

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 3rd

Subject Title: Digital Circuits and Logic Design

Subject Code: ESIT-101

Subject Incharge: Harpreet Kaur

S.No.	Title	Details
1.	Number Systems	Binary, Octal, Decimal, and Hexadecimal. Number base conversions, 1's, 2's, n's complements, signed Binary numbers. Binary Arithmetic, Binary codes: Weighted BCD, Gray code, Excess 3 code, ASCII – conversion from one code to another.
2.	Boolean Algebra	Boolean postulates and laws – De-Morgan's Theorem, Principle of Duality, Boolean expression – Boolean function, Minimization of Boolean expressions – Sum of Products (SOP), Product of Sums (POS), Minterm, Maxterm, Canonical forms, Conversion between canonical forms, Karnaugh map Minimization, Quine-McCluskey method - Don't care conditions
3.	Logic GATES	AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR. Implementations of Logic Functions using gates, NAND-NOR implementations. Study of logic families like RTL, DTL, DCTL, TTL, MOS, CMOS, ECL and their characteristics

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 3rd Semester

Subject Title: Data Structures

Subject Code: PCIT-101

Subject Incharge: Parminder Kaur Wadhwa

S. No.	Title	Details
1.	Introduction to Algorithms:	Definition and brief description of various data structures, operations on data structures, Algorithm development, Complexity analysis, Big O notation, Time space trade-off.
2.	Arrays, Stacks and Queues:	<p>Arrays:-Linear and Multi-dimensional arrays and their representation, operations on arrays, Linear Search, Binary Search, Sparse matrices and their storage.</p> <p>Stacks: Array Representation and Implementation of Stacks, Operations on Stacks, Application of stacks: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack, Balanced parenthesis checking. Recursion, Tower of Hanoi Problem.</p> <p>Queues: Sequential representation of queue, linear queue, circular queue, operations on linear and circular queue, dequeue, priority queue.</p>
3.	Linked List	<p>Linear linked list, operations on linear linked list, doubly linked list, operations on doubly linked list, Circular Linked list.</p> <p>Garbage collection and Compaction,</p> <p>Linked representation of Stack, Linked representation of a Queue, Skip List, Operation done in skip list, Implementing the skip list.</p>

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 3rd

Subject Title: Object Oriented Programming using C++

Subject Code: PCIT-102

Subject Incharge: Sandeep Kumar Singla

S.No.	Title	Details
1	Fundamental Concepts of a Programming Language	basic structure of a program, character set, tokens, keywords and identifiers, constant and variables, data types and sizes, operators and expressions, operator precedence, promotion and type conversion, Control flow (if, if-else, nested if-else, for, while, do-while, break, switch, continue and goto statements), arrays and strings.
2	Object Oriented Paradigm	need of object oriented programming, comparison of structured and object oriented development, elements of object oriented programming, encapsulation and data abstraction, inheritance, polymorphism, inheritance, dynamic binding and message communication
3	Classes and Objects	introduction to classes and objects, class specification, defining member functions, reference and instance variables, scope resolution operator, objects as arguments and returning object
4	Object Initialization and Cleanup	access specifiers, pass by reference, need for constructors and destructors, parameterized constructors, copy constructor, dynamic constructor, destructors, static data and member functions.
5	Overloading and Inheritance	unary and binary operator overloading, function overloading. Inheritance – need of inheritance, forms of inheritance, inheritance and member accessibility, generalization and aggregation, object composition and delegation, super keyword, overriding.

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 5th

Subject Title: Discrete Mathematics

Subject Code: IT-14501

Subject Incharge: Jasleen Kaur

S.No.	Title	Details
1.	Fundamentals of Sets	Operations on sets, Subsets, Types of sets, Ordered pairs, Proofs of general identities of sets, Classes of sets and partitions, Inclusion and exclusion principle
2.	Fundamentals of Relations	Properties of relations, Types of relations, Composition of relations, Closure properties of relations, Equivalence relations, Compatibility relations, Partial order relations.
3.	Fundamentals of Functions	Introduction and types of functions, Composition of functions, Invertible function, Hashing functions, Recursively defined functions.
4.	Propositional and Predicate Logic	Propositional logic, Truth tables, Normal forms (conjunctive and disjunctive), Validity of well-formed formula, Propositional inference rules, Predicate logic, Universal and existential quantifiers
5.	Combinatorial Mathematics	Basic counting principles, Permutations and combinations, Pigeonhole principle, Recurrence relations – Solving homogeneous and non-homogeneous recurrence relations, Generating function.

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 5th

Subject Title: Programming in Java

Subject Code: IT-14502

Subject Incharge: Harpreet Kaur

S.No.	Title	Details
1	Overview of Java	byte code, buzzwords, object oriented programming two paradigms, abstraction, the three OOP principles, structure of Java program, Java typical environment,
2	Date Types	Primitive data types - integers, floating-point types, characters, booleans; literals, variable,
3	Introduction to Classes and Methods	Class fundamentals, declaring object, assigning object reference variable, introducing methods, constructors ,overloading methods, objects as parameters, returning objects, overloading constructors, this keyword, garbage collection, the finalize () method, introduction to access various control, static , final, command line arguments.
4	Inheritance	Inheritance basics, using super, method overriding, dynamic method dispatch, using abstract classes, using final with inheritance,
5	Exception Handling	Exception handling fundamentals, exception types, uncaught exceptions using try and catch, multiple catch clauses, nested try statements, throw, finally,
6	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

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 5th

Subject Title: Theory of Computation

Subject Code: IT-14503

Subject Incharge: Rupinder Kaur

S.No.	Title	Details
1	Unit No-1	Basics of strings and alphabet
2	Unit No-2	Finite Automata
3	Unit No-3	Regular grammar and introduction to Context free grammar

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 5th

Subject Title: Human Computer Interaction

Subject Code: IT-14504

Subject Incharge: Dr. Pankaj Bhambri

S.No.	Title	Details
1.	Human Computer Interaction	<p>Prerequisites: Introductory Course Human and Interactive Systems: Human memory, reasoning and problem solving, emotion and psychology, effects of affect, measuring user affect, human information processing and perceptual-motor behavior, attention in information processing, human based design of interactive systems, models of interaction, ergonomics, HCI in the software process.</p> <p>[10]</p> <p>Cognitive and Interaction Models for HCI: Cognitive neuroscience, mental models, Cognitive architectures, The Model Human Processor (MHP), GOMS, Cognitive Complexity Theory, Task loading and stress in Human Computer Interaction, Relationship between stress and cognitive workload, mitigation of stress, Human error Identification in HCI, Interactions models, Status-event analysis, sensor-based interaction.</p>

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 5th

Subject Title: Advanced Computer Network

Subject Code: DEIT-14508

Subject Incharge: Mohanjit Kaur Kang

S.No.	Title	Details
1.	Internetworking:	Half and Full Duplex Ethernet, Ethernet at the Data Link Layer, Ethernet at the Physical Link Layer, Ethernet Cabling: Straight-through, Crossover and Rolled Cable, Data Encapsulation, Three-Layer Hierarchical Network Model . [4]
2.	TCP Protocols:	Internet Layer Protocols: IP, ICMP, ARP, RARP; Host to Host Layer Protocols: TCP, UDP; Application Layer Protocols: Telnet, FTP, TFTP, NFS, SMTP, LPD, X Window, SNMP, DNS, and DHCP. [6]
3.	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.[10]

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 6th

Subject Title: Information Assurance and Security

Subject Code: IT-14601

Subject Incharge: Dr. Pankaj Bhambri

S.No.	Title	Details
1.	Information Assurance and Security	Security Fundamentals: Introduction, Terminology, Attacks, Security Goals : Authentication, Authorization, Cipher Techniques: Substitution and Transposition, One Time Pad, Modular Arithmetic, GCD, Euclid's Algorithms, Discrete Logarithm, Fermat Theorem, Block Ciphers, Stream Ciphers. Secret Splitting and Sharing, Intrusion Detection and Prevention. [7] Cryptography: Symmetric Key Algorithms: DES, AES, BLOFISH, Attacks on DES. Modes of Operations, Linear Cryptanalysis and Differential Cryptanalysis. Public Key Algorithms: RSA, Key Generation and Usage, ECC. Hash Algorithms: SHA-1, MD5. [6] Key Management: Introduction, Key Management: Generations, Distribution, Updation, Digital Certificate, Digital Signature, PKI. Diffiee Hellman Key Exchange. One Way Authtication, Mutual Authentication, Neeham Schroeder Protocol. [6]

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 6th

Subject Title: Software Engineering and Testing

Subject Code:IT-14602

Subject Incharge: Sandeep Kumar Singla

S.No.	Title	Details
1	Introduction	Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models
2	Software Requirement Specifications (SRS)	Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEICMM Model.
3	Software Design:	Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design,

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 6th

Subject Title: Probability and Statistics

Subject Code: IT-14603

Subject Incharge: Rupinder Kaur

S.No.	Title	Details
1	Unit No-1	Introduction To Statistics
2	Unit No-2	Sampling Distribution and Testing of Hypothesis

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 6th

Subject Title: Information storage and management

Subject Code: DEIT-14615

Subject Incharge: Mohanjit Kaur

S.No.	Title	Details
1.	Introduction to Information Storage Technology:	Introduction to Information Storage Technology: Review data creation and the amount of Data being created and understand the value of data to a business, Challenges in Data Storage And Management, Data Storage Infrastructure. Identify Data Centre infrastructure elements and their requirements. Detail disk drive architecture and performance.
2.	Data protection	Concept of RAID and its Components Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Comparison of Levels. [8]
3.	[8] Intelligent Storage Systems:	Intelligent Storage System (ISS) and its components. Implementation of ISS as high- end and midrange storage arrays. [4]

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 6th

Subject Title: Management Information System

Subject Code: OEIT-14602

Subject Incharge: Mohanjit Kaur Kang

S.No.	Title	Details
1.	Managing Information Systems in Organizations:	Information in organizational functions, types of information technology, types of information systems- transaction processing systemsmanagement information systems, Managing in the Internet Era, Managing Information Systems in Organization-the IT interaction model, Challenges for the manager, Decision making with MIS-Tactical decisions-operational decisions, strategic decisions, communication in organizations- types of communication.
2.	Strategy:	Information goods-properties-technology lock-in and switching costs-network externalities-positive feedback-tippy markets, information systems and competitive strategyvalue chain, the Role of CIO-information system's plan-vendor coordination-technology updates-return on investment on technology.

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Semester: 6th

Subject Title: Software Project Management

Subject Code: OECS-14601

Subject In-charge: Priyanka Arora

S.No.	Title	Details
1	Project Evaluation and Planning	Activities in Software project management, Project evaluation – Cost benefit analysis, Cash flow forecasting, Cost benefit evaluation techniques, Risk evaluation. Project planning – Stepwise project planning, Software processes and process models. Project costing, COCOMO II, Staffing pattern, Effect of schedule compression, Putnam's equation, Capers Jones estimating rules of thumb.
2	Project Scheduling and Risk Management	Project sequencing and scheduling activities, Scheduling resources, Critical path analysis, Network planning
3	Software Quality Management	ISO Standards, Process capability models, Testing and software reliability, Quality plans, Test automation, Overview of project management tools.

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 7/8th

Subject Title: ICT in Agriculture and Rural Development

Subject Code: IT-14702

Subject Incharge: Harjot Kaur Gill

S.No.	Title	Details
1.	Introduction	Introduction to ICT, ICT in Agricultural and Rural Development.
2.	ICT Infrastructure, Appliances and Services	Making ICTs Affordable in Rural Areas, Mobile Money Moves to Rural Areas, M-PESA's :Pioneering Money Transfer Service, Delivering Content for Mobile Agricultural Services.
3.	Impact of Mmobile Devices on Agriculture and Rural Development	Key Benefits and Challenges Related to Mobile Phones and Agricultural Livelihoods, General Principles for Using Mobile Phones in Agricultural Projects.
4.	Increasing Productivity through ICT	Increasing Crop, Livestock, Fishery, Dairy Productivity through ICT, Preventing Yield Losses through Proper Planning and Early Warning Systems . IT Tools for India's with applications in Dairy Industry.

Syllabus for MSE – I (Internal and Detainees Reappear)

Semester: 7/8th

Subject Title: Corporate IT Management (Elective-IV)

Subject Code: DEIT-14721

Subject Incharge: Dr. Kamaljit Kaur

S.No.	Title	Details
1	Basic concepts	Understanding information systems - data and information, creating information, quality of information, categorization of corporate information systems.
2	IT management	IT management: Overview, IT infrastructure, IT management disciplines, IT managers, disadvantages of IT management.
3	Acquiring and developing BIS	Methods of software acquisition - initiating system development, BIS acquisition, rapid application development.
4	Corporate Project Management	project management process and methodology, System Analysis, System Design, Implementation and Maintenance. Case Study: Falling at the final hurdle.