M.C.A.
First Year

Prospectus No. 111722

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

(FACULTY OF ENGINEERING & TECHNOLOGY)

PROSPECTUS

Prescribed for

MASTER IN COMPUTER APPLICATION

FIRST YEAR M.C.A.

Examinations, 2010-2011

CREDIT GRADE SYSTEM

2010

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SYLLABUS
PRESCRIBED FOR
THREE YEAR POST GRADUATE DEGREE COURSE
MASTER IN COMPUTER APPLICATIONS
FIRST YEAR
SEMESTER : FIRST

1 MCA 1/ 1 CS 1 COMPUTER ORGANIZATION

Unit I — Chapter Objectives, Evaluation of Computers and computer generations, Technological trends, Measuring performance, speed up, Amdahl's law, Von Neumann machine architecture, Functional units and components in computer organization, Program development tools, Operating systems.

Unit II — From Electron to Bits, Binary representation of positive integers, Negative integers, Fixed point arithmetic operations on positive and signed (Negative) integers, Floating-Point numbers (IEEE 754 standard) and operations, BCD arithmetic operation, Design of ALU, Bit slice processors.

Unit III — Concept of instruction formats and instruction set, instruction set types, types of operands and operations, Generation of memory addresses and addressing modes, Subroutine nesting using stacks to implement subroutine calls and calling conventions, Processor organizations, Register organization, Stack based organizations, Encoding of machine instructions, General features of RISC and CISC instruction sets, modern processors convergence of RISK with CISC, Processor microarchitecture-I - Fundamental concepts for data path implementation,Processor microarchitecture-II - Data path implementation, microprogrammed execution, recent innovations in execution unit design.

Unit IV — Instruction pipeline, instruction pipeline hazards, overcoming hazards using a pipeline with forwarding paths, instruction set design influence on pipelining, example of pipelined CISC processor, example of pipelined RISC processor, VLIW (Very Long Instruction Word) processors, Vector processors, Multithreaded processors, Compilation techniques support to instruction level parallelism, Extracting parallelism.

Unit V — Some basic concepts, memory hierarchy, internal organization of semiconductor main memory chips - RAM and ROM, semiconductor main memories - RAM, semiconductor Read - Only memories - ROMs, speed, size and cost, secondary storage magnetic ferrite core memories, optical disks CD-ROM

memories, data caches, instruction caches, and unified cache, features describing a cache, cache implementations, multilevel caches.

Unit VI — Virtual memory organization, mapping functions for translating the program pages in virtual to physical addresses space, partitioning, segmentation (superpages or page blocks) partitioning of virtual address space in to segment and page address, demand paging and swapping, cache and virtual swapping, cache and virtual memory, inverted page tables concept, protection between programs running on the same system, accessing I/O devices, programmed I/O, interrupts, direct memory access DMA, bus arbitration, interface circuits, I/O interfaces, I/O processors, external I/O devices.

Text Book : Computer Architecture by Micholus Carter & Rajkamal, Schaum Series Pub.

1 MCA 2 / 1 CS 2 PROBLEM SOLVING USING C++

Unit I. — Objects & Classes in C++ : Declaring & using classes, Constructors, Objects as functions arguments, Copy Constructor, Static class data. Arrays of objects, C++ String class.

Unit II. — Operator overloading : Overloading unary & binary operators. Data conversion. Pitfalls of operator overloading. Pointers & arrays. Pointers & functions. new & delete operators. Pointers for objects.

Unit III. — Inheritance in C++ : Derived class & base class, Derived class constructors, Function overloading, class hierarchies, Public and private inheritance, Multiple inheritance. Containership : classes within classes.

Unit IV. — Virtual functions concepts, Abstracts classes & pure virtual functions. Virtual base classes, Friend functions, Static functions, Assignment and copy initialization, the this pointer. Dynamic type information.

Unit V. — Streams & Files in C++ : Stream classes, stream errors, disk file I/O with streams, File pointers, Error handling in file I/O. File I/O with members functions, overloading the extractions & insertion operators, Memory as a stream object, command-line arguments. Multifile programs.

Unit VI. Function Template, Class templates, Exception syntax, Multiple exceptions, exception with arguments. Introduction to the Standard Template Library. Algorithms, Sequential Containers, Iterates, Specialized iterates, Associative containers. Function objects.

Text-Book :

1. Savitch: Problem Solving using C++ (Addison Wesley) Low-Priced Edition.

References :

1. Robert Lafore Object-Oriented Programming in C++ (Galgotia)
2. Herbert Schildt C++ : Complete Reference (TMH)
3. Bjarne Stroustrupe C++ Programming Language (Addison-Wesley)
4. Venugopal Mastering C++ (TMH)
5. Lipmann C++ Primer (Addison-Wesley)

1MCA3 / 1 CS 3 COMPUTER ORIENTED STATISTICAL METHODS

UNIT-I : Introduction

Definitions : Websters, secrists, Gronton and Cowden definitions of statistics

Improtance of statistics

Scope of statistics : Industry, Economy, Planning, medical science, Computer Science etc.

Limitations of statistics.

General principles of classification of data.

Construction of Frequency distribution, cummulative frequency distribution, relative frequency distribution. Graphical representation of frequency distribution.

Diagrammatic representation : Simple bar, subdivided bar, pie diagram.

Numerical Problems.

UNIT-II : Measures of central Tendency & Measures of dispersion:

Concept of central tendency, criteria for good measures of central tendency.

Arithmetic mean for grouped and ungrouped date, properties of a.m., combined mean, weighted mean, merits and demerits.

Median, mode, G.M., H.M. for grouped & ungrouped data with its merits & demerits.

Partition values : quartiles, deciles, percentiles

Numerical problems on central tendency.

Concept of dispersion criteria for good measures of dispecrsion.

Measures of dispersion : Range, quartile deviation, mean deviation, S.D. for grouped & ungrouped data with its merits & demerits Variance : Definition for grouped & ungrouped data, combined variance, co-efficient of Dispersion, co-efficient of variation. Numerical problems on measures of dispersion.

UNIT-III : Moments, measures of Skewness and Kurtosis correlation

Raw & Central moments : for grouped & ungrouped data (upto first four moments) & their relationships. Skewness, measures of skewness, co-efficient of skewness, bempirical relation between mean, mode, median. Pearson's & Bowley's co-efficient of Skewness. Kurtosis & types of kurtic curves, co-efficient at Kurtosis based on moments.

Numerical problems on moments, co-efficient of skenmen & co-efficient of Kurtosis.

Unit-IV Corelation : Concept of correlation for bivariate data, scatter diagram, positive, negative & no correlation, cause and effect relationship.

Karl pearson's co-efficient of correlation(r), limits at r and interpretation of r, assumption on r.

Effect of change of origin & scale on r, independence of variables.

Spearman's Rank correlation, repeated rank correlation.

Numerical problems on karl pearsons & spearman's rank correlation co-efficient.

UNIT-V : Regression :

Concept of regression & linear regression

Derivation of regression lines by method of least squares.

Properties of regression co-efficients.

Linear and Non-linear regression : Fitting of second degree curve & curve y=abx by least square method.

Numerical problems on linear & non-linear regression.

Multiple regression by yule's notations (for tri-variat data)

Multiple correlation & partial correlation.

UNIT-VI : Time series :

Definition of Time series & uses of time series

Components of Time series, Additive & multiplicative models.

Methods of estimating treand by moving average method graphical method, semiavarage method & by least square methods.

Numerical problems on Time Series.

Text Books:

J.N. Kapoor : Mathematical Statistics (MCG)

Trivedi : Probability and Statistics with Computer Science Applica tions (TMH)

References:

1. Statistical Methods (An Introductory Text) : J. Medhi
2. Modern Elementary Statisics : J.E. Freund
3. Statistical Methods : S.P. Gupta
4. Fundamentals of Statistics : Goon, Gupta, Dasgupta

1MCA4 / 1 CS 4 PRINCIPLES OF MANAGEMENT

(8 hours/unit)

UNIT I Introduction : Definition and concepts of management, Importance of management .Various management functions & control, responsibilities. Human resources planning , Decision-making, Trade unions & collective bargaining.

UNIT II Organization planning, design and development: Production resources, Production planning, types of production system, production systems, production control.

UNIT III Product design & development : Introduction, design of the product, New product development; Material planning and control. Inventory control technique .

UNIT IV Maintenance and system reliability: Concepts and Objectives of maintenance. Failure analysis,Reliability Maintenance system & Classification. Maintenance planning, TQM ISO 9000 and Quality audit.

UNIT V Marketing management : Introduction, marketing planning . Consumer behavior, product management, Pricing & promotion decision.Financial planning. Source of finance.

UNIT VI Project Management: Concepts and importance of project, Project implementation, MIS.MIS meaning and objectives. Types of data, methods of data collection, analysis and presentation of data. Editing, reporting and presentation of data, Decision options.

Text book :

A.K.Gupta,J.K. Sharma : Management of Systems (Macmillan)

Referances :

1.Appleby : Modern Business Administration, 6/e (Macmillan)

2.Tritaphy & Reddy : Principals of Management, 2/e (TMH)

3.Gupta, Sharma et : Principales of Practices of Management (Kalyani)

1MCA5 / 1 CS 5 COMMUNICATION SKILLS

Unit I: Comprehension - word study :-

Synonym, antonym, meanings, matching words, adjectives, adverbs, prefix and suffix, correct forms of commonly misspelled words, understanding of the given passage.

Skimming for general ideas, Contextual vocabulary, Error detection, Note making and Location of argument from text, Ability to answer inferential, factual and personal response.

Unit-II Comprehension - - Structure study :-

Simple and compound sentences, types of conjunctions, singular and plural, tenses and their effect on verb forms. Use of - not only - but also, if clause, since, may, can, could, would, too etc. Active and passive forms, negative and interrogative, punctuation and capitalization.

Unit III Theoretical background - importance of communication, its process, model of communication its components & barriers. Types of written communication, organization of a text (Titles, summaries, headings, sequencing, signaling, cueing etc.), Important text factors (length of paragraph, sentences, words, clarification and text difficulty). Evaluation of written communication for its effectivity and subject content.

Unit IV Specific formats for written communication like - business correspondence, formal reports, technical proposals, research papers and articles, advertising and graphics. Format for day-to-day written communication like applications, notices, minutes, quotations, orders, enquiries etc. Letter writing, Preparation of Curriculum – Vitae,Composing messages-telegrams, telex,fax and e-mail Writing memos, agendas and notices of meetings, Preparing advertisements.

Unit-V Oral communications - Important objectives of interpersonal skills, Verbal communication, its significance, face to face communications, group discussion and personal interviews. Voice modulation and logical argument, Comprehension of text at normal reading speed. Listening skill and timely response, Participation and contribution to discussion, Command over language Formal and informal style of communication, Body language.

BOOKS Recommended :

1) Krishna Mohan, Meera Banerjee : Developing Communication Skills, MacMillan India Limited.

2) Chrissie Wright (Editor) : Handbook of Practical Communication Skills, Jaico Publishing House.
3) Curriculum Development Centre, TTTI WR, Bhopal : A Course in Technical English, Somaiya Publication Pvt. Ltd.
4) F.Frank Candlin : General English for Technical Students, University of London Press Ltd.

1 MCA 6 / 1 CS 6 PROBLEM SOLVING USING C++

LAB: LIST OF PROGRAMS

The sample list of program is given below. This list can be used as guide line for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1 Write a C++ program to implement a stack with its constructor and two member functions PUSH and POP

2 Write a C++ program to find product of two same numbers from 0 to 9 stored in an object array of 10 objects and then free the memory space occupied by an object array

3 Write a C++ program to overload minus operator as an unary and binary operator

4 Write a C++ program using friend operator function to overload plus binary operator

5 Write a C++ program to calculate the circumference of an earth (subclass) after getting distance of it measured from sun from planet (super class)

6 Write a C++ program for an inventory that stores the name of an item, the number on hand, and its cost. Include an inserter and an extractor for this class

7 Write a C++ program that creates an output file, writes information to it, closes the file and open it again as an input file and read the information from the file

8 Write a C++ program that counts number of words in a file

9 Write a C++ program to create an abstract class area having an abstract function get Area which will find an area of derived classes rectangle and triangle

10 Write a C++ program to create a generic function that swaps the values of the two variables it is called with"

1MCA7 / 1 CS 7 COMPUTER ORIENTED STATISTICAL METHODS

Practicals on Statistical Methods:

Minimum 12 practicles to be performed throughout the semester based on following (using C or C++ language).

1. Construction of frequency distribution, graphical methods & diagrammatic representation.
2. Problems on measures of Central Tendency.
3. Problems on measures of disperssion.
4. Problems on moments, measures of Shewmen and Kurtosis.
5. Computation of correlation co-efficient for bivariate data.
6. Fitting of linear & non linear regression lines
7. Computation of rank correlation co-efficient
8. Problems on time series .

1MCA8 / 1 CS 8 COMMUNICATION SKILLS LABORATORY

Objective :

On completion of this laboratory the candidate should be able to demonstrate adequate skills in oral and written communication for technical English language, actively participate in group discussions and interviews and exhibit the evidence of vocabulary building. Candidates should be assessed through continuous monitoring and evaluation.

The sample list of experiments is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1. Assignments and tests for vocabulary building
2. Technical report writing
3. Group discussions
4. Interview techniques
5. Projects and tasks such as class news letter
6. Writing daily diaries and letters
7. Interactive language laboratory experiments.

Text Book : Norman Lewis : Word Power Made Easy

http://www.teachingenglish.org.uk

1MCA 9/1 CS 9 COMPUTER LABORATORY-I

This laboratory is based on the study of following software

1. The study of Windows/Linux operating systems :
   The topics to be covered include
   1) The study of basic commands handling files, directories, system configuration and system calls

2) Shell programming,
3) General purpose utilities & editors
4) Seeting/resetting file attributes/ modes, sharing files,
5) TCP/IP networking

2. The study of spreadsheets : Creating Worksheets, Formatting cells, conditional formatting of cells and data, Use of functions, Creating Macros, Creating different types of charts. (At least 6 exercises covering above mentioned features) Use MS-Excel or Calc from Open Office Under Linux.
3. The study of DBMS : Creating Database, Tables, Views, Queries, Creating Reports (At least 6 exercises covering above mentioned features)

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SEMESTER : SECOND

2 MCA 1 / 2 CS 1 DATA STRUCTURES & ALGORITHMS

Unit-I Data structures basics, Mathematical/algorithmic notations & functions, Complexity of algorithms, Subalgorithms. String processing: storing strings, character data type, string operations, word processing, and pattern matching algorithms.

Unit-II Linear arrays and their representation in memory, traversing linear arrays, inserting & deleting operations, Bubble sort, Linear search and Binary search algorithms. Multidimensional arrays, Pointer arrays. Record structures and their memory representation. Matrices and sparse matrices.

Unit III Linked lists and their representation in memory, traversing a linked list, searching a linked list. Memory allocation & garbage collection. Insertion deletion operations on linked lists. Header linked lists, Two-way linked lists.

Unit-IV Stacks and their array representation. Arithmetic expressions: Polish notation. Quick sort, an application of stacks, Recursion. Tower of Hanoi problem. Implementation of recursive procedures by stacks, Queues. Deques. Priority queues.

Unit-V Trees, Binary trees & and their representation in memory, Traversing binary trees. Traversal algorithms using stacks, Header nodes: threads. Binary search trees, searching, inserting and deleting in binary trees. Heap and heapsort. Path length & Huffman's' algorithm. General trees.

Unit-VI Graph theory, sequential representation of graphs, Warshalls' algorithm, Linked representation, operations & traversing the graphs. Posets & Topological sorting. Insertion Sort, Selection Sort. Merging & Merge-sort, Radix sort, Hashing.

Text Book:

Seymour Lipschutz: "Theory & Problems of Data Structures" (TMH)

References:

1. Horowitz & Sahni "Data Structures" (Galgotia)
2. Trembley & Sorenson "Data Structures" (TMH)
3. Standish "Data Structures in JAVA" (Pearson)
4. Bhagat Singh & Naps "Data Structures" (TMH)

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2 MCA 2 / 2 CS 2 OBJECT ORIENTED PROGRAMMING

Unit-I Introduction, Software development, life-cycle approach, Software requirement specifications, Algorithms, VB Net projects, Designing objects, classes & applications, object relationships, Class design examples, class code in VB Net

Unit-II VB Net language, CLR, variables, expressions, statements, blocks, structured variables & enumerations. Classes, object orientation & variables, control structures, selection structures, repetitions, Subs, functions & parameters, errors & exception handling, scope.

Unit-III Data & object structures, organizing the data, arrays, other data structures, collections, inheritance in VB, code inheritance, interface inheritance, inheriting the data structures, Visual inheritance, polymorphism.

Uint-IV Winform applications : Structure of application, Winform basics, user interface code & the form designer, tools for creating a user interface, dialog boxes & the other user interface options, other form styles, control collection, delegates and event handlers, visual inheritance.

Unit-V Windows controls, accessing controls, command control, Simple input controls, list controls, manipulating the controls at runtime. Graphics in Winform programs, object modeling : application structure, real worlds object modeling with object relationships, software patterns.

Unit-VI Storing application data, computer files, Windows registry, file storage, structured data, Serialization. Databases in Visual Basic. Net Object oriented database systems, Net support for relational database systems, data access in a three tiered system, reading & writing data.

Text Books:

Alisstair McMonnies : Object Oriented Programming in Visual Basic.NET, Pearson Education.

References:

1. Hamilton J.P. : OOP with Visual Basic.NET, O'Reilly Media Inc.
2. Reynolds-Haertle R.A. : OOP with Visual Basic.NET & Visual C#.NET, Microsoft Press.
3. Michael Halvorson : Microsoft Visual Basic.NET Step by Step, Microsoft Press.
4. Francesco Balena : Programming Microsoft Visual Basic.NET, Microsoft Press.

2 MCA 3 / 2 CS 3 SYSTEM ANALYSIS & DESIGN

UNIT I. Introduction : System Analysis & Design concepts. Role of system analyst. Review of System DLC. Organization as systems. Levels of management culture. Project fundamentals. Feasibility study. Activity planning & control. Managing analysis & design activities.

UNIT II. Sampling and investigating hard data. Interviewing. Planning & conducting interview & reporting. Joint application design. Using questionnaries. Planning designing and administering the questionnaire.

UNIT III. Coservation of a decision-makers behavior and office environment. Prototyping : User reactions. Approaches to prototyping & developing prototype. Data flow aproach to requirements. Developing DFDs. Logical & Physical DFDs. Examples of DFDs.

UNIT IV. Data dictionary concept. Data repository. Creating & using data dictionary. Overview of process specifications. Structured English, Decision tables/trees. Decision support system & decision making concepts relevant to DSS. Semi structured decisions. Multiple-criteria decision-making.

UNIT V. System Proposal : Ascertaining hardware/software needs. Identifying & forecasting cost/benefit & comparing cost/benefit. Writing and presenting the systems proposals. Principles of Delivery.

UNIT VI. Output Design Objectives. Designing printed output, Screen output. Input Design objectives. Form Design. Screen Design for input. Introduction to OOSAD. : Object-Oriented Analysis. Object-Oriented Design.

Text-book :

Kenneth E.Kendall & Julie E.Kendall : "System Analysis and Design" (Pearson Education) 3/e

References :

1. Yeates "System Analysis & Design" (Macmillan)
2. J.Fitgerald & A.Fitgerald. "Fundamentals of System Analysis & Design" (John-Wiley) 3/e
3. Edward "System Analysis & Design" (McGraw-Hill)
4. Whilten, Bentley, Barlow "System Analysis & Design Methods" (Galgotia) 2/e.

2MCA 4 / 2 CS 4 DATA COMMUNICATIONS

Unit-I : Data communication concepts, uses and applications. Telephone : Voice communication networks, Switches, PBX cellular technologies, Fax. IVR, Voice Mail.

Unit-II : Hardware; network architecture, Hosts, Clients, Circuits, Special purpose Communication Devices, FEP, Multiplexers, Protocol Coverters, Line adapters.

Unit-III : Data transmission : Coding, Transmission modes, Band width, Modulation, Modem : Types and Standards, PAM & PCM techniques, Connector cables.

Unit-IV : OSI model, MAC protocol; Controlled & contention-based, Error control in networks, Data link Protocols : asynchronous & synchronous Transmission effeciency.

Unit-V : Network Layer : Topologies. Network routing, Network Standards and network protocols : TCP/IP, IPX/SPX, X.25 & GOSIP protocols.

Unit-VI : LANs : uses and types, LAN components. Ethernet : topology, MAC, types, Token rings : topology, MAC, types, Other types of LANs, MAP (IEEE 802.4)., ArcNet, Apple Talk.LAN performance improvement, selecting a LAN.

Text Book :

1. J.Fitzgerald & A Denis Business Data Communication & Networking, (5/e) (John Wiley & Sons)

References:

1. Schweber: Data Communication (McGrawHill)
2. Miller : Digital & Data Communication (Jaico)

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2 MCA 5 BUSINESS SYSTEMS

Unit-I Introduction : Nature of business, objectives, components of business, environment of business system, business system and its sub-systems, forms of legal ownership : sole proprietership, partnership organisation, company form of organisation. Social responsibilities of business.

Unit-II Company Management : Structure of company management, patterns and problems of company management, company meetings & resolutions, company office - its organisation and management. Business combinations, Government & business.

Unit-III Production functions : Plant location, factory planning, production control and cost control, Budgets and budgetory control, purchasing and storekeeping.

Unit-IV Personnel functions : Personnel management; definition, role of personnel manager, job evaluation, merit rating. Industrial relations, Trade Unionism, employee remunerations, wage payments, incentives & wage policies.

Unit-V Financial functions : Financial planning, various sources of finance, institutions of industrial finance. Securities market.

Unit-VI Marketing functions : Marketing & its function, transport, selling or distributions of goods, channels of distribution, salesmanship, advertising and promotion.

Text Book :

M.C.Shukla : Business Organisation & Management, S. Chand & Company.

References:

1. P. Gopalkrishnan : Materials Management, PHI.
2. Reddy & Gulshan : Business Organisation & Management, S. Chand & Company.
3. R.C.Appleby : Modern Business Administration, 6/e, Macmillan.

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2 MCA 6/2CS6 DATA STRUCTURES & ALGORITHMS - LABORATORY

The sample list of program is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected out comes. Further, C,C++ or Java may be used as the programming language.

1. Write an application to implement Tower of Hanoi Problem Algorithm.
2. Write an application to implement Abstract data type stack
3. Write an program to evaluate Post fix expression using stack
4. Write a program to implement Abstract data type queue.
5. Write a program to implement singly linked list that performs various operation such as insertion, deletion, searching a node in linear linked list.
6. Write a program to implement Preorder Traversal of a binary tree.
7. Write a Program to search a given element using Binary Search.
8. Write a Program to implement Selection Sort.
9. Write a Program to implement Merge Sort.
10. Write a Program to Perform insertion or search in a specified level of a stack implemented tree- structured symbol table.

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2 MCA 7 / 2 CS 7 Object Oriented Programming Labs:

Minimum ten programming assignments should be completed based on above syllabus.

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2MCA 8 / 2 CS 8 SYSTEM ANALYSIS & DESIGN LAB.

8 to 10 Examples of SAD from text book covering each unit of syllabus, using any available SAD tool, as from one available with text book.

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2MCA 9 COMPUTER LABORATORY-II

In this lab, the students have to develop a mini project based on any technology they have learnt. They have to properly follow and practice the system development life cycle. They will have to prepare a project report and submit it as a completion of this lab.

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APPENDIX-A
THREE YEAR POST GRADUATE DEGREE COURSE IN MASTER IN COMPUTER APPLICATION
SEMESTER PATTERN
CREDIT GRADE SYSTEM
FIRST YEAR SEMESTER-I

Sr.No.	Subject Code		Teaching Scheme					Examination Scheme							
			Hours/Week					Theory				Practical			
			Lecture	Tutorial	P/D	Total Hours/ Week	**Credits**	Duration of Paper (Hr.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min.Passing Marks	Max.Marks External	Max.Marks Internal	Total	Min. Passing Marks
1	1MCA1	Computer Organization	4	0	0	4	4	3	80	20	100	40	_	_	_	_
2	1MCA2	Problem Solving Using C++	4	0	0	4	4	3	80	20	100	40	_	_	_	_
3	1MCA3	Computer Oriented Statistical Methods	4	0	0	4	4	3	80	20	100	40	_	_	_	_
4	1MCA4	Principles of Management	4	0	0	4	4	3	80	20	100	40	_	_	_	_
5	1MCA5	Communication Skills	4	0	0	4	4	3	80	20	100	40	_	_	_	_
6	1MCA6	Problem Solving Using C++-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
7	1MCA7	Computer Oriented Statistical Methods-Lab	0	0	2	2	1	_	_	_	_	_	25	25	50	25
8	1MCA8	Communication Skills-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
9	1MCA9	Computer Lab-I	0	0	4	4	2	_	_	_	_	_	50	50	50	50
	TOTAL		20	0	10	30	25				500				250	

TOTAL : 750

APPENDIX-A
THREE YEAR POST GRADUATE DEGREE COURSE IN MASTER IN COMPUTER APPLICATION
SEMESTER PATTERN
CREDIT GRADE SYSTEM
FIRST YEAR SEMESTER-II

Sr.No.	Subject Code		Teaching Scheme					Examination Scheme							
			Hours/Week					Theory			Practical				
			Lecture	Tutorial	P/D	Total Hours/ Week	**Credits**	Duration of Paper (Hr.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min.Passing Marks	Max.Marks External	Max.Marks Internal	Total	Min. Passing Marks
1	2MCA1	Data Structure & Algorithms	4	0	0	4	4	3	80	20	100	40	_	_	_	_
2	2MCA2	Object Oriented Programming	4	0	0	4	4	3	80	20	100	40	_	_	_	_
3	2MCA3	System Analysis & Design	4	0	0	4	4	3	80	20	100	40	_	_	_	_
4	2MCA4	Data Communication	4	0	0	4	4	3	80	20	100	40	_	_	_	_
5	2MCA5	Business Systems	4	0	0	4	4	3	80	20	100	40	_	_	_	_
6	2MCA6	Data Structure & Algorithms-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
7	2MCA7	Object Oriented Programming-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
8	2MCA8	System Analysis & Design-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
9	2MCA9	Computer Lab-II	0	0	4	4	2	_	_	_	_	_	50	50	100	50
	TOTAL		20	0	10	30	25				500				250	

TOTAL : 750

APPENDIX-A
THREE YEAR POST GRADUATE DEGREE COURSE IN MASTER IN COMPUTER APPLICATION
SEMESTER PATTERN
CREDIT GRADE SYSTEM
SECOND YEAR SEMESTER-I

Sr.No.	Subject Code		Teaching Scheme					Examination Scheme							
			Hours/Week					Theory				Practical			
			Lecture	Tutorial	P/D	Total Hours/ Week	**Credits**	Duration of Paper (Hr.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min.Passing Marks	Max.Marks External	Max.Marks Internal	Total	Min. Passing Marks
1	3MCA1	Operating Systems	4	0	0	4	4	3	80	20	100	40	_	_	_	_
2	3MCA2	File Structure & Data Processing	4	0	0	4	4	3	80	20	100	40	_	_	_	_
3	3MCA3	Java Programming	4	0	0	4	4	3	80	20	100	40	_	_	_	_
4	3MCA4	Computer Networks	4	0	0	4	4	3	80	20	100	40	_	_	_	_
5	3MCA5	Computer Oriented Optimization Techniques	4	0	0	4	4	3	80	20	100	40	_	_	_	_
6	3MCA6	File Structure & Data Processing-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
7	3MCA7	Java Programming-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
8	3MCA8	Computer Oriented Optimization Techniques-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
9	3MCA9	Computer Lab-III	0	0	4	4	2	_	_	_	_	_	50	50	100	50
	TOTAL		20	0	10	30	25				500				250	

TOTAL : 750

APPENDIX-A
THREE YEAR POST GRADUATE DEGREE COURSE IN MASTER IN COMPUTER APPLICATION
SEMESTER PATTERN
CREDIT GRADE SYSTEM
SECOND YEAR SEMESTER-II

Sr.No.	Subject Code		Teaching Scheme					Examination Scheme								
			Hours/Week							Theory			Practical			
			Lecture	Tutorial	P/D	Total Hours/ Week	**Credits**	Duration of Paper (Hr.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min.Passing Marks	Max.Marks External	Max.Marks Internal	Total	Min. Passing Marks
1	4MCA1	Database Management Systems	4	0	0	4	4	3	80	20	100	40	_	_	_	_
2	4MCA2	Client Server Computing	4	0	0	4	4	3	80	20	100	40	_	_	_	_
3	4MCA3	Multimedia Technologies	4	0	0	4	4	3	80	20	100	40	_	_	_	_
4	4MCA4	Electronic Commerce	4	0	0	4	4	3	80	20	100	40	_	_	_	_
5	4MCA5	Elective-I	4	0	0	4	4	3	80	20	100	40	_	_	_	_
6	4MCA6	Database Management Systems-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
7	4MCA7	Client Server Computing-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
8	4MCA8	Multimedia Technologies-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
9	4MCA9	Electronic Commerce-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
10	4MCA10	Seminar	2	0	0	2	1	_	_	_	_	_	--	50	50	25
	TOTAL		22	0	8	30	25				500				250	
															TOTAL :	**750**

Elective-I : 1) Computer Graphics 2) Modelling & Simulation

APPENDIX-A
THREE YEAR POST GRADUATE DEGREE COURSE IN MASTER IN COMPUTER APPLICATION
SEMESTER PATTERN
CREDIT GRADE SYSTEM
THIRD YEAR SEMESTER-I

Sr.No.	Subject Code		Teaching Scheme					Examination Scheme								
			Hours/Week					Theory				Practical				
			Lecture	Tutorial	P/D	Total Hours/ Week	**Credits**	Duration of Paper (Hr.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min.Passing Marks	Max.Marks External	Max.Marks Internal	Total	Min. Passing Marks
1	5MCA1	Artificial Intelligence	4	0	0	4	4	3	80	20	100	40	_	_	_	_
2	5MCA2	Software Project Management	4	0	0	4	4	3	80	20	100	40	_	_	_	_
3	5MCA3	System Administration & Security	4	0	0	4	4	3	80	20	100	40	_	_	_	_
4	5MCA4	Management Information System	4	0	0	4	4	3	80	20	100	40	_	_	_	_
5	5MCA5	Elective-II	4	0	0	4	4	3	80	20	100	40	_	_	_	_
6	5MCA6	Artificial Intelligence-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
7	5MCA7	Software Project Management-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
8	5MCA8	System Administration & Security-Lab.	0	0	2	2	1	_	_	_	_	_	25	25	50	25
9	5MCA9	Mini Project	0	0	4	4	2	_	_	_	_	_	25	25	50	25
	TOTAL		20	0	10	30	25				500				250	

TOTAL : 750

Elective-II : 1) Data Warehousing 2) Bioinformatics

APPENDIX-A
THREE YEAR POST GRADUATE DEGREE COURSE IN MASTER IN COMPUTER APPLICATION
SEMESTER PATTERN
CREDIT GRADE SYSTEM
THIRD YEAR SEMESTER-II

Sr.No.	Subject Code	Subject	Teaching Scheme				Examination Scheme								
			Hours/Week						Theory			Practical			
			Lecture	Tutorial	P/D	Total Hours/ Week	**Credits**	Duration of Paper (Hr.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min.Passing Marks	Max.Marks External	Max.Marks Internal	Total	Min. Passing Marks
1	6MCA1	PROJECT & DISSERTATION	FULL TIME				25	--	_	_	_	_	150	100	250	150
														TOTAL :	**250**	

DIRECTION

No. 33/2010 Date : 24/6 /2010

Subject : Examinations leading to the Degree of Master in Computer Application (Three Year Course .... Bi-Annual Pattern .... Credit Grade System)

Whereas the schemes of teaching & examinations of Master in Computer Application course has been accepted by the Academic Council vide Item No. 49 (J) in its meeting held on 28-05-2010 as per the Credit Grade System for its implementation from the Academic Session 2010-2011,

AND

Whereas admissions to the First Year of Master in Computer Application course are to be made in the Academic Session 2010-2011,

AND

Whereas the matter for admission of the students at the examinations is required to be regulated by an Ordinance,

AND

Whereas the schemes of teaching & examinations of I and II Semesters of Master in Computer Application course are to be implemented from the academic session 2010-2011,

AND

Whereas the schemes of teaching & examinations are required to be regulated by the Regulation,

AND

Whereas the process of making an Ordinance and the Regulation is likely to take some time,

AND

Whereas syllabus for I and II Semesters of Master in Computer Application course is to be sent for printing.

Now, therefore, I, Dr.Ku.Kamal Singh, Vice-Chancellor of Sant Gadge Baba Amravati University in exercise of powers confirmed upon me under sub section (8) of Section 14 of the Maharashtra Universities Act, 1994, hereby direct as under :

1. This Direction may be called "Examinations leading to the Degree of Master in Computer Application (Three Year Course .... Bi-Annual Pattern .... Credit Grade System) Direction, 2010.
2. This Direction shall come into force w.e.f. the session :-
   - i) 2010-2011 for First Year,
   - ii) 2011-2012 for Second Year, and
   - iii) 2012-2013 for Third Year

3. Subject to their compliance with the provisions of this Direction and other ordinances in force from time to time, the following person shall be eligible for admission to MCA.
   - (a) Graduate in any Discipline with minimum 50% marks and Math upto 10+2 level (5% Relaxation for B.C.)
   - (b) A person passing a PGDCS Exam. of Sant Gadge Baba Amravati University, satisfying the condition given in "a" above are eligible to take admission directly at second year of MCA (subject to condition of availability of seats, in total intake capacity) subject to condition that he will pass the subject heads of 1st MCA not covered at PGDCS level.
4. (i) Duration of the course shall be three academic years.
   - (ii) Courses of First year MCA, Second year MCA and Third year MCA are divided into two parts every year i.e. part-I and part-II and the University shall held Examination in Winter and in Summer every year for both the Part-I & II.
   - (iii) The main Examination of Part-I shall be held in Winter & the Main Examination of Part-II shall be held in Summer every year. The Supplementary examination for Part-I shall be held in Summer and the Supplementary Examination for Part-II shall be held in Winter every year.
5. For purposes of instruction and examination the student shall study sequentially.
6. The period of academic session/term shall be such as may be notified by the University.
7. The Examinations shall be held at such places and on such dates as may be notified by the University.
8. Subject to his/her compliance with the provisions of this Direction and of other Ordinances (Pertaining to Examinations in General) in force from time to time, the applicant for admission, at the end of the course of study of a particular term shall be eligible to appear at it, if,
   - i) He/She satisfied the condition in the table and the provision thereunder.
   - ii) He/She was prosecuted a regular course of study in the University/College affiliated to the University.
   - iii) He/She has in the opinion of the Head of the Department/Principal shown satisfactory progress in his/her studies.

Name of Exam	The student should have passed the examination of	The student should have completed the session / term satisfactorily
1.	2.	3.
First Year MCA Part-I	The qualifying Examination mentioned in para-3	First Yr. MCA Part-I
First Year MCA Part-II		First Yr. MCA Part-I & II
Second Year MCA Part-I		Second Year MCA Part-I
Second Year MCA Part-II		Second Year MCA Part I & II
Third Year MCA Part - I	Shall have cleared Ist of MCA & qualified for admission to Third Year as per para-4	Third year MCA Part-I
Third Year MCA Part - II		Third Year MCA Part-I & II

9. The schemes of teaching & examinations shall be as provided under "Appendix-A" appended with this Direction.

10. i) The scope of the subject is as indicated in the syllabus.
    ii) The medium of instruction and examination shall be English.

11. The fees for each M.C.A. Examinations (Theory & Practical) shall be as prescribed by University from time to time.

12. The computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) of an examinee shall be as given below :-

The marks will be given in all examinations which will include college assessment marks and the total marks for each Theory / Practical shall be converted into Grades as per Table II.

SGPA shall be calculated based on Grade Points corresponding to Grade as given in Table II and the Credits allotted to respective Theory / Practical shown in the scheme for respective semester.

SGPA shall be computed for First Year (Part I & II), Second Year (Part I & II) and Third Year (Part I & II) and CGPA shall be computed in Third Year (Part II) based on SGPAs of First Year (Part I & II), Second Year (Part I & II) and Third Year (Part I & II). :-

$$SGPA = \frac{C_1 \times G_1 + C_2 \times G_2 + ... + C_n \times G_n}{C_1 + C_2 + ... + C_n}$$

Where C_1 = Credit of individual Theory / Practial

G_1 = Corresponding Grade Point obtained in the respective Theory / Practical

$$CGPA = \frac{(SGPA)_{\text{First Year Part-I}} \times (Cr)_{\text{First Year Part-I}} + ... + (SGPA)_{\text{Third Year Part-II}} \times (Cr)_{\text{Third Year Part-II}}}{(Cr)_{\text{First Year Part-I}} + ... + (Cr)_{\text{Third Year Part-II}}}$$

Where $(SGPA)_{\text{First Year Part-I to Third Year Part-II}}$ = SGPA of First Year Part-I to Third Year Part-II

$(Cr)_{\text{First Year Part-I to Third Year Part-II}}$ = Total Credits for First Year Part-I to Third Year Part-II

CGPA equal to 6.00 and above shall be considered as equivalent to First Class which shall be mentioned on Grade Card of Third Year Part-II as a foot note.**TABLE II**

THEORY

Grade	Percentage of Marks	Grade Points
AA	80 ≤ Marks ≤ 100	10
AB	70 ≤ Marks < 80	9
BB	60 ≤ Marks < 70	8
BC	55 ≤ Marks < 60	7
CC	50 ≤ Marks < 55	6
CD	45 ≤ Marks < 50	5
DD	40 ≤ Marks < 45	4
FF	00 ≤ Marks < 40	0
ZZ	Absent in Examination	—

PRACTICAL

Grade	Percentage of Marks	Grade Points
AA	85 ≤ Marks ≤ 100	10
AB	80 ≤ Marks < 85	9
BB	75 ≤ Marks < 80	8
BC	70 ≤ Marks < 75	7
CC	65 ≤ Marks < 70	6
CD	60 ≤ Marks < 65	5
DD	50 ≤ Marks < 60	4
FF	00 ≤ Marks < 50	0
ZZ	Absent in Examination	—

13. Provisions of Ordinance No.18 of 2001 in respect of an Ordinance to provide grace marks for passing in a Head of passing and improvement of Division (Higher Class) and getting distinction in the subject and condonation of deficiency of marks in a subject in all the faculties prescribed by the Statute No.18, Ordinance, 2001 shall apply to each examination under this Direction.

14. An examinee who does not pass or who fails to present himself/ herself for the examination shall be eligible for readmission to the same examination, on payment of fresh fees and such other fees as may be prescribed.

15. As soon as possible after the examination, the Board of Examinations shall publish a result of the examinees. The result of final MCA Examination shall be classified as above and meritlist shall be notified as per Ordinance No.6.

16. Notwithstanding anything to the contrary in this Direction, no person shall be admitted to an examination under this Direction, if he/she has already passed the same examination or an equivalent examination of any statutory University.

17. i) The examinees who have passed in all the subjects prescribed for all the examinations shall be eligible for award of the Degree of Master in Computer Application.

    ii) An examinee successful at the examination shall on payment of prescribed fees receive a degree in prescribed form signed by the Vice-Chancellor.

Sd/-
Dr. Kamal Singh
Vice-Chancellor

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SANT GADGE BABA AMRAVATI UNIVERSITY.

SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

(1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.

(2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc., refer the University Ordinances Booklet the various conditions/provisions pertaining to examination as prescribed in the following Ordinances.

Ordinance No. 1	:	Enrolment of Students.
Ordinance No. 2	:	Admission of Students
Ordinance No. 4	:	National cadet corps
Ordinance No. 6	:	Examinations in General (relevent extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Inprovement of Division (Higher Class) and getting Distinction in the subject and condonation of defficiency of marks in a subject in all the faculties prescribed by the Statute, No.18, Ordinance, 2001.
Ordinance No. 9	:	Conduct of Examinations (relevent extracts)
Ordinance No. 10	:	Providing for Exemptions and Compartments
Ordinance No. 19	:	Admission of Candidates to Degrees.

Ordinance No. 109	:	Recording of a change of name of a University student in the records of the University.
Ordinance No. 6/2008	:	For improvement of Division/Grade.
Ordinance No.19/2001	:	An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Dineshkumar Joshi
Registrar
Sant Gadge Baba
Amravati University.