Computer Science & Engineering

Semester -VII
Branch: Computer Science & Engineering

S.N.	Code	Course Title	Lecture	Tutorial	Practical	Credits
1	CSC701	Artificial Intelligence	3	0	0	3
2	PEC-III	**Professional Elective -III**	3	0	0	3
3	PEC-IV	**Professional Elective -IV**	3	0	0	3
4	OEC III	**Open Elective -III**	3	0	0	3
5	OEC IV	**Open Elective -IV**	3	0	0	3
6	CS701P	Artificial Intelligence Lab.	0	0	2	1
7	CS702D	Project-I	0	0	4	2
8	CS703I	Internship Assessment II	0	0	2	2
					Total credits	20

Code	Professional Elective-III (Any one)	Code	Professional Elective- IV(Any one)
CSP702	Machine Learning	ITP705	Data Mining and Data Warehousing.
CSP703	Multimedia and Applications	ITP706	Information Security.
CSP704	Human Computer Interaction	CSP707	Computer Vision

Code	Open Elective-III (Any one)	Code	Open Elective-IV(Any one)
ITO708	Software Engineering	ITO711	Information Security
CSO709	Values and Ethics in Profession.	CSO712	Cryptography
CSO710	*Data Mining	ITO713	Knowledge Domain Development

* Not for CSE Students

Semester -VIII
Branch: Computer Science & Engineering

S.N.	Code	Course Title	L	T	P	Credits
1.	CS801D	Project-II			16	08
					Total Credit	08

NOTE- A Student can be allowed to do project outside after the permission of departmental Academic Committee. Those students doing project outside has present their project progress every month. Those students doing project outside can be permitted to present progress every fortnight though video conferencing. Students doing project in house has present their project progress every week.

Computer Science & Engineering and Information Technology				
Code: CSC701	**Artificial Intelligence**	**L**	**T**	**P**	**C**
		3	0	0	3

COURSE OUTCOME

CO.1: Discuss basic concepts of Artificial Intelligence, AI(Artificial Intelligence) principles, AI Task domains and application.

CO.2: Explain various searching techniques, constraint satisfaction problem, game playing techniques and **Apply** these techniques in applications which involve perception, reasoning and learning.

CO.3: Explain various searching techniques, constraint satisfaction problem, game playing techniques and **Apply** these techniques in applications which involve perception, reasoning and learning.

CO.4: Explain working of uncertainty management, decision making and learning methods.

CO.5: Apply different knowledge representation, reasoning, and learning techniques to real-world problems.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO.1	3	-	-	-	-	-	-	-	-	-	-	3
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	-	-	-	-	-	-	-	-	-	-	2
CO.5	-	2	2	2	-	-	-	-	-	-	-	-

3: high, 2: moderate, 1 low

MODULE 1:

Introduction
Overview of AI, Problems of AI, AI techniques, Problem Solving, Problem Space and Search, Defining the problem as state space search, Problem characteristics; Tic,Tac,Toe Problem

AI languages
Basic knowledge of AI programming languages like Prolog and Lisp .

MODULE 2:

Basic Search Techniques

Solving Problems by searching; Uniform search strategies; Breadth first search, depth first search, depth limited search, bidirectional search, Best First search, comparing search strategies in terms of complexity.

MODULE 3:

Special Search Techniques
Heuristic Search, greedy best,first search, A* search; Hill climbing search, Simulated Annealing search; Genetic Algorithm; Constraint Satisfaction Problems; Adversarial search, Games, Optimal decisions and strategies in games, Minimax search, Alpha,beta pruning.

Symbolic Logic
Syntax and semantics for propositional logic, Syntax and semantics of FOPL, Properties of WFF, Clausal form, Unification, Resolution.

MODULE 4:

Reasoning Under Inconsistencies and Uncertainties :
Non,monotonic reasoning, Truth Maintainace System, Default Reasoning & closed world assumption, Predicate completion and circumscription, Fuzzy Logic.

Probabilistic Reasoning
Bayesian probabilistic inference, Representation of knowledge in uncertain domain, Semantics of Bayesian networks, Dempster, Shafer theory.

MODULE 5:

Structured Knowledge
Associative networks, Conceptual graphs, Frames structures.

Expert Systems
Rule based systems, Non production systems : decision tree architectures, black board system architecture, neural network architecture.

Learning
Types of learning, general learning model, Learning by induction; generalization, specialization, example of inductive learner.

Text book:

1.   Elaine Rich, Kevin Knight and Shivashankar B Nair, "Artificial Intelligence", Mc Graw Hill Publication, 2009.
2.   Dan W. Patterson, "Introduction to Artificial Intelligence and Expert System", Pearson Publication,2015.

References:

1.   Saroj Kaushik, "Artificial Intelligence", Cengage Learning, 2011.

	Computer Science & Engineering and Information Technology				
CSP702	**Machine Learning**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcome: At the completion of the course a student will be able to –

1. Discuss fundamental of machine learning, design and its application.
2. Differentiate various learning approaches, and to interpret the concepts of different learning.
3. Illustrate and apply clustering algorithms and identify its applicability in real life problems.
4. Discuss basics of neural network and its different model.
5. Describe different optimizations algorithm.

CO-PO Mapping-

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	2							
CO2	3	2	3	1					1			2
CO3	3	3	2	2	1							
CO4	3	2	2		2							
CO5	2	2	3	1	2							

MODULE 1: What is Machine learning, Basic principal, Utility of ML Well defined learning system, Designing learning system, Challenges in ML, Application of ML.

MODULE 2: Linear Regression (with one variable and multiple variables), Gradient Descent, Classification (Logistic Regression, Over fitting, Regularization, Support Vector Machines), Decision Trees and issue in decision tree, Bayesian Learning – Bayes Theorem, Concept Learning, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief Networks, EM Algorithm.

MODULE 3:

Clustering (K-means, Hierarchical, etc.), Dimensionality reduction, Principal Component Analysis, Anomaly detection, Feasibility of learning, Reinforcement learning.

MODULE 4:

Artificial Neural Networks, Artificial Perceptron's, Gradient Descent and The Delta Rule, Adaline, Multilayer Networks, Back-propagation Rule back-propagation Algorithm-Convergence.

MODULE 5:

Evolutionary algorithm, Genetic Algorithms – An Illustrative Example, Hypothesis Space Search, Genetic Programming, Swarm intelligence algorithm.

Text Book:
1. Understanding Machine Learning. Shai Shalev-Shwartz and Shai Ben-David. Cambridge University Press.

2. Tom Mitchell. Machine Learning (McGraw Hill)

3. Artificial Neural Network, B. Yegnanarayana, PHI, 2005

Reference Book:
1. Christopher M. Bishop. Pattern Recognition and Machine Learning (Springer)

Computer Science & Engineering and Information Technology					
CSP703	MULTIMEDIA SYSTEMS AND APPLICATIONS	L	T	P	C
		3	0	0	3

Course Outcome:

After Completion of this course, the students will be able to:
1. Developed understanding of technical aspect of Multimedia Systems.
2. Understand various file formats for audio, video and text media.
3. Develop various Multimedia Systems applicable in real time.
4. Design interactive multimedia software.
5. Apply various networking protocols for multimedia applications.
6. To evaluate multimedia application for its optimum performance.

Syllabus:

MODULE 1:

Introduction to Multimedia System: Architecture and components, Multimedia distributed processing model, Synchronization, Orchestration and Quality of Service (QOS) architecture.

MODULE 2:

Audio and Speech: Data acquisition, Sampling and Quantization, Human Speech production mechanism, Digital model of speech production, Analysis and synthesis, Psycho-acoustics, low bit rate speech compression, MPEG audio compression.

MODULE 3:

Images and Video: Image acquisition and representation, Composite video signal NTSC, PAL and SECAM video standards, Bilevel image compression standards: ITU (formerly CCITT) Group III and IV standards, JPEG image compression standards, MPEG video compression standards.

MODULE 4:

Multimedia Communication: Fundamentals of data communication and networking, Bandwidth requirements of different media, Real time constraints: Audio latency, Video data rate, multimedia over LAN and WAN, Multimedia conferencing.

MODULE 5:

Multimedia Information Systems: Operating system support for continuous media applications: limitations is usual OS, New OS support, Media stream protocol, file system support for continuous media, data models for multimedia and hypermedia information, content based retrieval of unstructured data.

Text / Reference Books

1.   Ralf Steinmetz and Klara Nahrstedt, Multimedia Systems, Springer.

2.   J. D. Gibson, Multimedia Communications: Directions and Innovations, Springer.

3.   K. Sayood, Introduction to Data Compression, Morgan-Kaufmann.

4.   A. Puri and T. Chen, Multimedia Systems, Standards, and Networks, Marcel Dekker.

5.   Iain E.G. Richardson, H.264 and MPEG-4 Video Compression, John Wiley.

6.   Borivoje Furht, Handbook of Multimedia Computing, CRC Press.

Computer Science & Engineering and Information Technology					
ITP705	Data Mining and Data Warehousing	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcomes

1. Establish the relation between data warehousing and data mining.
2. Able to comprehend multi-dimensional structure of data model.
3. Able to identify the need for analysis of large, complex, information-rich data sets.
4. Identify the goals and primary tasks of the data mining process.
5. Recognize the iterative character of a data process and specify its basic steps.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	1	2	3	2	-	-	-	-	-	1	-	-
CO 2												
CO3	3	3	1	-	3	3	3	2	3	-	-	2
CO4	2	3	2	-	-	-	-	-	-	-	-	1
CO5	1	2	3	-	-	-	-	-	-	-	-	-

Syllabus

MODULE 1:

Introduction :

Data warehousing-definitions and characteristics, Multi-dimensional data model, Warehouse schema.

Data Marts : Data marts, types of data marts, loading a data mart, metadata, data model. Maintenance, nature of data, software components; external data, reference data, performance issues, monitoring requirements and security in a data mart.

MODULE 2:

Online Analytical Processing: OLTP and OLAP systems, Data Modeling, LAP tools, State of the market, Arbor Essbase web, Microstrategy DSS web, Brio Technology, star schema for multi dimensional view, snowflake schema, OLAP tools.

MODULE 3:

Developing a Data Warehousing : Building of a Data Warehousing, Architectural strategies & organizational issues, design considerations, data content, distribution of data, Tools for Data Warehousing.

MODULE 4:

Data Mining : Definitions; KDD (Knowledge Discovery database) versus Data Mining; DBMS versus Data Mining, Data Mining Techniques; Issues and challenges; Applications of Data Warehousing & Data mining in Government.

Association Rules: Apriori algorithms. Partition algorithm, Dynamic itemset counting algorithm, FP- tree growth algorithm, Generalized association rule.

MODULE 5:

Clustering Techniques :Clustering paradigm, Partition algorithms, CLARA, CLARANS, Hierarchical clustering, DBSCAN, BIRCH, CURE; Categorical Clustering, STIRR, ROCK, CACTUS.

Decision Trees : Tree construction principle, Best split, Splitting indices, Splitting criteria, Decision tree construction with presorting.

MODULE 6:

Web Mining: Web content Mining; Web structure Mining; Web usage Mining; Text mining.

MODULE 7:

Temporal and Spatial Data Mining: Basic concepts of temporal data mining, The GSP algorithm, SPADE, SPIRIT, WUM.

Books

1. Data Warehousing, Reema Thareja
2. Data mining - Concepts & Techniques, Jiawei Han, Micheline Kamber, Morgan Kaufmann ,2nd Ed.2006.
3. Oracle 8i Data Warehousing, Michale Corey, Michale Abbey, Tata McGraw Hill
4. Fundamentals of Database Systems, Navathe and Elmasry, Addison Wesley, 2000
5. Data Mining, Arun Pujari Orient Longman, 2003

Computer Science & Engineering and Information Technology					
ITP706	**INFORMATION SECURITY**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

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

CO1   Recognize propensity of errors and remedies in processes involving information technology

CO2   Consummate knowledge of risk and controls in IT operation in industry

CO3   Determine IT security guidelines for various type of industries

CO4   Evaluate asset safeguarding, data integrity, system effectiveness and system effici ency.

CO5   Understand software security auditing including database security audit, network security audit and micro-computer security audit.

Mapping of course outcomes with program outcomes

Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
CO1		2		3		1		2	
CO2		2		3		1		2	
CO3		2		3		1		2	
CO4		2		3		1		2	
CO5		2		3		1		2	

Detailed syllabus:

Module1

Computer Auditing- System Access control, Data Access Control, Security Administration, System Design.

Module 2

Hardware Security Controls - The Total System Needs Securing, Levels of Hardware Controls, Operating System Controls , Access Controls, General-Purpose Operating Systems Security , Sources of Additional Information

Module 3

Software Controls - Software Security and Controls, Types of Software Intrusions, Configuration Management , Modularity and Encapsulation, Protecting Information, Selecting Security Software, Analysis of Software Products Database Security - Introduction to Databases, Security Requirements of Databases, Designing Database Security.

Module 4:

Methods of Protection, Security of Multilevel Databases,The Future of Databases. Network and Telecommunication Security - Telecommunications and Networks, Security Considerations, Cases in Point, Special Communications, Security Considerations.

Module 5:

Microcomputer Security - Microcomputer Problems and Solutions , The Microcomputer Environment , Security of Microcomputers, Internal Data Security, The Threats to Micros, Developing a Micro Security Plan, Establishing a Micro-to-Mainframe Link , Portable Microcomputer Security , Password Protection, Security of Special Micro Applications.

Reading:

1. Deborah Russell, *Computer Security Basics*, O'Reilly & Associate, 1991.
2. Karen A. Forcht, *Computer Security Management*, Boyd & Fraser Publishing Co., 1994.
3. Donald A. Watne, Peter B.B. Turney, *Auditing EDP Systems*, 2nd Edition, PH 1990

Computer Science & Engineering and Information Technology			
Code: CSP707	Computer Vision	L	T
		3	0

Objectives:

Computer Vision focuses on development of algorithms and techniques to analyze and interpret the visible world around us. This requires understanding of the fundamental concepts related to multi-dimensional signal processing, feature extraction, pattern analysis visual geometric modeling, stochastic optimization etc. Knowledge of these concepts is necessary in this field, to explore and contribute to research and further developments in the field of computer vision. Applications range from biometrics, medical diagnosis, document processing, mining of visual content, to surveillance, advanced rendering etc.

Course Outcomes

After completion of the course students will be able

COs	Course outcome description
CO1	To apply mathematical modeling methods for low-, intermediate- and high-level image processing tasks.
CO2	To design new algorithms to solve recent state of the art computer vision problems.
CO3	To perform software experiments on computer vision problems and compare their performance with the state of the art.
CO4	To develop a broad knowledge base so as to easily relate to the existing literature.
CO5	To gather a basic understanding about the geometric relationships between 2D images and the 3D world.
CO6	To build a complete system to solve a computer vision problem.

Detail Syllabus:

MODULE-I

Digital Image Formation and low-level processing: Overview and State-of-the-art, Fundamentals of Image Formation, Transformation: Orthogonal, Euclidean, Affine, Projective, etc.; Fourier Transform, Convolution and Filtering, Image Enhancement, Restoration, Histogram Processing.

MODULE-II

Depth estimation and Multi-camera views: Perspective, Binocular Stereopsis: Camera and Epipolar Geometry; Homography, Rectification, DLT, RANSAC, 3-D reconstruction framework; Auto-calibration.

MODULE-III

Feature Extraction: Edges - Canny, LOG, DOG; Line detectors (Hough Transform), Corners - Harris and Hessian Affine, Orientation Histogram, SIFT, SURF, HOG, GLOH, Scale-Space Analysis-Image Pyramids and Gaussian derivative filters, Gabor Filters and DWT.

MODULE-IV

Image Segmentation: Region Growing, Edge Based approaches to segmentation, Graph-Cut, Mean-Shift, MRFs, Texture Segmentation; Object detection.

MODULE-V

Pattern Analysis: Clustering: K-Means, K-Medoids, Mixture of Gaussians, Classification: Discriminant Function, Supervised, Un-supervised, Semi-supervised; Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA; Non-parametric methods.

MODULE-VI

Motion Analysis: Background Subtraction and Modeling, Optical Flow, KLT, Spatio-Temporal Analysis, Dynamic Stereo; Motion parameter estimation.

Textbook

1. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer-Verlag London Limited 2011.
2. Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, 2nd Edition, Cambridge University Press, March 2004.

Reference book

1. Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, Second Edition, Cambridge University Press, March 2004.
2. Christopher M. Bishop; Pattern Recognition and Machine Learning, Springer, 2006
3. R.C. Gonzalez and R.E. Woods, Digital Image Processing, Addison- Wesley, 1992.
4. K. Fukunaga; Introduction to Statistical Pattern Recognition, Second Edition, Academic Press, Morgan Kaufmann, 1990.

Computer Science & Engineering and Information Technology					
CSO709	**Values and Ethics in Profession**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcomes:

CO1   Identify the effects of technological growth on the society and the limited natural resources.

CO2   Identify the essence of sustainable development, and will be able to apply approaches to handle energy crisis and environment protection.

CO3   Analyze the impact of technology transfer and the problems of man machine interaction for the human operators in engineering projects and industries.

CO4   Apply industrial standards, code of ethics and role of professional ethics in engineering field.

CO5   Assess the possible values crisis at different levels and the way out with the help of the constitution and moral, and ethical values.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
IT6105.1	-	-	2	-	-	2	3	-	-	-	-	-
IT6105.2	-	-	3	-	-	-	3	-	-	-	-	-
IT6105.3	-	-	1	-	2	-	2	2	-	-	-	-
IT6105.4	-	-	3	-	2	3	-	3	-	-	-	-
IT6105.5	-	-	1	-	2	3	-	3	-	-	-	-
Average			2		1.2	1.6	1.6	1.6				

#3 highly, #2 moderate and #1 low

Module-1

Science, Technology and Engineering as Knowledge and as Social and Professional Activities, Effects of Technological Growth: Rapid Technological growth and depletion of resources. Reports of the Club of Rome. Limits of growth; sustainable development, Energy Crisis; Renewable Energy Resources.

Module-2

Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations. Environmental Ethics, Appropriate Technology Movement of Schumacher: later developments

Module-3

Technology and developing nations. Problems of Technology transfer. Technology assessment, impact analysis. Human Operator in Engineering projects and industries. Problems of man machine interaction. Impact of assembly line and automation. Human centered Technology.

Module-4

Ethics of Profession

Engineering profession: Ethical issues in engineering practice. Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond. Case studies.

Module-5

Profession and Human Values

Value Crisis in contemporary society, Nature of values: Value Spectrum of a 'good' life, Psychological values: Integrated personality; mental health, Societal values: The modern search for a 'good' society, justice, democracy, secularism, rule of law; values in Indian Constitution, Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity - Moral and ethical values: Nature of moral judgments; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.

Suggested Text Books:

1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York 1994 (2nd Edition)
2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991.
3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta 1996.

Suggested Reference Books:

1. Mike Martin and Ronald Schinzinger, "Ethics in Engineering", McGraw-Hill, New York, 2005.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics Concepts and Cases", Thompson Learning, 2000.
3. Govindarajan M, Natarajan S., Senthil Kumar V. S., "Engineering Ethics", Prentice Hall of India, New Delhi 2004.
4. Charles D Fledderman, Engineering Ethics", Prentice Hall, New Mexico, 1999.
5. Edmund G Seebauer and Robert L Barry, Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
6. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, 2003.

Computer Science & Engineering and Information Technology					
ITO708	Software Engineering	L	T	P	C
		3	0	0	3

Course Outcomes:

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions
- Ability to critically thinking and evaluate assumptions and arguments.

MODULE- I: Introduction to Software Engineering:The evolving role of software, Changing Nature of Software, legacy software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI).

MODULE 2: Process patterns, process assessment, personal and team process models. Process models: The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

MODULE 3: Software Requirements:Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis.

MODULE 4
Requirements validation, Requirements management. System models: Context Models, Behavioral models, Data models, Object models, structured methods.

MODULE 5: Design Engineering:Design process and Design quality, Design concepts, the design model, pattern based software design. Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture. Modeling component-level design: Designing class-based components, conducting component-level design, object constraint language, designing conventional components. Performing User interface design: Golden rules, User interface analysis, and design, interface analysis, interface design steps, Design evaluation.

TEXT BOOKS:

- Software engineering A practitioner's Approach, Roger S Pressman, sixth edition McGraw Hill International Edition.
- Software Engineering, Ian Sommerville, seventh edition, Pearson education.

REFERENCE BOOKS:

- Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
- Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
- Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
- Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
- Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
- Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
- Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
- Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley &Sons Ltd.
- Software Engineering 3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
- Introduction to Software Engineering, R. J. Leach, CRC Press.

Computer Science & Engineering and Information Technology				
CSO712	**CRYPTOGRAPHY**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcome:

.1	Explain the basics of network security and compare various encryption techniques.
.2	Summarize the functionality of public key cryptography
.3	Apply various message authentication functions and secure algorithms
.4	Demonstrate different types of security systems and describe different levels of security and services.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
IT6103.1	-	-	-	-	2	-	-	-	-	1	-	1
IT6103.2	-	2	-	-	2	-	-	-	-	-	-	-
IT6103.3	3	2	-	-	2	1	-	-	-	-	1	-
IT6103.4	-	3	1	-	-	2	-	3	-	-	-	-
Average	0.75	1.75	0.25	0	1.5	0.75	0	0.75	0	0.25	0.25	0.25

Course Description:

MODULE 1:

Conventional Encryption and Message Confidentiality: Conventional Encryption Principles, Conventional Encryption Algorithms, Location of Encryption Devices, Key Distribution

MODULE 2:

Public key cryptography and Message Authentication: Approaches to Message Authentication, SHA-1, MD5, Public key cryptography Principles, RSA, Digital Signatures, Key Management

MODULE 3:

Network Security Applications: Kerberos Motivation, Kerberos version 4, PGP Notation, PGP Operational Description

MODULE 4:

IP Security: IP Security Overview, IP Security Architecture, Authentication Header

Web Security: Web Security Threats, Web Traffic Security Approaches, Overview of Secure Socket Layer and Transport Layer Security, Overview of Secure Electronic Transaction

MODULE 5:

Intruders and Viruses: Intruders, Intrusion Techniques, Password Protection, Password selection Strategies, Intrusion Detection, Malicious Programs**,** Nature of viruses, Types of viruses, Macro viruses, Antivirus Approaches

Firewalls: Firewall characteristics, Types of Firewalls, Firewall configuration

Suggested Text Books:

1. *"Cryptography and Network Security Principles and Practices", Fourth Edition, William Stallings. Publisher: Prentice Hall*
2. *"Cryptography And Network Security", McGraw Hill, Behrouz A Forouzan*

Computer Science & Engineering and Information Technology					
ITO713	**Knowledge Driven Development (KDD)**	L	T	P	C
		3	0	0	3

Course objective:

Managing knowledge in a software project is a challenge. Waterfall methodology places emphasis on exhaustive documentation, which is difficult to be kept updated with the dynamics project delivery environment. Agile relies mostly on user stories and acceptance criteria for knowledge management which is flexible but may not be exhaustive.

KDD digitises the knowledge currently contained in the project documents into a specified number of building blocks represented in inventory relationship format. For the implementation aspects, it follows Agile way of working. By digitising knowledge, KDD brings in the next level of maturity in the project delivery that takes it closer to effective implementation of digital transformation programmes using enablers such as Machine Learning, Artificial Intelligence, Data Analytics, Cloud.

Course outcome:

After completing this course, students will acquire:

1. A general understanding of how IT projects are delivered by IT companies.
2. Details of a new project delivery methodology (Knowledge driven development – KDD) based on digitisation of project knowledge.
3. How KDD may assist Waterfall, Agile and DevOps methodologies.
4. The potential contribution of KDD in the current wave of digitisation that industry is undergoing.
5. Application of KDD in digitising domain knowledge and enterprise knowledge.

Course syllabus:

MODULE 1: Project delivery and supporting methodologies (4 hrs)

- IT Industry from technology and domain perspective
- Information technology – a knowledge-based industry
- IT project delivery – An introduction
- IT project delivery methodology landscape

MODULE 2 : Project delivery pain areas and the way forward (4 hrs)

- IT project failures
- Project delivery pain areas
- Project knowledge
-

MODULE 3. Project knowledge model – context and definition (5 hrs)

- Traditional project knowledge management
- Project delivery activities and project knowledge
- Project knowledge model – Definition
- Project knowledge model – An example

MODULE 4: Extending project knowledge model to cover end to end project delivery – KDD (10 hrs)

- KDD focus area and core value
- End to end project delivery using quality gate
- Tracking project delivery quality through Key process indicators (KPI)
- Fitment for different types of Domains and Projects
- KDD Differentiator
- Contrasting KDD with Agile and Waterfall methodologies

MODULE 5: KDD Compliance with standards of project delivery (10 hrs)

- Quality assurance framework
- Project management framework
- Service management framework
- Enterprise architecture framework
- Test management framework
- Addressing contemporary concerns of project delivery
- Assisting Waterfall, Agile and DevOps
- Positioning of KDD in the digital era

6. Global relevance of KDD (8 hrs)

- KDD and generic knowledge management framework
- Examples of generic knowledge management framework
- Generic knowledge management framework – its potential usage in skill development
- Towards another ontology framework

Recommended text-book:

Knowledge Driven Development – Bridging Waterfall and Agile Methodologies, Published jointly by Cambridge University Press and IISc Press.

References:

1. Agile Manifesto: http://agilemanifesto.org/

2. Scrum guide: https://www.scrumalliance.org/learn-about-scrum/the-scrum-guide

Computer Science & Engineering			
CSO710	**Data Mining**	L	T
		3	0

Course Outcomes
The students shall able to:
CO1.**Analyze** different data models used in data warehouse.
CO2. **Apply** different preprocessing techniques for different attributes.
CO3. **Determine** frequent item set using association rules.
CO4**. Apply** different classification techniques to classify the given data set.
CO5. **Analyze** different clustering techniques.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2			1	1	1					
CO2	3	2	2		1	1		1				1
CO3	3	2	2		1			1	1			
CO4	3	2	2		1		1		1			
CO5	3	2	2		1		1	1	1		1	1
	3	2	2		1	1	1	1	1		1	1

Module - 1
Data warehousing and online analytical processing: Data warehousing: Basic concepts, Data warehouse modeling: Data cube and OLAP, Data warehouse design and usage, Data warehouse implementation, Data generalization by attribute-oriented induction.

Module – 2
Introduction and Data Preprocessing :Why data mining, What is data mining, What kinds of data can be mined, What kinds of patterns can be mined, Which Technologies Are used, Which kinds of Applications are targeted, Major issues in data mining .Data Preprocessing: An overview, Data cleaning, Data integration, Data reduction, Data transformation and data discretization.

Module – 3
Classification: Basic Concepts: Basic Concepts, Decision tree induction, Bays Classification Methods, Rule-Based classification, Model evaluation and selection, Techniques to improve classification accuracy.

Module– 4
Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods: Basic Concepts, Frequent Itemset Mining Methods, Which Patterns Are Interesting?—Pattern Evaluation Methods, Pattern Mining in Multilevel, Multidimensional Space, Constraint-Based Frequent Pattern Mining.

Module – 5
Cluster Analysis: Basic concepts and methods: Cluster Analysis, Partitioning methods, Hierarchical Methods, Density-based methods, Grid-Based Methods, Evaluation of clustering.

Text Book:
1. Jiawei Han, Micheline Kamber, Jian Pei: Data Mining Concepts and Techniques, ELSEVIER (MK) 3rd edition 2012.

Reference Books:

1.Arun K Pujari: Data Mining Techniques 2nd Edition, Universities Press, 2009.
2. Jiawei Han and Micheline Kamber: Data Mining - Concepts and Techniques, 2nd Edition, Morgan Kaufmann Publisher, 2006.
3.Alex Berson and Stephen J. Smith: Data Warehousing, Data Mining, and OLAP Computing, Mc GrawHill Publisher, 1997.
4. Insight into Data Mining – Theory and Practice – K.P.Soman, Shyam Diwakar, V.Ajay, PHI, 2006.

Computer Science & Engineering			
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CSP704	**Human Computer Interaction**		
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COURSE OUTCOMES

CO. 1: Explain the capabilities of both humans and computers from the viewpoint of human information processing.

CO. 2: Understand the design technologies for individuals and persons with disabilities

CO. 3: Analyze and Design real time application in mobile HCI and Web Interface.

CO. 4: Describe typical human–computer interaction (HCI) models and styles, as well as various historic HCI paradigms.

Module I : FOUNDATIONS OF HCI

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

Module II : DESIGN & SOFTWARE PROCESS

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

Module III : MODELS AND THEORIES

Cognitive models –Socio-Organizational issues and stake holder requirements – Communication and collaboration models-Hypertext, Multimedia and WWW.

Module IV : MOBILE HCI

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

Module V : WEB INTERFACE DESIGN

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

TEXT BOOKS:

- Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004 (UNIT I , II & III)
- Brian Fling, "Mobile Design and Development", First Edition , O"Reilly Media Inc., 2009 (UNIT –IV)
- Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O"Reilly, 2009.(UNIT-V)

ITO711   INFORMATION SECURITY   L3 –T0 –P 0   Credit 3

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

CO1	Recognize propensity of errors and remedies in processes involving information technology
CO2	Consummate knowledge of risk and controls in IT operation in industry
CO3	Determine IT security guidelines for various type of industries
CO4	Evaluate asset safeguarding, data integrity, system effectiveness and system efficiency.
CO5	Understand software security auditing including database security audit, network security audit and micro-computer security audit.

Mapping of course outcomes with program outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1		2		3		1		2	
CO2		2		3		1		2	
CO3		2		3		1		2	
CO4		2		3		1		2	
CO5		2		3		1		2	

Detailed syllabus:
Module1

Computer Auditing- System Access control, Data Access Control, Security Administration, System Design.

Module 2

Hardware Security Controls - The Total System Needs Securing, Levels of Hardware Controls, Operating System Controls , Access Controls, General-Purpose Operating Systems Security , Sources of Additional Information

Module 3

Software Controls - Software Security and Controls, Types of Software Intrusions, Configuration Management , Modularity and Encapsulation, Protecting Information, Selecting Security Software, Analysis of Software Products Database Security - Introduction to Databases, Security Requirements of Databases, Designing Database Security, Methods of Protection,

Security of Multilevel Databases,The Future of Databases. Network and Telecommunication Security - Telecommunications and Networks, Security Considerations, Cases in Point, Special Communications, Security Considerations.

Module 4

Microcomputer Security - Microcomputer Problems and Solutions , The Microcomputer Environment , Security of Microcomputers, Internal Data Security, The Threats to Micros, Developing a Micro Security Plan, Establishing a Micro-to-Mainframe Link , Portable Microcomputer Security , Password Protection, Security of Special Micro Applications.

Reading:

1. Deborah Russell, *Computer Security Basics*, O'Reilly & Associate, 1991.
2. Karen A. Forcht, *Computer Security Management*, Boyd & Fraser Publishing Co., 1994.
3. Donald A. Watne, Peter B.B. Turney, *Auditing EDP Systems*, 2nd Edition, PH 1990