

FACULTY OF COMPUTER SCIENCE & IT

SYLLABUS

of

Bachelor of Science (Information Technology)

(Semester V-VI)

(Under Credit Based Continuous Evaluation Grading System)

(12+3 System of Education)

Batch: 2023-26

Session 2025-26



The Heritage Institution

**KANYA MAHA VIDYALAYA
JALANDHAR
(Autonomous)**

Program Specific Outcomes

Bachelor of Science (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 YEAR DEGREE PROGRAMME

Bachelor of Science (Information Technology)

Credit Based Continuous Evaluation Grading System (CBCEGS)

Session 2025-26

Bachelor of Science (Information Technology) Semester V										
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-5111	Data Structures	C	4-0-0	4-0-0	4	100	80	-	20	3
BITL-5112	Web Technologies	C	4-0-0	4-0-0	4	100	80	-	20	3
BITL-5113	Operating System	C	4-0-0	4-0-0	4	100	80	-	20	3
BITL-5114	Knowledge Management	C	4-0-0	4-0-0	4	100	80	-	20	3
BITP-5115	Lab on Web Technologies	C	0-0-4	0-0-2	2	50	-	40	10	3
BITP-5116	Lab on Data Structures	C	0-0-4	0-0-2	2	50	-	40	10	3
BITI-5117	Internship	C	0-0-4	0-0-2	2	50	-	50	-	3
SECJ-5551	*Job Readiness Course	AC	2-0-0	2-0-0	2	50	40	-	10	1
	Total				24	600				

Note:

C-Compulsory

AC - Audit Course

***Credits/Grades Points of these courses will not be included in the SGPA/CGPA of Semester / Program, only grades will be provided.**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Science (Information Technology)

Credit Based Continuous Evaluation Grading System (CBCEGS)

Session 2025-26

Bachelor of Science (Information Technology) Semester VI										
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-6111	Computer Graphics	C	4-0-0	4-0-0	4	100	80	-	20	3
BITL-6112	Digital Marketing	C	4-0-0	4-0-0	4	100	80	-	20	3
BITP-6113	Lab on Computer Graphics	C	0-0-4	0-0-2	2	50	-	40	10	3
BITP-6114	Lab on Digital Marketing	C	0-0-4	0-0-2	2	50	-	40	10	3
BITD-6115	Project	C	0-0-24	0-0-12	12	200	-	160	40	3
	Total				24	500				

Note:

C-Compulsory

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITL-5111

DATA STRUCTURES

Course Outcomes:

After passing course the student will be able to:

CO1: Analyse complexity of algorithms to determine their efficiency.

CO2: Comprehend various hashing method, sorting and searching algorithms.

CO3: Comprehend various operations of stack and queue along with different scenarios.

CO4: Comprehend advanced data structures such as tree and graph.

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITL-5111

DATA STRUCTURES

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 80

CA: 20

Instructions for Paper Setter -

Eight questions of equal marks (16 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

Data Structure: Introduction, Common Operations on Data Structures, Algorithm Complexity, Big O Notation, Time – Space tradeoff between Algorithms.

Arrays: Array Defined, Representing Arrays in Memory, Operations, Bubble Sort, Linear Search, Binary Search and Multidimensional Arrays.

UNIT-II

Hashing: Hash Functions: Division Method, Mid-Square Method & Folding Method and Collision Resolution methods.

Linked Lists: Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.

UNIT-III

Stacks: Description of STACK structure, Implementation of Stack in memory, Applications of Stacks – Converting Arithmetic expression from infix notation to reverse polish and their subsequent evaluation and Quicksort method.

Queues: Description of queue structure, Implementation of queue in memory, Description of priorities of queues, Dequeues.

UNIT-IV

Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory and Heapsort.

Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix and Graph traversal techniques - DFS, BFS.

References / Textbooks:

1. Seymour Lipschutz, Data Structures with C (Schaum's Outline Series), McGraw Hill Education (2017), 1st Edition
2. Reema Thareja, Data Structures Using C, Oxford Publication (2014), 2nd Edition
3. Sahni Horowitz, Fundamentals of Data Structures in C (2008), 2nd Edition
4. Narasimha Karumanchi, Data Structures and Algorithms made easy, Careermonk Publications (2016), 5th Edition
5. S.K. Srivastava and Deepali Srivastava, Data Structures through C, BPB Publications (2004)
6. YedidyahLangsam, Augestein and Tanenbaum, Data Structures using C and C++, Pearson Education India (2015), 2nd Edition

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITL-5112

WEB TECHNOLOGIES

Course Outcomes:

After passing course the student will be able to:

CO1: Apply JavaScript code for interaction with content of webpage.

CO2: Apply PHP as server side scripting language for control of flow, file handling, cookie and session handling, database interactions, etc.

CO3: Comprehend the application of XML, AJAX, JQuery and REST.

CO4: Use Laravel framework to create web applications.

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITL-5112

WEB TECHNOLOGIES

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 80

CA: 20

Instructions for Paper Setter -

Eight questions of equal marks (16 Marks) 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

Java script language: Basics, Features, Advantages, Limitations, Types, Basics, Functions, Control Statement, Arrays, JavaScript objects, Host objects.

DOM: Introduction, Methods, Accessing HTML and CSS, Events, Event Listener, Nodes and Collection.

BOM: Window, Screen, History, Navigation.

UNIT-II

Introduction to Server Side Scripting using PHP: Basics, Control Statement, Array, Functions.

Core PHP Concepts: Superglobals, Form Handling, PHP Include, Sessions, PHP File Handling, File Upload, Cookies, Error Handling, Exception Handling.

Introduction to OOPs in PHP: Classes, Object, Constructor, Inheritance. Access MySQL Database in PHP.

UNIT-III

XML: Basics, Structure, Namespace, Parsing.

AJAX: Fetching response from server (Textual and XML form), Basics of JQuery.

Introduction to **REST**.

UNIT-IV

Laravel: MVC Framework, Role of Model-View-Controller, Routing, Blade Templating.

Components, Form Handling and Validation, Session Handling, Pagination.

Handling Database: Creating Table, Inserting Data, Update, Delete and Query data.

References / Textbooks:

1. Jeffery C Jackson, “Web Technology- A Computer Science perspective”, Pearson Education, 1st Edition, 2007.
2. Chris Bates, “Web Programming- Building Internet Applications”, Wiley India, 1st Edition, 2006.
3. Achyut S Godbole and Atul Kahate, “Web technologies”, Tata McGraw Hill, 1st Edition, 2008.
4. Web Technologies, Uttam K Roy, Oxford University Press, 1st Edition, 2010.
5. Kirupa Chinnathambi, Learning React, Addison-Wesley Professional, 1st Edition, 2019.
6. Mark Masse, REST API Design Rulebook, O'Reilly Media, 2011.
7. Lynn Beighley, Michael Morrison, Head First PHP & MySQL, O'Reilly Media, 2009.
8. Vikram Vaswani, PHP: A Beginner's Guide, O'Reilly Media, 2008.
9. Gregory Blake, Laravel Basics, CreateSpace Independent Publishing Platform, 2016.
10. Matt Stauffer, Laravel: Up & Running: A Framework for Building Modern PHP Apps, O'Reilly Media; 2nd edition, 2019.

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

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITL-5113

OPERATING SYSTEM

Course Outcomes:

After passing course the student will be able to:

CO1: Describe, contrast and compare different types of Operating System.

CO2: Understand the process synchronization policies and CPU scheduling.

CO3: Describe and analyze the memory management and its allocation policies.

CO4: Comprehend about the application of virtual memory and disk scheduling.

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITL-5113

OPERATING SYSTEM

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 80

CA: 20

Instructions for Paper Setter -

Eight questions of equal marks (16 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: Definition, Batch Processing, Multi programming, Time Sharing Systems, Multitasking, multiprocessing, Parallel Systems, Distributed Systems, Real-time Systems.

Processes: Process Concepts, Process Scheduling, Threads, System Calls.

UNIT - II

CPU–Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm Evaluation: Response Time, Turnaround Time, Waiting Time, Throughput.

Process Synchronization: Critical-section problem, semaphores and its Types (Binary and Counting), Classical problems of synchronization and their solutions.

UNIT – III

Deadlocks: System Model, Deadlock characterization, Methods for handling deadlocks, Deadlocks Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Approach to Deadlock handling.

Memory Management: Background, Logical v/s Physical Address Space, Swapping, Continuous Allocation, Paging, Segmentation.

UNIT – IV

Virtual Memory: Background, Page Fault, Demand Paging, Page Replacement, Page Replacement Algorithms, Thrashing.

Secondary Storage Structures: Disk structures, Disk scheduling.

References/Textbooks:

1. Avi Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Concepts, Wiley, 2013.

2. Charles Crowley, Operating Systems: A Design-Oriented Approach , Tata McGraw Hill, 2001.
3. Deitel, An Introduction to Operating Systems, Second Edition, Addison Wesley, 1990.
4. William Stallings, Operating Systems: Internals and Design Principles, Pearson Education Limited, 2014.

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

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITL-5114

KNOWLEDGE MANAGEMENT

Course Outcomes:

After passing course the student will be able to:

CO1: To make the students realize the importance of knowledge element in the organizations, and Knowledge Management Cycle.

CO2: To Comprehend various methods of Knowledge capture and acquisition.

CO3: To use Knowledge application, knowledge sharing and Bloom's taxonomy.

CO4: To understand Knowledge Management Tools and Strategies.

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITL-5114

KNOWLEDGE MANAGEMENT

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 80

CA: 20

Instructions for Paper Setter -

Eight questions of equal marks (16 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

Knowledge Management: Meaning, types, information management to knowledge management, multi-disciplinary nature of knowledge management, Timeline, Levels of Intellectual capital, Significance and challenges of Knowledge Management. Major Approaches to KM cycle and integrated KM cycle.

UNIT – II

Stages of Knowledge Management Process , Knowledge management mechanism, Knowledge capture, Knowledge acquisition and conversion, Knowledge codification approaches using Cognitive map, decision tree, Knowledge application - individual knowledge worker , communities of practice.

UNIT – III

Implications of Knowledge sharing, Knowledge Application at Individual Level, Bloom's Taxonomy of cognitive domain, EPSS, Knowledge Application at Group and Organizational Levels, Implications of Knowledge Application.

UNIT – IV

Knowledge Management Tools, Data Mining and Knowledge Discovery, Content Management Tools, Social Bookmarking, PKM, Knowledge Dissemination tools, Developing Knowledge Management Strategy.

References:

1. Knowledge Management in Theory and Practice, Kimiz Dalkir, The MIT Press, Cambridge, Massachusetts, London, England

2. Knowledge Management: Concepts and Best Practices, 2e, Peter Heisig , Jens Vorbeck , Springer (India) Pvt. Ltd.
3. The Knowledge Manager's Handbook: A Step-By-Step Guide to Embedding Effective Knowledge Management in Your Organization Nick Milton , Patrick Lambe , Kogan Page
4. ESSENTIALS of Knowledge Management, Bryan Bergeron, John Wiley & sons Inc.
5. Knowledge Management,T.S. Ravi, Margham Publication
6. Knowledge Management , Mruthyunjaya H. C. , Prentice-Hall of India Pvt.Ltd
7. Knowledge Management , S. Mohapatra,Laxmi Publications
8. Knowledge Management, Dr. R.K. Jain, Vayu Education of India
9. Knowledge Management, Awad, E.M (2007),Pearson India, Delhi.
10. Knowledge Management: System and Resources , Fernandez I. B. and Sabherwal, R. ,PHI Delhi.

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITP-5115

LAB ON WEB TECHNOLOGIES

L-T-P: 0-0-2

Credits: 2

Examination Time: 3 Hours.

Max. Marks: 50

Practical: 40

CA: 10

Lab on Web Technologies.

Bachelor of Science (Information Technology) Semester – V

Session 2025-26

COURSE CODE: BITP-5116

LAB ON DATA STRCUTURES

L-T-P: 0-0-2

Credits: 2

Examination Time: 3 Hours.

Max. Marks: 50

Practical: 40

CA: 10

Implementation of different algorithm in C / C++.

Bachelor of Science (Information Technology) Semester – V
(Session 2025-26)
COURSE CODE: BITI-5117
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) Semester – VI
(Session 2025-26)**

COURSE CODE: BITL - 6111

COMPUTER GRAPHICS

Course Outcomes:

After passing this course the student will be able to:

CO1: Comprehend the background mechanism involved in display devices like CRT, LCD, LED, etc.

CO2: Comprehend basic concepts involved in drawing basic shapes.

CO3: Implement various algorithms and techniques to clip and transform various objects and viewports.

CO4: Identify the importance of viewing and projections.

**Bachelor of Science (Information Technology) Semester – VI
(Session 2025-26)**

COURSE CODE: BITL - 6111

COMPUTER GRAPHICS

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 80

CA: 20

Instructions for Paper Setter -

Eight questions of equal marks (16 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

Overview of Graphics System: Computer Graphics and their applications.

Display Devices: CRT Monitors, Random Scan, Raster Scan, LED & LCD Monitors, Virtual Reality and Workstation.

UNIT – II

Elementary Drawing: Points and various line drawing Algorithms and their comparisons and Circle & Ellipse Generating Algorithms.

UNIT – III

Two Dimensional Transformations: Basic Transformations - Translation, Rotation, Scaling, Reflection and Shearing. Matrix representation of Basic Transformations, Homogenous Coordinates and Composite transformations.

Windowing and Clipping: Windowing Concepts, Clipping and its Algorithms and Window-to-View Port Transformations.

UNIT - IV

Three Dimensional concepts: 3D Coordinate Systems, 3D Transformations - Translation, Rotation, Scaling, Reflection and Shearing,

Projection: Parallel Projections, Perspective Projection, Vanishing Point, View Confusion and Topological Distortion.

References / Textbooks:

1. Hearn D, Baker P, Computer Graphics, PHI Eastern Economy (2002), 2nd Edition.
2. Zhigang Xiang, Plastock R, Kalley G, Computer Graphics, McGraw Hill Education (2006), 2nd Edition.

3. Rajesh K. Maurya, Computer Graphics with Virtual Reality System, Wiley (2018), 3rd Edition
4. Udit Aggarwal, Computer Graphics, SK Katria and Sons (2013), Reprint 2013 Edition
5. Padeep K. Bhatia, Computer Graphics, Dreamtech Press (2019)
6. Andries Van Dam, Foley, Steven, John, Computer Graphics Principles and Practice, Peson Education India (2002), 2nd Edition

**Bachelor of Science (Information Technology) Semester – VI
(Session 2025-26)**

COURSE CODE: BITL - 6112

DIGITAL MARKETING

Course Outcome:

After passing the course the student will be able to:

CO1: Identify impact of digital space and digital marketing in reaching out to customers.

CO2: Comprehend importance of Keywords in Search Engine Optimization.

CO3: Outline factors affecting Social Media Marketing.

CO4: Comprehend importance of Tools and Analytics in social media marketing.

**Bachelor of Science (Information Technology) Semester- VI
(Session 2025-26)**

COURSE CODE: BITL-6112

DIGITAL MARKETING

L-T-P: 4-0-0

Credits: 4

Examination Time: 3 Hours.

Max. Marks: 100

Theory: 80

CA: 20

Instructions for Paper Setter -

Eight questions of equal marks (16 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 Marketing: Meaning, 4 Ps of Marketing, Value creation, communication, delivery and exchange. Segmentation, target marketing and positioning.

Consumer Behavior, Environmental and Psychological factors, decision making process and its stages. AIDAA model, Marketing Mix.

UNIT - II

Introduction to Digital Marketing: Introduction, Search Engine Optimization – Keywords, on page and off page optimization, Ad-Words, Meta-tags

Search Engine Marketing: Advertising, PPC, SEM Strategy, SEM Auction models.

UNIT – III

Social Media Marketing: Word of Mouth, factors affecting social media marketing, social media platforms- B2B and B2C.

UNIT – IV

Social Media Marketing Tools: Mobile marketing, website planning and creation, e-mail marketing, content marketing, online reputation management, digital analytics.

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References / Textbooks:

1. Phillip Kotler and Lane Keller Kevin, Marketing Management, Pearson Education
2. Seema Gupta, Digital Marketing, Tata McGraw Hill Education (2018)

3. Ian Dodson, The Art of Digital Marketing: The defensive guide to Creating Strategic, Targeted and measurable Online campaigns, Wiley Publishers
4. Stephanie Diamond, Digital Marketing - All in One for Dummies, Wiley Publishers
5. Digital Marketers, The Ultimate Guide to Digital Marketing,
<https://www.digitalmarketer.com/digital-marketing/assets/pdf/ultimate-guide-to-digital-marketing.pdf>
6. Damian Ryan, Understanding Digital Marketing: Marketing strategies for engaging, Cogan page Publishers Third Edition

Bachelor of Science (Information Technology) Semester – VI
(Session 2025-26)

COURSE CODE: BITP - 6113

LAB ON COMPUTER GRAPHICS

L-T-P: 0-0-2

Credits:

Examination Time: 3 Hours.

Max. Marks: 50

Practical: 40

CA: 10

Lab on implementation of applications of Computer Graphics in C / C++.

Bachelor of Science (Information Technology) Semester – VI
(Session 2025-26)

COURSE CODE: BITP - 6114

LAB ON DIGITAL MARKETING

L-T-P: 0-0-2

Credits:

Examination Time: 3 Hours.

Max. Marks: 50

Practical: 40

CA: 10

Lab on Digital Marketing.

Bachelor of Science (Information Technology) Semester – VI
(Session 2025-26)

COURSE CODE: BITD - 6115

PROJECT

Course Outcomes:

After passing course the student will be able to:

CO1: Apply the tools and techniques learnt to frame problems and their corresponding solutions.

CO2: Develop skills necessary to structure, manage and execute projects.

CO3: Learn to work as a member of a cohesive unit.

CO4: Develop presentation skills.

**Bachelor of Science (Information Technology) Semester – VI
(Session 2025-26)**

COURSE CODE: BITD - 6114

PROJECT

L-T-P: 0-0-12

Credits: 12

Examination Time: 3 Hours.

Max. Marks: 200

Theory: 160

CA: 40

General Instructions:

1. 1. A software module based on the work done in the entire course is to be developed.
2. Candidates have to submit one hard copy and two CDs/DVDs of documentation which shall be kept with the HoD in the college only. Further, supervisor/guide shall forward one copy of DVD/CD containing all the documentation files of the students (file name to be saved as Rollno_of_the_student.pdf) to the COE Office. The Covering letter (duly signed by the guide and Head of the department) should contain the following information. Candidate name, Candidate Roll no, Project Title of the student and .pdf file name of her project documentation.
3. The software module / website may be developed in groups, consisting of at most two students in a group.
4. The college shall depute guide(s)/supervisor(s) under whose supervision the software module shall be developed. The guide/supervisor shall clarify that the work done is original and authenticated. The certificate found to be incorrect at any stage shall attract the proceedings against all the stakeholders, as per rules.
5. The evaluation of the module shall be done as per the common ordinance of UG/PG under semester system.