GAUHATI UNIVERSITY
INSTITUTE OF DISTANCE AND OPEN LEARNING (GUIDOL)

Programme Project Report (PPR)

PPR ID: GU/GUIDOL/PPR/19 *(Total no. pages : 10)*
Programme: Master of Science (M.Sc.) in Information Technology (MSc-IT)

1. **Programme Mission and Objective:**

The mission of the Programme, to be launched, is *"to cater to the need of higher education in Information Technology and to widen the periphery of computer science & information technology."*

Objectives of the Programme:

- *The program focuses on the design of technological information systems, as solutions to business, research and communications support needs.*
- *To develop and promote technical skills needed to design, implement, and test solutions in the field of information technology.*
- *To provide a framework within which students can appreciate and integrate concept of new software technologies and extend their theoretical knowledge in specific areas of interest in academia and the industry.*
- *To provide graduates who are planning to work in an IT or computing environment with the opportunity to enhance their career prospects by gaining additional knowledge and skill in selected areas of IT.*
- *To generate competent and well-educated man-power for the teaching profession as well as manning positions of research associates in public/private sector academic institutions.*

2. **Relevance of the Programme with HEI's Mission and Goals:**

Gauhati University was established in 1948 with a mission to revitalize educational leadership, to set the standard for the production and dissemination of knowledge as well as to become an effective instrument of change in the society. With this aim in view, the Department of Computer Science was established in 1985. The Department started a one year Post Graduate Diploma course in Computer Science and Applications (PGDCSA)

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with thirty seats in 1986 at time in which there were only a few institutions in the entire country offering post graduate courses in Computer Science. The objectives of the course were to produce Computer Programmers, Research Scholars, Teachers, Instructors, Computer Professionals; i.e. to produce manpower for software industries, research and educational institutions and other organizations in India and abroad and association of the new generation in these fields and related areas. In 2001, a two-year (four semesters) M.Sc. programme in Computer Science was introduced after obtaining approval from the UGC with student intake capacity 15 per batch, replacing the PGDCSA programme. In 2005, the Department started another course MSc in Information Technology (MSc-IT) together with the existing MSc program in Computer Science. Keeping in view the motto of "*Quality Higher Education For All",* Master in Information Technology (MSc-IT) to be offered through ODL mode is very much relevant to the HEI's mission and goals as it aims to provide quality higher education in Information Technology to those aspiring candidates who are deprived of higher education due to various serious and unavoidable circumstances. Moreover, to keep the quality intact the curriculum and syllabi has been designed at par with the conventional mode keeping in mind the specific needs and acceptability of the learners in the ODL mode and in keeping with the aims and objectives of the parent department.

3. **Nature and Target Group of Learners:**

   Our target group includes

   1) Those who are deprived of admission in the parent department of Regular Mode due to limited intake capacity.
   2) Those employed in various organizations who desire to pursue higher education as a passion or as a mean for movement up the promotional ladder.
   3) Those willing to pursue research as a career.
   4) Those willing to have Computer Science/Information Technology as a career.
   5) Drop-outs primarily due to social, financial and economic compulsions as well as demographic factors.
   6) Job seekers.

   Gauhati University also has a provision in the ODL mode for lateral entry for those who had to discontinue the regular course after successful completion of the first two semesters due to unavoidable reasons. Acceptability of the lateral entry provision is an

indicator of parity of the courses in regular and distance mode. The curriculum is designed to enable learners to fulfill their aims and objectives in a manner they deem fit and proper. The curriculum is designed by a committee comprising of experts from the Department of the HEI, external experts and faculties of the ODL mode, keeping in view the needs of the diverse class of learners.

4. **Appropriateness of the Programme to be Conducted in the ODL Mode for Acquiring Specific Skills and Competence:**

The MSc-IT programme to be to be offered through ODL mode will have certain learning outcomes. This programme will help the learners

- To design an IT solution using best practices and standard methodologies in the field of Computer Science and Information Technology,
- To enhance and develop their knowledge and understanding of the theoretical and practical foundations of Information Technology as a subject,
- To enhance the capacity for creative, technical and problem solving skills in a research context,
- To make themselves theoretically and practically knowledgeable to understand, design and implement large and complex Computer Applications,
- To make themselves fit to embrace the future developments and retaining professional relevance,
- In gaining dexterity in advanced programming languages and building sophisticated software for a wide area of applications,
- To work with high-end applications in Internet Technologies,
- In acquiring managerial ability to use IT skills in Decision Making, by Analyzing Problems, Developing Solutions and Explaining findings,
- To be acquainted with various generic skills and competencies for Team Work, Time Management and Critical Thinking.

5. **Instructional Design:**
   a) **Curriculum Design**: The curriculum is designed by a committee comprising experts from the parent department and ODL mode of Gauhati University, keeping in view the needs of the diverse class of learners.

   b) **Detailed Syllabus**: Refer to Enclosure-I.

c) **Duration of the Program**: Minimum 2 years. However, the learners will be required to complete the course within 4 (four) years from the date of admission.

d) **Instructional Delivery Mechanism:** The programme will be delivered in 4 (four) semesters having 5 (five) course/paper in 1st, 2nd, 3rd semesters and in 4th semester there are 3 (three) courses/papers and 1 (one) Major Project. The learners will be provided with the printed/online SLM which covers almost all the contents in the syllabus *(Enclosure-III)*. Counseling/regular classes for both theory and practical is/will be held in headquarter and various affiliated study centres. Telephonic Counseling and providing online learning resources will also be a part of Instructional Delivery Mechanism. In the current pandemic situation of COVID-19, more emphasis will be given to the teaching-learning through online mode. The progress of the learners is/will be assessed periodically. At the end of each semester, learners' performance is/will be evaluated by Term/Semester-end examination.

e) Course Coordinator – Prof. Anjana Kakoti Mahanta

Department of Computer Science, Gauhati University

f) **Faculty:**

   (i) Full Time

1. Dr. Ridip Dev Choudhury, M.Sc. (Comp. Sc), Ph.D. -Assistant Professor, GUIDOL
2. Dr. Khurshid Alam Borbora, M.Sc. (Comp. Sc), Ph.D. - Assistant. Professor, GUIDOL
3. Dr. Swapnanil Gogoi, M.Sc. (Comp. Sc), Ph.D. - Assistant. Professor, GUIDOL
4. Pallavi Saikia, MSc (Comp. Sc) - Assistant. Professor, GUIDOL
5. Hemanta Kalita, MSc (IT), M.Tech(IT) - Assistant. Professor, GUIDOL
6. Dr. Rita Chakraborty, MSc (IT), Ph.D. - Assistant Professor, GUIDOL

   (ii) Resource persons are drawn from amongst teachers of affiliated colleges, researchers, faculties of the Department of HEI and also from the corporate sector.

g) **Media**: Print Media, ICT enabled tools, Multi-Media and e-Learning Portal.

h) Student Support Services: In order to successfully execute this programme, there are a wide range of support services. The various support services are listed as below:

i) **Network of Study Centres**: To assist its learners in ODL mode the University has established 118 study centres (list enclosed) throughout the State of Assam but within its territorial jurisdiction.

ii) **State of the Art Library** with around 7 thousand collections of materials which includes books, journals, magazines, CD and DVDs.

iii) **E-Learning Portal (**www.bodhidroom.net**)**: This portal is the first of its kind in the entire North east region of India. This provides the following services to the learners:

- ➢ Online enrolment of students
- ➢ Independent Discussion Forum for every course
- ➢ Independent News Forum for every course
- ➢ Online interaction facility with faculty members
- ➢ Online interaction between the students making the scope of collaborative learning
- ➢ Interaction through chatting of all users of all courses who are online.
- ➢ Separate Chat Room for individual course
- ➢ *Message My Teacher:* When a student logs in to Bodhidroom, after enrolling himself/herself to a course, he/she will see the names of the virtual class teachers. Student can directly send offline messages to the teachers. When the teacher is logged on, he will receive an alert of incoming messages. Then he can reply to the message.
- ➢ Online Study Material
- ➢ Old Examination Question Papers

iv) **Dynamic Website:** For ODL learners, the University have a separate website, www.idolgu.in, where one can get all the information regarding ODL programmes, up-coming events, examination results etc.

v) **Computerised Admission Process with Provision of Online Admissions:** The whole system of admissions and examinations are managed using professional software which gives instant online access to learners through **www.idolgu.in**.

vi) Flexible Walk in Group Counselling (FWGC): Regular group and individual counselling will be held in the GUIDOL (headquarter) complex during all working days. Learners may walk-in to the designated GUIDOL counselling room and meet their teachers to clarify their doubts. In the current pandemic situation of COVID-19, online platform will be provided for the purpose mentioned above.

vii) Personal Contact Programme (PCP): In addition to the Study Materials, useful Personal Contact Programmes will be held at various affiliated study centres, which will enable the students to clarify their confusions and ease their difficulty while going through it. Qualified faculty members of affiliated study centres will help out the attending students by providing necessary tips and guidelines during the interactive sessions. These sessions are also meant to give the students a chance to meet the teachers personally and discuss their problems. In the current pandemic situation of COVID-19, online platform will be provided for the purpose mentioned above.

viii) Community FM Radio: Gauhati University has its own Community radio station named as "Radio Luit 90.8 FM" and operates daily from 8AM to 8PM. The Community Radio station shall be extensively used to broadcast radio talks on various courses daily. The broadcast contents are designed as per the requirements by teaching staff of both the ODL Institute as well as the parent department. Experts are outsourced if situation arises.

6. **Procedure for Admissions, Curriculum Transaction and Evaluation:**

Admission: The admission process shall start as per the UGC guidelines. In the current pandemic situation of COVID-19, the learner can take admission through only online admission process. The minimum eligibility for MSc-IT program is BSc/BCA from any recognized Indian or foreign university. An entrance test is/shall be conducted for the admission to this programme or as decided by the Gauhati University Authority. The maximum intake capacity for this programme per study centre including the headquarter is/shall be 60. The fee for admission is Rs 11500.00 (Eleven Thousand Five Hundred only) per semester. Financial Assistance is provided to the candidates belonging to SC/ST and OBC category in the form of scholarship. A few learners belonging to the economically deprived section as well as the physically challenged category are provided free ship on the recommendation of the Vice-Chancellor of the University.

Curriculum Transaction: The curriculum will be transacted throughout the year as follows:

➢ Regular Counseling/Classes/Practicals will be carried out for minimum of 4 (four) months per semester.

  a) For odd semesters classes will start from the month of March and end by June every year and

  b) For even semesters classes will start from the month of October and end by January every year.

➢ Regarding the classes related to theory and practical courses/papers,

  a) One theory class, of one hour duration, for each course/paper is/will be conducted in a week.

  b) One practical class, of two hours duration, for each course/paper with practical component is/will be conducted in a week.

➢ For slow-learners, few remedial classes/counseling is/will be conducted as necessary.

For detailed Activity Planner refer to Enclosure – II.

Evaluation: Each course/paper will carry 100% weightage for the term/semester-end examinations. In order to pass/clear a course/paper, a candidate must secure minimum 35% marks in case of theory course/paper and 40% marks in practical as well as in the final project. All examinations are conducted by the Controller of Examinations as per rules and regulations of the University.

7. **Library Resource and Laboratory Support:**

The University has a State of the Art Central Library with rich collections of materials which includes books, journals, magazines, CD and DVDs, and is accessible to the ODL learners as well. Moreover, the Institute has its own Library where various books, journals and magazines are available.

Gauhati University being a member of UGC-Infonet Digital Library Consortium (http://www.inflibnet.ac.in/econ/index.php) which provides current as well as archival access to more than 5000 core and peer-reviewed journals and nine bibliographic databases from 23 publishers and aggregators in different disciplines. The ODL learners

can access the e-resources of UGC-Infonet Digital Library Consortium from the Gauhati University campus.

For conducting theory and practical classes, there are 2 (two) Digital Classrooms and 3(three) Computer Laboratories with the following facilities available at HQ:

	Item	Quantity
Computer Lab 1	Desktop Computer	55
	LCD Overhead Projector	1
	Document Scanner with Overhead Projector	1
	40 inch LED TV for parallel display with the LCD projector	1
	Smart Board	1
	Sound System with Lapel Connectivity	1 Set
	Split AC	4
	LAN Connectivity	
	Internet Connectivity provided by National Knowledge Network (NKN)	
Computer Lab 2	Desktop Computer	22
	55 inch LED TV used for projection	1
	Split AC	2
	LAN Connectivity	
	Internet Connectivity provided by NKN	
	Desktop Computer	30
	LCD projector	1
	Motorised display screen(5x7)	1

Computer New Lab	Split AC	2
	LAN Connectivity	
	Internet Connectivity provided by NKN	
Digital Classroom 1	Intake Capacity	64
	LCD Projector	1
	Sound System with Lapel Connectivity	1 Set
	Podium	1
	Split AC	3
	LAN Connectivity	
	Internet Connectivity provided by NKN	
Digital Classroom 2	Intake Capacity	100
	LCD Projector	1
	Sound System with Lapel Connectivity	1 Set
	Podium	1
	Split AC	4
	LAN Connectivity	
	Internet Connectivity provided by NKN	

It is also mandatory for all Study Centres offering M.Sc-IT and related programmes to have similar facilities.

8. **Estimated Cost of the Programme:** Total estimated cost of the programme is approximately Rs. 45 lakhs which includes preparation and printing of SLMs, remuneration of the Resource persons, establishment cost and overheads. The estimate is

evaluated considering the unit expenses of Rs.2.5 lakhs per course/1000 students for the entire duration of two years.

9. **Quality assurance Mechanism and Expected Programme outcome**:

- **Quality assurance Mechanism: The** institute has a *Centre for Internal Quality Assurance (CIQA)* constituted by the statutory body of the HEI. Members of the Cell are drawn from among the Deans of the different Faculty, Heads of the respective departments, Executive Council members, administrative staff and teaching staff of the institute. The Internal Quality Assurance Cell shall review the relevance and standard of the programme from time to time and make necessary changes in the syllabus and contents of the programme. The HEI shall continuously monitor the effectiveness of the program through *CIQA* and other statutory bodies.

- **Expected Programme outcome**: The expected programme outcome is reflected in the Course Benchmark Statement, which is stated as below-

  *Course Benchmark Statement***:** Master's in Information Technology shall be awarded to those learners who demonstrate:

  ➢ In designing an IT solution using best practices and standard methodologies in the field of Computer Science and Information Technology,
  ➢ In developing their knowledge and understanding of the theoretical and practical foundations of Information Technology as a subject,
  ➢ The capacity for creative, technical and problem solving skills in a research context,
  ➢ Making themselves fit to embrace the future developments and retaining professional relevance,
  ➢ In gaining dexterity in advanced programming languages and building sophisticated software for a wide area of applications,
  ➢ To work with high-end applications in Internet Technologies,
  ➢ In acquiring managerial ability to use IT skills in Decision Making, by Analyzing Problems, Developing Solutions and Explaining findings,
  ➢ To be acquainted with various generic skills and competencies for Team Work, Time Management and Critical Thinking.

➢ **Detailed Syllabus**

Total Marks: 2000		Total Credits: 73	
Course No	Course Title	Evaluation Pattern	Credit
SEMESTER - I			
IT-01	Fundamentals of Computers	Objectives:40%, Descriptive: 60%	3
IT-02	Introduction to Programming	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-03	Digital Logic	Objectives:40%, Descriptive: 60%	3
IT-05	Communication Skills & Technical Writing	Objectives:40%, Descriptive: 60%	2
IT-11	Mathematical Foundations of Computer Science	Objectives:40%, Descriptive: 60%	3
SEMESTER - II			
IT-07	Database Management System	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-12	Data Structure and Algorithm	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-13	Computer Organization & Architecture	Objectives:40%, Descriptive: 60%	4
IT-27	Web Technologies	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-10	Management and Accounting	Objectives:40%, Descriptive: 60%	3
SEMESTER - III			
IT-14	Operating System	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-17	Data Communication & Computer Network	Objectives:40%, Descriptive: 60%	4
IT-16	Objected Oriented Programming	Objectives:30%, Descriptive: 40%,	4

	using JAVA	Practical:30%	
IT-21	Software Engineering	Objectives:40%, Descriptive: 60%	4
IT-28	Advanced Web Technologies	Objectives:30%, Descriptive: 40%, Practical:30%	4
SEMESTER - IV			
IT-22	Computer Graphics & Multimedia	Objectives:40%, Descriptive: 60%	4
IT-23	Application Software Development	Objectives:40%, Descriptive: 60%	4
IT-29	E Commerce	Objectives:40%, Descriptive: 60%	3
IT-30	Project	200 Marks	8

SEMESTER – I
IT-01: FUNDAMENTALS OF COMPUTERS

Introduction
Brief history of development of computers, computer system concepts, capabilities and limitations, types of computers: Analog, Digital, Hybrid, general, special purpose, Micro, mini, mainframe super computers, generations of computers, personal computers, types of personal computers – Laptop, Palmtop etc.

Computer software

Need of software, types of software, System software – Operating system and its types, loader, linker etc.; Application software --word processing, spread sheet, presentation graphics, database management software; Programming languages - machine, assembly, high level, 4GL, their merits and demerits, Computer Viruses.

Components of Computer System

Basic components of computer system, Input devices, output devices, Control Unit, storage devices., maintaining the Computer System.

PC Hardware and Maintenance

Introduction and Identification of different hardware component of a PC , Installation of Operating System, Hard Disk Partitioning ,Troubleshooting.

IT-02: INTRODUCTION TO PROGRAMMING

Introduction to C:
Steps for Problem Solving ,Algorithm, Analysis of Algorithm Efficiency, Flowchart , Pseudo code, Program , Programming Languages , Translators

History of C , Features of C, Structure of a C Program, Writing a C Program, Compiling and Run a C Program, Syntax and Semantic Errors, Linker Errors, Logical and Runtime Errors, Execution Process

Variables and Constants:
Character Set, Identifiers and Keywords, Rules for Forming Identifiers , Data Types and Storage Classes in C, Variables , Declaring Variables, Initializing Variables, Constants, Types of constants

Expressions and Operators:
Assignment Statements, Unary and Binary Operators , Arithmetic Operators, Relational Operators , Logical Operators, Comma and Conditional Operators, Type Cast Operator, Size of Operator, Precedence of Operators

Control Statements, Decision Control Statements:: The if Statement , The switch Statement, Loop Control Statements:: The while Loop , The do-while Loop ,The for Loop, The Nested Loop, The Goto Statement, The Break Statement, The Continue Statement

Arrays:

Definition , Syntax of Array Declaration and Initialization, Subscript, Processing the Arrays , Multi-Dimensional Arrays, Declaration and Initialization of Two-Dimensional Array, Processing of Two Dimensional Arrays, Representation of Matrix using Two Dimensional Array

Strings:

Character Arrays, Declaration and Initialization of Strings, Array of Strings,Library String Functions: strlen , strcpy , strncpy , strcmp , strncmp , strcmpi , strnicmp , strcat , strncat , strlwr , strupr , strrev , strdup, strchr , strset , strnset , strstr

Functions:
Definition , Structure of a Function , Function Declaration , Function Definition , Formal parameter , Actual parameter ,The Return Statement , Function Prototypes , Recursive Function, Function Calling: Call by value and Call by address
Structures and Unions:

Declaration and Initialization of Structures, Accessing the Members of a Structure , Structures as Function Arguments , Structures and Arrays , Unions , Initializing an Union, Accessing the Members of an Union

Pointers:

What is Pointer , Address and Indirection Operators , Pointer Type Declaration and Assignment, Pointer to a Pointer , Null Pointer Assignment , Pointer Arithmetic, Passing Pointers to Functions , Arrays and Pointers , Array of Pointers , Pointers and Strings

The C Preprocessor and Command Line Arguments:

Definition, Macros in C, #define, #include, #ifdef, Other Preprocessor Commands, Predefined Names Defined by Preprocessor

Command Line Arguments in C, Structure of Programs that use Command-Line Arguments, Accessing Command-Line Arguments

Files:

Definition, File Handling in C Using File Pointers, fopen( ) , fclose( ) , Input and Output using file pointers , Character Input and Output in Files, String Input / Output Functions , Formatted Input / Output Functions , Block Input / Output Functions, Sequential Files, Random Access Files , Positioning the File Pointer

IT-03: DIGITAL LOGIC
Binary Systems

Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Binary Codes, Binary Storage and Registers, Binary Logic, Integrated Circuits

Boolean Algebra and Logic Gates

Basic Definitions, Boolean Algebra: Theorems and Properties, Boolean Functions, Canonical and Standard Forms and Other Logic Operations. Digital Logic Gates and its different types.

Simplification of Boolean Functions

Map Method: Two, Three and Four variable maps. Product of Sums Simplification, NAND and NOR implementation, Don't Care Conditions, Tabulation Method.

Combinational Logic and Sequential Logic

Adders: Half Adder, Full Adder and Binary Parallel Adder. Decoder, Encoder, Multiplexer, Demultiplexer.

Flip-Flops and its different types, Registers, Shift Registers, Counters.

Processor and Control Logic Design

Arithmetic Logic Unit and its design, Status Register. Hard-Wired Control, Microprogram Control.

SEMESTER – II

IT-12: DATA STRUCTURE AND ALGORITHM

Introduction to Data structure, Primitive and composite data types, Abstract Data Type Time and space complexity of algorithms, Concept of Θ, Big-O, Small-o and Big-Omega notations.

Linear List , Arrays, Stacks, Queue, Circular Queue, Priority Queue

Singly Linked List, Doubly Linked List and Circular Linked List

Introduction to Trees, Properties of Trees, Binary Trees, Extended binary trees, Complete binary trees, Binary search trees, Weight balanced and Height balanced trees, AVL trees, Threaded Binary trees , B-Trees , Heap .

Introduction to Graph, Properties of Graphs, Connected graph, Sequential representation of Graphs : Adjacency Matrix, Path matrix, Warshall's algorithm, Linked Representation of Graphs : Adjacency list, Graph Traversal: Depth-first and Breadth-first

Spanning trees, Minimum Spanning tree, Prim's and Kruskal's algorithms
Selection sort, Insertion sort, Bubble sort , Radix sort , Quick sort , Heap sort, Merge sort
Searching techniques: Binary search, Linear search, Hashing.

IT-07: DATABASE MANAGEMENT SYSTEM

The Basic Concepts

The file based system, limitations of file based system, the Database Approach, Advantages of DBMS.

DBMS Architecture

Three level architecture of Database System, Mappings, Data Independence.
Components and Functions of DBMS, Database Administrator and its roles.

Entity, Attributes and Associations

Definition of Entity, attribute, association among entity and attributes, Generalizations and Aggregation.

Data Models

Relational Model, Hierarchical Model, Network Model

The Relational Model

The Relational Model, Domains, Attributes, Tuples, Relations and Views. Primary Key, Foreign Key, Candidate Key, Alternate Key, Super Key, Relational Constraints.

The E-R Model, Weak Entity and Strong Entity.

Relational Algebra

Basic operations – Union, Intersection, Difference and Product. Additional operations – Select, Project, Join and Divide.

Database Integrity and Normalization

Referential Integrity, Entity Integrity. Functional Dependencies, Concept of Normalization, First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form.

Structured Query Language

What is SQL? Data Definition Languages, Data Manipulation Languages, Data Control Languages.

Database Recovery and Security

What is Recovery? Kinds of failures, Failure controlling methods, Database errors, Recovery Techniques, Security & Integrity, Relationship between Security and Integrity.

IT-11: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and

uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

Algebra of logic, Propositions, Connectives, Tautologies and contradiction, Equivalence and implication, Principle of Mathematical induction, quantifiers.

Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, solving simultaneous equations using Gauss elimination, Gauss Jordan Methods, Matrix Inversion method.

A general introduction, simple and multipgrpahs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms, Chromatic number, Bipartite graph, graph coloring.

IT-10: MANAGEMENT & ACCOUNTING

Accounting: Principles, concepts and conventions, double entry system of accounting, introduction to basis books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading, Profit and Loss accounts and Balance sheet of sole proprietary concern (without adjustment)

Financial Management: Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: Ration Analysis, Fund Flow statement and cash flow statement (without adjustments)

Costing: nature, importance and basic principles. Marginal costing: Nature scope and importance, Break even analysis, its uses and limitations, construction of break even chart, Standard costing: Nature, scope and variances (only introduction)

Computerized accounting: Meaning and advantages, Computer Programs for accounting, Balancing accounts, Trial balance and final accounts in computerized, Accounting, control, and Audit, Sub- Modules of computerized accounting systems.

Object Oriented Methodology

Paradigms of Programming Languages, Evolution of OO Methodology, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Introduction to Common OO Language, Applications of OOPs

Classes and Objects, Abstraction and Encapsulation, Inheritance, Method Overriding and Polymorphism.

Java Language Basics

Basic Features, Java Virtual Machine Concepts, Primitive Data Type And Variables, Java Keywords, Java Operators.

Expressions, Statements, Control Statements, Selection Statements, Iterative Statements, Jump Statements, Arrays.

Class and Objects

Class Fundamentals, Creating objects, Assigning object reference variables, Introducing Methods, Static methods, Constructors, Overloading constructors, This Keyword, Using Objects as Parameters, Argument passing, Returning objects, Method Overloading, Garbage Collection, The Finalize ( ) Method

Inheritance and Polymorphism

Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword

Packages and Interfaces
Package, Defining Package, CLASSPATH, Package naming, Accessibility of Packages, Using Package Members, Interfaces, Implementing Interfaces, Interface and Abstract Classes, Extends and Implements Together

I/O in Java
I/O Basics, Streams and Stream Classes, Byte Stream Class, Character Stream Classes, Predefined Streams, Reading from, and Writing to, Console, Reading and Writing Files, The Transient and Volatile Modifiers, Using Instance of Native Methods

Strings and Characters

Fundamentals of Characters and Strings, The String Class, String Operations, Data Conversion using Value of ( ) Methods, String Buffer Class and Methods

Exploring Java I/O

Java I/O Classes and Interfaces, I/O Stream Class, Input and Output Stream, Input Stream and Output Stream, Hierarchy,Text Streams, Stream Tokenizer, Serialization, Buffered Stream, Print Stream, Random Access File

IT-14: OPERATING SYSTEM

Introduction to Operating System

What is an operating system, history of operating systems. Operating system concepts – processes, files and shells.

Operating system classification – Single user, multi user, simple batch processing, multiprogramming, multitasking, parallel systems, distributed system, real time system.

Process Management

Process - Process Model, Process Hierarchies, Process States, Threads - What is thread and its use, design issues of thread.
Procss Scheduling:- Basic Concepts. Preemptive and non-preemptive scheduling. Types of scheduling:- batch, interactive and real-time. Scheduling Algorithms:- First Come First Server, Shortest Job First & Round Robin Scheduling.

What is Interprocess Communication, Race conditions, Critical-Sections, Mutual exclusion. Solution to race condition: - Disabling Interrupt, Peterson's solution, Sleep & Wake Up(The Producer Consumer Problem) and Semaphores.

Input/Ouput Management & Deadlocks

Basic principles I/O Hardware, I/O Devices, Device controllers, DMA. Principles of I/O Software, its goals, Interrupt Handlers, Device Drivers, Device Independent I/O Software(its functions)

What is Deadlock. Principles of Deadlock (Deadlock conditions & Modelling). Deadlock Detection, Recovery & Prevention. Deadlock Avoidance(Banker's algorithm).

Memory Management

Monoprogramming and Multiprogramming. Swapping and its basic concepts. Virtual Memory – Basic Concepts, Paging, Page Tables. Page replacement algorithms: - Optimal, Not Recently Used, First In First Out, Least Recently Used.

File System

What is file, file naming, file types(directory, regular, device), sequential access and random access files, file attributes, operations on file, hierarchical directory structure, path name(relative and absolute), operation on directories. File System Implementation Techniques.

System Calls

What is System Calls. System Calls:- Process Management(fork, getpid, getppid, wait, waitpid, exit, execve), Signaling(kill, sigaction, sigreturn, pause), File & Files System Management(creat, open, close, read, write, lseek, stat, fstat, dup, rename).

IT-28: ADVANCED WEB TECHNOLOGIES

Overview

History of Internet, Internet services: telnet, e-mail, ftp, WWW. Equipments required for an Internet Connection, Opening an e-mail account, Reading and Writing e-mail., ftp, www

URL, Surfing the Internet., Search Engine, uploading and downloading.

Web Browsers*:*

functions and working principle of web browsers; plug-ins & helper applications; conceptual architecture of typical web browsers (like Mozilla).

Introduction to Client/Server Computing:

client-server computing basics; types of Client/Server systems; middleware; N-tired systems: 2-tier/3-tier/4-tier systems; Fat Clients versus Fat Servers.

Web Servers:

Web services and web server functionality; web server composition; registration; HTTP, IP address, DNS & ports; conceptual architecture of a typical web server (like Apache).

Introduction to HTML

Hypertext Markup Language (HTML), Writing a web page in HTML, Tags, hyperlinks, URLs, tables, text formatting in web pages, Using graphics and multimedia in web pages; image maps., Use of frames and forms.

Introduction to JavaScript:

Constants, variables, operators, expressions, statements. Use of user-defined and built-in functions, Client-side Form validation using JavaScript, Using properties and methods of built-in objects.

IT-22: COMPUTER GRAPHICS & MULTIMEDIA

Graphics Hardware: The Functional Characteristics Of The Systems Are Emphasized. Input Device: Keyboard Touch Panel, Light Pens, Graphic Tablets, Joysticks, Trackball, Data Glove, Digitizer, Image Scanner, Mouse, Voice Systems.

Hard Copy Devices: Impact And Non Impact Printers, Such As Line Printers, Dot Matrix Printers, Laser, Ink- Jet, Electrostatic, Flatbed And Drum Plotters. Video Display Devices: Refresh Cathode–Ray Tube, Raster Scan Display, Random Scan Displays, Color CRT-Monitors, Direct View Storage Tube, Flat Panel Displays, 3-D Viewing Devices, Raster Scan Systems, Random Scan Systems, Graphic Monitors And Workstation.

Scan Conversation Algorithm Line, Circle And Ellipse, Breshenham's Algorithm, Area Filling Techniques, Character Generation. 2-Dimensional Graphics: Cartesian And Homogenous Co-Ordinate Systems, Geometrical Transformation (Translation, Scaling, Rotation, Reflection, Shearing), Two Dimensional Viewing Transformation And Clipping (Line, Polygon And Text)

3-Dimensional Graphics: Geometrical Transformation (Translation, Scaling, Rotation, Reflection, Shearing), Mathematics And Projections (Parallel And Perspective). 3-D Viewing transformation And Clipping.

Hidden Line Surface Removal Algorithms, Z-Buffer, Scan Line, Sub Division Shading: Modeling Light Intensities: Diffuse Reflection, Refracted Light, Half toning. Surface Shading Methods: Constant Intensity Method, Gouraud Shading, Phong Shading.

Introduction to Multi-media Technology, Audio System, Image Compression, Data Compression, Digital Motion Video, Authoring tools, Multimedia Applications, Multimedia DBMS.

IT-23: APPLICATION SOFTWARE DEVELOPMENT

Introduction to .NET

.NET: Introduction, Advantages, DNA Architecture, Study of .NET Framework, Languages under .NET.

Introduction to VB.NET
Basic Programming Rules, Creating a Project, Exploring & Coding a Project, Building a Project, Debugging.

Variables, Constants, Operators and Expressions and Control Statements, Arrays, Structures, Enumerators, Functions.

Class, Object, Inheritance, Events, String Handling, Exception Handling, File Handling, Multi-Threading, Memory Management Issues.

GUI Programming with VB.NET

Introduction to GUI Application and Their Components. Elements of GUI Programming: Controls, Properties, Methods, Events.

Form Control: Interacting with Controls, Dialog Controls, Creating and Using MDI Applications, Creating Custom Controls.

Database Programming

Connecting to Databases, Retrieving Data, Inserting Data, Updating Data etc.

IT-29: WEB TECHNOLOGY

Review of HTML & JavaScript:

Various HTML Tags, properties & use; Cascading Style Sheet (CSS). Creating interactive and dynamic web pages with JavaScript.

Markup language basics*:*

Standard Generalized Markup Language (SGML)- structures, elements, Content models, DTD, attributes, entities. Extensible Markup Language (XML)- Introduction: using user-defined tags in web pages; displaying XML contents using HTML and JavaScript; XML Document Type Definitions;

Extensible Stylesheet Language (XSL) and its use to display XML contents; XSL and basic database queries; brief introduction to other markup languages: VML, MathML, VRML, RELML, HRMML, VoxML, etc.

Server-side scripting:

Overview of CGI, ASP, and JSP. Server side scripting using PHP- constants, variables, operators, expressions & statements; user-defined & built-in functions; form processing scripts; using properties and methods of built-in objects. Web database connectivity-introduction to ODBC; PHP with database connectivity.

Advanced web technologies:

brief introduction to COM, DCOM, CORBA, ISAPI, SOAP, UDDI, WSDL, .NET, etc. Introduction to AJAX and its implementations.

Web Security:

Firewalls- definition and uses, network layer firewalls and application layer firewalls; Proxy servers.

IT 29: E – Commerce
Electronic commerce fundamentals:

History and basic idea of EDI and electronic messaging, definition of e-commerce; administration, business, and consumer models of e-commerce; e-commerce enablers- cost reduction, trust issues, products, processes, and markets.

E-commerce Internet applications: overview of e-commerce standardization activities and standards

Electronic payment systems: digital cash- Ecash, ECheque, Credit card based payment systems, Micropayments and Macropayments.

Social impacts of e-commerce: changes in administration & business; electronic shopping; electronic forms; global e-commerce and future trends.

IT-30: PROJECT

ACTIVITY PLANNER
Gauhati University Institute of Distance and Open Learning
Guwahati- 781014, Assam

ADMISSION				
SEMESTER (TRADITIONAL PROGRAMMES)				
A	1	Fresh	July-September	
	2	Continuation	July-September	
SEMESTER (IT PROGRAMMES)				
B	1	Fresh	July-September	
	2	Continuation	Odd Semester (July-September)	
			Even Semester (January-February)	
ADMISSION TEST FOR M.Sc. IT PROGRAMME				
C	August			
ANNUAL PROGRAMMES				
D	1	Fresh	July-September	
	2	Continuation	July- September	
DISTRIBUTION OF SLM				
SEMESTER/ANNUAL (TRADITIONAL PROGRAMMES)				
A	1	Fresh	July-September	
	2	Continuation	July-September	
SEMESTER (IT PROGRAMMES)				
B	1	Odd Semester	July-September	
	2	Even Semester	January-February	
CONTACT CLASSES				
SEMESTER (TRADITIONAL PROGRAMMES)				
A	1	Odd Semester	September-December	
	2	Even Semester	March-June	
SEMESTER (IT PROGRAMMES)				
B	1	Odd Semester	September-December	
	2	Even Semester	March-June	
ANNUAL PROGRAMMES				
C	1	Previous/Final	December-May	
EXAMINATION : TERM END				
SEMESTER (TRADITIONAL/IT PROGRAMMES)				
A	1	Odd Semester	February-March (All Sundays)	
	2	Even Semester	August-September (All Sundays)	
ANNUAL PROGRAMMES				
B	1	Previous	August-September (All Sundays)	
	2	Final	February-March (All Sundays)	
	Schedule may change as per the directive of the Controller of			

	Examinations, GU/Govt. of Assam		
EXAMINATION: Sessional (OMR based Internal Examination)			
SEMESTER (TRADITIOANL/IT PROGRAMMES)			
A	1	Odd Semester	November-December
	2	Even Semester	June-July
ANNUAL PROGRAMMES			
B	1	Previous	June-July
	2	Final	November-December
DECLARATION OF RESULTS (Term End)			
SEMESTER (TRADITIONAL/IT PROGRAMMES)			
A	1	Odd Semester	May-June
	2	Even Semester	November-December
ANNUAL PROGRAMMES			
B	1	Previous	November-December
	2	Final	May-June

ENCLOSURE-III

SLM covering syllabus

Sl No.	Semester	Course No.	Course Name
1	I	IT 01	Fundamentals of Computers
2		IT 02	Introduction to Programming
3		IT 03	Digital Logic
4		IT 05	Communication Skills & Technical Writing
5		IT 11	Mathematical Foundations of Computer Science
6	II	IT 07	Database Management System
7		IT 12	Data Structure and Algorithm
8		IT 13	Computer Organization & Architecture
9		IT 27	Web Technologies
10		IT 10	Management and Accounting
11	III	IT 14	Operating System
12		IT 17	Data Communication & Computer Network
13		IT 16	Objected Oriented Programming using JAVA
14		IT 21	Software Engineering
15		IT 28	Advanced Web Technology
16	IV	IT 22	Computer Graphics & Multimedia
17		IT 23	Application Software Development
18		IT 29	E Commerce