Master of Computer Application

FLEXILEARN
-Freedom to design your degree

Programme Structure

Curriculum & Scheme of Examination

2015

AMITY UNIVERSITY
CHHATTISGARH

RAIPUR

MCA

Programme Structure

THIRD SEMESTER

Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
IFT4301	Computer Graphics	3	-	-	3
IFT4302	Object Oriented Programming with C++	3	-	-	3
IFT4303	Data Base Management System	3	-	-	3
IFT4305	Data Communication & Computer Networks	3	1	-	4
IFT4310	Design & Analysis of Algorithms	3	1	-	4
IFT4307	Object Oriented Programming with C++ Lab	-	-	2	1
IFT4308	Data Base Management System Lab	-	-	4	2
IFT4311	Computer Graphics Lab	-	-	2	1
IFT4335	Summer Project – I (Evaluation)	-	-	-	5
Open Electives					4
CSS4351	Interpersonal Communication*	1	-	-	1
BEH4351	Leadership through Teams*	1	-	-	1
LAN4351 LAN4352 LAN4353 LAN4354 LAN4355 LAN4356 LAN4357 LAN4358	Foreign Business Language - III French -III German -III Spanish -III Russian -III Chinese -III Portuguese –III Korean-III Japanese-III	2	-	-	2
IFT4335	Summer Project – I (Evaluation)	-	-	-	5
	TOTAL				30

Syllabus – Third Semester

COMPUTER GRAPHICS

Course Code: IFT4301   **Credit Units: 03**

Course Objective:
The course provides the necessary theoretical background for introductory computer graphics and demonstrates the application of computer science to graphics. It also offers an opportunity for students to formulate and implement applications of computer graphics. This course further allows students to develop programming skills in computer graphics by programming assignments.

Course Contents:

Module I: Overview of Graphics System
Application of computer graphics, Video Display Devices, Raster Scan Display, Random Scan Display, Input Devices, Graphic Software and graphics standards, Numerical based on Raster and Random scan display, Frame buffer, Display processor, picture construction technique in interactive computer graphics.

Module II: Output Primitives

Scan conversion, Points and Lines, Line-Drawing Algorithm, Circle Generation Algorithms, Ellipse Generation Algorithm, Area fill algorithms for various graphics primitives: Scan line fill algorithm, boundary fill algorithm, flood fill algorithm, Polygon representation, various method of Polygon Inside test: Even-Odd method, winding number method, Various techniques for character generation.

Module III: Two Dimensional Geometric Transformations
Basic Transformations, Composite Transformation, Translation, Rotation, Scaling, General Pivot-Point Rotation, General Fixed Point Scaling, General Scaling Directions, Reflection, Shear, Raster Methods for Transformations.

Module IV: Two-Dimensional Viewing
Window to view Port Co-ordinate Transformation, Anti aliasing and filtering techniques, Clipping Operations, Cohen Sutherland Line Clipping algorithm, Sutherland Hodgeman Polygon Clipping algorithm, fractal geometry methods, fractal dimensions, Geometric construction of deterministic self-similar fractals, Iterated function system to generate fractals.

Module V: Three Dimensional Geometric and Modeling Transformations
3D viewing: 3 dimensional viewing parameters, Homogeneous coordinate representation, Advantages and disadvantages of homogeneous coordinate system, Translation, Rotation, Scaling, Other 3DTransformations, Composite Transformation, and Projections: Parallel projections, perspective projections, and oblique projection.

Module VI: Visible- Surface Detection Methods
Bezier curves and Bezier surfaces, B-spline curves and surfaces, Overview of Visible Surface Detection Algorithm, Concept of light source, secular and diffuse reflection, Illumination through light source, Shadow and its types, Depth-Buffer Method, A Buffer Method, Scan-Line Method, Binary search partition method, painter's algorithm or depth sorting method.

Module VII: Introduction to multimedia
Elementary image processing techniques, Introduction to Animation, software used in animation, Design of animation sequence, graphics library functions used in animation design.

Examination Scheme:

Components	CT1	CT2	A/C/Q	Attd	EE
Weightage (%)	10	10	05	5	70

Text & References:

Text:
- Computer Graphics, Donald Hearn, M Pauline Baker, 2nd Edition, PHI 1999
- Schaum Series**,** Computer Graphics

References:
- Computer Graphics, N. Krishnamurthy, TMH

OBJECT ORIENTED PROGRAMMING WITH C++

Course Code: IFT4302Credit Units: 03

Course Objective:
This course is aimed at developing Programming skills using Object Oriented Technology in C++. This purpose of this subject is to improve the programming approach and development of software using OOPS technology. The Subject involves various concepts of Object Oriented Programming such as Classes, Objects, Polymorphism, Inheritance, Templates, Exception Handling etc. needed for a better approach towards software development.

Course Contents:

Module I: Basic Concepts of OOPS
Introduction of C++, Features of Oops, Distinction between procedural and oops programming, definitions of class and objects, Concepts of inheritance , encapsulation Abstraction, and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages.

Module II: Overview of OOP Using C++
Basic Program Construction: Main And Functions ,Program Statements, Class Declaration, Comments, Starting, Compiling and Executing C++ Programs, Elements of C++ Language, Variables & Constants, Data Types Operators, Control Statements, Loops, Arrays

Module III: Functions
Simple Functions, Passing Arguments & Returning Values, Reference variables and arguments, Function Overloading, Inline Functions, Programming Style, Access Specifiers.

Module IV: Classes and Objects
Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, Structures and Classes, Scope resolution operator, Friend Functions, Constructors, Dynamic Constructor and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects.

Module V: Inheritance
Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Overriding inheritance methods, Constructors in derived class. Nesting of Classes

Module VI: Polymorphism
Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading. Overloading unary operator, Overloading binary operator, Pitfalls of Operator Overloading, Data Conversion from one data type to another.
 Pointers and Arrays, Pointers and Functions, Pointer to objects, this pointer, Virtual Functions, pure virtual functions. Memory management Operators.

Module VIII: Files and Sreams
Files and Streams: streams, string I/O, character I/O, object I/O, file pointer, error handling, command line arguments. formatted and Unformatted Input output

Module IX: Templateand Exception handling
Generic Programming – function template, class Template Standard Template Library: Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes.
Overview of Exception handling, Rethrowing an exception.

Examination Scheme:

Components	CT1	PR.	ATTD.	EE
Weightage (%)	10	15	5	70

Text & References:

Text:
- Object Oriented Programming in Turbo C++ , E. Balaguruswamy, Tata McGrahill

References:
- Object Oriented Programming with C++, Robert Lafore, Galgotia Publication
- C++ Programming, Yashavant Karnitkar, BPB Publications
- Mastering C++, K R Venugopal, Raj Kumar, T Ravishankar, Tata McGraw-Hill 2005

DATA BASE MANAGEMENT SYSTEM

Course Code: IFT4303   **Credit Units: 03**

Course Objective:
The primary aim of the subject is to provide the students a deeper understanding of the relational database model by exposing the students to a variety of important issues of data base management, e.g., database design, physical storage, query optimization, database recovery, concurrency control, security and data integrity.

Course Contents:

Module I: Introduction to DBMS
Introduction to DBMS, Architecture of DBMS, Components of DBMS, Traditional data Models (Network, Hierarchical and Relational), Database Users, Database Languages, Schemas and Instances, Data Independence

Module II: Data Modeling
Entity sets attributes and keys, Relationships (ER), Database modeling using entity, Weak and Strong entity types, Enhanced entity-relationship (EER), Entity Relationship Diagram Design of an E-R Database schema. Object modeling, Specialization and generalization

Module III: Relational Database Model
Basic Definitions, Properties of Relational Model, Keys, Constraints, Integrity rules, Relational Algebra, Relational Calculus.

Module IV: Relational Database Design
Functional Dependencies, Normalization, Normal forms (1st, 2nd, 3rd, BCNF), Lossless decomposition, Join dependencies, 4th & 5th Normal form.

Module V: Query Language
SQL Components (DDL, DML, DCL), SQL Constructs (Select…from…where…. group by…. having…. order by…), Nested tables, Views, correlated query,.

Module VI: Transaction Management and Concurrency Control Techniques
Transaction concept, ACID properties, Schedules and recoverability, Serial and Non-serial schedules, Serializability, Concurrency Techniques: Locking Protocols, Timestamping Protocol, Multiversion Technique, Deadlock Concept - detection and resolution, 2 – Phase Locking.

Module VII: Backup and Recovery
Database recovery techniques based on immediate and deferred update, Shadow pages and Write-ahead Logging

Examination Scheme:

Components	CT1	PR.	ATTD.	EE
Weightage (%)	10	15	5	70

Text & References:
Text:
- Fundamental of Database Systems, Elmasri & Navathe, Pearson Education, Asia
- Data Base Management System, Leon & Leon, Vikas Publications
- Database System Concepts, Korth & Sudarshan, TMH

References:
- Introduction to Database Systems, Bipin C Desai, Galgotia
- Oracle 9i The Complete Reference, Oracle Press

DATA COMMUNICATION AND COMPUTER NETWORKS

Course Code: IFT4305   **Credit Units: 04**

Course Objective:
Upon successful completion of the course, the student will be knowledgeable of basic data communication and networking concepts. Topics include routing/switching hardware, security, distributed client/server applications and architecture, intranets and intranet servers and browsers, networks and network servers, LANs/WANs, internetworking technologies, the OSI reference model for networking protocols, CSMA/CD, TCP/IP implementation, frame relay, FDDI, X-25, ISDN services.

Course Contents:
Module I: Introduction
Computer Network, Advantages and Disadvantages of Computer Network, Communication system, Analog and digital data

Module II: Data Communication
Data Transmission: Analog Transmission, Digital Transmission, Transmission impairments
Data Encoding: Digital data-digital signals, Digital data-Analog signals, Analog data- Digital signals, analog data- analog signals, Synchronous and Asynchronous transfer
Multiplexing: Frequency division multiplexing, Time division multiplexing

Module III: Transmission Media
Twisted pair, Coaxial cable, Optical Fibers, Wireless transmission, Microwaves, Radio waves, Infrared

Module IV: Protocols and Architecture
Protocols, OSI reference Models, TCP/IP Protocol Suit

Module V: Data Link Control and Protocol
Flow Control- Stop and Wait, Sliding Window, Error Detection, Error Control, HDLC

Module VI: Local Area Network
LAN Architecture, LAN topologies- Bus/ Tree LAN, Ring LAN, Star LAN, Wireless LAN, Ethernet and Fast Ethernet(CSMA/CD), Token Ring and FDDI

Module VII: Network Layer
Introduction, Routers, Routing Algorithms, Congestion Control Algorithm, Addressing, Internetworking

Module VIII: Transport Protocols
Transport Services, TCP, UDP

Module IX: Wide Area Networks
WAN, Circuit Switching, packet Switching, Frame Relay, ATM, ISDN

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	10	15	5	70

Text & References:
Text:
- Data Communication and Networking, Behrouz, Forouzan, TMH.
- Computer Networks', S. Tanenbaum, Eastern Economy ed., PHI.
- Data and Computer Communications, W. Stallings, Prentice Hall of India
References:
- Business Data Communications & Networking, Jerry Fitzgerald, Alan Dennis, John Wiley & Sons Inc.
- Computer Networks: Protocols, Black. U., Standards and Interfaces.

DESIGN AND ANALYSIS OF ALGORITHM

Course Code: IFT4310Credit Units: 04

Course Objective:
The designing of algorithm isan important component of computer science. The objective of this course is to make students aware of various techniques used to evaluate the efficiency of a particular algorithm. Students eventually should learn to design efficient algorithm for a particular program

Course Contents:
Module I: Introduction
Algorithm Design paradigms - motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations. Recurrences- substitution method, recursion tree method, master method

Module II: Divide and conquer
Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Merge sort**,** Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.
Greedy Method
Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths, traveling salesman

Module III: Dynamic programming
Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, chain Matrix multiplication, Traveling salesman Problem, longest Common sequence, knapsack problem

Module IV: Graph searching and Traversal
Overview, Representation of graphs, strongly connected components, Traversal methods (depth first and breadth first search)
Back tracking
Overview, 8-queen problem, and Knapsack problem
Brach and bound
LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem

Module V: Computational Complexity
Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:
Text:
- E. Horowitz, S. Sahni, and S. Rajsekaran, "Funadmentals of Computer Algorithms," Galgotia Publication
- T. H. Cormen, Leiserson, Rivest and Stein, "Introduction of Computer algorithm,"

References:
- Sara Basse, A. V. Gelder, "Computer Algorithms," Addison W
- J.E Hopcroft, J.D Ullman, "Design and analysis of algorithms"
- D. E. Knuth, " The art of Computer Program

OBJECT ORIENTED PROGRAMMING WITH C++ LAB

Course Code: IFT4307Credit Units: 01

Course Contents:

1. Write a program to display diamond of stars (*'s).
2. WAP to print Fibonacci series of 'n' numbers, where n is given by the programmer.
3. WAP to read a set of numbers in an array & to find the largest of them.
4. WAP to sort a list of names in ascending order.
5. WAP to sort an array of integers using functions.
6. WAP to exchange contents of two variables using call by value.
7. WAP to exchange contents of two variables using call by reference.
8. WAP to do the following using inline functions:
    a. Generate the following menu:
        1. Add two numbers.
        2. Subtract two numbers.
        3. Multiply two numbers.
        4. Divide two numbers.
        5. Exit.
    b. Ask the user to input two integers and then input a choice from the menu. Perform all the arithmetic operations which have been offered by the menu. Checks for errors caused due to inappropriate entry by user and output a statement accordingly.
9. WAP to add two complex numbers using friend function.
10. Write a program to exchange values between two classes using friend function.
11. Calculate area of different geometrical figures (circle, rectangle, square, triangle) using function overloading.
12. Write a program to Subtract two Complex numbers using operator overloading.
13. Create a class Complex for performing all arithmetic operations with complex numbers.
14. WAP to maintain the student record which contains Roll number, Name, Marks1, Marks2, Marks3 as data member and getdata(), display() and setdata() as member functions.
15. Write a class bank, containing data member: Name of Depositor, A/c type, Type of A/c, Balance amount. Member function: To assign initial value, To deposit an amount, to withdraw an amount after checking the balance (which should be greater than Rs. 500), To display name & balance.
16. Write a program to add & multiply two matrices by overloading + and * operators respectively.
17. Design three classes: Student, Test & Result. The Student class has its data members such as roll no, name etc. Create a Test class by inheriting the Student class. The Test class adds its own data members representing the marks scored in four subjects. Design one more class named as Sports which has a single data member representing sports marks. Derive the Result from class Test & Sports. What type of relationship this model belongs to? Write a program to model this relationship.
18. Write a class string to compare two strings, overload (= =) operator.
19. Declare a class of vehicle. Derived classes are two-wheeler, three-wheeler & four-wheeler. Display the properties of each type of vehicle using member functions of classes.
20. Create two classes namely Employee and Qualification. Using multiple inheritance derive two classes Scientist and Manager. Take suitable attributes & operations. WAP to implement this class hierarchy.
21. Consider an example of book shop which sells books and video tapes. These two classes are inherited from base class called media. The media class has command data members such as title and publication. The Book class has data members for storing number of pages in a book and tape class has playing time in a tape. Each class will have member functions such as read() and show().In the base class ,these members have to be defined as virtual functions. Write a program to model the class hierarchy for book shop and process objects of these classes using pointers to base class.
22. Write a program to create template to perform bubble sort for an array of any data type.
23. WAP to read data from keyboard & write it to the file. After writing is completed, the file is closed. The program again opens the same file and reads it.
24. WAP to reverse a string using pointers and arrays.
25. Write a program on rethrowing an exception.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

DATABASE MANAGEMENT SYSTEM LAB

Course Code: IFT4308 Credit Units: 02

Course Contents:
1. Create the following(s) table
   Salespeople with fields snum, sname, city, commission
   Orders table with fields onum, odate, snum, amt
   Customers table with fields cnum, cname, city, rating, snum
2. Display name & city of salesman where city is "Pune
3. Display the numbers of sales persons, with orders currently in the orders table without any repeats.
4. Display all customers where city is 'Mumbai' rating is more than 100.
5. Display all customers where city is either 'Pune' or 'Mumbai'
6. List all customers not having city 'Pune' or rating more than 100
7. Display all customers excluding those, with rating less than equal to 100, unless they are located in 'Nagar'
8. Display all sales persons names starting with character 'G', the 4th character is 'A' & the rest of characters will be any.
9. Find all records from customers table where city is not known i.e. NULL.
10. Assume each salesperson has a 12% commission on order amt. Display orderno, snum, commission for that order.
11. Display the count of snum in order table without duplication of snum.
12. Display the counts of all orders for Feb05
13. Display the maximum outstanding amount as blnc+amt
14. Display details of orders order number & date wise
15. Display customers highest ratings in each city.
16. Write a query that totals the orders for each day & places the results in descending order.
17. Add a column curr_bal in orders table for current balance
18. Increase commission of all sales persons by 200.
19. Display each order number followed by the name of customer who made it.
20. Calculate the amount of salespersons commissions on each order by a customer with a rating above 100.
21. Write a query that uses a sub-query to obtain all orders for the customer named 'Gopal'.
22. Write a query that produces the names & ratings of all customers who have above-average orders
23. Create a union of two queries that shows the names, cities 7 ratings of all customers. Those with a rating of 200 or greater will also have ratings "high rating", while the others will have the words "low rating".
24. Write a command that produces the name & number of each salesperson & each customer with more than one current order. Put results in alphabetical order.
25. Create an index that would permit each salesperson to retrieve his or her orders grouped by date quickly.
26. Create a view that shows all of the customers who have highest ratings.
27. Create a view that shows number of salespeople in each city.
28. Write a PL/SQL program to display the number in reverse order
29. Write a PL/SQL program to find the factorial of a given number
30. Write a PL/SQL program to generate fibonacci series
31. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7.Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius & area table name: areas radius area
32. Write a PL/SQL code block that will accept an account number from the user, check if the users balance is less than minimum balance,only then deduct rs.100/- from the balance. This process is fired on the acct table.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER GRAPHICS LAB

Course Code: IFT4311Credit Units: 01

Software Required: Turbo C++

Course Contents:

Assignments will be provided for the following:

- Geometrical shapes based on graphics algorithms
- 2D Geometric transformation translation, rotation, scaling, reflection.
- Clipping
- Animation

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

SUMMER INTERNSHIP- I (EVALUATION)

Course Code: IFT4335   **Credit Units: 05**

Guidelines:

There are certain phases of every Intern's professional development that cannot be effectively taught in the academic environment. These facets can only be learned through direct, on-the-job experience working with successful professionals and experts in the field. The internship program can best be described as an attempt to institutionalize efforts to bridge the gap between the professional world and the academic institutions. Entire effort in internship is in terms of extending the program of education and evaluation beyond the classroom of a university or institution. The educational process in the internship course seeks out and focuses attention on many latent attributes, which do not surface in the normal classroom situations. These attributes are intellectual ability, professional judgment and decision-making ability, inter-disciplinary approach, skills for data handling, ability in written and oral presentation, sense of responsibility etc.

In order to achieve these objectives, each student will maintain a file (**Internship File**). The Internship File aims to encourage students to keep a personal record of their learning and achievement throughout the Programme. It can be used as the basis for lifelong learning and for job applications. Items can be drawn from activities completed in the course modules and from the workplace to demonstrate learning and personal development.

The File will assess the student's analytical skills and ability to present supportive evidence, whilst demonstrating understanding of their organization, its needs and their own personal contribution to the organization.

The **layout guidelines** for the Project & Seminar Report

1. File should be in the following specification
- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page
Table of Content
Acknowledgement
Student Certificate
Company Profile (optional)
Introduction
Main Body
References / Bibliography

The File will include *five sections* in the order described below. The content and comprehensiveness of the main body and appendices of the report should include the following:

1. **The Title Page**--Title - An Internship Experience Report For (Your Name), name of internship organization, name of the Supervisor/Guide and his/her designation, date started and completed, and number of credits for which the report is submitted.
2. **Table of Content**--an outline of the contents by topics and subtopics with the page number and location of each section.
3. **Introduction**--short, but should include how and why you obtained the internship experience position and the relationship it has to your professional and career goals.
4. **Main Body**--should include but not be limited to daily tasks performed. Major projects contributed to, dates, hours on task, observations and feelings, meetings attended and their purposes, listing of tools and materials and their suppliers, and photographs if possible of projects, buildings and co-workers.

5. **References / Bibliography** --This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system

ASSESSMENT OF THE INTERNSHIP FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Internship File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student's own work. It will also ensure regularity and meeting the delaines.

STUDENT ASSESSMENT RECORD (SAR)

1. **Range of Research Methods used to obtain information**

2. **Execution of Research**

3. **Data Analysis**
   - Analyse Quantitative/ Qualitative information
   - Control Quality

4. **Draw Conclusions**

Examination Scheme:

Components	V	S	R	FP
Weightage (%)	20	20	20	40

V – Viva, S – Synopsis, FP – Final Presentation, R - Repor