Evaluation Scheme & Syllabus
for
MCA (Integrated)
4th Year
On
Choice Based Credit System
(Effective from the Session: 2020-21)
### MCA (INTEGRATED) FOURTH YEAR, 2020-21

#### SEMESTER-VII

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Subject Code</th>
<th>Subject Name</th>
<th>L-T-P</th>
<th>ESE Marks</th>
<th>Sessional</th>
<th>Total</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>RCAI-701</td>
<td>Multimedia &amp; Animation</td>
<td>3-1-0</td>
<td>70</td>
<td>20 10 100</td>
<td>100</td>
<td>4</td>
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<tr>
<td>2.</td>
<td>RCAI-702</td>
<td>Dot Net Framework &amp; C#</td>
<td>3-1-0</td>
<td>70</td>
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<td>3.</td>
<td>RCAI-703</td>
<td>Computer Based Optimization Techniques</td>
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<td>4.</td>
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<td>Software Project Management</td>
<td>3-1-0</td>
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<tr>
<td>5.</td>
<td>RCAI-705</td>
<td>Enterprise Resource Planning</td>
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<td>6.</td>
<td>RCAI-751</td>
<td>Multimedia &amp; Animation Lab</td>
<td>0-0-3</td>
<td>50</td>
<td>30 20 100</td>
<td>100</td>
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<tr>
<td>7.</td>
<td>RCAI-752</td>
<td>Dot Net Framework &amp; C# Lab</td>
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<td><strong>Total</strong></td>
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<td>700</td>
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</table>

**CT:** Class Test  
**TA:** Teacher Assessment  
**L/T/P:** Lecture/ Tutorial/ Practical

#### SEMESTER-VIII

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Subject Code</th>
<th>Subject Name</th>
<th>L-T-P</th>
<th>ESE Marks</th>
<th>Sessional</th>
<th>Total</th>
<th>Credit</th>
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<tr>
<td>1.</td>
<td>RCAI-801</td>
<td>Programming with Python</td>
<td>3-1-0</td>
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<td>2.</td>
<td>RCAI-802</td>
<td>Advanced Java Programming</td>
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<td>3.</td>
<td>RCAI-803</td>
<td>Mobile Computing</td>
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<td>Computer Networks</td>
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<td>5.</td>
<td><strong>Elective-1</strong></td>
<td>Programming with Python Lab</td>
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</table>

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**TA:** Teacher Assessment  
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#### Elective-1

1. RCAI-E11  
   Client Server Computing 
2. RCAI-E12  
   Data Warehousing & Mining 
3. RCAI-E13  
   Compiler Design 
4. RCAI-E14  
   Advanced Computer Architecture 
5. RCAI-E15  
   Mobile Application Development
Year-IV (Semester-VII)

RCAI-701: MULTIMEDIA & ANIMATION

UNIT-I

UNIT-II
Multimedia Systems: Design Fundamentals, Background of Art, Color theory overview, Sketching & illustration, Storyboarding, different tools for animation.

UNIT-III

UNIT-IV
Tools of Multimedia: Paint and Draw Applications, Graphic effects and techniques, Image File Format, Anti-aliasing, Morphing, Multimedia Authoring tools, professional development tools.

UNIT-V

References:

UNIT-I

UNIT-II
C-Sharp Language (C#): Introduction, Data Types, Identifiers, Variables, Constants, Literals, Array and Strings, Object and Classes, Inheritance and Polymorphism, Operator Overloading, Interfaces, Delegates and Events. Type conversion.

UNIT-III

UNIT-IV
Advanced Features Using C#: Web Services, Window Services, ASP.net Web Form Controls, ADO.Net. Distributed Application in C#, Unsafe Mode, Graphical Device Interface with C#.

UNIT-V

References:

UNIT-I

UNIT-II
Transportation Problems: Introduction to Transportation Model, Matrix Form of TP, Applications of TP Models, Basic Feasible Solution of a TP, Degeneracy in TP, Formation of Loops in TP, Solution Techniques of TP, Different Methods for Obtaining Initial Basic Feasible Solutions viz. Matrix Minima Method, Row Minima Method, Column Minima Methods, Vogel’s Approximation Method, Techniques for Obtaining Optimal Basic Feasible Solution.
Assignment Problems: Definition, Hungarian Method for AP.

UNIT-III
Replacement Problems: Capital equipment-discounting costs-replacement in anticipation of failure- group replacement-stochastic nature underlying the failure phenomenon.

UNIT-IV
Preliminaries: Inventory Models: Inventory models–various costs-deterministic inventory models, Single period inventory model with shortest cost, stochastic models, Application of inventory models, Economic lot sizes-price breaks.

UNIT-V
Dynamic Programming: Bellman’s Principle of optimality of Dynamic Programming, Multistage decision problem and its solution by Dynamic Programming with finite number of stages, Solution of linear programming problems as a Dynamic Programming problem

References:
UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

References:
RCAI-705: ENTERPRISE RESOURCE PLANNING

UNIT-I
Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering and Information Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP, ERP Drivers, Decision support system.

UNIT-II

UNIT-III
Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in Evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendor’s evaluation criterion, ERP Implementation approaches and methodology, ERP Implementation strategies, ERP Customization, ERP-A manufacturing Perspective.

UNIT-IV
Critical success and failure factors for implementation, Model for improving ERP effectiveness, ROI of ERP Implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations.

UNIT-V
Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units through Soft System approaches or Qualitative Analysis tools, Learning and Emerging Issues, ERP and E-Commerce.

References:

RCAI-751 : MULTIMEDIA & ANIMATION LAB

1. WRITE TO GENERATE AN ANIMATION TO REPRESENT THE GROWING MOON.
2. WRITE TO GENERATE AN ANIMATION TO INDICATE A BALL BOUNCING ON STEPS.
3. WRITE TO GENERATE AN ANIMATION TO DRAW THE TABLE FAN BLADES.
4. WRITE TO GENERATE SIMULATES A BALL HITTING ANOTHER BALL.
5. WRITE TO GENERATE TO CHANGE A CIRCLE INTO A SQUARE USING FLASH.
6. WRITE TO GENERATE AN ANIMATION TO INDICATE A FOR ROLLING BALL.
7. WRITE TO GENERATE A 3D PLANET USING FLASH.
8. WRITE TO GENERATE AN ANIMATION MOVING CAR.
9. WRITE TO GENERATE AN ANIMATION FLYING BUTTERFLY.
10. WRITE TO PREPARE A COVER PAGE FOR THE BOOK IN YOUR SUBJECT AREA.
11. WRITE TO GENERATE AN ANIMATION RUNNING MAN
12. WRITE TO GENERATE TYPE A WORD AND APPLY THE EFFECTS SHADOW EMBOSSE
13. WRITE TO GENERATE AN ANIMATION EMOICONS
14. WRITE TO DESIGN A VISITING CARD CONTAINING ATLEAST ONE GRAPHIC AND TEXT INFORMATION
15. WRITE TO GENERATE AN ANIMATION WITH THE FOLLOWING FEATURES.

   WELCOME
   * Letters should appear one by one
   * The fill colour of the text should change to a different colour after the display of the full Word

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.
RCAI- 752 : DOT NET FRAMEWORK & C# LAB

1. WRITE A PROGRAM TO CONSOLE PROGRAM TO ADD TWO INTEGERS.
2. WRITE A PROGRAM TO CALCULATE THE TOTAL MARKS OF STUDENTS IN 3 SUBJECTS AND THE PERCENTAGE THEY SCORED USING WINDOWS APPLICATION.
3. WRITE THE CODE FOR CREATING A SIMPLE LOGIN PAGE WITH WINDOWS APPLICATION.
4. WRITE A PROGRAM TO FIND OUT THE GRADES OF STUDENTS AS PER THEIR MARKS STORED USING WINDOWS APPLICATION.
5. WRITE A PROGRAM TO CREATE A CLASS SUM IN PROJECT AND ACCESS IT USING WINDOWS APPLICATION.
6. WRITE A PROGRAM TO CREATE A CLASS SUB IN CLASS LIBRARY AND ACCESS IT IN WINDOWS APPLICATION PROJECT.
7. WRITE A PROGRAM TO CREATE A DATABASE STUDENT WITH FIELDS: ROLL NO, NAME, ADDRESS, SEM. ACCESS IT ON THE WINDOW PAGE USING DATAGRIDVIEW CONTROL.
8. WRITE A PROGRAM TO IMPLEMENT ADROTATOR ON WEB PAGE.
9. WRITE A PROGRAM TO CREATE A WEB PAGE DISPLAYING DETAILS OF ABC INFOTECH. ADD AT LEAST 5 CONTROLS ON THIS WEB PAGE FOR EXAMPLE: CALENDAR TO DISPLAY THE UPCOMING EVENTS OF COMPANY, TEXTBOX AND BUTTONS TO GIVE ACCESS TO AUTHORIZED USER BY LOGGING IN, COMBO BOX TO SELECT PARTICULAR PRODUCT OF COMPANY, ETC.
10. WRITE A PROGRAM TO IMPLEMENT INTERFACE ON WINDOW PAGE.
11. WRITE A PROGRAM TO IMPLEMENT DELEGATE ON WINDOW APPLICATION.
12. WRITE A PROGRAM FOR USING A STANDARD CONTROLS IN WINDOWS FORM.
13. WRITE A WEB APPLICATION THAT Generates THE “INDEXOUTOF RANGE” EXCEPTION WHEN A BUTTON IS CLICKED. INSTEAD OF DISPLAYING THE ABOVE EXCEPTION, IT REDIRECTS THE USER TO A CUSTOM ERROR PAGE. ALL THE ABOVE SHOULD BE DONE WITH THE TRACE FOR THE PAGE BEING ENABLED.
14. CREATE A SIMPLE WEB SERVICE THAT CONVERTS THE TEMPERATURE FROM FAHRENHEIT TO CELSIUS, AND VICE VERSA CREATE A SIMPLE WEB SERVICE THAT CONVERTS THE TEMPERATURE FROM FAHRENHEIT TO CELSIUS, AND VICE VERSA. ALSO WRITE AN ASP PROGRAM TO CONSUME THIS WEB SERVICE.
15. WRITE A PROGRAM TO DELETE ALL COOKIES OF YOUR WEB SITE THAT HAS CREATED ON THE CLIENT’S COMPUTER.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.
Year-IV (Semester-VIII)

RCAI-801 : PROGRAMMING WITH PYTHON

UNIT-I
Fundamentals: Introduction, Features, Strengths, Using the Python interpreter, Program execution, Character set, Tokens, Variables, Data types, Operators, Expressions, Program input and program output, Command lines, The IDLE user interface.
Control Statements - if statements, Looping statements- while statement, for statements, nested loops.

UNIT-II
Objects: Strings- Creating and accessing strings, Substrings, Operators, Formatting expressions, Methods and Functions. Lists-Creating and accessing lists, Sequence operators, Type specific operators, Methods and functions. Tuples- accessing tuples, tuple operations, built-in functions and methods. Dictionaries- key: value pair, basic operations, functions, methods.

UNIT-III
Functions:Defining and calling a function, Types of functions, Passing parameters, Polymorphism in Python, Scope, Global statement, Nested functions, Recursive functions, Anonymous objects.
Modules:Creating modules, Namespaces, Reloading modules, Packages.

UNIT-IV
Exception Handling: Introduction, Exception, Default exception handlers, Handling multiple errors, Raising exceptions, generators.

UNIT-V
Classes and Objects:Classes, Class attributes, Instances, Instance attributes, Binding and method invocation, Inheritance, polymorphism, Built-in functions for classes and instances.
Files and input/output: Reading and writing files, Methods of file objects, Using standard library functions, Date and time.

References:

UNIT-I
EJB : Introduction to EJB, Types of EJB, Advantages of EJB, Lifecycle of enterprise beans, Working with Session Bean, Introduction to Java message service (JMS), JMS Architecture, JMS Programming API, Steps for writing JMS clients (sender and receiver), JMS and message driven bean, Entity bean, session bean, Message driven bean.

UNIT-II
J2EE : Overview of J2EE Technologies, Why J2EE?, J2EE Architecture, J2EE APIs, J2EE Containers, JavaServer Pages: Basic JSP Architecture, Life Cycle of JSP (Translation, compilation), JSP Tags and Expressions, Role of JSP in MVC-2, JSP with Database, JNDI: The Java Naming and Directory Interface, Java Mail: An overview of the Java Mail API.

UNIT-III
JAVA Script : Introduction to JavaScript, Difference between Java and JavaScript, JavaScript Characteristics, JavaScript and Common Programming Concepts: Variables, JavaScript Expressions, Operators, Inline Scripting, Keywords and Reserved Words, controlflow, array, built-in functions, user defined function, dialog box, Handling events using JavaScript, Built-in objects in JavaScript, session and cookies.

UNIT-IV
JSP : Introduction to java server pages (JSP), JSP application design, tomcat server, JSP objects, declaring variables, and methods, debugging, sharing database between JSP pages, Session, Application: database action, development of java beans in JSP.

UNIT-V

References:
RCAI-803 : MOBILE COMPUTING

UNIT–I
Introduction, Issues in mobile computing, Overview of wireless telephony, Cellular concept, GSM- air interface, channel structure; Location management- HLR-VLR, hierarchical, handoffs; Channel allocation in cellular systems, CDMA, GPRS, MAC for cellular system.

UNIT–II

UNIT–III
Data management issues in mobile computing, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

UNIT–IV
Mobile Agents computing, Security and fault tolerance, Transaction processing in mobile computing environment.

UNIT–V
Adhoc networks, Localization, MAC issues, Routing protocols, Global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Adhoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Adhoc Networks, applications.

References:

UNIT-I
**Basic Concepts:** Components of data communication, distributed processing, standards and organizations. Line configuration, topology, Transmission mode, and categories of networks.

**OSI and TCP/IP Models:** Layers and their functions, comparison of models. Digital Transmission, Interfaces and Modems: DTE-DCE Interface, Modems, Cable modems.

UNIT-II
**Transmission Media:** Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon capacity, comparison of media.

UNIT-III
**Multiplexing:** Many to one, One to many, WDM, TDM, FDM; error detection and correction, Circuit switching, packet switching and message switching.

**Data link control protocols:** Line discipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Link access procedures.

UNIT-IV
**Point to point controls:** Transmission states, PPP layers, LCP, Authentication, NCP. **ISDN:** Services, Historical outline, subscriber’s access, ISDN Layers and broadband ISDN.

UNIT-V

**References:**

3. Stallings W., “Data and computer communications”, PHI.
ELECTIVE-1

RCAI-E11: CLIENT SERVER COMPUTING

UNIT-I

Client/Server Computing: DBMS concept and architecture, Single system image, Client Server architecture, mainframe-centric client server computing, downsizing and client server Computing, preserving mainframe applications investment through porting, client server development tools, advantages of client server computing.

UNIT-II

Components of Client/Server application: The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA).
The server: Detailed server functionality, the network operating system, available platforms, the network operating system, available platform, the server operating system.

UNIT-III

Client/Server Network: connectivity, communication interface technology, Interposes communication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network management, Client-server system development: Software, Client–Server System Hardware: Network Acquisition, PC-level processing unit, Macintosh, notebooks, pen, UNIX workstation, x-terminals, server hardware.

UNIT-IV

Data Storage: magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance, RAID, RAID-Disk network interface cards.
Network protection devices, Power Protection Devices, UPS, Surge protectors.


UNIT-V

Client/Server System Development: Training, Training advantages of GUI Application, System Administrator training, Database Administrator training, and End-user training.
The future of client server Computing Enabling Technologies, The transformational system.

References:

RCAI-E12 : DATA WAREHOUSING& MINING

UNIT–I
Dss-Uses, Definition, Operational Database. Introduction to Data Warehousing- Data-Mart, Concept of Data-Warehousing, Multi-dimensional Database structures. Client/Server Computing Model and Data Warehousing, Parallel Processors and Cluster Systems, Distributed DBMS implementations.

UNIT–II
Data Warehousing - Data Warehousing Components, Building a Data Warehouse, Warehouse Database, Mapping the Data Warehouse to a Multiprocessor Architecture. DBMS Schemas for Decision Support, Data Extraction, Cleanup and Transformation Tools, Metadata.

UNIT–III

UNIT–IV
Knowledge Discovery, Data Mining- Introduction to Data-Mining, Techniques of Data-Mining, Decision Trees, Neural Networks, Nearest Neighbor & Clustering, Genetic Algorithms, Rule Introduction, Selecting and Using the Right Technique.

UNIT–V
Multimedia Data-Mining, Multimedia-Databases, Mining Multimedia Data, Data-Mining and the World Wide Web, Web DataMining, Mining and Meta-Data. Data Visualization and Overall Perspective, Applications of Data-Mining.

References:
UNIT-I

UNIT-II
LEXICAL ANALYSIS:- Lexical analysis- handles - token specification - design of lexical analysis (LEX) - Automatic generation of lexical analyzer - input buffering - A language for specifying lexical analyzers - implementation of lexical analyzer

UNIT-III
SYNTAX ANALYSIS – PARSING:- Definition - role of parsers - top down parsing - bottom-up parsing - Left recursion - left factoring - Handle pruning , Shift reduce parsing - operator precedence parsing – FIRST-FOLLOW LEADING- TRAILING- Predictive parsing - recursive descent parsing. LR parsing – LR (0) items - SLR parsing – Canonical LR - LALR parsing - generation of LALR - Ambiguous grammars - error recovery

UNIT-IV

UNIT-V

References:

RCAI-E14 : ADVANCED COMPUTER ARCHITECTURE

UNIT–I
INTRODUCTION- Parallel Computing, Parallel Computer Model, Program and Network Properties, Parallel Architectural Classification Schemes, Flynn’s & Feng’s Classification, Performance Metrics and Measures, Speedup Performance Laws: Multiprocessor System and Interconnection Networks; IEEE POSIX Threads: Creating and Exiting Threads, Simultaneous Execution of Threads, Thread Synchronization using Semaphore and Mutex, Cancelling the Threads.

UNIT–II

UNIT–III
THREAD AND PROCESS LEVEL PARALLEL ARCHITECTURE- Introduction to MIMD Architecture, Multithreaded Architectures, Distributed Memory MIMD Architectures, Shared Memory MIMD Architecture, Clustering, Instruction Level Data Parallel Architecture, SIMD Architecture, Fine Grained and Coarse Grained SIMD Architecture, Associative and Neural Architecture, Data Parallel Pipelined and Systolic Architectures, Vector Architectures.

UNIT–IV
PARALLEL ALGORITHMS- PRAM Algorithms: Parallel Reduction, Prefix Sums, Preorder Tree Traversal, Merging two Sorted lists; Matrix Multiplication: Row Column Oriented Algorithms, Block Oriented Algorithms; Parallel Quicksort, Hyper Quicksort; Solving Linear Systems: Gaussian Elimination, Jacobi Algorithm; Parallel Algorithm Design Strategies.

UNIT–V
DEVELOPING PARALLEL COMPUTING APPLICATIONS-OpenMP Implementation in ‘C’: Execution Model, Memory Model; Directives: Conditional Compilation, Internal Control Variables, Parallel Construct, Work Sharing Constructs, Combined Parallel Work-Sharing Constructs, Master and Synchronization Constructs; Run-Time Library Routines: Execution Environment Routines, Lock Routines, Timing Routines; Simple Examples in ‘C’. Basics of MPI.

References:

5. Quinn M.J., “Parallel Computing: Theory & Practice”, TMH.
6. Quinn M.J., “Parallel Programming in C with MPI and Open MP”, TMH
UNIT-I
Introduction: Mobile applications, Embedded systems, Market and business drivers for mobile applications, Publishing and delivery of mobile applications, Requirements gathering and validation for mobile applications

UNIT-II
Basic Design: Introduction, Basics of embedded systems design, Embedded OS Design constraints for mobile applications, Architecting mobile applications, User interfaces for mobile applications, Touch events and gestures, Quality constraints – performance, usability, security, availability and modifiability.

UNIT-III
Advanced Design: Designing applications with multimedia and web access capabilities, Integration with GPS and social media networking applications, Accessing applications hosted in a cloud computing environment, Design patterns for mobile applications.

UNIT-IV
Technology I – ANDROID: Introduction, Establishing the development environment, Android architecture, Activities and views, Interacting with UI, Persisting data using SQLite, Packaging and deployment, Interaction with server side applications, Using Google Maps, GPS and WiFi, Integration with social media applications.

UNIT-V
Technology II – iOS: Introduction, Objectives, features, UI implementation, Touch frameworks, Data persistence using Core Data and SQLite, Location aware applications using Core Location and Map Kit, Integrating calendar and address book with social media application, Using WiFi, iPhone marketplace.

References:
RCAI-851: PROGRAMMING WITH PYTHON LAB

1. WRITE A PROGRAM TO DEMONSTRATE THE USE OF IF AND IF-ELSE STATEMENTS.
2. WRITE A PROGRAM TO DEMONSTRATE THE USE OF FOR AND WHILE LOOPING STATEMENTS.
3. WRITE A PROGRAM TO PERFORM ARITHMETIC AND RELATIONAL OPERATORS ON STRINGS.
4. WRITE A PROGRAM TO DEMONSTRATE THE USE OF BUILT-IN STRING FUNCTIONS.
5. WRITE A PROGRAM TO CREATE AND ACCESS STRINGS AND Substrings (USING INDEXING AND SLICING).
6. WRITE A PROGRAM TO CREATE AND ACCESS LISTS.
7. WRITE A PROGRAM TO DEMONSTRATE THE USE OF BUILT-IN LIST FUNCTIONS.
8. WRITE A PROGRAM TO ILLUSTRATE CREATION AND CALLING OF A FUNCTION.
9. WRITE A PROGRAM TO ILLUSTRATE THE IMPORTING OF ENTIRE MODULE.
10. WRITE A PROGRAM TO CREATE AND ACCESS TUPLES.
11. WRITE A PROGRAM TO DEMONSTRATE THE USE OF BUILT-IN TUPLE FUNCTIONS.
12. WRITE A PROGRAM TO CREATE AND ACCESS DICTIONARIES.
13. WRITE A PROGRAM TO DEMONSTRATE THE USE OF BUILT-IN DICTIONARY FUNCTIONS.
14. WRITE A PROGRAM TO CREATE, ACCESS, RENAME AND DELETE FILES.
15. WRITE A PROGRAM TO DEMONSTRATE EXCEPTION HANDLING.
16. WRITE A PROGRAM TO DEMONSTRATE OBJECT ORIENTED CONCEPTS IN PYTHON.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.
RCAI-852: ADVANCED JAVA PROGRAMMING LAB

1. WRITE A PROGRAM ILLUSTRATING THE USE OF SESSION BEAN
2. WRITE AN EJB APPLICATION THAT DEMONSTRATES ENTITY BEAN.
3. WRITE AN EJB APPLICATION THAT DEMONSTRATES MDB.
4. WRITE A PROGRAM DEPICTING THE USE OF JMS PROGRAMMING API
5. WRITE EXAMPLES OF MESSAGE DRIVEN ENTITY BEAN, SESSION BEAN, THREAD SYNCHRONIZATION.
6. WRITE EXAMPLES ILLUSTRATING THE USE OF J2EEAPIS AND JAVA SERVER PAGES
7. WRITE A PROGRAM TO GET FAMILIAR WITH INTERACTION OF JSP PAGE WITH BACKEND DATABASE
8. WRITE EXAMPLES DEPICTING THE HANDLING OF REQUEST AND RESPONSE
9. WRITE A PROGRAM TO GET FAMILIAR WITH SESSION TRACKING, USER AUTHENTICATION
   a. WRITE A JAVA JSP PROGRAM TO PRINT 10 EVEN AND 10 ODD NUMBER.
   b. WRITE A JAVA JSP PROGRAM TO IMPLEMENT VERIFICATION OF A PARTICULAR USER LOGIN AND DISPLAY A WELCOME PAGE.
10. WRITE A JAVA JSP PROGRAM TO GET STUDENT INFORMATION THROUGH A HTML AND CREATE A JAVA BEAN CLASS, POPULATE BEAN AND DISPLAY THE SAME INFORMATION THROUGH ANOTHER JSP.
11. WRITE A JAVA JSP PROGRAM WHICH USES <jsp:plugin> TAG TO RUN A APPLET.
12. WRITE A JAVA JSP PROGRAM WHICH IMPLEMENTS NESTED TAGS AND ALSO USES TAG SUPPORT CLASS.
13. WRITE EXAMPLES ILLUSTRATING THE USE OF JAVASCRIPT VALIDATIONS AND EVENT HANDLING.
14. WRITE A PROGRAM TO CREATE COOKIES IN JAVASCRIPT.
15. WRITE A JAVA SERVLET PROGRAM TO IMPLEMENT A DYNAMIC HTML USING SERVLET (USER NAME AND PASSWORD SHOULD BE ACCEPTED USING HTML AND DISPLAYED USING A SERVLET).
16. WRITE A JAVA SERVLET PROGRAM TO DOWNLOAD A FILE AND DISPLAY IT ON THE SCREEN (A LINK HAS TO BE PROVIDED IN HTML, WHEN THE LINK IS CLICKED CORRESPONDING FILE HAS TO BE DISPLAYED ON SCREEN).
17. WRITE A JAVA SERVLET PROGRAM TO IMPLEMENT RequestDispatcher OBJECT (USE include() AND forward() METHODS).
18. WRITE A JAVA SERVLET PROGRAM TO IMPLEMENT AND DEMONSTRATE get() AND Post METHODS (USING HTTP SERVLET CLASS).
19. WRITE A JAVA SERVLET PROGRAM TO IMPLEMENT sendRedirect() METHOD (USING HTTP SERVLET CLASS).
20. WRITE A JAVA SERVLET PROGRAM TO IMPLEMENT SESSIONS (USING HTTP SESSION INTERFACE).

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.