FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

BACHELOR OF COMPUTER APPLICATIONS

Syllabus for the Students admitted in Session 2019-20
(SEMESTER III – IV)

Syllabus for the Students admitted in Session 2018-19
(SEMESTER V – VI)

Examination : 2020-21

GURU NANAK DEV UNIVERSITY
AMRITSAR

(ii) Subject to change in the syllabi at any time.
Please visit the University website time to time.

Bachelor of Computer Applications

Syllabus for the Students admitted in Session 2019-20

SEMESTER – III:

Paper No.	Paper	M. Marks
Paper–I	Computer Architecture	75
Paper–II	Database Management System	75
Paper–III	Introduction to Python Programming	75
Paper–IV	Programming Lab – Python	50
Paper–V	Programming Lab – Oracle	25

SEMESTER – IV:

Paper No.	Paper	M. Marks
Paper – I	Data Structure & File Processing	75
Paper – II	Information Systems	75
Paper – III	Internet Applications	75
Paper – IV	System Software	75
Paper – V	Lab – Data Structures Implementation using C++	50
Paper – VI	Lab – Web Designing and use of Internet	50
Paper – VII (ESL-221)	* Environmental Studies (Compulsory)	100

*** Marks of Paper EVS will not be included in Grand Total.**

Bachelor of Computer Applications

Syllabus for the Students admitted in Session 2018-19

SCHEME

SEMESTER – V:

Paper No.	**Paper**	**M. Marks**
Paper – I	Computer Networks	75
Paper – II	Web Technologies	75
Paper – III	Operating System	75
Paper – IV	JAVA Programming Language	75
Paper – V	Lab based on JAVA Programming Language	50
Paper – VI	Lab based on Web Technologies	50

SEMESTER – VI:

Paper No.	**Paper**	**M. Marks**
Paper – I	Computer Graphics	75
Paper – II	Software Engineering	75
Paper – III	Lab. Implementation of Applications of Computer Graphics in C++/C	50
Paper – IV	Project	300

Bachelor of Computer Applications (Semester – III)

Syllabus for the Students admitted in Session 2019-20

Paper – I: COMPUTER ARCHITECTURE

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

Section A

Information Representation: Register Transfer Language, Various Registers, Implementing Common Bus Using Multiplexers: Logical; Arithmetic & Shift Micro – operations.

Basic Computer Design Instruction Codes, Computer Instructions, Timing Signals, Instruction Cycle, Design of a Basic Computer.

Section B

CPU Design General Register Organization, Stack Organized CPU, Instruction Formats, Addressing Modes, Program Control, Hardwired & Microprogrammed (Wilhe's Design) Control Unit, RISC and CISC Characteristics.

Section C

Memory Organization Memory Hierarchy, Designs & Concepts of Main Memory, Auxiliary Memory, Associative Memory, Cache and Virtual Memory.

Section D

I/O Organization I/O Interface, Modes of Transfer, Program Interrupt, DMA & I/O Processor.

Pipeline & Vector Processing Introduction to Parallel Processing and Pipelining, SISD, SIMD & MISD, MIMD Machines.

References:

Computer System Architecture: M.M. Mano (PHI)
Computer Architecture: J.P. Hayes.
Computer Architecture: Patterson & Hemessy.

Bachelor of Computer Applications (Semester – III)

Syllabus for the Students admitted in Session 2019-20

Paper – II: DATABASE MANAGEMENT SYSTEM

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

Section A

Introduction to Data, Field, Record, File, Database, Database management system. Structure of database system, Advantage and disadvantage, levels of database system, Relational model, hierarchical model, network model, comparison of these models, E–R diagram, different keys used in a relational system, SQL.

Section B

DBA, responsibilities of DBA, Relational form like INF, 2NF, 3NF, BCNF, 4^{th} NF, 5^{th} NF, DBTG, concurrency control and its management, protection, security, recovery of database.

Section C

SQL: Introduction to SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Built in Functions, Views, Security amongst users, Sequences, Indexing Cursors– Implicit & Explicit, Functions & Packages Database Triggers.

Section D

Big Data: Introduction to Big Data and Analytics, Introduction to NoSQL

Books and References:

1. Introduction to Database System by C.J. Date.
2. Database Management System by B.C. Desai.
3. Database Concept by Korth.
4. Simplified Approach to DBMS– Kalyani Publishers
5. Oracle – Developer – 2000 by Ivan Bayross.
6. Database System Concepts & Oracle (SQL/PLSQ) – AP Publishers.
7. https://www.mongodb.com/nosql-explained
8. Introduction to NoSQL (Ebook), NoSQL Seminar 2012 @ TUT, Arto Salminen

Bachelor of Computer Applications (Semester – III)

Syllabus for the Students admitted in Session 2019-20

Paper III: Introduction to PYTHON Programming

Time: 3 Hrs. **M. Marks: 75**

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

Section A

Introduction to Python: Python's Technical Strengths, Execution Model, Process of Computational Problem Solving, Different ways to run Python Programs.

Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Strings, Statements and Data Types, Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

Lists & Dictionaries: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python, Dictionaries and Files, Looping and dictionaries, Advanced text parsing

Section B

Control Structures: Conditional blocks using if, else and elif,While statement, Definite loops using For, Loop Patterns,

Functions, Packages and Modules: Fundamental Concepts, Program Routines, Flow of Execution, Parameters &Arguments, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion, Understanding Packages, Modules, Top-Down Design, Python Modules Importing own module as well as external modules and packages.

Section C

Files: Opening Files, Using Text Files, Reading files, Writing files, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Manipulating file pointer using seek, String Processing, Exception Handling

Objects and Their Use: Introduction to Object Oriented Programming, Concept of class, object and instances, Constructor, class attributes and destructors, Real time use of class in live projects, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using Oops support

Section D

Using Databases and SQL: Database Concepts, SQL basic summary, SQL Database connection using python, creating and searching tables, Programming using database connections, Basic Data modelling, Programming with multiple tables

Reference Books:

1. Python for Informatics, Charles Severance, version 0.0.7
2. Introduction to Computer Science Using Python: A Computational Problem-SolvingFocus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI,2014, ISBN-13: 978-8120348660
4. Introduction to Computating& Problem Solving Through Python, Jeeva Jose and Sojan P.Lal, Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, PearsonEducation, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning ,2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013

Paper – IV
(Programming Lab-I)

Lab – I: Based on Python Programming Language : 50 Marks

Paper – V
(Programming Lab-II)

Lab – II: Practical in Oracle : 25 Marks

Bachelor of Computer Applications (Semester – IV)

Syllabus for the Students admitted in Session 2019-20

Paper – I: DATA STRUCTURES AND FILE PROCESSING

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

Section A

Basic Data Structures: Introduction to elementary Data Organization and operations, complexity of Algorithms and Time space trade off, Arrays, Stacks, Queues, Linked Lists.

Section B

Trees Binary Trees & Binary Search Trees. Graphs and Algorithms to manipulate them.

Searching Techniques: Linear and Binary Search.

Section C

Sorting Techniques: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort.

Section D

File Organization: Concept of field, record, file, blocking and compaction.

File Organization Techniques: Sequential, indexed, indexed sequential, Direct, Hashing. Concept of master and transaction files.

Text/References:

1. Data Structure – Seymour Lipschutz, Schaum Outline Series.
2. File Structure & Data Structures by E. Loomis.
3. Data Structures by Trabley & Soreuson.

Bachelor of Computer Applications (Semester – IV)

Syllabus for the Students admitted in Session 2019-20

Paper – II: INFORMATION SYSTEMS

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

Section A

Fundamental aspects of Information, Capturing of Information, Converting Information to Computer – readable form, source of Information, on–line Information access and capture.

Section B

What are systems? Information Systems? Categories of Information Systems, Development Life Cycle of Information system.

Section **C**

Various types of information systems: Transaction processing systems, office Automation systems, MIS and decision support system.

Section D

Case studies of the Information System: Accounting Information systems, Inventory control systems & Marketing systems.

References:

1. "Information Systems" by Mudride & Ross.
2. "Business Information Systems", Muneesh Kumar.
3. "Information Systems for Managers", Ashok Arora and A.K. Shaya Bhatia.

Bachelor of Computer Applications (Semester – IV)

Syllabus for the Students admitted in Session 2019-20

Paper – III: INTERNET APPLICATIONS

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

Section **A**

Introduction: About internet and its working, business use of internet, services offered by internet, Evolution of internet, internet service provider (ISP), windows environment for dial up networking (connecting to internet), internet addressing (DNS) and IP addresses).

E–Mail Basic Introduction; Advantage and disadvantage, structure of an e–mail message, working of e–mail (sending and receiving messages), managing e–mail (creating new folder, deleting messages, forwarding messages, filtering messages).

Section B

Internet Protocol: Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCPIP.

WWW: Introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark), web designing using HTML, DHTML with programming techniques.

Section **C**

Search Engine: About search engine, component of search engine, working of search engine, difference between search engine and web directory.

Section D

Intranet and Extranet: Introduction, application of intranet, business value of intranet, working of intranet, role of extranet, working of extranet, difference between intranet and extranet.

References:

1. "Understanding The Internet", Kieth Sutherland, Butterworth-Heinemann; 1st Edition (October 31, 2000).
2. "Internet Technologies", S. K. Bansal, APH Publishing Corporation (April 1, 2002).
3. "Data Communications and Networking", Behrouz A. Forouzan, 3rd Edition.

Bachelor of Computer Applications (Semester – IV)

Syllabus for the Students admitted in Session 2019-20

Paper – IV: SYSTEM SOFTWARE

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

Section **A**

Introduction to System Software

Introduction to System Software and its components

Translators, loaders, interpreters, compiler, assemblers

Section **B**

Assemblers:

Overview of assembly process, design of one pass and two assemblers

Macroprocessors:

Macro definition and expansion, conditional macro expansion, Recursive macro expansion

Section **C**

Compilers:

Phases of Compilation Process, Lexical Analysis, Parsing, Storage Management Optimization Incremental Compilers, Cross Compilers.

Section D

Loaders and Linkage Editors:

Basic loader functions. Relocation, program linking, linkage, editors, dynamic linking, Bootstrap loaders

References:

1. Leland L. Beck: System Software, An Introduction to System Programming, Addison Wesley.
2. D.M. Dhamdhere: Introduction to System Software, Tata McGraw Hill.
3. D.M. Dhamdhere: System Software and Operating System, Tata McGraw Hill, 1992.
4. Madrich, Stuarte: Operating Systems, McGraw Hill, 1974.
5. Stern Nancy Assembler Language Programming for IBM and IBM Compatible Computers, John Wiley, 1991.

Paper – V: LAB - I

Time: 3 Hours **M. Marks: 50**

Lab – Data Structure implementation using C++

Paper – VI: LAB - II

Time: 3 Hours **M. Marks: 50**

Lab – Web Designing and use of Internet

Bachelor of Computer Applications (Semester – IV)

Syllabus for the Students admitted in Session 2019-20

Paper VII: ESL-221 : Environmental Studies (Compulsory Paper)

Time: 3 Hrs. **Max. Marks: 100**

Teaching Methodologies

The Core Module Syllabus for Environmental Studies includes class room teaching and field work. The syllabus is divided into 8 Units [Unit-1 to Unit-VII] covering 45 lectures + 5 hours for field work [Unit-VIII]. The first 7 Units will cover 45 lectures which are class room based to enhance knowledge skills and attitude to environment. Unit-VIII comprises of 5 hours field work to be submitted by each candidate to the Teacher in-charge for evaluation latest by 15 December, 2020.

Exam Pattern: **End Semester Examination- 75 marks**
Project Report/Field Study- 25 marks [based on submitted report]
Total Marks- 100

The structure of the question paper being:

Part-A, Short answer pattern with inbuilt choice – **25 marks**
Attempt any five questions out of seven distributed equally from Unit-1 to Unit-VII.
Each question carries 5 marks. Answer to each question should not exceed 2 pages.

Part-B, Essay type with inbuilt choice – **50 marks**
Attempt any five questions out of eight distributed equally from Unit-1 to Unit-VII. Each question carries 10 marks. Answer to each question should not exceed 5 pages.

Project Report / Internal Assessment:

Part-C, Field work – **25 marks [Field work equal to 5 lecture hours]**
The candidate will submit a hand written field work report showing photographs, sketches, observations, perspective of any topic related to Environment or Ecosystem. The exhaustive list for project report/area of study are given just for reference:

1. Visit to a local area to document environmental assets: River / Forest/ Grassland / Hill / Mountain / Water body / Pond / Lake / Solid Waste Disposal / Water Treatment Plant / Wastewater Treatment Facility etc.
2. Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
3. Study of common plants, insects, birds
4. Study of tree in your areas with their botanical names and soil types
5. Study of birds and their nesting habits
6. Study of local pond in terms of wastewater inflow and water quality
7. Study of industrial units in your area. Name of industry, type of industry, Size (Large, Medium or small scale)
8. Study of common disease in the village and basic data from community health centre
9. Adopt any five young plants and photograph its growth
10. Analyze the Total dissolved solids of ground water samples in your area.

11. Study of Particulate Matter ($PM_{2.5}$ or PM_{10}) data from Sameer website. Download from Play store.
12. Perspective on any field on Environmental Studies with secondary data taken from Central Pollution Control Board, State Pollution Control Board, State Science & Technology Council etc.

Unit-I

The multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness

(2 lectures)

Unit-II

Natural Resources: Renewable and non-renewable resources:

Natural resources and associated problems.

(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

(8 Lectures)

Unit-III

Ecosystems

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

(6 Lectures)

Unit-IV

Biodiversity and its conservation

- Introduction – Definition: genetic, species and ecosystem diversity
- Biogeographical classification of India

- Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
- Biodiversity at global, national and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

(8 Lectures)

Unit-V

Environmental Pollution

Definition

- Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

(8 Lectures)

Unit-VI

Social Issues and the Environment

- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Protection Act, 1986
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and control of Pollution) Act, 1974
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

(7 Lectures)

Unit-VII

Human Population and the Environment

- Population growth, variation among nations
- Population explosion – Family Welfare Programmes

- Environment and human health
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

(6 Lectures)

Unit-VIII

Field Work

- Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-pond, river, hill slopes, etc

(Field work equal to 5 lecture hours)

ADVISORY FOR PUSHPA GUJRAL SCIENCE CITY, KAPURTHALA :

The Under Graduate students studying Environmental Studies (Compulsory Paper for All UG College Courses) may be taken to Pushpa Gujral Science City, Kapurthala in lieu of Field study report of 25 marks.

Although students will submit a hand written reports with pictures/ graphs/ tables related to biodiversity, ecology, health, biotechnology, energy, water etc. in about 10 pages to the teacher in-charge.

Above advisory is issued to promote scientific temperament in undergraduate classes and is optional. Further, the report will only be considered if there will be a minimum strength of 25 students along with deputed teacher by the college**.**

References:

1. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
2. Down to Earth, Centre for Science and Environment, New Delhi.
3. Heywood, V.H. & Waston, R.T. 1995. Global Biodiversity Assessment, Cambridge House, Delhi.
4. Joseph, K. & Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
5. Kaushik, A. & Kaushik, C.P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
6. Rajagopalan, R. 2011. Environmental Studies from Crisis to Cure. Oxford University Press, New Delhi.
7. Sharma, J. P., Sharma. N.K. & Yadav, N.S. 2005. Comprehensive Environmental Studies, Laxmi Publications, New Delhi.
8. Sharma, P. D. 2009. Ecology and Environment, Rastogi Publications, Meerut.
9. State of India's Environment 2018 by Centre for Sciences and Environment, New Delhi
10. Subramanian, V. 2002. A Text Book in Environmental Sciences, Narosa Publishing House, New Delhi.

Bachelor of Computer Applications (Semester – V)

Syllabus for the Students admitted in Session 2018-19

Paper – I: COMPUTER NETWORKS

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

SECTION–A

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

Transmission Media: Coaxial cable, twisted pair cable, fiber optics & satellites. OSI reference model, TCP/IP reference model, comparison of OSI and TCP reference model.

SECTION–B

Introduction to Analog and Digital Transmission: Telephone system, Modems, Types of modems, pulse code modulation.

Transmission & Switching: Multiplexing, circuit switching, packet switching, hybrid switching.

SECTION–C

Local Area Network Protocols: CSMA Protocols, IEEE standards 802, Token Bus, Token Ring.

Data Link Layer Design Issues: Services provided to Network layer, Framing, error control, flow control, link management. Error detection & correction, Elementary Datalink Protocols.

Design Issues of Network Layer: Services provided to transport layer, routing, connection, internet & World Wide Web.

SECTION–D

Network Security and Privacy: Brief Introduction to Cryptography.

Network Services: File transfer, Access & Management, Electronic Mail, Remote login

References:

1. Tannanbum, A.S.: Computer Networks, Prentice Hall, 1992, 3rd Edition.
2. Stallings, William: Local Networks: An Introduction: Macmillan Publishing Co.
3. Stallings, William: Data Computer Communication, Macmillan Publishing Co.

Paper II: WEB TECHNOLOGIES

Time: 3 Hrs. **M. Marks: 75**

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

SECTION–A

Introduction to websites, Static vs dynamic websites, server side and client side scripting
HTML 5 : Introduction , Structure of a web page , HTML Elements, HTML attributes, Basic Text Formatting tags, Comments, Links, Lists, Image, Style, Forms, Table, Media, Classes, iframes.
CSS3 : Introduction , stylesheets , selectors , styling – backgrounds, texts , fonts , links , lists , tables , Box model JAVASCRIPT: Introduction, datatypes, variables, comments ,Operators, functions and events, basics of JQuery and AJAX

SECTION–B

Introduction to PHP, basics, Data types, variables, comments, control statements, functions, PHP with web design, working with files, uploading a file, sessions, cookies, error handling , database connectivity with mysql .

SECTION–C

HOSTING : Overview of Domain , Hosting , SSL Certificates and steps to host a website online.
Introduction to Emerging Web Technologies: Introduction to Chatbot, Artificial Intelligence and Machine Learning basics used in websites.

SECTION–D

EMERGING WEB TECHNOLOGIES: Basics of Internet Of Things (IOT) used in Websites, Basics of BlockChain Technology in Websites, Augmented Reality and Virtual Reality and Basics of Single page applications websites using Angular.

References:

1. Chris Bates, "Web Programming- Building Internet Applications", Wiley India, 2006.
2. David William Baron, The World of Scripting Languages.
3. Programming PHP Rasmus Leadoff and Levin Tatroe O"' Reilly Publication.
4. Steven Holzner Php: The Complete Reference 1st Edition McGraw Hill Publication.
5. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill.

Paper – III: OPERATING SYSTEM

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

SECTION–A

Introduction: Definition, Early Systems, Simple Batch system, Multi programmed Batch. Time Sharing Systems, Personal Computer System, Parallel Systems, Distributed Systems, Real–time Systems.
Processes: Process concepts, Process Scheduling, Threads.
CPU–Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm Evaluation.

SECTION–B

Process Synchronization: Critical – section problem, semaphores, classical problem of synchronization.
Memory Management: Background, Logical v/s Physical address space, swapping, continuous allocation, paging, segmentation.

SECTION–C

Virtual Memory: Background, demand paging, performance of demand paging, page replacement, page replacement algorithms, thrashing.
Secondary Storage Structures: Disk structures, Disk scheduling, Disk Reliability.

SECTION–D

Deadlocks: System Model, Deadlock characterization, methods for handing deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock, combined approach to deadlock handling.

References:

1. Operating System Concepts, Fourth Edition by Silberschatz Galvin Addison Wesley.
2. Operating Systems, A Design Oriented Approach" by Crowley, Published by Tata McGraw Hill.
3. Operating Systems, Second Edition by Dietel, Addison Wesley.

Bachelor of Computer Applications (Semester – V)

Syllabus for the Students admitted in Session 2018-19

Paper – IV: JAVA PROGRAMMING LANGUAGE

Time: 3 Hours **Max. Marks: 75**

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

SECTION A

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 to kenizer.

SECTION B

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.

SECTION C

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.

SECTION D

Input /output: File input stream, File output stream, Buffered out put stream ,Buffered input stream .

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

References:

1. "Java–The Complete Reference", Hurbert Schildt, Tata MacGraw Hill.
2. "Introduction to Java Programming", Y. Daniel Mliang, Pearsons Publications.
3. "Beginning Web Programming with HTML, XHTML, and CSS", Jon Duckett, John Wiley & Sons, 06 Aug. 2004.

Paper–V

Time: 3 Hours **Marks: 50**

Lab : **Lab based on JAVA Programming Language**

Paper–VI

Time: 3 Hours

Lab based on Website Technologies

Paper – I: COMPUTER GRAPHICS

Time: 3 Hours **Total Marks: 75**

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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. The students can use only Non–programmable & Non–storage type calculator.

SECTION–A

Overview of Graphics system: Computer Graphics and their applications.

Display Devices: CRT Monitors (Random – Scan and Raster Scan, DVST, Plasma – Panel Display, LED and LCD Monitors.

SECTION–B

Elementary Drawing: Points and various line drawing Algorithms and their comparisons. Circle generating algorithms, Algorithms for ellipse, arc and spiral

Two Dimensional Transformations: Basic Transformations, Scaling, Translation, Rotation, Reflection, Shear, Matrix representation of Basic transformations and homogenous coordinates.

SECTION–C

Composite Transformations: Windowing and clipping. Windowing concepts, clipping and its algorithms. Window–to–view port transformations.

SECTION–D

Three Dimensional concepts. 3 D Coordinate Systems. 3D transformations. translation, scaling, rotation, projections, parallel projections. Perspective projection.

References:

1. Computer Graphics by Donal Hearn M. Pardive Baker (PHI) Easter Economy Edition.
2. Computer Graphics by Roy A. Plastock and Gordon Kalley – Schaum's Series.
3. Computer Graphics by Marc Berger.

Paper – II: SOFTWARE ENGINEERING

Time: 3 Hours **M. Marks: 75**

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided 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.

SECTION–A

Introduction to Software: Definition, Software characteristics, Software components, Software Applications.

Introduction to Software Engineering: Definition, Software Engineering Paradigms, waterfall method, prototyping, interactive Enhancement, The Spiral model.

Software Metrics: Role of Metrics and measurement, Metrics for software productivity and quality, Measurement software, size–oriented metrics, function oriented metrics, Metrics for software quality.

SECTION–B

Software Requirement Specification (SRS): Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS).

Planning a Software Project: Cost estimation, uncertainties in cost estimation, Single variable model, COCOMO model, Software size estimation, Project scheduling and milestones, Software & Personal Planning, Rayleigh curve, Personal Plan, Quality Assurance Plan, Verification & Validation (V & V), inspection & review.

System Design: Design Objectives, Design Principles, problem, Partitioning, Abstraction, Top Down and Bottom–up techniques.

SECTION–C

Coding: Coding by Top–down and Bottom–up, Structured Programming, Information Hiding, Programming style, Internal Documentation.

Testing: Level of testing, Test cases and test criteria, Functional Testing, Structural Testing.

SECTION–D

System Maintenance: Types of Maintenance, Corrective and Preventive Maintenance.

References:

1. Software Engineering, Roger S. Pressman.
2. Integrated Approach to Software Engineering, Pankaj Jalote.

Paper – III: Programming Laboratory

Time: 3 Hours **Marks: 50**

Lab: Implementation of Applications of Computer Graphics in C++/C

Paper – IV: PROJECT

Max. Marks: 300

General Instructions:

1. A software module based on the work done in the entire course is to be developed.
2. The soft copy of the module shall be submitted to the College/Institute till April 30 of the respective semester.
3. The software module shall be developed in groups, consisting of at most two students in a group.
4. The respective 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 & authenticated. The certificate found to be incorrect at any stage shall attract the proceedings against all the stakeholders, as per the University rules.
5. The evaluation of the module shall be done as per the common ordinance of UG/PG w.e.f. 2012–2013 under semester system.