TEACHING AND EXAMINATION SCHEME FOR
M. C. A. – LATERAL ENTRY

SEMESTER – I

Paper Name (Theory)	**Lec**	**Tut**	**Exam Hours**	**Sess Marks**	**Sem Exam Marks**
Soft Computing	5	1	3	20	80
Advance Linux Technology	5	1	3	20	80
Theory of Computation	5	1	3	20	80
Information Retrieval	5	1	3	20	80
Mobile Application Development	5	1	3	20	80
Total of Theory					**500**

Paper Name (Practical)	**Pract Hours**	**Exam Hours**	**Max Marks**
Soft Computing	6	3	50
Advance Linux Technology	6	3	50
Theory of Computation	6	3	50
Mobile Application Development	6	3	50
Total of Practical			200
Grand Total (Theory + Practical)			**700**

SEMESTER – II

Paper Name (Theory)	**Lec**	**Tut**	**Exam Hours**	**Sess Marks**	**Sem Exam Marks**
Artificial Intelligence	5	1	3	20	80
Data Warehouse	5	1	3	20	80
Data Mining	5	1	3	20	80
Advance GIS Tools	5	1	3	20	80
Seminar	5	1	3	20	80
Dissertation	6		6	40	160
Total of Theory					**700**

Paper Name (Practical)	**Pract Hours**	**Exam Hours**	**Max Marks**
Artificial Intelligence	6	3	50
Data Mining	6	3	50
Advance GIS Tools	6	3	50
Total of Practical			**150**
Grand Total (Theory + Practical)			**850**

Total Marks for M. C. A. (Lateral Entry): 1550

Note:

Part A:

1. 10 Question of 1 mark each – 10 marks
2. Answer should not exceed more than 20 words
3. All questions are compulsory

Part B:

1. 5 Questions of 2 marks each – 10 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part C:

1. 3 Questions of 20 marks each – 60 marks.
   There will be an internal choice in each question.
2. Answer should not exceed 400 words
3. All questions are compulsory.

There will be sessional (internal assessment) of 20 marks conducted by the department.

Two Practical exams shall be conducted by one internal and one external examiner of a batch of 30 students in day.

Duration of Practical exam is 3 hours.

A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.

Practical of 50 marks distribution is as under:

a. 30 marks for practical examination exercise for 3 questions
b. 10 marks for Viva-voce
c. 10 marks for Laboratory Exercise File

Scheme of Examination
(For M. C. A. – Lateral Entry)

Reg. 17

The examination for the M. C. A. – Lateral Entry will consist of 2 semesters. The examination shall consist of (a) Theory papers (b) Laboratory / Practical work and project work. Candidates will be required to pursue a regular, full time course of study at the University department for a period of one academic year in order to be eligible for appearing in the examination.

1. Eligibility for M. C. A. – Lateral Entry: M. Sc. Computer Science/M. Sc. Computer Science – LE/ M. Sc. Information Technology from any University,

2. Examination:
    i. There shall be 18 papers (5 theory, 4 practical in first semester and 6 theory including 1 seminar and 1 dissertation and 3 practical in the second semester). Theory paper shall be of 3 hours duration, having 100 marks. Out of 100 marks 20 marks shall be considered as internal assessment based on internal test and seminars and 80 marks will be of examination at the end of each semester as determined by the University. The practical shall be of 50 marks assessed by external examiner, the Seminar will be of 100 marks out of which 80 marks will be based on presentation and viva-voce assessed by external examiner and 20 marks will be assessed by internal examiner. The Dissertation shall be 200 marks out of which 160 will be based on project presentation and viva-voce, assessed by external examiner and 40 marks will be assessed by internal examiner.

    ii. To pass a semester a candidate shall have to score 40% marks in each subject (theory and practical) separately and also 50% marks in aggregate of all the papers prescribed for the examination.

    iii. If a candidate obtains 50% marks in aggregate and fails in not more than one (1) paper (theory) he/she will be allowed to keep that paper as due in the next semester examination.

    iv. Wherever a candidate appears at for a due paper examination he/she will do so according to the syllabus in force.

    v. A candidate not appearing at any examination/absent in any paper of term end examination shall be deemed as fail.

3. A candidate for a pass in the examination shall be required to obtain:
    i. At least 50% marks in the aggregate of all the papers prescribed for the examination and
    ii. At least 50% marks in the practical(s) wherever prescribed at the examination, provided that if a candidate fails to secure at least 40% marks in each individual paper at the examination notwithstanding his having obtained the minimum percentage of marks required in the aggregate for that examination.

    No Division will be awarded at the first semester examination. Division shall be awarded at the end of the Final Semester Examination (i.e. the 2nd Semester) on the

combined marks obtained at the first and the second semester taken together as noted below:

Passed with First Division	60% of the aggregate marks taken together of the first and the second semester examinations
Passed with second division	48%

Provided that if a candidate clears any paper after a continuous period of two years since he/she was admitted to the M. C. A. – Lateral Entry then for the passing marks, i.e. 40% marks, shall be taken into account in the case of such course(s).

4. The grace marks shall be given up to 1% of the total aggregate marks of theory and practical of that semester in maximum one paper.

Candidates reappearing at an examination in a subsequent year shall be examined in accordance with the scheme and syllabi in force and shall be entitled to the award of the degree of year in which they clear the last failing/unclear paper.

SEMESTER I

Duration 3 hours *Max marks 80*

SOFT COMPUTING

Basic of neural Networks, inference and learning, classification of models, association of models, optimization and self organization models, definition of learning, supervised and unsupervised learning. AI learning, neural network learning, knowledge based neural network, rule based, decision tree based, constraint based neural network.

Incremental learning, symbolic methods, neural network approaches, applications of neural networks, neural networks as mathematical models, expert system heuristic, hierarchical models, hybrid, parallel, control network discovery, symbolic methods, neural network methods.

Genetic Algorithm, evolutionary programming, classifier system, genetic programming parse tree, mathematical foundation of GA variant of GA (Hybrid and fuzzy GA enhancement of genetic programming application

ADVANCE LINUX TECHNOLOGY

History of Linux, Linux architecture, Linux file System, file naming, types of files, directory command, file command, vi editor, locating files in Linux, filter pipe, shell variables, local and global variables, command substitution, if, while, for, shift, tar, basic networking commands in Linux.

MySQL:
The MySQL RDBMS, open source movement, connecting to MySQL database, My SQL File storage, managing databases, tables, indexes, database objects.

Inserting, updating, deleting MySQL databases, SELECT, optional clauses of database, MySQL expressions, operators, MySQL Functions, comparing and converting data

Managing different types of data, summarizing data, performing system operations, JOIN sub-query, exporting copy and importing data, performing transactions, Auto commit mode, locking, managing system variables, log file, access privilege system.

PHP:
PHP Basics, variable data types, arrays, constants, operators, control structures, loops, functions, PHP object oriented language, PHP design patterns, overloading, how to write a web application with PHP, user input, validation, filter error handling, session, cookies, uploading

THEORY OF COMPUTATION

Definition of Automation, finite automata, transition system, Finite State Systems, Basic definitions, Finite Automata, Regular Expressions, Deterministic Finite Automation (DFA), Non-deterministic Finite Automation (NFA), regular languages and regular sets, equivalence of DFA and NFA, minimizing the number of states of a DFA, NFA with E transitions, equivalence of DFA and NFA with E Transaction, Finite Automata with output, Equivalence of Moore and Mealy machine.

Regular Expression Formalism, Equivalence of regular expressions and finite automata, regular sets and their closure properties, pumping lemma for regular expressions , Application of regular expression.

Turing Machine: Elements, formalism, Transition graph for Turing machine, Complexity, Composite and iterative, Universal, multi-tape, multi-stack, multi-track Turing machine, Halting problem, recursively enumerable and recursive langiages, function, TM Church's hypothesis,

Grammars: definition, notations, derivation process, derivation tree, context free language, ambiguous context free languages , simplification of context free grammar, normal forms, Chomsky hierarchy, Equivalence of right- linear and left – linear grammars, Equivalence of regular grammars and finite automata, pumping lemma for context free languages, Kuroda normal form.

Push down stack memory machine: Elements of PDM, Push down automata, finite automata vs PDA, PDA accepting CFLs, DPDA vs NPDA, Equivalance of CFG and PDA

Parsing Techniques : Parsing, top down parsing, bottom-up parsing, automatic construction of bottom up parsers

INFORMATION RETRIEVAL

Introduction: Motivation, Basic concepts, past, present, and future, the retrieval process.

Modeling: Introduction, A taxonomy of information retrieval models, retrieval: ad hoc and filtering, a formal characterization of IR models, classic information retrieval, alternative set theoretic models, alternative algebraic models, alternative probabilistic models, structured text retrieval models, models for browsing.

Retrieval Evaluation: Introduction, retrieval performance evaluation, reference collections. query

Languages: Introduction, keyword-based querying, Pattern matching, Structural queries, Query protocols.

Query Operations: Introduction, user relevance feedback, automatic local analysis, automatic global analysis.

Text and multimedia languages and Properties: Introduction, metadata, text, markup languages,

Multimedia Text Operations: Introduction, document preprocessing, document clustering, text compression, comparing text compression techniques.

Indexing and searching: Introduction; inverted files; other indices for text; Boolean queries; sequential searching; pattern matching; structural queries; compression.

Parallel and Distributed IR: Introduction, Parallel IR, Distributed IR.

User Interfaces and Visualization: Introduction, Human-Computer interaction, the information access process, starting pints, query specification, context, using relevance judgments, interface support for the search process.

Searching the Web: Introduction, challenges, characterizing the web, search engines, browsing, meta searchers, finding the needle in the haystack, searching using hyperlinks.

MOBILE APPLICATION DEVELOPMENT

Introduction to mobile communication and computing**:** Introduction to mobile computing, Novel applications, limitations and GSM architecture, Mobile services, System architecture, Radio interface, protocols, Handover and security. Smart phone operating systems and smart phones applications

Fundamentals of Android Development: Introduction to Android., The Android 4.1 Jelly Bean SDK, Understanding the Android Software Stack, Installing the Android SDK, Creating Android Virtual Devices, Creating the First Android Project, Using the Text View Control, Using the Android Emulator, The Android Debug Bridge (ADB), Basic Widgets Understanding the Role of Android Application Components, Event Handling , Displaying Messages Through Toast, Creating and Starting an Activity, Using the Edit ext Control.

The Android Debug Bridge (ADB), basic widgets understanding the role of Android Application Components, event handling, displaying messages through toast, creating and starting an activity, using the Edit ext Control Building Blocks for Android Application Design, Laying Out Controls in Containers, utilizing resources and media

Using Selection Widgets and Debugging Displaying and Fetching Information Using Dialogs and Fragments Advanced, Android Programming: Internet, Entertainment, and Services, Implementing drawing and animations, displaying web pages and maps, communicating with SMS and emails, creating and using content providers: creating and consuming services, publishing android applications

SEMESTER II

Duration 3 hours *Max marks 80*

ARTIFICIAL INTELLIGENCE

Definition of AI, Application of AI, knowledge-based systems, representation of knowledge organization and acquisition of knowledge.

Introduction of prolog, variable, object, domain, clauses, recursion basic list manipulation function, predicates, input, output, local variables, iteration, recursion, arrays, database in prolog, rule order, goal order, cut trial prolog query.

Syntax, semantics of propositional logic, syntax and semantics of FOPL, conversion to clausal form, inference rule, resolution principles, non-deductive inference methods, representation using rules, truth maintenance system, predicate completion and circumscription, modal and temporal logics

Bayesian probabilistic inference, possible word representation, Dempster-Shafer Theory, Ad-Hoc methods, Expert systems, natural language

DATA WAREHOUSE

Introduction of data warehousing, basic concepts, data warehousing architecture , data characteristics, Reconciled data layers. Data transformation function, tools to support data reconciliation.

Data Modeling Techniques and Options: Dimensions and Query Hierarchies, Star Schema and Variants, Spatial Data: A Very Special Dimension, Storage Concerns and Planning Physical Database Design, Exploiting Parallel Technology, Indexes

Role of meta data, OLAP tools, Security, Backup and Recovery, Loads, Tuning Loads and Scrubs, data warehouse and web, hardware for data warehouse

DATA MINING

Introduction to data mining, DM techniques, issues and challenges in Dm, Applications, Association rules, Prior, Partition, Pincer-Search, Dynamic Itemset counting, FP-tree growth, Incremental, Boder Algorithm

Clustering Techniques, portioning, k-Medoid algorithm, Hierarchical, categorical clustering algorithm, Decision tree, best split, splitting indices and criteria, decision tree construction algorithm, CART, ID3, C4.5, CHAID, Decision tree construction with presorting, rain Forest, approximate methods, Boat, Pruning Technique

Data mining using NN, web mining, temporal and spatial data mining.

ADVANCE GIS TOOLS

Introduction to GIS, history, definition, hardware and software, raster based GIS, data acquisition, nature of spatial data, geo-referencing.

GIS functionality, data models, raster, vector, object oriented, coordinate system and geo-coding, data structures

Introduction to ArcView, creating maps, adding tabular data, choosing map projection, attribute features, aggregating data, creating and editing spatial data.

Introduction to VBA, data types, string, numbers, geo-coding, script writing, loops, interacting with views and themes, graphics, creating layout.

Spatial data overview, data mining primitives, generalization and specialization, spatial rules, classification algorithms, classification, clustering algorithms.