Semester Syllabus for Postgraduates
As recommended by Board of Studies of Computer Science and Applications
Barkatullah University, Bhopal
Session 2019-20 onwards

Class: M. Sc. Computer Science Semester IV (for Regular Students only)

Paper Code	Paper Title	Internal	Theory	Grand Total
MSCS-401	Big Data Analytics	15	85	100
MSCS-402	Multimedia & Computer Graphics	15	85	100
MSCS-403	PHP &MySQL	15	85	100
MSCS -404	Elective- II	15	85	100
MSCS -405	**Lab-I(Big Data Analytics)**			50
MSCS -406	**Lab-II(PHP & MySQL)**			50
MSCS-407	**Project**			100
			Grand Total	600

Electives: Sem IV –

1. Enterprise Resource Planning
2. Cloud Computing
3. Artificial Intelligence

Paper Code: MSC5401
Paper Title :BIG DATA ANALYTICS **Max.Marks: 85**

UnitI

Introduction to Big Data: Introduction– distributed file system–Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce.

UnitII

Introduction to Hadoop: Hadoop Architecture,Big Data – Apache Hadoop&HadoopEcoSystem, Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce- Data Serialization

UnitIII

HDFS, HIVE AND HIVEQL, HBASE:HDFS-Overview, Installation and Shell, Java API; Hive Architecture and Installation, Comparison with Traditional Database, HiveQL Querying Data, Sorting And Aggregating, Map Reduce Scripts, Joins & Sub queries, HBase concepts, Advanced Usage, Schema Design, Advance Indexing, PIG, Zookeeper , how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

UnitIV

SPARK: Introduction to Data Analysis with Spark, Downloading Spark and Getting Started, Programming with RDDs, Machine Learning with MLlib.

NOSQL:NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vsNoSQL, NewSQL.

UnitV

Data Analytics with R Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with BigR.

Text Books & Reference books:

1. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
2. SeemaAcharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015.
3. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
4. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
5. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
6. AnandRajaraman and Jefrey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
7. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
8. Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
9. Pete Warden, "Big Data Glossary", O'Reily, 2011.
10. Michael Mineli, Michele Chambers, AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
11. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
12. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012

Paper Code: MSCS-402
Paper Title:COMPUTER GRAPHICS AND MULTIMEDIA **Max.Marks:85**

UnitI

Devices: storage tube graphics display - raster scan displays, random scan systems, 3D viewing devices, Plotters, printers, digitizers, Light pens etc.; Active & Passive graphics devices; Scan Conversion techniques, line drawing: simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms. Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

UnitII

2D transformations: Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping: World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping, Cohen Sutherland, Midpoint Line clipping algorithms, Polygon Clipping: Sutherland –Hodgeman, Weiler-Atherton algorithms.

UnitIII

3D transformations: translation, rotation, scaling.Parallel & Perspective Projection, Types of Parallel & Perspective Projection. Hidden Surface elimination: Depth comparison, Back face detection algorithm, Painters algorithm, Z-buffer algorithm. Curve generation, Bezier and B-spline methods. , Diffuse reflection, Specular reflection, Phong Shading,Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV.

UnitIV

Multimedia : Multimedia Terms, Multimedia Hardware, Basic tools in Multimedia, , Uses of Multimedia, Multimedia System Architecture, Text –Types ,text compression, Text file formats RTF, TIFF, hypertext and hypermedia Audio- Components of an audio system, Digital **Audio:** digital audio, MPEG,MIDI, processing sound, sampling, compression, Sound cards, Audio file formats ,Audio Processing softwares.

UnitV

Video: Analog and Digital Video, Introduction to graphics accelerator cards, intro to AV/DV and IEEE1394 cards, Video file formats, compression standards.

Animation: Uses of Animation, Principles of Animation, Computer based animation,2D and 3D Animation techniques, Animation file formats, Animation softwares, Compression.

Textbooks & Reference books:

1. Donald Hearn and M.P. Becker, "Computer Graphics" ,Pearson Pub.
2. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill
3. FolayVandam, Feiner, Hughes, "Computer Graphics Principle & Practice" , Pearson Pub.
4. Sinha and Udai , "Computer Graphics", Tata McGraw Hill
5. Parekh, "Principles of Multimedia", Tata McGraw Hill
6. Prabhat k Andleigh, KiranThakral , "Multimedia System Design " PHI Pub.
7. Shuman, " Multimedia in action".

Paper Code: MSCS-403
Paper Title:PHP& MySQL **Max. Marks: 85**

UNIT I

BASICS OF PHP: Introduction to PHP, what does PHP Do?, Object Oriented Programming with PHP, language basics, installation of XAMPP/LAMP, syntax, comments, variables, constants and data types, expressions and operators, flow control statements, including html code in PHP, embedding PHP in web pages.

UNIT II
FUNCTIONS & STRINGS: Defining a function, Calling a function, variable scope, function parameters, return values, predefined functions.
Strings: Creating & accessing string, searching and replacing strings, encoding and escaping, comparing strings, formatting strings, regular expression.

UNIT III
Data & File Handling: PHP Forms: $_GET, $_POST, $_REQUEST, $_FILES, $_SERVER, $GLOBALS, $_ENV, input/output controls, validation, Cookies and Sessions.
File Handling: File and directory, open, close, read, write, append, delete, uploading and downloading files. File exists, File Size, Rename. Reading and display all/selected files present in a directory.

UNIT IV
MYSQL AN OVERVIEW: Introduction, phpMyAdmin, Entering queries, Creating and using a database, Creating and selecting a database, creating a table, loading data into a table, Retrieving information from a table, selecting all data, selecting particular rows, selecting particular columns, sorting, date, calculations, working with NULL values, pattern matching, counting rows, using more than one tables.

UNIT V
MYSQL DATABASES IN PHP: Introduction, connecting to a MySQL database, querying the database, Retrieving and displaying the results, modifying data and deleting data through front end. Designing applications using PHP & MySQL.

Text Books & References:

1. PHP & MySQL, VikramVaswani, McGraw-Hill
2. The Complete Reference - PHP, Steven Holzner, McGraw-Hill
3. The Complete Reference – MySQL, VikramVaswani, McGraw-Hill
4. Beginning PHP 5.3, Matt Doyle, Wrox Publication
5. PHP for the Web covers PHP5 & 7, Larry Ullman
6. Programming PHP, RasmusLerdorf, Kevin Tatroe, Bob Kaehms, RicMcGredy, O'REILLY.
7. "PHP 5 Recipes, A problem solution approach", Lee Babin, Nathan A. Good, Frank M. Kromann, and Jon Stephens, Apress

Paper Code: MSCS-404 **Elective II**

(i)ENTERPRISE RESOURCE PLANNING **Max.Marks:85**

Unit I

History of ERP, Concept of ERP System, Reasons to go for ERP, Need of ERP, Evolution of ERP, Structure of ERP, Concept of Material Requirement Planning (MRP), Manufacturing Resource Planning (MRP II), Common Misconceptions about ERP, Benefits of ERP, Disadvantages of ERP, ERP and Related Technologies, MIS (Management Information System), DSS (Decision Support System), EIS (Executive Information System), Data Warehouse, Data Mining.

Unit II

BPR (Business Process Reengineering), How ERP is related with BPR, Barriers to the Success of BPR; Role and Importance of Data Warehouse in ERP, Role of Data Mining in ERP; Supply Chain Management (SCM), Evolution and Components of SCM, Characteristics of SCM, How ERP is related with SCM; Role and Need of Customer Relationship Management, Integration of ERP, SCM and CRM.

Unit III

ERP Modules, Finance, Plant Maintenance, Quality Management, Material Management; Domain of ERP as well as areas affected by ERP e.g. Aerospace, Automobiles etc.; Market Players SAP, JD Edwards, BANN, PeopleSoft, Oracle Etc., ERP market in Indian Context; Assemble-To-Order, Make-To-Order, Make-To-Order, Just in Time (JIT); Hidden Costs involved in ERP Implementation, Planning and Project Management, Training, Data Conversion, Dirty Data, Integration Testing, Data Analysis.

Unit IV

ERP Implementation Lifecycle, Evaluation Criteria for ERP Product, Integrating ERP into organizational Culture, Critical Factors in the Success and Failure of ERP, ERP Success inhibitors, Return On Investment of ERP Implementation, Useful Guidelines for ERP Implementation, Role of Vendors in ERP Implementation, Evaluation Criteria for Vendors, Role and Need of ERP Consultants, Role of End Users in ERP Implementation, Training of End Users, Motivation for End Users.

Unit V

ERP and Internet, ERP and E-Commerce, How ERP interoperate E-Commerce, Future Directions in ERP, New Evolving Markets, Faster Implementation Methodologies, New Business Segments, Concept of Extended ERP, e-ERP, e-CRM, e-SCM, Case Study on SAP, ORACLE, People Soft etc.

Suggested Readings:

1. Alexis Leon, 'Enterprise Resource Planning Demystified', Tata McGraw-Hill Publishing Company Ltd.
2. MahadeoJaiswal and Ganesh Vanapalli, 'Text Book of Enterprise Resource Planning', Macmillan India Ltd.
3. Vinod Kumar Garg and N.K. Venkitakrishnan, 'Enterprise Resource Planning– Concepts and Practice', PHI.
4. Rahul V. Altekar, 'Enterprisewide Resource Planning', Tata McGraw Hill.
5. Joseph A Brady, Ellen F Monk, Bret Wagner, 'Conceptsin Enterprise Resource Planning', Thompson Course Technology.
6. Mary Summer, 'Enterprise Resource Planning', Pearson Education.

Paper Code: MSCS-404 **Elective II**

(ii) **CLOUD COMPUTING** **Max.Marks: 85**

Unit I

Cloud Computing Basics: What Is Cloud Computing? Cloud Components, Infrastructure, characteristics of cloud computing, Services & Applications-Storage, Database Services, Intranets and the Cloud -Components, Hypervisor Applications, First Movers in the Cloud –Amazon, Google, Microsoft . Benefits, Limitations. Types of cloud (public, private, community and hybrid cloud), Pros and Cons of Cloud Computing

Unit II

Cloud Computing Services: Software as a Service: The Basics , Storage as a Service , Providers, Security, Reliability, Advantages, Cautions, Outages, Theft , Cloud Storage Providers. Platform as a Service: Accessing the Cloud Platforms - Web Application Framework , Web Hosting Service , Proprietary Methods , Web Applications, Web APIs , Web Browsers -Internet Explorer , Firefox , Safari , Chrome. Infrastructure as a Service: Advantages, Software Considerations, Vendor Advantages, Limitations, Driving Forces-Popularity.
Database as a Service, Monitoring as a Service, Communication as services.

UNIT III

Collaborating with cloud : Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to MapReduce, GFS, HDFS, Hadoop Framework. Collaborating on Calendars, Schedules and Task Management, Collaborating on Event Management, Contact Management, Project Management, Collaborating on Word Processing, Databases, Storing and Sharing Files, Collaborating via Web-Based Communication Tools, Evaluating Web Mail Services, collaborating via Social Networks, Collaborating via Blogs and Wikis.

UNIT IV

Virtualization for cloud : Need for Virtualization, Pros and cons of Virtualization, Virtualization Concerns, Security aspects of Virtualization, Types of Virtualization – System Vm, Process VM, Virtual Machine monitor, Virtual machine properties, Interpretation and binary translation, HLL VM, Hypervisors, Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT V

Security, standards, and applications : Security in Cloud Computing, The Open Cloud Consortium, Security Management Standards: Standards for application Developers, Standards for Messaging, Standards for Security, cloud security challenges, Availability Management in SaaS, PaaS and IaaS. Access Control , Security Vulnerability, Patch, and Configuration Management, Conclusion and the future scope of the Cloud-Analyst Predictions , Survey Says?, The Future of Security in Cloud Computing. Relevant Case Studies

TEXT BOOKS & Reference books

1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "Cloud Computing for Dummies" (Wiley India Edition)
2. John Rittinghouse& James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press
3. Antohy T Velte ,Cloud Computing : " A Practical Approach", McGraw Hill
4. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online"
5. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers
6. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter-—CloudComputing a Practical Approach.
7. B.Furht; A. Escalante —Handbook of cloud computing.
8. Majd F. Sakr -—Introduction to Cloud Computing.
9. Tim Mather, SubraKumarswamy, ShaheedLatif-—Cloud Security and Privacy.

Paper Code: MSCS-404 **Elective II**

(iii)ARTIFICIAL INTELLIGENCE **Max.Marks: 85**

Unit I

Scope of AI: Games, Theorem Proving, Natural Language Processing, Vision And Speech, Processing, Robotics, Expert Systems, General Issues and Overview Of AI, AI Techniques, AI Problems. **Intelligent Agents**: Definitions Of A Rational Agent, Reflex, Model-Based, Goal-Based, And Utility-Based Agents, The Environment In Which A Particular Agent Operates. **Problem Solving** : State Space Search; Production Systems, Search Space Control; **Uninformed Search:** Depth-First, Breadth-first search. **Introduction to LISP**: Syntax and Numeric Functions, Basic List, Manipulation Functions in LISP

Unit II

Informed /Heuristic Search: Heuristic Search, Hill Climbing, Best-First Search, A*, AO* Search, Branch And Bound, Problem Reduction, Constraint Satisfaction End, Means-End Analysis. **Knowledge Representation**: Predicate Logic: Unificatioin, Modus Ponens, Resolution In Predicate Logic, Conflict Resolution Forward Chaining, Backward Chaining, Declarative And Procedural Representation, Rule Based Systems **LISP (Continued):** Functions, Predicates And Conditionals, Input, Output, And Local Variables, Iteration And Recursion, Property Lists And Arrays.

Unit III

Structured Knowledge Representation: Semantic Nets: Slots, Exceptions And Default Frames, Conceptual Dependency, Scripts. **Game Playing:** Game Tree, Minimax Algorithm, Alpha Beta Cutoff, Modified Minimax Algorithm

Introduction To PROLOG: List, Operators, Arithmetic, Objects, Relationships, Facts, Rules And Variables.

Unit IV

Natural Languages and NLP, Syntactic Processing, Parsing Techniques, Semantic Analysis, Case Grammar, Augmented Transition. **Handling Inconsistent And Incomplete Knowledge:** Truth Maintenance Systems, Reasoning Techniques, Concept Of Uncertainty, Bayes' Theorem, Certainty Factors And Rule-Based Systems, Bayesian Networks, Dempster-Shafter Theory, Fuzzy Logic: Fuzzy Sets, Fuzzy Operators & Arithmetic, Membership Functions, Fuzzy Relations

PROLOG: Syntax and Data Structures, Representing Objects & Relationships By Using —Trees And —Lists, Cut & Fail, Backtracking.

Unit V

Learning: Concept of Learning, Learning Automation, Rote Learning, Genetic Algorithm, Learning By Inductions, Artificial Neural Nets, Expert Systems: Need and Justification for Expert Systems, Knowledge Acquisition.

AI: Present and Future.

Case Studies: Mycin, Black Board System

Textbooks & Reference Books:

1. S. Russell and P. Norvig, —Artificial Intelligence: A Modern Approachl (2nd ed.), Pearson Education, 2005.
2. Elaine Rich and Kelvin Knight, —Artificial Intelligencel, Tata McGraw Hill, 2002.
3. Eugene Charniak and Drew McDermott, —Introduction to Artificial Intelligencel, Pearson Education, 2009.
4. Nils J. Nilson, —Principles of Artificial Intelligencel, Narosa Publishing House, 2001
5. R. Akerkar, —Introduction to Artificial Intelligencel, Prentice-Hall of India, 2005
6. Dan W. Patterson, —Introduction to Artificial Intelligence and Expert Systemsl, Prentice Hall of India, 2006.

7. Nils J Nilson, —Artificial Intelligence: A New Synthesisl, Morgan Kaufmann Publishers, Inc., San Francisco, California, 2000.
8. Clocksin and C.S. Mellish, —Programming in PROLOGl, Narosa Publishing House, 2002. 9. SarojKaushik, —Logic and Prolog Programmingl, New Age International Publisher, 2006
10. R. J. Schalkoff, —Artificial Intelligence-an Engineering Approachl, McGraw Hill Singapore, International Editions, 1992.
11. George F. Luger, —Artificial Intelligence-Structures and Strategies For Complex Problem Solvingl, Pearson Education, 5th Edition, 2010

Big Data Analytics

Paper Code: MSCS-405 **Lab I : ~~Core Java~~** **Max.Marks: 50**

Suggested Practical List

1. Setting up a multi-node Apache Hadoop cluster from scratch
2. Performing file I/O using HDFS.
3. Implementing an end-to-end data pipeline with Hive
4. Creating User Defined Functions in Hive
5. Working with HBase Shell and loading data from Hive
6. Running a Map/ Reduce Job - Word Count
7. Using Eclipse to build Map/Reduce Applications
8. Deploying Map/Reduce Jobs on Cluster
9. Analyzing Stock Market Data using Pig/Latin
10. Working With Complex Data Types
11. Analyzing weather data using Hive
12. Working with Hbase Shell
13. Loading Data in HDFS, Hive &Hbase in Various formats

Paper Code: MSCS-406 **Lab II :PHP & MySQL** **Max.Marks:50**

Suggested list of Practicals

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement.
2. Write a PHP script to demonstrate arithmetic operators, comparison operator, and logical operator.
3. Write PHP Script to input marks, generate result and display grade.
4. Write PHP Script for addition of two 2x2 matrices.
5. Write PHP script to obtain factorial of a number using function
6. Write PHP script to demonstrate string, date and math function.
7. Write PHP script to demonstrate
8. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
9. Write two different PHP script to demonstrate passing variables through a URL.
10. Write two different PHP script to demonstrate passing variables with sessions.
11. Write PHP script to demonstrate passing variables with cookies.
12. Write a program to keep track of how many times a visitor has loaded the page.
13. Write PHP script to demonstrate exceptional handling.
14. Write a PHP script to connect MySQL server from your website.
15. Write a program to read customer information like cust_no, cust_name, Item_purchase, and mob_no, from customer table and display all these information in table format on output screen.
16. Write a program to edit name of customer to "Bob" with cust_no =1, and to delete record with cust_no=3.
17. Write a program to read employee information like emp_no, emp_name, designation and salary from EMP table and display all this information using table format.
18. Create a dynamic web site using PHP and MySQL.

Paper Code :MSCS-407 **Marks : 100**

Paper Title: Project :Application Developmentusing any/all technologies learnt during the course

Recommendation: The technology to be used for Project Development to be revised every 2 yrs .as per the prevailing trends and needs of the industry/market.

GUIDELINES for Project Development in M Sc. (CS) Final Semester.

- **Internal Evaluation (CCE) will be based on viva on project synopsis((i.) System study and system design, (ii.) Presentation) submitted by the student – 20 marks.**
- **External Evaluation will be based on , Viva and demonstration of the work done in the project– 80 marks**

1. Project will consist of software development taken up in a group consisting of not more than 2 students.
2. Report will be submitted jointly by the group in one copy.
3. Project can be done eitheras on-the-job training in a software development organization/company or it can be a self effort as a suitable solution to a real world problem identified in consultation with guide teacher.

GUIDELINES FOR PROJECT FORMULATION

*** TYPE OF PROJECT**

It is **suggested** that the project to be chosen should have some direct relevance to the real world. Students are expected to work out a solution for real life problemsinvolving diverse application domains in some industry/development laboratories/educational institutions/software companies. However, it is not mandatory for a student to work on a live project. The student can formulate or innovatea project problem with the help of his/her Guide.

The project work will give an opportunity to the students to develop quality software solutions. Project development should involve all the stages of the software development life cycle (SDLC) like requirements analysis, systems design, software development/coding, testing and documentation, with an overall emphasis on the development of reliable software systems. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, and develop good understanding of SDLC.

Project Ethics to be adhered to: Plagiarism to be avoided: The project should be genuine and original in nature and should not be copied from anywhere . Students should be encouraged to work in the suggested areas listed at the end of the guidelines.

***Calendar For The Project**

Sr. No.	Topic	Date
1	Assigning of teacher guide	Before 15/January

2	Topic Finalized	Before 31/January/
3	Submission Of the Project Abstract And Synopsis (**CCE 1**)	Before 10/February/
4	PPT Presentation **(CCE 2)**	Before 20 /February/
5	First proof of the Project Report to be checked by teacher guide	Before 20/March/
6	Final Submission and Viva/demonstration by external examiner	3rd week of April

*** PROJECT PROPOSAL (SYNOPSIS)**

The project proposal should be prepared in consultation with thementor in organisation / teacher guide. The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken. The project proposal should contain complete details in the following form:

1. Title of the Project
2. Introduction and Objectives of the Project
3. Relevance of the topic for the benefit of the society
4. Analysis :(DFDs at least up to second level , ER Diagrams/ Class Diagrams/ Database Design etc. as per the project requirements).
5. Design: A complete structure which includes: Number of modules and purpose of each module to provide an estimation of the student's effort on the project. Data Structures as per the project requirements for all the modules.
6. Testing process to be used.
7. Reports generation (Mention tentative content of report)
8. Tools / Platform, Hardware and Software Requirement specifications
9. Are you doing this project for any Industry/Client? Mention Yes/No. If Yes, Mention the Name and Address of the Industry or Client
10. Future scope and further enhancement of the project.

Incomplete project proposals in any respect should be given another chance and re-submitted after incorporating changes and suggestions given by the guide. CCE marks to be given based on synopsis viva.

*** PROJECT REPORT FORMULATION**

I. The project report must contain the following in detail :

1. Certificate from the organization where project has been undertaken.
2. Certificate of Originality (Format given).
3. Declaration(Format given).
4. Acknowledgement (Format given).
5. Introduction
4. Objectives
5. Tools/Environment Used

6. Analysis Document (This should include SRS in proper structure based on Software Engineering concepts, E-R diagrams/Class diagrams/any related diagrams (if the former are not applicable), Data flow diagrams/other similar diagrams (if the former is not applicable), Data dictionary)
7. Design Document (Modularization details, Data integrity & constraints including database design, Procedural design, User interface design)
8. Program Description (Detailed specification instead of code), Comments & Description.)
9. Testing (Test case designs are to be included separately for Unit testing, Integration testing, System testing; Reports of the outcome of Unit testing, Integration testing, System testing are to be included separately. Also, details of debugging and code improvement are to be included.)
10. Input and Output Screens
11. Implementation of Security for the Software developed (In case, you have set up a User Name and Password for your software, you should ensure the security of User Name and Password during transmission to server)
12. Limitations, future scope for improvement/enhancement of the Project
13. Application of the project mentioning benefit to the real world
14. Bibliography/ References
15. Synopsis

II. The Project Report may not be more than 80 1.5mm spaced A-4 size typed pages .
III. Executable file of the project must be submitted in soft copy attached at the back of the project report.

IV. The project report should be hard bound; should consist of a Contents page; all pages of report should be numbered; content should be well organized in a meaningful manner; printouts of text & screen layouts should be original and should not be xeroxed)

***Important Points For Preparation & Submission of the Project Report**

1. The Project Report should be submitted in A-4 size typed in 1.5mm line space, justified. (Font Times New Roman, size normal 12 , Heading 16 and Subheading 14)
2. The length of the report should be between 50 to 80 pages including the cover page, summary, table of contents, list of figures, list of tables, and acknowledgement.
3. Ensure that Project Synopsis and the final report contain the signatures of both the Guide and the student along with date.
4. If any project report is received in the absence of the items listed above, it will be rejected and returned to students for compliance. Also, violation of Project Guidelines may lead to rejection of the Project .
5. Spiral bound photocopy of the project report is to be submitted to the College. Original copy of the same Project Report is to be retained with the student and the student is supposed to carry his copy while appearing for viva voce.
6. If the title and content of the Project differs from the title mentioned in the Project Proposal, the Project Report should be rejected by the external examiner and valuation to be done accordingly.

***Suggested list of topics for Application Development**

A sample list of topics for Project development is provided below. This is just a suggested list and students are free to choose any other innovative project relevant to computer applications **which can be developed using any technology learned during the course.**

- Customer Targeted E-Commerce
- Automated Faculty Evaluation System
- Online Health Shopping Portal With Product Recommendation
- College Forums with Alumni With Content Filtering
- Sql Injection Prevention System
- College Social Network Project
- ERP System
- Online Book Recommendation Using Collaborative Filtering
- Monitoring Suspicious Discussions On Online Forums
- Fake Product Review Monitoring & Removal For Genuine Ratings
- A Commodity Search System For Online Shopping Using Web Mining
- Secure Online Auction System
- Farming Assistance Web Service
- Online Loan Application & Verification System
- Matrimonial Portal
- Online Herbs Shopping Project
- Online Bakery Shop System
- Course Material Distribution System
- Online Furniture Shop Project
- Hotel Room Comparison System Project
- Salon management System
- Sports Club Management Project
- Online Blood Bank Project
- Stationery Management System
- Online Application for the Training and Placement
- Online Leave Management System
- Airline Reservation System
- Recipe Management System
- Complaint Management System
- Web Based Meeting Scheduler
- Student Project Allocation And Management
- Ticket Reservation System
- Content Management System
- Call Center Management
- Online On-Request Courses Coordination System
- Civil Registry
- Online Career Guidance and Placement Unit
- Ad Agency
- Any other approved topic

*** Formats of certificates to be included**

A. Cover page:.

PROJECT REPORT

On

<Project Title>

SUBMITTED TO

Barkatullah University

<logo of university>

IN PARTIAL FULLFILLENT
OF THE DEGREE OF
MASTER ofSCIENCE IN Computer Science
Session <>

By

Name : .....
Roll No : .....
Enrollment No.....

Under the
Guidance of

<Name of Internal Guide>
<Designation >

< Name of External Guide>
<Designation>

B. Certificate from the organization :(to be issued by the organization and the photocopyof the certificate is to be attached in the report)

C. Format for acknowledgement

ACKNOWLEDGEMENT

I convey my sincere gratitude to _____ _____ for giving me the opportunity to prepare
my project work in _____. I express my sincere thanks to all the staff members of _____.

I am thankful to _____ for her/his guidance during my project work and
sparing her/his valuable time for the same.

I express my sincere obligation and thanks to thePrincipal and all Faculties of the Department of_____, _____,
for providing me with guidance, help, motivation and valuable advice at every stage for completing the project work successfully.

Signature:
Name:
Roll No:

D. Format for Declaration

DECLARATION

I do hereby declare that the project work entitled "_____"submitted by me for the partial fulfillment of the requirement for the award of Master of Science in Computer Science, is an authentic work completed by me. The report being submitted has not been submitted earlierfor the award of any degree or diploma to any Institute or University.

Date:

Signature :
Name:
Roll No:

E. Certificate of Originality

CERTIFICATE OF ORIGINALITY

This is to certify that the project report entitled _____ Submitted to Barkatullah University, Bhopal, in partial fulfillment of the requirement for the award of the degree of Master of Science in Computer Science, is an original work carried out by Mr./ Ms._____.Enrollment No.: _____ Roll.No.....

The matter embodied in this project is a genuine work done by the student and has not been submitted whether to this University or to any other University / Institute for the fulfillment of the requirement of any course of study.

Signature of the Guide
Name, Designation and
Address of the Guide