis and the Unified Modeling, Organizing the Requirements Document, Organizing and Writing Requirements, Requirements	8 Hrs.


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	Validation and Review.	
Unit 5	Programming Language and the Software Production Process Coding of Real Time Software, Assembly Language, Procedural Language, Object-Oriented Language, Overview of programming languages for real time systems. Real time features of JAVA, C#, Special Real Time Languages, Compiler Optimization of code.	6 Hrs.
Unit 6	Metrics & Cost Estimation Lines of Code, McCabe's Metric, Halstead's Metric, Function points, Feature Points, Metric for Object Oriented Software. Fault Tolerance, Cost Estimation using COCOMO, Basic COCOMO, Detailed COCOMO, COCOMO II model.	7 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition	Units Covered
1	Real time system design and analysis	Phillip A. Laplante	Wiley India	4 th Edition	2004	1,2,3,4,5,6
2	Embedded / Real Time Systems : Concepts, design&programming Black Book	Dr. K.V. K. K. Prasad	Dreamtech Press	New Edition	2015	1,2,3,4,5,6
3	Real-Time Systems: Theory and Practice,	Rajib Mall,	Pearson,	1 st Edition	2006	1,2,3,4,5,6
4	Real Time Systems	Jane W. S. Liu,	Pearson Education	1 st Edition	2000	1,2,3,4,5,6

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Embedded and Real-Time Operating Systems	Wang K. C.	Springer	First	2017
2	Building a Real Time Operating System	Colin Walls	Newnes	First	2019
3	Real -Time Systems	C.M. Krishna, Kang G. Shin,	McGraw -Hill International Editions	Third	2010
4	Real-Time Systems, Design Principles for Distributed Embedded Applications	Kopetz, Hermann	Springer	Third	2002



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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	1CSPC358 Advanced Database System Laboratory
Prerequisite/s	1CSPC209- Database Engineering Laboratory
Teaching Scheme: Practical	02 hours
Credits	01
Evaluation Scheme: ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC358_1	Construct complex data types by utilizing features of object based databases.(K3)
1CSPC358_2	Experiment with distributed concurrency control protocols and joins concept in distributed DBMS.(K3)
1CSPC358_3	Analyzing different types of algorithm using data mining(K4)
1CSPC358_4	Perform different PL/SQL, NoSQL and OLAP queries on various databases. (S2)
1CSPC358_5	Follow professional and ethical principles during laboratory work in a team for laboratory activities. (A2)

Course Contents:It should consist of minimum 8-10 experiments based on following list.

1	Create structured data types of ORDBMS and perform operations- create table using Structured data types, insert data and solve queries.
2	Implement multivalued Attributes complex types and Inheritance in ORDBMS.
3	Implementation of two phase and three phase commit protocol
4	Implementation of Concurrency Control in distributed DBMS
5	Implementation of semi join concept in distributed DBMS
6	Implement parallel joins, sorting and aggregates
7	Implement vertical and horizontal fragmentation in distributed DBMS
8	Queries on PL/SQL Commands
9	Write OLAP queries for given database schema.
10	Implementation of data warehousing and decision support cube operator using OLAP queries
11	Create a MongoDB Database and connect it to the java program apply different database operations on it.
12	Implement a program that MongoDB with a collection and Insert document, Update document in to the collection.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	Mc Graw Hill Education	6	2011
02	Database Systems- A practical approach to	Thomos Connolly, Carolyn Begg	Pearson Education.	4	2009


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	Design, Implementation				
03	Getting Started with NoSQL	Gaurav Vaish	Packet	2	2012
04	Database Management Systems	Raghu Ram Krishnan	McGraw Hill	3	2002

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Database Systems	RamezElmasri and ShamkantNavathe	Pearson Education	4	2007
02	Database Systems: Design, Implementation and management	PeterRof, Carlos Coronel	Cengage Learning	7	2014
03	Principals of Database Systems	J. D. Ullman	Galgotia publications	1	2011
04	Sql: A Complete Reference	Alexis Leon	McGraw Hill Education	1	2002



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Course Details:

Class	B. Tech Sem -VI
Course Code & Course Title	1CSPC359-Object Oriented Modeling and Design
Prerequisite/s	1CSPC254
Teaching Scheme (Lecture/Tutorial/Practical)	02/00/02
Credits	03
Evaluation Scheme: ISE/ESE	50/50

Course Outcomes (COs) Students will be able to:	
1CSPC359_1	Identify with diagram conceptual, behavioral and architectural modeling of theUML. (K ²)
1CSPC359_2	Demonstrate fundamental concepts of Object oriented modelling and design to solve simple real world problems. (K ³)
1CSPC359_3	Apply object oriented modeling techniques and methodology to design solutions of simple real world problems. (K ³)
1CSPC359_4	Compare structural and behavioral diagram using UML. (K ⁴)
1CSPC359_5	Analyze simple real world problems and apply Object oriented modeling and design concepts to solve the same.(K ⁴)
1CSPC359_6	Prepare and present a power point presentation on assigned topic(S ³)
1CSPC359_7	Follow professional and ethical principles during laboratory work in a team for Laboratory activities. (A ²)

Course Contents:		
Unit 1	Introduction Modeling as a design technique, Objects, classes, links and associations, generalization and Inheritance, Aggregation, abstract classes, generalization as extension and restriction, and multiple inheritance.	04 Hrs
Unit 2	Dynamic & Functional Modeling Events and states, operations, nested state diagrams, concurrency, advanced dynamic modeling concepts, relation of object and dynamic models, Data Flow Diagrams, relation of functional to object and dynamic models.	05 Hrs
Unit 3	Design Methodology Analysis Overview, System design with examples, Object Design, combining the three models, designing Algorithms, design Optimization, implementation of Controls, design association.	05 Hrs


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Unit 4	Structural Modeling using UML Classes, Relationships, Common mechanisms, Diagrams, Class Diagrams, Interfaces, Types and Roles, Packages, Instances and Object Diagram	05 Hrs
Unit 5	Behavioral Modeling using UML Interactions, Use cases, Use case diagram, Interaction Diagrams and Activity diagrams, Events and signals, State Machines, State chart diagrams	05 Hrs
Unit 6	Architectural Modeling Components, Deployment, Collaboration, Component Diagrams, Deployment Diagrams	04 Hrs

List of Experiments: It should consist of minimum 8-10 experiments based on following list.

1.	Learning Setup and configuration of RSA/Rational Rose.
2.	Study of class and instance diagrams in OMT Methodology.
3.	Study of different relationships between classes in the object model.
4.	Study of issues related to Functional and dynamic model in OMT Methodology.
5.	Draw Use Case diagram for particular scenario.
6.	Draw sequence diagram.
7.	Draw class diagram.
8.	Draw collaboration diagram.
9.	Working with packages.
10.	Adding attributes & operations to classes & relationship. (Types, association, dependencies, aggregation, Generalization, multiplicity)
11.	Draw state transition diagram and Activity diagrams.
12.	Setting Component view.
13.	Setting Deployment View.
14.	Code generation and validations.

Text Books					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Object-orientated Modeling & Design	James Rumbaugh, Michael Blaha, William Premerlani, Frederick Eddy, William Lorensen	Prentice-Hall of India(PHI)	2	2005
2	The Unified Modeling Language User Guide	Grady Booch, James Rumbaugh, Lvar Jacobson.	Pearson	2	2008
3	Object Oriented Modeling and Design with UML2.0	James Rumbaugh, Michael Blaha	Pearson	2	2001
4	Software Modeling & Design	Hassan Gomaa	Cambridge University Press	3	2004


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Reference Books					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Threat first Object oriented analysis & design	BreetMclaughline, Garry Police & Devide West.	OREILLY	1	2006
2	Object Oriented Analysis & design	Kahate	Tata McGraw-Hill	1	2007
3	Object oriented analysis & design using UML	H. Srimathi, H. Sriram, A.Krishnamoorthy	SCITECH PUBLICATION	2	2009
4.	Object-Oriented Analysis & design understanding system development with UML 2.0	Mike O'Docherty	John Wiley & Sons	3	2004



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Course Details:

Class	B. Tech, VI Sem.
Course Code and Course Title	ICSPE360-Augmented and Virtual Reality
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	03
Evaluation Scheme: ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE360_1	Demonstrate understanding and perspective on the VR/AR. (K ³)
ICSPE360_2	Build Augmented Reality Application (S ⁶)
ICSPE360_3	Build Virtual Reality Application (S ⁶)
ICSPE360_4	Examine observations and determine results of experiment. (A ²)

Course Contents:

Unit 1	Introduction of Virtual Reality: Fundamental Concept and Components of Virtual Reality. Primary Features and Present Development on Virtual Reality. Comparison between different VR headsets.	02 Hrs.
Unit 2	AR Software Introduction to Google cardboard, field of view in VR, basics of software, basics of tools, Uses of commands , Google VR software development kit,	03 Hrs.
Unit 3	Unity Importing google VR SDK to unity, introduction to android studio, Linking unity with android studio building the virtual reality game.	02 Hrs.
Unit 4	Introduction to Augmented Reality Introduction, What is augmented reality, Difference between AR and VR	02Hrs.
Unit 5	AR application ARONE APP introduction, Image handling in Vuforia, Projecting Barbarian 3D Model on Image Target, building APK file for ARONE App	03 Hrs.
Unit 6	Application of AR/VR in Digital Entertainment: VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR., Introduction to MR and XR.	02 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Augmented Reality: Principles and Practice	Dieter Schmalstieg , Tobias Hollerer	Addison-Wesley	First Edition	2016
02	Virtual Reality Technology	Burdea, G. C. and P. Coffet.	Wiley-IEEE Press,	Second Edition.	2003/2006


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03	Understanding Augmented Reality, Concepts and Applications	Alan B. Craig	Morgan Kaufmann	Illustrated edition	2013.
04	Developing Virtual Reality Applications, Foundations of Effective Design	Alan Craig, William Sherman and Jeffrey Will	Morgan Kaufmann	Illustrated edition	2009

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR	Steve Aukstakalnis	Addison-Wesley	First edition	2016
02	Learning Virtual Reality Developing Immersive Experiences and Applications	Tony Parisi	Shroff/O'Reilly	First edition	2015
03	Unity 2020 Virtual Reality Projects: Learn VR development by building immersive applications and games with Unity 2019.4 and later versions	Jonathan Linowes	Packt Publishing Limited	Third edition	2020

Experiment list

Sr. No.	Title of Experiment
1	Installation of Unity
2	Experiment on Google VR SDK
3	Installation of Android Studio
4	Building a VR Game
5	Importing Game to Mobile
6	Building and running a VR Application
7	Experiment on Vuforia
8	Projecting Barbarian 3D model
9	Building the APK for ARONE app
10	Projecting Cake 3D model
11	Building and running a AR Application


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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	ICSPE361 Digital Image Processing
Prerequisite/s	Mathematics: Linear algebra, Vectors and Matrices
Teaching Scheme: Lecture/Tutorial	2/0/2
Credits	03
Evaluation Scheme: ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE361_1	explain fundamental concepts of digital image processing, image enhancement, restoration, color image processing, image segmentation, morphology etc. (K2)
ICSPE361_2	Implement various algorithms in digital image processing for enhancement, restoration, segmentation, color imaging, morphology (K3)
ICSPE361_3	Use modern languages, tools and libraries for implementation and manipulation of image processing algorithms. (S3)
ICSPE361_4	Compare different algorithms of image processing and apply them to solve real life problems. (K4)
ICSPE361_5	Develop solutions to real world problems by making use of combinations of appropriate image processing algorithms. (K6)
ICSPE361_6	Follow professional and ethical principles during laboratory work in a team for laboratory activities. (A2)

Course Contents:

Unit 1	Digital Image Fundamentals Introduction: Concept, Fundamental Steps and Components of Image Processing System Digital Image Fundamentals: Image Acquisition, A simple image model, Sampling and Quantization, Imaging Geometry, Different types of digital images	5 Hrs.
Unit 2	Image Enhancement Point Processing, Basic Gray Level Transformations, Histogram Processing, Spatial domain Filtering, Frequency domain filtering	5 Hrs.
Unit 3	Image Restoration Image Restoration: Model of image degradation/restoration process, Noise models, Restoration – spatial filtering	4 Hrs.
Unit 4	Color Image Processing Color Fundamentals, Color Models, Pseudo-color Image Processing - Intensity Slicing, Gray-level to color transformation, Full Color Image Processing - Color Transformations, Smoothing and Sharpening	4 Hrs.
Unit 5	Image Segmentation Point, Line and Edge Detection, Edge Detection – using first and second order	6 Hrs.


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	derivatives, LoG, Canny edge detector, Thresholding, Boundary Extraction – Connectivity, Hough Transform, Region-based Segmentation – region growing, region splitting and merging	
Unit 6	Morphological Image Processing Preliminaries, Mathematical Morphology, Standard Binary morphological operations: Erosion and Dilation, Opening and Closing, Hit-or-miss transformation	4 Hrs.

List of Experiments

Experiments to be performed using Python-OpenCV or MATLAB.

1	Reading and displaying image. Geometric transformations.
2	Implement point processing operations.
3	Histogram Equalization
4	Image filtering – spatial domain
5	Image filtering – frequency domain
6	Color Image processing - Gray-level to color transformation
7	Color Image segmentation
8	Point, line and edge detection
9	Hough Transform for detecting lines and circles
10	Segmentation using region growing algorithm
11	Implementation of morphological operations

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Digital Image Processing	R. C. Gonzalez, R. E. Woods	PHI	3 rd	2007
02	Digital Image Processing	S. Shridhar	Oxford University Press	2 nd	2016

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Digital Image Processing	A. K. Jain	Prentice Hall	-	1989
02	Image Processing, Analysis and Machine Vision	Milan Sonka, Vaclav Hlavac, Roger Boyle	Thomson Learning	3 rd	2008
03	Digital Image Processing	S. Jayaraman, S. Esakkirajan, T. Veerkumar	Tata McGraw-Hill Education	1 st	2009


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Course Details:

Class	B.Tech-Sem-VI
Course Code and Course Title	1CSPE362- Professional Elective- IV Open Source Technology
Designated as	Compulsory
Prerequisite/s	-
Teaching Scheme (Lecture/ Tutorial)	02/0/02
Credits	03
Evaluation Scheme: ISE-I /ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPE362_1	Identify the need of open source technology, open source Ecosystem.(K3)
1CSPE362_2	Exercise the FOSS tools for the software development.(K3)
1CSPE362_3	Perform different commands to solve problem. (S2)
1CSPE362_4	Examine observations and determine results of experiment(A3)

Course Contents:

Unit 1	Introduction to open source software: Introduction to open sources- Need of Open Sources- Advantages of Open Sources- Applications of Open Sources- commercial aspects of Open source software.	04 Hrs
Unit 2	The FOSS Ecosystem The FOSS Ecosystem Linux operating system, Roles of Operating System, Choosing the operating system, Installing different distributions of GNU/Linux, FreeBSD/Open Solaris.	04 Hrs
Unit 3	Open Source Operating System: Installation of Linux (Redhat-CentOS): Theory about Multiboot Environment, Hard disk Partitioning, Swap space, LVM, and Boot loader Command Line: Basic File System Management Task, Working with files, Piping and Redirection, Working with VI editor, use of sed and understanding FHS of Linux	06 Hrs
Unit 4	Scilab: Installation of the software Scilab. Basic syntax, Mathematical Operators, Predefined constants, Control Statement, Built in functions, Polynomials, Vectors, Matrix. Handling these data structures using built in functions.	05 Hrs
Unit 5	Open Source Network and Security: Network and Security Administration Basic networking commands, Configuration of Apache Web servers, DNS servers, DHCP servers, mail Servers, NFS, FTP servers. Securing servers with IPTables.	05 Hrs
Unit 6	Case Studies: Data mining Tools: Apache mahout, weka. Web Development Tools: Bootstrap, CodeIgniter	04 Hrs


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Laboratory list

It should consist of minimum 8-10 experiments based on the following list.

Expt. No.	Title of Experiment
1.	Installation of Red HAT Linux operating system. a. Partitioning drives b. Configuring boot loader (GRUB/LILO) c. Network configuration d. Setting time zones e. Creating password and user accounts f. Execute Basic Command like ifconfig, chmod, mkdir, ls, ls-a, cat etc g. Shutting down
2.	Do the following changes in Grub file a. Write the path where the grub file is located. b. Change the timeout and title of the system.
3.	Setting up Samba Server
4.	Configuring dhcp server and client
5.	Configure a DNS Server with a domain name of your choice.
6.	Connecting to the internet a. Setting up linux as a proxy server b. Configuring mozilla or firefox to use as a proxy.
7.	Configuring Mail Server and FTP server
8.	Linux system administration a. Becoming super user b. Temporarily changing user identity with su command c. Using graphical administrative tools d. Administrative commands e. Administrative configuration files
9.	Creating Matrices and Some Simple Matrix Operations using Scilab
10.	Plot 2D and 3D Graph using Scilab
11.	Configure Open Source Data Mining Tools
12.	Configure Open Source Web Development Tools

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Red Hat Enterprise Linux 6	Sander van Vugt	Wiley Publications sons	First	2013
2	Linux Lab: Hands on Linux	Prof. DayanandAmbawade and Prof. Deven N. Shah	Dreamtech Publish	-	2014


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Reference Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	The Linux Kernel Book	Remy Card, Eric Dumas and Frank Mevel,	Wiley Publications, New York		2003
2.	The Linux Philosophy for SysAdmins	David Both	Apress	First	2018
3.	Websites: 1. Software Carpentry - www.swc.scipy.org/ 2. Producing Open Source Software - by Karl Fogel. (www.producingoss.com) 3. For various FOSS : www.bitnami.com 4. Online Version control : www.github.com .				



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Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	1CSPR363- Internship/Intra institute /Inter institute activity
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial	--
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPR363_1	Make use of technology for solving real world problem (K3)
1CSPR363_2	Take part in developing solutions by examining the situations (K4)
1CSPR363_3	Justify the solutions for given problem (K5)
1CSPR363_4	Plan and create the detailed module for proposed solution (K5)

Course Contents:

The Internship Program allows T.Y. students to gain practical experience in the workplace before receiving their undergraduate degrees. The internship is a required academic course. The student identifies companies willing to hire him/her on a full time basis for 2 Weeks (80-90 hrs) period (minimum required). The Internship Program supervises the students and awards academic credits (1) upon successful completion of all the required assignments.

After completion of Internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period. The student may contact Industrial Supervisor/ Faculty Mentor/TPO for assigning special topics and problems and should prepare the final report on the assigned topics.

Daily diary will also help to a great extent in writing the industrial report since much of the information has already been incorporated by the student into the daily diary. The training report should be signed by the Internship Supervisor, TPO and Faculty Mentor.

The Internship report will be evaluated on the basis of following criteria:

- i. Originality.
- ii. Adequacy and purposeful write-up.
- iii. Organization, format, drawings, sketches, style, language etc.
- iv. Variety and relevance of learning experience.
- v. Practical applications, relationships with basic theory and concepts taught in the course.

And/Or

If student has an innovative idea then he/she can work on that idea as step towards a technical Startup. Student is expected to enroll in pre incubation/incubation center to work on his idea.

Activity will be evaluated on the basis of following criteria

- i. Market analysis
- ii. Business plan/module
- iii. IP ownership (Patent Search) etc.

He/she has to prepare a detailed report under guidance of mentor provided by department and submit the report of the activity carried out.



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And/Or

Student is expected to participate in any technical national / international competition like Programming hackathon / Project competition with a significant achievement anytime during the semester during weekends or holidays.

Activity will be evaluated on the basis of following criteria

- i. Participation in National / International technical symposium or hackathon/ Programming / Project Competition.
- ii. Achievement in the event if any with evidence of certificates
- iii. Demonstration of the same work at department with a report of the event and/or project report



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TY CSE - 67/69

Course Details:

Class	B. Tech, Sem. VI
Course Code and Course Title	ICSMC319- CONSTITUTION OF INDIA
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	2/0
Credits	01
Evaluation Scheme:	Grade

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1CSMC319_1	Know the background of the present constitution of India.
1CSMC319_2	Understand the working of the union, state and local levels.
1CSMC319_3	Gain consciousness on the fundamental rights and duties.
1CSMC319_4	Be able to understand the functioning and distribution of financial resources between the centre and states.
1CSMC319_5	Be exposed to the reality of hierarchical Indian social structure and the ways the grievances of the deprived sections can be addressed to raise human dignity in a democratic way.

Course Contents:		
Unit 1	Evolution of the Indian Constitution: 1909 Act, 1919 Act and 1935 Act. Constituent Assembly; Composition and Functions; Meaning and importance of Constitution, Making of Indian Constitution – Sources; Salient features of the Indian Constitution.	4Hrs.
Unit 2	Rights and Duties: Fundamental Rights, Fundamental Duties, Directive principles.	4Hrs.
Unit 3	Union Government: Executive-President, Prime Minister, Council of Minister State Government; Executive: Governor, Chief Minister, Council of Minister Local Government: Panchayat Raj Institutions, Urban Government	6Hrs.
Unit 4	Relation between Federal and Provincial units: Union-State relations, Administrative, legislative and Financial, Inter State council, NITI Ayog, Finance Commission of India.	4Hrs.
Unit 5	Administrative organization and constitution Federalism in India – Features, Local Government -Panchayats –Powers and functions; 73rd and 74th amendments, Election Commission – Organisation and functions, Citizen oriented measures – RTI and PIL – Provisions and significance	6Hrs.
Unit 6	Statutory Institutions: Elections-Election Commission of India, National Human Rights Commission, National Commission for Women	4Hrs


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TY CSE - 68169

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to the Constitution of India	Durga Das Basu	Gurgaon; LexisNexis	23rd Edition	2018
02	India's Constitution	M.V.Pylee	New Delhi; S. Chand Pub	16th Edition	2017
03	The Constitutional Law of India	J.N. Pandey	Allahabad; Central Law Agency	55th Edition	2018
04	Constitution of India	P.M. Bakshi	Universal Law Publishing Co	17 th Edition	2003

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Shorter Constitution of India	D.D. Basu	Prentice Hall of India	15 th Edition	2017
02	Indian Constitutional Law	M.P. Jain	Wadhwa & Co	8 th Edition	2005
03	Constitutional Law of India	M.P. Singh	Eastern Book Co.	2 nd Edition	2011
04	Constitutional Law of India	H.M. Seervai	Tripathi Publications	4 th Edition	2017



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TY CSE - 69/69



**Annasaheb Dange College of Engineering
and Technology, Ashta**

(An Autonomous Institute affiliated to Shivaji University, Kolhapur)

Curriculum Structure and Syllabus

**B. Tech.
COMPUTER SCIENCE AND ENGINEERING**

SEM VII & SEM VIII

Revision I

(Academic Year 2021-22)

Teaching and Evaluation Scheme B. Tech: VII Semester

CourseCode	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory Marks		Practical Marks	
							Max.	Min. for Passing	Max.	Min. for Passing
1CSOE4**	Open Elective-III	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSHS403	Project Management	2	0	0	2	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC404	Information and Network Security	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC405	Distributed and Cloud Computing	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPE4**	Professional Elective- V	3	0	0	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
1CSPC451	Information and Network Security Laboratory	0	0	2	1	ISE	--	50	20	
1CSPC452	Distributed and Cloud Computing Laboratory	0	0	2	1	ISE	--	50	20	
						ESE	POE	50	20	
1CSPE4**	Professional Elective- V Lab	0	0	2	1	ISE	--	50	20	
						ESE	POE	50	20	
1CSPR456	Project Phase I	0	0	4	4	ISE	--	50	20	
						ESE	POE	50	20	
Total		14	0	10	21		500		350	
Total Contact Hours/ Week: 24 Hrs										

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CSE-ST-01/03

Professional Elective- V 1. Deep Learning - 06 2. Big Data Analytics -07 3. High Performance Computing -08	Professional Elective Laboratory- V 4. Deep Learning Laboratory - 53 5. Big Data Analytics Laboratory -54 6. High Performance Computing Laboratory -55
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Open Elective-III (Semester-VII)		
Courses Code	Course Name	Department
1AEOE421	Air Traffic Control and Airport Design	Aeronautical Engineering
1AEOE422	Aircraft General Engineering Maintenance	
1AEOE423	Design of Fixed wing unmanned aerial vehicles	
1AUOE401	Vehicle maintenance and safety	Automobile Engineering
1AUOE402	Vehicle Aerodynamics	
1CVOE401	Structural Auditing	Civil Engineering
1CVOE402	Disaster Management	
1CSOE401	Introduction to image processing and computer vision	Computer Science and Engineering
1CSOE402	Introduction to machine learning	
1EEOE401	Electric Vehicles	Electrical Engineering
1EEOE402	Wind and Solar Energy Systems	
0FTOE411	Process Optimization	Food Technology
0FTOE412	Cold Storage and Supply Chain Management	
1MEOE401	Total Quality Management	Mechanical Engineering
1MEOE402	Reliability engineering	
1MEOE403	Renewable Energy Engineering	

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	2	-	-	8	4	3	4
Cumulative Sum	8	24	19	73	16	9	7



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Teaching and Evaluation Scheme
 B. Tech Semester VIII

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory Marks		Practical Marks	
							Max.	Min. for Passing	Max.	Min. for Passing
1CSPE4**	Professional Elective- VI *	3	0	0	3	ISE I	10	40	20	--
						MSE	30			--
						ISE II	10			--
						ESE	50			--
1CSPR457	Internship / Project Phase II	0	0	27#	8	ISE	--	50	20	
						ESE	POE	50	20	
1CSPR458	Socio Outreach	0	0	0	1	ISE	-	50	20	
Total		3	0	0	12		100		150	
Total Contact Hours/ Week: 30 Hrs										

Students shall opt for an industry internship (including project work) or in-house project work. Contact hours for industry internship candidates shall be as per industry norms. Students opting for in-house project work shall have contact hours 27 hrs./ week for project work.

*List of courses shall be announced at start of semester. Students opting for industry internship shall be applicable for blended teaching scheme (Flipped Classroom).

Professional Elective- VI

1. MOOC Course-1
2. MOOC Course-2
3. MOOC Course-3

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	-	-	-	-	3	-	9
Cumulative Sum	8	24	19	73	19	9	16

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Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	1CSOE401 Introduction to Image Processing and Computer Vision
Prerequisite/s	Mathematics: Linear algebra, Vectors and Matrices
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSOE401_1	Explain the fundamental concepts of image processing, image enhancement, segmentation, morphology, video processing etc. (K²)
1CSOE401_2	Describe various image processing and computer vision algorithms. (K²)
1CSOE401_3	Write algorithms and apply the concepts mathematically to interpret the results with justification (K³)
1CSOE401_4	Compare various algorithms and identify the suitable for solving real-world problems (K⁴)
1CSOE401_5	Explain applications of computer vision under various disciplines and domains along with recent trends used such as machine and deep learning. (K³)

Course Contents:

Unit 1	Fundamentals <i>Introduction:</i> Image Processing Vs Computer Vision, Digital image Concept, Fundamental Steps and Components of Image Processing System, Fundamentals of Computer Vision <i>Digital Image Fundamentals:</i> Image Acquisition, A simple image model, Sampling and Quantization, Different types of digital images	6 Hrs.
Unit 2	Image Enhancement Point Processing, Basic Gray Level Transformations, Histogram Processing, Spatial domain Filtering – Smoothing, Sharpening, Laplacian Filters, Median, Min, Max Filters, Gradient Frequency domain filtering – Fourier Transform, Filtering in frequency domain – Low pass, High pass filters	8 Hrs.
Unit 3	Image Segmentation Point, Line and Edge Detection, Edge Detection – using first and second order derivatives, LoG, Canny edge detector, Thresholding, Boundary Extraction – Connectivity, Hough Transform, Region-based Segmentation – region growing, region	7 Hrs.

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	splitting and merging	
Unit 4	Morphological and Color Image Processing <i>Morphological Image Processing:</i> Preliminaries, Mathematical Morphology, Standard Binary morphological operations: Erosion and Dilation, Opening and Closing, Hit-or-miss transformation, Basic Morphological algorithms <i>Color Image Processing:</i> Color Fundamentals, Color models, Gray level to color transformations, Basics of Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation	9 Hrs.
Unit 5	Video Processing Moving Object Detection and Tracking-Introduction, Background Modeling, Connected Component Labeling, Object Tracking, Discrete Kalman Filtering, Particle Filtering	7 Hrs.
Unit 6	Recent Advances in Computer Vision Applications of Computer Vision in Various Domains, Feature Extraction for imaging applications – case studies, Machine and Deep Learning for Computer Vision – an overview	5 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Digital Image Processing	R. C. Gonzalez, R. E. Woods	Prentice Hall India	3 rd	2007
02	Digital Image Processing	S. Shridhar	Oxford University Press	2 nd	2016
03	Digital Image Processing	S. Jayaraman, S. Esakkirajan, T. Veerkumar	Tata McGraw-Hill Education	1 st	2009

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Image Processing, Analysis and Machine Vision	Milan Sonka, Vaclav Hlavac, Roger Boyle	Thomson Learning	3 rd	2008
02	Computer Vision – A Modern approach	D. A. Forsyth, J. Ponce	Pearson Education, Prentice Hall		2005
03	Computer Vision	Linda Shapiro, George C. Stockman	Prentice Hall		2000


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Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	1CSOE402 Introduction to Machine Learning
Prerequisite/s	Basic Linear Algebra, Statistics and Probability
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSOE402_1	Explain the fundamentals, challenges of machine learning. (K ²)
1CSOE402_2	Describe various machine learning algorithms. (K ²)
1CSOE402_3	Demonstrate the working of various machine learning algorithms with mathematical justifications for sample real-world data. (K ³)
1CSOE402_4	Demonstrate and use various machine learning algorithms and models. (K ³)
1CSOE402_5	Comprehend strengths and weaknesses of various machine learning approaches and select appropriate machine learning algorithms for real-world applications. (K ⁴)

Course Contents:

Unit 1	Introduction Introduction to Machine Learning, Applications, History of machine learning, Types of Learning, Hypothesis space, performance evaluation, cross-validation	6 Hrs.
Unit 2	Regression and Decision Trees Simple and Multiple Regression – Gradient Descent and Normal Equations, Logistic Regression, Regularization Decision Tree representation– ID3 algorithm Application/ Case Study	9 Hrs.
Unit 3	Instance Based Learning and Feature Selection k-nearest neighbor, Distance weighted nearest neighbor algorithm, Curse of Dimensionality, feature selection – filter methods, wrapper methods, feature extraction– PCA Application/ Case Study	6 Hrs.
Unit 4	Probability and Bayes Learning Bayes Theorem, Bayes Optimal Classifier, Naïve Bayes Classifier Application/ Case Study	5 Hrs.
Unit 5	Clustering Introduction to clustering, k-means clustering, Hierarchical Clustering– Agglomerative – Linkage Criteria	5 Hrs.

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	Application / Case Study	
Unit 6	Support Vector Machines and Neural Network Introduction to support Vector Machine, Linear SVM – Optimal Margin Classifier, Soft Margin Classifier/maximum margin with noise, non-linear SVM, Kernel Functions, Multi-class SVMs Introduction to neural network, Perceptron, Perceptron Learning, Multilayer neural network, backpropagation, Introduction to deep neural network. Application / Case Study	11 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Machine Learning	Tom Mitchell	McGraw-Hill	1 st	1997
02	Introduction to Machine Learning	EthemAlpaydin	The MIT Press	2 nd	2010

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Elements of Statistical Learning	T. Hastie, R. Tibshirani, J. Friedman		2 nd	2008
02	NPTEL course Introduction to Machine Learning	Prof. Sudeshna Sarkar	NPTEL	-	-
03	Coursera Machine Learning	Prof. Andrew Ng	Coursera / Stanford university	-	-


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B-Tech-CSE-04/32

Course Details:

Class	B. Tech., Sem. VII
Course Code and Course Title	1CSHS403- Project Management
Prerequisite/s	1CSPC205- Software Engineering
Teaching Scheme: Lecture/Tutorial	2/0
Credits	02
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSHS403_1	Disseminate project management framework and involved in each phase (K ²)
1CSHS403_2	Use project integration management techniques for software project. (K ³)
1CSHS403_3	Apply the relationship between scope, cost, time in software project. (K ³)
1CSHS403_4	Summarize the software quality metrics. (K ²)
1CSHS403_5	Illustrate importance of good communication and relationship between stakeholders for resolving issues. (K ²)
1CSHS403_6	Analyze the observations and risk factors during project development. (K ⁴)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction to Project Management Project and Project Management (PM), Role of project Manager, System view of PM, Organization, Stakeholders, Project phases and lifecycle, Context of IT projects, process groups, mapping groups to Knowledge areas	04 Hrs.
Unit 2	Project Integration Management Strategic planning and project selection, Developing a Project Management Plan, Directing and Managing Project Work, Monitoring and Controlling Project Work, Performing Integrated Change Control, Closing Projects or Phases	04 Hrs.
Unit 3	Project Scope, Time and Cost management Planning Scope Management, Collecting Requirements, Defining Scope, Validating Scope, Controlling Scope Planning Schedule Management, Defining Activities, Sequencing and Estimating Activity, Resources & Duration, Developing & Controlling Schedule Basic Principles of Cost Management, Planning Cost Management, Estimating Costs	06 Hrs.
Unit 4	Quality Management Importance, Planning Quality Management, ISO standards in IT industry, Performing Quality Assurance, Controlling Quality, Tools and Techniques for Quality Control, Modern Quality Management, Improving IT Project Quality	04 Hrs.
Unit 5	Human Resource management Importance, keys to managing people, human resource planning, acquiring, developing and Managing project team, software assistance.	05 Hrs.


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B-Tech-csE-05/32

Unit 6	Risk management Importance, risk management planning, sources of risk, risk identification, qualitative and quantitative risk analysis, risk response planning, risk monitoring and control.	05 Hrs.
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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Information Technology Project Management.	Kathy Schwalbe	Thomson Course Technology	Seventh Edition	2007
2.	A guide to the Project Management Body of Knowledge	Andrew S. Tanenbaum	PrenticeHall	5 th	2011
3.	Project Management Paperback	B AForouzan	TMG Hill	4 th	2010
4.	Bankers' Handbook on Credit Management (IIBF)	Kurose, J.F. and Ross, K.W., "	Addison Wesley	3 rd	2004

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1.	Project Management Core Textbook	Mantel Jr., Meredith, Shafer, Sutton with Gopalan	Wiley	1 st	2006
2.	Project Management	Harold Kerzner	Wiley	10 th	2013
3.	Project Management: A Systems Approach to Planning, Scheduling, and Controlling	Natalia Oliferandvictor Olifer	WileyIndiaEdition	1 st	2009
4.	Project Management Lite	Comer, D.E. and Droms, R.E	Prentice-Hall	4 th	2004



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Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	1CSPC404- Information and Network Security
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC404_1	Explain OSI security architecture along with different symmetric cipher algorithms. (K ²)
1CSPC404_2	Make use of public key cryptography, digital signature and hash function scheme. (K ³)
1CSPC404_3	Describe Intrusion Detection System and TCP layer security concepts. (K ²)
1CSPC404_4	Apply authentication techniques, electronic mail security, IP security and web security techniques. (K ³)
1CSPC404_5	Analyze the various applications along with various attacks. (K ⁴)

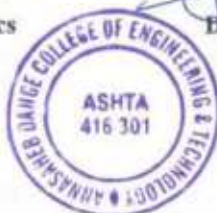
Course Contents:

Unit 1	Symmetric Ciphers: Overview - Services, Mechanism and Attacks, The OSI security Architecture, A model for Network security. Classical Encryption techniques - Symmetric Cipher model, Substitution techniques, Transposition techniques.	07 Hrs.
Unit 2	Block Cipher and Data Encryption Standard : Block Cipher and Data Encryption Standard- Simplified DES, Block cipher principles, The Data Encryption Standard, The strength of DES, Block Cipher Design Principles Math Background : Modular Arithmetic, Euclidean and Extended Euclidean algorithm, Prime numbers	07 Hrs.
Unit 3	Asymmetric Ciphers : Public Key Cryptography and RSA- Principles of Public Key Cryptosystems, The RSA Algorithm, Key Management, Diffie-Hellman Key Exchange, Digital Signature	07 Hrs.
Unit 4	TCP layer security: Transport-Level Security: Web Security Considerations, Secure Sockets Layer, Transport Layer Security, HTTPS standard, Secure Shell (SSH) application Intruders - Intrusion Detection System (IDS), Password Management	07 Hrs.


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Unit 5	IP layer Security: Authentication Applications - Kerberos, X.509 Authentication Service , IP Security (IPSec) – IP Security Overview, IP Security Architecture, Authentication header, encapsulation security payload, Internet Key Exchange (IKE), Malicious Software: Viruses, Worms, Denial of Services (DOS) Attacks, IP Spoofing Attacks	08 Hrs.
Unit 6	Application layer security: Electronic Mail Security- Pretty Good Privacy(PGP)- Notation, operational description, S/MIME- overview, functionality Firewall - Firewall Design principles, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Configurations, Various Case studies.	06 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year
01	Cryptography and Network security Principles and Practices	Williams Stallings	Pearson India	6	2014
02	Security in Computing	Charles P. Pfleeger	PEARSON	4	2009
03	Cryptography and Network Security	Atul Kahate	Tata McGraw - Hill Education	2	2007
04	Network Security Essentials	Williams Stallings	Pearson India	6	2018

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Cryptography and Security	C. K. Shyamala	Wiley	1	2011
2	Information Systems Security	Nina Godbole	Wiley	1	2008
3	Cryptography and Network Security	Behrouz A. Forouzan	Mcgraw Higher Education	3	2016
4	Applied Cryptography	Bruice Schneier	Wiley	2	2006


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B-Tech-cse-08/32

Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	1CSPC405- Distributed & Cloud Computing
Prerequisite/s	1CSPC208
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPC405_1	Explain the principles underlying the functioning of distributed systems (K ²)
1CSPC405_2	Apply the algorithms used in distributed system & visualize their working (K ¹)
1CSPC405_3	Explain Cloud Infrastructure and their Components(K ²)
1CSPC405_4	Make use of different virtualization techniques(K ¹)
1CSPC405_5	Explain various cloud computing services and data security aspects in cloud (K ²)

Course Contents:

Unit 1	Distributed system paradigms Definition, goals, architecture, Types of distributed system, Architectural styles, system architectures	05 Hrs.
Unit 2	Processes, Communication & Synchronization Remote procedure calls, synchronization, clock synchronization, logical clock, mutual exclusion, election algorithms	08 Hrs.
Unit 3	Cloud Computing Basics Cloud computing fundamentals, the role of networks in Cloud computing, Essential characteristics of Cloud computing, Cloud deployment model, Cloud service models, Multitenancy, Cloud cube model, Cloud economics and benefits, Cloud types and service scalability over the cloud, challenges in cloud NIST guidelines. Cloud Computing Framework: Amazon EC2, S3 storage, Load Balancer	08 Hrs.
Unit 4	Virtualization Introduction & Benefits, Implementation levels of Virtualization, Virtualization at OS level, Virtualization structure, Virtualization Mechanism, Open source Virtualization Technology, Xen Virtualization Architecture, Binary translation with full Virtualization, paravirtualization, Virtualization of CPU, memory and I/O devices	08 Hrs.
Unit 5	Exploring cloud services Software as a Service – Overview, advantages, examples. Platform as a Service – overview, advantages and functionalities, PaaS application frameworks – Drupal, Long Jump. Case study – Google Apps and Web Services.	06 Hrs.
Unit 6	Data security in cloud Security Overview, Cloud Security Challenges and Risks, General Issues Securing the Cloud, Securing Data, Data Security, Application Security, Virtual Machine Security. Identity and Presence, Identity Management and Access Control, Disaster Recovery in Clouds	07 Hrs.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Distributed Systems-Principles & paradigms	Andrew S. Tanenbaum	Pearson	2 nd	2015
02	Cloud Computing Bible	Barrie Sosinsky,	Wiley	-	2011
03	Cloud Computing Black Book	Kailash Jayaswal Dr.Deven Shah	Dreamtech Press	-	2016

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Distributed Systems – Concepts & Design	George Koulouris, Jean Dollimore, TimKindberg	Pearson Education	3 rd	2005
02	Cloud Computing Principles and Paradigms	RajkumarBuyya James Broberg, Andrzej Goscinski	Wiley	-	2013



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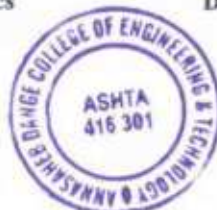
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B-Tech - CS6 - 10/32

Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	ICSPE406- Deep Learning
Prerequisite/s	Machine Learning, Basic calculus (derivatives) Basic linear algebra (matrices, vectors) Basic probability and statistics Programming experience in Python
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	03
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:


ICSPE406_1	Describe the fundamentals of supervised and unsupervised neural networks and deep learning networks (K2)
ICSPE406_2	Explain feed forward networks and their training issues (K3)
ICSPE406_3	Distinguish different types of ANN architectures and identify their applications (K4)
ICSPE406_4	Formulate & analyze the correct parameters and hyper-parameters of deep learning model for getting improved performance (K4)
ICSPE406_5	Apply Deep learning architectures for various real world applications and analyze their performance. (K4)

Course Contents:

Unit 1	Unit I: Feed forward neural networks: Fundamentals Of Neural Networks, Learning Methods – Taxonomy Of Neural Network Architectures and Applications, Perceptron Models: Discrete, Continuous and Multi-Category –Training Algorithms: Discrete and Continuous Perceptron Networks – Limitations of the Perceptron Model, Multilayer perceptron (MLP), Activation functions : linear & nonlinear activation functions, Derivatives of activation functions, Generalized Delta Rule, Derivation of Back propagation (BP) Training, and Summary of Back propagation Algorithm –Kolmogorov Theorem	07 Hrs.
Unit 2	Unit II: Optimization of Neural Networks: Gradient descent and the backpropagation algorithm, Saddle point problem in neural networks, vanishing gradient problem and ways to mitigate it, Regularization methods (dropout, drop connect, batch normalization), Heuristics for avoiding bad local minima, Heuristics for faster training, Nestors accelerated gradient descent	07 Hrs.
Unit 3	Unit III: Convolutional Neural Networks (CNN): Introduction to CNN, Building blocks of CNN, Transfer Learning, Case studies: LeNet, AlexNet, ZF-Net, VGGNet, GoogLeNet, ResNet, Visualizing CNNs, Guided Backpropagation, Fooling Convolutional Neural Networks, Applications of CNN– Object Detection, Content based image Retrieval.	07 Hrs.
Unit 4	Unit IV: Deep Unsupervised Learning: Autoencoders, Types: Standard, Denoising, Sparse, Contractive, Regularization in autoencoders, L2 regularization, Early stopping, Variational Autoencoders, Adversarial Generative Networks, Autoencoder and DBM	07 Hrs.
Unit 5	Unit V: Recurrent Neural Networks (RNN) : Introduction to RNN, working principle,	07


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B-Tech-CSE-11/32

	Backpropagation through time (BPTT), Vanishing and Exploding Gradients, Long Short Term Memory, Gated Recurrent Units, Bidirectional LSTMs, Bidirectional RNNs, speech recognition and natural language processing using RNN	Hrs.
Unit 6	Unit VI: Applications of Deep Learning Deep Learning for Computer Vision: Image segmentation, object detection, automatic image captioning, Classification using Convolutional Neural Networks Deep Learning for NLP : Introduction to NLP and Vector Space Model of Semantics, Word Vector Representations: Continuous Skip-Gram Model, Continuous Bag-of-Words model (CBOW), Applications of Dynamic Memory Networks in NLP, Recent Research in NLP using Deep Learning	07 Hrs.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Deep Learning	Ian Goodfellow	The MIT Press	-	2016
02	Pattern Recognition and Machine Learning	T2. Bishop, C. , M.,	Springer	1st edition	2006
03	Neural Networks: A Systematic Introduction	Raúl Rojas			1996

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Deep Learning with Python	Francois Chollet,	Manning Publications	1st	2017
02	Tensor Flow for Deep Learning	Reza BosaghZadeh, BharathRamsundar,			2018
03	Matrix Computations	Golub, G.,H., and Van Loan,C.,F	JHU Press		2013

Online Resources: Michael Nielsen, "Neural Networks and Deep Learning", Determination Press, 2015. <http://neuralnetworksanddeeplearning>



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Course Details:
Structure of Course

Class	Final Year B.Tech. Sem-VII
Course Code and Course Title	1CSPE407 Big Data Analytics
Prerequisite/s	Database Engineering
Teaching Scheme: Lecture/Tutorial/Practical	03/00/00
Credits	03
Evaluation Scheme: ISE/MSE/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

1CSPE407_1	Solve examples using probability theory (K^3)
1CSPE407_2	Explain components of business intelligence environment and discuss structure of decision making process. (K^2)
1CSPE407_3	Examine big data and Hadoop ecosystem tools (K^4)
1CSPE407_4	Summarize framework with respect to Hadoop (K^2)
1CSPE407_5	Make use of R language for Data Analytics (K^3)

Course Contents:

Unit No.	Unit name	Contact Hrs.
Unit 1	Introduction to Statistics and Probability: <ul style="list-style-type: none"> • The Engineering method and statistical thinking • Collecting Engineering data <ul style="list-style-type: none"> ○ Retrospective study ○ Observation ○ Designed experiments • Introduction and framework <ul style="list-style-type: none"> ○ Population, ○ Sample ○ Observations, ○ Variables, ○ Data collection, • Sample space and events <ul style="list-style-type: none"> ○ Random Experiments ○ Sample Space ○ Events • Interpretation of probability 	08 Hrs.


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B-Tech - CSE - 13/32

	<ul style="list-style-type: none"> ○ Introduction ○ Axioms of probability ○ Random variables 	
Unit 2	<p>Business Intelligence and decision support system</p> <ul style="list-style-type: none"> • Effective and timely decisions • Data, Information and Knowledge • The role of mathematical models • Business intelligence architectures <ul style="list-style-type: none"> ○ Cycle of business intelligence analysis ○ Enabling factor in business intelligence projects ○ Development of business intelligence system • Ethics of business intelligence • Definition of system • Representation of the decision-making process • Definition of decision support system • Development of decision support system 	07Hrs.
Unit 3	<p>Overview of Big Data</p> <ul style="list-style-type: none"> • What is Big Data • Evolution of Big Data • Structure of Big Data • Elements of Big Data • Big Data Analytics • Careers in Big Data • Future of Big Data • Big Data Case Studies 	06Hrs
Unit 4	<p>Understanding Hadoop Ecosystem</p> <ul style="list-style-type: none"> • Hadoop Ecosystem • Hadoop Distribution file system • MapReduce • Hadoop YARN • Introducing HBase 	06 Hrs.
Unit 5	<p>Understanding MapReduce and HBase</p> <ul style="list-style-type: none"> • The Mapreduce Framework • Techniques to Optimize MapReduce Jobs • Use of MapReduce • Role of HBase in Big Data Processing • Exploring the Big data Stack (Hive, Pig and Pig Latin, Sqoop, Zookeeper, Flume Oozies) • Virtualization and Big Data • Spark: for efficient and scalable data processing 	08 Hrs.
Unit 6	<p>Exploring R:</p> <ul style="list-style-type: none"> • Exploring basic feature of R • Exploring RStudio • Handling basic expression in R 	07 Hrs.


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	<ul style="list-style-type: none"> • Basic arithmetic in R • Mathematical operation • Variables in R • Handling data in R Workshop • Reading datasets and exporting data from R • Manipulating and processing data in R 	
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to static and data analysis	Christian Heumann · Michael Schomaker Shalabh,	Springer	1	2016
02	Applied Statistics and Probability for Engineers	Douglas C. Montgomery And George C. Runger	John Wiley & Sons, Inc.	3	20
03	Big data Black Book	DT Editorial	Dreamtech Press Edition	1	2016
04	Business Intelligence	Carlo Verzellis	Wiley	1	Reprint 2017

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Hadoop: The Definitive Guide	Tom White	O'REILLY Publication	3	2015
02	Big Data and Analytics	Seema Acharya and Subhashini Chellappan	Wiley India	1	2015
03	Regression Analysis by Example	Samprit Chatterjee, Ali S. Hadi	Wiley	5	2006
04	An Introduction to Statistical Learning with Applications in R	Daniela Witten, Trevor Hastie, Robert Tibshirani	Springer	1	2017 Reprint
05	Introductory statistics with R	Peter Dalgaard	Springer	2	2018
06	Introduction to Probability and Statistics for Engineers and Scientists	Sheldon M. Ross	Elsevier Academic Press	3	2004



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B-Tech-CSE-15/32

Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	ICSPE408 High Performance Computing
Prerequisite/s	Computer Architecture
Teaching Scheme: Theory/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE408_1	Comprehend parallel algorithm design and taxonomy of parallel architecture (K ²)
ICSPE408_2	Apply OpenMP and MPI directives and libraries to implement parallel program (K ³)
ICSPE408_3	Develop different CUDA programs (K ³)
ICSPE408_4	Analyze performance of parallel algorithms designed using Open MP, MPI and CUDA (K ⁴)
ICSPE408_5	Develop HPC Scalable Applications (K ⁶)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction Taxonomy of parallel architecture, Interconnection networks, processor array, Task/Data parallelism	6 Hrs
Unit 2	Parallel algorithm design Parallel programming models and tools, methodological design of parallel algorithm, Task channel method, finding the maximum	6 Hrs
Unit 3	Open MP Shared memory programming, Parallel for loop, critical section, reduction, performance improvement	8 Hrs
Unit 4	MPI MPI Model, MPI Interface, Collective communication	8 Hrs
Unit 5	CUDA GPGPU Architecture of NVIDIA, CUDA Model, Programming in CUDA	8 Hrs
Unit 6	Application Scalability HPC Application Development, Profiler	4 Hrs


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	An Introduction to Parallel Programming	Peter S. Pacheco	Morgan Kaufmann	--	2011
02	Parallel programming in C with MPI and OpenMP	Michael J Quinn	Tata McGraw Hill	--	2003
03	Programming Massively Parallel Processors	David B. Kirk and Wen-mei W. Hwu	Morgan Kaufmann	2 nd Edition	2010

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Parallel Computing	Ananth Grama, George Karypis, Vipin Kumar & Anshul Gupta	Pearson Education Limited	Second Edition	2003
02	Multi-core Programming	Shameem Akhter and Jason Roberts	Intel Press	--	2006
03	CUDA Programming: A Developer's Guide to Parallel Computing with GPUs	Shane Cook	Elsevier Inc	First Edition	2013
04	OpenMP Programmer's Manual	-	-	-	-
05	MPI Programmer's Manual	-	-	-	-



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B-Tech-CSE-17/32

Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	ICSPC451- Information and Network Security Laboratory
Prerequisite/s	--
Teaching Scheme: Practical/Tutorial	2/0
Credits	01
Evaluation Scheme: ISE / ESE	50 / 00

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPC451_1	Develop code for classical Encryption Techniques to solve the problems.(K3)
ICSPC451_2	Build cryptosystems by applying symmetric and public key encryption algorithms.(K3)
ICSPC451_3	Construct code for authentication algorithms.(K4)
ICSPC451_4	Demonstrate the network security system using open source tools. (K3)
ICSPC451_5	Identify and apply the security measures to information and network security. (S3)
ICSPC451_6	Follow professional and ethical principles during practical performance. (A2)

Experiment List:It should consist of minimum 8-10 experiments based on following list.

1	Perform encryption, decryption using the following substitution techniques i. Ceaser cipher ii. Playfair cipher
2	Perform encryption and decryption using following transposition techniques i. Rail fence ii. Row & Column Transformation
3	Apply DES algorithm for practical applications
4	Implement RSA Algorithm using HTML and JavaScript
5	Implement the Diffie-Hellman Key Exchange algorithm for a given problem.
6	Calculate the message digest of a text using the SHA-1 algorithm
7	Demonstrate intrusion detection system (ids) using any tool eg. Snort or any other s/w.
8	Demonstrate Electronic mail and its security issues.
9	Demonstration of SSL using any suitable tool
10	Demonstration Automated Attacks and Penetration Tools using any Assessment Tool.
11	Study and implement Encryption/decryption for Pretty Good Privacy (PGP) Protocol.
12	Creating a Zero Trust Environment on PaloAlto firewall (NDG NETLAB+)


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year
01	Cryptography and Network security Principles and Practices	Williams Stallings	Pearson India	6	2014
02	Applied Cryptography, Protocols Algorithms and Source Code in C	Bruce Schneier,	Wiley	2	2008
03	Cryptography and Network Security	Atul Kahate	Tata McGraw - Hill Education	2	2007
04	Network Security Essentials	Williams Stallings	Pearson India	6	2018

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Cryptography and Security	C. K. Shyamala	Wiley	1	2011
2	Information Systems Security	Nina Godhole	Wiley	1	2008
3	Cryptography and Network Security	Behrouz A. Forouzan	Mcgraw Higher Education	3	2016
4	Applied Cryptography	Bruice Schneier	Wiley	2	2006


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B-Tech - CSE - 19/32

Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	1CSPC452- Distributed & Cloud Computing Laboratory
Prerequisite/s	1CSES257
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50/ 50

Course Outcomes (COs):

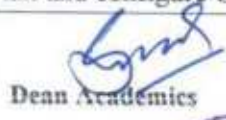
Upon successful completion of this course, the student will be able to:

1CSPC452_1	Develop the communication among processes at different hosts and apply the algorithms used in distributed system. (K ³)
1CSPC452_2	Build highly scalable cloud-based applications by creating and configuring virtual machines on the cloud and building private cloud(K ⁶)
1CSPC452_3	Apply various virtualization techniques(K ³)
1CSPC452_4	Debate on various cloud platforms and their services(A ³)
1CSPC452_5	Communicate effectively in lab with orally and writing journals.(S ³)

Course Contents:

1	Program based on Remote procedure call using RMI
2	Program based on clock synchronization
3	Program based on Mutual Exclusion
4	Configuration of Private Cloud (Openstack/Eucalyptus)
5	Case study on Amazon EC2 to learn about Amazon EC2 and to start web service on it.
6	<ul style="list-style-type: none"> • Launch a Linux EC2 instance • Create a EBS volume with 20 GB of storage and attach it the created EC2 instance • Resize the attached volume and make sure it reflects in the connected instance
7	Create an EFS and connect it to 3 different EC2 instances. Make sure the all instances have different Operating System. For instance, Ubuntu, Red Hat Linux and Amazon Linux 2
8	<ul style="list-style-type: none"> • Create an Instance in one region with Linux OS and manage the requirement of web servers of your company using AMI • Replicate the instance in other region • Build two EBS volumes and attach them to the first instance region • Delete one volume after detaching it and extend the size of other volume Take backup of this EBS volume
9	<ul style="list-style-type: none"> • Create a Classic Load Balancer and register 3 EC2 instances with different web pages running in them • Migrate the Classic Load Balancer into an Application Load Balance
10	Case study on Microsoft azure for building, deploying and managing applications and services through a global network of Microsoft-managed data-centers.
11	Design and develop custom Application using Sales force Cloud.
12	Assignment to install and configure Google App Engine.


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B-Tech-cse-20/32

13	Design an Assignment to retrieve, verify, and store user credentials using Firebase Authentication, the Google App Engine standard environment and Google Cloud Data store.
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Distributed Systems-Principles & paradigms	Andrew S. Tanenbaum	Pearson	2 nd	2015
02	Cloud Computing Principles and Paradigms	RajkumarBuyya James Broberg, Andrzej Goscinski	Wiley	1 st	2013
03	Cloud Computing Black Book	Kailash Jayaswal Dr. Deven Shah	Dreamtech Press	1 st	2016
04	Cloud Computing: A Practical Approach for Learning and Implementation	A. Srinivasan	Pearson	1 st	2014

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Distributed Systems – Concepts & Design	George Koulouris, Jean Dollimore, TimKindberg	Pearson Education	3 rd	2005
02	Cloud Storage Security: A Practical Guide (Computer Science Reviews and Trends)	Aaron Wheeler (Author), Michael Winburn (Author)	Elsevier	1 st	2015
03	Spatial Cloud Computing: A Practical Approach	Chaowei Yang	CRC Press	1 st	2017



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Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	ICSPE453- Deep Learning Laboratory
Prerequisite/s	Machine Learning Basic calculus (derivatives) Basic linear algebra (matrices, vectors) Basic probability and statistics Programming experience in Python
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE/PoE	50/50

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:

ICSPE453_1	Identify and apply appropriate procedures, tools and technologies for implementation of simple and complex neural network and deep learning architectures. (K3)
ICSPE453_2	Identify and apply appropriate data sets, Deep Learning architectures to solve real world problems. (K3)
ICSPE453_3	Design Python programs using libraries such as PyTorch, TensorFlow and API such as Keras for implementing Deep learning architectures for various applications (K4)
ICSPE453_4	Evaluate the tunable parameters influencing the accuracy or error of deep learning model and analyze how these parameters shape the performance of the model (K5)
ICSPE453_5	Implement and build a deep learning application for detection or prediction tasks from the real world. (S6)
ICSPE453_6	Contribute actively by presenting his/her own ideas in a team and coordinate to carry out a task. (A3)

Experiment List:

1	Installing of Anaconda or Miniconda and working with Tensorflow and Keras
2	Introduction and working with Google Colab for using GPUs and TPUs for large projects
3	Developing simple perceptron (single layer neural network)
4	Developing simple multilayer neural network for different tasks
5	Designing and developing basic CNN for given task
6	Using transfer learning in CNN
7	Designing and developing simple RNN for given task
8	Designing and developing RNN with LSTM for given task
9	Designing and developing model for Text generation using LSTM
10	Designing and developing model for Autoencoder for classification
11	Parsing and Sentiment Analysis using Recursive Neural Networks

Note: The students shall undergo a micro project based on some real-world problem as one component of in-semester-evaluation.

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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Deep Learning	Ian Goodfellow	The MIT Press	-	2016
02	Pattern Recognition and Machine Learning	T2. Bishop, C., M.,	Springer	1st edition	2006
03	Neural Networks: A Systematic Introduction	Raúl Rojas			1996

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Deep Learning with Python	Francois Chollet,	Manning Publications	1st	2017
02	Tensor Flow for Deep Learning	Reza BosaghZadeh, BharathRamsundar,			2018
03	Matrix Computations	Golub, G.,H., and Van Loan,C.,F	JHU Press		2013

Online Resources:

Michael Nielsen, "Neural Networks and Deep Learning", Determination Press, 2015.
<http://neuralnetworksanddeeplearning.com>



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B-Tech - CSE - 23/32

Course Details:

Class	Final Year B.Tech. Sem-VII
Course Code and Course Title	1CSPE454 Big Data Analytics Laboratory
Prerequisite/s	Data Base Engineering
Teaching Scheme: Lecture/Tutorial /Practical	00/00/02
Credits	01
Evaluation Scheme: ISE/ESE	50 / 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

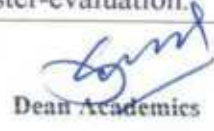
1CSPE454_1	Explain need of Data Analytics. (K ²)
1CSPE454_2	Analyze data using Hadoop Ecosystem tools (K ⁴)
1CSPE454_3	Create application to solve real life problems using R programming (K ⁵)
1CSPE454_4	Demonstrate programs using analytics tools (S ³)
1CSPE454_5	Follow given instructions during practical performance. (A2)

Laboratory Plan

Expt. No.	Title of Experiment	Planned Week
1	Installation of Hadoop	1
2	Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm. <ul style="list-style-type: none"> Find the number of occurrences of each word appearing in the input file(s) 	2
3	Dealing with Cloudera /IBM InfoSphere Insights	3
4	Hadoop Hive DDL commands, like create database, viewing database, Dropping database	4
5	Hadoop Hive DML commands like Insert, delete, update, data retrieval queries	5
6	Revision – I	6
7	Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data	7
8	Installation of R	8
9	Declaring variables expressions, functions and executing R script	9
10	Working with R with data sets- create, read, write and R Tables- create, read, write.	10
11	Manipulating and processing data in R- merging datasets, sorting data, putting data into shape	11
12	Dealing with graphs using R	12
13	Revision – II	13

Note: The students shall undergo a micro project based on some real-world problem as one component of in-semester-evaluation.


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B-Tech - cSE - 24/32

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	BusinessIntelligence – DataMining and optimization forDecision Making	Carlo Verzellis-	Wiley	1	Reprint 2017
02	Big Data and Analytics	Seema Acharya and Subhashini Chellappan	Wiley India	1	2015
03	Big Data (Black Book)- DT Editorial Services	DT Editorial	Dreamtech Press Edition	1	2016
04	Data mining Introductory and Advanced topics	Margaret H. Dunham	Pearson Education	3	2008

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Data Mining: Concepts and Techniques	Jiawei Han and Micheline Kamber	Morgan Kaupmann	3	2011
02	R For Data Science	Hadley Garrett GrolemondWickham,	O'REILLY	1	2016
03	"Analytics in a Big Data World: The Essential Guide to DataScience and its Applications	Bart Baesens	John Wiley & Sons	1	2014
04	Big-Data-Analytics-with-R-and-Hadoop	Vignesh Prajapati	PACKT	1	2013



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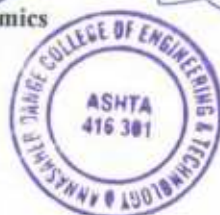
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B-Tech - CSE - 25/32

Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	ICSPE455 High Performance Computing Laboratory
Prerequisite/s	Computer Architecture
Teaching Scheme: Theory/Practical	0/2
Credits	01
Evaluation Scheme: ISE/ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICSPE455_1	Comprehend parallel algorithm design and taxonomy of parallel architecture (K2)
ICSPE455_2	Compare the sequential and parallel approach of various problems with help of OpenMP, MPI, CUDA platform implementations. (K4)
ICSPE455_3	Justify use of different tools like cuDNN, Digits etc based on given application problems. (K5).
ICSPE455_4	Demonstrate parallel programming directives to solve problems (S3)
ICSPE455_5	Follow professional and ethical practices during laboratory work for given laboratory activities.(A2)

Course Contents:

Expt. No.	Title of Experiment	Contact Hours
1	Study of Processor architecture and networking.	2 Hrs
2	Analytical modeling of sequential algorithm.	2 Hrs
3	Feasibility study of parallel approach.	2 Hrs
4	2-3 Problem statements based on Open MP Programming	4 Hrs
5	2-3 Problem statements based on MPI Programming	4 Hrs
6	2-3 Problem Statements based on CUDA	4 Hrs
7	Study of advanced parallel tools like OpenACC, Digits, CuDNN	2 Hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	An Introduction to Parallel Programming	Peter S. Pacheco	Morgan Kaufmann	--	2011
02	Parallel programming in C with MPI and OpenMP	Michael J Quinn	Tata McGraw Hill	--	2003
03	Programming Massively Parallel Processors	David B. Kirk and Wen-mei W. Hwu	Morgan Kaufmann	2 nd Edition	2010


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B-Tech-CSE-26/32

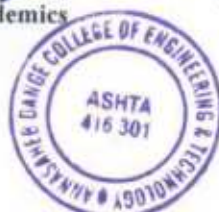
Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Parallel Computing	Ananth Grama, George Karypis, Vipin Kumar & Anshul Gupta	Pearson Education Limited	Second Edition	2003
02	Multi-core Programming	Shameem Akhter and Jason Roberts	Intel Press	--	2006
03	CUDA Programming: A Developer's Guide to Parallel Computing with GPUs	Shane Cook	Elsevier Inc	First Edition	2013
04	OpenMP Programmer's Manual	-	-	-	-
05	MPI Programmer's Manual	-	-	-	-


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B-Tech-CSE-27/32

Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	1CSPR456- Project Phase I
Prerequisite/s	Miniproject
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Credits	04
Evaluation Scheme: ISE/ESE	50/50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1CSPR456_1	Identify and formulate the real-world problem for their major project in the field of their own interest (K2)
1CSPR456_2	Survey technical literature, blogs, documents about latest technological trends etc. to come-up with an innovative idea for technical project (K2)
1CSPR456_3	Analyze the hardware and/or software requirements of the proposed work (K4)
1CSPR456_4	Identify and use relevant tools (from industry) and technologies for documentation, designing, coding, testing and debugging the software / hardware pertaining to their major project (K3)
1CSPR456_5	Defend or argue or appraise the results obtained during project work (K5)
1CSPR456_6	Design the prototype of the selected idea (K6)
1CSPR456_7	Exercise all the managerial (project planning, scheduling) and behavioral skills in a team to accomplish the goals of their project (A3)
1CSPR456_8	Develop summarizing, writing, documentation and presentation skills to showcase their ideas in the conferences / journals leading to effective communication. (S3)



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B-Tech - cse - 28/32

Course Contents:

1. Project Phase I work is to be carried out in the group of three to four students.
 Someone has said that choosing teammates for project is way more significant than choosing life partner. So here you will develop team building skills. On the contrary, students must learn how to adjust with unknown team members and get the work done.
2. Project Phase I is intended to help the students become better learners and better engineers.
3. The students shall select the project by reviewing the literature in the domain of their interest and with the consultation of the respective supervisor / guide and approval from the department and submit the brief document discussing outline of the project with clear objectives
4. The students are encouraged to acquire and exercise professional skills such as inter-personal communication, presentation skills etc.
5. The students shall be exposed to all the standard tools used in the industry with help of industry experts.
6. The skills that students acquire during pre-project are intended to make them better prepared for accomplishing their Major project with a great success.
7. The students are supposed to learn to manage time to achieve the scheduled milestones of their project work.
8. Students shall be trained on how to get prepared to change their (or company's) plans midway. Adapt and survive.
9. Students should maintain a project log book containing weekly progress of the project.
10. During semester project will be evaluated progress-wise as per the project calendar provided by the department.
11. The students will prepare a prototype of their work by the end of the semester and it will be showcased along with a technical poster in the event organized by the department.
12. Project Phase I report should be prepared using Latex and submitted in soft and hard form

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Class	B. Tech, Sem. VIII
Course Code and Course Title	1CSPR457- Internship* or Institute Project Phase II
Prerequisite/s	1CSPR456
Teaching Scheme: Lecture/Tutorial/Practical	0/0/27
Credits	8
Evaluation Scheme: ISE/ESE	50/50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1CSPR457_1	Identify , formulate and solve a problem. (K3)
1CSPR457_2	Analyze the hardware and/or software requirements of the system (K4)
1CSPR457_3	Use different tools available in the market for design, coding, testing and deployment and documentation (K3)
1CSPR457_4	Design and construct a hardware and/or software system, component, or process to meet desired requirements of the problem undertaken. (K6)
1CSPR457_5	Defend or argue or appraise the results obtained during project work (K5)
1CSPR457_6	Demonstrate the developed project / product and its usage to the customers.(K3)
1CSPR457_7	Develop summarizing, writing, documentation and presentation skills to showcase their ideas in the conferences / journals leading to effective communication. (S3)
1CSPR457_8	Exercise all the managerial (project planning, scheduling) and behavioral skills in a team to accomplish the goals of their project (A3)



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B-Tech - CSE - 30/32

Course Contents:

1. Internship* or Institute Project Phase II is the task based work leading to partial or complete solution to a problem identified by industry / institute. This final year project is intended to work on real-world problem solving and hence the students may be allowed to work as interns at various industries or institutes of national importance or the research labs.
2. If the students opt for internships at industry, they will work on the problem statements defined by industry with contribution from internal mentor as well. The students who opt for in-house project will be encouraged to formulate their own ideas to solve the real-world problems in the domain of their interests leading to concrete solution to the problem in the institute premises. OR they can be part of any live ongoing research project in the department. The topics being selected should be from the thrust areas and sub-domains of computer science and engineering. The ideas sponsored by industry to be implemented at institute will also be encouraged. Also, it is advised that the students opting for in-house projects should extend their ideas identified in pre-project phase in semester VII. The promising ideas from the students having potential for startups will be encouraged.
3. Irrespective of Industry sponsored project to be implemented at industry or in-house project, project group will select a project topic with consent from guide and approval from the department and submit the brief document discussing outline of the project with clear objectives. The students are required to undergo literature survey, formulate the problem and propose a methodology to achieve the objectives.
4. Project work should involve analytical, experimental, design or combination of these in the area of Computer Science and Engineering; multi-disciplinary work is also encouraged.
5. Students should maintain a project log book containing weekly progress of the project.
6. The project evaluation committee will evaluate the project throughout the semester. The progress of the project will be monitored and assessed as per the project calendar provided by the department.
7. On completion of the work, students should prepare an article and should submit the same to national / international conference, research symposiums, national / international peer reviewed journals. The students should participate in the project exhibitions / competitions in and outside the institute at state / national level.
8. On completion of the work, a project report should be prepared using Latex and the soft and print copy of the same should be submitted to the department.
9. Students need to undergo all the modes of evaluation scheduled by the department time-to-time.



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B-Tech-CSE-31/32

Class	B. Tech, Sem. VIII
Course Code and Course Title	1CSPR458- Socio Outreach
Prerequisite/s	
Teaching Scheme: Lecture/Tutorial/Practical	0/0/0
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1CSPR458_1	Contribute in various social activities with effective interpersonal, communication skills.
1CSPR458_2	Showcase social, professional and ethical responsibilities to help / assist the needy.
1CSPR458_3	Make use of technical skills to provide awareness about digital literacy.
1CSPR458_4	Build foundation to work for environmental sustainability.
1CSPR458_5	Develop understanding of working with people of diversity including age, gender, race, ethnicity, religion without discrimination.

Institute organizes extensive programs of social outreach activity, including on-campus and off-campus social awareness workshops, competitions and donation drives. These activities aim to raise awareness of the vital role that engineering has in our society. The students always participate in such activities throughout the tenure of undergraduate program at institute. This course is included to encourage and reward the students to volunteer and participate in the various Social Outreach Programs.

Based on their participation and contribution towards social activities the students will be evaluated for this course on submitting evidences of their work.



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