

**M.Phil.Computer Science and Application, Semester System 2019-20**

**TABLE 1 : Course structure of M. Phil. in Computer Science and Application as per the ordinance no 13 published in the Gazette of India on july 05, 2016 M. Phil. programme shall be of two (2) consecutive semesters/one year.**

<p><b>FIRST SEMESTER:</b> The credits of the M.Phil. Course work (24 credits )will be as under -</p>	<p><b>SECOND SEMESTER :</b> Upon satisfactory completion of course work, the M.PHIL. Scholars shall be required to undertake research work (dissertation/thesis) In the second semester (24 credits ) Along with some seminars and presentations as prescribed below</p>
<p>(I) Research methodology (4 credits ) (II) Computer application using web technologies (4 credits ) (III) One of the following optional Advance subjects in the relevant field (4 credits ) a. Software Technologies b. Data mining and data ware housing c. Advance networking and security system d. Software testing &amp; Quality Assurance (IV) Review of published research in the relevant field (4 credits ) (V) Synopsis submission (4 credits ) (VI) Compressive viva -voce (4 credits ) Note : dissertation topic to be allotted and synopsis submission in the first semester and to be submitted for evaluation in II semester.</p>	<p>i. Seminar (4 credits ) ii. Term paper/assignment (4 credits ) iii. Final Dissertation/ project presentation (12 credits ) iv. Compressive viva -voce (4 credits )</p>
<p>The examination and evaluation scheme for m.phil course work shall be according to the examination and evaluation scheme of the university as applicable to the other programmes of the of the UTDS. Each paper will be converted in to as per the scheme of the examination.</p>	

J IWAJI UNIVERSITY, GWALIOR  
CBCS Scheme of Examination

M.Phil.(Computer Science and Application) First Semester December 2019

COUR SE CODE MPHC SA	Course name	Total marks	Min pass marks	Credit c (i)	End semester examination marks			Internal assessment marks			Total obtained marks	Grade points G(i)	Letter grade	SGPA $S(1)=\frac{\sum C(i).G(i)}{\sum C(i)}$
					Max	Min	Obtaine d	Max	Min	Obtaine d				
101	Research Methodologies	100	55	4	60	21		40	14					
102	Computer application using web technologies	100	55	4	60	21		40	14					
103	One of the following optional Advance subjects in the relevant field a. Software Technology b. Data mining and data warehouse c. Advance networking and security system d. Software testing & Quality Assurance	100	55	4	60	21		40	14					
104	Review of published research in the relevant field	100	55	4				100	55					
105	Synopsis submission	100	55	4				100	55					
106	Compressive viva -voce	100	55	4				100	55					
	$\sum_{i=0}^6 C(i)$			24										

*Handwritten signature and initials in blue ink.*

**JIWAJI UNIVERSITY, GWALIOR**  
**CBCS Scheme of Examination**  
**M.Phil.(Computer Science and Application ) Second Semester June 2020**

COURS E CODE MPHCS A	Course name	Total marks	Min pass marks	Credit c (i)	marks		Total obtained marks	Grade points G(i)	Letter grade	SGPA S(2)= $\frac{\sum C(i).G(i)}{\sum C(i)}$
					Max	Obtained				
201	Seminar	100	55	4	100	55				
202	Term paper/assignment	100	55	4	100	55				
203	Final Dissertation/ project presentation			12						
204	Compressive viva -voce	100	55	4	100	Pass/fail				
	$\sum_{i=0}^6 C(i)$			24						

Sem. I		Sem. II		Result
SC(1)	S(1)	SC(2)	S(2)	
24	24			
$CGPA = \frac{\sum SC(i).S(i)}{\sum SC(i)}$				

$SC(i) = \sum C(i).SGPA = S(i)$ , J=J<sup>th</sup> Semester, SGPA = Semester Grade Point Average. CGPA = Cumulative Grade Point Average.

NB : A student has to acquire minimum 55% marks. In end semester examination minimum 21 out of 60 and in internal assessment minimum 14 out of 40. But sum of both should be 55 or more. Grade will be decided by the marks obtained out of 100.

*SW*  
*TU*

## Compulsory -I

### MPHCSA-101: RESEARCH METHODOLOGY

#### Unit-1 Research Basic

Meaning of Research – Objectives of Research – Motivation in Research – Types of Research – Research Approaches – Significance of Research – research Methods versus Methodology – Research and Scientific Method – Importance of Knowing How Research is done – Research Process – Criteria of good Research

#### Unit-2. Research Defining

Problem – Technique involved in Defining the Problem – Meaning of Research Design – Need for Research Design – Features of a Good Design – Important Concepts Relating to Research Design – Different Research Design – Data.

#### Unit-3 Data Analysis

- Mathematical and statistical analysis using software tools like MAT Lab, SPSS or free wares tools.
- Report writing and analyzed data representation - Significance of Report Writing – Different Steps in writing Report – Layout of the Research Report – Types of Report: research papers, thesis, Research Project Reports – Oral Presentation – Mechanics of Writing a research Report –Precautions for Writing Research Reports.

#### Unit-4 Quality Research Strategies

- Building expertise in the areas of interest, generating the base content in the selected area, literature survey for research work- already done, being done by others and arriving at directions of research.
- Formulation of research title , development of criteria based research proposal ,Presentation for the research proposal and review of the proposal base on the feedbacks by evaluation experts.

#### Unit-5. Research documentation

- Planning for the research work with outcomes/achievable and time targets.
- Research monitoring publication of research outcomes in referred journals.
- Documentation of research work to generate thesis with norms and standards.
- Introduction of Plagiarism, Detect Plagiarism, Strategies to Minimize Plagiarism.

#### REFERENCES:

1. "Thesis & Assignment Writing" By Anderson, Berny H. Dujrston, H. Pode, Wiley Eastern Ltd., New Delhi, 1970.
- 2 MAT LAB Programming By Y. Kirani Singh and B. B. Chaudhuri, PHI
3. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.
4. Quantitative Data Analysis in Education: A Critical Introduction Using SPSS - By Paul Connolly
5. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to algorithms" Prentice Hall 1990.
6. "Research Methodology" R. Panneerselvam, PHI, New Delhi 2005
7. Research Methodology-Methods and Techniques", 2/e, by C.K. Kothari (2004), New Age International, New Delhi.
8. Elements of Research Writing", by Dr. S.K. Yadav (2015), UDH Publishers & Distributors, Pvt. Ltd. New Delhi



Compulsory -II

**MPHCSA- 102: COMPUTER APPLICATIONS USING WEB TECHNOLOGIES**

Unit 1 : HTML and CSS

HTML basics tags, HTML4, HTML5, Elements, Attributes, Head, Body, Formatting, Table, input tag, Form, linking tag, iframe, layouts, Meta, image, Media, list, URL.

CSS basics, syntax, ID, Class, Selectors, background, border, fonts, links, styling, border, padding, grouping, align, navigation bar, image gallery.

Unit 2 : JAVA SCRIPT

Javascript Basics: fundamentals, variable declaration, Assigning value, control statements (if, if else, if ladder, while loop, for loop, do...while loop), switch, break, continue, array.

Function(built-in & predefined), Internal & External javascript.

Unit 3 : JDBC

Life Cycle of JDBC, 2Tire Architecture, 3Tire Architecture, java.sql.\*, Connection Interface, ResultSet Interface, DriverManager, Class.forName(), connect java program with MS-Access/MySQL/Oracle, Insert, Update, Delete, Display, Search Record from Database using Java Program.

Unit 4 : JAVA Servlets

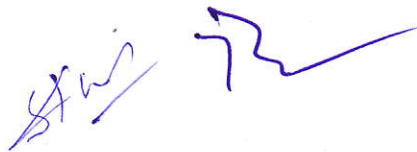
Life Cycle of a servlet, JSDK, Servlet API, Servlet packages, javax.servlet, javax.http.servlet, doGet(), doPost(), doService(), Servlet Parameters, HttpServletRequest, HttpServletResponse, Session, Cookies, Apache Tomcat Server, Connectivity with Database using JDBC.

Unit 5 : Java Server Pages(JSP)

Introduction to JSP, problem with servlets, anatomy of JSP page, JSP processing, JSP 9 implicit Objects, JSP Application design with MVC, JSP Application Development, Connectivity with Database using JDBC.

REFERENCES:

1. Internet and World Wide Web – How to program by Dietel, and Nieto Pearson Education Asia. (Chapters: 3,4,8,9,10,11,12-18).
2. The Complete Reference Java 2 third Edition by Patrick Naughton and Herbert Schildt. (Chapters: 19,20,,21,22,25,27).
3. Java Server Pages by Hans Bergstan. (Chapters: 1-9).
4. Web Enabled Commercial Application Development using... HTML, JavaScript, DHTML and PHP by Ivan Bayross



MPHCSA 103 (ELECTIVE): ADVANCE SUBJECT IN COMPUTER SCIENCE & APPLICATION

**ELECTIVE PAPERS**

MPCSA 103 (A) : SOFTWARE TECHNOLOGIES

Course Content:

UNIT-1. Software Management Concept

- Software engineering, Software engineering, principles, Software myths.
- software Process models : The waterfall model, spiral model, prototype model,
- Software maintenance, Metrics for Software Maintenance
- Software Configuration Management

UNIT-2. Software Cost Estimation

- Issues related to size & cost estimation
- Cost Estimation Non Algorithmic Techniques; Expert Judgment, Estimation by analogy, Fuzzy logic based estimation
- Algorithmic Techniques; Function point, Constructive Cost Model
- Comparison of various estimation techniques.

UNIT-3. Function Oriented Design

- Design Principles; Problem partitioning, abstraction, modularity
- Module -Level concepts; Coupling, cohesion
- Design Notations and specification
- Metrics

UNIT-4. Object oriented Design

- Object-Oriented Analysis & design
- OO Concepts; Relationship among objects, Inheritance and polymorphism.
- Design Concepts ; Coupling, Cohesion etc.
- Unified modeling Language(UML); Class ,Sequence, collaboration, interaction, state, Activity diagram, design pattern
- Metrics; WMC,DIT, NOC, CBC,RFCLCOM

UNIT-5. Software Testing

- Software Testing Fundamentals
- Test Case Design
- Basic path Testing
- Control Structure Testing

REFERENCES:

Software Engineering – Roger S.Pressman , fifth edition, Mc Graw hill.

An Integrated Approach to Software Engineering - Pankaj Jalote, Narosa Publication



MPHCSA 103 (B) : DATA MINING AND DATA WAREHOUSE

UNIT-1 Introduction: Fundamentals of data mining

- Data mining Functionalities,
- Classification of Data Mining Systems,
- Major issues in Data Mining,
- Data Warehouse and OLAP Technology for Data mining
- Data Warehouse, Multidimensional Data Model,
- Data Warehouse Architecture, Data Warehouse implementation,
- Development of Data Cube Technology

UNIT-2 Data Preprocessing, Data Mining Primitives, Languages, and System Architectures

- Needs Preprocessing the Data,
- Data Cleaning, Data Integration and Transformation,
- Data Reduction, Discretization and Concept Hierarchy Generation.
- Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on Data Mining Query Language Architectures of Data Mining Systems.

UNIT-3 Concepts Description and Mining Association Rules

- Characterization and Comparison: Data Generation and Summarization
- Bases characterization, Analytical Characterization: Mining Class Comparisons
- Association Rule Mining,
- Rules from Relational Databases and Data Warehouses

UNIT-4 Classification , Prediction and Cluster Analysis Introduction

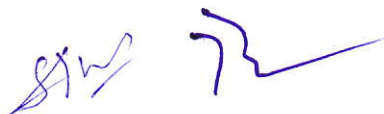
- Issues Regarding Classification and Prediction,
- Classification by Decision Tree , Classification by Backpropagation, Classification Based on Concepts from Association Rule Mining
- Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density , Based Methods
- Grid Based Methods, Model – Based Clustering Methods, outlier analysis. Multidimensional Analysis and Descriptive

UNIT-5. Mining Complex Types of Data

- Mining of Complex, Data Objects, Mining Spatial Databases
- Mining Multimedia Databases
- Mining Time – Series and Sequence Data, Mining Text Databases,
- Mining the World Wide Web.

REFERENCE:

1. Data Mining - Concepts and Techniques - Jiaweihan & Micheline Kamber Morgan Kaufmann publishers.
2. Data Ming Techniques – Arjun K Pujari, Universities Press.
3. Data Warehousing in the Real world, Sam Anahory & Dennis Murray., Pearson Edn Asia.
4. Data Mining Introductory and Advanced Topics", M.H. Dunham, Pearson Education



MPHCSA 103 (C) : ADVANCED NETWORKING AND SECURITY SYSTEM

UNIT-1 Network Tools and Techniques

- Protocol layering, system design, multiple access, switching, scheduling, naming, addressing, routing, error control; flow control
- Traffic management – data link layer protocols
- Internet: concept, history, network layer, transport protocol UDP, TCP, Ipv4, Ipv6

UNIT-2 Local Area Networks, Socket and Interprocess communication

- Topologies, access techniques, LAN, 802.11G wireless LANs.
- Application layer: DNS, Email, WWW, multimedia.
- TCP sockets, UDP sockets name and address conversion, IPv4 / Ipv6 interoperability - Socket programming.
- Posix IPC, system V IPC, Pipes, FIFO, Posix message queue,
- System V semaphore, RPC in Sun systems. Unix programming using Ipe.

UNIT-3 Classical Encryption, Block Cipher and the Data Encryption Standard

- Classical Encryption Techniques : Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Rotor Machines, Steganography.
- Simplified DES, Block Cipher Principles, The Data Encryption Standard
- Block Cipher Design Principles and Modes of Operation
- Advanced Encryption Standard : Evaluation Criteria , The AES Cipher

UNIT-4 Contemporary Symmetric Ciphers and Confidentiality using Symmetric Encryption

- Triple DES, Blowfish, RC5,
- Characteristics of Advanced Symmetric Ciphers RC4 Stream Cipher.
- Placement of Encryption function, Traffic Confidentiality, Key Distribution, Random Number generation.

UNIT-5 Introduction to Number Theory and Key Management

- Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality,
- The Chinese Remainder Theorem, Discrete Logarithms.
- Key Management, Diffe-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.
- Authentication applications – Electronic Mail Security, IP Security– Web Security – System Security : Intruders – Malicious Software - Firewalls

REFERENCE:

- Computer Networks, A.S. Tanenbaum, PHI, 4th ed, ISBN 81-7808-785-5
- Cryptography and Network Security Third Edition William Stallings
- Cryptography and Data Security Demming, D, Addison Wesley, 1982.
- Computer Networking A top down approach featuring the Internet, J.F.Kurose.





MPHCSA 103 (D) : SOFTWARE TESTING AND QUALITY ASSURANCE

UNIT - I Testing Objectives and principles - Purpose of Software testing – SDLC and testing – Verification and validation - Weyuker's adequacy axioms – model for testing and consulting oracles – Is complete testing possible – The Consequence of bugs – Taxonomy of Bugs– Test case Design – Black Box Testing and White Box testing – Testing strategies - Unit testing – Integration Testing – Validation testing – System testing – The art of Debugging and debugging approaches.

UNIT - II Basis Path testing - Data flow testing - Control flow and structure testing– Strategies – Applications, Tools and effectiveness – Condition Testing -Transaction Flow testing, Syntax Testing – Grammar for formats – Implementation. Loop and Logic Based Testing – Decision tables – Path Expressions – KV Charts – Specifications – State transition Testing – identifying good & bad states – state testing Metrics and Complexity.

UNIT - III Graph based testing methods –Orthogonal Array testing –Performance Testing -Testing for Real-time Systems– issues – Testing in web applications – Testing in object oriented software - Differences from testing non-OO Software – Testing OOA and OOD models -Class testing strategies - Class Modality - State-based Testing - Message Sequence Specification.

UNIT - IV Automated Tools for Testing - Static code analyzers - Test case generators - GUI Testing - Capture/Playback – Stress Testing - Testing Client -server applications - Testing compilers and language processors - Testing web enabled applications. Design for Testability - Observability & Controllability - Built-in Test - Design by Contract - Precondition, Post condition and Invariant - Impact on inheritance – polymorphism.

UNIT - V Regression Testing - Challenges – Test optimization- Mutation testing – Fault based testing – Scenario based testing-penetration testing-Testing Approaches in Software Industry – testing metrics – function based metrics –Bang metrics – software quality metrics.

REFERENCE::

1. Boris Beizer," Software Testing Techniques", 2nd Edition, Dreamtech Press, 2003.
2. Myers, Glenford.J., "The Art of Software Testing", John-Wiley & Sons,1979.
3. Roger.S.Pressman, "Software Engineering – A Practitioner's Approach", 5th Edition, Mc- Graw Hill, 2001.
4. Marnie.L. Hutcheson, "Software Testing Fundamentals", Wiley, 2007.
5. William E.Perry, "Effective Methods for Software Testing ", 2nd Edition, John Wiley & Sons, 2000.
6. Robert V.Binder, "Testing Object-Oriented Systems: Models Patterns and Tools ", Addison Wesley, 2000.

