Date : 26/07/2021

DEVI AHILYA VISWAVIDYALAYA, INDORE, (M. P.)

REVISED - 2021

SEMESTER WISE SCHEME

AND

SYLLABUS

FOR

BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)

2018-19 ACADEMIC YEAR ONWARDS

BCA Third Year Semester Scheme: 2018-19 and Onwards

BCA – V Semester
Examination Scheme

Course	Theory Max. Marks		Practical Max Marks	Max. Marks	Min Marks
	Internal	External			
BCA – 501 Linear Algebra and Geometry	10	40	--------	50	04+13
BCA – 502 Computer Networks	10	40	--------	50	04+13
BCA – 503 Introduction to Cloud Computing	----------	50	--------	50	17
BCA –504 Introduction to Data Science	----------	50	--------	50	17
BCA – 505 Human Values and Professional Ethics	10	40	--------	50	04+13
BCA – 506 Information Technology Trends	10	40	--------	50	04+13
BCA – 507 Network and Cloud Computing Lab	--------	--------	25	25	09
BCA – 508 Data Science using R Lab	--------	--------	25	25	09
Total Marks	40	260	50	-----	--------
Grand Total	----------	---------	-------	350	--------

Note: The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/ analytical/ theoretical questions.

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BCA – VI Semester

Examination Scheme

Course	Theory Max. Marks		Practical Max Marks	Max. Marks	Min Marks
	Internal	External			
BCA – 601 Operations Research	10	40	--------	50	17
BCA – 602 Internet and Web Technology using PHP	-------	50	--------	50	17
BCA – 603 Computer Graphics and Multimedia	--------	50	--------	50	17
BCA – 604 Principles and Practices of Management	10	40	--------	50	04+13
BCA – 605 Project	----	.....	-------	100	33
BCA – 606 Computer Graphics and Multimedia Lab	-----	-----	25	25	09
BCA – 607 Internet and Web Technology using PHP Lab	--------	--------	25	25	09
Total Marks	20	180	50	--------	--------
Grand Total	---------	---------	-------	350	-------

Note: The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/ analytical/ theoretical questions.

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BCA – 501: Linear Algebra and Geometry

Max. Marks: 40   **Min Marks: 13**

Course Objectives: To introduce the concept of Linear Algebra & Geometry which build strong foundation of students in many areas of Computer Science including graphics, image processing, Cryptography, machine learning, computer vision, Optimization, graph algorithm, quantum computation, information retrieval and web-search. Analytical Geometry is very important for computer graphics, computer games, game designing, animation and cartography.

Course Outcomes: It is expected that after completion of the course, students will able to

1) Vector Space and Linear Maps which help in the image processing.
2) Concept of Eigen Vectors and Eigen Values and that have many important applications in computer vision and machine learning.
3) Group Theory which plays a vital role in applications of Cryptography.
4) Parabolic and ellipsoidal surfaces which helps in computer graphics.
5) Cone and cylindrical surfaces which helps in cartography and animation.

Unit I

Groups. Definition, Order of an element. Subgroups; Definition, Necessary and Sufficient Condition. Coset Decomposition. Right and Left Cosets, Lagrange's Theorem. Definitions and Basics of Normal Subgroups, Quotient Group, Homomorphism and Isomorphism of groups, Kernel of Homomorphism.

Unit II

Vector Spaces. Vector space, Subspace and Quotient Space, Linearly Dependent and Independent Vectors. Linear Maps. Definition and properties. Homomorphism and Isomorphism of Vector spaces, Kernel of a Linear Map.

Unit III

Matrix Representation of a Linear Map. Rank and Nullity of Linear Map. Fundamental Theorem of Vector Space Homomorphism. Eigen Values and Eigen vector of Matrix, Cayley Hamilton Theorem: Proof and Applications.

Unit IV

Parabolic, definition and description, Elliptical and Hyperbolic paraboloid, Parabolic of revolution. Tangent planes and Normal to a parabolic. The Ellipsoid, Tangent & Normal plane to it, director sphere of an ellipsoid, conjugate diameters and diametrical planes to ellipsoid, locus of chords.

Unit V

The definition and description, finding equation of Cone, standard equation, condition of general Quadratic equation representing cone. Angle between two generators, enveloping

Cone of conicoid, right circular Cone. The Cylinder definition, equation, right circular Cylinder, enveloping cylinder to a conicoid.

Text Books:

(1) Linear Algebra by I. N Herstein, Wiley Publisher.
(2) Analytical Geometry of Three Dimensions by P. K. Jain, New Age International Publisher.

Reference Books:

(1) Linear Algebra Schaum's Series by Seymour Lipschutz &Mark Lipson, Mc-Graw Hill Publisher.
(2) Linear Algebra by S. N. Goel, Kedarnath Ramnath Publication, Meerut.
(3) Linear Algebra by Kenneth Hoffman and Ray Kunze, Prentice Hall of India Pvt. Ltd. New Delhi.
(4) Solid Geometry by M.L. Khanna, S.P Nigam, S.S. Gangwar, Jai Prakash Nath Publication Meerut.
(5) Solid Geometry by P.N. Chatterjee, Ram Prasad & Sons Publisher Bhopal.
(6) Coordinate Geometry of Three Dimensions by D.C Agrawal Shree Sai Prakashan Meerut .

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BCA – 502: Computer Networks

Max. Marks: 40   **Min Marks: 13**

Course Objectives: The course objective is to provide a general idea of data communications, networking, protocols, standards and networking model.

Course Outcomes: It is expected that after completion of the course, students will able to

1) Independently understand basic computer network technology.
2) Understand and explain Data Communications System and its components.
3) Identify the different types of network topologies and protocols.
4) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
5) Identify the different types of network devices and their functions within a network.
6) Understand and building the skills of subnetting and routing mechanisms.
7) Get familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Unit I

Data communications and networking for Today's Enterprise, A communication model, Data Communications, Networking, and the Internet. Network model, need for a protocol architecture, The TCP/IP protocol architecture, The OSI model, Addressing. Data transmission: Concept and terminology, Analog and digital signals, Transmission impairment, Channel capacity.

Unit II

Digital transmission: Digital-to-digital conversion, Analog-to-digital conversion, Transmission mode. Analog transmission, Digital-to-analog conversion, Analog-to-digital conversion.

Unit III

Bandwidth utilization: Frequency division multiplexing, Wavelength division multiplexing, Synchronous and statistical time-division multiplexing, switching: Circuit switching Packet switching, Types of errors, framing (character and bit stuffing), error detection & correction method.

Unit IV

Data Link Layer protocols, LAN Protocol Architecture, Bridges, Emergence of High — Speed LANs, Ethernet, Token Bus, Token Ring, Wireless LAN Technology (Wi-Fi). Routing in switched network: Routing in packet switched networks,

Unit V

Internet and transport protocols: Principles of internetworking IPv4 & IPv6, Connection-oriented transport protocol mechanism, TCP and UDP. Network security: Encryption and decryption technique, Internet applications: E-mail, World Wide Web, And HTTP.

Text Books:

(1) B. Forouzan, Data Communications and Networking, The McGraw-Hill Companies, Inc., 2007, 4th Ed.
(2) A. S. Tanenbaum, Computer Networks, Pearson Education Inc. (PHI), 2012, 4th Ed.

Reference Books:

1) J. F. Kurore & K. W. Rose, Computer Networking, Pearson Education Inc., 2005, Third Edition.
2) A. L. Garcia and I. Widjaja, Communication Networks: Fundamentals Concepts and Key Architecture, Tata McGraw-Hill Publishing Company Limited, 2003, 2nd Edition.
3) M. A. Miller, Data and Network Communication: Delmar Thomson Learning Inc., 1999, 1st Edition.
4) Douglas E. Comer, Introduction to Computer Networks, Prentice Hall Inc., 2015, 6th Edition.

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BCA – 503: Introduction to Cloud Computing

Max. Marks: 50   **Min Marks: 17**

Course Objectives: The course objective is to provide comprehensive knowledge of the Cloud Computing fundamental issues, technologies, applications and implementations including security aspects.

Course Outcomes: It is expected that after completion of the course, students will able to

1) Understand the core issues of cloud computing such as security, privacy, and interoperability.
2) Identify problems, and explain, analyze, and evaluate various cloud computing solutions.

Unit I

Introduction to cloud computing, History, Importance of cloud computing in the current era, characteristics of cloud computing, what cloud computing really is and isn't, pros and cons of cloud computing, technologies in cloud computing, migrating into cloud.

Unit II

Types of clouds, cloud infrastructure, cloud application architecture, working of cloud computing, trends in cloud computing, cloud service models, cloud deployment models, cloud computing and services pros and cons.

Unit III

Cloud computing technology, cloud life cycle model, role of cloud modelling and architecture, cloud system architecture, virtualization, types of virtualization, importance and limitations of various types of virtualization, virtualization in cloud computing.

Unit IV

Data storage, introduction to enterprise data storage, data storage management, file system, cloud data stores, cloud storage characteristics, applications utilizing cloud storage.

Unit V

Introduction to web services, cloud service deployment tools, management/ administrative services, risk management in cloud computing, introduction to apache hadoop.

Text Books:

(1) Cloud Computing: A practical approach for learning and implementation, 1st edition, Pearson, A. Srinivasan, J. Suresh.

Reference Books:

1) Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
2) Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011

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3) Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
4) Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010

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BCA – 504: Introduction to Data Science

Max. Marks: 50   **Min Marks: 17**

Course Objectives: The objective of the course is introducing and teach idea of Data Science and enable students to apply Data Science in real world. This course will help learning from data, in order to gain useful predictions and business decisions.

Learning Outcomes: It is expected that after completion of the course, students will able to
1) Learn the fundamentals of Data Science
2) Work with R to analyze structured and unstructured data.
3) Develop the ability to build and assess data-based models.
4) Predict outcomes with supervised and unsupervised machine learning techniques.

Unit I

Introduction: What is Data Science? The Data Science Process, Different Types of Data: Quantitative, Categorical. Graphical Summaries of Data: Pie Chart, Bar Graph, Pareto Chart, Histogram. Measuring the Center of Quantitative Data: Mean, Median, Mode. Measuring the Variability of Quantitative Data: Range, Standard Deviation, and Variance.

Unit II

Overview of R, R data types: Vectors, Matrices, Factors, Lists, Data Frames, reading and writing data, Control structures, functions, scoping rules, dates and times

Unit III

Introduction to Data Cleansing, Missing and Repeated Values, Feature Engineering. Outliers and Errors, Finding Outliers, Cleaning Data with R.

Unit IV

Machine Learning: Definition and overview, Regression, Simple Linear Regression, Multiple Regression, Assessing Performance, Ridge Regression, Feature Selection & Lasso, Nearest Neighbors & Kernel Regression

Unit V

Machine Learning: Classification, Linear Classifiers & Logistic Regression, Learning Linear Classifiers, Overfitting & Regularization in Logistic Regression, Decision Trees, Handling Missing Data, Boosting.

Text Books:

1) Allan G. Bluman, Elementary Statistics: A Step By Step Approach.10th Edition,McGraw-Hill, 2017.
2) Paul Teetor, R Cookbook, First Edition, O,ReillyMedia, 2011.
3) Tom Mitchell, Machine Learning, First Edition, McGraw Hill. 1997

BCA – 505: Human Values and Professional Ethics

Max. Marks: 40   **Min Marks: 13**

Course Objectives: The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "virtuous" in individual, social and professional context.

Course Outcomes: It is expected that after completion of the course, students will able to

1) Understand ethical philosophies, principles, models that directly and indirectly affect business.
2) Learn the importance of the ethics and moral values.

Unit I

Human Values; Types, Features and Classification Sources of Value System Values across Cultures.

Unit II

Morality Norms, Beliefs, Attitude Moral Norms, Moral Values Moral Standards

Unit III

Professional Ethics; Nature, Characteristics and Needs Ethics V/s Morals and Values Ethico-Moral Action Ethical Codes, Ethical Practices

Unit IV

Nature and Dimensions of Attitude Components of Attitude Attitude Formation Functions of Attitude Changing Attitude

Unit V

Moral Values and Character-Building Character; Meaning, Important Components of Character Character Development.

Text Books:

1) Beteille Andre (1991), Society and Politics in India, Athlone Press, Latest edition
2) Chakraborty S. K. (1999), Values and Ethics for Organizations, oxford university press, Latest edition
3) Fernando, A.C. (2009), Business Ethics - An Indian Perspective, Pearson Education, India, Latest edition

Reference Books:

1) Charles D. Fleddermann (2012). "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, (Indian Reprint), Latest edition
2) Boatright John R (2012), "Ethics and the Conduct of Business", Pearson Education, New Delhi, Latest edition
3) Crane, Andrew and Matten Dirk (2015), Business ethics, Oxford University Press Inc., New York., Latest edition

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4) Murthy, C.S.V. (2016), Business Ethics – Text and Cases, Himalaya Publishing House Pvt. Ltd., Latest Edition

5) Naagrajan,R.R (2016), Professional Ethics and Human Values, New Age International Publications, , Latest edition

6) Campbell, V., & Bond, R. (1982). Evaluation of a character education curriculum. In D. McClelland, Education for values. New York: Irvington Publishers, Latest Edition.

7) R. S. Dwivedi (1995), "Human Relations and Organizational Behavior: A Global perspective", Macmillan Latest Edition

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BCA – 506: Information Technology Trends

Max. Marks: 40   **Min Marks: 13**

Course Objectives: To make aware student the changes in technologies, applications and systems around us.

Course Outcomes: It is expected that after completion of the course, students will able to

1) Get knowledge about modern communication systems.
2) Be familiarized with concept of Mobile Commerce and Geographic Information System.
3) Understand the concept of data warehouse. data mining and Big Data.
4) Understand the use of Artificial Intelligence and IoT in current context.

Unit I

Introduction and basic concepts of modern communication and telephony technology: CDMA, WLL, GSM, VOIP, Bluetooth, Wi-Fi, Communication Technology: 2G, 3G, 4G, 5G. Communication over Radio, Microwave systems, Communication satellites, Radar, Fiber optics, ISDN – their properties, Geographic Information System (GIS): Components of a GIS – Hardware, Software, Data, People, Methods, Working and application of GIS.

Unit II

Information Security - Introduction, Malicious Programs, Cryptography, Digital Signature. Firewall, Users Identification and Authentication, Security Awareness and policies. Application areas requiring security. Mobile Commerce: Introduction, Growth, Success stories of Mobile commerce, Technologies for mobile commerce, M-Commerce in India. Digital Marketing

Unit III

Data Warehouse and Data Marts: Introduction, Advantages of data warehouse, Data warehouse components, Data warehouse architecture and schemas. Big Data Concept, Data Mining: Introduction, Evolution of data mining, Data mining – verification versus discovery, Advantages of data mining, Technologies used in data mining.

Unit IV

Artificial Intelligence and Expert System: Concept of Artificial Intelligence and Expert System. Building of Expert System, Merits and Demerits of Expert System, Application of Expert System, Application of Artificial Intelligence

Unit V

Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Home automation, Industry applications, Surveillance and other IoT applications. Introduction to Virtual Reality: definition, Applications of VR. Smart Systems, Embedded systems,

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Text Books:

1) Fundamentals of Information Technology by Alex Leon & M. Leon, Vikas Publications, New Delhi.

2) Frontiers of Electronic Commerce by Ravi Kalakota, Andrew B. Whinston, , Addison Wesley Longman Publication.

3) E-Commerce: An Indian Perspective (Second Edition) by S.J.P. T. Joseph, Prentice-hall Of India Pvt Ltd.

4) Security in Computing (Third Edition) by C.P.Pfleeger, S.L. Pfleeger, D.N. Shah. S.Ware, Prentice Hall 2002.

5) Mobile Communications, Joschen Schiller, Pearson Education.

6) Recent Magazines of Computers and Communication.

7) Cloud Computing PHI by Rao M.N.

8) Internet of Things McGrawHill by Raj Kamal

Reference Books:

1) Introduction to Information Technology - ITL Education Solutions Ltd., Seventh Impression, Pearson Education, 2008.

2) Data Mining Techniques - Arun K Pujari, University Press.

3) Enterprise Resource Planning 1/e - Alexis Leon, International edition-Tata McGraw Hill publication.

4) Concepts in computing - Kenneth Hoganson, First Indian Edition, Jones & Bartlett Publishers, Inc., 2010.

5) Artificial Intelligence - Elaine Rich, Kevin Knight, 2nd edition, McGraw Hill, 1991.

6) Computer Networks - Andrew S. Tanenbaum, 4th Edition, Pearson Education.

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BCA – 507: Network and Cloud Computing Lab

Max. Marks: 25   **Min Marks: 9**

1) Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.
2) Familiarization with Transmission media and Tools: Co-axial cable, UTP Cable, Connectors etc., Preparing straight and cross cables.
3) Study of various LAN topologies and their creation using network devices, cables and computers.
4) How to make a network cabling connection.
5) How to Create a Local Area Network (LAN).
6) Network Protocol - Types of Network Protocols.
7) Network maintenance Troubleshooting.
8) Steps for installing Proxy Server on Windows.
9) Procedure to create a network (LAN).
10) Trouble shooting tools in Data Communication.
11) Procedure to share hardware resources (printer) over network.
12) Implementation of file and printer sharing.
13) Network Cable Connectors Types and Specifications.
14) Case study on IEEE Standards 802.3, 802.4 and 802.5.
15) Case Study on DNS, TELNET, FTP
16) Virtualization in cloud using any freeware Tool.
17) Installing Operating System on virtual computer.
18) Using existing cloud services like SAAS, PAAS, IAAS, Cloud Storage.

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BCA – 508: Data Science using R Lab

Max. Marks: 25   **Min Marks: 9**

1) Write a R program to take input from the user (name and age) and display the values. Also print the version of R installation.
2) Write a R program to get the details of the objects in memory.
3) Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.
4) Write a R program to create a vector which contains 10 random integer values between -50 and +50.
5) Write a R program to get the first 10 Fibonacci numbers.
6) Load the built in warpbreaks data set . Find out, in a single command, which columns of warpbreaks are either numeric or integer.
7) a. Load the `state` datasets.
   b. Convert the `state.x77` dataset to a dataframe.
   c. Rename the `Life Exp` variable to `Life.Exp`, and `HS Grad` to `HS.Grad`
8) Suppose we wanted to enter all the variables in a first-order linear regression model with Life Expectancy as the dependent variable. Fit this model.
9) Suppose we wanted to remove the `Income`, `Illiteracy`, and `Area` variables from the model in Exercise 2. Use the `update` function to fit this model.
10) Let's assume that we have settled on a model that has `HS.Grad` and `Murder` as predictors. Fit this model.
11) Write a R program to create a Data Frames which contain details of 5 employees and display summary of the data
12) Write a R program to create the system's idea of the current date with and without time.
13) To prepare data for analysis in R
14) To find missing data in R?
15) To exclude missing data in R?
16) To remove rows with 0 in R?
17) Create a list of 80% of the rows in the original dataset to use for training.
18) Select 20% of the data for validation.
19) Use the remaining 80% of data to train and test the models.
20) Find the dimensions of the "iris" dataset.
21) Find the type of each attribute in your dataset.
22) Take a look at the first 5 rows of your dataset.
23) Display the summary of the "iris" dataset.
24) What happens to missing values in a histogram? What happens to missing values in a bar chart? Why is there a difference?

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BCA – 601: Operations Research

Max. Marks: 40   **Min Marks: 13**

Course Objectives: To analyze different situations in the industrial/ business scenario involving limited resources and finding the optimal solution within constraints.

Course Outcomes: It is expected that after completion of the course, students will able to

1) Identify and develop operational research models from the verbal description of the real system.
2) Analyze the different operation research models that are needed to solve optimization problems.
3) Understand the mathematical tools that are needed to solve business problems.
4) Formulate and solve the problems as networks and graphs.
5) Use CPM and PERT techniques to plan, schedule and control project activities.
6) Apply analytical skills and problem-solving tools to the analysis of the operations problems.

Unit I

Introduction to Operations Research: Origin and Development of OR, nature of OR, characteristics of OR, Meaning, Scope of Operations Research and Decision making, Advantages and Limitations of OR, Application of OR, Phases of OR, OR Models.

Unit II

Linear Programming: Meaning of Linear Programming, Mathematical Formulation of Linear Programming Problems, Graphical Solution, Simplex Method, Dual Simplex, Advantages and limitations of LPP.

Unit III

Transportation Problems: Mathematical Model and Formulation, Initial Basic Feasible Solution, North West Corner Method, Least Cost Method, Vogel's Approximation Method, Optimal Solution (Minimization And Maximization) using Modified Distribution Method, Degeneracy in Transportation Problem.

Assignment Problems: Definition of Assignment Problem, comparison with Transportation Problem, formulation and solution of Assignment Problem using Hungerian Method (Minimization and Maximization), Travelling Salesman Problem.

Unit IV

Sequencing and Scheduling: Johnson's Algorithm for processing n jobs through 2 machines, Algorithm for processing n jobs through 3 or more machines, Processing 2 jobs through n machines.

Queuing Models : Essential features of queuing systems, operating characteristics of queuing system, probability distribution in queuing systems, classification of queuing models, solution of queuing M/M/1 : ∞ /FCFS, M/M/1 : N/FCFS.

Unit V

Project Management: PERT and CPM : Project management origin and use of PERT, origin and use of CPM, Applications of PERT and CPM, PERT/ CPM Network Diagram representation, Critical path calculation by network analysis and critical path method (CPM), Determination of floats, Project Evaluation and review Technique (PERT).

Text Books:

1) B.E. Gillet, Introduction to Operation Research: A Computer Oriented Algorithmic Approach, Tata McGraw Hill publishing Co. Ltd., New Delhi, 2000.
2) P. K. Gupta & D.S. Hira, Operations Research, S. Chand & Co., 1976, 7th Edition.

References Books:

1) H.A. Taha, Operations Research: An Introduction, Mc Millian Co., New York, 2007, 8th Edition.
2) N.S. Kambo, Mathematical Programming Techniques, Affiliated East West Press Pvt. Ltd., 2008, Revised Edition.
3) R. Panneserlvam, Operations Research, Prentice Hall India Learning Pvt. Ltd., New Delhi, 2004, 2nd edition.
4) S.D. Sharma, Operations Research, Kedar Nath & Co. Meerut, 2010, 15th edition.
5) K. S. Gupta, P.K. Gupta and Manmohan, Operations Research, Sultan Chand and Sons, New Delhi, 2002, Ninth Edition.

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BCA – 602: Internet and Web Technology Using PHP

Max. Marks: 50   **Min Marks: 17**

Course Objectives: The course objective is to understand the principles of creating an effective web page using HTML, CSS and the concepts on web designing and development using PHP and MySQL

Course Outcomes: It is expected that after completion of the course, students will able to

1) Develop an understanding about the basic concepts of web page design using HTML and CSS.
2) Develop an understanding about the web site development using PHP.
3) Create powerful and dynamic web applications using PHP and MySQL.
4) Build a simple, yet functional web application using PHP/MySQL.

Unit I

Web Technology: Introduction to WWW, web browsers, web servers, HTTP, URL.

HTML: Introduction, Objective, HTML Command Tags: Text, List, Table, creation of links, inserting graphics, forms.

Cascading style sheets: Introduction to CSS

Unit II

A Brief History of PHP, PHP Characteristics. Installing and Configuring PHP on Windows. PHP Language Basics: Lexical Structure, Data Types, Variables, Expressions and Operators, Decision Statements, Flow Control Statements. Embedding PHP in Web Pages.

Strings: String Constants, Printing Strings, Accessing Individual Characters, String Handling Functions: length, Word count, string position, reverse, replace.

Maths: max, min, sqrt, sin, cos, tan, sinh, cosh, tanh, abs, count, ceil, round, floor, log, log10, pow() functions.

Arrays: Indexed Arrays, Associative Arrays, Identifying Elements of an Array, Storing Data in Arrays, Multidimensional Arrays, extracting multiple values, converting between arrays and variables, Traversing Arrays.

Unit III

Session: Session handling, creating session, storing values in session, accessing values from session, destroying session. Cookies: creating cooking, setting values, accessing cookies values, session cookie, persistant cookie, redirecting page.

Functions: Calling a Function, Defining a Function, Variable Scope, Function Parameters, Return Values, Variable Functions.

Object Oriented Programming Concepts: Classes, Objects, Member Functions, Encapsulations, Inheritance, and Polymorphism. (only basic definitions of these topics).

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Unit IV

Form Handling in PHP: Setting Up Web Pages to Communicate with PHP, Handling Text Fields. Text Areas, Check box, Radio button, Submit, Reset, Button, Image Button, Select Box, input type email, password, date and url.

File Handling: Working with files: File Open and Read, File Create and Write, Reading and writing Character in file, reading entire file, Rename and Delete File, File Uploading.

Unit V

Database Access: Using PHP to access a database. Introduction to MySql, connectivity with MySql.

Creating form and saving data of form to MySql. Performing CRUD operation using PHP and MySql.

Text Books:
1) Programming PHP by Rasmus Lerdorf and Kevin Tatroe, O'Reilly Publications
2) Beginning PHP5 by Wrox Publication
3) Mastering PHP : BPB Publication
4) PHP 5.1 for beginners by Evan Bayross and Sharman Shah, SPD Publications
5) PHP 5.2 The Complete Reference by Steven Holzner, Mc Graw Hill Edition 2008.

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BCA – 603: Computer Graphics & Multimedia

Max. Marks: 50   **Min Marks: 17**

Course Objectives: The objective of the course is to provide comprehensive introduction about computer graphics system, design algorithms, two-dimensional transformations, and techniques of clipping, three-dimensional graphics and three-dimensional transformations.

Course Outcome: It is expected that after completion of the course, students will able to

1) Learn the basic concepts of computer graphics.
2) Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
3) Create 2D animations using tools.
4) Create 3D graphical scenes using open graphics library suits.
5) Implement image manipulation and enhancement.
6) Learn fundamentals of animation and its related technologies.

Unit I

Computer Graphics: Introduction, Application of Computer Graphics, Display Devices: Refresh Cathode -Ray Tubes, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Flat Panel Displays. Video cards/display cards.

Input Devices: Mouse, Trackball, Space ball, Data Glove, Joystick, Light pen, Scanner, Digital Camera, Touch Panels, Voice Systems. Hardcopy Devices: Printers and Plotters.

Unit II

Graphics Primitives: Line Generation Algorithms: DDA algorithm, Bresenham's algorithm. Circle Generation Algorithms: Midpoint Circle algorithm, Bresenham's circle generation algorithm.

Displaying Lines, characters and polygon. Polygon filling Algorithms: Scan Line Polygon fill algorithm, Inside - Outside Tests, Boundary-Fill algorithm, Flood -Fill algorithm. Fundamentals of Aliasing, Antialiasing Technique.

Unit III

Two Dimensional (2-D): Two Dimensional Transformations: Translation, Scaling, Rotation, Reflection, Shear, Homogenous coordinate system, Composite transformations, Raster method of transformation.

2-D Viewing: Window to Viewport coordinates transformation. Clipping: Clipping operations. Point clipping. Line clipping: Cohen Sutherland Algorithm, Liang Barsky Algorithm, Nicholl-Lee-Nicholl Algorithm. Polygon clipping: Sutherland- Hodgeman Algorithm, Weiler Atherton Algorithm. Text clipping, Exterior clipping.

Unit IV

Three-dimensional: Concepts, 3-D transformation: transition, scaling, composite transformation, and Other Transformation- rotation and shearing.

3-D viewing: Concepts, viewing pipeline, viewing coordinates, projection transformation, Parallel & Perspective Projections.

Unit V

Multimedia: Introduction, applications, components, hardware, data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia tools, presentations tools, Authoring tools, presentations, concept of 3D Modelling.

Animation: Principle of animation, cell animation, kinematics, morphing.

Advancements in the technology in Computer graphics and Multimedia.

Text Books:

1) D. Hearn and M. P. Baker, Computer Graphics: C Version, Prentice Hall of India, 2002, Second Edition.
2) T. Vaughan, Multimedia: Making it Works, Tata McGraw-Hill Professional, New Delhi, 2006, Seventh Edition

Reference Books:

1) D. F. Rogers, Procedural Elements for Computer Graphics, Tata Mc-Graw-Hill Publishing Company Ltd. New Delhi, 2001, 2nd Edition.
2) J. D. Foley, A. V. Dam, S. K. Feiner, J. F. Hughes, Computer Graphics: Principles and Practice in C, Addison-Wesley Professional, 2000, Second Edition.
3) Z. Xiang, R. A. Plastock, Schaum's outline of Theory and Problems of Computer Graphics,Tata McGraw-Hill Professional, New Delhi, 2006, Second Edition.

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BCA – 604: Principles and Practices of Management

Max.Marks:40   **Min.Marks:13**

Course Objectives: The course aims to help the students to be aware of the primary functions & responsibilities of managers, and understand the environment of an organization.

Course Outcomes: It is expected that after completion of the course, students will able to

1) Understand the concepts related to business.
2) Understand the roles, skills and functions of management.
3) Understand the complexities associated with the management of resources in the organization.

Unit I

The Nature of Management: Definition and role of management, Functions of Manager, Scientific Management, Human Relations school of Management, Contingency Theory of Management.

Unit II

Planning: Nature and Purpose of Planning, Components of Planning, objective of Business Management by Objectives.

Unit III

Organizing: Nature of Purpose of Organizing, Departmentation, Span of management, Delegation of Authority, Line and Staff Relationships. Staffing: Nature of staffing, problems faced in staffing, process of staffing.

Unit IV

Directing Process: Principles of Direction. Problems in Human Relation, Strategies for Establishing Healthy Human Relations.

Unit V

Control: Meaning and Process of Control. Control Techniques.

Text Book:
1) "Principles of Management", Harold Koontz, O'Donnel and Heinz Weihrich, New York: McGraw Hill Book Co.

Reference Books:
1) "Management", Stoner, Freeman and Gilbert Jr., PHI, 6th Ed.
2) "Organization and Management Concepts", R.D. Agarwal, New Delhi, Tata McGraw Hill. 1995.
3) "Management", Robbins and Coulter. PHI, 8th Ed.
4) "A. - Fundamentals of Management: Essential Concepts and Applications", Robbins S. P. and Decenzo David, Pearson Education. 5th Ed.
5) "Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets", Hillier Frederick S. and Hillier Mark S. Tata McGraw Hill, 2nd Ed., 2008.

BCA – 605: PROJECT

Max. Marks: 100   **Min. Marks: 33**

The students are expected to work on a project in final year. The student can formulate a project problem with the help of guide and submit the project proposal of the same. If approved, the student can commence working on it and complete it. The project comprises of 100 marks, of which project report has 20 marks, implementation and prototype demonstration has 30 marks; and presentation & viva-voce has 50. Project evaluation will be done by internal and external examiners.

Project Report Guidelines

I Introduction

Project Introduction
Existing System with limitations
Preliminary investigation
Feasibility study
Proposed System with aim and objectives
Software/ hardware Requirements

II System Analysis

Functional and non-functional requirements
System flow diagram
Data Flow Diagram
E-R Diagrams

III System Design

Architectural design
Structural design
Algorithmic design
File/ Database Design
User Interface Design

IV Coding

Module implementation & Screen snapshots

VI System Testing

Test strategy
Test Cases
Test reports

VII Conclusions
Bibliography
Appendices (if any)

BCA – 606: Computer Graphics & Multimedia Lab

Max. Marks: 25   **Min Marks: 09**

1) Write a program to implement DDA algorithm
2) Write a program to implement Bresenham algorithm
3) Write a program to implement circle generating algorithm
4) Write a program to implement ellipse generating algorithm
5) Write a program to implement scaling on polygon.
6) Write a program to implement transferring on polygon.
7) Write a program to implement rotation on polygon.
8) Write a program to implement reflection on polygon.
9) Write a Program to implement set of Basic Transformations on Polygon i.e. translation, Rotation and Scaling.
10) Write a program to implement set of Composite Transformations on Polygon i.e., Reflection, Shear (x &Y), rotation about an arbitrary point.
11) Write a program to implement Line Clipping Algorithm using Cohen Sutherland Algorithm.
12) Write a program to implement Line Clipping Algorithm using Liang Barsky Algorithm.
13) Write a program to Implement Polygon Clipping Algorithm using Sutherland Hodgman
14) Algorithm
15) Determine the sequence of basic transformations that are equivalent to the x-direction and y- direction shearing matrix.
16) Show that transformation matrix for a reflection about the line $y=x$, is equivalent to a reflection relative to the x axis followed by a counter clockwise rotation of 90 degrees.
17) Modify the Liang-Barsky line clipping algorithm to polygon clipping.
18) Write a routine to clip an ellipse against a rectangular window.
19) Write a routine to implement exterior clipping on any part of a defined picture using any specified window.
20) Modify the BRESENHAM algorithm so that it will produce a dashed-line pattern. Dash length should be independent of slope.
21) Write a procedure to scan the interior of a specified ellipse into a solid color.
22) Modify the 4-connected boundary fill algorithm to avoid excess stacking.
23) Write the Scan line filling algorithm

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BCA – 607: Internet and Web Technology Using PHP Lab

Max. Marks: 25   **Min. Marks: 09**

1) Write down html code to design navigation menu for home, about us, contact us, registration and login page. Link all of them too.
2) Write down html code to list unordered list of items and link each item to another page which will show detail about them.
3) Write down html code to design 4 sections using div tags. Each section will show image, link, ordered list and an image which is a link to another html page respectively.
4) Write down html code to design 5 sections using table tags.
5) Write down html code to design a registration form like facebook.com using div.
6) Write down html code to design registration form in four steps.
7) Write down html code to design login form like Gmail.
8) Write down html code to design a bill. The bill should contain date of invoice, different items, quantity, price of single item and total price.
9) WAP to print hello world using php .
10) WAP to print Character, Boolean, Integer and Floating values using single variable.
11) WAP to reverse a string using strrev function
12) WAP to demonstrate strlen, strstr, strpos, stripos, stristr functions.
13) WAP to search a string within string.
14) WAP to sum of all digits of number.
15) WAP to print pattern like

        1
        1 2
        1 2 3
        1 2 3 4

16) WAP to print pattern like

        *
        *
        * *
        * * *

17) WAP to demonstrate sin, cos, tan, sinh, cosh, tanh, sqrt, abs, pow, max and min functions.
18) WAP to create an array of character and reverse the characters in array.
19) WAP to create an array of item price and print maximum price.
20) WAP to create array of strings and calculate length of each string.
21) WAP to break a string using explode function with following comma, white space and dollar symbol. After breaking store all in an array.
22) WAP for matrix multiplication.
23) WAP for storing and displaying student roll no and marks in associative array.
24) WAP to create a multi-dimensional array. In the array row index will be integer and column index will be string. For example $a[0]['id'], $a[0]['name'], $a[0]['dob'], $a[1]['id'], $a[1]['name'], $a[1]['dob'] and so on.

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25) WAP to create user defined function to print hello world.
26) WAP to create user defined function to reverse the string.
27) WAP to create user defined function to swap value of two variables.
28) WAP to create a function to find out maximum of four numbers.
29) WAP to create class to show use of class.
30) WAP to create class, in which one function will set variable like name, id and salary. Another function will be called to show all these details.
31) WAP to create a class which will have function for area. The second class will inherit it and override the function area.
32) WAP print maximum of three numbers accepted from user.
33) WAP to print average of 5 numbers. Input will be taken from the user using form tag.
34) WAP to take username, address, phone number and date of birth from user and then print them all on html page using PHP code in page design using html.
35) WAP to accept the name of user from html form and check its length. It the length is less than 7 or greater than 14, redirect it to same page and print the error message; if name is within given length take page to another page and print welcome message.
36) WAP to create session using set some value in session like name and print the name on another page using session.
37) WAP to store username in session, take input from user, redirect to another page and print username from session.
38) WAP to take username and password. Check it in database. If record is found, then user will redirect to home page and on home page all details will be displayed. Following options should be there – edit profile, change password, logout, user session to store user name and check them on each page. If session expires, user will be directed to another page.
39) WAP to create cookie to store a name.
40) WAP to access cookie data and display them.
41) WAP to create "keep me signed in" as in gmail and yahoo.
42) WAP to create session cookie.
43) WAP to create persistant cookie.
44) WAP to create a file and store user details entered by user with the help of form.
45) WAP to print information of the file. The file name will be given by the user.
46) WAP to copy contents of one file to another file.
47) WAP to connect MySql database using PDO and MySQLI connection object.
48) WAP to create login with MySql database. User will enter username and password. Write SQL command which will take username and password and check with database table. If record is found all details of user will be displayed.
49) WAP to create signup form and store all user information in database. Check that no duplicate username will be stored.
50) WAP to display all user data store in database table.
51) WAP to edit user record by selecting a user from list of all users.
52) WAP to delete user record by selecting a user from list of all users.

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