



**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES: KADAPA  
(AUTONOMOUS)**

(Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu)  
Accredited by NAAC with 'A' grade, Bangalore.

**M.TECH.COMPUTER SCIENCE AND ENGINEERING  
COURSE STRUCTURE & SYLLABUS  
FIRST YEAR FIRST SEMESTER**

S.No.	Course codes	Course Name	Category	Hours per			Credits
				L	T	P	
1.	23CSEPC01	Advanced Data Structures and Algorithms	PC	3	0	0	3
2.	23CSEPC02	Advanced Computer Networks	PC	3	0	0	3
3.	23CSEPE01	<b>Program Elective Course- I</b> Machine Learning Object Oriented Software Engineering Digital Image & Video Processing	PE	3	0	0	3
4.	23CSEPE02	<b>Program Elective Course-II</b> Data Science Design Patterns Information Security	PE	3	0	0	3
5.	23CSEPC01L	Advanced Data Structures and Algorithms Lab	PC	0	0	4	2
6.	23CSEPC02L	Advanced Computer Networks Lab	PC	0	0	4	2
7.	23CSEMC01	Research Methodology and IPR	MC	2	0	0	2
8.	23CSEAC01	<b>Audit Course-I</b> English for Research paper writing Dissertation Management Sanskrit for Technical Knowledge	AC	2	0	0	0
<b>Total</b>							<b>18</b>



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**M.TECH.COMPUTER SCIENCE AND ENGINEERING**

**COURSE STRUCTURE & SYLLABUS**

**FIRST YEAR SECOND SEMESTER**

S.No.	Course codes	Course Name	Category	Hours per week			Credits
				L	T	P	
1.	23CSEPC01	Advanced Operating Systems	PC	3	0	0	3
2.	23CSEPC02	Internet of Things	PC	3	0	0	3
3.	23CSEPE01	<b>Program Elective Course –III</b> Deep Learning Service Oriented Architecture Computer Vision	PE	3	0	0	3
4.	23CSEPE01	<b>Program Elective Course - IV</b> Data Visualization Techniques Distributed Systems Privacy Preserving Data Publishing	PE	3	0	0	3
5.	23CSEPC01L	Advanced Operating Systems Lab	PC	0	0	4	2
6.	23CSEPC02L	Internet of Things Lab	PC	0	0	4	2
7.	23CSEPR01	Technical seminar	PR	0	0	4	2
8.	23CSEAC01	<b>Audit Course –II</b> Pedagogy Studies Stress Management for Yoga Personality Development through Life Enlightenment Skills	AC	2	0	0	0
<b>Total</b>							<b>18</b>



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Course Code	ADVANCED DATA STRUCTURES AND ALGORITHMS (Common to M.Tech CSE)	L	T	P	C
23CSEPC01		3	0	0	3
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>To understand concepts of dictionaries and hash tables.</li> <li>To implement lists and trees.</li> <li>To analyze usage of B-trees, Splay trees and 2-3 trees.</li> <li>To understand the importance of text processing and computational Geometry.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Understand the implementation of symbol table using hashing techniques</li> <li>Apply advanced abstract data type (ADT) and data structures in solving real world problem</li> <li>Effectively combine the fundamental data structures and algorithmic techniques in building a solution to a given problem</li> <li>Develop algorithms for text processing applications</li> </ul>					
<b>UNIT- I</b>		Lecture Hrs: 8			
Dictionaries : Definition, Dictionary Abstract Data Type, Implementation of Dictionaries, Hashing: Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing.					
<b>UNIT- II</b>		Lecture Hrs: 8			
Skip Lists : Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Deterministic Skip Lists, Trees: Binary Search Trees (BST), AVL Trees, Red Black Trees: Height of a Red Black Tree, Red Black Trees Bottom-Up Insertion, Top-Down Red Black Trees, Top-Down Deletion in Red Black Trees, Analysis of Operations.					
<b>UNIT- III</b>		Lecture Hrs: 8			
2-3 Trees , Advantage of 2-3 trees over Binary Search Trees, Search and Update Operations on 2-3 Trees, Analysis of Operations, B-Trees: Advantage of B- trees over BSTs, Height of B-Tree, Search and Update Operations on 2-3 Trees, Analysis of Operations, Splay Trees: Splaying, Search and Update Operations on Splay Trees, Amortized Analysis of Splaying.					
<b>UNIT- IV</b>		Lecture Hrs: 9			
Text Processing: String Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem					
<b>UNIT- V</b>		Lecture Hrs: 8			
Computational Geometry: One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees, Quad trees, k-D Trees.					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, second Edition, Pearson, 2004.</li> <li>2. T.H. Cormen, C.E. Leiserson, R.L. Rivest, Introduction to Algorithms, Third Edition Prentice Hall, 2009</li> </ol>					
<b>Reference books:</b>					
1. Michael T. Goodrich, Roberto Tamassia, Algorithm Design, First Edition, Wiley, 2006.					



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Course Code	ADVANCED COMPUTER NETWORKS	L	T	P	C
23CSEPC02		3	0	0	3
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b>					
<p>The objective of this course is to build a solid foundation in computer networks concepts and design</p> <ul style="list-style-type: none"> <li>• To understand computer network architectures, protocols, and interfaces.</li> <li>• The OSI reference model and the Internet architecture network applications.</li> <li>• The course will expose students to the concepts of traditional as well as modern day computer networks- wireless and mobile, multimedia-based.</li> <li>• Students completing this course will understand the key concepts and practices employed in modern computer networking</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>• Analyse computer network architectures and estimate quality of service</li> <li>• Design application-level protocols for emerging networks</li> <li>• Analyse TCP and UDP traffic in data networks</li> <li>• Design and analyse medium access methods, routing algorithms and IPv6 protocol for data networks</li> <li>• Analyse Data Center Networks and Optical Networks</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 8 Hrs			
Network Architecture, Performance: Bandwidth and Latency, High Speed Networks, Network-Centric View, Reliable Transmission, Ethernet and Multiple Access Networks, Overlay Networks: Routing Overlays, Peer-to-Peer Networks and Content Distribution Networks, Client-Server Networks, Delay-Tolerant Networks,					
<b>UNIT-II</b>		Lecture Hrs: 9 Hrs			
Switching: Circuit-Switched Networks, Datagram Networks, Virtual-Circuit Networks, Message-Switched Networks, Asynchronous Transfer Mode: Evolution, Benefits, Concepts, Layer and Adaptation Layer, IPv4: Address Space, Notations, Classful, Classless, Network Address Translation, Datagram					
<b>UNIT- III</b>		Lecture Hrs: 7 Hrs			
Fragmentation and Checksum IPv6 Addresses: Structure, Address Space, Packet Format and Extension Headers, ICMP, IGMP, ARP, RARP, Congestion Control and Resource Allocation: Problem, Issues, Queuing, TCP Congestion Control, Congestion-Avoidance Mechanisms and Quality of Service,					
<b>UNIT-IV</b>		Lecture Hrs: 8 Hrs			
Internetworking: Intra-Domain and Inter-Domain Routings, Unicast Routing Protocols: RIP, OSPF and BGP, Multicast Routing Protocols: DVMRP, PIM-DM, PIM-SM, MSDP and MOSPF, Spanning Tree Algorithm, Optical Networking: SONET/SDH Standards, Traffic Engineering: Requirement, Traffic Sizing, Characteristics, Protocols, Time and Delay Considerations, Connectivity, Availability, Reliability and Maintainability and Throughput.					
<b>UNIT-V</b>		Lecture Hrs: 8 Hrs			
Multimedia Over Internet: Transmission, IP Multicasting and VoIP, Domain Name System: Domain Name Space, Distribution, Domains, Resolutions and Dynamic Domain Name System, SNMP, Security: IPsec, SSL/TLS, PGP and Firewalls, Datacenter Design and Interconnection Networks.					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>1. Larry L. Peterson and Bruce S. Davie, Computer Networks: A System Approach, Fifth Edition, Morgan Kaufmann, Elsevier, 2012.</li> <li>2. Behrouz A. Forouzan, Data Communications and Networking, McGraw Hill, Fifth Edition, 2017.</li> </ol>					



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| <ol style="list-style-type: none"><li>3. Chwan-Hwa (John) Wu, J. David Irwin, Introduction to Computer Networks and Cyber Security, CRC press, Taylor &amp; Francis Group, 2014</li><li>4. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Pearson, 5th Edition, 2014.</li></ol> |
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<b>Reference Books:</b>
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| <ol style="list-style-type: none"><li>1. Sathish Jain Advanced Computer Networking: Concepts and Applications</li></ol> |
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Course Code	MACHINE LEARNING (Common to M. Tech CSE)	L	T	P	C
23CSEPE01		3	0	0	3
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>To understand various key paradigms for machine learning approaches.</li> <li>To familiarize with the mathematical and statistical techniques used in machine learning.</li> <li>To understand and differentiate among various machine learning techniques.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>To formulate a machine learning problem</li> <li>Select an appropriate pattern analysis tool for analysing data in a given feature space.</li> <li>Apply pattern recognition and machine learning techniques such as classification and feature selection to practical applications and detect patterns in the data.</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 9 Hrs			
Introduction: Definitions, Datasets for Machine Learning, Different Paradigms of Machine Learning, Data Normalization, Hypothesis Evaluation, VC-Dimensions and Distribution, Bias-Variance Tradeoff, Regression					
<b>UNIT-II</b>		Lecture Hrs: 8 Hrs			
Bayes Decision Theory: Bayes decision rule, Minimum error rate classification, Normal density and discriminant functions. Parameter Estimation: Maximum Likelihood and Bayesian Parameter Estimation					
<b>UNIT- III</b>		Lecture Hrs: 8 Hrs			
Discriminative Methods: Distance-based methods, Linear Discriminant Functions, Decision Tree, Random Decision Forest and Boosting Feature Selection and Dimensionality Reduction: PCA, LDA, ICA, SFFS, SBFS					
<b>UNIT-IV</b>		Lecture Hrs: 7 Hrs			
Learning from unclassified data. Clustering. Hierarchical Agglomerative Clustering, k-means partitioned clustering. Expectation maximization (EM) for soft clustering. Semi-supervised learning with EM using labelled and unlabelled data.					
<b>UNIT-V</b>		Lecture Hrs: 8 Hrs			
Kernel Machines: Kernel Tricks, SVMs (primal and dual forms), K-SVR, K-PCA (6 Lectures) Artificial Neural Networks: MLP, Backprop, and RBF-Net					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>Shalev-Shwartz, S., Ben-David, S., (2014), Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press</li> <li>R. O. Duda, P. E. Hart, D. G. Stork (2000), Pattern Classification, Wiley-Blackwell, 2nd Edition.</li> </ol>					
<b>Reference Books:</b>					
<ol style="list-style-type: none"> <li>Machine Learning Methods in the Environmental Sciences, Neural Networks, William W. Hsieh, Cambridge Univ Press.</li> <li>Richard O. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley &amp; Sons Inc., 2001</li> <li>Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995</li> </ol>					



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Course Code	OBJECT ORIENTED SOFTWARE ENGINEERING	L	T	P	C
23CSEPE01		3	0	0	3
	Semester	I			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>To learn and understand various O-O concepts along with their applicability contexts.</li> <li>Given a problem, identify domain objects, their properties, and relationships among them.</li> <li>How to identify and model/represent domain constraints on the objects and (or) on their relationships</li> <li>To learn various modelling techniques to model different perspectives of object-oriented software design (UML)</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Discuss about software development process models</li> <li>Identify the contemporary issues and discuss about coding standards</li> <li>Recognize the knowledge about testing methods and comparison of various testing techniques.</li> <li>Use the concept and standards of quality and getting knowledge about software quality assurance group.</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 8Hrs			
Introduction to Software Engineering - Software Development process models – Agile Development - Project & Process - Project management - Process & Project metrics - Object Oriented concepts, Principles & Methodologies.					
<b>UNIT-II</b>		Lecture Hrs: 8Hrs			
Software Requirements Specification, Software prototyping - Software project planning - Scope - Resources - Software Estimation - Empirical Estimation Models – Planning - Risk Management - Software Project Scheduling - Object Oriented Estimation & Scheduling.					
<b>UNIT-III</b>		Lecture Hrs: 9Hrs			
Analysis Modelling - Data Modelling - Functional Modelling & Information Flow - Behavioural Modelling - Structured Analysis - Object Oriented Analysis - Domain Analysis - Object oriented Analysis process - Object Relationship Model - Object Behaviour Model, Design modelling with UML.					
<b>UNIT-IV</b>		Lecture Hrs: 9Hrs			
Design Concepts & Principles - Design Process - Design Concepts - Modular Design - Design Effective Modularity - Introduction to Software Architecture - Data Design - Transform Mapping - Transaction Mapping - Object Oriented Design - System design process - Object design process - Design Patterns.					
<b>UNIT-V</b>		Lecture Hrs: 8Hrs			
Top-Down, Bottom-Up, object oriented product Implementation & Integration. Software Testing methods - White Box, Basis Path - Control Structure - Black Box - Unit Testing - Integration testing - Validation & System testing - Testing Tools - Software Maintenance & Re-engineering.					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>Fairley R, "Software Engineering Concepts", second edition, Tata McGraw Hill, New Delhi, 2003.</li> <li>Jalote P, "An Integrated Approach to Software Engineering", third edition, Narosa Publishers, New Delhi, 2013.</li> </ol>					
<b>Reference Books:</b>					
<ol style="list-style-type: none"> <li>Grady Booch, James Rumbaugh, Ivar Jacobson - "the Unified Modeling Language User Guide" - Addison Wesley, 1999.</li> <li>Ali Bahrami, "Object Oriented Systems Development" 1st Edition, The McGraw-Hill Company, 1999</li> </ol>					





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Course Code	DIGITAL IMAGE AND VIDEO PROCESSING	L	T	P	C
23CSEPE01		3	0	0	3
	<b>Semester</b>	<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• To study the image fundamentals and mathematical transforms necessary for image processing.</li> <li>• To study the image enhancement techniques</li> <li>• To study image restoration procedures.</li> <li>• To study the image compression procedures.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>• Review the fundamental concepts of a digital image processing system.</li> <li>• Analyse images in the frequency domain using various transforms.</li> <li>• Evaluate the techniques for image enhancement and image restoration.</li> <li>• Categorize various compression techniques</li> </ul>					
<b>UNIT – I</b>		Lecture Hrs: 9 Hrs			
Introduction, Image sampling, Quantization, Resolution, Image file formats, Elements of image processing system, Applications of Digital image processing. Introduction, Need for transform, image transforms, Fourier transform, 2D Discrete Fourier transform and its transforms, Importance of phase, Walsh transform, Hadamard transform, Haar transform, slant transform Discrete cosine transform, KL transform, singular value decomposition, Radon transform, comparison of different image transforms					
<b>UNIT – II</b>		Lecture Hrs: 9 Hrs			
Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering. Introduction to Image restoration, Image degradation, Types of image blur, Classification of image restoration techniques, Image restoration model, Linear and Nonlinear image restoration techniques, Blind de-convolution.					
<b>UNIT – III</b>		Lecture Hrs: 8 Hrs			
Image Segmentation: Introduction to image segmentation, Point, Line and Edge Detection, Region based segmentation., Classification of segmentation techniques, Region approach to image segmentation, clustering techniques, Image segmentation based on thresholding, Edge based segmentation, Edge detection and linking, Hough transform, Active contour Image Compression: Introduction, Need for image compression, Redundancy in images, Classification of redundancy in images, image compression scheme, Classification of image compression schemes, Fundamentals of information theory, Run length coding, Shannon-Fano coding, Huffman coding, Arithmetic coding, Predictive coding, Transformed based compression, Image compression standard, Wavelet-based image compression, JPEG Standards.					
<b>UNIT – IV</b>		Lecture Hrs: 7 Hrs			
Basic Steps of Video Processing: Analog Video, Digital Video. Time-Varying Image Formation models: Three-Dimensional Motion Models, Geometric Image Formation, Photometric Image Formation, Sampling of Video signals, Filtering operations.					
<b>UNIT – V</b>		Lecture Hrs: 8 Hrs			
2-D Motion Estimation: Optical flow, General Methodologies, Pixel Based Motion Estimation, Block Matching Algorithm, Mesh based Motion Estimation, Global Motion Estimation, Region based Motion Estimation, Multiresolution motion estimation, Waveform based coding, Block based transform coding, Predictive coding, Application of motion estimation in Video coding.					
<b>Textbooks:</b>					





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1. Digital Image Processing – Gonzalez and Woods, 3rd Ed., Pearson.
2. Video Processing and Communication – Yao Wang, Joem Ostermann and Yaquin Zhang. 1st Ed., PHI Int.



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**Reference Books:**

1. S. Jayaraman, S. Esakkirajan and T. Veera Kumar, "Digital Image processing, Tata McGraw Hill publishers, 2009



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Course Code	DATASCIENCE	L	T	P	C
23CSEPE02		3	0	0	3
	<b>Semester</b>	<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>Provide you with the knowledge and expert set to become a proficient data scientist.</li> <li>Demonstrate an understanding of statistics and machine learning concepts that are vital for data science;</li> <li>Produce Python code to statistically analyse a dataset;</li> <li>Critically evaluate data visualizations based on their design and use for communicating stories from data;</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Explain how data is collected, managed and stored for data science;</li> <li>Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists;</li> <li>Implement data collection and management scripts using MongoDB</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 7Hrs			
Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.					
<b>UNIT-II</b>		Lecture Hrs: 7Hrs			
Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data sources					
<b>UNIT- III</b>		Lecture Hrs: 9Hrs			
Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes					
<b>UNIT-IV</b>		Lecture Hrs: 8Hrs			
Data visualization: Introduction, Types of data visualisation, Data for visualisation: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings					
<b>UNIT-V</b>		Lecture Hrs: 8Hrs			
Applications of Data Science, Technologies for visualisation, Bokeh (Python) Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly.</li> <li>2. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press</li> </ol>					
<b>Reference Books:</b>					
<ol style="list-style-type: none"> <li>1. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. MIT Press, 2013.</li> <li>2. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. O'Reilly, 2013.</li> <li>3. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition. Springer, 2009.</li> <li>4. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science. 2018.</li> <li>5. Mohammed J. Zaki and Wagner Miera Jr. Data Mining and Analysis: Fundamental Concepts and Algorithms. Cambridge University Press, 2014.</li> <li>6. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, Third Edition. Morgan Kaufmann, 2011.</li> </ol>					



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Course Code	DESIGN PATTERNS (Common to M.Tech CSE)	L	T	P	C
23CSEPE02		3	0	0	3
	<b>Semester</b>	<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>Understand the concept of Design patterns and its importance.</li> <li>Understand the behavioural knowledge of the problem and solutions.</li> <li>Relate the Creational, Structural, behavioural Design patterns.</li> <li>Apply the suitable design patterns to refine the basic design for given context</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Identify the appropriate design patterns to solve object oriented design problems.</li> <li>Develop design solutions using creational patterns.</li> <li>Apply structural patterns to solve design problems.</li> <li>Construct design solutions by using behavioral patterns.</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 8Hrs			
Introduction: What is a Design Pattern?, Design Patterns in Small talk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.					
<b>UNIT-II</b>		Lecture Hrs: 9Hrs			
A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.					
<b>UNIT- III</b>		Lecture Hrs: 9Hrs			
Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns. Structural Pattern Part-I: Adapter, Bridge, Composite.					
<b>UNIT- IV</b>		Lecture Hrs: 8Hrs			
Structural Pattern Part-II: Decorator, Façade, Flyweight, Proxy. Behavioural Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator.					
<b>UNIT- V</b>		Lecture Hrs: 8Hrs			
Behavioral Patterns Part-II: Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.					
<b>Textbooks:</b>					
1. Design Patterns By Erich Gamma, Pearson Education					
<b>Reference Books:</b>					
1. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Grady Booch Design Patterns: Elements of Reusable Object-Oriented Software					



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Course Code	INFORMATION SECURITY	L	T	P	C
23CSEPE02		3	0	0	3
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>To understand basics of Cryptography and Network Security.</li> <li>To be able to secure a message over an insecure channel by various means.</li> <li>To learn about how to maintain the Confidentiality, Integrity and Availability of a Data</li> <li>To understand various protocols for network security to protect against the threats in the networks.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Provide security of the data over the network.</li> <li>Do research in the emerging areas of cryptography and network security.</li> <li>Implement various networking protocols.</li> <li>Protect any network from the threats in the world</li> </ul>					
<b>UNIT- I</b>		Lecture Hrs: 9Hrs			
Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internet network security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.					
<b>UNIT- II</b>		Lecture Hrs: 8Hrs			
Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication.					
<b>UNIT- III</b>		Lecture Hrs: 8Hrs			
Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.					
<b>UNIT- IV</b>		Lecture Hrs: 7Hrs			
Email privacy: Pretty Good Privacy (PGP) and S/MIME. IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.					
<b>UNIT- V</b>		Lecture Hrs: 8Hrs			
Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3. Intruders, Viruses and related threats.					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.</li> <li>Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W. Manzuik and Ryan Perme, Wiley Dreamtech,</li> <li>Cryptography and network Security, Third edition, Stallings, PHI/Pearson</li> </ol>					
<b>Reference Books:</b>					
<ol style="list-style-type: none"> <li>Network Security and Cryptography, Bernard Menezes, Cengage Learning.</li> <li>Cryptography and Security, C.K. Shymala, N. Harini and Dr. T.R. Padmanabhan, Wiley-India.</li> <li>Applied Cryptography, Bruce Schneier, 2nd edition, John Wiley &amp; Sons.</li> <li>Cryptography and Network Security, Atul Kahate, TMH.</li> <li>Introduction to Cryptography, Buchmann, Springer.</li> <li>Number Theory in the Spirit of Ramanujan, Bruce C. Berndt, University Press</li> <li>Introduction to Analytic Number Theory, Tom M. Apostol, University Press</li> </ol>					



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<b>Course Code</b>	<b>ADVANCED DATA STRUCTURES AND ALGORITHMS SLAB (Common to M.Tech CSE)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>23CSEPC01L</b>		<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• Implement linear and nonlinear data structures.</li> <li>• Analyze various algorithms based on their time complexity.</li> <li>• Choose appropriate data structure and algorithm design method for a specific application.</li> <li>• Identify suitable data structure to solve various computing problems.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<ul style="list-style-type: none"> <li>• Implement divide and conquer techniques to solve a given problem.</li> <li>• Implement hashing techniques like linear probing, quadratic probing, random probing and double hashing/rehashing.</li> <li>• Perform stack operations to convert infix expression into postfix expression and evaluate the postfix expression.</li> <li>• Differentiate graph traversal techniques like Depth First Search, Breadth First Search. Identify shortest path to other vertices using various algorithms.</li> </ul>					
<b>List of Experiments:</b>					
<ul style="list-style-type: none"> <li>• To implement functions of Dictionary using Hashing (division method, Multiplication method, Universal hashing).</li> <li>• To perform various operations i.e., insertions and deletions on AVL trees.</li> <li>• To perform various operations i.e., insertions and deletions on 2-3 trees.</li> <li>• To implement operations on binary heap.</li> <li>• To implement operations on graphs</li> <li>• To implement Depth First Search for a graph non-recursively.</li> <li>• To implement Breadth First Search for a graph non-recursively.</li> <li>• To implement Kruskal's algorithm to generate a minimum-cost spanning tree.</li> <li>• To implement Dijkstra's algorithm to find shortest path in the graph.</li> </ul>					



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Course Code	ADVANCED COMPUTER NETWORKS LAB	L	T	P	C
23CSEPC02L		0	0	4	2
	<b>Semester</b>	<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>Aim to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks</li> </ul>					
<b>Course Outcomes (CO):</b>					
Develop programs for client-server applications Perform packet sniffing and analyze packets in network traffic. Implement error detecting and correcting codes Implement network security algorithms					
<b>List of Experiments:</b>					
<ol style="list-style-type: none"> <li>Implementation of client-server programs for different network applications</li> <li>Study and analysis of the network using Wireshark network protocol analyzer</li> <li>Implementation of topology generation for network simulation</li> <li>Implementation of queuing management</li> <li>Implementation of MAC-layer protocols</li> <li>Implementation of routing protocols</li> <li>Implementation of transport-layer protocols</li> <li>Implementation of network security mechanisms</li> </ol>					





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Course Code	RESEARCH METHODOLOGY AND IPR (Common to M.Tech CSE)	L	T	P	C
23CSEM01		2	0	0	2
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>Identify an appropriate research problem in their interesting domain.</li> <li>Understand ethical issues understand the Preparation of a research project thesis report.</li> <li>Understand the Preparation of a research project thesis report</li> <li>Understand the law of patent and copyrights.</li> <li>Understand the Adequate knowledge on IPR</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Analyze research related information</li> <li>Follow research ethics</li> <li>Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</li> <li>Understanding that when IPR would take such important place in growth of individuals &amp; nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general &amp; engineering in particular.</li> <li>Understand that IPR protection provides an incentive to inventors for further research work and investment in R &amp; D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 9 Hrs			
Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, scope, and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations					
<b>UNIT-II</b>		Lecture Hrs: 8 Hrs			
Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.					
<b>UNIT- III</b>		Lecture Hrs: 8 Hrs			
Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.					
<b>UNIT-IV</b>		Lecture Hrs: 7 Hrs			
Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.					
<b>UNIT-V</b>		Lecture Hrs: 7 Hrs			
New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science &amp; engineering students"</li> <li>Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"</li> </ol>					
<b>Reference Books:</b>					
<ol style="list-style-type: none"> <li>Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"</li> <li>Halbert, "Resisting Intellectual Property", Taylor &amp; Francis Ltd, 2007.</li> <li>Mayall, "Industrial Design", McGraw Hill, 1992.</li> <li>Niebel, "Product Design", McGraw Hill, 1974.</li> </ol>					



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5. Asimov, "Introduction to Design", Prentice Hall, 1962.
6. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.



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Course Code	ADVANCED OPERATING SYSTEMS	L	T	P	C
23CSEPC01		3	0	0	3
<b>Semester</b>		<b>II</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>To be able to read and understand sample open source programs and header files.</li> <li>System calls which explore networking and security Applications..</li> <li>To acquire the knowledge in the implementation of interprocess communication.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>To explain the functionality of a large software system by reading its source.</li> <li>To revise any algorithm present in a system.</li> <li>Interprocess communication mechanism</li> <li>Android mobile inner process system</li> </ul>					
<b>UNIT- I</b>		Lecture Hrs: 8 Hrs			
Basic Operating System Concepts- Overview of Unix File System- Files- Links- Types- Inodes- Access Rights- System Calls- Overview of Unix Kernels- Model- Implementation- Reentrant Kernels- Address Space- Synchronization- Interprocess Communication- Process Management- Memory Management- Device Drivers.					
<b>UNIT- II</b>		Lecture Hrs: 8 Hrs			
Processes, Lightweight Processes, and Threads- Process Descriptor- State- Identifying a Process- Relationships among processes- Organization- Resource Limits- Creating Processes- System Calls- Kernel Threads- Destroying Processes- Termination- Removal.					
<b>UNIT- III</b>		Lecture Hrs: 9 Hrs			
The Virtual File System (VFS) - Role - File Model - System Calls - Data Structures - Super Block, Inode, File, dentry Objects - dentry Cache - Files Associated with a Process - Filesystem Types - Special Filesystems - Filesystem Type Registration - Filesystem Handling - Namespaces - Mounting - Unmounting - Implementation of VFS System Calls.					
<b>UNIT- IV</b>		Lecture Hrs: 8 Hrs			
Windows Operating system- versions, Concepts and tools, Windows internals, System Architecture, Requirements and design goals, Operating system model, Architecture overview. Key system components. System mechanisms- Trap dispatching, object manager, Synchronization, System worker threads, Windows global flags, Local procedural calls, Kernel event tracing.					
<b>UNIT- V</b>		Lecture Hrs: 8 Hrs			
What is Android, basic building blocks - activities, services, broadcast receivers & content, UI components - views & notifications, components for communication - intents & intent filters, and Android API levels launching emulator editing emulator settings emulator shortcuts logcat usage, Applications of Android.					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>Daniel P. Bovet and Marco Cesati, "Understanding the Linux Kernel", 3rd Edition, O'Reilly Publications, 2005.</li> <li>Harold Abelson, Gerald Jay Sussman and Julie Sussman, — Structure and Interpretation of Computer Programs, Second Edition, Universities Press, 2013.</li> </ol>					
<b>Reference Books:</b>					
1. Mark E. Russinovich and David A. Solomon, Microsoft Windows Internals, 4th Edition, Microsoft Press, 2004.					



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Course Code	INTERNET OF THINGS	L	T	P	C
23CSEPC02		3	0	0	3
<b>Semester</b>		<b>II</b>			
<b>Course Objectives:</b>					
Introduce the fundamental concepts of IoT and physical computing <ul style="list-style-type: none"> <li>• Expose the student to a variety of embedded boards and IoT Platforms</li> <li>• Create a basic understanding of the communication protocols in IoT communications.</li> <li>• Familiarize the student with application program interfaces for IoT.</li> <li>• Enable students to create simple IoT applications.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>• Choose the sensors and actuators for an IoT application</li> <li>• Select protocols for a specific IoT application</li> <li>• Utilize the cloud platform and APIs for IoT applications</li> <li>• Experiment with embedded boards for creating IoT prototypes</li> <li>• Design a solution for a given IoT application</li> <li>• Establish a startup</li> </ul>					
<b>UNIT- I</b>		Lecture Hrs: 9Hrs			
Overview of IoT: The Internet of Things: An Overview, The Flavor of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things? Design Principles for Connected Devices: Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances. Prototyping: Sketching, Familiarity, Costs Vs Ease of Prototyping, Prototypes and Production, Open source Vs Closed source, Tapping into the community.					
<b>UNIT- II</b>		Lecture Hrs: 8Hrs			
Embedded Devices: Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things					
<b>UNIT- III</b>		Lecture Hrs: 8Hrs			
Communication in the IoT: Internet Communications: An Overview, IP Addresses, MAC Addresses, TCP and UDP Ports, Application Layer Protocols Prototyping Online Components: Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Protocol					
<b>UNIT- IV</b>		Lecture Hrs: 8Hrs			
Business Models: A short history of business models, The business model canvas, Who is the business model for, Models, Funding an Internet of Things startup, Lean Startups. Manufacturing: What are you producing, Designing kits, Designing printed circuit boards.					
<b>UNIT-V</b>		Lecture Hrs: 8Hrs			
Manufacturing continued: Manufacturing printed circuit boards, Mass-producing the case and other fixtures, Certification, Costs, Scaling up software. Ethics: Characterizing the Internet of Things, Privacy, Control, Environment.					
<b>Textbooks:</b>					
1. Adrian McEwen, Hakim Cassimally- Designing the Internet of Things, Wiley Publications, 2012					
<b>Reference Books:</b>					
1. Haider Raad Fundamentals of IoT and Wearable Technology Design, Wiley Publications 2020. 2. Kashish Ara Shakil, Samiya Khan, Internet of Things (IoT) Concepts and Applications, Springer Publications 2020.					



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Course Code	DEEPLARNING	L	T	P	C
23CSEPE01		3	0	0	3
	Semester	II			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>To present the mathematical, statistical and computational challenges of building neural networks.</li> <li>To teach the concepts of deep learning.</li> <li>To introduce dimensionality reduction techniques.</li> <li>To enable the student to know deep learning techniques to support real-time applications.</li> <li>To explain the case studies of deep learning techniques.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.</li> <li>Implement deep learning algorithms and solve real-world problems.</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 8Hrs			
Introduction: Introduction to machine learning - Linear models (SVMs and Perceptron's, logistic regression) - Intro to Neural Nets: What a shallow network computes - Training a network: loss functions, backpropagation and stochastic gradient descent - Neural networks as a universal function approximates.					
<b>UNIT-II</b>		Lecture Hrs: 9Hrs			
Deep Networks: History of Deep Learning - A Probabilistic Theory of Deep Learning - Backpropagation and regularization, batch normalization - VCDimension and Neural Nets - Deep Vs Shallow Networks Convolutional Networks - Generative Adversarial Networks (GAN), Semi-supervised Learning .					
<b>UNIT-III</b>		Lecture Hrs: 8Hrs			
Dimensionality Reduction: Linear (PCA, LDA) and manifolds, metric learning - Auto encoders and dimensionality reduction in networks - Introduction to Convnet - Architectures - AlexNet, VGG, Inception, ResNet - Training a Convnet: weights initialization, batch normalization, hyperparameter optimization.					
<b>UNIT-IV</b>		Lecture Hrs: 8Hrs			
Optimization and Generalization: Optimization in deep learning - Non-convex optimization for deep networks - Stochastic Optimization Generalization in neural networks - Spatial Transformer Networks - Recurrent networks, LSTM - Recurrent Neural Network Language Models - Word-Level RNNs & Deep Reinforcement Learning - Computational & Artificial Neuroscience.					
<b>UNIT-V</b>		Lecture Hrs: 8Hrs			
Case Study and Applications: ImageNet - Detection - Audio Wave Net - Natural Language Processing Word2Vec - Joint Detection Bioinformatics - Face Recognition - Scene Understanding - Gathering Image Captions.					
<b>Textbooks:</b>					
1. "Deep Learning", Ian Goodfellow, Yoshua Bengio, Aaron Courville, MIT Press 2016.					
<b>Reference Books:</b>					
1. "Neural Networks and Deep Learning A Text Book", Charu C Aggarwal, Springer International Publishing AG, Part of Springer Nature 2018.					



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Course Code	SERVICE ORIENTED ARCHITECTURE	L	T	P	C
23CSEPE01		3	0	0	3
	Semester	II			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>Understand SOA and evolution of SOA.</li> <li>Understand web services and primitive, contemporary SOA.</li> <li>Understand various service layers.</li> <li>Understand service-oriented analysis and design based on guidelines.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Comprehend the need for SOA and its systematic evolution</li> <li>Apply SOA technologies to enterprise domain</li> <li>Design and analyze various SOA patterns and techniques</li> <li>Compare and evaluate best strategies and practices of SOA</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 8Hrs			
Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common Tangible Benefits of SOA, Common Pitfalls of Adopting SOA. The Evolution of SOA: An SOA Timeline, The Continuing Evolution of SOA, The Roots of SOA.					
<b>UNIT-II</b>		Lecture Hrs: 8Hrs			
Web Services and Primitive SOA: The Web Services Framework, Services, Service Descriptions. Web Services and Contemporary SOA (Part I-Activity management and Composition): Message Exchange Patterns, Service Activity, Coordination, Atomic Transactions, Orchestration, and Choreography. Web Services and Contemporary SOA (Part-II-Advanced Messaging, Metadata and Security): Addressing, Reliable Messaging, Correlation, Policies, Metadata exchange, Security.					
<b>UNIT- III</b>		Lecture Hrs: 9Hrs			
Principles of Service-Oriented: Service-Oriented and the Enterprise, Anatomy of SOA, Common Principles of Service-Oriented, Interrelation between Principles of Service-Oriented, Service Orientation and Object Orientation. Service Layers: Service-Oriented and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.					
<b>UNIT- IV</b>		Lecture Hrs: 9Hrs			
SOA Delivery Strategies: SOA Delivery Lifecycle Phases, The Top-Down Strategy, The Bottom-up Strategy, The Agile Strategy. Service Oriented Analysis (Part I-Introduction): Introduction to Service Oriented Analysis, Benefits of a Business Centric SOA, Deriving Business Services. Service Oriented Analysis (Part-II-Service Modelling): Service Modelling, Service Modelling Guidelines, Classifying Service Model Logic, Contrasting Service Modelling Approaches. Service Oriented Design (Part I-Introduction): Introduction to Service-Oriented Design, WSDL Related XML Schema Language Basics, WSDL Language Basics, Service Interface Design Tools. Service Oriented Design (Part II-SOA Composition Guidelines): SOA Composing Steps, Considerations for Choosing Service Layers, Considerations for Positioning Core SOA Standards, Considerations for Choosing SOA Extensions.					
<b>UNIT- V</b>		Lecture Hrs: 8Hrs			
Service Oriented Design (Part III- Service Design): Service Design Overview, Entity-Centric Business Service Design, Application Service Design, Task-Centric Business Service Design, Service Design Guidelines. Service Oriented Design (Part IV-Business Process Design): WS-BPEL Language Basics, WS-Coordination Overview, Service Oriented Business Process Design.					
<b>Textbooks:</b>					
1. Service-Oriented Architecture-Concepts, Technology, and Design, Thomas Erl, Pearson Education, 2006.					



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2. Understanding SOA with Web Services, Eric Newcomer, Greg Lomow, Pearson Education, 2005.
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<b>Reference Books:</b>
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1. Thomas Erl; Service Oriented Architecture Concepts Technology & Design, Pearson Education Limited; 2015, ISBN-13: 9788131714904.
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2 Guido Schmutz, Peter Welkenbach, Daniel Liebhart; Service Oriented Architecture An Integration Blueprint; Shroff Publishers & Distributors; 2010, ISBN-13: 9789350231081
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Course Code	COMPUTER VISION (Common to M.Tech CSE)	L	T	P	C
23CSEPE01		3	0	0	3
	Semester	II			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• Be familiar with both the theoretical and practical aspects of computing with images.</li> <li>• Have described the foundation of image formation, measurement, and analysis.</li> <li>• Understand the geometric relationships between 2D images and the 3D world.</li> <li>• Grasp the principles of state-of-the-art deep neural networks</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>• Develop the practical skills necessary to build computer vision applications.</li> <li>• To have gained exposure to object and scene recognition and categorization from images</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 8Hrs			
Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis					
<b>UNIT-II</b>		Lecture Hrs: 7Hrs			
Edge detection, Edge detection performance, Hough transform, corner detection					
<b>UNIT -III</b>		Lecture Hrs: 7Hrs			
Segmentation, Morphological filtering, Fourier transform					
<b>UNIT-IV</b>		Lecture Hrs: 8Hrs			
Feature extraction, shape, histogram, colour, spectral, texture, using CVI tools, Feature analysis, feature vectors, distance/similarity measures, data pre-processing					
<b>UNIT-V</b>		Lecture Hrs: 8Hrs			
Pattern Analysis: Clustering: K-Means, K-Medoids, Mixture of Gaussians, Classification: Discriminant Function, Supervised, Un-supervised, Semisupervised Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods					
<b>Textbooks:</b>					
1. Computer Vision: Algorithms and Applications by Richard Szeliski.					
<b>Reference Books:</b>					
1. Deep Learning, by Goodfellow, Bengio, and Courville. 2. Dictionary of Computer Vision and Image Processing, by Fisher et al.					



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Course Code	DATA VISUALIZATION TECHNIQUES	L	T	P	C
23CSEPE02		3	0	0	3
<b>Semester</b>		<b>II</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• To develop skills to both design and critique visualizations.</li> <li>• To introduce visual perception and core skills for visual analysis.</li> <li>• To understand visualization for time-series analysis.</li> <li>• To understand visualization for ranking analysis.</li> <li>• To understand visualization for deviation analysis..</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>• Explain principles of visual perception</li> <li>• Apply core skills for visual analysis</li> <li>• Apply visualization techniques for various data analyst tasks</li> <li>• Design information dashboard</li> </ul>					
<b>UNIT – I</b>		Lecture Hrs: 9Hrs			
Information visualization – effective data analysis – traits of meaningful data – visual perception – making abstract data visible – building blocks of information visualization – analytical interaction – analytical navigation – optimal quantitative scales – reference lines and regions – multiple concurrent views – focus and context – details on demand – over-plotting reduction – analytical patterns – pattern examples.					
<b>UNIT – II</b>		Lecture Hrs: 8Hrs			
Distribution analysis – describing distributions – distribution patterns – distribution displays – distribution analysis best practices – correlation analysis – describing correlations – correlation patterns – correlation displays – correlation analysis techniques and best practices – multivariate analysis – multivariate patterns – multivariate displays – multivariate analysis techniques and best practices.					
<b>UNIT – III</b>		Lecture Hrs: 8Hrs			
Information dashboard – Introduction – dashboard design issues and assessment of needs – Considerations for designing dashboard – visual perception – Achieving eloquence.					
<b>UNIT – IV</b>		Lecture Hrs: 8Hrs			
Advantages of Graphics – Library of Graphs – Designing Bullet Graphs – Designing Sparklines – Dashboard Display Media – Critical Design Practices – Putting it all together – Unveiling the dashboard.					
<b>UNIT – V</b>		Lecture Hrs: 9Hrs			
Plotting Geospatial Data: Introduction to Geoplotlib, Design Principles of Geoplotlib, Geospatial Visualizations, Plotting Geospatial Data on a Map Web-Based Visualizations: Concepts of Bokeh, Interfaces – Plotting and Model Interfaces, Output, Bokeh Server, Presentation, Integrating – HTML Document and Bokeh Applications					
<b>Textbooks:</b>					
<ol style="list-style-type: none"> <li>1. Ben Fry, "Visualizing data: Exploring and explaining data with the processing environment", O'Reilly, 2008.</li> <li>2. Mario Dobler, Tim Grobmann, "Data Visualization with Python", O'Reilly, First Edition, 2019</li> </ol>					
<b>Reference Books:</b>					
1. Stephen Few, "Information dashboard design: Displaying data for at-a-glance monitoring", second edition, Analytics Press, 2013.					



# ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES: KADAPA (AUTONOMOUS)

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Course Code	DISTRIBUTED SYSTEMS	L	T	P	C
23CSEPE02		3	0	0	3
<b>Semester</b>		<b>II</b>			
<b>Course Objectives:</b>					
To introduce the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment, and to provide insight into related research problems					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>• Design trends in distributed systems.</li> <li>• Apply network virtualization.</li> <li>• Apply remote method invocation and objects</li> </ul>					
<b>UNIT- I</b>		Lecture Hrs: 8Hrs			
Distributed data processing; What is a DDBS; Advantages and disadvantages of DDBS; Problem areas; Overview of database and computer network concepts DISTRIBUTED DATABASE MANAGEMENT SYSTEM ARCHITECTURE Transparencies in a distributed DBMS ; Distributed DBMS architecture; Global directory issues					
<b>UNIT- II</b>		Lecture Hrs: 9Hrs			
DISTRIBUTED DATABASE DESIGN Alternative design strategies; Distributed design issues; Fragmentation; Data Allocation SEMANTIC DATA CONTROL View management; Database security; Semantic Integrity Control QUERY PROCESSING ISSUES Objectives of query processing; Characterization of query processors; Layers of query processing; Query decomposition ; Localization of distributed data					
<b>UNIT- III</b>		Lecture Hrs: 9Hrs			
Factors governing query optimization; Centralized query optimization; Ordering of fragment queries; Distributed query optimization algorithms TRANSACTION MANAGEMENT The transaction concept; Goals of transaction management; Characteristics of transactions; Taxonomy of transaction models CONCURRENCY CONTROL Concurrency control in centralized database systems; Concurrency control in DDBSs; Distributed concurrency control algorithms; Deadlock management					
<b>UNIT- IV</b>		Lecture Hrs: 7Hrs			
Reliability issues in DDBSs; Types of failures; Reliability techniques; Commit protocols; Recovery protocols					
<b>UNIT- V</b>		Lecture Hrs: 8Hrs			
PARALLEL DATABASE SYSTEMS Parallel architectures; parallel query processing and optimization; load balancing ADVANCED TOPICS Mobile Databases, Distributed Object Management, Multi-databases					
<b>Textbooks:</b>					
1. Principles of Distributed Database Systems, M. T. Ozsu and P. Valduriez, Prentice-Hall, 1991.					
<b>Reference Books:</b>					
1. Distributed Database Systems, D. Bell and J. Grimson, Addison-Wesley, 1992.					



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Course Code	PRIVACY PRESERVING DATA PUBLISHING	L	T	P	C
23CSEPE02		3	0	0	3
	Semester	II			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>Will be able to decide, given an application, if it should be formulated as a data privacy problem. If yes, the students will be able to formally define the problem and state what properties can be guaranteed by applying differential privacy.</li> <li>Will have understanding of how (and why) randomness (or uncertainty) provides privacy protection.</li> <li>Will be able to analyse real-world privacy problems, identify which privacy-preserving methods are appropriate, and implement the private algorithms in code.</li> <li>Will be able to evaluate and compare privacy-preserving algorithms.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Apply anonymization methods for sensitive data protection</li> <li>Apply state-of-art techniques for data privacy protection</li> <li>Design privacy preserving algorithms for real-world applications</li> <li>Identify security and privacy issues in OLAP systems</li> <li>Apply information metrics for Maximizing the preservation of information in the anonymization process</li> </ul>					
<b>UNIT- I</b>		Lecture Hrs: 8Hrs			
Fundamentals of defining privacy and developing efficient algorithms for enforcing privacy, challenges in developing privacy preserving algorithms in real-world applications, privacy issues, privacy models,					
<b>UNIT-II</b>		Lecture Hrs: 7Hrs			
Anonymization operations, information metrics, Anonymization methods for the transaction data, trajectory data, social networks data, and textual data, Collaborative Anonymization,					
<b>UNIT- III</b>		Lecture Hrs: 7Hrs			
Access control of outsourced data, Use of Fragmentation and Encryption to Protect Data Privacy, Security and Privacy in OLAP systems.					
<b>UNIT- IV</b>		Lecture Hrs: 7Hrs			
Extended Data publishing Scenarios, Anonymization for Data Mining, publishing social science data,					
<b>UNIT- V</b>		Lecture Hrs: 8Hrs			
Continuous user activity monitoring (like in search logs, location traces, energy monitoring), social networks, recommendation engines and targeted advertising.					
<b>Textbooks:</b>					
1. Benjamin C. M. Fung, Ke Wang, Ada Wai-Chee Fu and Philip S. Yu, Introduction to Privacy Preserving Data Publishing: Concepts and Techniques, 1st Edition, Chapman & Hall/CRC, 2010.					
<b>Reference Books:</b>					
1. Bee-Chung Chen, Daniel Kifer, Ashwin Machanavajjhala, Kristen LeFevre Privacy-Preserving Data Publishing, Now Publishers Inc, 2009.					



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Course Code	ADVANCED OPERATING SYSTEMS LAB	L	T	P	C
23CSEPC01L		0	0	4	2
	<b>Semester</b>	<b>II</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>To study Linux memory management data structures and algorithms.</li> <li>To acquire the knowledge in the implementation of interprocess communication.</li> <li>To understand how program execution happens in Linux.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<ul style="list-style-type: none"> <li>To revise any algorithm present in a system.</li> <li>To design a new algorithm to replace an existing one.</li> <li>To appropriately modify and use the data structures of the Linux kernel for a different software system.</li> </ul>					
<b>List of Experiments:</b>					
<ol style="list-style-type: none"> <li>Write programs using the following system calls of UNIX operating system: 40 fork, exec, getpid, exit, wait, close, stat, opendir, readdir</li> <li>Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)</li> <li>Write C programs to simulate UNIX commands like ls, grep, etc.</li> <li>Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)</li> <li>Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)</li> <li>Developing Application <span style="float: right;">using</span> InterProcess communication (using shared memory, pipes or message queues)</li> <li>Implement the Producer-Consumer problem using semaphores (using UNIX system calls).</li> </ol>					



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Course Code	INTERNET OF THINGS LAB	L	T	P	C
23CSEPC02L		0	0	4	2
<b>Semester</b>		<b>II</b>			
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>The main objective of IOT applications is to know the different real-time sensors used to measure the different electrical parameters and to control the different devices from anywhere through IOT.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<ul style="list-style-type: none"> <li>The students will be thorough about the technology behind the IoT and associated technologies</li> <li>The students will be able to use the IoT technologies in practical domains of society</li> <li>The students will be able to gain knowledge about the state-of-the-art methodologies in IoT application domains.</li> </ul>					
<b>List of Experiments:</b>					
<ol style="list-style-type: none"> <li>Exercise on Eclipse IoT Project.</li> <li>Experiments on few Eclipse IoT Projects.</li> <li>Any Experiment on architecture of IoT Toolkit.</li> <li>Exercise on smart object API Gateway service reference implementation in IoT Toolkit.</li> <li>Experiment on HTTP-to-CoAP semantic mapping Proxy in IoT Toolkit.</li> <li>Experiment on Gateway as a service deployment in IoT Toolkit.</li> <li>Experiment on application framework and embedded software agents for IoT Toolkit</li> </ol>					



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# AUDITC OURSE-I





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(Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu)

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Course Code	ENGLISH FOR RESEARCH PAPER WRITING	L	T	P	C
23CSEAC01		2	0	0	0
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b> This course will enable students:					
<ul style="list-style-type: none"> <li>• Understand the essentials of writing skills and their level of readability</li> <li>• Learn about what to write in each section</li> <li>• Ensure qualitative presentation with linguistic accuracy</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>• Understand the significance of writing skills and the level of readability</li> <li>• Analyze and write title, abstract, different sections in research paper</li> <li>• Develop the skills needed while writing a research paper</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 10 Hrs			
1 Overview of a Research Paper- Planning and Preparation- Word Order- Useful Phrases- Breaking up Long Sentences- Structuring Paragraphs and Sentences- Being Concise and Removing Redundancy - Avoiding Ambiguity					
<b>UNIT-II</b>		Lecture Hrs: 10 Hrs			
Essential Components of a Research Paper- Abstracts- Building Hypothesis- Research Problem- Highlight Findings- Hedging and Criticizing, Paraphrasing and Plagiarism, Cauterization					
<b>UNIT- III</b>		Lecture Hrs: 10 Hrs			
Introducing Review of the Literature – Methodology - Analysis of the Data- Findings- Discussion- Conclusions- Recommendations.					
<b>UNIT- IV</b>		Lecture Hrs: 9 Hrs			
Key skills needed for writing a Title, Abstract, and Introduction					
<b>UNIT- V</b>		Lecture Hrs: 9 Hrs			
Appropriate language to formulate Methodology, incorporate Results, put forth Arguments and draw Conclusions					
<b>Suggested Reading</b>					
<ol style="list-style-type: none"> <li>1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books) Model Curriculum of Engineering &amp; Technology PG Courses [Volume-I]</li> <li>2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press</li> <li>3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book</li> <li>4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011</li> </ol>					



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Course Code	DISASTER MANAGEMENT	L	T	P	C
23CSEAC01			2	0	0
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b> This course will enable students:					
<ul style="list-style-type: none"> <li>Learn to demonstrate critical understanding of key concepts in disaster risk reduction and humanitarian response.</li> <li>Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.</li> <li>Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations</li> <li>Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in</li> </ul>					
<b>UNIT-I</b>		Lecture Hrs: 9 Hrs			
<p><b>Introduction:</b> Disaster: Definition, Factors and Significance; Difference Between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.</p> <p><b>Disaster Prone Areas in India:</b> Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics</p>					
<b>UNIT-II</b>		Lecture Hrs: 8 Hrs			
<p><b>Repercussion of Disasters and Hazards:</b> Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Spills and Spills, Outbreak of Disease and Epidemics, War and Conflicts.</p>					
<b>UNIT- III</b>		Lecture Hrs: 7 Hrs			
<p><b>Disaster Preparedness and Management:</b> Preparedness: Monitoring of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.</p>					
<b>UNIT- IV</b>		Lecture Hrs: 8 Hrs			
<p><b>Risk Assessment Disaster Risk:</b> Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.</p>					
<b>UNIT- V</b>		Lecture Hrs: 9 Hrs			
<p><b>Disaster Mitigation:</b> Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.</p>					
<b>Suggested Reading</b>					



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1. R.Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies
2. "New Royal book  
Company.. Sahni, Pardeep Et. Al. (Eds.), "Disaster Mitigation Experiences And Reflections", Prentice Hall  
Of India, New Delhi.
3. Goel S.L., "Disaster Administration And Management Text And Case Studies", Deep & Deep  
Publication Pvt. Ltd., New Delhi



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Course Code	SANSKRIT FOR TECHNICAL KNOWLEDGE	L	T	P	C
23CSEAC01		2	0	0	0
<b>Semester</b>		<b>I</b>			
<b>Course Objectives:</b> This course will enable students:					
<ul style="list-style-type: none"><li>• To get a working knowledge in illustrious Sanskrit, the scientific language in the world</li><li>• Learning of Sanskrit to improve brain functioning</li><li>• Learning of Sanskrit to develop the logic in mathematics, science &amp; other subjects enhancing the memory power</li><li>• The engineering scholars equipped with Sanskrit will be able to explore the huge</li><li>• Knowledge from ancient literature</li></ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"><li>• Understanding basic Sanskrit language</li><li>• Ancient Sanskrit literature about science &amp; technology can be understood</li><li>• Being a logical language will help to develop logic in students</li></ul>					
<b>UNIT-I</b>					
Alphabets in Sanskrit,					
<b>UNIT-II</b>					
Past/Present/Future Tense, Simple Sentences					
<b>UNIT- III</b>					
Order, Introduction of roots					
<b>UNIT- IV</b>					
Technical information about Sanskrit Literature					
<b>UNIT- V</b>					
Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics					
<b>Suggested Reading</b>					
1. "Abhyas pustakam" – Dr. Vishwas, Sanskrit-Bharti Publication, New Delhi 2. "Teach Yourself Sanskrit" Prathama Deeksha- Vempati Kutumbashastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication 3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean Books (P) Ltd., New Delhi					



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# AUDITC OURSE-II



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(Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu)  
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Course Code	PEDAGOGY STUDIES	L	T	P	C
23CSEAC01			2	0	0
<b>Semester</b>		<b>II</b>			
<b>Course Objectives:</b> This course will enable students:					
<ul style="list-style-type: none"> <li>Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.</li> <li>Identify critical evidence gaps to guide the development.</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
Students will be able to understand: <ul style="list-style-type: none"> <li>What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</li> <li>What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</li> <li>How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</li> </ul>					
<b>UNIT-I</b>					
<b>Introduction and Methodology:</b> Aims and rationale, Policy background, Conceptual framework and terminology Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching.					
<b>UNIT-II</b>					
<b>Thematic overview:</b> Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.					
<b>UNIT- III</b>					
Evidence on the effectiveness of pedagogical practices, Methodology for the in-depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.					
<b>UNIT- IV</b>					
<b>Professional development:</b> alignment with classroom practices and follow-up support, Peer support, Support from the head teacher and the community. Curriculum and assessment, Barrier to learning: limited resources and large class sizes					
<b>UNIT- V</b>					
<b>Research gaps and future directions:</b> Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.					
<b>Suggested Reading</b>					
<ol style="list-style-type: none"> <li>Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.</li> <li>Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of</li> </ol>					



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3. Curriculum Studies, 36(3):361-379.
4. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
5. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal of Educational Development, 33(3):272-282.
6. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
- Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. [www.pratham.org/images/resource%20working%20paper%202.pdf](http://www.pratham.org/images/resource%20working%20paper%202.pdf).





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Course Code	STRESS MANAGEMENT BY YOGA	L	T	P	C
23CSEAC01			2	0	0
<b>Semester</b>		<b>II</b>			
<b>Course Objectives:</b> This course will enable students:					
<ul style="list-style-type: none"> <li>• To achieve overall health of body and mind</li> <li>• To overcome stress</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>• Develop healthy mind in a healthy body thus improving social health also</li> <li>• Improve efficiency</li> </ul>					
<b>UNIT-I</b>					
Definitions of Eight parts of yoga (Ashtanga)					
<b>UNIT-II</b>					
Yama and Niyam.					
<b>UNIT- III</b>					
Do's and Don't's in life.					
i) Ahimsa, satya, asteya, bramhacharya and aparigraha (i) Shauca, santosh, tapa, swadhyay, ishwar pranidhan					
<b>UNIT- IV</b>					
Asana and Pranayam					
<b>UNIT- V</b>					
i) Various yoga poses and their benefits for mind & body ii) Regularization of breathing techniques and its effects - Types of pranayam					
<b>Suggested Reading</b>					
1. 'Yogic Asanas for Group Training-Part-I': Janardan Swami Yogabhyasi Mandal, Nagpur 2. 'Rajayoga or conquering the Internal Nature' by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata					



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Course Code	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS	L	T	P	C
23CSEAC01		2	0	0	0
<b>Semester</b>		<b>II</b>			
<b>Course Objectives:</b> This course will enable students:					
<ul style="list-style-type: none"> <li>To learn to achieve the highest goal happily</li> <li>To become a person with stable mind, pleasing personality and determination</li> <li>To awaken wisdom in students</li> </ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"> <li>Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life</li> <li>The person who has studied Geeta will lead the nation and mankind to peace and prosperity</li> <li>Study of Neetishatakam will help in developing versatile personality of students</li> </ul>					
<b>UNIT-I</b>					
Neetisatakam- Holistic development of personality Verses- 19,20,21,22(wisdom) Verses-29,31,32(pride&heroism) Verses-26,28,63,65(virtue)					
<b>UNIT-II</b>					
Neetisatakam- Holistic development of personality Verses- 52,53,59(dont's) Verses-71,73,75,78(do's)					
<b>UNIT- III</b>					
Approach today today work and duties. Shrimad Bhagwad Geeta: Chapter 2- Verses 41,47,48, Chapter 3- Verses 13,21,27,35, Chapter 6- Verses 5,13,17,23,35, Chapter 18- Verses 45,46,48.					
<b>UNIT- IV</b>					
Statements of basic knowledge. Shrimad Bhagwad Geeta: Chapter 2- Verses 56,62,68 Chapter 12- Verses 13,14,15,16,17,18 Personality of Role model. Shrimad Bhagwad Geeta:					
<b>UNIT- V</b>					
Chapter 2- Verses 17, Chapter 3- Verses 36,37,42, Chapter 4- Verses 18,38,39 Chapter 18- Verses 37,38,63					
<b>Suggested Reading</b>					
"Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P. Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.					