SHIVAJI UNIVERSITY, KOLHAPUR.

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(2009)

New Syllabus For

M.Sc-II. Computer Science

Sem.-III & IV

Syllabus to be implemented from June 2011 onwards.

M.Sc Computer Science(Regular)

Semester- III

PAPER – M.Sc 3.1 Artificial Intelligence

Unit- 1 :   **(15hrs)**

Introduction to Artificial Intelligence and Problem Solving: Definition, AI Applications, state and space search, depth first search, bredth first search, Heuristic search techniques, Best first search, Mean and ends analysis, A* and AO* Algorithm

Knowledge Representation using Predicate Logic: Predicate calculus, Predicates and Arguments, WFF, rule based representation, Resolution, principal, unification, modes pones.

Unit- 2 :   **(15hrs)**

Structured Knowledge Representation
Monotonic and non-monotonic reasoning, Semantic Net, Frames, Script, Conceptual dependency.
Game Playing & Natural Language Processing
Minmax search procedure, Alphabeta cutoffs, vision, Introduction to natural language processing

Unit- 3:   **(15hrs)**
Learning
Concept of learning, Types of learning, learning automata, learning induction, Introduction to neural network
Expert System
Utilization and functionality, architecture of Expert system, Knowledge representation, Forward and backward chaining, Two case studies on expert systems.

Unit- 4:   **(15hrs)**

AI Laboratory
Prolog Programming language, exercises

Text Books
   1. Dan W. Patterson, "Artficial Intelligence & Expert Systems"

References:

   1. Elaine Rich, Kerin Knight, " Artificial Intelligence"
   2. Rajendra Akerkar, "Introduction to artificial Intelligence"
   3. Eugene Charniak, Drew McDermott, "Introduction to Artificial Intelligence".
   4. Russel & Norvig, " Artificial Intelligence", (PHI)

M.Sc Computer Science(Regular)

Semester- III

Paper—M.Sc 3.2 Complier Techniques

UNIT 1: (15hrs)

Introduction to Compiling: Compilers, Phases of a compiler, Compiler construction tools, Lexical Analysis: Role of a Lexical analyzer, input buffering, specification and recognition of tokens, finite automata, designing a lexical analyzer generator.

UNIT 2: (15 hrs)

Syntax Analysis: Role of Parser, CFG, Writing grammars for context free environments, Top-down parsing, Recursive descent and predictive parsers (LL), Bottom-Up parsing, LR, SLR, and LALR parsers.

UNIT 3: (15 hrs)

Syntax Directed Translation: Syntax directed definitions, Evaluation order for SDD's, Construction of syntax trees, syntax directed schemes, implementing L-attributed SDD's, **Intermediate Code Generation**: Types and declaration, type checking, control flow, backpatching, switch statement, intermediate code for procedures.

UNIT 4: (15 hrs)

Code Generation: Issues in design of a code generator and target machine model, Addresses in the target code, basic blocks and flow graphs, Optimization of basic blocks.

References: -

1. Compilers - Principles, Techniques and Tools - A.V. Aho, R. Shethi and J.D.Ullman

   (Pearson Education.)

2. Compiler Design – G. Sudha Sadasivam, SCITECH publications

3. Compiler Construction - Barret, Bates, Couch (Galgotia)

M.Sc Computer Science(Regular)

Semester- III

Paper—M.Sc 3.3 Dot Net Programming

Unit 1:

Overview of .NET framework, problems with the earlier languages and .NET solution. Overview of .NET binaries and .NET architecture. The role of Microsoft Intermediate Language and Metadata. Understanding Common Language Runtime, Common Type System and Common Language Specification. .NET base classes, overview of .NET assemblies, .NET memory management. (15)

Unit 2:

Introduction to Visual Studio .NET, Visual Studio .NET IDE., Building Visual Basic .NET application. VB.NET language fundamentals, object oriented programming with VB.NET, cross language inheritance, Namespaces, accessing the registry. Interfaces and collections – Understanding interface-based programming, building a custom enumerator, building a cloneable object, comparable objects (15)

Unit 3:

Introducing Windows Forms, GDI+ namespaces, Windows Form controls.
Data access with ADO.NET – The need for ADO.NET, ADO.NET namespaces, ADO.NET managed providers, OLEDB managed providers, SQL managed providers, Accessing XML through ADO.NET. (15)

Unit 4:

Web development and ASP.NET – Problems with classic ASP. Benefits of ASP.NET, ASP.NET namespaces, architecture of ASP.NET web application.
Building and understanding web services, anatomy of a web service, overview of web service namespaces, building a simple web service, Web Service Description Language (WSDL), generating a proxy with VB.NET. Deployment of a VB.NET application. (15)

References:
1. Visual Basic .NET and the .NET platform – An Advanced Guide – Andrew Troelsen.
2. Programming Visual Basic .NET – Dave Grundgiger.
3. Teach Yourself Visual Basic .NET in 21 days – Duncan Mackenzie and Kent Sharkey
4. Introducing Microsoft .NET – David S. Platt
5. Database Access with Visual Basic .NET – Jeffrey P. McManus, Jackie goldstein and Kevin T. Price.
6. ASP.NET Projects – Building 10 Enterprise Projects – Eric A. Smith

M.Sc Computer Science(Regular)

Semester- III

Paper—M.Sc 3.4 Parallel Computing

UNIT 1: (15hrs)

Parallel Computer models : The state of computing, Elements Of Modern Computer, Evolution of computer architecture, System attributes, Multiprocessor: Multiprocessor system interconnect , Hierarchical bus system, crossbar switch, Multiport memories, Multistage network, Functional structures , Multiprocessor Scheduling , Multicomputer, Multivector and SIMD computer: SIMD array processor, SIMD interconnection network, SIMD matrix multiplication, PRAM architecture and models.

UNIT 2: (15 hrs)

Program and Network Properties : Conditions of parallelism, Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Program flow mechanism. **Introduction of Parallel Computing:** Implicit Parallelism, Dichotomy of Parallel Computing Platforms, Physical Organizations of Parallel Platforms, Cache Coherence in Multiprocessor System, Communication Costs in parallel machines. Routing mechanism for interconnection networks, Impact of process- processor mapping and mapping techniques.

UNIT 3: (15 hrs)

Principles Of Parallel Algorithm Design: Basics of computation,Decomposition techniques,mapping techniques for load balancing. Parallel Algorithm Models. **Communication perations:**One-to-All Broadcast and All-to-one reduction,All-to-AllBroadcast and Reduction, All-Reduce and prefix-Sum operations.Scatter and Gather All-to-All personalized communication, Circular Shift.

UNIT 4: (15 hrs)

Message Passing Computing : Principles of Message Passing Programming , Opeartions, Groups and communicators, MPI programming compilation and execution.

Elementory Algorithms -Matrix manipulation, Graph connectivity and traversal, Tree traversal, Sorting and searching on PRAM, Fourier Tranformations.

References: -

1. Kai Hwang, Advanced Computer Architecture Parallelism Scalability Programmability,TMH (2001)
2. Anath Grama,Anshul Gupta,George Karypis and Vipin Kumar-Introduction to parallel Computing.

3. V.Rajaraman - Elements of Parallel Computing (PHI)
4. Selim Akl - The design and analysis of parallel algorithms (PHI)
5. Michael J. Quinn Parallel Programming in C with MPI and OpenMP McGrawHill

Paper - M.Sc LAB-V Laboratory course

(Based on paper M.Sc 3.1 and M.Sc 3.3)

Paper - M.Sc. LAB-VI Project & Viva

M.Sc Computer Science(Regular)

   Semester- IV

Industrial project/ Research project to be developed in this semester

Equivalence for semester- III and IV M.Sc. (Computer Science) Regular

Sr. no	Paper no	New Syllabus titles	Old syllabus titles	Equivalence for old syllabus from new syllabus
Sem-III				
1	M.Sc. 3.1	Artificial Intelligence	Distributed computing	**Two more chances should be given to old candidates**
2	M.Sc. 3.2	Compiler Techniques	Software Engineering	**MSc1.2: Object Oriented Software Engineering (Semester one)**
	M.Sc. 3.3	Dot Net Programming	Internet Technology	**Two more chances should be given to old candidates**
	M.Sc. 3.4	Parallel Computing	Computer Graphics	**Two more chances should be given to old candidates**
Sem-IV				
		Research/ Industrial project	Soft Computing	Artificial intelligence (sem-III M.Sc. 3.1)
			Simulation and Modeling	**Two more chances should be given to old candidates**
			Image Processing and Pattern Recognition	**Two more chances should be given to old candidates**
			Mobile Computing	**Two more chances should be given to old candidates**
			Information Retrieval Systems	**Two more chances should be given to old candidates**