

FACULTY OF COMPUTER SCIENCE & IT

SYLLABUS

of

**Bachelor of Science (Honours) Information Technology
(offered under 4-Year UG Degree Programme)**

(Semester I-IV)

(Under Credit Based Continuous Evaluation Grading System)

Under NEP 2020

Session: 2025-26



The Heritage Institution

**KANYA MAHA VIDYALAYA
JALANDHAR
(Autonomous)**

Program Specific Outcomes

Bachelor of Science (Honours) Information Technology (Session 2025-26)

After completing this program, the students will be able to:

PSO1: Apply skills for development of software and websites for providing efficient solution to IT based problems.

PSO2: Comprehend development process in IT industry through ethical, defined and innovative techniques.

PSO3: Achieve leadership role and team player role to be able to work in multidisciplinary areas at various job roles.

PSO4: Identify and demonstrate the implementation of various tools and technologies involved in the field of Information Technology.

PSO5: Demonstrate proficiency in the field of Programming, Web development and IT enabled services.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE/FOUR YEAR DEGREE PROGRAMME Bachelor of Science (Information Technology) - Three Year Degree Programme

Bachelor of Science (Honours) Information Technology - Four Year Degree Programme

(Under Credit Based Continuous Evaluation Grading System)

Session 2025-26

Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information Technology Semester - I										
Course Code	Course Title	Cour se Type	Hours per week	Credit		Marks				Examinati on Time (in Hours)
			L-T-P	L-T-P	Total	Total	Ext.		CA	
							L	P		
BITL-1421 / BITL-1031/ BITL-1431	Punjabi (Compulsory) / 1 Basic Punjabi/ 2Punjab History and Culture	C	4-0-0	4-0-0	4	100	70	-	30	3
BITM-1102	Communication Skills in English - I	AEC	4-0-0	4-0-0	4	100	50	20	30	3+3
BITL-1113	Digital Electronics	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BITL-1114	Introduction to Programming – C	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BITL-1115	Fundamentals of Computers	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BITP-1116	Lab on Programming – C	DSC	0-0-4	0-0-2	2	50	-	35	15	3
BITP-1117	Lab on Office Package	DSC	0-0-4	0-0-2	2	50	-	35	15	3
BITM-1110	Introduction to the Internet	SEC	2-0-2	2-0-1	3	100	40	30	30	3+3
VACF-1491	*Foundation Course	VAC	2-0-0	2-0-0	2	50	35	-	15	3
	Total				29	750				

Note:

C – Compulsory, DSC – Discipline Specific Course, SEC – Skill Enhancement Course

AEC – Ability Enhancement Course, VAC – Value Added Course

¹ Special course in lieu of Punjabi (Compulsory)

² Special course in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.

***Credits/Grades Points of these courses will not be added in total, only grades will be provided.**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE/FOUR YEAR DEGREE PROGRAMME

Bachelor of Science (Information Technology) - Three Year Degree Programme

Bachelor of Science (Honours) Information Technology - Four Year Degree Programme

(Under Credit Based Continuous Evaluation Grading System)

Session 2025-26

Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information Technology Semester - II										
Course Code	Course Title	Course Type	Hours per week	Credit		Marks				Examination Time (in Hours)
			L-T-P	L-T-P	Total	Total	Ext.		CA	
							L	P		
BITL-2421/ BITL-2031/ BITL-2431	Punjabi (Compulsory) ¹ Basic Punjabi ² Punjab History and Culture	C	4-0-0	4-0-0	4	100	70	-	30	70
BITM-2102	Communication Skills in English-II	MDC	3-0-2	3-0-1	4	100	50	20	30	3+3
BITL-2113	Computer Networks	DSC	3-1-0	3-1-0	4	100	70	-	30	3
BITL-2114	Database Management System	DSC	3-1-0	3-1-0	4	100	70	-	30	3
BITL-2115	Introduction to Object Oriented Programming-I	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BITP-2116	Lab on Database Management System	DSC	0-0-4	0-0-2	2	50	-	35	15	3
BITP-2117	Lab on Object Oriented Programming - I	DSC	0-0-4	0-0-2	2	50	-	35	15	3
VACD-2161	*Drug Abuse: Problem, Management and Prevention (Compulsory)	VAC	2-0-0	2-0-0	2	50	35	-	15	3
	Total				26	650				

Note:

C – Compulsory, DSC – Discipline Specific Course, SEC – Skill Enhancement Course

MDC –Multi Disciplinary Course, VAC – Value Added Course

¹ Special course in lieu of Punjabi (Compulsory)

² Special course in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.

***Credits/Grades Points of these courses will not be added in total, only grades will be provided.**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE/FOUR YEAR DEGREE PROGRAMME

Bachelor of Science (Information Technology) - Three Year Degree Programme

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Session 2025-26

Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information Technology Semester - III										
Course Code	Course Title	Course Type	Hours per week	Credit		Marks				Examination Time (in Hours)
			L-T-P	L-T-P	Total	Total	Ext.		CA	
							L	P		
BITL-3111	Computational Problem Solving	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BITL-3112	Advanced Database Management System	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BITL-3113	Numerical Methods and Statistical Techniques	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BITL-3114	E-Business	MDC	4-0-0	4-0-0	4	100	70	-	30	3
BITP-3115	Lab on Computational Problem Solving	DSC	0-0-4	0-0-2	2	50	-	35	15	3
BITP-3116	Lab on Advanced Database Management System	DSC	0-0-4	0-0-2	2	50	-	35	15	3
BITI-3117	Internship	C	0-0-4	0-0-2	2	50	-	50	-	-
BITM-3110	Data Analysis using Spreadsheet and Tableau	SEC	2-0-2	2-0-1	3	100	40	30	30	3+3
VACG-3531	Gender Sensitization	VAC	2-0-0	2-0-0	2	50	35	-	15	1
	Total				27	700				

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Session 2025-26

Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information Technology Semester - IV										
Course Code	Course Title	Course Type	Hours per week	Credit		Marks				Examination Time (in Hours)
			L-T-P	L-T-P	Total	Total	Ext.		CA	
							L	P		
BITL-4111	Web Development	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BCAL-4112	Applied and Discrete Mathematics	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BCAL-4113	System Analysis and Design	DSC	4-0-0	4-0-0	4	100	70	-	30	3
BCAL-4114	Object Oriented Programming - II	DSC	4-0-0	4-0-0	4	100	70	-	30	3
	Effective Soft Skills	AEC	4-0-0	4-0-0	4	100	70	-	30	3
BCAP-4115	Lab on Web Designing and Development	DSC	0-0-4	0-0-2	2	50	-	35	15	3
BCAP-4116	Lab on Object Oriented Programming - II	DSC	0-0-4	0-0-2	2	50	-	35	15	3
AECE-4221	Environmental Studies (Compulsory)	VAC	1-0-2	1-0-1	2	50	20	15	15	3+3
	Total				26	650				

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

**COURSE CODE: BITL-1113
DIGITAL ELECTRONICS**

Course Outcomes:

After the completion of this course, the student will be able to:

CO1: Comprehend and apply the number systems.

CO2: Apply K-map for simplification of Boolean expressions and implement them with Logic Gates.

CO3: Implement complex combinational circuits and memory interconnections.

CO4: Design counters using flip-flops.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

**COURSE CODE: BITL-1113
DIGITAL ELECTRONICS**

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Number System: Introduction to number system (Binary, Octal, Decimal, Hexadecimal and Arbitrary), number conversion system, binary arithmetic. 1's and 2's complement.

Representation of signed binary numbers, Non-weighted Codes: BCD Code, Excess-3 Code, Grey Code, ASCII, Integer and floating point representation.

UNIT- II

Logic Gates and Boolean Algebra: Logic gates, Universal Gates, Boolean Algebra Laws of Boolean Algebra, canonical forms of Boolean expressions, K-Map.

UNIT-III

Combinational Circuits: Half, Full, BCD and Parallel Adder, Half and full Subtractor, Multiplexers, Demultiplexers, Multiplexer Tree, Demultiplexer Tree, Decoder, Encoder: Priority and 7-segment Display, Parity Generator and Checker.

RAM and ROM Chips, Read and Write timing diagrams, Address Selection Logic, Design of Large memory using smaller chips.

UNIT-IV

Sequential Circuits: Introduction, RS-latch, Flip-flops (Truth Table, Internal Circuit, Excitation Table), clock and Triggering, Registers: SISO, SIPO, PISO, PIPO, Counters: Up, Down, Up/Down, Ring, Twisted Ring.

References / Textbooks:

1. M. Morris Mao, Digital Design, Pearson Publication (2018), 6th Edition.
2. Ronald J. Tocci, Digital Systems, Pearson (2009), 10th Edition.
3. Morris Mano, Digital Logic and Computer Design, Pearson Education (2004), 1st Edition.
4. V.K. Jain, Arti Agarwal, Digital Electronics, Genius Publications Pvt. Ltd. (2018), 1st Edition
5. K. Meena, Principles of Digital Electronics, Prentice Hall India Learning Private Limited (2009), 1st Edition
6. William H. Gothmann, Digital Electronics: An introduction to Theory and Practice, Prentice Hall India Learning Private Limited (1982), 2nd Edition

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

COURSE CODE: BITL-1114

INTRODUCTION TO PROGRAMMING - C

Course Outcomes:

After passing course the student will be able to:

CO1: Comprehend the working of various programming constructs involved in C Programming.

CO2: Design C program and control its sequence using various control statements.

CO3: Apply programming concepts such as arrays, functions and strings to provide solution in different problem domains.

CO4: Work with pointers, structures and union.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

COURSE CODE: BITL-1114

INTRODUCTION TO PROGRAMMING - C

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hrs.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Fundamentals: Character set, Identifiers and Keywords, Data types, Constants, Variables, Expressions, Statements, Symbolic Constants.

Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, Library functions. Data Input and Output statements

UNIT -II

Control Statements: Preliminaries, While, Do-while and for statements, Nested loops, If-else, Switch, Break – Continue statements.

Program Structure Storage Class: Storage Classes- Auto, extern, register and static.

UNIT-III

Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.

Arrays: Defining, processing an array, passing arrays to a function, multi-dimensional arrays.

Strings: String declaration, string functions and string manipulation.

UNIT - IV

Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self-referenced structure, and unions.

Pointers: Fundamentals, pointer declaration, passing pointer to a function, pointer and one dimensional arrays, operation on pointers, pointers & multi-dimensional arrays of pointers, passing functions, other functions, more about pointer declarations.

References/Textbooks:

1. E Balagurusamy, Programming in ANSI C, Tata McGraw-Hill, 2002.
2. Byron Gottfried, Schaum's Outline Programming with C, McGraw Hill, 1996.
3. Brian W. Kernighan, Dennis M. Ritchie, The C Programming language, Prentice Hall, 1988.
4. Stephen G. Kochan, Programming in C, Pearson Education, 2015.

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

COURSE CODE: BITL-1115

FUNDAMENTALS OF COMPUTERS

Course Outcomes:

After passing course the student will be able to:

CO1: Comprehend about computer hardware, operating system concepts and various system software.

CO2: Identify various input, output and memory devices.

CO3: Apply word processing software to create professional and academic documents.

CO4: Create effective and well-formatted presentation.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

**COURSE CODE: BITL-1115
FUNDAMENTALS OF COMPUTERS**

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hrs.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Fundamentals of Computer: Introduction to computer, Applications of computer, Components of computers (Input unit, Output Unit, Memory Unit & CPU).

Software: Application Software, Service software, System software, booting a System.

Memories: Primary Memory -RAM (Working and Its types), ROM (Types of ROM). Secondary Memory - Hard Disk (Structure of a hard disk, working, concept of tracks, sectors, clusters, cylinders).

UNIT-II

Input Devices: Keyboards, Mouse, Joystick, Light Pen and Data Scanning devices (scanner, OCR, OMR, MICR, Bar Code Reader, Card Reader)

Output Devices: Monitor, Printers (laser printer, dot matrix printer, ink jet printer)

Word Processing: Introduction to Office, word processing & its features, Parts of window of word (Title bar, menu bar, status bar, and ruler), understanding the Ribbon, Use of Office Button and Quick Access Toolbar, Creation of new documents, opening document, insert a document into another document.

UNIT-III

Word Processing: Page setup, margins, gutters, font properties, Alignment, page breaks, header & footer, deleting, moving, replace, editing text in document, saving a document,

spell checker, printing a document. Creating a table, entering and editing, Text in tables. Changing format of table, height, width of row/column. Editing, deleting Rows, columns in table. Adding picture, page colors and Watermarks, Borders, shading, Templates, wizards, drawing objects.

Presentation: Introduction to PowerPoint, Exploring menus, starting a new slide, saving presentation, moving/rearranging slides, printing slides. Applying theme to presentation, Views (slide View, slide sorter, notes view, outline view), Formatting & enhancing text formatting. Displaying slide show, adding multimedia. Slide transitions, applying Animation, Timing slide display, adding movies & sounds.

UNIT-IV

Spreadsheet: Introduction to Worksheet/Spreadsheets, creating a simple Worksheet, Computations in a Worksheet, Printing the Worksheet, Graphs, Data Sorting, Filling, Filtering data. **Functions and Formulas:** Applying Formulas. Inserting and Editing a Function, Auto Calculate and Manual Calculation, Defining Names, Using and Managing Defined Names, Displaying and Tracing Formulas, Understanding Formula Errors, Using Logical Functions (IF), Using Financial Functions (PMT), Using Database Functions (DSUM), Using Lookup Functions (VLOOKUP), User Defined and Compatibility Functions, Date & Time Functions, Math & Trig Functions, Statistical Functions, Text Functions, Logical Functions. **Working with Pivot Tables:** Creating a PivotTable, Specifying PivotTable Data, changing a PivotTable's Calculation, Filtering and Sorting a PivotTable, working with PivotTable Layout, Grouping PivotTable Items, updating a PivotTable, formatting a PivotTable, creating a PivotChart.

References/Textbooks:

1. Joyce Cox, Joan Lambert and Curtis Frye, Microsoft office Professional 2010 Step by Step, Microsoft Press, 2010.
2. V. Rajaraman, NeeharikaAdabala, Fundamentals of Computers, PHI Learning, 2015.
3. P.K. Sinha, Computer Fundamentals, BPB Publications, 2004.
4. Anshuman Sharma, A book of Fundamentals of Information Technology, Lakhanpal Publishers, 5th Edition.
5. Peter Norton, Peter Norton's Computing Fundamentals, McGraw-Hill Technology Education, 2006.

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

**COURSE CODE: BITP-1116
LAB ON PROGRAMMING – C**

L-T-P: 0-0-2

Credits: 2

Examination Time: 3 Hrs.

Max. Marks: 50

Practical : 35

CA: 15

Lab based on Course Code BITL-1114

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

COURSE CODE: BITP-1117

LAB ON OFFICE PACKAGE

L-T-P: 0-0-2

Credits: 2

Examination Time: 3 Hrs.

Max. Marks: 50

Practical : 35

CA: 15

Lab based on Course Code BITL-1115

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

**COURSE CODE: BITM-1110
INTRODUCTION TO THE INTERNET**

Course Outcome:

After passing course the student will be able to:

CO1: Understand Internet basics and it's working.

CO2: Gain knowledge of email service on different mail servers.

CO3: Understand different Internet protocols and search engines.

CO4: To give hands-on experience and provide a comprehensive, non-technical, hands-on overview of the Internet based services.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

**COURSE CODE: BITM-1110
INTRODUCTION TO THE INTERNET
(Theory)**

L-T-P: 2-0-1

Credits: 3

Examination Time: 3 Hrs.

Max. Marks: 100

Theory: 40

Practical: 30

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (8 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit I

Origin, growth and evolution of the Internet; the impact of the Internet; terminology: web pages, website, web browser, web server, bandwidth; Connect to the Internet: hardware and software, types of Internet connections, Internet Service Providers; Navigating different types of websites and online resources.

Student should explore the local market to understand the internet service providers, rates, bandwidth etc.

UNIT II

Email Communication: Email Etiquette and Best Practices, Managing and Organizing Emails Email Tools and Features, identifying spam and phishing emails;

Searching on the Internet: Overview of internet resources and search engines, Basics of Using Search Engines -How search engines work, Basic search techniques and tips, Understanding search engine results pages (SERPs), Using search operators (e.g., AND, OR, NOT), Utilizing advanced search features (e.g., Google Advanced Search),

UNIT III

Online Tools for Productivity: Introduction to productivity tools (e.g., Google Workspace, Microsoft Office 365), Cloud storage and file management (e.g., Google Drive, Dropbox), Collaboration and Communication Tools: Online communication etiquette and best practices, using collaboration tools (e.g., Google Docs, Slack, Microsoft Teams), Effective virtual meeting strategies (e.g., Zoom, Google Meet)

UNIT IV

Building Online Presence: Creating and maintaining a professional online profile (e.g., LinkedIn), Personal branding and digital portfolios, Networking strategies for academic and career growth, Understanding digital footprints and online reputation.

Digital citizenship and respectful online behaviour, balancing screen time and managing digital distractions

References/Textbooks:

1. Douglas E Comer, The Internet Book: Everything You Need to Know About Computer Networking and How the Internet Works, CRC Press
2. Faithe Wempen, Digital Literacy For Dummies 1st Edition

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- I**

Session 2025-26

**COURSE CODE: BITM-1110
INTRODUCTION TO THE INTERNET
(Practical)**

L-T-P: 2-0-1

Credits: 3

Examination Time: 3 Hrs.

Max. Marks: 100

Theory: 40

Practical: 30

CA: 30

Instructions for the examiners:-

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva should also be conducted alongside, and the student is asked viva questions related to the question and the solution he/she is working on during the exam.

Lab exercises based on:

- Identifying internet connections and Configuring internet connection on PC/Laptop
- Email Tools and features
- Using the Google search engine and explore Bing
- Using Google Docs, Google Drive for document preparation and storage
- Collaboration using Slack
- Analyzing LinkedIn profiles
- Creating your own LinkedIn profile
- Virtual meeting platforms: Microsoft Teams, Zoom, Google Meet

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- II**

Session 2025-26

**COURSE CODE: BITL-2113
COMPUTER NETWORKS**

Course Outcomes:

After passing course the student will be able to:

CO1: Describe the functions of each layer in OSI and TCP/IP model.

CO2: Identify various network devices and the layers on which it operates.

CO3: Describe the Data Link layer and Network layer design issues.

CO4: Comprehend the functioning of Transport layer and Application layer protocols.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- II**

Session 2025-26

COURSE CODE: BITL-2113

COMPUTER NETWORKS

L-T-P: 3-1-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT – I

Introduction: Basic concepts of Computer Networks, Basic Components of a Network, Network types and topologies.

Models: OSI Reference Model, TCP/IP Model, Comparison between TCP/IP and OSI model

Transmission Media: Coaxial Cable, Twisted Pair Cable, Fiber Optics & Satellites.

UNIT – II

Network Devices: Hub, Switch, Repeaters, Bridges, Routers, Gateways.

Introduction to Analog and Digital Transmission: Introduction to Analog and Digital Signals, Modems, Types of modems, pulse code modulation. Multiplexing and its types, Circuit Switching, Packet Switching, Message Switching.

Data Link Layer Design Issues: Error Control, Flow Control, Error Detection & Correction

UNIT - III

Media Access Protocols: CSMA, CSMA/CD, CSMA/CA.

IEEE standards 802: Token Ring, FDDI.

Design Issues of Network Layer: Routing Algorithm- Distance Vector Routing, Link state Routing and The Dijkstra Algorithm, IPv4: Notation, Classful addressing, Header Format, IPv6 addressing.

UNIT – IV

Design issues of Transport Layer: Introduction to TCP, TCP Services, features, TCP segment format, Introduction to UDP, User Datagram Format, UDP Operation

Introduction to Cryptography, types of Key.

References/Textbooks:

1. Tanenbaum, A.S., Computer Networks, Prentice Hall, 2010.
2. Stallings, W., Local Networks: An Introduction: Macmillan Publishing Co, 1990.
3. Stallings W., Data and Computer Communications, Prentice Hall, 2011.
4. Forouzan B., Data Communications and networking, McGraw Hill, 2007.

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- II**

Session 2025-26

COURSE CODE: BITL-2114

DATABASE MANAGEMENT SYSTEM

Course Outcomes:

After the completion of this course, the student will be able to:

CO1: Comprehend various data models and use of ER Diagram in Database Management System.

CO2: Apply relational Algebra for performing queries of different types and Create tables using SQL.

CO3: Apply DML commands to insert, delete, update and query data from database.

CO4: Analyse the normal form of a database from its schema.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- II**

Session 2025-26

COURSE CODE: BITL-2114

DATABASE MANAGEMENT SYSTEM

L-T-P: 3-1-0

Credits: 4

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Introduction: Introduction to Database, Database management system. Structure of database system, Advantages and Disadvantages, Schema, levels of database system, Relational model, Hierarchical model, Network model.

E-R diagram: Entity set, Relationship set, Attributes, Generalization, Participation, different keys used in a relational system.

UNIT-II

DBA, responsibilities of DBA, Codd's Rules, Relational Algebra: Selection, Projection, Rename, Union, Intersection, Set Difference, Cartesian Product.

Introduction to SQL, Data types, Constraints, DDL: Creating Table, Deleting Table, Alter Table (Renaming table, changing name of column, adding/dropping column, adding dropping constraint, changing type of column).

UNIT-III

DML: Insertion, Deletion and Update. Inserting Multiple records, Deleting and update records having reference to another table (Cascade/Restrict/Set Null).

Querying Data: Operators, Where, Order By, Group By and Having clause. Aliases, Handling NULL values, displaying distinct records, Built in Functions, Aggregate Functions and Wildcards.

UNIT-IV

DCL: Creating and managing users/roles, Grant and Revoke commands.

Introduction to Normalization – need and advantages of normalization, Role of Candidate Key, 1NF, 2NF, 3NF, BCNF, 4NF.

Query Processing and Optimization: Steps and Components. Views in SQL.

References/Textbooks:

1. C.J. Date, An Introduction to Database Systems, Pearson Education 2000.
2. H. F. Korth & Silverschatz, A., Database System Concepts, Tata McGraw Hill, 2010.
3. Elmasri & Navathe, Fundamentals of Database Systems, Addison-Wesley, 2011.
4. Hoffer, Prescott, Mcfadden, Modern Database Management, Paperback International, 2012.
5. Martin Gruber, Understanding SQL, BPB Publication, 1994.

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- II**

Session 2025-26

COURSE CODE: BITL-2115

INTRODUCTION TO OBJECT ORIENTED PROGRAMMING - I

Course Outcomes:

After the completion of this course, the student will be able to:

CO1: Comprehend the concepts of Object Oriented Programming Paradigm.

CO2: Identify the use of access specifiers and different types of constructors in class.

CO3: Apply function and operator overloading.

CO4: Comprehend different types of inheritance and polymorphism.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- II**

Session 2025-26

COURSE CODE: BITL-2115

INTRODUCTION TO OBJECT ORIENTED PROGRAMMING – I

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Programming Paradigms: Introduction to the object oriented approach towards programming by discussing Traditional, Structured Programming methodology.

Objects & Classes: Object Definition, Instance, Encapsulation, Data Hiding, Abstraction, Inheritance, Messages, Method, Polymorphism, Classes.

UNIT-II

Object Oriented Programming using C++: Characteristics of OOP, Overview of C++, I/O using cout and cin, Objects and Classes, Member functions and data, private & public, constructor & destructor, Constructor Overloading, Types of Constructors.

UNIT-III

Function Overloading: Function Overloading, Default Arguments, Ambiguity in Function Overloading.

Operator Overloading: Overloading unary and binary operators, Type Conversion using Operator Overloading

UNIT-IV

Inheritance: Concept of inheritance, Base & derived classes, Access Specifiers, Class Hierarchies, Types of Inheritance with examples.

Virtual Functions and Polymorphism: Virtual functions, friend functions, static function, this pointer, polymorphism, Types of Polymorphism with examples, templates, class templates.

References / Textbooks:

1. Herbertt Schildt, C++: The Complete Reference, Tata McGraw-Hill Education India, 4th Edition.
2. Bjarne Stroustrup, The C++ Programming Language, Addison – Wesley Professional (2013), 4th Edition
3. Bjarne Stroustrup, A Tour of C++ (C++ In-Depth Series), Addison – Wesley Professional (2018), 2nd Edition
4. G.S. Baluja, C++ Program Design (w/CD), Khanna Book Publishing Company (2015), 2nd edition.
5. Stanley Lippman, Josee Lajoie, Barbara Moo, C++ Primer, Addison-Wesley Professional (2012), 5th edition.
6. Richard Johnsonbaugh and Martin Kalin, Object Oriented Programming in C++, Pearson Education (1999), 2nd Edition

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- II**

Session 2025-26

COURSE CODE: BITP-2116

LAB ON DATABASE MANAGEMENT SYSTEM

L-T-P: 0-0-2

Credits: 2

Examination Time: 3 Hours

Max. Marks: 50

Practical : 35

CA: 15

Lab based on Course Code BITL-2114

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- II**

Session 2025-26

COURSE CODE: BITP-2117

LAB ON OBJECT ORIENTED PROGRAMMING - I

L-T-P: 0-0-2

Credits: 2

Examination Time: 3 Hours

Max. Marks: 50

Practical : 35

CA: 15

Lab based on Course Code BITL-2115

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III**

Session 2025-26

COURSE CODE: BITL-3111

COMPUTATIONAL PROBLEM SOLVING

Course Outcomes:

After passing course the student will be able to:

CO1: Comprehend basics of Python programming like operators, data types, control structures, etc.

CO2: Apply list and dictionaries for handling and accessing data through iterations.

CO3: Implement various built-in and user defined function to solve mathematical problems.

CO4: Comprehend Object Oriented Programming and modules in Python.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III**

Session 2025-26

COURSE CODE: BITL-3111

COMPUTATIONAL PROBLEM SOLVING

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT- I

Introduction to Problem solving using Python: Process of Computational Problem Solving, Python Programming Language.

Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types.

Control Structures: Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging.

UNIT- II

Lists: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python.

Iteration: While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion.

Dictionaries: Dictionaries and Files, Looping and dictionaries, Advanced text parsing.

UNIT- III

Functions: Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments.

Files: Opening Files, Using Text Files, String Processing, Exception Handling.

UNIT- IV

Objects and Their Use: Introduction to Object Oriented Programming.

Modular Design: Modules, Top-Down Design, Python Modules.

Using Databases and SQL: Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables.

References/Textbooks:

1. Charles Severance, Python for Informatics, Version 0.0.7.
2. Charles Dierbach, Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Wiley Publications, 2012.
3. Guttag John V, Introduction To Computation And Programming Using Python, PHI, 2014.
4. Jeeva Jose and Sojan P. Lal, Introduction to Computing& Problem Solving Through Python, Khanna Publishers, 2015.
5. Mark J. Guzdial, Introduction to Computing and Programming in Python, Pearson Education, 2015.
6. Kenneth Lambert, Fundamentals of Python, Course Technology, Cengage Learning, 2015
7. Mark Lutz, Learning Python, O'Reilly Media, 2013

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III
Session 2025-26
COURSE CODE: BITL-3112
ADVANCED DATABASE MANAGEMENT SYSTEM**

Course Outcomes:

After passing course the student will be able to:

CO1: Gain knowledge of transaction management and Concurrency control.

CO2: Create, manage and access database using PL/SQL.

CO3: Create and manage database using NoSQL

CO4: Comprehend the implementation of queries using MongoDB

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III**

Session 2025-26

COURSE CODE: BITL-3112

ADVANCED DATABASE MANAGEMENT SYSTEM

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 Marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

SQL: Join methods & sub query, Union, Intersection, Minus, Indexes, Views.

Transaction Management-ACID Properties, Concurrency Control, Security amongst users.

UNIT-II

PL/SQL: Introduction, advantages and limitations, block structure, constant and variables, input and output, control statements, data-types. Triggers, functions and procedures, cursors, packages, exceptions.

Big Data: Meaning, Characteristics, Benefits, CAP Theorem

UNIT III

NoSQL: Overview, Need of NoSQL, Structured Data Vs. Unstructured Data, Types of Database in NoSQL, Features of NoSQL, Advantages of NoSQL, Eventual Consistency, ACID vs BASE Properties.

MongoDB: Overview, Install MongoDB server, Environment, Create Database, Data Model, Collection (Creation and Deletion), Data types in MongoDB, CRUD: Create, Update, Delete And Query Database.

UNIT IV

SQL to MongoDB Mapping, Projection. Sorting, Limiting and Counting records. Indexes in MongoDB: Creation of Index, Options, Dropping and fetching of Index. Analyze Query performance, Plan and Profiler. MongoDB Aggregation Query: Aggregate Framework (sum, avg, min, max, push, first, etc). Replication and Sharding, MapReduce Function. Creating database backup.

Reference/ Textbooks:

1. C.J. Date, An Introduction to Database Systems, Pearson Education 2000.
2. H. F. Korth&Silverschatz, A., Database System Concepts, Tata McGraw Hill, 2010.
3. Elmasri&Navathe, Fundamentals of Database Systems, Addison-Wesley, 2011.
4. Hoffer, Prescott, Mcfadden, Modern Database Management, Paperback International, 2012.
5. Adam Fowler, “NoSQL For Dummies”, Wiley, First Edition, 2015.
6. Gerardus Blokdyk, “NoSQL A Complete Guide”, 5STARCooks, Second Edition, 2021.

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III
Session 2025-26
COURSE CODE: BITL-3113
NUMERICAL METHODS AND STATISTICAL TECHNIQUES**

Course Outcomes:

After the completion of this course, the student will be able to:

CO1: Solve non-linear and linear equations using different methods.

CO2: Comprehend interpolation and numerical integration.

CO3: Calculate different means and deviations using statistical techniques.

CO4: Comprehend correlation, curve fitting and regression for finding solutions to various statistical problems

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III
(Session 2025-26)
COURSE CODE: BITL-3113
NUMERICAL METHODS AND STATISTICAL TECHNIQUES**

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Students can use non-storage and non-programmable scientific calculator.

UNIT-I

Introduction: Numerical Methods, Numerical methods versus numerical analysis, Types of Error, Errors and Measures of Errors.

Non-linear Equations: Bisection Method and Newton Raphson's Method

Linear Equations: Gauss Elimination Method, Gauss Jordan Method.

UNIT-II

Interpolation: Newton's Methods: Forward Difference Method, Backward Difference Method, and Divided Difference Method.

Numerical Integration: Trapezoidal Rule, Simpson's 1/3 method and Simpson's 3/8 Method

UNIT-III

Statistical Techniques:

Measure of Central Tendency: Arithmetic mean, Median, Mode.

Measures of dispersion: Range, Quartile Deviation, Mean deviation, Standard deviation, Co-efficient of variation.

UNIT –IV

Correlation: Introduction, Karl Pearson's Coefficient of Correlation, Rank Correlation method

Regression: Regression line and regression equations, Regression Coefficient

Non Linear Curve Fitting: Fit a quadratic or polynomial equation, Fit an exponential curve,

References / Textbooks:

1. Amrinder Pal Singh, Jaspal Singh, Anshuman Sharma, Fundamentals Of Numerical Methods And Statistical Techniques, Lakhanpal Publishers, 4th edition.
2. Kandasamy P.& et Al., Numerical Methods, S. Chand & Company (2006), Reprint Edn. 2006 Edition.
3. B.S. Grewal, Numerical Methods in Engineering & Science, Khanna Publishers (2013), 11th Edition.
4. E. Balagurusamy, Numerical Methods, Tata McGraw Hill Education (2017)
5. H.S.G. Rao, Numerical Methods, IK International Publishing House (2011)
6. S.S. Sastry, Introductory methods of Numerical Analysis, PHI (2012), 5th Edition

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III
(Session 2025-26)**

COURSE CODE: BITL-3114

E-BUSINESS

Course Outcomes:

After passing this course student will be able to:

CO1: Comprehend the basic terms of E-Commerce, aims, benefits and E-Commerce models.

CO2: Acquaint about the working and components of EDI.

CO3: Identify Electronic Payment systems, various issues involved in relation to secure electronic transactions and various E-Payment options.

CO4: Comprehend BPR and Case Studies of E-Business related applications.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III**

(Session 2025-26)

COURSE CODE: BITL-3114

E-BUSINESS

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT – I

Introduction to E – Commerce: Meaning and Concept, Features, Benefits, E-Commerce v/s. Traditional Commerce. E-Commerce Framework, VAN and EDI as Promoters. E-Commerce Models.

Steps involved in opening your own online business, Role of Website and the technologies needed to build a website.

UNIT - II

EDI: EDI Vs Traditional Systems, components and working of EDI system, EDI implementation issues, Factors for successful EDI Implementation, EDI service providers in India.

UNIT – III

Concerns for E – Commerce: Legal and regulatory issues, Laws for E – Commerce, E-Commerce in India, Sections of IT Act for E-Commerce transactions.

Electronic Payment Systems: Various Methods of Electronic Payments – Google pay, Paytm, Debit and Credit Cards, UPI. E-Commerce security Issues and Measures.

UNIT – IV

Re – Engineering for Change: Business process re – engineering (BPR), Methodology and Planning Methods for change.

Case Studies: To demonstrate usefulness of E – Commerce in various business areas like Banks, Reservations, E–Governance and E-Retailing.

References / Textbooks:

1. Chaffey, E-Business and E-Commerce Managemet: strategy, Implementation and Practice, Pearson Education India (2013), 5th Edition
2. Kenneth C. Laudon and Carol Guercio Traver, E-Commerce, Pearson (2018), 13th Edition
3. S.J. P.t. Joseph, E-Commerce: An Indian Prespective, PHI Learning Pvt. Ltd. (2019), 6th Revised Edition
4. Shruti Mathur, Ecommerce, Pinnacle Learning (2020)
5. David Whiteley, E-Commerce: Strategy, Technologies and Applications, McGraw Hill Education (2017).
6. Nidhi Dhawan, A handbook of E-Commerce, Sun India Publications (2017)
7. Laudon, Kenneth C and Carol Guercio Traver, E–Commerce business. Technology Pearson Education Delhi (2011).

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III**

Session 2025-26

**COURSE CODE: BITP-3115
LAB ON COMPUTATIONAL PROBLEM SOLVING**

**L-T-P: 0-0-2
Credits: 2**

**Max. Marks: 50
Practical: 35
CA: 15**

Lab-I: Lab on computational problem solving.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III**

Session 2025-26

COURSE CODE: BITP-3116

LAB ON ADVANCED DATABASE MANAGEMENT SYSTEM

L-T-P: 0-0-2

Credits: 2

Max. Marks: 50

Practical: 35

CA: 15

Lab based on Advanced Database Management System

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III
(Session 2025-26)
COURSE CODE: BITI - 3117
INTERNSHIP**

**L-T-P: 0-0-2
Credits: 2**

Max. Marks: 50

Internship with Local / Public / Private Industry / Business organization / MOOCs / Online Internship / Certifications from the recognized organization.

Important points to be considered:

- MOOCs tenure should not be less than 8 weeks.
- The tenure of the Online Certification must be more than 60 hours.
- Online / Offline Internship tenure not to be less than two months / 60 hours.
- The requisite certificate to be submitted to HOD in print form on or before November 15, 2025.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III
(Session 2025-26)
COURSE CODE: BITM-3110
DATA ANALYSIS USING SPREADSHEET AND TABLEAU**

Course Outcomes:

After the completion of this course, the student will be able to:

CO1: Understand the scope of data analysis with Spreadsheet

CO2: To enable students to create applications and tools to deal with complex.

CO3: To comprehend hands-on experience with Spreadsheet and Tableau

CO4: To enable the students to create a Tableau dashboard.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III
(Session 2025-26)**

COURSE CODE: BITM-3110

DATA ANALYSIS USING SPREADSHEET AND TABLEAU

L-T-P: 2-0-1

Credits: 3

Examination Time: 3+3 Hours

Max. Marks: 100

Theory: 40

Practical: 30

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (8 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Students can use non-storage and non-programmable scientific calculator.

UNIT - I

Spreadsheet: Font Formatting, changing the Color of a cell, Currency symbols in Spreadsheet, Merging cells, Using Auto fill, using paste special, adding comment to a cell.

Spreadsheet Charts: Sorting Data, Creating an Spreadsheets chart, Moving and Resizing your chart, Charts Styles and Layouts, Chart Titles and Series Titles, Chart Layout Panel in Spreadsheets, Format chart Panel, Create Pie chart, Add Labels to a Pie Chart, Format Pie chart segments, Create a 2D line Chart in Spreadsheets, Format your Axis titles, Predict the future with a Trendline chart.

UNIT - II

Introduction to Time series, Analysis of Time Series Data: Forecasting/Data Relationship Tools –Graphical Analysis.

Conditional Logic: IF Function, Conditional Formatting in Spreadsheets, CountIF, CountIFS, SUM, MULTIPLY, SUMIF, and SUMIFS. MS Spreadsheets Advance Feature: Pivot Tables, LOOKUP Function, VLOOKUP Function, Searching with MATCH and INDEX, Drop down Lists in Spreadsheets, Adding your Error Message box.

UNIT – III

Tableau: Introduction, Architecture, File Types & Extensions, Creating Data Extracts in Tableau.

Tableau Chart Types: Working with Combined Axis, Working with Combination Charts, Using Scatter Plots, Using Line Chart, Using Heat Maps, Using Histograms, Using Pie Charts.

UNIT - IV

Tableau Dashboard: Build Interactive Dashboards, Best practices for creating effective dashboards, creating a Dashboard and Importing Sheets, Use of Running Actions, Using Dashboard Actions.

References / Textbooks:

1. Joyce Cox, Joan Lambert and Curtis Frye, Microsoft office Professional 2010 Step by Step, Microsoft Press, 2010.
2. V. Rajaraman, Neeharika Adabala, Fundamentals of Computers, PHI Learning, 2015.
3. P.K. Sinha, Computer Fundamentals, BPB Publications, 2004
4. Jumpstart Tableau: A Step-By-Step Guide To Better Data Visualization, Apress Publication

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV
(Session 2025-26)**

COURSE CODE: BITL-4111

WEB DEVELOPMENT

Course Outcomes:

After passing course the student will be able to:

CO1: Comprehend basics of internet and email along with their effective use.

CO2: Apply HTML for development of static webpages.

CO3: Implement styling and behavior in webpages through the use of CSS.

CO4: Create and manage websites through the application of WordPress content management system.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV
(Session 2025-26)
COURSE CODE: BCAL-4111
WEB DEVELOPMENT**

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Internet: Introduction, working, applications, DNS, IP addresses, Search engine and its working. File Transfer Protocol (FTP), Telnet, HTTP, WWW and its working.

E-Mail Basics: Introduction, Advantage and disadvantage, protocols and structure of an e-mail message, working of e-mail (sending and receiving messages).

UNIT-II

HTML: Introduction, Features, Program Structure, Headings, Paragraph, Styling, Formatting, Hyperlinks, Image, Table, List, Frame, Block, Entities, Form, Form elements, Audio, Video, Embed YouTube Video.

UNIT-III

CSS: Introduction, Advantages and Limitations, types, selector, colors, background, box model, text, font, display, position, z-index, float, clear, rounded corners, 2D Transformations, Transitions and Animations.

UNIT-IV

WordPress: Installation, Configuration, Management - Managing Posts, comments, pages, categories, Plugins, Widgets, Tags, images, users, Import and export content, Updating WordPress. Useful Plugins – MailChimp, Creating Gallery, Stripe Checkout, Verified Authorship, Google Maps, Google Analytics.

References / Textbooks:

1. Anshuman Sharma, Fundamentals of Internet Applications, Lakhanpal Publications, 2016.
2. Ikvinderpal Singh, Internet Applications, Khanna Book Publishing Company, 1st Edition, 2011
3. P. Rizwan Ahmed, Internet & its Applications, Margham Publications, 2013.
4. Douglas E. Comer, Computer Networks and Internet with Internet Applications, Pearson, 4th Edition, 2008.
5. Satish Jain/Vineeta Pillai, Wireless Communication & Networking made Simple, BPB Publishers, 2007.
6. Laura Lerney, Rafe Colburn, Jennifer Kyrnin, Mastering HTML, CSS & Javascript Web Publishing, BPB Publishers, 1st Edition, 2016.
7. Lisa Sabin-Wilson, WordPress for Dummies, Wiley, 8th Edition, 2021.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV
Session 2025-26
COURSE CODE: BITL-4112
APPLIED AND DISCRETE MATHEMATICS**

Course Outcomes:

After passing course the student will be able to:

CO1: Have knowledge of matrices, sets, relations, propositional logic.

CO2: Have knowledge of Boolean algebra.

CO 3: represents world knowledge in symbolic notation through propositional calculus.

CO 4: Apply discrete mathematical concepts to obtain analytical and numerical solutions.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV
Session 2025-26**

**COURSE CODE: BITL-4112
APPLIED AND DISCRETE MATHEMATICS**

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 Marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Logic and Propositional Calculus: Proposition and Compound Propositions, basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions, Logical Equivalence, Laws of propositional logic, Algebra of propositions, Conditional and Bi conditional Statements, Arguments, Logical Implication, Propositional Functions, inference theory of proposition calculus, truth sets, Predicates and Quantifiers, Negation of Quantified Statements, Inference theory of the predicates calculus.

UNIT-II

Sets: Definition of sets, set representation, types of sets, operations on sets, Venn diagram, cardinality of sets (formulae), laws of set theory, Countable and uncountable sets, minset, maxset, normal forms, Partitions of sets, Cartesian products.

Relations: Basic definitions, domain and range of relations, representation of relations (arrow diagram). Types of relations, properties of relations, inverse of relation, closure of relation, equivalence classes, composition of relation.

UNIT-III

Functions: Basic definitions, domain, co-domain and range of functions, types of functions (Surjective, injective, bijective), inverse of a function, composition of function.

Matrices: Introduction, types of matrix, matrix addition, subtraction and scalar multiplication, multiplication of matrices, properties of matrix multiplication, transpose and its properties.

UNIT IV

Symmetric, skew-symmetric, nilpotent, unitary, orthogonal, Hermitian, skew-Hermitian, Identity matrix, involuntary matrix.

Determinant, minors and co-factors, adjoint of a matrix, Inverse of matrix, properties of determinant, rank of matrix, equation solving using Crammer's rule and matrix inversion method.

References/Textbooks:

1. Seymour Lipschutz, Marc Lars Lipson, Discrete Mathematics (Schaum's outlines Series), McGraw-Hill, 1997.
2. Bernard Kolman, Robert C. Busby, Discrete Mathematical structures for Computer Science, Prentice-Hall, 1984.
3. Alan Doerr, Kenneth Levasseur, Applied Discrete Structures for Computer Science, Galgotia Publications, 1989.
4. J.P.Tremblay. and R Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill, 1997.

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV
Session 2025-26
COURSE CODE: BITL-4113
SYSTEM ANALYSIS AND DESIGN**

Course Outcomes:

After passing course the student will be able to:

CO1: Gather data to analyze and specify the requirements of a system.

CO2: Comprehend various system analysis and design processes.

CO3: Identify different types of testing and involved documentation.

CO4: Comprehend implementation of system along with its maintenance.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV**

Session 2025-26

**COURSE CODE: BITL-4113
SYSTEM ANALYSIS AND DESIGN**

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

System Planning and Analysis: Introducing System Analysis and Design, SA&D Concepts, Qualifications and Responsibilities of System Analyst as an agent of change, Systems development life cycle and role of different stages Determining Feasibility, types of feasibility, Feasibility Study.

Information Requirements analysis: Sampling and investigating data through Interviews and Questionnaires, use of Structured English, Decision tables.

UNIT-II

System Analysis Process: Using data flow diagrams, data dictionaries, describing Process specifications and system proposal

System Design: Architectural Design, User Interface Design, Data Design, Module specifications, Module coupling and cohesion, Top-down and bottom-up design,

UNIT-III

Tools for Structured design and System design considerations.

System Development and Testing: Introduction to testing and its types, Types of Documentation and Documentation Tools.

UNIT–IV

System Implementation: Quality Assurance, Managing system implementation, Transition to new system. Different modes for training users.

System Maintenance: Concept of maintenance and its importance, compare and contrast different types of maintenance.

References/Textbooks:

1. Marvin R. Gore and John W. Stubbe, Elements of System Analysis, Dubuque, Iowa Wm.C. Brown 1988.
2. Thapliyal M.P., System Analysis and Design, JBD Publisher, 2002.
3. Hoffer, Modern Systems Analysis and Design, George and Valacich, Pearson, 2014.
4. Dorny C. Nelson, Understanding Dynamic System: Approaches to Modelling, Analysis and Design, Pearson, 1993.
5. Perry Edwards, System Analysis and Design, McGraw-Hill, 1993.
6. Elias M. Awad, System Analysis and Design, Galgotia Publications, 1997.
7. James A. Senn, Analysis and Design of Information Systems, McGraw-Hill, 1989.
8. Silver and Silver, System Analysis and Design, Addison Wesley, Last Edition

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV**

(Session 2025-26)

COURSE CODE: BITL-4114

OBJECT ORIENTED PROGRAMMING- II

Course Outcomes:

After passing this course the student will be able to:

CO1: Understand the basic fundamentals of Object Oriented Programming using Java.

CO2: Identify the use of inheritance, interfaces and packages in Java.

CO3: Identify the utilization of multithreading and Exception handling.

CO4: Connect Java application with an existing database and access it through JDBC.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV**

(Session 2025-26)

COURSE CODE: BITL-4114

OBJECT ORIENTED PROGRAMMING- II

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 70

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (14 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT - I

JAVA BASICS: Introduction to Java, Features of Java, Structure of a Java Program, primitive data types, keywords, Identifiers, literals, operators and comments.

OOPS: Object oriented concepts Advantage of OOPs, Objects and Classes,

Strings: Declaring a string, Immutable string, string comparison, concatenation, substring, string tokenizer.

UNIT - II

Inheritance: what is inheritance, types of inheritance, static import, Method overloading, method overriding, Runtime polymorphism, super keyword, final keyword

Interfaces: Abstract classes, declaring an interface, relationship between classes and interface, interface inheritance, implementing multiple inheritance using interface

Packages: what are packages, advantages of using packages, accessing package from another package, subpackaging, running packages by setting path and classpath.

UNIT - III

Exception Handling: what is exception handling, checked and unchecked exceptions, try-catch, try-multiple catch, try – finally, throw and throws

Multithreading: What is a thread, life cycle of a thread, creating a thread, sleeping a thread, joining a thread, thread priority

UNIT - IV

Input/Output: File input stream, File output stream, Buffered output stream, Buffered input

stream.

Database connectivity: JDBC, JDBC drivers, steps to connect to the database, connectivity with MySQL.

References/Textbooks:

1. HurbertSchildt, Java The Complete Reference, Tata McGraw Hill, 2014.
2. Y. Daniel Liang, Introduction to Java Programming, Pearsons Publications, 2015.
3. Jon Duckett, Beginning Web Programming with HTML, XHTML, and CSS, John Wiley & Sons, 2004.
4. Thomas A. Powell, HTML & CSS: The Complete Reference, McGraw-Hill, 2010.

Note: The latest editions of the books should be followed.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- IV**

(Session 2025-26)

COURSE CODE: BITP-4115

LAB ON WEB DEVELOPMENT

L-T-P: 0-0-2

Credits: 2

Max. Marks: 50

Practical: 35

CA: 15

Lab on Web Development.

**Bachelor of Science (Information Technology) /Bachelor of Science (Honours) Information
Technology Semester- III**

(Session 2025-26)

COURSE CODE: BITP-4116

LABON OBJECT ORIENTED PROGRAMMING- II

L-T-P: 0-0-2

Credits: 2

Max. Marks: 50

Practical: 35

CA: 15

Lab on Object Oriented Programming – II.