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शिवाजी विद्यापीठ, कोल्हापूर - ४१६ ००४.

दुरध्वनीः (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग– २६०९०९४) तार : युनिशिवाजी
फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३. e-mail bos@unishivaji.ac.in.

★ ★ ★ ★ ★ B+

Accredited By NAAC

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SU/BOS/Commerce /6021   Date : 20-8-2009

To,
The Head,
Department of Commerce,
Shivaji University,
Kolhapur.

Subject: Regarding the revised syllabi & equivalence of M.C.A. Semester I & II
           (Under Academic Flexibility and Credit system) under the Faculty of Commerce.

 Sir/Madam,

        With reference to the subject mentioned above, I am directed to inform you that
the university authorities have accepted and granted approval to the revised syllabi &
equivalence of M.C.A. Semester I & II (Under Academic Flexibility & Credit system)
under the Faculty of Commerce.

        This syllabi will be implemented from the academic year 2009-2010, (i.e. from
June 2009) onwards. This syllabus is also available on university website
www.unishivaji.ac.in.

        The question papers on the pre-revised syllabi of above mentioned Course will
be set for the examinations to be held in October/November-2009   and   April/March-
2010. These two chances are available for repeater students, if any.

        You are therefore, requested to bring this to the notice of all students and
teachers concerned.

        Thanking you,

                                                                Yours faithfully,

                                                                Dy. Registrar
                                                                (Board of Studies Section)

Copy to:-

        1   Dean, Faculty of Commerce
        2   Chairman, Board of Studies in
             Business Management
        3   Appointment Section
        4   P.G. Admission Section
        5   O.E-I Section
        6   Affiliation Section (P.G.)
        7   Computer Centre
        8   Eligibility Section

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Shivaji University, Kolhapur.

Department of Commerce & Management
Revised Syllabi of MCA (Under Academic Flexibility, Credit System)
(Under Commerce Faculty)
Semester – I & II
Introduced From Academic Year 2009-10
(i.e. June 2009 onwards)

Syllabi 0f MCA (Commerce) Semester I & II

(Under Academic Flexibility, Credit System)
TO be introduced From Academic Year 2009-10
(i.e. June 2009 onwards)

1. Introduction: -

MCA (Commerce) is a six-semester course spread over the period of three years. The Department of Commerce, Shivaji University, Kolhapur, offers this course on its campus. It is designed to offer in depth knowledge of recent technologies in use today. Students are also provided extensive laboratory training on the course content and the current requirements of industries and R & D. In the final semester every student has to undertake a project, which is an industrial project.

In addition, the course caters to the requirements of providing complete exposure to NET/SET syllabus for Commerce framed by the U.G.C.

2. Advantages of the course: -

The course provides exposure to the students to the technologies in-vogue and trains them to take up projects relevant to the industrial needs, the R& D activities and self –employment opportunities.

The student after passing the MCA course has many opportunities of employment, self-employment and higher studies.

Employment Opportunities: -

− I.T. Industries (India and Abroad).
− Research and Development Laboratories.
− Employment as a teacher and Other Govt. Organizations.
− Electronics and Telecommunication Industries.
− Process and Manufacturing Industries.

Educational Opportunities: -

− Higher studies in I.I.T, I.I.Sc, and CERE Pilani. (Ph.D.)
− Research in Shivaji University or any other University. (Ph.D.)
− Research abroad.

3. Objectives of the Courses: -

The course is designed with a view to cater to the present day requirements in Industries, R & D fields, higher studies and Self-employment. Moreover the course structure intends to inculcate strong practical skills, so that the student can take up independent projects which will help them to be a successful software engineer as well as entrepreneur. The students passed out from the course will serve as quality human resource to take up the state of art research work of the Department.

4. Title of the Course:

Master Of Computer Application [M.C.A.] (Under Commerce Faculty)

5. Eligibility of the Course:

- Any graduate with 50% of marks.
- Knowledge of mathematics at XII standard level is desirable.

6. Fees for the Course

Class	Total Fees, Paying	Total Fees, EBC/PTC/ STC/ Maji Saineek / FF	Total Fees, SC/NT/ST/ OBC/ SBC	Total Fees, Paying	Total Fees, EBC/PTC/ STC/ Maji Saineek / FF	Total Fees, SC/NT/ST/ OBC/ SBC
M.C.A. Part I	20,575/-	------	------	20,575/-	------	------
M.C.A. Part II	19,975/-	------	------	19,975/-	------	------
M.C.A. Part III	11,400/-	------	------	11,400/-	------	------

For foreign students tuition fees is Rs.80,000/- + 4575/- per year.

7. Strength of the Students:

The intake capacity is 60 + 10 % of the intake.

8. Admission/Selection procedure:

The admission to the MCA (Commerce) course is by entrance examination only. Admissions are given on the basis of merit of entrance examination and following the University rules of admission

The admission will be by round and the information regarding entrance examination result and the round of admission will be put up on the Shivaji University website www.unishivaji.ac.in.

9. Duration of the Course:

MCA (Under Commerce Faculty) is a three years, six semesters full time course.

10. Period of the Course:

From June to April End as specified in the University Calendar from time to time.

11.Teachers Qualification:

a) Good academic record

b) MCA with minimum 55% (MCA under any faculty)

c) NET/SET if candidate has Ph.D. in the subject, he will be exempted from NET/SET as per UGC and university rules.

12. Credit system implementation

MCA (Under Commerce Faculty) is a six semester course. For I, III, V course consists of five theory courses, one laboratory (Practical) course and one Seminar each carrying weightage of 100 marks (4 credits) each. For II, IV semester course consists of five theory courses and two laboratory (practical +project) courses each carrying weightage of 100 marks (4 credits) each. However, in the final semester, there will be one project. In order to qualify for three-year master's degree a student must acquire minimum of 60 credits (10 credits each semester) which are distributed as given below.

 i. 20 credits in compulsory courses

 ii. 04 credits in practical course.

 iii. 04 credits in project

 iv. 04 Credits in Seminar

Credit as defined is the workload of a student in

  1. Lectures

  2. Practical

  3. Seminar

  4. Project

  5. Private work in the library/home

  6. Examination

  7. Other assessment activities

The credit system permits students to

- learn at their own pace
- choose electives from a wide range of elective courses offered by the University departments
- undergo additional courses and acquire more than the required number of credits
- adopt an inter-disciplinary approach in learning
- make best use of the expertise of available faculty

How much time a student gives for the examination per semester?

1) 5 Theory papers per semester each of 3 hours duration. Time required is 15 hours

2) One practical with two lab assignment (for semester I, III, & V)

3) One practical with two lab assignment and one project (for semester II, IV)

4) One Industrial project for 6th semester.

5) One Seminar per subject (For Semesters I, III & IV)

Total time for a semester (I, III, V) examination is

15(theory) + 1(practical) + 1(Seminar) = 17hours.

Total time for a semester (II, IV) examination is

15(theory) + 2(practical) + ½hr (project) = 17½hours.

Total time for a semester (VI) examination is

45 minutes (project) = 45 minutes

Time required for the other activities.

• Projects – synopsis

• Discussions

• Library – Book issue, Journal reference, Internet access. Reading magazines and relevant information

• Private work – Project material, Books purchase, Xerox, availing outside facilities etc

• Home – Study, Notes preparation, Computations, tutorials, assignments etc.

Types of credits

1) Credit by examination – Tests (theory , Practical and Projects, Seminar)

2) Credit by non examination –Proficiency in state National and International sports achievements, Social service (NSS), Military services (NCC), Colloquium & debate, Cultural programs etc

Credits by lectures and practicals

• 1 credit is equivalent to 15 contact hours

• Total instructional days as per the UGC norms are 180

• For the M.CA course there are 5 theory papers with 4 hours teaching per week

  so the instructional days for theory papers in a semester are 5 X 15(weeks) = 75 days.

• There are 1 practical + 1 Seminar per subject each of 4 hrs per week for semester-I,III ,V

• There are 2 practicals (with one project) each of 6 hrs per week for semester-II ,IV

• The total practical workload is of 12 hours. Thus the instructional days for the practical course of 2 practicals are 6 x 15 = 90 days.

- 60 days are common for theory and practicals there for the time for which a student is busy in a semester is 60(theory + practical) + 30(practical) = 90 days.
- With 4 credits per subjects there will be 4 x 5 = 20 credits for the theory papers and 2 x 4 = 8 credits for the practicals. Every practical (project) of 100 marks carries 4 credits.

Number of credits for the MCA course per semester will be 20+8 = 28.

Total number of credits for the entire MCA course = 5 x 28+ 8

(for 6th semester) = 148.

The implementation of the credit system:

- Under the credit system every semester duration will be of at least 15 weeks.
- The examination must be scheduled in one month's time.
- The students must get at least 3 weeks time for the examination preparations.
- Every theory paper syllabus should consist of 4 units (sub units allowed) each carrying 1 credit.
- In order to have uniformity in the credit transfer internal examination in all the P.G.departments shall have equal weightage 80 external +20 internal.

Theory paper	Contact hours	credits
Unit –I (sub units if any)	15	1
Unit –II (sub units if any)	15	1
Unit –IIII (sub units if any)	15	1
Unit –IV (sub units if any)	15	1

- The practical course credit distribution

a) Practical paper   contact hours

    Paper-I   6

    Project   6

    Total credits for practical papers= 12 hrs for the semester (II, IV)

  b) Practical paper   contact hours

    Paper-I   6

    Total credits for practical papers= 6 hrs for the semester (I, III, V)

A project of 100 marks will carry 4 credits. Where a project of 100 marks is offered to the student, the student will have to perform 1 project and 1 practical paper for that semester. Time for the explanation for the practical course (contact hours) will be one week (12 hrs).

Grades, grade point and average grade point's calculations

Table showing the grades, grade points and marks scored by a student

Grades	Grade points	marks out of 100
A+	9	91 to 100
A	8	81 to 90
A-	7	71 to 80
B+	6	61 to 70
B	5	51 to 60
B-	4	41 to 50
C+	3	31 to 40
C	2	21 to 30
C-	1	11 to 20
F	0	0 to 10

Semester Grade Point Average (SGPA):-It is a semester index grade of a student.

1. SGPA = $(g_1 x c_1) + (g_2 x c_2) + ----- + (g_6 x c_6)$/ Total credits offered by the student in a semester.

2. Cumulative Grade Point Average (CGPA) :- It is a cumulative index grade point average of a student

   CGPA = $(g_1 x c_1) + (g_2 x c_2) + ----- + (g_6 x c_6)$/ Total number of credits offered by a student upto and including the semester for which the cumulative average is required.

3. Final Grade Point Average (FGPA):- It is a final index of a student in the course

   FGPA = $(n / \sum c_i \times g_i) / (n/ cl)$

   Where c_i – credit of the course (paper) (4)

        g_i – grade pints secured (see the table for conversion)

        n - number of courses (number of papers offered)

        cl – Total number of credits for the entire M.Sc course (96)

Rules for opting for the credits

1. Admission to the students from the other departments for the credits will be restricted to the core papers or practicals only.

2. A student from the other department will be offered credits of his choice in multiples of 4. A theory paper or the practical course can be offered as the credit. However number of such admissions will depend upon the seats available, classroom seating capacity and the laboratory facilities.

3. Core Courses

   Core courses are those, knowledge of which is deemed essential for students registered for a particular Master's programme. As such all core courses shall be mandatory and a student must pass in all the core courses prescribed for the programme. Core courses shall be spread over all the four semesters.

4. Any student can have credits from the Management course.

5. Attendance: As per the university rule the attendance of the student must be at least 75 %. For attendance in the classroom or laboratory student will have to sign the attendance sheet. Merely 'P' for present or 'A' for absent will not be considered valid.

6. A teacher offering the course will be responsible for maintaining the attendance and the performance sheets of all the students offering that course. The attendance sheet will have to be deposited to the department office by every teacher bearing his signature at the end of every semester.

Nature of the internal examination:-

- For every theory paper there will be two internal examination(s) carrying 10 marks each. The total of the marks scored in these two examinations will be taken for the final score out of 20.

- The nature of this examination will be as follows.

- There will be 10 questions of objective type only in the internal examination.

- No student will be allowed to take reexamination if he/she remains absent unless the reason is genuine.

- The decision regarding such cases will be taken in a department committee meeting.

- The result of the internal assessment will be declared after one week from the date of examination. The student will be shown the answer papers by the concerned teachers.

The assessment of the practicals (examination): -

1) Every practical a student performs day to day in the laboratory shall be of two hours durations. A student will have to carry out practical assignments in Lab.
   ➢ Marks for the practicals (practical + Project) for semester (II, III)shall be 200.
   ➢ Marks for the practicals (practical) for semester (I, III, V) shall be 100.

2) There will be no external examination for the practical. These examinations will be internally conducted. In every semester there will be two internal practical examinations each carrying 50 marks. For 50 marks examination a student will have to perform three experiments.

3) For the assessment of the project specialization wise panel of expert will be appointed. The panel of expert will be as follows.

   i) Project guide

   ii) One expert from the industry/academic institute in the subject

   iii) 1 teacher from the department.

   The distribution of the project marks shall be as follows.

i) Project presentation	(20%)
ii) Demonstration of the project	(30%)
iii) Orals	(30%)
iv) Report	(20%)

3. The workload of a teacher will be as per the UGC norms as far as the theory and practicals are concerned.

5. The Assessment of Seminar:-

There will be internal evaluation of the seminar. The student should deliver the seminar & submit the report to the concerned teacher. For this seminar 100 marks are given. The distribution of 100 marks is as follows: 20 marks for each subject's seminar. (20 * 5 = 100)

Every teacher should conduct the seminar of his subject & collect seminar reports & evaluate the report for 20 marks.

13.   **Nature of the Question Paper:**

The model question paper is as follows:

TITLE OF THE PAPER

Paper- X   Marks: 80

Time- 3 Hrs.   Day and Date

Instructions:

1. All questions carry equal marks.

2. Attempt any 5 questions

3. Each question carries 16 marks.

- Total number of questions in theory question paper are- 7

- Questions can have sub questions in them.

Structure and titles of the semester courses

For an example the marks obtained and the grade is given using the above rules.

MCA-Semester-I

Sr. No.	Course	Credits	Letter Grade	Marks Obtain.	Grade Value	Credit value	Grade Points
1	Fundamentals of Information Technology	4	B-	45	4	4*4	16
2	Procedure Oriented Programming with C	4	A	85	8	4*8	32
3	Discrete Mathematics	4	B+	70	6	4*6	16
4	Computer Organization and Architecture	4	B	56	5	4*5	20
5	Introduction to Management Function	4	C+	32	3	4*3	12
6	Business Communication	4	B	59	5	4*5	20
7	Practical I (Procedure Oriented Programming with C)	4	B-	48	4	4*4	16
	Total	28				Total	132

Total no. of Grade Points   132

GPA = ------------------------------   =   ------   =   4.71

Total no. of Credit points   28

Practical Lab Assignments (On Procedure Oriented Programming with C) :

1) Write a program to print or display "Hello C".

2) Input and output your name, address and age to an appropriate structure.

3) Write a C program for addition, subtraction, multiplication and division of two numbers.

4) Write a program that works out the largest and smallest values from a set of 10 inputted numbers.

5) Write a program to read in 10 numbers and compute the average, maximum and minimum values.

6) Write a program that displays-

   - "Hi" when the user enters input value as 1.

   - " Hello" when the user enters input value as 2.

   - "Hey" when the user enters input value as 3.

   - "Excuse me" when the user enters input value other than 1,2 or 3

7) Calculate the sum of the numbers starting from 0 to 12.

8) Write a program that calculate LCM and GCD of 2 input numbers.

9) Write a recursive function factorial that calculate factorial of given number.

10) Write a program that find maximum number from the following set of numbers (34,23,22) (314,123,122).

11) Write a program that changes the value of variable I from 10 to 60 through pointer.

12) Write a program that stores integer value 10 on heap and frees it.

13) Write a program that accepts roll number , PCM percentage of 10 students and stores in a file. Access the roll number of 7th student and display PCM average of that student.

MCA-Semester-II

Sr. No.	Course	Credits	Letter Grade	Marks Obtain.	Grade Value	Credit value	Grade Points
1	Software Engineering	4	A-	77	7	4*7	28
2	Data Structure	4	B-	45	4	4*4	16
3	Statistical Computing	4	B	53	5	4*5	20
4	Database Management System	4	C+	40	3	4*3	12
5	Accounting and Financial Management	4	C-	19	1	4*1	04
6	Practical – II (Data Structure, DBMS)	4	C+	33	3	4*3	12
7	Project & Viva	4	B-	50	4	4*4	16
	Total	28				Total	108

$$GPA = \frac{\text{Total no. of Grade Points}}{\text{Total no. of Credit points}} = \frac{108}{28} = 3.85$$

CGPA = (132/28) + (108/28)   =

Practical Lab Assignments (Data structure and SQL) :

1) write a program to implement Queue

2) write a program to convert an infix expression into postfix expression

3) write a program to implement doubly linked list

4) write a program for Tower of Honoi problem

5) write a program to implement tree with insert ,delete and search

6) write a program to for inorder, postorder and preorder traversal of tree

7) write a program for binary and sequential search

8) write a program for bubble sort ,insertion sort & quick sort

9) write a program for shortest path finding

10) write a program to implement linked list with inset ,delete,search,view function

11) create a table 'student' which store information about student & display the information

12) Alter table student by adding a primary key on the column roll. no

13) write a PL/SQL block to accept an employee number & the branch number followed by updating branch number of that employee to which he belongs appropriately.

14) write a PL/SQL block that will display the customer name, fixed deposit no. the fixed deposit amount of the five customer holding the highest amount in fixed deposit

15) write a stored procedure to calculate addition of two no.

MCA-Semester-III

Sr. No.	Course	Credits	Letter Grade	Marks Obtain.	Grade Value	Credit value	Grade Points
1	Operating System	4	B-	44	4	4*4	16
2	Object Oriented Programming C++	4	A	81	8	4*8	32
3	Computer Oriented Optimization Techniques	4	C	27	2	4*2	08
4	Visual Programming With VB	4	A+	93	9	4*9	36
5	Organization Behavior And Business Communication	4	B	57	5	4*5	20
6	Practical – III (Object Oriented Programming C++, Visual Programming With VB)	4	B-	47	4	4*4	16
7	Project & Viva	4	C+	33	3	4*3	12
	Total	28				Total	140

$$\text{GPA} = \frac{\text{Total no. of Grade Points}}{\text{Total no. of Credit points}} = \frac{140}{28} = 5.0$$

CGPA = (132/28) + (108/28) + (140/28) =

MCA-Semester-IV

Sr. No.	Course	Credits	Letter Grade	Marks Obtain.	Grade Value	Credit value	Grade Points
1	Computer Network	4	B-	46	4	4*4	16
2	Software Project Management	4	C+	39	3	4*3	12
3	Web Designing With HTML	4	A-	75	7	4*7	28
4	Java Programming	4	A+	90	9	4*9	36
5	Enterprise Recourse Planning	4	B+	65	6	4*6	24
6	Practical – IV (Web Designing With HTML, Java Programming)	4	B	55	5	4*5	20
7	Project & Viva	4	C	27	2	4*2	08
	Total	28				Total	144

Total no. of Grade Points   144

GPA = -------------------------------   =   ------   =   5.14

Total no. of Credit points   28

CGPA = (132/28) + (108/28) + (140/28) + (144/28)   =

MCA-Semester-V

Sr. No.	Course	Credits	Letter Grade	Marks Obtain.	Grade Value	Credit value	Grade Points
1	Knowledge Management	4	C+	35	3	4*3	12
2	Linux Operating System	4	A-	77	7	4*7	28
3	Advanced Java Programming	4	A+	94	9	4*9	36
4	Information System Audit	4	B+	68	6	4*6	24
5	E-C0mmerce Applications	4	B-	46	4	4*4	16
6	Practical – V (Linux Operating System, Advanced Java Programming)	4	B	55	5	4*5	20
7	Project And Viva	4	B-	42	4	4*4	16
	Total	28				Total	152

Total no. of Grade Points   152

GPA = -------------------------------   =   ------   =   5.428

Total no. of Credit points   28

CGPA = (132/28) + (108/28) + (140/28) + (144/28) + (152/28)   =

MCA-Semester-VI

Total marks 250

Total credits - 10

(internal mark + external examiner mark)

= (50 + 200)

Grade for Semester-VI

Final Grade Point Average is calculated by using the formula

{n/(c1*g1)} / {n/ci}

Where

c = Credit of the ith course (paper)

g = Grade point secured in each paper

n = No. of Courses (No. of papers offered)

ci = Total number of the credits for whole examination

Instructions for candidate opting subjects in Commerce departments

MCA (Under Commerce)

1) Semester-I   - Procedure Oriented Programming With C++

2) Semester-II   - Object-Oriented Programming With C++

3) Semester-III   -RDBMS using ORACLE/Organizational Behavior & Business communication

4) Semester-IV   - IT-Elective-I / BM-Elective-I/ Enterprise Resource Management

5) Semester-V   - IT-Elective-I / BM-Elective-II/ IT Management

- Projects and practical cannot be opted.
- Students have to pay some extra fee for each subject.

The rules for taking admissions for second year and third year of MCA (Commerce) under credit system as per follows:-

➢ **Admission to second year MCA (Commerce) Part – II :-**

1) If a student of MCA (Commerce) Part – I is failed in Sem. – I and Sem. – II, he will be allow to take admission to second year MCA (Commerce) Part – II.

➢ **Admission to third year MCA (Commerce) Part – III :-**

1) Before taking admission to third year MCA (Commerce) Part – III, a student has to clear all subjects, Practical's and Project of MCA (Commerce) Part – I .

2) If a student has cleared all subjects, Practical's and Project of MCA (Commerce) Part – I but he is failed at Sem. – III and Sem. – IV of MCA (Commerce) Part – II, he is able to take admission to third year of MCA (Commerce) Part – III

Credit System Syllabus

Master of Computer Application (Commerce)
Semester -I
Paper-I- MCA (Commerce) - 1.1: Fundamentals of Information Technology

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Unit-I

Computer Basics: Evolution, generations and classification of computers, The computer system, Applications of computers. **Computer Memory and Storage:** Memory hierarchy, RAM, ROM, Types of secondary storages, Magnetic tape, magnetic disks and its types, optical disks and its types, Types of input output devices.

Unit-II

Operating system: Definition, evolution, types and functions of operating system, **Information technology basics**: Information, technology, information technology, Role of IT, IT and Internet, Careers in IT industry. Computer Software: Definition, Categories of software, software piracy, software terminologies, installing and uninstalling software.

Unit-III

Data communications and computer networks: data communication, transmission media, modulation, multiplexing, switching, computer network, network topologies, communication protocol- OSI Model, Network devices: Network interface card, repeater, hub, bridge, switch, router gateway. **The internet:** evolution of internet, basic internet terms, internet applications

Unit-IV

Computer Security: Definition, Malicious programs, cryptography, digital signature, user identification and authentication, security awareness and policies. **Emerging trends in IT:** E-commerce, electronic data interchange, mobile communication, Bluetooth, global positioning system, infrared communication, smart card, imminent technologies.

Reference Books:

1) Introduction to Information Technology ---   ITL Education Solutions Ltd.
2) Fundamentals of Information Technology --- Deepak Bharihoke
3) Computer Fundaments ---   V Rajaraman
4) Computer Fundamentals   ---   P K Sinha

Credit System Syllabus
Master of Computer Application (Commerce)
Semester -I
Paper-II- MCA (Commerce) -1.2: Procedure Oriented Programming with C

Unit-I   **(15)**

Introduction to programming: procedural programming, algorithm, flowchart, Pseudo code, identifiers, reserved words, tokens, constants, variables, operators and expressions ,structure of a C program.

Unit- II   **(15)**

Input/output functions, Control statements, Loop control structures in C, array declaration, one dimensional, two dimensional, String manipulations in C.

Unit-III   **(15)**

Functions: declaration, calling, actual and formal arguments, recursion, Storage classes in C, Structures and union, pointers, dynamic memory allocation.

Unit- IV   **(15)**

Files: Types, declaration, handling characters, handling integers, random file access, fseek(), fread(), fwrite, ftell() functions. C preprocessor and command line arguments.

References:

1. T Jeyapoovan : Programming with C
2. Ellis Horowitz, Sartaj Sahni : Fundamentals of Computer Algorithms (Galgotia)
3. Kernighan and Ritchie : The C Programming language
4. Herbert Schildt : Complete C Reference
5. Let us C - Kanetker

Credit System Syllabus
Master of Computer Application (Commerce)
Semester -I
Paper-III- MCA (Commerce) - 1.3 : Discrete Mathematics

Unit 1 : a) Theory of matrices : Types of matrices, inverse by adjoin method, solutions of simultaneous linear equations (Homogeneous and non homogeneous) by gauss elimination method.

b) Recurrence relations and solutions : linear homogeneous and non-homogeneous equations with two indices formula for derangement, restrictions on relation positions

Unit 2 : a) set theory : Set and numbers, operations on sets, power set, partition of a set, product sets, computer representation of sets, principle of inclusion and exclusion.

b) Relations and Functions: relations, digraphs, paths in relations, properties of relations ,equivalence relations, operations on relations ,closures and Warshall's algorithm, computer representations of relations and digraph. Functions, properties, functions for computer science.

Unit 3 : a) Mathematical logic : Notations, connections, normal forms, theory of inference for statement calculus.

b) Predicate calculus, inference theory of predicate calculus.

Unit 4 : a) Graph theory : Graphs, terminology and representation, elementary graph algorithms, DFS, BFS, spanning tree, kruskals and prims algorithm.

b) Shortest path algorithm, topological sorting, bipartite graphs, eularian and Hamiltonian graphs.

References:

1. Discrete mathematical structure: Kolman B. Busby R.C. Ross S.C. prentice – Hall of India (P) Ltd.

2. Discrete mathematics: Olympia Nicodimi CBS – publishers and distributors Delhi.

3. Discrete Mathematical structures with applications of computer science : Tremblay J.P. and manohar R. THM- 7.

4. Elements of discrete Mathematics : Liv C.L. Tata Mcgraw Hill publishing company Ltd. New Delhi.

5. Discrete Mathematics: Joshi K.D. Wiley eastern India Ltd.

6. A logical approach to discrete Mathematics : Darcial Gries, Fred B. Schneidn. Springer Verlag, New York.

7. Graph Theory : clark

8. Graph theory and applications : Fould

9. The theory of graphs and its applications : Berpe C. John Wiley and sons New York.

10. Graph Algorithms : Even S. Computer Science press Potomac Md.

11. Graph theory : Havary F. Addison, Wesley publishing company.

12. Algorithmic Graph theory : chartrand.

Credit System Syllabus
Master of Computer Application (Commerce)
Semester -I
Paper-IV- MCA (Commerce) -1.4: Computer Organization and Architecture

Unit - 1 (15)
Digital Logic Circuits - Digital Computers, Logic gates, Boolean algebra, Map Simplification, Combination Circuits, flip-flops – R/S, D, JK, JKMS and Sequential Circuits – Binary Counters, Down Counter, Serial –in-serial-out shift register, Parallel-in-Parallel-out-shift register.
Digital Components - Decoders, Multiplexes, and Memory Unit.

Unit – 2 (15)
Data Representation - Number systems – Decimal, Binary, Hexadecimal and Base Conversion algorithms. Fixed Point Representation, Floating Point Arithmetic, Other Alphanumeric Codes, Error detection Codes.
Basic Computer Organization and Design - Instruction Codes, Computer Registers, Computer instructions, Memory Reference Instructions, Input-Output and interrupt, Input configuration and instruction, program interrupt.

Unit – 3 (15)
Memory Organization – Memory hierarchy, Main memory- RAM and ROM chips, Auxiliary Memory, Associative Memory – H/W Organization, Cache Memory – associative mapping, direct mapping, set associative mapping, Virtual memory – Address space and memory space.
Micro programmed Control: Control Memory, Address sequencing – conditional BRANCHING, Mapping of instructions, subroutine.

Unit – 4 (15)

Input-Output Organization - Peripheral devices, Input- Output Interface – I/O bus and interface modules, I/O versus memory bus, Isolated versus memory-mapped I/O ,asynchronous Data
Transfer – Strobe control, handshaking, DMA – DMA controller, DMA Transfer .

References:-
1. M. Morris Mano -- Computer System Architecture, Pearson education.

2. Rajaraman V. Fundamentals of Computers.

3. William Stallings, Computer Organization & Architecture, Maxwell, Macmillan.

4. V.Carl Hamacher, Zvonko G. Vranesic, Sajwat G. Zaky, Computer Organisation, McGrewHill
   Publication.

5. P.Pal Choudhari, Computer Organisation & Design, Prentice Hall of India
6. George W. Gorshine, Computer Organisation, BHI.

Credit System Syllabus
Master of Computer Application (Commerce)
Semester -I
Paper-V- (MCA-1.5): Introduction to Management Functions
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Unit – 1
Human Resource Development: Behavioral aspects of MANAGEMENT – HRD selection, appraisal, training & information systems, Strategic Human Resource Management   (15)

Unit – 2
Financial Management: Concept, scope & its relationship with other functional areas, conceptual understanding of financial management – classification chart of the ratio's – fund flow analysis, ratio analysis, distinguish between fund flow and cash flow, working capital cycle, risk and return trade off (illustrations should be excluded), Strategic Financial Management   (15)

Unit – 3
Production Management – Concept, scope and relationship with other functions – production system, production planning and control, concepts of materials management, quality management, quality concept and planning, standardization quality circles.
        (15)

Unit – 4
Marketing Management: Concept – scope – relationship with other functional areas, Marketing – conceptual background of the four components i.e. product price, Place and Promotion, marketing Information System, Marketing Research and Organization, Strategic Marketing Management.   (15)

Reference Books :

1. Agarwal R.D. "Organization & Management" TATA MCGROW HILL 1986
2. Massie "Essentials of Management" 4th edition prentice Hall of India.
3. Kotler Philip – "Marketing Management, Prentice Hall India".
4. Pandey I.M. – "Financial Management".
5. Prasanna Chandra – " Financial Management".
6. Chunawala, Patel – "Production & Operations Management".
7. M.E. Tukaram Rao – " Industrial Management".

Credit System Syllabus
Master of Computer Application (Commerce)
Semester -I
Paper-VI- (MCA-1.6): Business Communication

Unit I : (15)
Communication – Concept & meaning of communication, barriers to communication, methods of communication, techniques to improve communication. Summarization- Techniques of summarize a given passage to test comprehension and ability to present written matter in a brief and concise manner, Basic official correspondence- Principles of correspondence, languages and style in official letter, formats of letters (complete-block, modified-block, semi-block), types of letters, writing curriculum vitae, bio data.

Unit II (15)

Communication in a business organization- Internal and External Communication, strategies for conducting successful business meeting. Documentation of meeting. Introduction to modern communication techniques- email, internet, video conferencing etc., Legal and ethical issues in communication (Intellectual and property rights, patents).

Unit III (15)
Advanced technical writing- Report writing & presentation, qualities of report, languages and style in reports, types of reports, formats, methods of compiling data. Technical paper writing, writing proposals.

Unit IV (15)
Soft-skills- Interpersonal skills- motivation, negotiating and conflict resolution, assertiveness, leadership, team building, decision making, time management. Interview techniques- Preparing for job interviews, verbal & non-verbal communication during interviews, observation sessions and role play techniques to be used to demonstrate interview strategies. Group discussion - Dynamics of group behaviour, techniques for effective participation.

References :
1. Business Correspondence and Report writing - R.C. Sharma& Krishna Mohan, TMH
2. Technical Communication – Anderson, Thomson
3. English for Engineers & Technologists- A Skill Approach- Humanities & Social Science Division, Anna University, Madras, Orient Longman
4. Technical Writing & Professional Communication – Huckins, Thomas.

Credit System Syllabus
Master of Computer Application (Commerce)
Semester -II
Paper-VII (MCA-2.1): Software engineering

Unit – I   (15)
Introduction: concept of software and software packages, difference between system, software and software packages. overview of software engineering. Software Development life cycle,
S/W development process models - Model of waterfall, Prototyping, Iterative development, spiral, prototyping,

Unit – II   (15)
concept of software requirement specification (SRS), Characteristics of good SRS, proceeding techniques. Role of system analyst , role of users in system development, Feasibility study. Software Analysis & Design: Software analysis tools and techniques, DFD, ERD, data dictionary.

Unit – III   (15)
Function Oriented Design – Design principles – Problem Partitioning , Abstraction, modularity, top-down and bottom-up strategies. Module level concepts: coupling, cohesion. **Structured design methodology:** identify the most abstract input and output data elements, first level factoring, factoring the input, output and transform branches. Design heuristics.

Unit – IV   (15)
Software Testing – Testing fundamentals – White Box Testing, Black Box Testing- Graph-Based Testing Methods, Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing.
 A Strategic Approach to Software Testing -- Verification & Validation, Unit Testing, Integration Testing. Software configuration management:

Reference:
1. "An integrated Approach to software engineering", Narosa, 1991

2. "Software Engineering A practice approach", McGraw Hill, 1992

3. "An Integrated Approach to Software Engineering", 3rd edition Pankaj Jallote

4. Bently and Barlow, "System Analysis and Design Methods", Galgotia.

Credit System Syllabus
Master of Computer Application (Commerce)

Semester -II
Paper-VIII- (MCA-2.2): Data Structure

Unit – I   **(15)**
Introduction to Data Structure – Abstract data type, Arrays – Arrays as an ADT, sorting and searching – sorting – concept of sorting, types of sorting – simple sort, bubble sort, Quick sort, insertion sort, and Radix sort, sorting applications, searching – concept of searching, linear search, binary searching, searching applications.

Unit – II   **(15)**
Stack & Queues – Stack , infix, postfix and prefix notations, stack applications, Queues – Queues as an ADT, Implementation of Queues. Linked list & Tree – Definition operation on linked list, linked list as a stack and queue. Insertion into and deletion from a linked list, header linked list, Circular and double linked list,

Unit – III   **(15)**
Trees : Basic of hash function. Basic Terminology of trees, Binary Trees and their representation, expression evaluation, Complete Binary trees, Extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees, Huffman's algorithm, B trees.

Unit – IV   **(15)**
Graphs: Terminology and Representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, linked representation of graph , Depth first and breadth first traversal, Dijkstra algorithm for shortest path, spanning trees.

Reference Books:
1. File and Data Structure by A. Tanenbaum PHI
2. Data structures using C and C++ by Langsam, augenstein, Tenenbaum

3. Data structures through C by Dr.Sahani

4. Data Structure through C and C++ by Jagtap.

5. Horowitz and Sahani, "Fundamentals of Data structures", Galgotia publications
6. An introduction to data structures and application by Jean Paul Tremblay & Pal G. Sorenson (McGraw Hill)

7. R.L. Kruse,B.P. Leary,C.L. Tondo, "Data structure and program design in C", PHI

Credit System Syllabus
Master of Computer Application (Commerce)
Semester -I
Paper-IX- MCA (Commerce) –2.3 Statistical Computing

Unit – 1 :

(a) Population, Sample, Parameters Sample Statistics, sample Size, advantages of Sampling methods, Simple random sampling (with and without replacement) Stratified Sampling, Cluster Sampling.

(b) Various types of data, Frequency distribution, Tabulation, graphical representation, Measures of Central tendency, dispersion, skewness and kartosis.

Unit – 2 :

(a) Correlation, interpretation of correlation and regression.

(b) Combinatorial analysis : Basic principle of counting, Permutations and combinations, Binomial coefficients, Multinomial coefficients. Distribution of balls in urns, Algorithms to enumerate permutations and combinations.

Unit – 3 :

(a) Probability : Introduction, definitions of various terms, mathematical definition of Probability, empirical (relative frequency, statistical) and axiomatic definition of probability, concept of subjective probability, conditional probability, theorems on total probability, multiplication rule, Baye's theorem, independence of events, Algorithms to conduct random experiments and to determine empirical probabilities.

(b) Random variables; Definition, classification, probability mass function, distribution function, Probability density function, expectation and variance, Definition and properties of standard discrete and continuous distributions, Bernoulli, Binomial, Hyper Geometric, Geometric, Poisson, Lexiform, Exponential and normal distributions.

Unit – 4 :

(a) Test of significance: Basic concept of hypothesis, Procedure of testing of hypothesis, Large Sample Tests, chi-square test for variance,

chi-square test for goodness of fit and independence of attributions,

t-tests.

(b) Simulation : Generation of Pseudo random numbers and generation of random observations from standard probability distributions. Simple applications of simulation.

References :

1) Probability and statistics with reliability, querying and computer science applications : Kishor S. Trivedi PH.I

2) computer oriented numerical methods : V. Rajaraman PH.I.

3) A First course in Probability : S. Ross

4) Statistical Methods : J. Medhi

5) Non-Uniform random variant generations : Deuroye

6) Statistics : Concepts and applications – Harvy Frank and Steven C.

7) Probability and statistics in Engineering and management Science : William W. Hines and D. C. Montgomery.

8) Statistics for management : Levin R. I.

9) Statistics for Business and Economics : Paul N. Bold.

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Credit System Syllabus
Master of Computer Application (Commerce)
Semester -II
Paper-X (MCA-2.4): Database Management System

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Unit –I (15)
Introduction to DBMS :
Concept and architecture of DBMS ,Schemas,instances and data independence,
Introduction to conventional data models (Network ,Hierarchical and Relational)
Database languages, **Physical Data Organization**: A Model for External Storage
Organization, Hashed files, Indexed files, B-trees.

Unit –II (15)
Database Design and the E-R Model: Overview of the design process, E-R Model,
 constraints, E-R diagrams, E-R design Issues
Relational database design : Functional dependencies , Normal Forms , Loss less join
 and Dependencies preserving decomposition

Unit-III (15)
Transactions and Concurrency Control:- Transaction concept, transaction state,
concurrent execution , serializability, Recoverability, Locking , Multiple Granularity
of data items.
Recovery System :- Failure classification, storage structure, recovery and atomicity,
log-based recovery
Security and protection : Role of DBA , File structure , table space , segments , User
database, Data dictionary management , memory structure , process structure .

Unit IV (15)
Developing application software : Using Oracle products , SQL, PL/SQL
Advance techniques in databases : History of ODBMS, Concept of persistence,
problems posed by persistent objects, concept of ODBC, Introduction to parallel,
distributed databases.

References :
1. Korth and Silderschutz - "Database systems concepts" (TMH)
 2. C.J.Date - "Introduction to database systems" (Narosa)
3. Desai B. - "Introduction to database concepts"(Galgotia)
4. Ulman J.D. - "Principles of database systems" (Galgotia)
5. Oracle installation and user manual
6. Raghu Ramakrishna-"Database management system"

Credit System Syllabus
Master of Computer Application (Commerce)
Semester -II
Paper-XI - (MCA-2.5): Accounting and Financial Management

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Unit – I   **(15)**
Basic Accounting and conventions underlying preparation of financial statements (balance sheet, Highlighting accounting equation, profit and loss statement, accounting process, basic accounts, trail balance and financial statements issues such as provisions for bad debts tax dividends looses such as bad debts missing information, classification effect, cost of assets rental etc.)
Income measurement (revenue recognition and matching costs and revenues inventory valuation)

Unit – II   **(15)**
Depreciation accounting, intangible assets accounting, understanding published annualaccounts including fund flow statement.

Unit – III   **(15)**
Basic costs concepts: Introduction cost, classification, allocation, appointment and absorption costs centers.) Cost analysis for managerial decisions (direct costing break even analysis, relevant costs, pricing, pricing joint costs. make of buy, relevant fixed costs and sunk costs), Cost analysis for control (Standard costing variances, material, labour, overhead sales and profit), Standard cost accounting (budgeting and control of manufacturing and manufacturing expenses, performance appraisal, evaluation of costs control systems.)

Unit – IV   **(15)**
Financial Management - Meaning ,Objectives, Scopes of financial management, Decisions – (Financing, dividend, investment) , Sources of finance (Long Term, Short term) Financial Planning (meaning and factors determining the financial planning), Functions of finance manager, Responsibility Accounting, Reporting System – (Features of report, essentials of reporting system, levels of mgmt and reporting) Computerized financial Accounting with tally.

Reference:
1. Bhattacharya S.K. and Dearden John, "Accounting for Management", PHI, New Delhi.
2. Chanwick, "The Essence of financial accounting", Prentice Hall of India, New Delhi.
3. Horngren Sundem and Selio, "Introduction to Management Accounting", PHI, New Delhi.
4. Hilton and Gorden, "Budgeting Profic planning and control", PHI,New Delhi.
5. Financial management – Prasanna Chandra

MCA (Under Commerce Faculty) Equivalence to subject for Credit System (Old)

MCA-Semester-I

Sr. No.	Credit System Paper (Old)	Credit System Paper (Revised)
1	Computer Organization and Architecture	Computer Organization and Architecture
2	Introduction to Management Functions	Introduction to Management Functions
3	Statistical And Numerical Methods	Statistical Computing (MCA Part –II Sem-III)
4	Procedure Oriented Programming with C	(Procedure Oriented Programming with C)
5	Windows Programming With VB	Visual Programming With VB (MCA Part –II Sem-III)

MCA-Semester-II

Sr. No.	Credit System Paper (Old)	Credit System Paper (Revised)
1	Operating System	Operating System(MCA Part II Sem III)
2	Accounting and Financial Management	Accounting and Financial Management
3	Software Engineering	Software Engineering
4	Object Oriented Programming with C++	Object Oriented Programming with C++ (MCA Part II Sem III)
5	Data And File Structure	Data Structure