KUMAUN UNIVERSITY, NAINITAL
DEPARTMENT OF INFORMATION TECHNOLOGY

Scheme and syllabus for B Sc (Information Technology-2019)

Note: - For B Sc there will be two papers of 75 marks each out of which 60 marks will be allotted for semester end examination and 15 marks will be earmarked for internal assessment. There will be one practical examination of 50 marks in each semester.

SEMESTER-I	**Practical**	**Internal**	**External**	**Total**
PAPER I-FUNDAMENTALS OF IT	**-**	**15**	**60**	**75**
PAPER II- Object Oriented Programming with C++	**-**	**15**	**60**	**75**
Practical Examination based on paper II	**50**	**-**	**-**	**150**
TOTAL MARKS:				**200**
SEMESTER -II				
PAPER I- Operating Systems	**-**	**15**	**60**	**75**
PAPER II- Web Technologies	**-**	**15**	**60**	**75**
Practical Examination based on paper II	**50**	**-**	**-**	**150**
TOTAL MARKS:				**200**

SEMESTER-III	**Practical**	**Internal**	**External**	**Total**
PAPER I- Computer Networks	**-**	**15**	**60**	**75**
PAPER II- Data Base Management Systems	**-**	**15**	**60**	**75**
Practical Examination based on paper II	**50**	**-**	**-**	**150**
TOTAL MARKS:				**200**
SEMESTER -IV				
PAPER I- Cyber Security & Law	**-**	**15**	**60**	**75**
PAPER II- Programming with Java	**-**	**15**	**60**	**75**
Practical Examination based on paper II	**50**	**-**	**-**	**150**
TOTAL MARKS:				**200**
SEMESTER-V	**Practical**	**Internal**	**External**	**Total**
PAPER I-Software Engineering	**-**	**15**	**60**	**75**
PAPER II- PROGRAMMING WITH PYTHON	**-**	**15**	**60**	**75**
Practical Examination based on paper II	**50**	**-**	**-**	**150**

TOTAL MARKS:				**200**
SEMESTER -VI				
PAPER I- Security in Computing	**-**	**15**	**60**	**75**
PAPER II- Internet Of Things	**-**	**15**	**60**	**75**
Project /Practical based on IOT	**50**	**-**	**-**	**150**
TOTAL MARKS:				**200**

KUMAUN UNIVERSITY, NAINITAL
DEPARTMENT OF INFORMATION TECHNOLOGY

Scheme and syllabus for B A (Information Technology-2019)

Note: - For BA there will be two papers of 50 marks each out of which 35 marks will be allotted for semester end examination and 15 marks will be earmarked for internal assessment. There will be one practical examination of 50 marks in each semester.

SEMESTER-I	**Practical**	**Internal**	**External**	**Total**
PAPER I-FUNDAMENTALS OF IT	**-**	**15**	**35**	**50**
PAPER II- Object Oriented Programming with C++	**-**	**15**	**35**	**50**
Practical Examination based on paper II	**50**	**-**		**50**
TOTAL MARKS:				**150**
SEMESTER -II				
PAPER I- Operating Systems	**-**	**15**	**35**	**50**
PAPER II- Web Technologies	**-**	**15**	**35**	**50**
Practical Examination based on paper II	**50**	**-**	**-**	**50**
TOTAL MARKS:				**150**

SEMESTER-III	**Practical**	**Internal**	**External**	**Total**
PAPER I- Computer Networks	**-**	**15**	**35**	**50**
PAPER II- Data base Management Systems	**-**	**15**	**35**	**50**
Practical Examination based on paper II	**50**	**-**	**-**	**50**
TOTAL MARKS:				**150**
SEMESTER -IV				
PAPER I- Cyber Security & Law	**-**	**15**	**35**	**50**
PAPER II- Programming with Java	**-**	**15**	**35**	**50**
Practical Examination based on paper II	**50**	**-**	**-**	**50**
TOTAL MARKS:				**150**
SEMESTER-V	**Practical**	**Internal**	**External**	**Total**
PAPER I-Software Engineering	**-**	**15**	**35**	**50**
PAPER II- PROGRAMMING WITH PYTHON	**-**	**15**	**35**	**50**
Practical Examination based on paper II	**50**	**-**	**-**	**50**

TOTAL MARKS:				**150**
SEMESTER -VI				
PAPER I- Security in Computing	**-**	**15**	**35**	**50**
PAPER II- Internet Of Things	**-**	**15**	**35**	**50**
Project /Practical based on IOT	**50**	**-**	**-**	**50**
TOTAL MARKS:				**150**

BA/B Sc-Semester I
Paper I
Fundamentals of Information Technology

UNIT-I

Introduction to Computers

Introduction, Characteristics of Computers, Block diagram of Computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers and Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages and High Level Languages).
Data Organization, Drives, Files, Directories.
Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display)
Number Systems- Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction and Multiplication

UNIT-II
Algorithm and Flowcharts

Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples
Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples

UNIT-III
Operating System and Services in O.S.

DOS – History, Files and Directories, Internal and External Commands, Batch Files, Types of O.S.

UNIT-IV
Windows Operating Environment

Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush.

UNIT-V
Editors and Word Processors

Basic Concepts, Examples: MS-Word, Introduction to desktop publishing.

UNIT-VI
Spreadsheets and Database packages

Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint.

Referential Books :

1. Fundamental of Computers – By V.Rajaraman B.P.B. Publications
2. Fundamental of Computers – By P.K. Sinha
3. Computer Today- By Suresh Basandra
4. Unix Concepts and Application – By Sumitabha Das
5. MS-Office 2000(For Windows) – By Steve Sagman
6. Computer Networks – By Tennenbum Tata MacGrow Hill Publication

BA/B Sc-Semester I
Paper II
Object Oriented Programming in C++

Unit 1: Evolution of Programming methodologies, Introduction to OOP and its basic features, Basic components of a C++, Program and program structure, Compiling and Executing C++ Program. Selection control statements in C++.

Unit 2: Data types, Expression and control statements Iteration statements in C++, Introduction to Arrays, Multidimensional Arrays, Strings and String related Library Functions.

Unit 3: Functions, Passing Data to Functions, Scope and Visibility of variables in Functions, Structures in C++.

Unit 4: Creating classes and Abstraction: Classes objects, data members, member functions, this Pointer, Friends, Friend Functions, Friend Classes, Friend Scope, and Static Functions.

Unit 5: Constructors and Destructors, Static variables and Functions in class.

Unit 6: Operator Overloading in C++, Overloading Unary Operators, Overloading binary operators.

Unit 7: Inheritance in C++, Types of Inheritance, Pointers, Objects and Pointers, Multiple Inheritance.

Referential Books:

1. A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997**.**
2. S.B.Lippman & J.Lajoie, " C++ Primer", 3rd Edition, Addison Wesley, 2000.The C programming Lang., Person Ecl – Dennis Ritchie
3. R.Lafore, "Object Oriented Programming using C++", Galgotia Publications, 2004
4. D.Parasons, "Object Oriented Programming using C++", BPB Publication.

BA/B Sc-Semester II
Paper I
Operating systems

UNIT-I

Introduction, What is an operating system, Simple Batch Systems, Multi-programmed Batch systems, Time- Sharing Systems, Personal – Computer Systems, Parallel systems, Distributed systems, Real- Time Systems**.**

Memory Management: Background, Logical versus physical Address space, swapping, Contiguous allocation, Paging, Segmentation

Virtual Memory: Demand Paging, Page Replacement, Page- replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations

UNIT-II

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple – Processor Scheduling.

Process Synchronization: Background, The Critical – Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

UNIT-III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

UNIT-IV

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap- Space Management, Disk Reliability

UNIT-V

Information Management: Introduction, A Simple File system, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File system File – System Interface; File Concept, Access Methods, Directory Structure, Protection.

Referential Books:

1. Silbersachatz and Galvin, " Operating System Concepts", Person, 5th Ed. 2001
2. Madnick E., Donovan J., " Operating Systems:,Tata McGraw Hill,2001
3. Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000

BA/B Sc-Semester II
Paper II
Web Technologies

Unit I

Internet Basics: Evolution of Internet, Basic internet terms and applications. ISP Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol Mailing List- Subscribing, Unsubscribing.

Unit II

Introduction to World Wide Web and its work, Web Browsers, Search Engine, Downloading, Hyper Text Transfer Protocol (HTTP), URL, Web Servers, FTP, Web publishing- Domain Name Registration, Space on Host Server for Web Site, Maintain and Updating.

Unit III

HTML: Elements of HTML & Syntax, Comments, Headings, Paragraph, Span, Pre Tags, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, div, Use of Forms in Web Pages.

Unit IV

CSS**:** Introduction to Cascading Style Sheets, Types of Style Sheets (Inline, Internal and External), using Id and Classes, CSS properties: Background Properties, Box Model Properties, Margin, Padding, List Properties and Border Properties

Unit V

Java Script: Introduction to Client Side Scripting, Introduction to Java Script, Comments, Variables in JS, Global Variables, Data types, Operators in JS, Conditions Statements (If, If Else, Switch), Java Script Loops (For Loop, While Loop, Do While Loop), JS Popup Boxes (Alert, Prompt, Confirm), JS Events, JS Arrays, JS Objects.

Reference:

1. Thomas A. Powell , "HTML: The Complete Reference", Osborne/ McGraw-Hill
2. Deitel, Deitel and Nieto : Internet & WWW. How to program, 2nd Edition, Pearson Education Asia.
3. Bayross, "Web Enabled Commercial Applications Development Using HTML, DHTML, Java Script, Perl CGI," Third Edition, BPB Publications.
4. Internet and Web Page Designing By V.K Jain (BPB)
5. Web Enabled Commercial Application Development Using HTML, DHTML , java script, Perl CGI By Ivan Bayross (BPB)

BA/B Sc-Semester III

Paper I
Computer Networks

Unit - I

Data Communication and Networking: Overview, Network Types, LAN Technologies, Topologies, Models- OSI Model, TCP/IP Stack

Unit - II

Physical Layer: Introduction, Digital Transmission, modes, digital to digital, analog to digital, Analog Transmission, digital to analog, analog to analog, Transmission media, Wireless Transmission, **Switching techniques:** Circuit Switching, Packet switching, Message switching.

Unit - III

Data Link Layer: Introduction, Data Link Control: Line Discipline- Enq/Ack, Poll/Select,
Flow Control: Stop And Wait, Sliding Window, **Error Control:** ARQ, Stop and Wait ARQ, Sliding Window ARQ.

Unit - IV

Network Layer: Introduction, Network Addressing, Routing, Internetworking, Tunneling, Packet Fragmentation, Network Layer Protocols, ARP, ICMP, IPv4, IPv6

Unit V

Transport Layer: Introduction, Transmission Control Protocol, User Datagram Protocol

Application Layer: Introduction, Client-Server Model, Application Protocols.

Suggested Readings-

1. Computer Forensics by Marie- Helen Maras
2. Data Communication and Networking By Forozan (Tata McGraw Hill)
3. Data Communication And Computer Networks By Dr. Madhulika Jain, Satish Jain (BPB)
4. William Stallings, “Data and Computer Communications”, Pearson Education, 2008.
5. Rajneesh Agrawal and Bharat Bhushan Tiwari, “Data Communication and Computer Networks”, Vikas Publishing house Ltd., 2005.
6. A. S. Tanenbaum, “Computer Networks”, Fourth Edition, Pearson Education.
7. A. Leon-Gracia and I. Widjaja, “Communication Networks”, Tata McGraw Hill, 2004.

BA/B Sc-Semester III
Paper II
Data base Management systems

Unit I

Introduction: Characteristics of database approach, Advantages, Database system architecture, Overview of different types of Data Models and data independence, Schemas and instances, Database languages and interfaces; E-R Model : Entities, Attributes, keys, Relationships, Roles, Dependencies, E-R Diagram.

Unit II

Introduction to Relational model, Constraints: Domain, Key, Entity integrity, Referential integrity; Keys: Primary, Super, Candidate, Foreign; Relational algebra: select, project, union, intersection, cross product, different types of join operations.

Unit III

SQL: Data Types, statements: select, insert, update, delete, create, alter, drop; views, SQL algebraic operations; Stored procedures: Advantages, Variables, creating and calling procedures, if and case statements, loops, Functions, Triggers.

Unit IV

Normalization: Definition, Functional dependencies and inference rules, 1NF, 2NF, 3NF; Transactions processing: Definition, desirable properties of transactions, serial and non-serial schedules, concept of serializability, conflict-serializable schedules.

Unit V

Concurrency Control: Two-phase locking techniques, dealing with Deadlock and starvation, deadlock prevention protocols, basic timestamp ordering algorithm; Overview of database recovery techniques; concept of data warehousing.

Suggested Readings:

1. Fundamentals of Database Systems,Ramez A. Elmasri, Shamkant Navathe,5th Ed(Pearson)
2. Database System Concepts By Korth, Silberschatz, Sudarshan (Mcgraw Hill)
3. An Introduction to Database Systems By Bipin C. Desai (Galgotia Publication.)
4. SQL, PL/SQL Programming By Ivan Bayross (BPB)
5. Commercial Application Development Using Oracle Developer 2000 By Ivan Bayross (BPB)

http://www.mysqltutorial.org/mysql-stored-procedure-tutorial.aspx

BA/B Sc-Semester IV
Paper I
Cyber Security & Law

Unit I

Cyber Security: definition, cybercrime and information security, cybercriminals, classification of cybercrime, cybercrime Era. Cyber offences: categories of cybercrime, how criminals plan the attack, cyber stalking, cyber cafe and cybercrime, botnets and cybercrime, Cloud Computing and cybercrime.

Unit II

Tools and methods used in cybercrime: phishing and Identity theft; methods of phishing, spear phishing, types of phishing scams, phishing toolkits, and spy phishing, Personally Identifiable Information, types and techniques of ID theft, password cracking, keyloggers and spywares, backdoors, steganography, DoS and DoS attacks, SQL Injection, Buffer Overflow.

Unit III

Cybercrime on mobile and wireless devices: Security challenges posed by mobile devices, attacks on wireless networks, credit card frauds mobile and wireless era. Authentication security service, attacks on mobile phones; mobile phone theft, mobile virus, phishing, vishing, smishing, hacking Bluetooth.

Unit IV

Cybercrime and Cyber Security: Cyber Law, The Indian IT Act, Digital Signatures and IT Act, Cyber security and organizational implications, Cyber crisis management, Anti- Cybercrime Strategies, Cybercrime and Cyber terrorism. Cyber crime and Indian IT Act 2000.

Unit V

Computer forensics: introduction, computer forensics and digital evidence, digital forensics life cycle, computer forensics and steganography, Relevance of the OSI 7 Layer model to computer forensics, Anti forensics.

Suggested Readings:

1. Cyber Security by Nina Godbole & sunit Belapure

2. Computer Forensics by Marie- Helen Maras

BA/B Sc-Semester IV
Paper II
Java Programming

Unit I

Introduction to java: evolution, features, comparison with C and C++; Java program structure; tokens, keywords, constants, variables, data, type casting, statements, Operators and Expression; Conditional Statements and Loop Statements.

Unit II

Class: Syntax, instance variable, class variables, methods, constructors, overloading of constructors and methods. Arrays, Strings and Vectors.

Unit - III

Inheritance: types of inheritance, use of super, method overriding, final class, abstract class, wrapper classes. Interface, Packages and visibility controls.

Unit - IV

Errors and Exceptions: Types of errors, Exception classes, Exception handling in java, use of try, catch, finally, throw and throws. Taking user input, Command line arguments.

Unit- V

Multithreaded Programming: Creating Threads, Life cycle of thread, Thread priority, Thread synchronization, Inter-thread communication, Implementing the Runable Interface;

Suggested Readings

1. The Complete reference Java Ninth Edition By Herbert Schildt (Tata McGraw Hill)
2. Core Java Volume I—Fundament als (9th Edition) by Cay S. Horstmann, Gary Cornell, Prentice Hall
3. Java: A Beginner's Guide, Sixth Edition: A Beginner's Guide by Herbert Schildt, McGraw-Hill Osborne Media
4. Programming in JAVA By E. Balagurusamy (TMH)
5. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
6. Horstmann, Cay S. and Gary Cornell, "Core Java 2: Fundamentals Vol. 1", Pearson Education.

BA/B Sc-Semester V
Paper I
Software Engineering

UNIT-I

Software Engineering: Software, **Software Process**, Process Characteristics, Software Process Model-Linear Sequential Model, Prototyping Model, Spiral Model.

Software Quality: McCall's Quality Factors.

Software Requirement Analysis and Specification (SRS): Need, Characteristics and Components.

Unit- II

Cost Estimation: COCOMO Model, **Designing Concepts:** Design Principles, Module level concepts-Cohesion and Coupling, Design notations and specifications, Verification, Metrics.

Unit - III

Object Oriented Design: Concepts, Design Notation and Specification, Design methodology, metrics.

Debugging Process: Information Gathering, Fault Isolation, Fault Confirmation, Documentation, Fixing fault isolation.

Unit -IV

Testing: Testing Fundamental, Functional Testing (Black Box), Structural Testing (White Box), Alpha And Beta Testing, Testing Object Oriented Programs, Testing Process: Comparison of Different Testing, Level of Testing. Project management for special classes of software projects: Using CASE tools, CBSE.

Unit – V

UML: An overview of UML- UML notations, UML Class diagrams-association, multiplicity, generalization, aggregation, interfaces.

Reference books:

1. Software Engineering: A Practitioner's Approach by Roger S. Pressman(McGraw Hill)
2. An Integrated Approach to Software Engineering By Pankaj Jalote, (Narosa Publishing House)
3. Object-Oriented Software Engineering: Practical Software Development using UML and Java By Timothy C. Lethbridge, Robert Laganière (McGraw Hill)
4. Object-Oriented Software Engineering Using UML, Patterns, and Java By Bernd Bruegge & Allen H. Dutoit(Prentice Hall)
5. K.K.Aggarwal & Yogesh Singh "Software engineering", 2nd Ed., New Age International 2005.
6. Sommerville, "Software Engineering", Addison Wesley, 2002.

James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach" John Wiley & Sons.

BA/B Sc-Semester V
Paper II
Programming with Python

Unit 1

Introduction: History Features, Setting up path, working with Python, Basic Syntax, Variable and Data Types, Operator.

Unit 2

Conditional Statements: If, if- else, nested if-else
Looping: For, While, Nested loops
Control Statements: Break, Continue, and Pass.

Unit 3

String Manipulation: Accessing Strings, Basic Operations, String slices, Function and Methods
Tuple: Introduction, Accessing tuples, Operations, Working, Functions and Methods
Dictionaries: Introduction, Accessing values in dictionaries, working with dictionaries, Properties, Functions.

Unit 4

Functions: Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables.
Modules: Importing module, Math module, Random module, Packages, Composition.

Unit 5
Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Functions
Exception Handling: Exception, Exception Handling, except clause. Try-finally clause
User Defined Exceptions.

Reference books:
Python : The Complete Reference, McGraw-Hill/Osborne Media publication.
Core Python Programming : Dr R Nageshwara Rao

BA/B Sc-Semester VI
Paper I
Cloud Computing

Unit I

Introduction to Client – Server Computing, Peer-to-Peer Computing, Distributed Computing, Collaborative Computing, Cloud Computing

Unit II

Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services – SaaS, IaaS, PaaS, DaaS and VDI etc.

Unit II

Cloud as Web-Based Application, Cloud Service Development: Pros and Cons, Types, Software as a Service, Platform as a Service, Web Services, On-Demand computing

Discovering Cloud Services, Development Services and Tools, overview of major Cloud Service providers- Amazon Ec2, Google App Engine, IBM Clouds, Eucalyptus etc.

Unit III

Application of Cloud Computing for Centralizing Email communications, collaborating on Schedules, Calendars, To-Do Lists, Contact Lists. Cloud for the Community, Group Projects and Events; Cloud Computing for the Corporation. Cloud Computing for Schedules and Task Management, Exploring Online Scheduling Applications and Online Planning and Task Management;

Unit IV

Cloud Computing Collaborating on Event Management, Contact Management and Collaborating on Project Management. Cloud Collaborating on Word Processing, Databases, Storing and Sharing Files; Evaluating Web Mail Services, Evaluating Web Conference Tools; Cloud computing and Social Networks, Groupware, Blogs and Wikis.

Unit V

Data privacy and security Issues and other risks in Cloud Computing

Suggested Readings-

1. Cloud Computing Concepts Technology and Architecture by Thomas Erl, Prentice Hall
2. Cloud Computing Principles and Paradigm by Rajkumar Buyya, James Broberg, Andrzej Goscinski, Wiley Publications

BA/B Sc-Semester VI
Paper II
Internet of Things

Unit-I

Introduction: Definition Characteristics, Architecture, Logical Design, protocols. Types of IOTs. M2M and IOT: Difference, SDN and NFV for IOT.

Unit- II

IOT System Management: Need, SNMP, Requirements. IOT platform design methodology. IOT logical design

Unit III

IOT Devices: Building blocks, exemplary device: Raspberry PI Interfaces. Other IOT devices. Introduction to WAMP, Django, SkyNet

Unit IV

Introduction to Apache Hadoop, Map reduce programming model, Hadoop Yarn, Apache Oozie, Apache Spark, Apache Strom

Unit V

Tools for IOT: Chef, Puppet, NETCONF-YANG, IOT code generator

Suggested Readings:

1. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
3. From Machine-to-Machine to the Internet of Things : Introduction to a New Age of Intelligence by Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle, Academic Press, 2014

4. Rethinking of Internet of Things by Francis daCosta, Apress

5. Adrian McEwen, “Designing the Internet of Things”, Wiley Publishers, 2013

VI semester
PROJECT (based on a Case Study) IOT

KUMAUN UNIVERSITY, NAINITAL
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Scheme and syllabus for B Com (Information Technology-2019)

Note: - For B Com there will be one paper of 100 marks out of which 50 marks will be allotted for semester end examination and 25 marks will be earmarked for internal assessment and 25 marks will be allotted for practical examination.

SEMESTER-I	**Practical**	**Internal**	**External**	**Total**
PAPER IV-Fundamentals of IT & OOPS Concepts	**25**	**25**	**50**	**100**
SEMESTER -II				
PAPER IV- Operating Systems & Web Technologies	**25**	**25**	**50**	**100**
TOTAL MARKS:				**100**
SEMESTER-III	**Practical**	**Internal**	**External**	**Total**
PAPER IV- Computer Networks & DBMS Concepts	**25**	**25**	**50**	**100**
SEMESTER -IV				
PAPER IV- Java Basics & Cyber Security	**25**	**25**	**50**	**100**
SEMESTER-V	**Practical**	**Internal**	**External**	**Total**
PAPER IV- Python Programming & Basics of Software Engineering	**25**	**25**	**50**	**100**
SEMESTER -VI				
PAPER IV- Cloud Computing & IOT	**25**	**25**	**50**	**100**
Project /Practical based on IOT	**-**	**-**	**-**	**-**

B Com Semester 1
PAPER IV-Fundamentals of IT & OOPS Concepts
Part (a)

UNIT-I
Introduction to Computers
Introduction, Characteristics of Computers, Block diagram of Computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers and Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages and High Level Languages)
Data Organization, Drives, Files, Directories.
Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display)
Number Systems- Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction and Multiplication

UNIT-II
Algorithm and Flowcharts and Operating systems
Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples
Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages,
Examples DOS – History, Files and Directories, Internal and External Commands,
Batch Files, Types of O.S

UNIT-III
Windows Operating Environment
Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush

UNIT-IV
Office Packages
Purpose, usage, command, MS-word, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint

(Part b)
Object Oriented Programming Concepts

Unit -V
Evolution of Programming methodologies, Introduction to OOP and its basic features, Basic components of a C++, Program and program structure, Compiling and Executing C++ Program. Selection control statements in C++.

Unit- VI
Data types, Expression and control statements Iteration statements in C++, Introduction to Arrays, Multidimensional Arrays, Strings and String related Library Functions.

Unit- VII
Functions, Passing Data to Functions, Scope and Visibility of variables in Functions, Structures in C++.

Unit -VIII
Creating classes and Abstraction: Classes objects, data members, member functions, this Pointer, Friends, Friend Functions, Friend Classes, Friend Scope, and Static Functions.

Unit IX: Constructors and Destructors, Static variables and Functions in class.

Referential Books:

1. Fundamental of Computers – By V.Rajaraman B.P.B. Publications
2. Fundamental of Computers – By P.K. Sinha
3. Computer Today- By Suresh Basandra
4. Unix Concepts and Application – By Sumitabha Das
5. MS-Office 2000(For Windows) – By Steve Sagman
6. Computer Networks – By Tennenbum Tata MacGrow Hill Publication
7. A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.
8. S.B.Lippman & J.Lajoie, " C++ Primer", 3rd Edition, Addison Wesley, 2000.The C programming Lang., Person Ecl – Dennis Ritchie
9. R.Lafore, "Object Oriented Programming using C++", Galgotia Publications, 2004
10. D.Parasons, "Object Oriented Programming using C++", BPB Publication.

B Com Semester II
PAPER IV- Operating Systems & Web Technologies

UNIT-I

Introduction, What is an operating system, Simple Batch Systems, Multi-programmed Batch systems, Time- Sharing Systems, Personal – Computer Systems, Parallel systems, Distributed systems, Real- Time Systems**.**

Memory Management: Background, Logical versus physical Address space, swapping, Contiguous allocation, Paging, Segmentation

UNIT-II

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple – Processor Scheduling.

Process Synchronization: Background, The Critical – Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

UNIT-III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

UNIT-IV

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap- Space Management, Disk Reliability

Part (b)
Web Technologies

UNIT-V

Internet Basics: Evolution of Internet, Basic internet terms and applications. ISP Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol Mailing List- Subscribing, Unsubscribing.

UNIT-VI

Introduction to World Wide Web and its work, Web Browsers, Search Engine, Downloading, Hyper Text Transfer Protocol (HTTP), URL, Web Servers, FTP, Web publishing- Domain Name Registration, Space on Host Server for Web Site, Maintain and Updating.

UNIT-VII

HTML: Elements of HTML & Syntax, Comments, Headings, Paragraph, Span, Pre Tags, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, div, Use of Forms in Web Pages.

UNIT-VIII

CSS**:** Introduction to Cascading Style Sheets, Types of Style Sheets (Inline, Internal and External), using Id and Classes, CSS properties: Background Properties, Box Model Properties, Margin, Padding, List Properties and Border Properties

UNIT-IX

Java Script: Introduction to Client Side Scripting, Introduction to Java Script, Comments, Variables in JS, Global Variables, Data types, Operators in JS, Conditions Statements (If, If Else, Switch), Java Script Loops (For Loop, While Loop, Do While Loop), JS Popup Boxes (Alert, Prompt, Confirm), JS Events, JS Arrays, JS Objects.

Reference Books:

1. Silbersachatz and Galvin, " Operating System Concepts", Person, 5th Ed. 2001
2. Madnick E., Donovan J., " Operating Systems:,Tata McGraw Hill,2001
   Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000
3. Thomas A. Powell , "HTML: The Complete Reference", Osborne/ McGraw-Hill
4. Deitel, Deitel and Nieto : Internet & WWW. How to program, 2nd Edition, Pearson Education Asia.
5. Bayross, "Web Enabled Commercial Applications Development Using HTML, DHTML, Java Script, Perl CGI," Third Edition, BPB Publications.
6. Internet and Web Page Designing By V.K Jain (BPB)
7. Web Enabled Commercial Application Development Using HTML, DHTML , java script, Perl CGI By Ivan Bayross (BPB)

B Com III Semester
PAPER IV- Computer Networks & DBMS Concepts
Part (a)
Computer Networks

Unit - I

Data Communication and Networking: Overview, Network Types, LAN Technologies, Topologies, Models- OSI Model, TCP/IP Stack

Unit - II

Physical Layer: Introduction, Digital Transmission, modes, digital to digital, analog to digital, Analog Transmission, digital to analog, analog to analog, Transmission media, Wireless Transmission, **Switching techniques:** Circuit Switching, Packet switching, Message switching.

Unit - III

Data Link Layer: Introduction, Data Link Control: Line Discipline- Enq/Ack, Poll/Select, **Flow Control**: Stop And Wait, Sliding Window, **Error Control:** ARQ, Stop and Wait ARQ, Sliding Window ARQ.

Unit - IV

Network Layer: Introduction, Network Addressing, Routing, Internetworking, Tunneling, Packet Fragmentation, Network Layer Protocols, ARP, ICMP, IPv4, IPv6

Unit V

Transport Layer: Introduction, Transmission Control Protocol, User Datagram Protocol

Application Layer: Introduction, Client-Server Model, Application Protocols.

Part(b)

Data base Management systems

Unit VI

Introduction: Characteristics of database approach, Advantages, Database system architecture, Overview of different types of Data Models and data independence, Schemas and instances, Database languages and interfaces; E-R Model : Entities, Attributes, keys, Relationships, Roles, Dependencies, E-R Diagram.

Unit VII

Introduction to Relational model, Constraints: Domain, Key, Entity integrity, Referential integrity; Keys: Primary, Super, Candidate, Foreign; Relational algebra: select, project, union, intersection, cross product, different types of join operations.

Unit VIII

SQL: Data Types, statements: select, insert, update, delete, create, alter, drop; views, SQL algebraic operations; Stored procedures: Advantages, Variables, creating and calling procedures, if and case statements, loops, Functions, Triggers.

Unit IX

Normalization: Definition, Functional dependencies and inference rules, 1NF, 2NF, 3NF; Transactions processing: Definition, desirable properties of transactions, serial and non-serial schedules, concept of serializability, conflict-serializable schedules.

Suggested Readings:

1. Computer Forensics by Marie- Helen Maras
2. Data Communication and Networking By Forozan (Tata McGraw Hill)
3. Data Communication And Computer Networks By Dr. Madhulika Jain, Satish Jain (BPB)
4. William Stallings, "Data and Computer Communications", Pearson Education, 2008.
5. Rajneesh Agrawal and Bharat Bhushan Tiwari, "Data Communication and Computer Networks", Vikas Publishing house Ltd., 2005.
6. A. S. Tanenbaum, "Computer Networks", Fourth Edition, Pearson Education.
7. A. Leon-Gracia and I. Widjaja, "Communication Networks", Tata McGraw Hill, 2004.
8. Fundamentals of Database Systems,Ramez A. Elmasri, Shamkant Navathe,5th Ed(Pearson)
9. Database System Concepts By Korth, Silberschatz, Sudarshan (Mcgraw Hill)
10. An Introduction to Database Systems By Bipin C. Desai (Galgotia Publication.)
11. SQL, PL/SQL Programming By Ivan Bayross (BPB)
12. Commercial Application Development Using Oracle Developer 2000 By Ivan Bayross (BPB)
13. http://www.mysqltutorial.org/mysql-stored-procedure-tutorial.aspx

B Com IV Semester
PAPER IV- Java Basics & Cyber Security
Part (a)

Java Programming Basics

Unit I

Introduction to java: evolution, features, comparison with C and C++; Java program structure; tokens, keywords, constants, variables, data, type casting, statements, Operators and Expression; Conditional Statements and Loop Statements.

Unit II

Class: Syntax, instance variable, class variables, methods, constructors, overloading of constructors and methods. Arrays, Strings and Vectors.

Unit - III

Inheritance: types of inheritance, use of super, method overriding, final class, abstract class, wrapper classes. Interface, Packages and visibility controls.

Unit - IV

Errors and Exceptions: Types of errors, Exception classes, Exception handling in java, use of try, catch, finally, throw and throws. Taking user input, Command line arguments.

Unit- V

Multithreaded Programming: Creating Threads, Life cycle of thread, Thread priority, Thread synchronization, Inter-thread communication, Implementing the Runable Interface;

Part (b)
Cyber Security & Law

Unit-VII

Cyber Security: definition, cybercrime and information security, cybercriminals, classification of cybercrime, cybercrime Era. Cyber offences: categories of cybercrime, how criminals plan the attack, cyber stalking, cyber cafe and cybercrime, botnets and cybercrime, Cloud Computing and cybercrime.

Unit -VII

Tools and methods used in cybercrime: phishing and Identity theft; methods of phishing, spear phishing, types of phishing scams, phishing toolkits, and spy phishing, Personally Identifiable Information, types and techniques of ID theft, password cracking, keyloggers and spywares, backdoors, steganography, DoS and DoS attacks, SQL Injection, Buffer Overflow.

Unit-VIII

Cybercrime on mobile and wireless devices: Security challenges posed by mobile devices, attacks on wireless networks, credit card frauds mobile and wireless era. Authentication security service, attacks on mobile phones; mobile phone theft, mobile virus, phishing, vishing, smishing, hacking Bluetooth.

Unit- IX

Cybercrime and Cyber Security: Cyber Law, The Indian IT Act, Digital Signatures and IT Act, Cyber security and organizational implications, Cyber crisis management, Anti- Cybercrime Strategies, Cybercrime and Cyber terrorism. Cyber crime and Indian IT Act 2000.

Suggested Readings-

1. Cyber Security by Nina Godbole & sunit Belapure
2. Computer Forensics by Marie- Helen Maras
3. The Complete reference Java Ninth Edition By Herbert Schildt (Tata McGraw Hill)
4. Core Java Volume I—Fundament als (9th Edition) by Cay S. Horstmann, Gary Cornell, Prentice Hall
5. Java: A Beginner's Guide, Sixth Edition: A Beginner's Guide by Herbert Schildt, McGraw-Hill Osborne Media
6. Programming in JAVA By E. Balagurusamy (TMH)
7. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
8. Horstmann, Cay S. and Gary Cornell, "Core Java 2: Fundamentals Vol. 1", Pearson Education.

B Com V Semester
PAPER IV- Python Programming & Basics of Software Engineering

Part (a)
Python Programming

Unit 1

Introduction: History Features, Setting up path, working with Python, Basic Syntax, Variable and Data Types, Operator.

Unit 2

Conditional Statements: If, if- else, nested if-else
Looping: For, While, Nested loops
Control Statements: Break, Continue, and Pass.

Unit 3

String Manipulation: Accessing Strings, Basic Operations, String slices, Function and Methods
Tuple: Introduction, Accessing tuples, Operations, Working, Functions and Methods
Dictionaries: Introduction, Accessing values in dictionaries, working with dictionaries, Properties, Functions.

Unit 4

Functions: Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables.
Modules: Importing module, Math module, Random module, Packages, Composition.

Unit 5

Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Functions
Exception Handling: Exception, Exception Handling, except clause. Try-finally clause
User Defined Exceptions.

Software Engineering

Unit 6

Software Engineering: Software, **Software Process**, Process Characteristics, Software Process Model- Linear Sequential Model, Prototyping Model, Spiral Model.
Software Quality: McCall's Quality Factors.
Software Requirement Analysis and Specification (SRS): Need, Characteristics and Components.

Unit 7

Cost Estimation: COCOMO Model, **Designing Concepts:** Design Principles, Module level concepts- Cohesion and Coupling, Design notations and specifications, Verification, Metrics.

Unit 8

Object Oriented Design: Concepts, Design Notation and Specification, Design methodology, metrics. **Debugging Process:** Information Gathering, Fault Isolation, Fault Confirmation, Documentation, Fixing fault isolation.

Unit 9

Testing: Testing Fundamental, Functional Testing (Black Box), Structural Testing (White Box), Alpha And Beta Testing, Testing Object Oriented Programs, Testing Process: Comparison of Different Testing, Level of Testing.

Reference books:

1. Software Engineering: A Practitioner's Approach by Roger S. Pressman(McGraw Hill)
2. An Integrated Approach to Software Engineering By Pankaj Jalote, (Narosa Publishing House)
3. Object-Oriented Software Engineering: Practical Software Development using UML and Java By Timothy C. Lethbridge, Robert Laganière (McGraw Hill)
4. Object-Oriented Software Engineering Using UML, Patterns, and Java By Bernd Bruegge & Allen H. Dutoit(Prentice Hall)
5. K.K.Aggarwal & Yogesh Singh "Software engineering", 2nd Ed., New Age International 2005.
6. Sommerville, "Software Engineering", Addison Wesley, 2002.
   James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach" John Wiley & Sons.
   7. Python : The Complete Reference, McGraw-Hill/Osborne Media publication.
   Core Python Programming : Dr R Nageshwara Rao

B Com SEMESTER -VI

PAPER IV- Cloud Computing & IOT

Part (a)
Cloud Computing

Unit -I

Introduction to Client – Server Computing, Peer-to-Peer Computing, Distributed Computing, Collaborative Computing, Cloud Computing

Unit- II

Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services – SaaS, IaaS, PaaS, DaaS and VDI etc.

Unit- II

Cloud as Web-Based Application, Cloud Service Development: Pros and Cons, Types, Software as a Service, Platform as a Service, Web Services, On-Demand computing

Discovering Cloud Services, Development Services and Tools, overview of major Cloud Service providers- Amazon Ec2, Google App Engine, IBM Clouds, Eucalyptus etc.

Unit -III

Application of Cloud Computing for Centralizing Email communications, collaborating on Schedules, Calendars, To-Do Lists, Contact Lists. Cloud for the Community, Group Projects and Events; Cloud Computing for the Corporation. Cloud Computing for Schedules and Task Management, Exploring Online Scheduling Applications and Online Planning and Task Management;

Unit -IV

Cloud Computing Collaborating on Event Management, Contact Management and Collaborating on Project Management. Cloud Collaborating on Word Processing, Databases, Storing and Sharing Files; Evaluating Web Mail Services, Evaluating Web Conference Tools; Cloud computing and Social Networks, Groupware, Blogs and Wikis.

Unit- V

Data privacy and security Issues and other risks in Cloud Computing

Part (b)

Internet of Things

Unit-VI

Introduction: Definition Characteristics, Architecture, Logical Design, protocols. Types of IOTs. M2M and IOT: Difference, SDN and NFV for IOT.

Unit- VII

IOT System Management: Need, SNMP, Requirements. IOT platform design methodology. IOT logical design

Unit -VIII

IOT Devices: Building blocks, exemplary device: Raspberry PI Interfaces. Other IOT devices. Introduction to WAMP, Django, SkyNet

Unit- IX

Introduction to Apache Hadoop, Map reduce programming model, Hadoop Yarn, Apache Oozie, Apache Spark, Apache Strom

Suggested Readings-

1. Cloud Computing Concepts Technology and Architecture by Thomas Erl, Prentice Hall
2. Cloud Computing Principles and Paradigm by Rajkumar Buyya, James Broberg, Andrzej Goscinski, Wiley Publications
3. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
4. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
5. From Machine-to-Machine to the Internet of Things : Introduction to a New Age of Intelligence by Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle, Academic Press, 2014
6. Rethinking of Internet of Things by Francis daCosta, Apress
7. Adrian McEwen, “Designing the Internet of Things”, Wiley Publishers, 2013

VI semester
PROJECT (based on a Case Study) IOT