MSE -II Syllabus

Semester	Section	Subject Code	Subject	Subject Teacher	Syllabus Contents
3rd	A and B	PCIT 101	Data Structure	Parminder Kaur Wadhwa	Trees, Graphs, Hashing, Sorting
3rd	A and B	PCIT-102	Object Oriented Programming using C++	Sandeep Kumar Singla	**Pointers and Run Time Polymorphism:** Abstract classes, need of pointers, pointer to objects, this keyword, pointer to derived classes, friend functions, virtual functions and pure virtual functions. **Exception Handling:** error handling, exception handling model, try, throw, catch and multiple catch, nested try, handler throwing the same exception again, handling uncaught exception and user defined exceptions, rules for handling exceptions successfully. **String Handling:** creating string objects, extracting characters of a string, string handling functions, streams in C++, formatted and unformatted I/O, formatting using manipulators. **File Handling and Templates**: file streams, opening and closing a file, reading and writing a file, error handling during file operations, templates, class and function templates.
3rd	A and B	ESIT-101	DCLD	Dr.Amit Kamra and Harpreet Kaur	**Combinational Circuits:** Design procedure –Serial adder/Subtractor, Parallel adder/ Subtractor Carry look ahead adder, BCD adder, Magnitude Comparator, Multiplexer/Demultiplexer, encoder/decoder, parity checker, code converters. Implementation of combinational logic using MUX. **Sequential Circuits**: Flip flops SR, JK, T, D and Master slave, Excitation table, Edge triggering, Level Triggering, Realization of one flip flop using other flip flops. Asynchronous/Ripple counters, Synchronous counters, Modulo-n counter, Ring Counters. Classification of sequential circuits-Moore and Mealy, Design of Synchronous counters: state diagram, Circuit implementation. Shift registers **Signal Conversions**: Analog & Digital signals. A/D and D/A conversion techniques (Weighted type, R-2R Ladder type, counters Type, Dual Slope type, Successive Approximation type). **Introduction to VHDL** :Introduction, Behavioral, Data flow, Structural Models, Simulation Cycles, Process Concurrent Statements, Sequential Statements, Loops, Functions and Procedures, Tools used for Simulation of VHDL.

3rd	A and B	PCIT-103	Data Communication and Computer Networks	Dr. Manpreet Singh and Dr. Pankaj Bhambri	**Medium Access Sublayer:** Static and Dynamic Channel Allocation, ALOHA, CSMA Protocols, Controlled Access, Polling, Token Passing, IEEE 802.3 Frame Format, Ethernet Cabling, Mancheter Encoding, Collision Detection in 802.3, Binary Exponential Backoff Algorithm. **Network Layer:** Design Issues, IPV4 Classful and Classless Addresses, Subnetting, Routing Algorithms, Distance Vector and Link State Routing, Congestion Control: Princples, Prevention Policies, Leaky Bucket and Token Bucket Algorithms. **Transport Layer:** Elements of Transport Protocols, Addressing, Connection establishment and relaease, flow control and buffering, MUX and DEMUX, Introduction to TCP/ IP and their Comparisons. **Application Layer:** WWW, DNS, SMTP, POP3, IMAP, MIME
3rd	A and B	MCIT-101	Environment Science	Harjot Kaur Gill	**Environmental Pollution:** Definition, causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. **Impact of Information Technology on Environment and Sustainable Development**: Positive and Negative Impacts of IT for Environment, Mobile Phones and Cell Towers, SAR Levels, Effects of Mobile Radiations, Management and Control, IT Impact in Education-Health-Entertainment-EnvironmentBusiness-Society,National Management Information System, Environmental Information System,Geographical Information System, Functions of Remote Sensing, Human Health and Safety. **Social issues and the Environment:** Form unsustainable to sustainable development, Water conservation, rain water harvesting, water shed management, Resettlement and rehabilitation of people; its problems and concerns, case studies, Environmental ethics: issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies, Environment protection Act, Air (prevention and control of pollution) Act, Water (prevention and control of pollution) Act, Wildlife protection act, Forest conservation act. **E-Wastage and Green Computing**: Impacts of E-Waste on the Environment, Harmful Effects caused by Improper Computer & Electronic Waste Recycling, Global Trade Issues, Information Security, Recycling, Repair, Electronic Waste Substances, Holistic Approaches and Techniques for Green Computing, Impacts of Green Computing, Green Awareness, Green Initiatives in Information Technology, Green Computing Certifications, Issues & Challenges Ahead.

3rd	A and B	HSMIT-101	Professional Practice , Laws and Ethics	Mohanjit Kaur Kang	**Risk Identification and evaluation:**Analyzetheroleofrisktoanorganization,RiskAssessment and appropriate actions, Establishing a security policy, Prevention, Detection , response, Information Privacy, Privacy laws, application and court rulings, Identity theft, Consumer profiling, Treating customer data responsibly, Workplace monitoring **Freedom of Expression:** First Amendment rights, controlling access to information on internet, defamation and hate speech, Anonymity on internet, corporate blogging, Social Networking: Social networking ethical issue, Cyber bullying, cyber stalking, uploading of inappropriatematerials, Crime in virtual worlds **Laws, IT Act 2000, Intellectual Property and Copyrights:** Computer Misuse Act 1990, Overview of IT Act 2000, definition, chapters, Jurisdiction, Penalties, Intellectual property: Introduction –meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets; Law relating to Copyright in India including Historical evolution of Copy Rights Act, 1957, Meaning of copyright –computerprograms, Ownership of copyrights and assignment, Criteria of infringement, Piracy in Internet –Remedies and procedures in India; Law relating to Patents under Patents Act, 1970 including Concept and historical perspective of patents law in India, Patentable inventions with special reference to biotechnology products. **Plagiarism:**IntroductiontoPlagiarism,Types of Plagiarism.
5th	A and B	IT-14501	Discrete Mathematics	Jasleen Kaur	**GRAPHS** – Graph terminology, Directed and undirected graphs, Eulerian chains and cycles, Hamiltonian chains and cycles, shortest path algorithms – Dijkstra's algorithm, Warshall's algorithm, Graph coloring, Chromatic number, Planar graphs, Euler's Theorem for Planar Graphs, Isomorphic and homomorphic graphs, Applications of graph theorem Trees-Tree Terminology, Spanning tree algorithms – Kruskal's algorithm, Prim's algorithm. **Algebraic Systems**: Definition and elementary properties of groups, abelian groups, semigroups, monoids, rings.

| 5th | a and b | IT-14502 | Programming in Java | Dr. Akshay Girdhar and Harpreet kaur | **Inheritance:** Inheritance basics, using super, method overriding, dynamic method dispatch, using abstract classes, using final with inheritance, constructor in derived class, object class.

Package and Interfaces: Introducing package, package access protection, importing packages, interfaces - defining, implementing, nesting, extending, default interface methods.

Exception Handling: Exception handling fundamentals, exception types, uncaught exceptions using try and catch, multiple catch clauses, nested try statements, throw, finally, built-in exceptions, creating your own exception sub classes, chained exceptions.
Multithreaded Programming: The Java thread model, life cycle of thread, the main thread, creating thread, creating multiple threads, using isAlive() and join(), thread priorities, thread synchronization, inter thread communications, suspending, resuming and stopping threads.

String Handling: The string constructors, string length, special string operations, character extraction, string comparison, searching string, modifying string, data conversion, changing the case of characters, StringBuffer
Java database connectivity (jdbc): JDBC-ODBC Bridge, DriverManager class, java.sql package (Connection interface, Statement interface, Prepared Statement interface, ResultSet interface, ResultSetMetaData interface) |
| 5th | Aand B | IT -14503 | Theory of Computation | Rupinder Kaur | **Unit No-4 : Context Free Languages:** Introduction,Leftmost and right most derivation trees,parsing and ambiguity, ambiguity in grammar and languages, Normal forms-Chomsky and Greibach Normal forms.
Unit No-5: Pushdown Automata: NDPDA, DPDA, context free languages and PDA, comparison of deterministic and non-deterministic versions, closure properties, pumping lemma for CFL
Unit No-6 : Turing Machines: Introduction, Techniques for Turing machine construction – Multi head and Multi tape Turing Machines, The Halting problem , Problems about Turing machines., Language of Turing machines, Variations, Universal Turing Machines, Difference between Finite Automata and Turing Machines. |

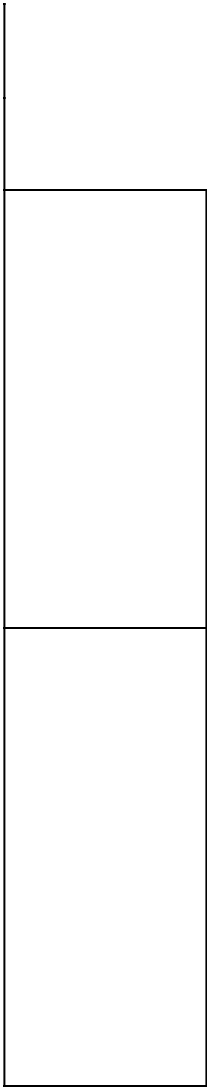| 5th	A and B	IT-14504	Human Computer Interaction	Dr.Kulwinder Singh Mann, Dr. Pradeep Jaswal	Technology, Design and Evaluation Techniques in HCI: Interactive desing and prototyping, user interace managment system, universal desing principles, user support and help systems, evaluation methods.
5th	A and B	DEIT-14508	Advanced Computer Networks	Mohanjit Kaur Kang	**Switching:** Overview of Switch, Unmanaged and Managed Switches, Switch Administrative Configurations, Viewing, Saving and Erasing Configurations, Spanning Tree Protocol, VLAN Basics, Static VLAN, Dynamic VLAN, Frame Tagging, Trunking Protocol, Routing between VLANs, Configuring VLANs, Configuring VLAN Trunk Ports, Configuring Inter-VLAN Routing **Adhoc Networks**: Features, Advantages and Applications, Adhoc versus Cellular networks, Network Architecture, Protocols: MAC protocols, Routing Protocols, Technologies, Applications of Mobile Adhoc Network
5th		DEIT - 14516	Advanced Web Technologies	Sidharath Jain	**Responsive Web Design using AngularJS:** Introduction to Responsive Single Page Application and AngularJS, AngularJS dynamic routing-based approach, AngularJS Directive Based Approach, AngularJS Based Breakpoints for Layout Manipulation, Debugging and Testing Responsive Applications. **Version Control and Data Repository Maintenance:** Introduction to Git, Installation of Git, Setting up account on Bitbucket using SSH, Local Git: Creating a new commit, View history and differences between Git, Remote Git: Adding remote repository, Pushing changes to remote repository, Cloning remote Bitbucket repository, Merging branches, Patches: Generating, mailing and Applying Patches.
5th	A,B	DEIT-14514	.NET	Yadvir Kaur	**Introduction to ADO.NET:** Brief introduction of ADO.NET solution architecture, Data Access Models, Dissecting ADO.NET, Working with ADO.NET in Connected Mode, Working with ADO.NET in Disconnected Mode, Data Centric Application Architecture, Data Binding XML Integration in ADO.NET, Transactions in ADO.NET, DBConcurrency Exception – Disconnected Mode, ADO.NET Technology – The Complete Picture, Recommendations for Data Access Strategies with Specific Types of Applications. **ASP.NET and Web Services:** Introduction to Web Applications, Introduction to ASP.NET, ASP.NET Web Forms, ASP.NET Controls, User Controls and Custom Controls, Error Handling and Tracing, Data Binding, ASP.NET Built in Objects, Introduction to Web Services. **WCF, WF & WPF:** WCF security, Data Access (ADO Dot Net), Basics SQL, .NET and SQL Server, Application Blocks, Code Review Tools, Silverlight, WF, WPF, Card Space.

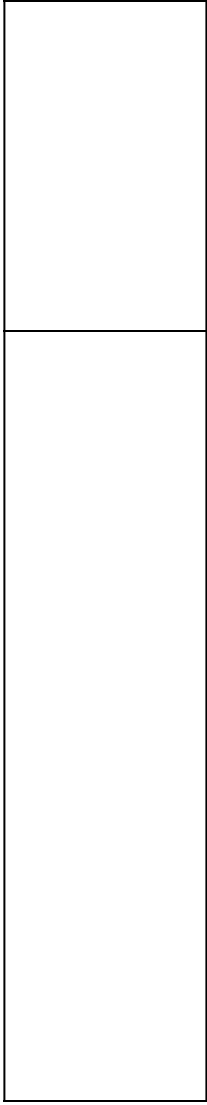| 5th | A,B | DEIT-14510 | Business Intelligence and its Applications | Kamaljit Kaur | **Data Mining Primitives:** Data preprocessing including data cleaning, data integration, data transformation. Definition and Specification of a generic data mining task. Description of Data mining query language with few example queries. Relationship between data warehouse and data mining. **Association Analysis:** Different methods (algorithms) for mining association rules in transaction based databases. Classification of association rules, Apriori, frequent pattern growth algorithm. **Classification and Predictions:** Different Classification algorithm, including C4.5, CART., use of genie index, decision tree induction, Bayesian classification **Clustering:** Different types of clustering Methods -Partition based clustering, Density based clustering, and Distribution based clustering, Hierarchical clustering. K-Means and DBSCAN Clustering Algorithm. **Business Intelligence:** Improvement in Decision Making Process, Need of Business Intelligence Program, Introduction to Business Intelligence, Analytics Spectrum, Value Drivers and Information Use, Performance Metrics and Key Performance Indicators, Horizontal and Vertical Use Case for Business Intelligence (BI). Applications of BI. |
| 7th | B | IT-14701 | Business Enterprise Application | Kiran Jyoti | **Construction readiness of enterprise applications:** Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis – code profiling and code coverage **Types and methods of testing an enterprise application:** Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application. **Advanced Topics:** Integration Patterns, Service oriented integration-Web services, Service Choreography and Orchestration, BPMN, BPEL, Messaging based integration- Synchronous and Asynchronous Messaging, message structure, JAVA messaging services, Enterprise service bus-routing, scalable connectivity and protocol, Global and Brokered ESBs, Support to SOA |

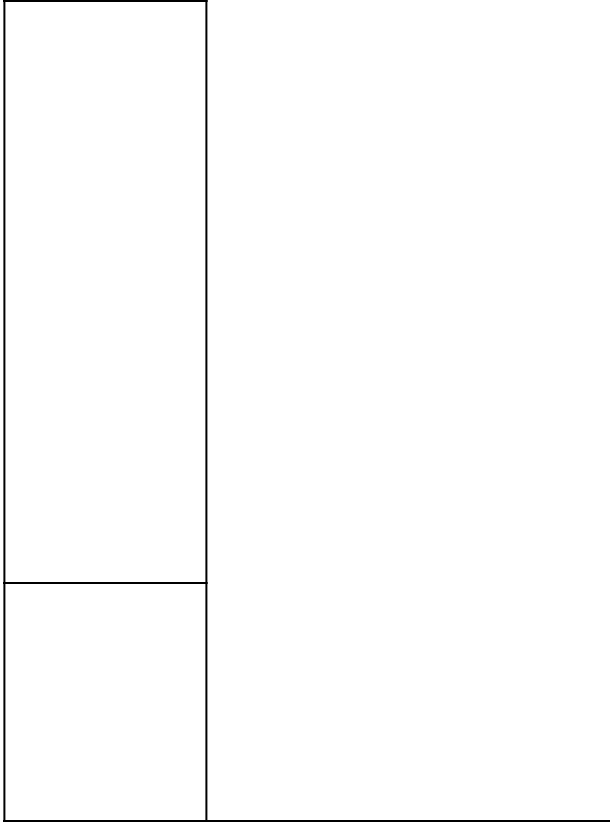|					
7th		IT-14702	ICT in Agriculture & Rural Development	Sidharath Jain	**Globalization of e-agriculture:** Global e-agriculture and rural development, evolution of e-agriculture and global ICT trends, key characteristics of e-agriculture development, key lesson from global e-agriculture development, e-agriculture and rural development in Asia. **Applications of ICT:** ICT and its potential to transform Indian agriculture, ICT based pest management for sustainable pulse production. Learning in agriculture and rural development, ICT use in agriculture, key success factors for ICT application in agribusiness, implications of ICT use in agriculture and agribusiness industry. **Case Studies:** Impact of digital revolution on rural society in India, Agricultural knowledge dissemination system, Community radio for development of rural India, Mobile communication and development of rural India, Harnessing ICTs for Indian Agricultural and rural development, Agricultural development through Information Communication Technology (ICT) in India.
7th	B	IT-14703	Engineering Enterpreneurship	Dr. Pradeep Jaswal	The Marketing Plan: Industry Analysis, Marketing research for the new venture, difference between a business plan and a marketing plan. Preparing the marketing plan, characteristics of a marketing plan, the marketing mix, steps in preparing the marketing plan. [2] The Organizational Plan: Developing the management team, legal forms of business, tax attributes of forms of business, the limited liability company versus the S-corporation, designing the organization, building the management team and a successful organization culture, the role of a board of directors, the board of advisors. [3] The Financial Plan: Operating and capital budgets, forecasting sales, pro forma income statements, pro forma cash flow statement, pro forma balance sheet, break-even analysis, pro forma sources and applications of funds statement, software packages. [2] Sources of Capital: An overview, personal funds, family and friends, commercial banks, role of Government Agencies in small-business financing, research and development limited partnerships, Government grants, Private placement, bootstrap financing, financing the business, informal risk-capital market, venture capital, valuing your company, going public. [4] Strategies for Growth and Managing the Implications of Growth: Growth strategies, implications of growth for the firm, overcoming pressures on existing human resources, overcoming pressures on management of employees, overcoming pressures on Entrepreneur's time, overcoming pressures on existing financial resources, using external parties to help grow a business, joint ventures, acquisitions, mergers, leverage buyouts, franchising. [5] Succession Planning and

7th			Cloud Infrastructure	Sachin Bagga	**Security in Clouds:** Cloud security issues and challenges, Cloud security reference model, Encryption techniques: Symmetric key encryption and Asymmetric key encryption. Identity and key management, Digital signature, Secure socket layer (SSL) **Cloud Concepts and Technologies:** Virtualization: Definition, Characteristics and benefits of virtualization, Virtualization and cloud computing, Types of virtualization, and Load balancing. Hypervisors, Multitenancy, Scalability and elasticity, Billing and metering of services, Application programming interfaces (APIs), and Service level agreement (SLA) **Migration into Cloud:** Introduction, Broad Approaches to Migration into Cloud, The SevenStep Model of Migration into Cloud **Cloud Computing Platforms:** Study and comparison of various open source and commercial cloud platforms. Open source cloud platforms: Openstack, Eucalyptus, and Nebula etc. Commercial cloud platforms: Amazon Elastic compute cloud (EC2), Google App Engine, and MS Azure etc
7th	B	DEIT-14718	Computer Forensics	Dr. Pankaj Bhambri	**Computer Forensics Capture:** Data Recovery, Backup and Recovery, Data Recovery Solution, Hiding and Recovering Hidden Data, Evidence Collection and Data Seizure, Need to collect evidence, Collection options, Obstacles, Types of evidences, Rule of evidences, Volatile evidence, General procedure, Collection and archeiving, Methods of Collection, Artifacts, Collection steps, Controlling Contamination, The chain of custody, Restructuring the attack, **Computer Forenscis Evidence:** Duplication and preservation of digital evidence, preserving the digital crime, computer evidence processing steps, legal aspects of collecting and preseving computer forensic evidence, computer image verification, authentication, special needs of evidential authentication, practical considerations and implementation. **Computer Forenscis Analysis:** Discovery of electronics evidence, electronic document discovery, identification of data, timekeeping, forensics identification and analysis of technical surveillance devices, reconstructing past events, useable and unuseable file formats, converting files. **Networks:** Network Forensics Scenario, a technical approach, destruction of email, dmaging computer evidence, tools for intrusion response, to the destruction of data, systems
7th			Corporate IT Management		Managing E-business: E-business strategy and analysis, strategic analysis, strategic objectives & strategic implementation, managing e-business infrastructure. [5] Managing Information Security: Need of control, control strategies, types of controls, techniques of controlling information systems, threats related to internet services. Case Study: Computer Viruses

7th	B	DEIT-14711	Mobile Application Development	Ranjodh Kaur	**Apps Interactivity in Android:** Android Fragment: Fragment Class, Fragment Life Cycle Android Intent Class: Intent types, Intent Filters, Instantiating Intent Object, Android Context Class, Event Processing: Events, Event Listener , Event Handler. **Persistent Data Storage:** SQLite: Android Built in SQLite content provider, Modifying data using your android application, Creating basic activity, Configuring manifest Packaging and managing SQLite with android app **Android Services and Threads:** Android service class: Controlling services, Spawning process, Process Life Cycle, Thread Caveats, Background Processing Services
M.Tech.		MIT-104	Data warehousing and Data Mining	Kiran Jyoti	**Data Mining:** Introduction to Data mining and knowledge discovery, Know your Data, Data Pre-processing, Mining frequent patterns, associations and correlations: Basic concepts and methods, Classification: Basic concepts, Classification algorithms, Clustering: Basic Concepts, Clustering algorithms, Cluster analysis: Basic Concepts and methods , outlier detection, **Web and Text Mining**: Introduction, web mining, web content mining, web structure mining, we usage mining, Text mining – unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.
M.Tech.		MAC-101	English for Research Paper writing	Jasleen Kaur	**Module 4**: Key skills are needed when writing a title, key skills are needed when writing an abstract, key skills are needed when writing an introduction, key skills are needed when writing a review of the literature **Module 5**:Skills are needed when writing the methods, skills needed when writing the results, skills are needed when writing the discussion, and skills are needed when writing the conclusions **Module 6**:Useful phrases, how to ensure paper is as good as it could possibly be the first – time
M.Tech.		MIT-102	Soft Computing	Manpreet Singh	Module 3: NEURAL NETWORKS: Evolution of Neural Networks, Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks: theory, architecture, training algorithm; Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks Module 4: GENETIC ALGORITHMS: Introduction to Genetic Algorithms (GA), Biological Background, Traditional Optimization and Search Techniques, Genetic Algorithm vs Traditional Algorithms, Operators in Genetic Algorithms, Stopping Condition for Genetic Algorithm Flow

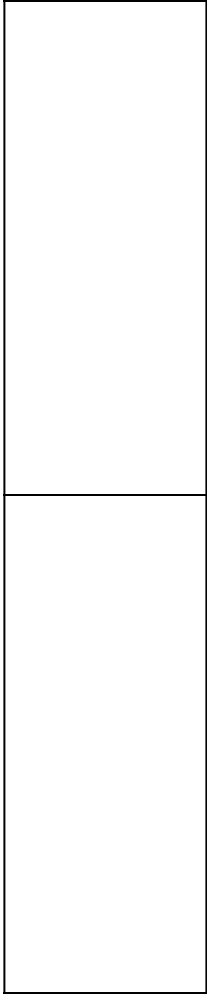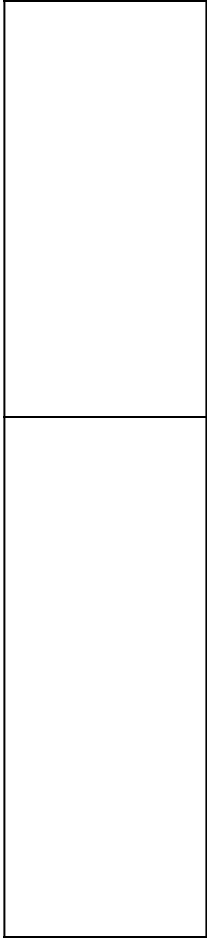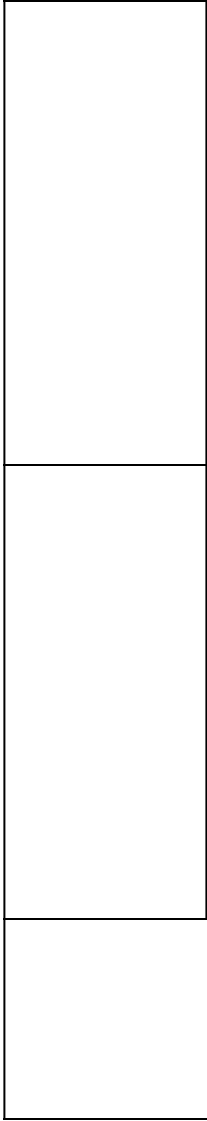|					
M.Tech.		MIT-106	Machine Learning	Sachin Bagga	**Regression** :Random Forest Regression **Classification :** Logistic Regression, Support Vector Machine (SVM), Kernel SVM, Random Forest Classification **Clustering :** Hierarchical Clustering, Association Rule Learning: Apriori, Eclat, Reinforcement Learning: Upper Confidence Bound (UCB), Thompson Sampling **Deep Learning :** Artificial Neural Networks, Training Neural Nets, Multi-Class Neural Nets, Identify the pros/cons of static and dynamic training, Convolutional Neural Networks **Dimensionality Reduction :** Dimensionality Reduction: Principal Component Analysis (PCA)
M.Tech.		MIT-101	Digital Image Processing	Akshay Girdhar	Module 3:: Image Enhancement in Spatial Domain;Module 6: Multiresolution Analysis;Module 8: Image Segmentation:
M.Tech.		MRM-101	Research Methodology	Amit kamra	Module 4:IPR:Nature of Intellectual Property, Module 5: Patents, Module 6: Recent Trends: