M. Tech. (CSE) III Semester

Scheme of Teaching and Examination

Semester III (Stage-I)

Sl. No	Subject Code	Subject	Periods per Week			Scheme of Examination		Total Marks	Credit L+(T+P)/2
						Theory / Practical			
			L	T	P	ESE	TA		
1	**CSE 012116**	Industrial Training	--	--	--	100	100	200	2
2	**CSE 012117**	Research Seminar-III	--	--	--	25	25	50	2
Total						**125**	**125**	**250**	**4**

L:Lecture **T:**Tutorial **P:**Practical **ESE:** End SemesterExamination **T.A:**Teacher's Assessment.

Semester III (Stage-II)

Sl. No	Subject Code	Subject	Periods per Week			Scheme of Examination		Total Marks	Credit L+(T+P)/2
						Theory / Practical			
			L	T	P	ESE	TA		
1	**CSE 012118 (1-4)**	Elective-II	3	1	-	50	50	100	4
2	**CSE 012119**	Dissertation-I	..	..	28	125	125	250	10
Total			**3**	**1**	**28**	**175**	**175**	**350**	**14**

L: Lecture **T:** Tutorial **P:** Practical **ESE:** End SemesterExamination **T.A:** Teacher's Assessment.

Elective-II

S. No	Subject Code	Subject Name
1.	CSE 012118(1)	Cyber Laws & Information Security
2.	CSE 012118(5)	Data Clustering
3.	CSE 012118(7)	Indexing and Retrieval in Bigdata
4.	CSE 012118(8)	Advanced Digital Image Processing and Computer Vision

Semester: IIIBranch:**Computer Science & Engineering**
Subject:Cyber Laws & Information SecurityCode: CSE011212 (1)

Course Description: The course objective is to explain students the core information assurance (IA) principles and introduces the key components of cyber securitynetwork architecture, securitytools and hardening techniques. This course combines the discipline of technology, business, laws and organizational behavior.

Course Objectives: The course objective is to:

- To introduce the cyber world and cyber law in general
- To explain about the various facets of cyber crimes
- To enhance the understanding of problems arising out of online transactions and provoke them to find solutions
- To clarify the Intellectual Property issues in the cyber space and the growth and development of the law in this regard
- To educate about the regulation of cyber space at national and international level

Syllabus:

Unit: I: Introduction
Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level.

Unit-II: Cyber Law - International Perspectives
UN & International Telecommunication Union (ITU) Initiatives, Council of Europe - Budapest Convention on Cybercrime, Asia-Pacific Economic Cooperation (APEC), Organization for Economic Co-operation and Development (OECD),World Bank, Commonwealth of Nations

Unit-III: Constitutional & Human Rights Issues in Cyberspace
Freedom of Speech and Expression in Cyberspace – Access to Internet, Right to Privacy, Right to Data Protection

Unit-IV: Cyber Crimes & Legal Framework
Cyber Crimes against Individuals, Institution and State, Different offences under IT Act, 2000, Cyber Torts, Intellectual Property Issues in Cyber Space, E Commerce, Dispute Resolution in Cyberspace

Unit-V: Information Security:

Elements of information protection, Threats to information security, Structure of information security program, Information security policies, Assets classification: Information classification, Access control, Physical security, Risk analysis and risk

management, Business continuity planning

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

- Evaluate external and internal threats to an organization.
- Apply elementary security measures in day to day life.
- Design and modify network and wireless security protocols using different tools.
- Assess security threats for an application/organization and propose appropriate.preventive measures.

Text books

1.T.R. Peltier, J. Peltier, J.Blackley,Chris Reed & John Angel," Information Security Fundamentals", Computer Law, OUP, New York, (2007).
2.Justice Yatindra Singh, Cyber Laws, "Universal Law Publishing Co.", New Delhi, (2012).

Reference books

1.Verma S, K, Mittal Raman, "Legal Dimensions of Cyber Space, Indian Law Institute", New Delhi, (2004)
2.Jonthan Rosenoer, "Cyber Law", Springer, New York, (1997).
3.Sudhir Naib, "The Information Technology Act, 2005: A Handbook", OUP, New York, (2011)

Semester:IIIBranch: Computer Science & Engineering Subject: Data ClusteringCode:CSE 012118(5)

.....

Course Description:
This course is designed to introduce vast amount of data available in different size, and shape to be processed for different purpose. It also includes various methods to identify the features in data of varied form. Various clustering techniques also discussed in

course to find patterns hidden in unlabeled data.

Course objectives: The course objective is to:

- Store and process different types of data like text, multi-media and high dimensional.
- Learn various feature extraction methods to preprocess data.
- Select appropriate clustering technique to cluster the data.

Syllabus:

Unit - I:Cluster analysis

Common Techniques Used in Cluster Analysis: Feature Selection Methods, Probabilistic and Generative Models, Distance-Based Algorithms. Data Types Studied in Cluster Analysis: Clustering Categorical, Text, multi-media, time series data.

Unit - II:Feature Selection for Clustering

Filter Model, wrapper and hybrid model. Spectral Feature Selection, Laplacian score, Term Frequency (TF) and Inverse document frequency, Chi square statistics.

Unit - III: Partitional and Hierarchical Clustering Algorithms

K-Means Clustering, Minimization of Sum of Squared Errors, Factors Affecting K-Means, Variations of K-Means, Agglomerative and divisive Clustering.

Unit - IV: Density and Grid Based Clustering

Introduction, DBSCAN, DENCLUE, OPTICS, classical algorithms: STING, STING+, High dimension algorithm: CLIQUE.

Unit - V: Clustering High-Dimensional Data

The "Curse of Dimensionality", Clustering Tasks in Subspaces of High-Dimensional Data, Techniques, examples and algorithms.

Course outcomes: After successful completion of the course, students will be able

- Preprocess the huge amount of data.
- Identify important and non-important features in data to cluster it properly.
- Generate the clusters from the data sample given and also evaluate the clustering result.

Text Books:-

1.Charu C. Aggarwal, Chandan K. Reddy, "DataClusteringAlgorithms

andApplications", CRC Press, Taylaor and Francis group.

Reference Books:

1.Guojun gan, Chaoqun ma, and Jianhongwu, "Data Clustering: Theory, Algorithms, and Applications", ISBN 978-0-898716-23-8.

Semester: III Branch: Computer Science & Engineering Subject:Indexing and Retrieval in Bigdata Code:CSE 012118(7)

.....

Course Description:

This course introduces the concepts of big data analyticsand the analytical tools like Hadoop, PIG,HIVE, Spark, R etc.

Course Objectives:

The course objective is to:

- To optimize business decisions and create competitive advantage with Big Data analytics
- To explore the fundamental concepts of big data analytics.
- To learn to analyze the big data using intelligent techniques

- To understand the various search methods and visualization techniques
- To learn to use various techniques for mining data stream
- To understand the applications using Map Reduce Concepts
- To introduce programming tools PIG& HIVE in Hadoop echo system.

Syllabus:

Unit-I: Introduction

Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting.

Unit-II: Mining data streams

Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis- Stock Market Predictions

Unit-III: Hadoop

Hadoop Distributed File System – Components of Hadoop Analysing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS Basics- Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features in Hadoop environment.

Unit-IV: Frameworks

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphereBigInsights and Streams. Predictive Analytics- Simple linear regression- Multiple linear regression- Interpretation 5 of regression coefficients. Visualizations - Visual data analysis techniques- interaction techniques - Systems and applications.

Unit-V: Data Analytics with R Machine Learning

Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with BigR.

Course Outcomes:

After completion of this course, the students would be able to

- Work with big data platform and explore the big data analytics techniques

business applications.
- Design efficient algorithms for mining the data from large volumes
- Analyze the HADOOP and Map Reduce technologies associated with big data Analytics
- Explore on Big Data applications Using Pig and Hive
- Understand the fundamentals of various big data analytics techniques
- Build a complete business data analytics solution

Text Books:

1.Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
2.Seema Acharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015.

Reference Books:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.

Semester: III Branch: Computer Science and Engineering
Subject: Advanced Digital Image Processing and Computer Vision Code: CSE012118(8)

.....

Course Description:

This course provides an introduction to basic concepts, methodologies and algorithms of digital image processing focusing on the following two major problems concerned with digital images: (1) image enhancement and restoration for easier interpretation of imagesand (2) image analysis and object recognition. Some advanced image processing techniques will also be studied in this course. The primary goal of this course is to lay a solid foundation for students to study advanced image analysis topics such as computer vision systems, biomedical image analysis, and multimedia processing & retrieval.

Course Objectives:

The course objective is to:
- Introduce students to the fundamental techniques andapplications of digital signal processing

- Develop skills for analyzing and synthesizing algorithms and systems thatprocess discrete time signals, with emphasis on realization and implementation.

Syllabus:

UNIT-IDiscrete Random Signal Processing
Discrete random processes, Expectation, Variance, Co-Variance, Scalar product, Energy of DiscreteSignals - Parseval's Theorem, Weiner Khitchine relation - Power spectral density - Periodogram -Sample auto-correlation - Sum Decomposition Theorem, Spectral Factorization Theorem – Discreterandom signal processing by linear systems - Simulation of white noise - Lowpass filtering of whitenoise.

UNIT-IISpectrum Estimation
Non-Parametric methods - Correlation method - Co-variance estimator - Performance analysis ofestimators – Unbiased consistent estimators - Periodogram estimator - Barlett spectrum estimation -Welch estimation - Model based approach - AR, MA, ARMA Signal modeling - Parameter estimationusing Yule-Walker method.

UNIT-IIILinear Estimation and Prediction
Maximum likelihood criterion - Efficiency of estimator - Least mean squared error criterion – Wienerfilter - Discrete Wiener Hoff equations - Recursive estimators - Kalman filter - Linear prediction,Prediction error - Whitening filter, Inverse filter - Levinson recursion, Lattice realization, Levinsonrecursion algorithm for solving Toeplitz system of equations.

UNIT-IVAdaptive Filters
FIR Adaptive filters - Newton's steepest descent method - Adaptive filters based on steepest descentmethod - Widrow Hoff LMS Adaptive algorithm - Adaptive channel equalization - Adaptive echocanceller - Adaptive noise cancellation - RLS Adaptive filters - Exponentially weighted RLS – Slidingwindow RLS - Simplified IIR LMS Adaptive filter.

UNIT-VMultirate Digital Signal Processing
Mathematical description of change of sampling rate - Interpolation and Decimation - Continuous timemodel - Direct digital domain approach - Decimation by integer factor - Interpolation by an integerfactor - Single and multistage realization - Poly phase realization - Applications to sub band coding -Wavelet transform and filter bank implementation of wavelet expansion of signals.

Course Outcomes:

Upon completion of this course, students will be able to:

- Describe and analyze discrete time signals in the time domain and frequency domain.
- Apply digital signal processing techniques to analyze & design discrete time signals and systems
- Design and apply digital filters

Text Books:

1. Monson H. Hayer, "Statistical Digital Signal Processing and Modeling", John Wiley and Sons Inc., New York, 1996.

Reference Books:

1. Sophoncles J. Orfanidis, "Optimum Signal Processing ", McGraw-Hill, 1990.
2. John G. Proakis, Dimitris G. Manolakis, "Digital Signal Processing", Prentice Hall of India, New Delhi, 1995.
3. David A. Forsyth and Jean Ponce, "Computer Vision: A Modern Approach", Pearson Education, 2003