Purbanchal University
BACHELOR OF INFORMATION TECHNOLOGY (BIT)

Year: I **Semester: II**

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
BIT151HS	Mathematics-II	3	3	2	-	5
BIT152CO	Digital Logic	3	3	1	2	6
BIT153HS	Discrete Structure	3	3	1	-	4
BIT154CO	Object –Oriented Programming in C++	3	3	1	2	6
BIT155MS	Financial Management and Accounting	3	3	1	1	5
BIT156CO	Project-II	2	-	-	3	3
	Total	**17**	**15**	**6**	8	**29**

Note :- Each semester of BIT program spans over a period of 15 weeks of class work and one week of internal examinations, such as internal tests, quizzes, and mid-term examination.

Mathematics II
BIT152SH

Year: I **Semester: II**

Teaching Schedule Hour/ Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical*	Theory**	Practical	
3	2	--	20	--	80	--	100

Course Objective: The main objective of this course is to enable students to apply mathematical tools such as advanced calculus, functions of a complex variables and series in information technology.

Course Contents:

Unit 1: Multiple Integrals **(6 hrs)**

Definition and Evaluation of Double Integrals; Area by Double integration; Introduction to triple integrals & some simple applications; Change of variables.

Unit 2: Differential Equations of the first order **(8 Hrs)**

Variable separable; Exact Differential equations; Homogeneous equations; Linear Differential Equation; Simultaneous differential equations; Equations of higher degree Some applications.

Unit 3: Linear Differential Equations **(7 Hrs)**

Homogeneous equations of second order; Methods of determining particular integrals and application; Vibrations of a particle (SHM).

Unit 4: Fourier Series and Integrals **(10 Hrs)**

Definitions and derivations; Odd and Even functions; Half range series; Change of scale; The Fourier Integral and Fourier Transforms.

Unit 5: Functions of a Complex Variable **(8 Hrs)**

Basic definitions; Functions of a complex variable; Limits, continuity & differentiation; Cauchy Riemann Equations; Analytic Functions; Harmonic Functions; Complex exponential, trigonometric and hyperbolic function.

Unit 6: Complex Series, Residues and poles **(6 Hrs)**

Taylor's Theorem; Laurent's Series; Zeros, Singularities and poles; Residues.

References:

1. Engineering Mathematics Vol II.:--□ S.S. Sastry, Prentice Hall of India.
2. Fraleigh, J.B. Calculus with Analytic Geometry, Addison Wesley pub. Co. Inc (1980)
3. Bajpai, A.C., Calus, I.M and fairley, J.A., Mathematics for Engineering & Scientists, Vol I, John wiley & sons (1973)
4. Goldstain, I.J. Lay, D.C. and schinder, D.I. Calculus and its Applications, Prentice Hall Inc (91977)
5. Spiegel, M.R. Theory and problems of advanced calculus, Scham publishing co

6. Srivastava, R.S.L. Engineering Mathematics, Vol II, Tata, McGraw hill publishing co, (1980)
7. Potter & Goldberg, Mathematical Methods, Prentice Hall of India.

Digital Logic
BIT 152CO

Year I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	2	20	50	80	-	150

Course Objective: The main objective of this course is to familiarize students with the concepts of design and analysis of digital systems and introduce the principles of digital computer organization and design.

Course contents

Unit 1: Number Systems **(5 Hrs)**

Introduction, Comparison between analog and digital system, Number system and conversion (Binary, Octal, and Hexadecimal), signed and unsigned numbers, fraction conversion, Binary Arithmetic, Representation of Binary coded decimal, gray code, alphanumeric code and error detection and correction codes

Unit 2: Boolean Algebra and Logic Gates **(6 Hrs)**

Introduction to Boolean algebra; Basic theory and properties of Boolean algebra; Boolean functions; Logic gates and operations.

Unit 3: Simplification of Boolean Functions **(6 Hrs)**

K-Map; Two and three variable maps; Product of sums, sum of products; Simplification of NAND and NOR implementation.

Unit 4: Combinational Logic **(16 Hrs)**

Design procedure of Adders and Subtractors; Code conversion, Analysis procedure; Multilevel NAND gates; Multilevel NOR gates; Binary parallel adder; Decimal adder; Magnitude comparator; Decoders; Multiplexers; Read only memory Programmable logic array (PLA).

Unit 5: Sequential Logic **(6 Hrs)**

Difference between sequential and combinational circuit; Introduction and Design procedure of RS, JK, T, D and master-slave flip flops; Design with state equation and state reduction table.

Unit 6: Registers and Counters **(6 Hrs)**

Introduction; Left and right shift register; Serial in serial out, Serial in parallel out, Parallel in serial out, Parallel in parallel out; Asynchronous and Synchronous counter; Asynchronous up and down counter; Decade counter, Ring counter; Application of counter.

Laboratory:

1. Familiarization with logic gates
2. De Morgan's law
3. Multiplexer and de-multiplexer
4. Encoder and decoder

5. Half adder and half subtractor
6. Full adder and full subtractor
7. RS, JK, T,D and master slave flip flops
8. Shift registers, Sequential logic
9. Ripple counters and synchronous counters
10. Simulation using suitable software

References:

1. Floyd T. L & Jain R. P, "Digital Fundamentals", 8th edition
2. Morris Mano, "Logic & Computer Design Fundamentals", Pearson education
3. William I, Fletcher, "An Engineering Approach to Digital Design", Prentice Hall of India, New Delhi, 1990
4. A.P. Malvino & Jerald A. Brown, "Digital Computer Electronics", 1995
5. D. D. Hodegs & H.G. Jackson, "Analysis & Design of Digital Integrated Circuits", McGraw Hill, New York, 1983

Discrete Structure
BIT153HS

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	-	20	-	80	-	100

Course Objective: The main objective of this course is to provide the concept of computational mathematics.

Course contents:

Unit 1: Set Theory and Matrices **(3 Hrs)**

Overview of sets and sets operation; Sequence; Matrices; Mathematical structure.

Unit 2: Function and Counting **(7 Hrs)**

Functions; Function for computer science; Permutation; Combination; The Pigeonhole principle; Recurrence relation.

Unit 3: Logic **(6 Hrs)**

Proposition and logical operation; Conditional statement; Proof Techniques; Mathematical induction.

Unit 4: Relation and Digraphs **(8 Hrs)**

Products set and partitions; Relations digraphs; Paths and in-relation and digraphs; Properties of relations; Equivalent relation; Manipulation of relation; Transitive closure and Warshall's algorithms.

Unit 5: Graph and Tree **(8 Hrs)**

Graphs; Euler path and circuit; Hamiltonian path and circuit; Trees; Labeled tree; Binary search tree; Minimal spanning tree.

Unit 6: Order Relation and Structure **(6 Hrs)**

Partially ordered sets; External element of a Posets; Lattices; Finite Boolean algebra.

Unit 7: Automata, Language and Grammar **(7 Hrs)**

Introduction; Finite-state Automata; Strings; Languages; Regular expressions; Grammars.

References:

1. "Discrete Mathematical Structure", Bernard Kolman, Rober C, Busy, Sharman Ross, PHI India
2. "Applied Discrete Structure", K. D. Joshi, New Age International Pvt. Ltd., New Delhi, India
3. "Discrete Mathematics", B. P. Prashar, CBS Publishers & Distribution, New Delhi, India

Object-Oriented Programming in C++
BIT154CO

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	2	20	20	60	-	100

Course Objective: The main objective of this course is to introduce students with the concepts of object oriented programming using C++.

Course contents:

Unit 1: Introduction to Object Oriented Programming **[2 Hrs]**

Procedural Programming Language vs OOPL, Characteristics of object-oriented languages, Applications of OOP.

Unit 2: C++ Programming Concept **[3 hrs]**

Introduction to programming in C++, Operators in C++, Type conversion: automatic conversion, Type casting, Arrays and Pointers in C++, New and Delete operators, "this" pointer, Manipulators, Constants, Enumeration.

Unit 3: Functions Used in C++ **[3 Hrs]**

Functions overloading, Default arguments, Inline functions

Unit 4: Classes and Objects **[7 Hrs]**

Introduction, Access specifier (public, private and protected), Defining member functions, Accessing class members, Nesting of Member Functions, Array of Objects; Static Data Member, Static Member Functions; Friend Functions, Friend Class; Passing Objects as Function Arguments, Returning Objects from Functions.

Unit 5: Constructor & Destructor **[3 Hrs]**

Types of constructor (Default constructor, Parameterized constructor, Copy constructor); Overloaded constructors, Destructor.

Unit 6: Operator Overloading **[6 Hrs]**

General rules and restrictions for overloading operator; Overloading Unary and Binary operators; Data conversion: Conversion from Basic to Class types, Conversion from Class to Basic Types, Conversion between Objects of different classes.

Unit 7: Inheritance **[6 Hrs]**

Introduction & benefits of inheritance, Types of Inheritance, Types/Modes of Derivation, Multipath Inheritance, Ambiguity in Multipath Inheritance, Virtual Base Class, Abstract Base Class; Contructors and Destructors in Inheritance

Unit 8: Virtual Functions and Polymorphism **[4 Hrs]**

Early vs Late Binding, Overriding, Virtual functions, Pure Virtual Functions

Unit 9: File Handling **[6 Hrs]**

Stream Based Input/Output, Hierarchy Stream Classes; Unformatted and Formatted I/O Operations; File Input Output; Opening and Closing file; Opening file using constructor; Opening file using open() function; Reading and Writing Data Files.

Unit 10: Templates and Namespaces **[3 Hrs]**

Function templates, Class templates, Standard Template Library, Namespaces.

Unit 11: Exception handling **[2 Hrs]**

Introduction to exceptions, Exception handling model: Try, Catch ,Throw.

Laboratory: There shall be lab classes covering above mentioned topics.

References:

1. Robert Lafore, "Object-Oriented Programming in C++, Galgotia Publication, India
2. E. Balagurusamy, "Object Oriented Programming with C++, McGraw Hill 4/e
3. Deitel & Deitel, "C++ How to Program", 3/e Prentice Hall
4. Yashavant Kanetkar, "Let Us C++", BPB Publication, New Delhi

Financial Management and Accounting
BIT155MS

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
3	1	1	20	50	80	-	150

Course Objective: The main objective of this course is to familiarize students with the basic knowledge of financial management and accounting in information technology.

Course contents

Unit 1: Nature of Financial Management **[3 Hrs]**

Meaning and importance objectives-profit vs wealth maximization, functions, financial; management in new millennium-globalization of business and information technology

Unit 2: Time Value of Money **[3 Hrs]**

Concept, present values and future values

Unit 3: Capital Budgeting **[4 Hrs]**

Importance, generating ideas for capital projects, projects classifications, capital budgeting; decision rules-payback period, NPV and IRR, comparison of NPV and IRR.

Unit 4: Working Capital **[5 Hrs]**

Concept of working capital, cash management (preparation of Cash Budget), receivables management inventory management, financing working capital.

Unit 5: Capital Structure **[4 Hrs]**

Meaning of capital structure, optimum capital structure, business and financial risks, determining; Optimum structure, factors affecting capital structure policies.

Unit 6: Dividends **[4 hrs]**

Meaning of Dividends and retained earnings, optimum dividend policy, factor affecting dividend policies, types of dividend policy, other forms of dividend stock dividends-stock dividends, stock splits, stock repurchase.

Unit 7: Nature of Accounting **[4 Hrs]**

Meaning, importance, basic accounting concepts, principles and standards: double entry system of accounting, rules of double-entry-equation rule and types of account rule.

Unit 8: Accounting Process **[6 Hrs]**

Journalizing and subdivision of journal, ledger posting, cash book, preparation of trial balance.

Unit 9: Financial statement **[5 Hrs]**

Meaning types- income statement (Trading & P/L account), B/S, preparation of financial statements of sole trading concern & Partnership firm.

Unit 10: Financial Analysis **[4 Hrs]**

Meaning, types, ratio analysis, uses and limitation of ratio analysis

Unit 11: Cash Flow Statement – Direct Method **[3Hrs]**

Laboratory: Lab will be conducted to the accounting topics of the syllabus using accounting package (e.g. Tally, Facts). Students should prepare final accounts of any organization using any of those accounting package.

References:

1. Eugene F. Brigham & Joel F. Houston, "Fundamentals of Financial Management", Harcourt Asia Pte, Singapore, Indian Edition, 2001.
2. T. S. Gerewal, "Introduction to Accounting", S. Chand & Co, New Delhi.
3. Lawrence J Gitman, "Principles of Managerial Finance", Addison Wesley Longman (Singapore) Pvt. Ltd, Indian Reprint, 2001.
4. Surendra Pradhan, "Basics of Financial Management", Educational Enterprises, Kathmandu.

Project-II
BIT 156CO

Year: I **Semester: II**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
			Theory	Practical	Theory	Practical	
-	-	3	-	60	-	40	100

Course Objective: The main objective of this course is to enable students design and complete the software project by using Object Oriented Programming Language (C++ Programming).

Course Contents:
A Project group will be developing a software project by using object-oriented programming [BIT154CO]. Every students of the group should work at least for 45 lab hours under the supervision of the assigned supervisor. Students must develop the assigned software, submit written report, and give oral presentation.

General Procedure:
1. Topic Selection
2. Information Gathering
3. System Requirements and Specifications
4. Algorithms and Flowcharts
5. Coding
6. Implementation
7. Documentation

The project document shall include the following:
1. Technical description of the project
2. System aspect of the project
3. Project tasks and time-schedule
4. Project team members
5. Project supervisor
6. Implementation of the project

Project Evaluation Criteria for Internal assessment:
The marks allocated for the project should be evaluated based on the following criteria:
- Title identification and Proposal Writing— 10 Marks
- Mid-term Presentation — 20 Marks
- Pre-final Submission and final Presentation — 30 Marks

Project Evaluation Criteria for External assessment:
The marks allocated for the project should be evaluated based on the following criteria:
- Project Documentation— 20 Marks
- Final Presentation — 10 Marks
- VIVA - 10 Marks

Group Size: 2 to 3 students in one group.