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

COMPUTER SCIENCE BOARD

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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)


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


Books:
2) Dr.K.V.K.Prasad, “Software Testing Tools”, Dreamtech

References:
1) Andreas Spillner, Tilo Linz, Hans Schaefer ,“Software Testing Foundations”, Shoff Publishers and Distributors
M.Sc. (Computer Science) - II
SEMESTER - I

PAPER-2: SOFT COMPUTING TECHNIQUES
(3MSc2) (Marks-80)

Unit I (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, prepositional 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 seperatability, 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)

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:

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

Unit – I (Introduction to Research Methodology)
Data Collection Method: Primary Data- Observation Method, Personal Interview, Telephonic Interview, Mail Survey, Questionnaire Design.

Unit – II (Sampling Design)

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.

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:
2) S.P.Gupta, “Introduction to Mathematical Statics”.
3) S.B. Kishor, Bhagyashreevaidya, “Operation Research”, Das Ganu
References:
M.Sc. (Computer Science) - II
SEMESTER - I
PAPER-4: C#.NET
(3MSc4) (Marks-80)

Unit- I: Understanding .Net

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:

References:
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)
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.