Department of Computer Science
Islamic University of Science & Technology

Credit Based Choice Based Curriculum

for

Master of Science in Information Technology
(M.Sc. IT) Programme
2018-2020 Onwards

Semester-III(26 Credit Semester)						
Course Code	**Course Name**	**Paper category**	**Hours / Week**			**Credits**
			L	**T**	**P**	
18 Core Credit Units						
MIT-3T1-C	Java Programming	Core	2	1	4	5
MIT-3T2-C	Design and Analysis of Algorithms	Core	2	1	4	5
MIT-3T3-C	Data Communication and Computer Networks	Core	4	0	0	4
MIT-3T4-C	Operating System	Core	4	0	0	4
6 Elective Credit Units						
MIT-3E1-DCE	Programming Languages and Paradigms	DCE	3	0	0	3
MIT-3E2-DCE	Open Source Web Technologies	DCE	2	1	0	3
MIT-3E3-DCE	Soft Computing	DCE	3	0	0	3
MIT-3E4-DCE	Parallel and Distributed Computing	DCE	3	0	0	3
MIT-3E5-DCE	Multimedia & Image Authoring	DCE	2	1	0	3
MIT-3E6-DCE	Wireless Communication.	DCE	3	0	0	3
2 credit units to be taken from outside departments						

Semester-IV(26 Credit Semester)						
Course Code	**Course Name**	**Paper category**	**Hours / Week**			**Credits**
			L	**T**	**P**	
20 Core Credit Units						
MIT-4T1-C	Research Methodologies	Core	4	0	0	4
MIT-4T2-C	Theory of Computation & Formal Languages	Core	4	0	0	4
MIT-4T3-C	Major Project Work	Core				10
6 Elective Credit Units						
MIT-4E1-DCE	Bio Informatics	DCE	3	0	0	3
MIT-4E2-DCE	Cloud and Grid Computing	DCE	3	0	0	3
MIT-4E3-DCE	Information Security and Networks	DCE	3	0	0	3
MIT-4E4-DCE	Pattern Recognition	DCE	2	1	0	3
MIT-4E5-DCE	Data Warehousing	DCE	3	0	0	3
MIT-4E6-DCE	Organizational Behaviour	DCE	3	0	0	3
MIT-4E7-DCE	Machine Learning.	DCE	3	0	0	3
MIT-4E8-DCE	Dot Net	DCE	2	1	0	3
MIT-4E9-DCE	Data Mining	DCE	3	0	0	3
MIT-4E10-DCE	Advanced Java	DCE	3	0	0	3

Semester – IV

Semester-IV(26 Credit Semester)						
Course Code	Course Name	Paper category	Hours / Week			Credits
			L	T	P	
20 Core Credit Units						
MIT-4T1-C	Research Methodologies	Core	4	0	0	4
MIT-4T2-C	Theory of Computation & Formal Languages	Core	4	0	0	4
MIT-4T3-C	Major Project Work	Core				10
6 Elective Credit Units						
MIT-4E1-DCE	Bio Informatics	DCE	3	0	0	3
MIT-4E2-DCE	Cloud and Grid Computing	DCE	3	0	0	3
MIT-4E3-DCE	Information Security and Networks	DCE	3	0	0	3
MIT-4E4-DCE	Pattern Recognition	DCE	2	1	0	3
MIT-4E5-DCE	Data Warehousing	DCE	3	0	0	3
MIT-4E6-DCE	Organizational Behaviour	DCE	3	0	0	3
MIT-4E7-DCE	Machine Learning.	DCE	3	0	0	3
MIT-4E8-DCE	Dot Net	DCE	2	1	0	3
MIT-4E9-DCE	Data Mining	DCE	3	0	0	3
MIT-4E10-DCE	Advanced Java	DCE	3	0	0	3

Course Title:	Research Methodologies	**Course Code:**	MIT-4T1-C
Semester:	4th	**Paper Type:**	Core
Credits:	04	**Max Marks:**	100
Pre Requisite:	MIT-2T1-C, MIT-1T3-C	**Co-Requisite:**	MIT-4T2-C

Marks Distribution: (Mid Term:30, End Term:50, Viva:10, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To familiarize participants with basic of research and the research process.*
- *To enable the participants in conducting research work and formulating research synopsis and report.*
- *To familiarize participants with various Statistical packages.*
- *To impart knowledge for enabling students to develop data analytics skills and meaningful interpretation to the data sets so as to solve the business/Research problem.*

COURSE CONTENT:

UNIT I

Concept of Research: Introduction to research, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research & Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research. What is a Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem.

UNIT II

Research Design: Meaning of Research Design, Need for Research Design, Features of a Good Design, Different Research Designs, Basic Principles of Experimental Designs, Sampling Design: Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs. Methods of Data Collection.

UNIT III

Testing of Hypothesis: What is a Hypothesis, Basic Concepts Concerning Testing of Hypothesis, Procedure for Hypothesis Testing, Data Analysis: Data Preparation, Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations & Chi-square test.

UNIT IV

Report Writing: Meaning of Interpretation , Technique of Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Computers & Researcher.

COURSE OUTCOMES:

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

- *Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.*
- *Have basic knowledge on qualitative research techniques.*
- *Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis.*
- *Have basic awareness of data analysis-and hypothesis testing procedures*

Text Books:

1. Research Methodology – C.R.Kothari

References:

1. Business Research Methods – Donald Cooper & Pamela Schindler, TMGH, 9th edition
2. Business Research Methods – Alan Bryman & Emma Bell, Oxford University Press

Course Title:	Theory of Computation & Formal Languages	**Course Code:**	MIT-4T2-C
Semester:	4th	**Paper Type:**	Core
Credits:	04	**Max Marks:**	100
Pre Requisite:	MIT-2T1-C, MIT-1T3-C	**Co-Requisite:**	MIT-4T1-C

Marks Distribution: (Mid Term:30, End Term:50, Viva:10, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To be able to construct finite state machines and the equivalent regular expressions.*
- *To understand the class of languages described by finite state machines and regular expressions.*
- *To understand and construct pushdown automata and the equivalent context free grammars.*
- *To understand the concept of construct Linear bounded automata and the equivalent context Sensitive grammars.*
- *To understand the concept of Turing Machine and Universal Turing machine*

COURSE CONTENT:

UNIT I

Introduction to Set Theory, Introduction to Automata, Alphabets, String, Languages, Strings, Kleen Star, Kleen Plus, Introduction to Finite automata, Deterministic finite automata, DFA notations (Transition Table, Transition Table) Languages Accepted by DFA, Designing DFA by pattern recognition, Application of DFA, Non-deterministic Finite Automata, Language accepted by NDFA, Conversion of DFA to NDFA, Overview of e-NDFA. DFA vs NDFA vs e-NDFA,

UNIT II

Finite Automata & Regular Expressions: Definition, Basic Regular Expressions, Obtaining regular expression: Using Basics Expressions & State Elimination Method, Application of regular Expressions, Regular Languages: Definition, Properties, and Pumping Lemma for Regular Languages, Decidable and Closure properties of Regular languages. Limitation of Finite Automata, Equivalence & minimization of DFA.

UNIT III

Introduction to Grammar, Chomsky Hierarchy, Generation of Grammar from Finite Automata & Regular Expressions, Derivation Trees, Left most and Right Most Derivation Trees, Ambiguous Grammar, Context Free Grammar and its applications, properties of context free languages. Introduction to Push down Automata, Transition & Graphical Representation.

UNIT IV

Introduction to Linear bounded Automata & Turing Machine. Turing machine model, transition table Instantaneous definition, Acceptance and Construction of Turing machine. Standard Turing machine, Transducers, Lexical and Syntax Analyse: Parsing, Top down Parsing (Predictive parsers, LL (K), recursive Descent) and Bottom up Parsing (LR (K)).

COURSE OUTCOMES:

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

- *Describe the mathematical model of machines.*
- *Understand the concept of formal language and corresponding automaton.*
- *Introduces the concept of ambiguity, derivations and parse tree in grammar.*
- *Apply the acquired knowledge of formal languages to the engineering areas like Compiler Design*
- *Apply the acquired knowledge of finite automata theory and to design discrete problems to solve by computers.*

Text Books:

1. Fintite Automata and Formal Languages"- A Simple Approach, A.M Padma Read Pearson Education

References:

1. Hopcroft, J., & Ullman, J., "Introduction to Automata Theory, Languages & Computation", Pearson Education
2. Hopcroft J, R. Motwani, & J. Ullman, "Introduction to Automata Theory, Languages & Computation", Pearson Education
3. P. Linz, "Introduction to Formal Languages & Automata", Jones &Barlett PWS Publishing Company
4. Donald Knuth, "The Art of Computer Programming", Prentice Hall

Course Title:	Project Work	**Course Code:**	MIT-4T3-C
Semester:	4th	**Paper Type:**	Core
Credits:	10	**Max Marks:**	250
Pre Requisite:	All courses upto semester 3rd	**Co-Requisite:**	MIT-4T1-C, MIT-4E8-DCE, MIT-4E1-DCE, MIT-4E4-DCE, MIT-4E7-DCE

Marks Distribution: (Mid Term: 100, End Term: 150, Viva: 0, Assignment / Presentations: 0)

Project Work

Course Title:	Bioinformatics	**Course Code:**	MIT-4E1-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T2-C, MIT-3E3-DCE	**Co-Requisite:**	MIT-4T1-C, MIT-4E7-DCE

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To get introduced to the basic concepts of Bioinformatics and its significance in Biological data analysis.*
- *Describe the history, scope and importance of Bioinformatics and role of internet in Bioinformatics.*
- *Explain about the methods to characterize and manage the different types of Biological data.*
- *Classify different types of Biological Databases.*
- *Introduction to the basics of sequence alignment and analysis.*
- *Overview about biological macromolecular structures and structure prediction methods.*

COURSE CONTENT:

UNIT I

Introduction to biology, Living cell: characteristics & functions, basics of molecular biology: DNA, RNA, gene, genetic code, processes of transcription, translation, splicing etc. ,basics of proteins, sequences, structure & functions of proteins, Introduction to bioinformatics: Definitions & concepts, & the role of bioinformatics, Types of biological data.

UNIT II

Introduction to databases, types of Biological Databases – flat file databases, relational databases, object-oriented databases, introduction to biological databases, Sequence databases (EMBL, GenBank, DDBJ, SWISS-PROT, PIR, TrEMBL), search engines: SRS,ENTREZ. BLAST, FASTA.

UNIT III

Basic overview of algorithms: Space & time complexity. Need & significance of sequence alignment. Global & local alignments , techniques of sequence alignments: Doplot, Needleman-wunsch algorithm for global alignment, Smith-waterman algorithm for local alignments ,substitution matrices: PAM, Blosum etc. Gene prediction(ab initio & similarity based). Ontologies in bioinformatics: need for ontologies.

COURSE OUTCOMES:

At the end of the course student will be able to apply:

- *knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics*
- *Existing software effectively to extract information from large databases and to use this information in computer modeling*
- *Problem-solving skills, including the ability to develop new algorithms and analysis methods*
- *An understanding of the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries*

Text Books:

1. T. K. Attwood & D J Parry-Smith, "Introduction to bioinformatics", Pearson Education
2. Jean-Michel Claveriw, CerdricNotredame, "Bioinformatics – A beginner's Guide", WILEY DreamTech India Pvt

References:

1. Harshawardhan P. Bal." Bioinformatics Principles & Applications" O'Reily
2. T. K. Attwood & D J Parry-Smith, "Introduction to bioinformatics", Pearson Education
3. Jean-Michel Claveriw, CerdricNotredame, "Bioinformatics – A beginner's Guide", WILEY DreamTech India Pvt
4. S.C. Rastogi, N. Mendiratta" Bioinformatics Methods &Applications"TMH
5. Krane ,"Bioinformatic", Pearson Education
6. B. Bergeron, "Bioinformatics Computing", Pearson
7. D. E. Krene& M.L. Payma, "Fundamental concepts of Bioinformatics", Pearson

Course Title:	Cloud & Grid Computing	**Course Code:**	MIT-4E2-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T1-C, MIT-3E2-DCE	**Co-Requisite:**	MIT-4E3-DCE, MIT-4E8-DCE

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVE:

The objective of studying Cloud and Grid Computing is that it enables new social services by connecting users via social networks that are constructed using multiple cloud service and it will run the software industry upside down. Thus educates potential users about the benefits of cloud computing and the best way to make full use of them.

COURSE CONTENT:

UNIT I

Cloud Computing: Introduction to cloud & Cluster computing, cloud computing vs cluster computing, Evolution of cloud computing, principles of cloud computing, cloud Computing architecture, Cloud computing applications. Cloud service models (IaaS, PaaS, SaaS), could Deployment models (Public, Private, hybrid& community models). Challenge and Security Issues

UNIT II

Grid Computing: Introduction to Grid Computing, Characteristics, grid computing Architecture, grid complexity levels and topologies, grid components and grid layers, applications of Grid Computing. Grid security issues: Authorization and Authentication methods, Grid computing vs Cloud Computing Cluster Computing.

UNIT III

Introduction to OGSA, Services, Schema and architecture, Overview of OGSI, Virtualization: Virtual machines and visualization of clusters and data centres, levels of virtualization, virtualization structures and tools and mechanism, virtualization of CPU, Memory & I/O devices

COURSE OUTCOMES:

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

- *Elaborate the basic concepts of cloud computing and defining the basic terms*
- *Understand various cloud implementations and migration techniques*
- *To define the various industrial applications of cloud virtualization.*
- *learn security challenges and preventive measures in cloud computing*

Text Books:

1. Cloud Computing by pankaj Sharma published by S.K.Kataria and Sons.
2. Cloud Computig Bible: Published by Wiley India Pvt. Ltd.
3. Grid and Cloud Computing and Applications: The 2014 World Comp International Conference. Publisher C.S.R.E.A
4. Grid, Cloud and Cluster Computing and Applications by Hamid R.Arabnia, Ashu M.G.Solo

References:

1. Mastering Cloud Computing, Paperback-1 Feb 2013 by Buyya, Vecchiola&Selvi.
2. Cloud Computing: Concepts, Technology & Architecture, 1e Paperback-2014 by Erl.
3. Grid & Cloud Computing, a business perspective on Technology & Applications, Springer by Stanoevska-Slabeva, Katarina, Wozniak, Thomas, Ristol, Santi (Eds.)

Course Title:	Information Security & Networks	**Course Code:**	MIT-4E3-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T3-C, MIT-3E6-DCE	**Co-Requisite:**	MIT-4E2-DCE

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.*
- *To Gain familiarity with prevalent network and distributed system attacks, defenses against them, and forensics to investigate the aftermath.*
- *Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.*
- *Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.*

COURSE CONTENT:

UNIT I

Introduction: Security trends, the OSI Security Architecture, Security attacks, Security mechanisms, Security services, Model for Network Security. Encryption: Symmetric & Asymmetric Encryption, Symmetric Cipher model, Substitution techniques (Mono-alphabetic & Poly-alphabetic) & Transposition Technique, Rotor Machines, Block and Stream ciphers, Modern Round Ciphers: DES, AES, Introduction to Steganography. Encryption vs Steganography.

UNIT II

Introduction to Number Theory: Prime Numbers, Fermat's & Euler's theorem & discrete logarithms. Public Key Cryptography & RSA. Key management: Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic & Elliptic Curve Cryptography. Message Authentication & Hash functions. Digital Signatures & Authentication protocols. Network Security Applications: IP Security

UNIT III

Mechanics of Routing Protocols: Routing , Static and Dynamic Routing, Distant vector routing & link state routing, Internet working with Dissimilar Protocols, Protocol design Consideration: Simplicity, flexibility, Optimality, Overhead & Scaling, Operation above Capacity, forward compatibility. Migration: Routing Algorithms & addressing parameters, making multi-protocol operation possible,

Network Security: Security Features in Wireless Adhoc & Wireless Sensor Networks.

COURSE OUTCOMES:

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

- *Evaluate the security treats in modern computer era*
- *Define and identify firewall and network filtering*
- *List and recognize various VPN*
- *Identify different technique of sandboxing*
- *Distinguish various ethical hacking and testing procedures*

Text Books:

1. William Stalling ," Cryptography & Network Security", Pearson Education

References:

1. Radia Perlman, "Interconnections: Bridges, Routers switches & Internet-working protocols Pearson education
2. Mark Sportack, "IP Routing Fundamentals", Pearson Education
3. Gerard J. Holzmann, "Design & Validation Computer Protocols", Prentice Hall

Course Title:	Pattern Recognition	**Course Code:**	MIT-4E4-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T2-C, MIT-3E3-DCE	**Co-Requisite:**	MIT-4T1-C, MIT-4E7-DCE

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To equip students with basic mathematical and statistical techniques commonly used in pattern recognition.*
- *To introduce students to a variety of pattern recognition algorithms.*
- *Enable students to apply machine learning concepts in real life problems.*

COURSE CONTENT:

UNIT I

Introduction to Pattern Recognition, Pattern recognition approaches, pattern recognition applications, Pattern recognition systems: Sensing, Segmentation & grouping, Feature extraction, Classification, Post processing. Design cycle, Statistical pattern recognition, syntactic (structural) pattern recognition, neural pattern recognition, Parameter estimation techniques, Non-parametric Pattern Recognition

UNIT II

Introduction to Bayesian decision theory, Bayesian estimation: Gaussian distribution, ML estimation, EM algorithm, Feature selection & extraction techniques, Linear Discriminant Functions, Introduction to Dimension Reduction techniques.

UNIT III

Supervised Learning, Unsupervised Learning, Reinforcement Learning, Support Vector Machines, Bayesian Belief Nets, Bayes estimation (learning). Density estimation, Probabilistic Classification. Maximum Likelihood parameter estimation. Bias & Biased Estimates.

COURSE OUTCOMES:

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

- *Understand machine learning concepts and range of problems that can be handled by machine learning.*
- *Compare and parameterize different learning algorithms.*
- *Apply the machine learning concepts in real life problems.*

References:

1. Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.
2. Introduction to Machine Learning Edition 2, by EthemAlpaydin
3. Introduction to Artificial Intelligence – RajendraAkerkar, PHI.
4. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/Pearson Education.
5. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition
6. Artificial Intelligence & Expert Systems – Patterson PHI
7. Expert Systems: Principles & Programming- Fourth Edn, Giarrantana/ Riley, Thomson

Course Title:	Data Warehouse	**Course Code:**	MIT-4E5-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T2-C, MIT-3E3-DCE	**Co-Requisite:**	MIT-4T1-C, MIT-4E7-DCE

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To provide students with an understanding of the fundamentals of data warehouse, its basic components and the role of data warehouse in decision support.*
- *To provide knowledge of the important steps and techniques to be considered during data warehouse development, future trends and usage of data warehouse.*
- *To introduce the concept of dimensional modelling technique for designing a data warehouse.*
- *To provide knowledge of data integration and the extraction, transformation and load (ETL) processes.*
- *To introduce students to the methods and tools for accessing and analyzing the warehouse data.*

COURSE CONTENT:

UNIT I

Overview of decision support systems: Organizational need for strategic information, Failures of past decision-support systems, operational versus decision-support systems, data warehousing – the only viable solution, data warehouse defined. Data warehouse – The building Blocks: Defining Features, data warehouses & data marts, overview of the components, metadata in the data warehouse

Defining the business requirements: Dimensional analysis, information packages – a new concept, requirements gathering methods, requirements definition: scope & content

UNIT II

Principles of dimensional modeling: Objectives, From Requirements to data design, the STAR schema, STAR Schema Keys, Advantages of the STAR Schema

Dimensional Modeling: Updates to the Dimension tables, miscellaneous dimensions, the snowflake schema, aggregate fact tables.

UNIT III

OLAP in the Data Warehouse: Demand for Online analytical processing, need for multidimensional analysis, fast access & powerful calculations, limitations of other analysis methods, OLAP is the answer, OLAP definitions & rules, OLAP characteristics, major features & functions, general features, dimensional analysis, what are hypercubes? Drill-down & roll-up, slice-&-dice or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, ROLAP versus MOLAP, OLAP implementation considerations

COURSE OUTCOMES:

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

- *Understand the concept related to data warehouse architecture*
- *Compare Online Analytical Processing (OLAP) and Online Analytical Transaction Processing(OLTP) tools*
- *Design a data mart or data warehouse for any organization*
- *Asses raw input data and preprocess it to provide suitable input for range of data mining algorithms*
- *Extract association rules and classification model*
- *Identify the similar objects using clustering techniques*

Text Books:

1. Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons

References:

1. Sam Anahony, "Data Warehousing in the real world: A practical guide for building decision support systems", John Wiley
2. Alex Berson,Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw Hill W. H. 5.
3. Inmon, "Building the operational data store", John Wiley
4. Kamber & Han, "Data Mining Concepts & Techniques", Hartcourt India P. Ltd

Course Title:	Organizational Behavior	**Course Code:**	MIT-4E6-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-2E3-DCE, MIT-2E4-DCE	**Co-Requisite:**	MIT-4T1-C, MIT-4E8-DCE

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To help the students to develop cognizance of the importance of human behaviour.*
- *To enable students to describe how people behave under different conditions and understand why people behave as they do.*
- *To provide the students to analyze specific strategic human resources demands for future action.*
- *To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.*

COURSE CONTENT:

UNIT I

Evolution of management Thought-Classical, Behavioral and Management Science Approaches; The Hawthorne Studies; Systems and Contingency Approach for understanding organizations; Application of Management thought to the current scenario; Fundamental Concepts of Organizational Behavior; The role of OB in Management; Managerial Process, Functions; Managerial Skills and Roles in Organizations.

UNIT II

Foundations of Individual Behavior-Personality-Meaning; Development of Personality; Personality Determinants; the "Big Five" Personality Traits; Emotional Intelligence. Perception;- Nature and importance; Factors influencing perception; Managing the Perception Process. Learning- Components of learning process; Theoretical process of learning- Classical Conditioning; Operant Conditioning; Cognitive and Social Learning Theory.

UNIT III

Attitude: Nature and dimensions; Components and functions of attitude, Formation and attitude change. Motivation in organizations: Nature and importance; The motivational framework; The content theories of work motivation- Maslow's Need Hierarchy Theory; The Dual Structure Theory of Motivation; Process theory of work motivation- Vroom's Expectancy Theory; J. Stacy Adam's Equity Theory. Note:- The list of cases and specific references will be announced by the concerned faculty in the class at the beginning of the semester.

COURSE OUTCOMES:

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

- *Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.*
- *Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.*
- *Analyze the complexities associated with management of the group behavior in the organization.*
- *Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.*

References:

1. Fundamentals of Management by Griffin, Houghton Mifflin Company, Boston New York, U.S.A
2. Essentials of Management by Andrew J/ DuBrin
3. THOMSON- South western Management of Organizational Behavior by Hersey/Balanchard/Johnson Pearson Education- New Delhi
4. Organizational Behavior By Stephen Robins- Pearson Education- New Delhi Organizational Behavior By Fred Luthans McGrawHill
5. Organizational Behavior By Debra/ James – THOMSON- South- Western

Course Title:	Machine Learning	**Course Code:**	MIT-4E7-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T2-C	**Co-Requisite:**	MIT-4E1-DCE, MIT-4E4-DCE

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To explain Curve fitting with a specific focus on Regression analysis, logistic Regression Analysis.*
- *To explain different machine learning procedures which include Supervised, Unsupervised, semi supervised and reinforcement learning etc.*
- *To explain familiar machine learning Techniques like Support Vector Machines and its nonlinear variant.*
- *To explain few distribution like Gaussian, Dirichlet etc. and its subsequent use in modelling data for learning.*
- *To explain common applications of machine learning with a specific focus on latest developments in the said area.*

COURSE CONTENT:

UNIT I

Introduction: Basic definitions, learning types: supervised & unsupervised, hypothesis space & inductive bias, evaluation, cross-validation, Linear regression, Decision trees, over fitting, Instance based learning, Feature reduction, Collaborative filtering based recommendation

UNIT II

Probability & Bayes learning Logistic Regression, Support Vector Machine, Kernel function & Kernel SVM neural network: Perceptron, multilayer network, back propagation, introduction to deep neural network Introduction to Graphical Models. Generative Vs. Discriminative Models.

UNIT III

Computational learning theory, PAC learning model, Sample complexity, VC Dimension, Ensemble learning, clustering: k-means, adaptive hierarchical clustering, Gaussian mixture model. Some application areas of machine learning e.g. Natural Language Processing, Computer Vision, applications on the web.

COURSE OUTCOMES:

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

- *Apply a variety of learning algorithms to data.*
- *Perform evaluation of learning algorithms and model selection?*
- *Apply machine learning algorithms to solve problems of moderate complexity*

References:

1. Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.
2. Introduction to Machine Learning Edition 2, by Ethem Alpaydin

Course Title:	Dot Net	**Course Code:**	MIT-4E8-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T1-C, MIT-3E1-DCE	**Co-Requisite:**	MIT-4T1-C

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *Understand the fundamentals of developing software applications using object oriented methodologies*
- *Creating C# Net applications using standard .net controls.*
- *Connecting to different data sources and querying the database.*
- *To understand the basic of ASP. Net web application.*

COURSE CONTENT:

UNIT I

An Overview of .NET Technology: Features of .NET, Understanding .NET Framework, Main Components of .NET Framework, The Common Language Runtime, The Common Language Specification, The Common Type System, .NET Class Libraries, Assemblies, Metadata and Attributes. Introduction to Visual Studio.NET: Exploring Visual Studio.NET Interface.

UNIT II

C# IDE, Basic Window Controls: Text Box, Label, Check Box, List Box, Checked List Box, Radio Buttons, Buttons, Tree View and List View Controls, Objects and Type: Classes and Structs, Partial classes, static classes, Function Overloading, Operator Overloading, Inheritance: Types of inheritance, virtual methods, hiding methods, sealed classes and methods, Interfaces, Derived interfaces.

UNIT III

Introducing Web Application, Components of Web Application, Building a Web Form, HTML Server Controls. ASP.NET, Using Visual Web Developer, Designing a Simple Web Form. Including C# Code in ASP.NET, Hosting the Web Page, IIS Web Server

An Overview of ADO.NET, Design Goals of ADO.NET, ADO.NET Architecture, Objects Used in ADO.NET Model, .NET Framework Data Providers, .NET Framework Data Provider for SQL Server, Provider for Oracle, ADO.NET DataSet Object Model, Data Binding, Types of Data Binding, Generating DataSet, Binding Controls to the DataSet

COURSE OUTCOMES:

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

- *Understand the Microsoft .NET Framework and ASP.NET page structure*
- *Design web application with variety of controls*
- *Access the data using inbuilt data access tools*
- *Use Microsoft ADO.NET to access data in web Application*
- *Configure and deploy Web Application*
- *Develop secured web application*

Text Books:

1. "ASP .Net : Unleashed" , SAMS Publications'
2. Dietel &Dietel , "C# , How to Program",Pearson Education.

References:

1. "ASP .Net for beginner",Wrox Publications
2. Visual C#.Net by John Sharp & John Jagger, PHI, New Delhi.
3. 14 lesson to get you started with c# and dot net, faraz rasheed

Course Title:	Data Mining	**Course Code:**	MIT-4E9-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T1-C, MIT-3E1-DCE	**Co-Requisite:**	MIT-4T1-C

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

- *To provide students with an overview of the methodologies and approaches to data mining.*
- *To Gain insights into the challenges and limitations of different data mining techniques.*
- *To enable students to understand and implement the data mining methods on real world datasets.*
- *To introduce students to the state-of-the-art methods and modern programming tools for data mining.*
- *To explore latest trends in data mining such as web mining and text mining.*

COURSE CONTENT:

UNIT I

Data Mining: Introduction, The Knowledge Discovery Process, Major issues in Data Mining, Data Mining tasks, Applications of Data Mining, Related technologies- Machine learning and Statistics, Data Preprocessing- Overview, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT II

Association Analysis: Basic concepts, Frequent Itemset Generation, Apriori Principle, Frequent Itemset Generation in the Apriori Algorithm, Rule Generation.

Classification: Basic Concepts, Classification by Decision Tree, Bayesian Classification, Rule based Classification, Support Vector Machines, Artificial Neural Networks- Perceptron, Multilayer Artificial Neural Network, Associative Classification, *k*- Nearest Neighbor Classifier, Genetic Algorithm.

UNIT III

Cluster Analysis: Basic Concepts, Categorization of major Clustering methods, Partitioning methods-K-means, Hierarchical methods, Density based methods-DBSCAN, Grid based methods, Clustering high dimensional data, Outliers and Outlier Analysis, Current Trends: Text Mining & Web Mining.

COURSE OUTCOMES:

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

- *Understand Data Mining Principles*
- *Identify appropriate data mining algorithms to solve real world problems.*
- *Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining.*
- *Describe complex data types with respect to spatial and web mining.*

Text Books:

1. Data Mining: Concepts and Techniques. J. Han, M. Kamber, and J. Pei. Morgan Kaufmann 2011

References:

1. Data Mining: Practical Machine Learning Tools and Techniques. I. H. Witten, E. Frank, and Mark A. Hall. Morgan Kaufmann 2011.
2. Introduction to Data Mining. P.-N. Tan, M. Steinbach, and V. Kumar. Pearson education 2006.

Course Title:	Advances Java	**Course Code:**	MIT-4E10-DCE
Semester:	4th	**Paper Type:**	DCE
Credits:	03	**Max Marks:**	75
Pre Requisite:	MIT-3T1-C, MIT-3E1-DCE	**Co-Requisite:**	MIT-4T2-C

Marks Distribution: (Mid Term:25, End Term:35, Viva:05, Assignment / Presentations:10)

COURSE OBJECTIVES:

Objective of this course is to provide the ability to design console based, GUI based and web based applications. Students will also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications

COURSE CONTENT:

UNIT I

Streams: stream operations, stream creation, filter map & flatmap methods, extracting substreams & concatenating streams, other stream transformation, simple reductions, the optional type ,collecting results, collecting into maps, grouping & partitioning, downstream collections, reduction operations, primitive type streams, parallel streamsInput & outputi/o streams, text input & output, reading & writing binary data, object i/o streams & serialization.

UNIT II

Networking Connecting to a server, implementing servers, Database Programming JDBC design, structured query language, JDBC Configuration, Working with JDBC statements, query execution, scrollable & updatable result sets, row sets, metadata, transactions, advanced sql type, connection management in web & enterprise applications

UNIT III

Core Spring: Introduction to spring, wiring beans, advanced wiring, aspect oriented spring, Spring on web building, spring web application , Spring in the backend using databases with Spring & JDBC, persisting database with object relational mapping, advanced spring MVC, working with spring web flow , securing web applications.

COURSE OUTCOMES:

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

Learn the Internet Programming, using Java Applets

- *Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings.*
- *Apply event handling on AWT and Swing components.*
- *Learn to access database through Java programs, using Java Data Base Connectivity (JDBC).*
- *Create dynamic web pages, using Servlets and JSP. 6. make a resusable software component, using Java Bean.*
- *Invoke the remote methods in an application using Remote Method Invocation (RMI)*
- *Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).*
- *Develop Stateful, Stateless and Entity Beans. 10. use Struts frameworks, which gives the opportunity to reuse the codes for quick development. 11. map Java classes and object associations to relational database tables with Hibernate mapping files*

Text Books:

1. Core Java Volume 11-Advanced features by Cay S.horstman 10th edition Publisher: Prentice Hall Spring in Action, Fourth Edition

References:

1. Pro Spring 5 Authors: Cosmina, I., Harrop, R., Schaefer, C.
2. Spring Boot in Action by Craig Walls