BACHELORS WITH COMPUTER APPLICATIONS AS MAJOR

1st SEMESTER

CAP122J: COMPUTER APPLICATIONS _ COMPUTER FUNDAMENTALS

CREDITS: THEORY - 04; PRACTICALS - 02

Course Objectives:

1. *To introduce to the students the basic understanding of the working of a computer system.*
2. *To familiarize the students with the basic notations and data representation methods used.*
3. *To familiarize the students with the various software and hardware aspects of computers.*
4. *To make the students understand the need and working of the interconnection and communication between computers.*
5. *To make the students familiar with the basic internet technology and concepts.*

THEORY (4 CREDITS)

UNIT – I

Introduction to Computers, History, Generation of Computers, Data Processing, Memory Hierarchy. Input/ Output devices, BIOS, VDU
Data Representation - Binary, Decimal, Octal, Hexadecimal and their conversions, 1's and 2's compliment. Block Diagram of a Basic Computer and its working.

UNIT – II

Application Software and System Software, Open-Source Software and Proprietary Software.
Computer Languages and its types (Machine Language, Assembly Language, High Level Language) Translators, Compiler, Interpreter
Operating System and its functions, Types (Single-User, Multi-User, Multi-Tasking, Time-Sharing, Distributed, Real-Time)

UNIT – III

Data Communication - Need for Network Communication, Modes of Communication-Simplex,
Duplex, Half-Duplex; Introduction to Networks, LAN, MAN, WAN
Protocols - Ethernet, IP, TCP, UDP, HTTP
Networking Elements - Switch, Router, Server, Firewall

UNIT – IV

Introduction of Internet and WWW, Basic working of a Web Browser, Introduction to popular web browsers. Concepts of URL, Domain Name, Web Server, Smartphone Apps, Email, Instant Messaging, ISP Communication and Collaboration: Using e-governance, search engines, Webhosting, netiquettes.

COMPUTER FUNDAMENTALS LAB. (2 CREDITS)

MS WORD BASICS:

1. Basics of Word Processing, Create, Save, Edit, open files.
2. Using the Interface (Menu Toolbars), Editing Text (Copy, Delete, Move Etc.). Finding and replacing text.
3. Insert: Table, images, textbox, word art, symbols.
4. Auto correct Feature, Grammar check Facility, Formatting and Editing, Font, Size, alignment paragraph, Bullets and numbering.
5. Table: Insert and Draw, changing cell width and height, insert/delete rows in columns.
6. Borders and shadings, Mail merge.

MS EXCEL BASIC:

Creating and opening worksheets, saving and data entry in cells.

7. Entry of Numbers, Text and Formulae, Moving Data in the Worksheet.
8. Selecting Data Range, Using the Interface (Toolbars, Menus).
9. Editing basics, working with Workbooks Saving, Cell Reference, Formatting, Editing.
10. Working with Data, charts, graphs.

MS POWER POINT BASICS:

11. Creating, opening and saving a PowerPoint slide.
12. Creating presentations using existing templates.
13. Entering and editing text. Inserting and deleting slides.
14. Use of fonts and drawing, inserting images, graphics., viewing and printing.
15. Creation of animated slides, adding images, graphics and sound in slides. Adding Timing, auto slide changes.

REFERENCES:

1. Fundamentals of Computers, V Rajaraman 6th edition PHI Learning Private Limited 2014
2. Computer today, Donald H. Sanders, McGraw Hill Publishing Company.
3. Microcomputers Software and Applications, Dennis P. Curtin and Leslie R. Portel, PHI.
4. Data Processing: An Introduction, Donald P. Spencer and Charles R. Merril Pub. And Co.
5. Computers and Their Applications, Larry Joel Goldestein, PHI.
6. Computer Fundamentals. P. K. Sinha
7. Internet Basics. E. Douglas Commer PHI.

BACHELORS WITH APPLIED COMPUTING AS MINOR

(FOR STUDENTS WITH MAJOR IN COMPUTER APPLICATIONS / INFORMATION TECHNOLOGY)

1st SEMESTER

ACP124N APPLIED COMPUTING _ DIGITAL ELECTRONICS

CREDITS: THEORY: 4; PRACTICAL: 2

COURSE LEARNING OUTCOMES:

- *To introduce concepts of number systems and Boolean algebra.*
- *To familiarize students with the operation and use of basic digital logic gates as well as the design and minimization of combinational logic circuits.*
- *To introduce the concept of microprocessors and familiarize them with basic operation of a CPU.*

THEORY (4 CREDITS)

UNIT 1:

Introduction to Digital and Analog Quantities, Binary Digits, Logic Levels, Pulse, Waveforms, Clock and Timing Diagrams *(1 Hour)*
Number Systems - Decimal, Binary, Octal, Hexadecimal and their Conversions. *(4 Hours)*
Unsigned Binary Arithmetic, Ones Complement, Twos Complement. Signed Numbers and their arithmetic. Binary Coded Decimal. Error Codes-Parity Code *(4 Hours)*
Logic Gates—AND, OR, NOT, NAND, NOR, XOR and XNOR Gates. *(2 Hours)*
Boolean Algebra: Boolean Operations, Laws and Rules of Boolean Algebra, DeMorgan's Theorems. Constructing a Boolean Expression for a Logic Circuit, Logic Simplification. *(5 Hours)*

UNIT 2:

SOP and POS forms, Karnaugh Maps and minimization upto 4 variables, Don't care conditions *(4 Hours)* Combinational Logic Circuits: AND-OR, AND-OR-INVERT, XOR and XNOR logic, Converting Boolean Expression or Truth Table to a Logic Circuit, NAND and NOR as Universal Gates *(4 Hours)*
Half Adder, Full Adder, 4-bit Parallel Binary Adder, Comparator, Binary Decoder, Encoder, Multiplexer, Demultiplexer *(7 Hours)*

UNIT 3:

Latches: SR Latch, D Latch, Gated SR and D Latch *(2 Hours)* Flip Flops: Difference between Flip Flop and Latch, Level vs Edge-Triggered. D Flip Flops, JK Flip Flops and their operation *(4 Hours)*
Characteristics and Applications of Flip Flops (storage, counting), Intro to 555 Timer *(2 Hours)*
Shift Registers - Serial and Parallel (4-bit) *(3 Hours)* Counters: Synchronous and Asynchronous (2/3 bit). Decade Counter, Johnson counter *(4 Hours)*

UNIT 4:

von Neumann Architecture: Block Diagram, CPU, Memory, I/O Ports and Buses, Bus Master, Bus Contention: Shared Signal Lines and Tri-State Outputs, Fan-out, Buffers, Device Selection, System Timing.
Microprocessor, ALU, Control/Timing Unit, Decode Unit, Register Set, Instruction Execution Cycle. Memory: Memory Bus, Read / Write operations and Addressing Modes. I/O: Polling, Interrupts and DMA. Intro to Types of CPU Instructions.
Microcontrollers: Architecture, Registers, Functional Units and Peripherals. System on Chip (SoC): Block Diagram, Functional Elements, Difference between Microprocessor, Microcontroller and SoC. *(15 Hours)*

TEXTBOOK:

1. Thomas Floyd, Digital Fundamentals, 11th Edition (2015), Pearson.

REFERENCES:

1. Morris Mano, Michael Ciletti, Digital Design with an Introduction to the Verilog HDL, VHDL, and SystemVerilog, 6th Edition, Pearson (2017)
2. Malvino, Principle of Digital Electronics, McGraw-Hill
3. R.P. Jain - Modern Digital Electronics, McGraw-Hill, 4th ed. 2010
4. LaMerez, Quick Start Guide to Verilog, Springer (2019)
5. M. Rafiquzzaman - Digital Logic, with an Introduction to Verilog and FPGA-Based Design, Wiley (2019)

PRACTICALS (2 CREDITS)

User a Verilog/System Verilog simulator like ModelSim or Icarus Verilog to simulate the following digital circuits:

1. Implement the following logic gates in Verilog:
    a. A 2-input AND Gate
    b. A 3-input OR Gate
2. Implement the following logic gates in Verilog and simulate them using a test bench:
    a. A 2-input NAND Gate
    b. A 2-input NOR Gate
3. Design and simulate 3-input XOR gate in Verilog.
4. Design and simulate a module in verilog that implements the following boolean logic: a.
5. Design and simulate a half adder in Verilog
6. Design and simulate a full adder in Verilog
7. Design and simulate a 4-bit binary adder in Verilog
8. Design and simulate a 2-to-1 multiplexer in Verilog
9. Design and simulate a 4-to-1 multiplexer assembled from three 2-to-1 multiplexers in Verilog
10. Design and simulate a 3-to-8 decoder in Verilog
11. Design and simulate a clocked D Flip Flop with reset input in Verilog
12. Design and simulate a simple 4-bit ALU in Verilog that performs addition, subtraction, AND, and OR operations

BACHELORS WITH COMPUTER APPLICATIONS AS MINOR

1st SEMESTER

(FOR STUDENTS WITH SUBJECTS OTHER THAN COMPUTER APPLICATIONS / IFORMATION TECHNOLOGY AS MAJOR)

CAP122N: COMPUTER APPLICATIONS _ COMPUTER FUNDAMENTALS

CREDITS: THEORY - 04; PRACTICALS - 02

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THEORY (4 CREDITS)

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COMPUTER FUNDAMENTALS LAB. (2 CREDITS)

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2. Computer today, Donald H. Sanders, McGraw Hill Publishing Company.
3. Microcomputers Software and Applications, Dennis P. Curtin and Leslie R. Portel, PHI.
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7. Internet Basics. E. Douglas Commer PHI.

1st SEMESTER

SKILL ENHANCEMENT COURSE

CAP122S: MULTIMEDIA APPLICATIONS

CREDITS: THEORY: 2, PRACTICAL: 2

THEORY (2 CREDITS)

UNIT-I

Multimedia:

Introduction to multimedia, components, uses of multimedia, multimedia applications, virtual reality.

Text:

Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext.

Images:

Still Images bitmaps, vector drawing, 3D drawing & rendering, natural light & colors, computerized colors, color palettes, image file formats.

Sound:

Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.

UNIT-II

Video:

How video works, analog video, digital video, video file formats, video shooting and editing.

Animation:

Principle of animations, animation techniques, animation file formats.

Internet and Multimedia:

www and HTML, multimedia on the web - web servers, browsers, web page makers and site builders.

Making Multimedia:

Stages of a multimedia project, Requirements to make good Multimedia Hardware - Macintosh and Windows production Platforms, Hardwar'e peripherals Connections, Memory and storage devices, Multimedia software and Authoring tools

REFERENCES:

Tay Vaughan, —Multimedia: Making it work, TMH. Eighth edition.2011

Ralf Steinmetz and KlaraNaharstedt, —Multimedia: Computing, Communications Applications, Pearson.2012

Keves. —Multimedia Handbook, TMH 2000.

K. Andleigh and K,Thakkar, —Multimedia System Design, PHI 2013

PRACTICAL (2 CREDITS)

1. Implement text formatting tags using HTML.
2. Write an HTML code to display tabular data.
3. Write an HTML code to implement anchor tags.
4. Write an HTML code to change colors for text and background.
5. Write an HTML code to display images in a tabular format.
6. Implement basic tool operations shown in tool box on an image using Photoshop.
7. Create a logo in Photoshop.
8. Create a text banner using various tools of Photoshop.
9. Implement image layering in Photoshop.
10. Using Photoshop perform various image conversion operations. Observe the change in quality after conversion in different formats.
11. Using an appropriate tool (like 3D Studio Max), create a 3D object (like space ship) of your choice.
12. Using 3D Studio Max create an animation file.
13. Using filmora software, edit a video file.
14. Using 3D Studio Max add a sound to a video clip.
15. Add animated text to a video file.

1st SEMESTER
COMPUTER APPLICATIONS
(WEB DEVELOPER)
SKILL ENHANCEMENT COURSE (SEC)

WDP122S: INTERNET BASICS AND HTML

CREDITS: THEORY: 2, PRACTICAL: 2

THEORY (2 CREDITS)

UNIT 1 – INTERNET BASICS (15 LECTURES)

Communication using the Internet: Basic of Computer networks; LAN, WAN, OSI and TCP Network Models, Concept of Internet, Applications of Internet, Connecting to Internet, What is ISP, Knowing the Internet.

WWW and Web Browsers: World Wide Web, Web Browsing Software's, Search Engines, Understanding URL, Domain name, IP Address, Using e-Governance Website.

Communications and collaboration: Basics of Electronic Mail, Getting an Email Account, Sending and Receiving Emails, Accessing Sent Emails, Using Emails, Document Collaboration, Instant Messaging, Netiquettes.

UNIT 2 – HTML (15 LECTURES)

Introduction to Hyper Text Markup Language. Key components of HTML Document, HTML Elements, Tags and Attributes , Headers, HTML Basic Tags, Formatting Tags, Ordered List, Unordered List, Definition Lists, Nesting of Lists, Hyperlinks, Tables, Images, Images as Hyperlink, Forms, Frames, Div and Span Tags for Grouping, Using Object Tag to embed Multimedia Elements.

REFERENCE BOOKS:

1. Internet Basics E Douglas Commer PHI
2. Mastering HTML BPB Publications

PRACTICAL (2 CREDITS)

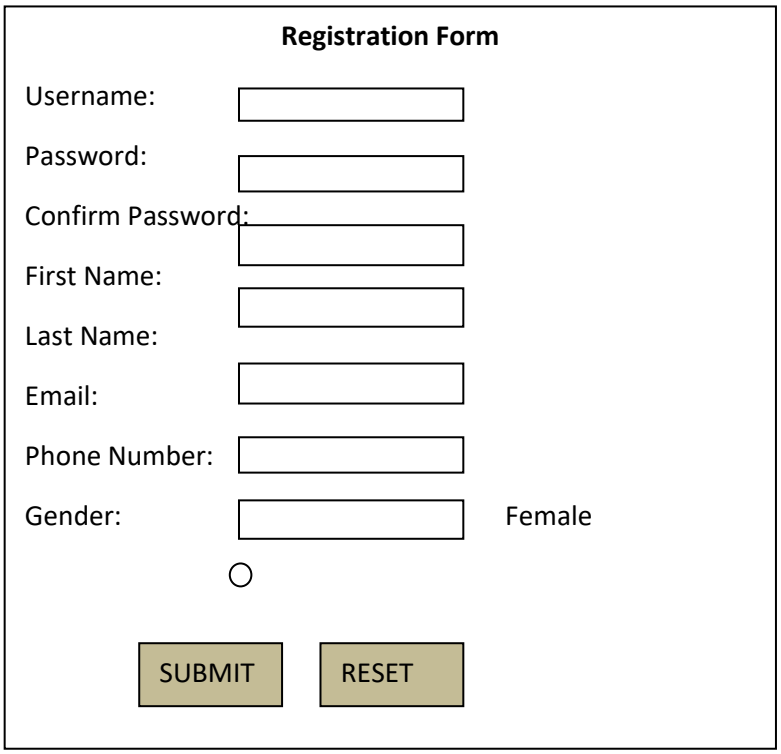
LAB SHEET- INTERNET BASICS AND HTML

1. Create an Email ID to
   a) Send an email
   b) Send an email to multiple participants
   c) Delete an email
   d) Email a picture
   e) Email a document
2. Create HTML document with following formatting – Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking text as well as marquee text.
3. Design a webpage that displays your information (Bio-data) using basic HTML Tags
4. Create HTML document and demonstrate Inserting Images, Internal and External linking
5. Create a table with the following data

Roll Number	Practical Marks		Total
	Internal	External	
4801	25	26	51
4802	24	25	49
4803	20	24	44

6. Design a webpage to print the following:
   A. Courses
      a. BCA
      b. BBA
      c. BSC IT
      d. BA
      e. BSC
      f. BMMMC
   B. Semester
      - First Semester
      - Second Semester
      - Third Semester
      - Fourth Semester
      - Fifth Semester
      - Sixth Semester
   C. Batch
      I. 2018
      II. 2019
      III. 2020
      IV. 2021

7. Write HTML code to demonstrate use of frames in a web page.
8. Write an HTML code to generate the following output


Registration Form
Username:
Password:
Confirm Password:
First Name:
Last Name:
Email:
Phone Number:
Gender:
Female
SUBMIT
RESET

BACHELORS WITH DIGITAL AND TECHNOLOGICAL SOLUTIONS AS VALUE ADDED COURSE
1st to 2nd SEMESTERS

DTS024V: DIGITAL AND TECHNOLOGICAL SOLUTIONS

CREDITS: 02

COURSE OBJECTIVES:

- *To gain familiarity with digital paradigms;*
- *To sensitize about role & significance of digital technology;*
- *To provide know how of communications & networks;*
- *To bring awareness about the e-governance and Digital India initiatives;*
- *To provide a flavour of emerging technologies - Cloud, Big Data, AI, 3D printing.*

COURSE OUTCOME:

- *Knowledge about digital paradigm;*
- *Realization of importance of digital technology, digital financial tools, e-commerce;*
- *Know-how of communication and networks;*
- *Familiarity with the e-governance and Digital India initiatives;*
- *An understanding of use & applications of digital technology;*
- *Basic knowledge of machine learning and big data.*

COURSE CONTENTS:

UNIT I

Introduction & Evolution of Digital Systems. Role & Significance of Digital Technology. Information & Communication Technology & Tools. Computer System & it's working, Software and its types. Operating Systems: Types and Functions. Problem Solving: Algorithms and Flowcharts.

Communication Systems: Principles, Model & Transmission Media. Computer Networks & Internet: Concepts & Applications, WWW, Web Browsers, Search Engines, Messaging, Email, Social Networking. Computer Based Information System: Significance & Types. E-commerce & Digital Marketing: Basic Concepts, Benefits & Challenges.

UNIT II

Digital India & e-Governance: Initiatives, Infrastructure, Services and Empowerment. Digital Financial Tools: Unified Payment Interface, Aadhar Enabled Payment System, USSD, Credit / Debit Cards, e-Wallets, Internet Banking, NEFT/RTGS and IMPS, Online Bill Payments and PoS. Cyber Security: Threats, Significance, Challenges, Precautions, Safety Measures, & Tools, legal and ethical perspectives.

Emerging Technologies & their applications: Overview of Cloud Computing, Big Data, Internet of Things, Virtual Reality, Blockchain & Cryptocurrency, Robotics, Machine Learning & Artificial Intelligence, 3-D Printing. Digital Signatures.

TEXT BOOK

- F S Masoodi, Z S Masoodi and K B Dar, Digital and Technological Solutions, BPB Publications.

REFERENCE BOOKS

- V. Rajaraman, Introduction to Information Technology, 3rd Edition, PHI;
- E Balagurusamy, Fundamentals of Computers, Tata Mc GrawHill;
- Behrouz A. Forouzan, Data Communications and Networking, McGraw Hill;
- Pramod Kumar, Anuradha Tomar, R. Sharmila, Emerging Technologies in Computing Theory, Practice, and Advances, Edition 2021, Chapman and Hall/CRC Imprint;
- Buvya, Broberg, and Gosciniski, Cloud Computing- Principals and Paradigms, Wiley
- Russel and Norving, Artificial Intelligence- A Modern Approach, Pearson Education;
- Samuel Greengard, Internet of Things, MIT Press;
- C.S.V. Murthy, E-commerce Concepts, Models, Strategies;
- Hurwith, Nugent Halper, Kaufman, Big Data for dummies, Wiley & Sons - Wiley.

SEMESTER 1st to 3rd
MULTI-DISCIPLINARY COURSE
CAP022I COMPUTER APPLICATIONS (INTRODUCTION TO COMPUTERS)

CREDITS: 3

COURSE OBJECTIVES

1. *To introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.*
2. *To provide hands-on use of Microsoft Office 2013 applications Word, Excel, Access and PowerPoint. Completion of the assignments will result in MS Office applications knowledge and skills.*
3. *To describe the organization and operation of a computer processor, primary and secondary memory, peripheral devices and to give computer specifications*

UNIT – I: COMPUTER BASICS

Introduction: Characteristics of Computer, Classification of Computers, Architecture and Chronology, Applications of Computer. Block Diagram of Computer.
Commonly used Terms: Hardware, Software, Firmware, Units of Measurement of Storage, Input/ Output Devices, Types of Memory, Generation of Computer Languages, and Introduction to Internet & E-Mail.

UNIT – II: OPERATING SYSTEM BASICS & GUI USING MS-WINDOWS.

Application Software and System Software, Open-Source Software and Proprietary Software.
Computer Languages and its types (Machine Language, Assembly Language, High Level Language) Translators, Compiler, Interpreter. Operating System and its functions.

UNIT –III: INTRODUCTION TO MS OFFICE

MS Word Basics: Basics of Word Processing, Text Selection, Opening Documents and Creating Documents, Saving Documents/Quitting Documents, Printing Documents. Using the Interface (Menu Toolbars), Editing Text (Copy, Delete, Move Etc.). Finding and replacing text. Special check Feature/ Auto correct Feature, Grammar check Facility, Formatting and Editing. Mail Merge, Bullets & Numbering, Borders and Shadings.

MS EXCEL BASIC:
Worksheet Workbook, Workspace Basics, Data Entry in cell, Entry of Numbers, Text and Formulate, Moving Data in the Worksheet, Selecting Data Range, Using the Interface (Toolbars, Menus), Editing basics, working with Workbooks Saving and Quitting, Cell Reference, Formatting, Editing.

MS POWER POINT BASICS:
Use of existing templates, fonts and drawing. Hands of MS PowerPoint, Creation of animated slides.

REFERENCE BOOKS:

1. Computer today, Donald H. Sanders, McGraw Hill Publishing Company.
2. Microcomputers Software and Applications, Dennis P. Curtin and Leslie R. Portel, PHI.
3. Data Processing: An Introduction, Donald P. Spencer and Charles R. Merril Pub. And Co.
4. Computers and Their Applications, Larry Joel Goldestein, PHI.
5. Windows-2000, kethy, Tata McGraw Hill Publishing Company.