

**Syllabus of
M.Sc. (Computer Science)
Part II(SEM-I)**

COMPUTER SCIENCE BOARD

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Chairman, Computer Science Board**



**GONDWANA UNIVERSITY,
GADCHIROLI**

SESSION 2013-2014

M.Sc. (C/S) - II (Semester – I)

Paper -1: Software Testing Tools and Methodology

Paper-2: Soft Computing Techniques

Paper-3: Research Methodology and Operational Techniques

Paper-4: C# .NET

Paper- 5: Practical-I based on Theory Paper-1 and 2

Paper- 6: Practical-II based on Theory Paper-3 and 4

M.Sc. (Computer Science) - II
SEMESTER - I
PAPER-1: SOFTWARE TESTING TOOLS AND METHODOLOGY
(3MSc1) (Marks-80)

Unit –I: (Introduction Testing)

Introduction: Fundamentals of Test Process, Purpose of Testing, Testing and Debugging, Software Quality, Requirement Behavior and Correctness, General Principles of Testing, Test Metrics, Model for Testing

Role of Testing in SDLC: Review of Software Development Models (Waterfall Models, Spiral Model, W Model, V Model) Agile Methodology and Its Impact on Testing, Test Levels (Unit, Component, Module, Integration, System, Acceptance, Generic)

Unit – II: (Flow Graphs, Transaction, Dataflow and Path Testing)

Flow Graphs and Path Testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow Testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing

Domain Testing: Domains and Paths, Nice and Ugly Domains, Domain Testing, Domain and Interface Testing, Domains and Testability

Unit – III: (Static, Dynamic, White Box Testing)

Static Testing: Structured Group Examinations, Static Analysis, Control Flow and Data Flow, Determining Metrics

Dynamic Testing: Black Box Testing, Equivalence Class Partitioning, Boundary Value Analysis, State Transition Test, Cause Effect Graphing and Decision Table Technique and Used Case Testing and Advanced Black Box Techniques

White Box Testing: Statement Coverage, Branch Coverage, Test of Conditions, Path Coverage, Advanced White Box Techniques, Instrumentation and Tool Support, Gray Box Testing, Intuitive and Experience Based Testing

Unit - IV: (Testing Tools and Object oriented Software)

Testing Tools: Automation of Test Execution, Requirement Tracker, High Level Review Types of Test Tools, Tools for Test Management and Control, Test Specification, Static Testing, Dynamic Testing, Non Functional Testing, Selection and Introduction of Test Tools Tool Selection and Introduction, Cost Effectiveness of Tool Introduction **Testing Object oriented Software:** Introduction to OO Testing Concepts, Differences in OO Testing

Books:

- 1) BarisBeizer, “Software Testing Techniques”, Dreamtech, Second Edition.
- 2) Dr.K.V.K.K.Prasad, “Software Testing Tools”, Dreamtech

References:

- 1) Andreas Spillner, Tilo Linz, Hans Schaefer ,“Software Testing Foundations”, Shoff Publishers and Distributors
- 2) Srinivasan D and Gopalswamy R ,”Software Testing: Principles and Practices”, Pearsoned, 2006
- 3) Robert V Binder, Addison Wesley ,”Testing Object oriented Systems Models, Patterns and Tools” , 1996

M.Sc. (Computer Science) - II
SEMESTER - I
PAPER-2: SOFT COMPUTING TECHNIQUES
(3MSc2)

(Marks-80)

Unit I (Soft Computing)

Soft Computing: Introduction of Soft Computing, Soft Computing Verses Hard Computing, Various Types of Soft Computing Techniques, Application of Soft Computing,

Artificial Intelligence: Introduction, Various types of Production System, Characteristics of production system, breadth first search, depth first search techniques, other search techniques like Hill Climbing, Best first search, A* Algorithm, AO* Algorithms and various types of control strategies, knowledge represent issues, propositional and predicted logic, monotonic and non monotonic reasoning, forward reasoning, backward reasoning, weak and strong slot and filler structures, NLP

Unit II (Neural Network)

Neural Network: Structure and functions of a single neural, biological neural, artificial neural, definition of ANN, taxonomy of neural net, difference between ANN and human brain, characteristics and applications of ANN, single layer network, Perceptron training algorithms, linear separability, Windrow and Hebb;s learning rule/Delta rule, ADALINE, MADALINE, AI V/S ANN.

Introduction of MLP, different activation functions, error back propagation algorithms, derivations of BBPA, Momentum, Limitation, Characteristic and Application of EBPA.

Unit III (Fuzzy logic)

Fuzzy logic: fuzzy set theory, fuzzy set verses crisp set, Crisp Relation and Fuzzy Relation, **Fuzzy Systems:** Crisp logic, Fuzzy logic, introduction and features of membership functions, fuzzy rule base system: fuzzy propositions, formations, decomposition and aggression of fuzzy rule, fuzzy reasoning, fuzzy interface system, fuzzy decision making & applications of fuzzy logic.

Unit IV (Genetic Algorithms)

Genetic Algorithms: fundamentals, basic concepts, working principle, encoding , fitness function, reproduction, genetic modeling: inheritance operators, cross over, inversion and deletion, mutation operator, bitwise operator, generational cycle, Convergence of GA, application and advance in GA, difference and similarity between GA, and other traditional methods.

Books:

- 1) L. Fortuna, G. Rozzotto, M. Lavorgna, "Soft Computing: New Trends and Applications", Springer. 2001
- 2) James Anderson , " An Introduction To Neural Networks", TheMit Press, 1995
- 3) Burkhardt, Henn, Hepper, Rintdorff, Schaeck. "Pervasive Computing", Pearson, 2002. Isbn 978-81-7758-280-2
- 4) Melanie Mitchell, "An Introduction To Genetic Algorithms" , Mit Press , 1998, Isbn 0-262-13316-4

References:

- 1) F. Adelstein, S.K.S. Gupta, "Fundamentals of Mobile and Pervasive Computing", TMH.
- 2) Mohamad H. Hassoum, " Fundamentals of Artificial Neural Network" The MIT Press 1995

M.Sc. (Computer Science) - II
SEMESTER - I
PAPER-3: RESEARCH METHODOLOGY AND OPERATIONAL
TECHNIQUE
(3MSc3) (Marks-80)

Unit – I (Introduction to Research Methodology)

Introduction to Research Methodology : Meaning, Objectives, Motivation in Research, Types, Approaches, Importance, Research Methodology, Scientific Research, Process, Criteria for Good Research, Problems Encountered, Defining Research Problem, Developing Research Proposal, **Research Design:** Meaning, Need, Features, Important, Six P of Research

Data Collection Method- Primary Data- Observation Method, Personal Interview, Telephonic Interview, Mail Survey, Questionnaire Design.

Unit – II (Sampling Design)

Sampling Design: Implications, Steps Criteria for Sampling Procedure, Characteristics of Good Sample Design, Different Types of Sample Design, Different Types of Sample Design- (a) Probability Sampling Like Simple Random, System Random, Systematic Random, Stratified, Cluster. (B) Non Probability Sampling Like Quota, Judgmental, Convenience

Report Writing and Interpretation- Pre-Writing Considerations. Meaning and Technique of Interpretation, Different Types of Report Writing, formats of Report Writing, Thesis Writing, formats of Publication in Research Journals.

Unit –III (Large Sample Test)

Large Sample Test: Definition of Hypothesis, Basic Concepts- Null Hypothesis and Alternative, The Level of Significance, Type I and Type II Errors, Two Tailed and One Tailed, Power of Test, Testing of Mean, Testing of Differences Between Two Means, Testing of Proportion of Difference Between Two Proportion Limitations of Hypothesis Testing.

Small Sample Test: Idea of Degree of Freedom, Test Significance Based Upon T and F Statistic-Testing of Mean, Testing of Difference Between Two Means, Testing of Equality of Variances, Chi-Square Test.

Unit –IV (CHI-Square Test for Large Samples)

CHI-Square Test for Large Samples: Definition of Chi-Square, Limitations of Chi-Square Test, and Chi - Square Test As a Test of Goodness of Fit and As a Test of Independence, Yates's Correction and Its Application, **Analysis of Variance (ANOVA):** Concept, One Way ANOVA, and ANOVA in Test in Latin Square Design.

Books:

- 1) Kothari .C.R, "Research Methodology-Methods and Techniques", New Age Publications.
- 2) S.P.Gupta, "Introduction to Mathematical Statics".
- 3) S.B. Kishor, Bhagyashreevaidya, "Operation Research", Das Ganu,

References:

1. D.K.Bhattacharyya, "Research Methodology", 1st Edition (2003), EBP, New Delhi
2. Sancheti and Kapoor, "Business Statics", Sultan Chand and Sons, New Delhi.

M.Sc. (Computer Science) - II

SEMESTER - I

PAPER-4: C#.NET

(3MSc4)

(Marks-80)

Unit- I: Understanding .Net

Basic of .Net Framework, Evolution of C#, The C# Environment, Characteristics of C#, Comparison Among C++, and Benefits of C #.

Unit-II: C# .Net Programming

Overview of C# ,Basics in C#, Object oriented Aspects of C#, Delegates and Their Usefulness, Events, Errors and Exceptions Properties and Indexers, , Attributes, I/O in C#, Exception and Error Handling in C#, C# and Windows Applications

Unit-III-Advanced Features Using C#

Web Services, Window Services, Asp.Net Web form Controls and ADO.Net, Distributed Application in C#, Unsafe Mode, Graphical Device Interface with C#.

Unit-IV: Net Assemblies and Attribute

.Net Assemblies Features and Structure, Private and Share Assemblies, Built-in Attribute and Custom Attribute. Introduction about Generic. Versioning, Attributes, Reflection, Viewing Metadata, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server

Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using Single call, Threads.

Books:

- 1) E.Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2004.
- 2) J. Liberty, "Programming C#", 2nd Ed., O'reilly, 2002.
- 3) Herbert Schildt, "The Complete References: C#", Tata Mcgraw-Hill, 2004.
- 4) Robinson Et Al, "Professional C#", 2nd Ed., WroxPress, 2002.

References:

- 1) Andrew Troelsen, "C# and the .Net Platform", Press, 2003.
- 2) S. ThamaraiSelvi, R. Murugesan, "A Textbook on C# ", Pearson, 2003.

M.Sc.(Computer Science)-II

SEMESTER- I

PAPER-5: Practical-I

(3MSc5)

(Marks-100)

Section – A: Based Soft Computing Technique using Mat Lab

Fuzzy Logic

- Different operations on Fuzzy sets.
- Linguistic variables
- Fuzzy intersections
- Fuzzy unions

Neural Network

- Properties of single neuron
- Theoretical model of neuron
- Binary model of neuron
- Essential vector operations

Genetic Algorithm

- Genetic algorithm in problem solving
- Biological terminology of genetic algorithm

Section B - Based on Software Testing

(Note :Minimum 10 practicals based on available projects)

M.Sc. (Computer Science)-II
SEMESTER - I
PAPER-5: Practical-II
(3MSc6)

(Marks-100)

Section – A Practical based C#.NET

1. Simple Programs with C#:
 - a) Write a console application that obtains four int values from the user and displays the product. Hint: you may recall that the Convert.ToDouble () command was used to convert the input from the console to a double; the equivalent command to convert from a string to an int is Convert.ToInt32 ().
 - b) If you have two integers stored in variables var1 and var2, what Boolean test can you perform to see if one or the other (but not both) is greater than 10?
 - c) Write an application that includes the logic from Exercise 1, obtains two numbers from the user, and displays them, but rejects any input where both numbers are greater than 10 and asks for two new numbers.
 - d) Write an application that receives the following information from a set of students:
Student Id:
Student Name:
Course Name:
Date of Birth:
The application should also display the information of all the students once the data is entered. Implement this using an Array of Structs.
 - e) Write programs using conditional statements and loops:
 - i. Generate Fibonacci series.
 - ii. Generate various patterns (triangles, diamond and other patterns) with numbers.
 - iii. Test for prime numbers.
 - iv. Generate prime numbers.
 - v. Reverse a number and find sum of digits of a number.
 - vi. Test for vowels.
 - vii. Use of for each loop with arrays.
2. Object oriented programs with C#
 - a) Program using classes.
 - b) Program with different features of C#
 - i. Function Overloading
 - ii. Operator Overloading
 - iii. Inheritance (all types)
 - iv. Constructor overloading
 - v. Interfaces
 - vi. Using Delegates and events
 - vii. Exception handling
3. Programs using different controls.
4. Programs using CSS.

5. Programs using ASP.NET Server controls.
6. Database programs with ASP.NET and ADO.NET
7. Programs using Language Integrated query.
8. Programs securing web pages.
9. Programs using AJAX.
10. Programs using JQuery.