

Scheme & Syllabus of Bachelor of Computer Applications (BCA)

Batch 2019 onwards



By

Board of Study Computer Applications

Department of Academics

IK Gujral Punjab Technical University

**I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)**

Bachelors of Computer Applications (BCA):

It is a Under Graduate (UG) Programme of 3 years duration (6 semesters)

Eligibility: All those candidates who have passed the 10+2 or its equivalent examination in any stream conducted by a recognized Board / University / Council.

Or

Those candidates who have passed their Matriculation examination **AND** have also passed three year Diploma in any Trade from Punjab State Board of Technical Education & Industrial Training, Chandigarh or such Examination from any other recognized State Board of Technical Education, or Sant Longowal Institute of Engineering & Technology, Longowal.

BCA (Lateral Entry): It is a Under Graduate (UG) Programme of 2 years duration (4 semesters)

Eligibility: All those candidates who have passed Matriculation examination **AND** have also passed 3 Year Diploma in any Trade from Punjab State Board of Technical Education & Industrial Training, Chandigarh or such Examination from any other recognized State Board of Technical Education, or Sant Longowal Institute of Engineering & Technology, Longowal.

Or

10+2 with 1 year Diploma in Computer Application / IT (or equivalent) from a recognized University with Mathematics as course at 10+2 or DIT / DCA level.

**I. K. Gujral Punjab Technical University
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PROGRAM OUTCOMES (POs)

Program: BCA

1. **Basic knowledge:** An ability to apply knowledge of basic mathematics, science and domain knowledge to solve the computational problems.
2. **Discipline knowledge:** An ability to apply discipline –specific knowledge to solve core and/or applied computational problems.
3. **Experiments and practice:** An ability to plan and perform experiments and practices and to use the results to solve computational problems.
4. **Tools Usage:** Apply appropriate technologies and tools with an understanding of limitations.
5. **Profession and society:** Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional practice.
6. **Environment and sustainability:** Understand the impact of the computational solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
7. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the professional practice.
8. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.
9. **Communication:** An ability to communicate effectively.
10. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

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First Semester

| Course Code | Course Type | Course Title | Load Allocation | | | Marks Distribution | | Total Marks | Credits |
|-------------|--|---|-----------------|----------|-----------|--------------------|------------|-------------|-----------|
| | | | L | T | P | Internal | External | | |
| UGCA1901 | Core Theory | Mathematics | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1902 | Core Theory | Fundamentals of Computer and IT | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1903 | Core Theory | Problem Solving using C | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1904 | Practical/Laboratory | Workshop on Desktop Publishing | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1905 | Core Practical/Laboratory | Problem Solving using C Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1906 | Core Practical/Laboratory | Fundamentals of Computer and IT Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| BTHU103/18 | Ability Enhancement Compulsory Course (AECC)-I | English | 1 | 0 | 0 | 40 | 60 | 100 | 1 |
| BTHU104/18 | Ability Enhancement Compulsory Course (AECC) | English Practical/Laboratory | 0 | 0 | 2 | 30 | 20 | 50 | 1 |
| HVPE101-18 | Ability Enhancement Compulsory Course (AECC) | Human Values, De-addiction and Traffic Rules | 3 | 0 | 0 | 40 | 60 | 100 | 3 |
| HVPE102-18 | Ability Enhancement Compulsory Course (AECC) | Human Values, De-addiction and Traffic Rules (Lab/ Seminar) | 0 | 0 | 1 | 25 | --** | 25 | 1 |
| BMPD102-18 | | Mentoring and Professional Development | 0 | 0 | 1 | 25 | --** | 25 | 1 |
| | TOTAL | | 13 | 3 | 16 | 460 | 440 | 900 | 25 |

****The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only. (See guidelines at the last page of this file)**

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Second Semester

| Course Code | Course Type | Course Title | Load Allocation | | | Marks Distribution | | Total Marks | Credits |
|-------------|---|--|-----------------|----------|-----------|--------------------|------------|-------------|-----------|
| | | | L | T | P | Internal | External | | |
| UGCA1907 | Core Theory | Fundamentals of Statistics | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1908 | Core Theory | Computer System Architecture | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1909 | Core Theory | Object Oriented Programming using C++ | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1910 | Core Practical/Laboratory | Object Oriented Programming using C++ Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1911 | Core Practical/Laboratory | Fundamentals of Statistics Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1912 | Core Practical/Laboratory | Computer System Architecture Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| EVS102-18 | Ability Enhancement Compulsory Course (AECC) -III | Environmental Studies | 2 | 0 | 0 | 40 | 60 | 100 | 2 |
| BMPD202-18 | | Mentoring and Professional Development | 0 | 0 | 1 | 25 | -- | 25 | 1 |
| | TOTAL | | 11 | 3 | 13 | 365 | 360 | 725 | 21 |

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Third Semester

| Course Code | Course Type | Course Title | Load Allocation | | | Marks Distribution | | Total Marks | Credits |
|-------------|--------------------------------------|--|-----------------|----------|-----------|--------------------|------------|-------------|-----------|
| | | | L | T | P | Internal | External | | |
| UGCA1913 | Core Theory | Computer Networks | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1914 | Core Theory | Programming in Python | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1915 | Core Theory | Data Structures | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1916 | Core Practical/Laboratory | Computer Networks Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1917 | Core Practical/Laboratory | Programming in Python Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1918 | Core Practical/Laboratory | Data Structures Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1919 | Skill Enhancement Course-I | PC Assembly & Troubleshooting | 3 | 0 | 0 | 40 | 60 | 100 | 3 |
| UGCA1920 | Skill Enhancement Course- Laboratory | PC Assembly & Troubleshooting Laboratory | 0 | 0 | 2 | 30 | 20 | 50 | 1 |
| BMPD302-18 | | Mentoring and Professional Development | 0 | 0 | 1 | 25 | -- | 25 | 1 |
| | TOTAL | | 12 | 3 | 15 | 395 | 380 | 775 | 23 |

Fourth Semester

| Course Code | Course Type | Course Title | Load Allocation | | | Marks Distribution | | Total Marks | Credits |
|-------------|--------------------------------------|--|-----------------|---|---|--------------------|----------|-------------|---------|
| | | | L | T | P | Internal | External | | |
| UGCA1921 | Core Theory | Software Engineering | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1922 | Core Theory | Database Management Systems | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1923 | Core Theory | Operating Systems | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| UGCA1924 | Core Practical/Laboratory | Software Engineering Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1925 | Core Practical/Laboratory | Database Management Systems Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1926 | Core Practical/Laboratory | Operating Systems Laboratory | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| UGCA1927 | Skill Enhancement Course-II | Web Designing | 3 | 0 | 0 | 40 | 60 | 100 | 3 |
| UGCA1928 | Skill Enhancement Course- Laboratory | Web Designing Laboratory | 0 | 0 | 2 | 30 | 20 | 50 | 1 |

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|------------|--------------|--|-----------|-----------|-----------|------------|------------|------------|-----------|
| BMPD402-18 | | Mentoring and Professional Development | 0 | 0 | 1 | 25 | -- | 25 | 1 |
| | TOTAL | | 12 | 03 | 15 | 395 | 380 | 775 | 23 |

Students will undergo 4 weeks Institutional Summer Training* after 4th semester. Examination will be conducted along with 5th semester practical.

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Course Code: UGCA1901

Course Name: Mathematics

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 1 st | Contact hours: 44 hours |
| Internal max. marks: 40 | Theory/Practical: Theory |
| External max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: core/elective: Core |

Prerequisite: Student must have the knowledge of Basic Mathematics.

Co requisite: NA.

Additional material required in ESE: Minimum two exercises of each concept will be recorded in the file and the file will be submitted in End Semester Examinations.

Course Outcomes: After studying this course, students will be able to:

| CO# | Course Outcomes |
|------------|---|
| CO1 | Represent data using various mathematical notions. |
| CO2 | Explain different terms used in basic mathematics. |
| CO3 | Describe various operations and formulas used to solve mathematical problems. |

| Detailed contents | Contact hours |
|--|----------------------|
| <p><u>Unit-I</u> Set Introduction, Objectives, Representation of Sets (Roster Method, Set Builder Method), Types of Sets (Null Set, Singleton Set, Finite Set, Infinite Set, Equal Set, Equivalent Set, Disjoint Set, Subset, Proper Subset, Power Set, Universal Set) and Operation with Sets (Union of Set, Intersection of Set, Difference of Set, Symmetric Difference of Set) Universal Sets, Complement of a Set.</p> | 12 hours |
| <p><u>Unit-II</u> Logic Statement, Connectives, Basic Logic Operations (Conjunction, Disjunction, Negation) Logical Equivalence/Equivalent Statements, Tautologies and Contradictions.</p> | 10 hours |
| <p><u>Unit -III</u> Matrices Introduction, Types of Matrix (Row Matrix, Column Matrix, Rectangular Matrix, Square Matrix, Diagonal Matrix, Scalar Matrix, Unit Matrix, Null Matrix, Comparable Matrix, Equal Matrix), Scalar Multiplication,</p> | 12 hours |

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| Negative of Matrix, Addition of Matrix, Difference of two Matrix, Multiplication of Matrices, Transpose of a Matrix. | |
| Unit-IV Progressions Introduction, Arithmetic Progression, Sum of Finite number of quantities in A.P, Arithmetic Means, Geometric Progression, Geometric Mean. | 10 hours |

Text Books:

1. Discrete Mathematics and Its Applications by Kenneth H. Rosen, Mc Graw Hill, 6th Edition.
2. College Mathematics, Schaum's Series, TMH.

Reference Books:

1. Elementary Mathematics, Dr. RD Sharma
2. Comprehensive Mathematics, Parmanand Gupta
3. Elements of Mathematics, ML Bhargava

E Books/ Online learning material

1. www.see.leeds.ac.uk/geo-maths/basic_maths.pdf
2. www.britannica.com/science/matrix-mathematics
3. www.pdfdrive.com/schaums-outline-of-discrete-mathematics-third-edition-schaums-e6841453.html

Course Code: UGCA1902

Course Name: Fundamentals of Computer and IT

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 1 st | Contact hours: 44 hours |
| Internal max. marks: 40 | Theory/Practical: Theory |
| External max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|-----|-----------------|
|-----|-----------------|

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|-----|--|
| CO1 | Understanding the concept of input and output devices of Computers |
| CO2 | Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices. |
| CO3 | Understand an operating system and its working, and solve common problems related to operating systems |
| CO4 | Learn basic word processing, Spreadsheet and Presentation Graphics Software skills. |
| CO5 | Study to use the Internet safely, legally, and responsibly |

| Detailed Contents | Contact hours |
|--|---------------|
| <p>Unit-I</p> <p>Human Computer Interface Concepts of Hardware and Software; Data and Information.</p> <p>Functional Units of Computer System: CPU, registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.</p> <p>Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter.</p> <p>Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks.</p> <p>Data Representation: Bit, Byte, Binary, Decimal, Hexadecimal, and Octal Systems, Conversions and Binary Arithmetic (Addition/ Subtraction/ Multiplication) Applications of IT.</p> | 12 |
| <p>Unit-II</p> <p>Concept of Computing, Types of Languages: Machine, assembly and High level Language; Operating system as user interface, utility programs.</p> <p>Word processing: Editing features, formatting features, saving, printing, table handling, page settings, spell-checking, macros, mail-merge, equation editors.</p> | 10 |
| <p>Unit-III</p> <p>Spreadsheet: Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using</p> | 10 |

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| formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs. Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows. | |
| Unit-IV Electronic Payment System: Secure Electronic Transaction, Types of Payment System: Digital Cash, Electronic Cheque, Smart Card, Credit/Debit Card E-Money, Bit Coins and Crypto currency, Electronic Fund Transfer (EFT), Unified Payment Interface (UPI), Immediate Payment System (IMPS), Digital Signature and Certification Authority. Introduction to Bluetooth, Cloud Computing, Big Data, Data Mining, Mobile Computing and Embedded Systems and Internet of Things (IoT) | 12 |

Text Books:

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education
2. Computer Fundamentals, A. Goel, 2010, Pearson Education.
3. Fundamentals of Computers, P. K.Sinha & P. Sinha, 2007, BPB Publishers.
4. IT Tools, R.K. Jain, Khanna Publishing House
5. "Introduction to Information Technology", Satish Jain, Ambrish Rai & Shashi Singh, Paperback Edition, BPB Publications, 2014.

Reference Books:

1. "Introduction to Computers", Peter Norton
2. Computers Today, D. H. Sanders, McGraw Hill.
3. "Computers", Larry long & Nancy long, Twelfth edition, Prentice Hall.
4. Problem Solving Cases in Microsoft Excel, Joseph Brady & Ellen F Monk, Thomson Learning

E Books/ Online learning material

1. www.sakshat.ac.in
 2. <https://swayam.gov.in/course/4067-computer-fundamentals>
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**I. K. Gujral Punjab Technical University
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Course Code: UGCA1903

Course Name: Problem Solving using C

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 1 st | Contact hours: 44 hours |
| Internal max. marks: 40 | Theory/Practical: Theory |
| External max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|------------|---|
| CO1 | Student should be able to understand the logic building used in Programming. |
| CO2 | Students should be able to write algorithms for solving various real life problems. |
| CO3 | To convert algorithms into programs using C . |

| Detailed Contents | Contact hours |
|---|----------------------|
| <p>Unit-I</p> <p>Logic Development: Data Representation, Flowcharts, Problem Analysis, Decision Trees/Tables, Pseudo code and algorithms. Fundamentals: Character set, Identifiers and Key Words, Data types, Constants, Variables, Expressions, Statements, Symbolic Constants.</p> <p>Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, Library functions.</p> | 11 |
| <p>Unit-II</p> <p>Data Input and Output: formatted & unformatted input output.</p> <p>Control Statements: While, Do-while and For statements, Nested loops, If-else, Switch, Break – Continue statements.</p> | 10 |
| <p>Unit-III</p> | 11 |

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| <p>Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.</p> <p>Arrays: Defining, processing arrays, passing arrays to a function, multi-dimensional arrays.</p> <p>Strings: String declaration, string functions and string manipulation Program Structure Storage Class: Automatic, external and static variables.</p> | |
| <p>Unit-IV</p> <p>Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, unions.</p> <p>Pointers: Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer, Pointers and Arrays</p> <p>File Handling: File Operations, Processing a Data File</p> | 12 |

Text Books:

1. Programming in ANSI C, E. Balagurusami, Fourth Edition, Tata McGraw Hill.
2. Programming in C, Third Edition, Stephen G Kochan, Pearson.
3. The C Programming Language, Kernighan & Richie, Second Edition, PHI Publication.

Reference Books:

1. Object Oriented Programming, Lafore R, Third Edition, Galgotia Publications
2. Let us C, Yashvant P Kanetkar, Seventh Edition, BPB Publications, New Delhi.
3. Programming in C, Byron S. Gottfried, Second Edition, McGraw Hills.
4. Problem Solving and Programming in C, R.S. Salaria, Second Edition
5. Programming in C, Atul Kahate.

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Course Code: UGCA1904

Course Name: Workshop on Desktop Publishing

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 1 st | Contact hours: 4 hours per week |
| Internal max. marks: 60 | Theory/Practical: Practical |
| External max. marks: 40 | Duration of end semester examinations (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: Students must have basic understanding of designing/ Painting tools.

Co requisite: Printing & Publishing tools.

Additional material required in ESE: Softcopy & Hardcopy of the exercises are to be maintained during the practical labs and to be submitted during the End Semester Examinations.

Course Outcomes: After studying this course, students will be able to:

| CO# | Course outcomes |
|------------|--|
| CO1 | The students will gain professional skills of <i>Desk Top Publishing</i> Tools like designing, Printing & Publishing by using various tools. |
| CO2 | Develop skills in printing jobs through basic understanding of a variety of designing tools. |
| CO3 | Apply these concepts and knowledge in designing field including practice from text formatting to final publishing. |
| CO4 | Workshops are included to enhance professional skills like Brochures, Flexes, Business Cards, Certificates and News Letter layouts etc. |

Instructions: Instructor can increase/decrease the experiments as per the requirement.

Assignments:

| | |
|----|---|
| 1. | Design and print a <i>Title Page</i> of a Magazine/Book. |
| 2. | Prepare multiple designs for a <i>Flex</i> by using different Tools. |
| 3. | Prepare <i>NSS Certificates</i> for appreciation using logos of University, College & NSS unit. |
| 4. | Prepare 5 different Designing of <i>Business Cards</i> . |
| 5. | Prepare <i>Envelops</i> displaying full address of the company by inserting graphical symbol/ logos of company. |
| 6. | Design and Print <i>Invoices</i> for three companies. |
| 7. | Prepare and print <i>News Letter Layouts</i> for any five activities of your college/ university. |
| 8. | Prepare <i>Invitation Cards</i> for cultural meet held in your college. |

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| 9. | Design and print <i>Brochures</i> to advertise a “Blood Donation Camp” in your college. |
| 10. | Design <i>Logos</i> of your college, University & Govt. of Punjab also display these logos on black background as water mark. |
| 11. | Design, Print and Publish 5 motivations Playcards. |
| 12. | Design & Print assignment book of minimum 20 Pages an any Topic. |
| 13. | Design & Print any five most important activities of your college in a collage. |
| 14. | Design & Print Question Paper of any Subject. |
| 15. | Assemble all the latest news cutting of your activities on a 10 X 8 size flex. |

Reference Books:

1. DTP Course, by Shirish Chavan published by Rapidex.
2. DTP Course Kit by Vikas Gupta published by Comdex.
3. CorelDraw 9 by David Karlins published by Techmedia.
4. Adobe Illustrator CC by Brian Wood published by Adobe Press.
5. Page Maker in Easy Steps - Scott Basham.

Software Tools:

1. Adobe Illustrator 14.
 2. CorelDraw Graphics Suit.
 3. GNU image manipulation program.
 4. Ink Scape.
 5. PhotoScape Setup.
 6. PM701.
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**I. K. Gujral Punjab Technical University
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Course Code: UGCA1905

Course Name: Problem Solving using C Laboratory

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 1 st | Contact hours: 4 hours per week |
| Internal max. marks: 60 | Theory/Practical: Practical |
| External max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course Outcomes |
|------------|--|
| CO1 | Students should be able understand the logic building used in programming |
| CO2 | Students should be able to write algorithms for solving various real-life problems |
| CO3 | Students should be able to convert the algorithms into computer programs using C language. |

Instructions: Develop all programs in C programming language.

Assignments:

| | |
|-----|--|
| 1. | WRITE A PROGRAM to display your name. Write another program to print message with inputted name. |
| 2. | WRITE A PROGRAM to add two numbers. |
| 3. | WRITE A PROGRAM to find the square of a given number. |
| 4. | WRITE A PROGRAM to calculate the average of three real numbers. |
| 5. | Write a program to Find ASCII Value of a Character |
| 6. | WRITE A PROGRAM to Find the Size of int, float, double and char |
| 7. | WRITE A PROGRAM to Compute Quotient and Remainder |
| 8. | WRITE A PROGRAM to accept the values of two variables. |
| 9. | WRITE A PROGRAM to find the simple interest, inputs are amount, period in years and rate of interest. |
| 10. | Basic salary of an employee is input through the keyboard. The DA is 25% of the basic salary while the HRA is 15% of the basic salary. Provident Fund is deducted at the rate of 10% of the gross salary(BS+DA+HRA). WRITE A PROGRAM to calculate the net salary |
| 11. | WRITE A PROGRAM to find area of a circle using PI as constant |
| 12. | WRITE A PROGRAM to find volume of a cube using side as input from user |
| 13. | WRITE A PROGRAM using various unformatted Input Functions |

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|-----|---|
| 14. | WRITE A PROGRAM to find area of rectangle and print the result using unformatted output Functions |
| 15. | WRITE A PROGRAM to find the larger of two numbers. |
| 16. | WRITE A PROGRAM to find greater of three numbers using Nested If. |
| 17. | WRITE A PROGRAM to find whether the given number is even or odd. |
| 18. | WRITE A PROGRAM to Generate Multiplication Table Using for loop |
| 19. | WRITE A PROGRAM to Generate Multiplication Table Using while loop |
| 20. | WRITE A PROGRAM to Make a Simple Calculator Using switch...case |
| 21. | WRITE A PROGRAM to find whether the given number is a prime number. |
| 22. | WRITE A PROGRAM using function to find the largest of three numbers |
| 23. | WRITE A PROGRAM using function to print first 20 numbers and its squares. |
| 24. | WRITE A PROGRAM to find the factorial of a given number. |
| 25. | WRITE A PROGRAM to print the sum of two matrices |
| 26. | WRITE A PROGRAM to Find the Length of a String |
| 27. | WRITE A PROGRAM to Copy String using strcpy() |
| 28. | WRITE A PROGRAM to compare a string |
| 29. | WRITE A PROGRAM to reverse a string |
| 30. | WRITE A PROGRAM to reverse a string |
| 31. | WRITE A PROGRAM to multiply two numbers using pointers. |
| 32. | WRITE A PROGRAM to display address of variable using pointers |
| 33. | WRITE A PROGRAM to show the memory occupied by Structure and Union |
| 34. | WRITE A PROGRAM to create Student I-Card using a Structure |
| 35. | WRITE A PROGRAM to read data from a file from a file |
| 36. | WRITE A PROGRAM to save Employee details in a file using File Handling |

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Course Code: UGCA1906

Course Name: Fundamentals of Computer and IT Laboratory

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|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 1 st | Contact hours: 4 hours per week |
| Internal max. marks: 60 | Theory/Practical: Practical |
| External max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: - NA-

Course Outcomes:

| CO# | Course outcomes |
|------------|--|
| CO1 | Familiarizing with Open Office (Word processing, Spreadsheets and Presentation). |
| CO2 | To acquire knowledge on editor, spread sheet and presentation software. |
| CO3 | The students will be able to perform documentation and accounting operations. |
| CO4 | Students can learn how to perform presentation skills. |

Instructions:

| | |
|---|---|
| Word Orientation: | |
| The instructor needs to give an overview of word processor. Details of the four tasks and features that would be covered Using word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter. | |
| 1. | Using word to create Resume Features to be covered: - Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word. |
| 2. | Creating an Assignment Features to be covered: - Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes. |
| 3. | Creating a Newsletter Features to be covered :- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs |
| 4. | Creating a Feedback form Features to be covered :- Forms, Text Fields, Inserting objects, Mail Merge in Word. |
| Excel Orientation: | |

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| The instructor needs to tell the importance of Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered Excel – Accessing, overview of toolbars, saving excel files, | |
| 1. | Creating a Scheduler Features to be covered :- Gridlines, Format Cells, Summation, auto fill, Formatting Text |
| 2. | Calculations Features to be covered :- Cell Referencing, Formulae in excel – average, std.deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP |
| 3. | Performance Analysis Features to be covered :- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting |
| 4. | Game (like Cricket, badminton) Score Card Features to be covered :- Pivot Tables, Interactive Buttons, Importing Data, Data Protection, Data Validation |
| Presentation Orientation: | |
| 1. | Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows |
| 2. | This session helps students in making their presentations interactive. Topics covered includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts |
| 3. | Concentrating on the in and out of Microsoft power point. Helps them learn best practices in designing and preparing power point presentation. Topics covered includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides. Auto content wizard, Slide Transition, Custom Animation, Auto Rehearsing |
| 4. | Power point test would be conducted. Students will be given model power point presentation which needs to be replicated |
| Internet and its Applications | |
| The instructor needs to tell the how to configure Web Browser and to use search engines by defining search criteria using Search Engines | |
| 1. | To learn to setup an e-mail account and send and receive e-mails |
| 2. | To learn to subscribe/post on a blog and to use torrents for accelerated downloads |
| 3. | Hands on experience in online banking and Making an online payment for any domestic bill |

Reference Books:

1. IT Tools, R.K. Jain, Khanna Publishing House.

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2. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education.
 3. Introduction to information technology, Turban, Rainer and Potter, John Wiley and Sons.
 4. Problem Solving Cases in Microsoft Excel, Joseph Brady & Ellen F Monk, Thomson Learning.
-

**AECC (For UGC courses)
BTHU103-18 English:**

Course Outcomes:

- The objective of this course is to introduce students to the theory, fundamentals and tools of communication.
- To help the students become the independent users of English language.
- To develop in them vital communication skills which are integral to their personal, social and professional interactions.
- The syllabus shall address the issues relating to the Language of communication.
- Students will become proficient in professional communication such as interviews, group discussions, office environments, important reading skills as well as writing skills such as report writing, note taking etc.

The recommended readings given at the end are only suggestive; the students and teachers have the freedom to consult other materials on various units/topics given below. Similarly, the questions in the examination will be aimed towards assessing the skills learnt by the students rather than the textual content of the recommended books.

Detailed Contents:

Unit1- 1 (Introduction)

- Theory of Communication
- Types and modes of Communication

Unit- 2 (Language of Communication)

- Verbal and Non-verbal
- (Spoken and Written)
- Personal, Social and Business
- Barriers and Strategies
- Intra-personal, Inter-personal and Group communication

Unit-3 (Reading and Understanding)

- Close Reading
- Comprehension
- Summary Paraphrasing

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- Analysis and Interpretation
- Translation (from Hindi/Punjabi to English and vice-versa)

OR

Precis writing /Paraphrasing (for International Students)

- Literary/Knowledge Texts

Unit-4 (Writing Skills)

- Documenting
- Report Writing
- Making notes
- Letter writing

Recommended Readings:

1. *Fluency in English* - Part II, Oxford University Press, 2006.
 2. *Business English*, Pearson, 2008.
 3. *Language, Literature and Creativity*, Orient Blackswan, 2013.
 4. *Language through Literature* (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas
 5. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
 6. *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
-

**AECC
BTHU104/18 English Practical/Laboratory
: 0L 0T 2P 1 Credit**

Course Outcomes:

- The objective of this course is to introduce students to the theory, fundamentals and tools of communication.
- To help the students become the independent users of English language.
- To develop in them vital communication skills which are integral to personal, social and professional interactions.
- The syllabus shall address the issues relating to the Language of communication.
- Students will become proficient in professional communication such as interviews, group discussions and business office environments, important reading skills as well as writing skills such as report writing, note taking etc.

The recommended readings given at the end are only suggestive; the students and teachers have the freedom to consult other materials on various units/topics given below. Similarly, the questions in the examination will be aimed towards assessing the skills learnt by the students rather than the textual content of the recommended books.

Interactive practice sessions in Language Lab on Oral Communication

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- Listening Comprehension
- Self Introduction, Group Discussion and Role Play
- Common Everyday Situations: Conversations and Dialogues
- Communication at Workplace
- Interviews
- Formal Presentations
- Monologue
- Effective Communication/ Mis- Communication
- Public Speaking

Recommended Readings:

1. *Fluency in English* - Part II, Oxford University Press, 2006.
 2. *Business English*, Pearson, 2008.
 3. *Practical English Usage*. Michael Swan. OUP. 1995.
 4. *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
 5. *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
-

Course Code: HVPE101-18

Course Name: Human Values, De-addiction and Traffic Rules

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 0 P: 0 |
| Branch: Computer Applications | Credits: 3 |
| Semester: 1 st | Contact hours: 33 hours |
| Internal max. marks: 40 | Theory/Practical: Theory |
| External max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Ability Enhancement |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|------------|--|
| CO1 | To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings. |

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| | |
|-----|---|
| CO2 | To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way. |
| CO3 | To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature. |

Note: This course is intended to provide a much needed orientational input in Value Education to the young enquiring minds.

| Detailed Contents | Contact hours |
|--|---------------|
| <p>Unit-I</p> <p>Course Introduction - Need, Basic Guidelines, Content and Process for Value Education</p> <ol style="list-style-type: none"> 1. Understanding the need, basic guidelines, content and process for Value Education 2. Self-Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration 3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority 5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario 6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels | 8 |
| <p>Unit-II</p> <p>Understanding Harmony in the Human Being - Harmony in Myself!</p> <ol style="list-style-type: none"> 1. Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’ 2. Understanding the needs of Self (‘I’) and ‘Body’ - <i>Sukh</i> and <i>Suvidha</i> 3. Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer) 4. Understanding the characteristics and activities of ‘I’ and harmony in ‘I’ | 8 |

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| | |
|---|---|
| <p>5. Understanding the harmony of I with the Body: <i>Sanyam</i> and <i>Swasthya</i>; correct appraisal of Physical needs, meaning of Prosperity in detail</p> <p>6. Programs to ensure <i>Sanyam</i> and <i>Swasthya</i> - Practice Exercises and Case Studies will be taken up in Practice Sessions.</p> | |
| <p>Unit-III</p> <p>Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship</p> <p>1. Understanding harmony in the Family- the basic unit of human interaction</p> <p>2. Understanding values in human-human relationship; meaning of <i>Nyaya</i> and program for its fulfillment to ensure <i>Ubhay-tripti</i>; Trust (<i>Vishwas</i>) and Respect (<i>Samman</i>) as the foundational values of relationship</p> <p>3. Understanding the meaning of <i>Vishwas</i>; Difference between intention and competence</p> <p>4. Understanding the meaning of <i>Samman</i>, Difference between respect and differentiation; the other salient values in relationship</p> <p>5. Understanding the harmony in the society (society being an extension of family): <i>Samadhan</i>, <i>Samridhi</i>, <i>Abhay</i>, <i>Sah-astitva</i> as comprehensive Human Goals</p> <p>6. Visualizing a universal harmonious order in society- Undivided Society (<i>Akhand Samaj</i>), Universal Order (<i>Sarvabhaum Vyawastha</i>)- from family to world family! - Practice Exercises and Case Studies will be taken up in Practice Sessions.</p> | 6 |
| <p>Unit-IV</p> <p>Understanding Harmony in the Nature and Existence - Whole existence as Co-existence</p> <p>1. Understanding the harmony in the Nature</p> <p>2. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature</p> <p>3. Understanding Existence as Co-existence (<i>Sah-astitva</i>) of mutually interacting units in all-pervasive space</p> <p>4. Holistic perception of harmony at all levels of existence - Practice Exercises and Case Studies will be taken up in Practice Sessions.</p> | 5 |
| <p>Unit-V</p> | 6 |

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| | |
|---|--|
| <p>Implications of the above Holistic Understanding of Harmony on Professional Ethics</p> <ol style="list-style-type: none">1. Natural acceptance of human values2. Definitiveness of Ethical Human Conduct3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order4. Competence in professional ethics:<ol style="list-style-type: none">a) Ability to utilize the professional competence for augmenting universal human order,b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,c) Ability to identify and develop appropriate technologies and management patterns for above production systems.5. Case studies of typical holistic technologies, management models and production systems6. Strategy for transition from the present state to Universal Human Order:<ol style="list-style-type: none">a) At the level of individual: as socially and ecologically responsible engineers, technologists and managersb) At the level of society: as mutually enriching institutions and organizations. | |
|---|--|

Text Book

1. R R Gaur, R Sangal, G P Bagaria, 2009, *A Foundation Course in Value Education*.

Reference Books

1. Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and Harper Collins, USA.
2. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
3. A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991.
5. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Common wealth Publishers.
6. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.
7. Subhas Palekar, 2000, *How to practice Natural Farming*, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limits to Growth – Club of Rome’s report*, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers*, Oxford University Press

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10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including Human Values)*, Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, *Foundations of Ethics and Management*, Excel Books.
12. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, <http://uhv.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, *An Inconvenient Truth*, Paramount Classics, USA
4. Charlie Chaplin, *Modern Times*, United Artists, USA
5. IIT Delhi, *Modern Technology – the Untold Story*

Course Code: HVPE102-18

Course Name: Human Values, De-addiction and Traffic Rules (Lab/ Seminar)

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 1 |
| Branch: Computer Applications | Credits: 1 |
| Semester: 1 st | Contact hours: 1 hour per week |
| Internal max. marks: 25 | Theory/Practical: Practical |
| External max. marks: 0 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 25 | Elective status: Ability Enhancement |

One each seminar will be organized on Drug De-addiction and Traffic Rules. Eminent scholar and experts of the subject will be called for the Seminar at least once during the semester. It will be binding for all the students to attend the seminar.

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Course Code: UGCA1907

Course Name: Fundamentals of Statistics

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 2 nd | Contact hours: 44 hours |
| Internal max. marks: 40 | Theory/Practical: Theory |
| External max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: Students must have the basic knowledge of mathematic terms.

Co requisite: NA

Additional material required in ESE: Minimum two exercises of each concept will be recorded in the file and the file will be submitted in End Semester Examinations.

Course Outcomes: After studying this course, students will be able to:

| CO# | Course Outcomes |
|------------|---|
| CO1 | Understand the science of studying & analyzing numbers. |
| CO2 | Identify and use various visualization tools for representing data. |
| CO3 | Describe various statistical formulas. |
| CO4 | Compute various statistical measures. |

| Detailed Contents | Contact hours |
|--|----------------------|
| <p>Unit I</p> <p>Statistics and Probability: Introduction to Statistics – Origin of Statistics, Features of Statistics, Scope of Statistics, Functions of Statics, Uses and importance of Statistics, Limitation of Statistics, Distrust of Statistics</p> <p>Collection of Data: Introduction to Collection of Data, Primary and Secondary Data, Methods of Collecting Primary Data, Methods of Secondary Data, Statistical Errors, Rounding off Data (Approximation).</p> | 8 hours |
| <p>Unit II</p> <p>Classification of Data Frequency Distribution: Introduction Classification of Data, Objectives of Classification, Methods of Classification, Ways to Classify Numerical Data or Raw Data.</p> <p>Tabular, Diagrammatic and Graphic Presentation of Data: Introduction to Tabular Presentation of Data, Objectives of</p> | 12 hours |

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| | |
|--|----------|
| <p>Tabulation, Components of a Statistical Table, General Rules for the Construction of a Table, Types of Tables, Introduction to Diagrammatic Presentation of Data, Advantage and Disadvantage of Diagrammatic Presentation, Types of Diagrams, Introduction to Graphic Presentation of Data, Advantage and Disadvantage of Graphic Presentation, Types of Graphs.</p> | |
| <p>Unit III Measures of Central tendency: Introduction to Central Tendency, Purpose and Functions of Average, Characteristics of a Good Average, Types of Averages, Meaning of Arithmetic Mean, Calculation of Arithmetic Mean, Merit and Demerits of Arithmetic Mean, Meaning of Median, Calculation of Median, Merit and Demerits of Median, Meaning of Mode, Calculation of Mode, Merit and Demerits of Mode, Harmonic Mean- Properties- Merit and Demerits.</p> | 12 hours |
| <p>Unit IV Measures of Dispersion: Meaning of Dispersion, Objectives of Dispersion, Properties of a good Measure of Dispersion, Methods of Measuring Dispersion, Range Introduction, Calculation of Range , Merit and Demerits of Range, Mean Deviation, Calculation of Mean Deviation , Merit and Demerits of Mean Deviation, Standard Deviation Meaning, Calculation of Standard Deviation , Merit and Demerits of Standard Deviation, Coefficient of Variation, Calculation of Coefficient Variance, Merit and Demerits of Coefficient of Variation.</p> | 12 hours |

Text Books:

1. Statistics and Data Analysis, A.Abebe, J. Daniels, J.W.Mckean, December 2000.
2. Statistics, Tmt. S. EzhilarasiThiru, 2005, Government of Tamilnadu.
3. Introduction to Statistics, David M. Lane.
4. Weiss, N.A., Introductory Statistics. Addison Wesley, 1999.
5. Clarke, G.M. & Cooke, D., A Basic course in Statistics. Arnold, 1998.

Reference Books:

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1. Banfield J.(1999), Rweb: Web-based Statistical Analysis, Journal of Statistical Software.
2. Bhattacharya,G.K. and Johnson, R.A.(1977), Statistical Concepts and Methods, New York, John Wiley & Sons.

E-Books/ Online learning material

1. http://onlinestatbook.com/Online_Statistics_Education.pdf
2. <https://textbookcorp.tn.gov.in/Books/12/Std12-Stat-EM.pdf>
3. <https://3lihandam69.files.wordpress.com/2015/10/introductorystatistics.pdf>

Course Code: UGCA1908

Course Name: Computer System Architecture

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 2 nd | Contact hours: 44 hours |
| Internal max. marks: 40 | Theory/Practical: Theory |
| External max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: Basics of Information Technology

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|-----|--|
| CO1 | Know about the basic functioning of various parts of computer system from hardware point of view and interfacing of various peripheral devices used with the system. |
| CO2 | Learn number system and various types of micro-operations of processor. |
| CO3 | Learn the communication of various components through common bus. |
| CO4 | Learn how to design Combinational & Sequential circuits |

| Detailed Contents | Contact hours |
|--|---------------|
| <p>Unit-I</p> <p>Logic Gates: AND, OR, NOT, NAND, NOR, XOR, XNOR, NAND & NOR as Universal Gates, Logic Gates Applications.</p> <p>Boolean Algebra: Introduction, Theorems, Simplification of Boolean Expression using Boolean Algebra, SOP & POS Forms, Realization of Boolean Expression using Gates, K-Maps, Simplification of Boolean Expression using K-Maps.</p> | 12 |

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| | |
|---|----|
| <p>Unit-II</p> <p>Combinational Logic Circuits: Half Adder & Half Subtractor, Full Adder & Full Subtractor, Parallel Binary Adder, Binary Adder/Subtractor.</p> <p>Combinational Logic Circuits: Multiplexers & Demultiplexers, Implementation of Boolean equations using Multiplexer and Demultiplexer, Encoders & Decoders.</p> | 12 |
| <p>Unit-III</p> <p>Sequential Logic Circuits: Latch, Flip Flops- R-S Flip-Flop, J-K Flip-Flop, Race Around Condition, Removing Race Around Condition, Master-Slave J-K Flip-Flop, D Flip-Flop, T Flip-Flop, Applications of Flip-Flops.</p> | 8 |
| <p>Unit-IV</p> <p>Introduction to Computer Organization: Introduction to Computer and CPU (Computer Organization, Computer Design and Computer Architecture), Stored Program Concept- Von Neumann Architecture, Harvard Architecture, RISC and CISC Architecture.</p> <p>Register Transfer and Micro operations- Introduction to Registers, Instruction Format, Types of Instructions- Memory Reference Instructions, Register Reference Instructions and Input-Output Instructions.</p> <p>Common Bus System: Introduction to Common Bus System, Types of Buses (Data Bus, Control Bus, Address Bus), 16-bit Common Bus System--Data Movement among registers using Bus.</p> | 12 |

Text Books:

1. Computer System Architecture, M.M. Mano, Third Edition, PHI.
2. Digital Computer Electronics, Malvino, Second Edition, Mc-Graw Hill.
3. Modern Digital Electronics, R. P. Jain, Fourth Edition, TMH.

Reference Books:

1. Computer Organization and Architecture, Stallings, Eighth Edition, PHI.
2. Computer Organization and Architecture, J.P.Hayes, Third Edition, TMH.
3. Digital and Electronic Circuits, T. C. Bartee, McGraw Hill.
4. Digital Fundamentals, Floyd, Ninth Edition, PHI.

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5. Digital Integrated Electronics, Taub & Schilling, Eighth Edition, Mc-Graw Hill.

Course Code: UGCA1909

Course Name: Object Oriented Programming using C++

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 2 nd | Contact hours: 44 hours |
| Internal max. marks: 40 | Theory/Practical: Theory |
| External max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|------------|---|
| CO1 | To learn programming from real world examples. |
| CO2 | To understand Object oriented approach for finding Solutions to various problems with the help of C++ language. |
| CO3 | To create computer based solutions to various real-world problems using C++ |
| CO4 | To learn various concepts of object oriented approach towards problem solving |

| Detailed Contents | Contact hours |
|---|----------------------|
| Unit-I Principles of object oriented programming Introduction to OOP and its basic features, Basic components of a C++, Program and program structure, Compiling and Executing C++ Program. Difference between Procedure Oriented Language(C) and Object Oriented Language | 12 |
| Unit-II Classes & Objects and Concept of Constructors Defining classes, Defining member functions, Declaration of objects to class, Access to member variables from objects, Different forms of member functions, Access specifiers (Private, public, protected), Array of objects. | 10 |

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| | |
|--|----|
| Introduction to constructors, Parameterized constructors, Copy Constructor, Multiple constructors in class, Dynamic initialization of objects, Destructors. | |
| Unit-III Inheritance and Operator overloading Introduction to Inheritance, Types of inheritance: - Single inheritance, Multiple inheritance, Multilevel inheritance, Hierarchical inheritance, Hybrid inheritance, Defining operator overloading, Overloading of Unary and Binary operators, Rules for overloading operators | 12 |
| Unit-IV Polymorphism and File Handling Early Binding, Late Binding, Virtual Functions, pure virtual functions, Abstract Classes. Opening and Closing File, Reading and Writing a file. | 10 |

Text Books:

1. Object Oriented Programming with C++, E. Balagurusami, Fourth Edition, Tata Mc-Graw Hill.
 2. Object Oriented Programming in Turbo C++, Robert Lafore, Fourth Edition Galgotia Publications.
 3. The C++ Programming Language, Bjarna Stroustrup, Third Edition, Addison-Wesley Publishing Company.
 4. Object Oriented Programming Using C++, Salaria, R. S, Fourth Edition, Khanna Book Publishing.
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**I. K. Gujral Punjab Technical University
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Course Code: UGCA1910

Course Name: Object Oriented Programming using C++ Laboratory

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 2 nd | Contact hours: 4 hours per week |
| Internal max. marks: 60 | Theory/Practical: Practical |
| External max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|------------|---|
| CO1 | To learn programming from real world examples. |
| CO2 | To understand Object oriented approach for finding Solutions to various problems with the help of C++ language. |
| CO3 | To create computer based solutions to various real-world problems using C++ |
| CO4 | To learn various concepts of object oriented approach towards problem solving |

Instructions: Develop all program in C++

Assignments:

| | |
|----|---|
| 1. | Write a program to enter mark of 6 different subjects and find out the total mark (Using cin and cout statement) |
| 2. | Write a function using reference variables as arguments to swap the values of pair of integers. |
| 3. | Write a function to find largest of three numbers. |
| 4. | Write a program to find the factorial of a number. |
| 5. | Define a class to represent a bank account which includes the following members as Data members: a) Name of the depositor b) Account Number c) Withdrawal amount d) Balance amount in the account Member Functions: a) To assign initial values b) To deposit an amount c) To withdraw an amount after checking the balance d) To display name and balance. |
| 6. | Write the above program for handling n number of account holders using array of objects. |
| 7. | Write a C++ program to compute area of right angle triangle, equilateral triangle, isosceles triangle using function overloading concept. |

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| | |
|-----|---|
| 8. | Consider a publishing company that markets both book and audio cassette version to its works. Create a class Publication that stores the title (a string) and price (type float) of a publication. Derive the following two classes from the above Publication class: Book which adds a page count (int) and Tape which adds a playing time in minutes(float). Each class should have get_data() function to get its data from the user at the keyboard. Write the main() function to test the Book and Tape classes by creating instances of them asking the user to fill in data with get_data() and then displaying it using put_data(). |
| 9. | Consider an example of declaring the examination result. Design three classes student, exam and result. The student has data members such as rollno, name. Create the class exam by inheriting the student class. The exam class adds data members representing the marks scored in 5 subjects. Derive the result from exam-class and it has own data members like total, avg. |
| 10. | Write a program for overloading of Unary ++ operator. |
| 11. | Write a program for overloading of Binary + operator. |
| 12. | Write a program of Virtual Functions. |
| 13. | Write a program of Abstract Classes. |
| 14. | Write a program to read and write from file. |

Reference Books:

1. Object Oriented Programming with C++, E. Balagurusami, Fourth Edition, Tata Mc-Graw Hill.
 2. Object Oriented Programming in Turbo C++, Robert Lafore, Fourth Edition Galgotia Publications.
 3. The C++ Programming Language, Bjarna Stroustrup, Third Edition, Addison-Wesley Publishing Company.
 4. Object Oriented Programming Using C++, Salaria, R. S, Fourth Edition, Khanna Book Publishing.
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Course Code: UGCA1911

Course Name: Fundamentals of Statistics Laboratory

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 2 nd | Contact hours: 4 hours per week |
| Internal max. marks: 60 | Theory/Practical: Practical |
| External max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: Students must have the knowledge of Spreadsheet.

Co requisite: The students will develop analytical behavior & will have better understanding of analyzing data and testing hypotheses.

Additional material required in ESE: Minimum two exercises of each concept will be recorded in the file and the file will be submitted in End Semester Examinations.

Course Outcomes: After studying this course, students will be able to:

| CO# | Course Outcomes |
|------------|--|
| CO1 | Represent data using various Frequency table and Graphs. |
| CO2 | Apply various operations/ formulas using any software/package to solve statistical problems. |

Instructions: Sample exercises are given below and Instructor can increase or decrease the experiments as per the requirement.

| | | | | | | | | | | | | | |
|-----------|---|---------|---------|---------|---------|---------|---------|-----------|---|---|----|----|----|
| 1: | Display the Maximum and Minimum market data. | | | | | | | | | | | | |
| 2: | Display year wise strength of the students of a college in Tabular form & Graphical form. | | | | | | | | | | | | |
| 3: | Calculate the average marks of the students of your College. | | | | | | | | | | | | |
| 4: | Print measure of Central Tendency using grouped and ungrouped data. | | | | | | | | | | | | |
| 5: | Construct & print frequency distribution using data with the following Techniques: a) Histogram b) Frequency Polygon c) Frequency Curve c) Ogive curves. | | | | | | | | | | | | |
| 6: | Find out & display the Median and Mode from the following series by using suitable method: <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 0 10px;">Class</td> <td style="padding: 0 10px;">156-158</td> <td style="padding: 0 10px;">158-160</td> <td style="padding: 0 10px;">160-162</td> <td style="padding: 0 10px;">162-164</td> <td style="padding: 0 10px;">164-166</td> </tr> <tr> <td style="padding: 0 10px;">Frequency</td> <td style="padding: 0 10px;">4</td> <td style="padding: 0 10px;">8</td> <td style="padding: 0 10px;">28</td> <td style="padding: 0 10px;">51</td> <td style="padding: 0 10px;">89</td> </tr> </table> | Class | 156-158 | 158-160 | 160-162 | 162-164 | 164-166 | Frequency | 4 | 8 | 28 | 51 | 89 |
| Class | 156-158 | 158-160 | 160-162 | 162-164 | 164-166 | | | | | | | | |
| Frequency | 4 | 8 | 28 | 51 | 89 | | | | | | | | |
| 7: | Calculate an appropriate measure of dispersion using grouped and ungrouped data. | | | | | | | | | | | | |
| 8: | Make an array and calculate range of the data. | | | | | | | | | | | | |
| 9: | Represent the placement record of the students of your college. | | | | | | | | | | | | |

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| | | | | | | | | | | | | | | | |
|-----------------|---|-------|--------|---------|---------|---------|---------|---------|-----------------|---|----|----|----|----|----|
| 10: | Calculate & display Letter Grade using spreadsheet. | | | | | | | | | | | | | | |
| 11: | <p>Represent the following data by suitable graphs, determine therefrom the number of children having IQ (i) Below 105 (ii) Above 124.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">IQ</td> <td style="text-align: center;">75-84</td> <td style="text-align: center;">85-94</td> <td style="text-align: center;">95-104</td> <td style="text-align: center;">105-114</td> <td style="text-align: center;">115-124</td> <td style="text-align: center;">125-134</td> </tr> <tr> <td style="text-align: center;">No. of Children</td> <td style="text-align: center;">8</td> <td style="text-align: center;">20</td> <td style="text-align: center;">45</td> <td style="text-align: center;">54</td> <td style="text-align: center;">28</td> <td style="text-align: center;">16</td> </tr> </table> | IQ | 75-84 | 85-94 | 95-104 | 105-114 | 115-124 | 125-134 | No. of Children | 8 | 20 | 45 | 54 | 28 | 16 |
| IQ | 75-84 | 85-94 | 95-104 | 105-114 | 115-124 | 125-134 | | | | | | | | | |
| No. of Children | 8 | 20 | 45 | 54 | 28 | 16 | | | | | | | | | |

Reference Books:

1. Statistics for Economics, TR Jain, VK Ohri.
2. Statistics and Data Analysis, A.Abebe, J. Daniels, J.W.Mckean, December 2000.

E-Books/ Online learning material

1. https://www.meritnation.com/cbse-class-11-commerce/economics/class_13_tr_jain.
2. http://college.cengage.com/mathematics/brase/understandable_statistics/9780618949922_ch03.pdf
3. http://www.rockcreekschools.org/pages/uploaded_files/Excel%201%20Lab%20Exercises.pdf

Course Code: UGCA1912

Course Name: Computer System Architecture Laboratory

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 2 nd | Contact hours: 4 hours per week |
| Internal max. marks: 60 | Theory/Practical: Practical |
| External max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| Total marks: 100 | Elective status: Core |

Prerequisite: Basic knowledge of Fundamentals of Computer and IT

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|-----|---|
| CO1 | The students will be able to perform number system conversions. |
| CO2 | The students will understand the function of all components of Computer architecture. |
| CO3 | The students will understand various types of basic, combinational & universal logic gates |
| CO4 | The students will learn how to design Combinational circuits like Adder, Subtractor, Decoder, Encoder, Multiplexer, Demultiplexer |
| CO5 | The students will learn how to design Sequential circuits like Flip Flops, Counters |

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Assignments:

| | |
|-----|--|
| 1. | To verify the Truth Table of Basic Logic Gates |
| 2. | To verify the Truth Table of Combinational Logic Gates |
| 3. | To verify the Truth Table of Universal Logic Gates |
| 4. | To verify the Truth Table of Half Adder Combinational Circuit |
| 5. | To verify the Truth Table of Full Adder Combinational Circuit |
| 6. | To verify the Truth Table of Half Subtractor Combinational Circuit |
| 7. | To verify the Truth Table of Full Subtractor Combinational Circuit |
| 8. | To verify the Truth Table of Decoder Combinational Circuit |
| 9. | To verify the Truth Table of Encoder Combinational Circuit |
| 10. | To verify the Truth Table of Multiplexer Combinational Circuit |
| 11. | To verify the Truth Table of De Multiplexer Combinational Circuit |
| 12. | To verify the Truth Table of S-R Flip-Flop |
| 13. | To verify the Truth Table of J-K Flip-Flop |
| 14. | To verify the Truth Table of Master Slave J-K Flip-Flop |
| 15. | To verify the Truth Table of D Flip-Flop |
| 16. | To verify the Truth Table of T Flip-Flop |
| 17. | To verify the working of Asynchronous Up Counter |
| 18. | To verify the working of Asynchronous Down Counter |
| 19. | To verify the working of Asynchronous MOD-N Counter |
| 20. | To verify the working of Synchronous Up Counter |
| 21. | To verify the working of Synchronous Down Counter |
| 22. | To verify the working of Synchronous MOD-N Counter |
| 23. | To verify the working of Asynchronous Bidirectional Counter |
| 24. | To verify the working of Synchronous Bidirectional Counter |

Reference Books:

1. Computer Organization and Architecture, Stallings, Eighth Edition, PHI.
 2. Modern Digital Electronics, R. P. Jain, Fourth Edition, TMH.
 3. Digital Logic & Computer Design, D. Morris Mano, Second Edition, PHI.
 4. Digital and Electronic Circuits, T. C. Bartee, McGraw Hill.
 5. Digital Fundamentals, Floyd, Ninth Edition, PHI.
 6. Digital Integrated Electronics, Taub & Schilling, Eighth Edition, Mc-Graw Hill.
-

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**Ability Enhancement Compulsory Course
EVS102-18 Environmental Studies**

Course Outcomes:

1. Students will enable to understand environmental problems at local and national level through literature and general awareness.
2. The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues.
3. The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate these problems.
4. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world

UNIT-1: Introduction to Environmental Studies

Multidisciplinary nature of Environmental Studies: Scope & Importance
Need for Public Awareness

UNIT-2: Ecosystems

Concept of an Ecosystem: Structure & functions of an ecosystem (Producers, Consumers & Decomposers)

Energy Flow in an ecosystem: Food Chain, Food web and Ecological Pyramids

Characteristic features, structure & functions of following Ecosystems:

- Forest Ecosystem
- Aquatic Ecosystem (Ponds, Lakes, River & Ocean)

UNIT-3: Natural Resources

Renewable & Non-renewable resources

Forest Resources: Their uses, functions & values (Biodiversity conservation, role in climate change, medicines) & threats (Overexploitation, Deforestation, Timber extraction, Agriculture Pressure), Forest Conservation Act

Water Resources: Their uses (Agriculture, Domestic & Industrial), functions & values, Overexploitation and Pollution of Ground & Surface water resources (Case study of Punjab), Water Conservation, Rainwater Harvesting,

Land Resources: Land as a resource; Land degradation, soil erosion and desertification

Energy Resources: Renewable & non-renewable energy resources, use of alternate energy resources (Solar, Wind, Biomass, Thermal), Urban problems related to Energy

UNIT-4: Biodiversity & its conservation

Types of Biodiversity: Species, Genetic & Ecosystem

India as a mega biodiversity nation, Biodiversity hot spots and biogeographic regions of India

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Examples of Endangered & Endemic species of India, Red data book

UNIT-5: Environmental Pollution & Social Issues

Types, Causes, Effects & Control of Air, Water, Soil & Noise Pollution

Nuclear hazards and accidents & Health risks

Global Climate Change: Global warming, Ozone depletion, Acid rain, Melting of Glaciers & Ice caps, Rising sea levels

Environmental disasters: Earthquakes, Floods, Cyclones, Landslides

UNIT-6: Field Work

Visit to a National Park, Biosphere Reserve, Wildlife Sanctuary

Documentation & preparation of a Biodiversity (flora & fauna) register of campus/river/forest

Visit to a local polluted site: Urban/Rural/Industrial/Agricultural

Identification & Photography of resident or migratory birds, insects (butterflies)

Public hearing on environmental issues in a village

Suggested Books:

1. Bharucha, E. Text Book for Environmental Studies. University Grants Commission, New Delhi.
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment (R)
9. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
10. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
11. Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
12. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
13. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
14. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
15. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
16. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
17. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.

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18. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
19. Survey of the Environment, The Hindu (M)
20. Townsend C., Harper J, and Michael Begon, Essentials of Ecology,
Blackwell Science (TB)
21. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science
Publication (TB)
22. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co.
Philadelphia, USA 499p

Course Code: UGCA1913

Course Name: Computer Networks

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 3 rd | Contact hours: 44 hours |
| Theory/Practical: Theory | Percentage of numerical/design problems: -- |
| Internal max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 60 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: Information Technology

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to

| CO# | Course outcomes |
|------------|--|
| CO1 | familiar with the different Network Models. |
| CO2 | Understand different network technologies and their application. |
| CO3 | update with different advanced network technologies that can be used to connect different networks |
| CO4 | familiar with various hardware and software that can help run a smooth network |

| Detailed Contents | Contact hours |
|--|----------------------|
| Unit-I Data communications concepts: Digital and analog transmissions-Modem, parallel and serial transmission, synchronous and asynchronous communication. Modes of communication: Simplex, half duplex, full duplex. Types of Networks: LAN, MAN, WAN Network Topologies: Bus, Star, Ring, Mesh, Tree, Hybrid Communication Channels: Wired transmissions: Telephone lines, leased | 12 |

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|---|----|
| <p>lines, switch line, coaxial cables-base band, broadband, optical fiber transmission.</p> <p>Communication Switching Techniques: Circuit Switching, Message Switching, Packet Switching.</p> | |
| <p>Unit-II</p> <p>Network Reference Models: OSI Reference Model, TCP/IP Reference Model, Comparison of OSI and TCP/IP Reference Models. Transmission impairments – Attenuation, Distortion, Noise. Multiplexing – Frequency division, Time division, Wavelength division.</p> <p>Data Link Layer Design Issues: Services provided to the Network Layer, Framing, Error Control (error detection and correction code), Flow Control, Data Link Layer in the Internet (SLIP, PPP)</p> | 10 |
| <p>Unit-III</p> <p>MAC sub layer: CSMA/CD/CA, IEEE standards (IEEE802.3 Ethernet, Gigabit Ethernet, IEEE 802.4 Token Bus, IEEE 802.5 Token Ring)</p> <p>Network Layer: Design Issues, Routing Algorithms: Optimality Principle, Shortest Path Routing, Congestion Control Policies, Leaky bucket and token bucket algorithm, Concept of Internetworking.</p> | 12 |
| <p>Unit-IV</p> <p>Transport Layer: Design issues, Elements of transport protocols – Addressing, Connection establishment and release, Flow control and buffering, Introduction to TCP/UDP protocols.</p> <p>Session, Presentation and Application Layers: Session Layer – Design issues, remote procedure call. Presentation Layer – Design issues, Data compression techniques, Cryptography. Application Layer – Distributed application (client/server, peer to peer, cloud etc.), World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP), HTTP as an application layer protocol.</p> | 10 |

Text Books:

1. Computer Networks, Tanenbaum, Andrew, Fifth Edition, PHI.
2. Data Communication and Networking, Behrouz A. Forouzan, Fourth Edition.
3. Computer Today, S.K. Basandra, First Edition, Galgotia.

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Reference Books:

1. Data Communication System, Black, Ulysse, Third Edition, PHI.
 2. Data and Computer Communications, Stalling, Ninth Edition, PHI.
 3. James F. Kurose and Keith W. Ross, "Computer Networking", Pearson Education.
 4. Douglas E. Comer, "Internetworking with TCP/IP", Volume-I, Prentice Hall, India.
-

Course Code: UGCA1914

Course Name: Programming in Python

| | |
|--------------------------------------|---|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 3 rd | Contact hours: 44 hours |
| Theory/Practical: Theory | Percentage of numerical/design problems: 40% |
| Internal max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 60 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to:

| CO# | Course Outcomes |
|------------|--|
| CO1 | Familiar with Python environment, data types, operators used in Python. |
| CO2 | Compare and contrast Python with other programming languages. |
| CO3 | Learn the use of control structures and numerous native data types with their methods. |
| CO4 | Design user defined functions, modules, and packages and exception handling methods. |
| CO5 | Create and handle files in Python and learn Object Oriented Programming Concepts. |

| Detailed Contents | Contact hours |
|--------------------------|----------------------|
| Unit-I | 12 |

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|--|----|
| <p>Introduction to Python Programming Language: Programming Language, History and Origin of Python Language, Features of Python, Limitations, Major Applications of Python, Getting, Installing Python, Setting up Path and Environment Variables, Running Python, First Python Program, Python Interactive Help Feature, Python differences from other languages.</p> <p>Python Data Types & Input/Output: Keywords, Identifiers, Python Statement, Indentation, Documentation, Variables, Multiple Assignment, Understanding Data Type, Data Type Conversion, Python Input and Output Functions, Import command.</p> <p>Operators and Expressions: Operators in Python, Expressions, Precedence, Associativity of Operators, Non Associative Operators.</p> | |
| <p>Unit-II</p> <p>Control Structures: Decision making statements, Python loops, Python control statements.</p> <p>Python Native Data Types: Numbers, Lists, Tuples, Sets, Dictionary, Functions & Methods of Dictionary, Strings (in detail with their methods and operations).</p> | 10 |
| <p>Unit-III</p> <p>Python Functions: Functions, Advantages of Functions, Built-in Functions, User defined functions, Anonymous functions, Pass by value Vs. Pass by Reference, Recursion, Scope and Lifetime of Variables.</p> <p>Python Modules: Module definition, Need of modules, Creating a module, Importing module, Path Searching of a Module, Module Reloading, Standard Modules, Python Packages.</p> | 12 |
| <p>Unit-IV</p> <p>Exception Handling: Exceptions, Built-in exceptions, Exception handling, User defined exceptions in Python.</p> <p>File Management in Python: Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files in Python, directories in Python.</p> | 10 |

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|--|--|
| Classes and Objects: The concept of OOPS in Python, Designing classes, Creating objects, Accessing attributes, Editing class attributes, Built-in class attributes, Garbage collection, Destroying objects. | |
|--|--|

Text Books:

1. Programming in Python, Pooja Sharma, BPB Publications, 2017.
2. Core Python Programming, R. Nageswara Rao, 2nd Edition, Dreamtech.

Reference Books:

1. Python, The complete Reference, Martin C. Brown, Mc Graw Hill Education.
2. Python in a Nutshell, A. Martelli, A. Ravenscroft, S. Holden, OREILLY.

Course Code: UGCA1915

Course Name: Data Structures

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 3 rd | Contact hours: 44 hours |
| Theory/Practical: Theory | Percentage of numerical/design problems: -- |
| Internal max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 60 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to

| CO# | Course outcomes |
|-----|--|
| CO1 | Apply appropriate constructs of Programming language, coding standards for application development |
| CO2 | Use appropriate data structures for problem solving and programming |
| CO3 | Use algorithmic foundations for solving problems and programming |
| CO4 | Apply appropriate searching and/or sorting techniques for application development. |
| CO5 | Develop programming logic and skills. |

| Detailed Contents | Contact hours |
|-------------------|---------------|
| Unit-I | 10 |

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| | |
|--|----|
| <p>Introduction to Data Structures: Algorithms and Flowcharts, Basics Analysis on Algorithm, Complexity of Algorithm, Introduction and Definition of Data Structure, Classification of Data, Arrays, Various types of Data Structure, Static and Dynamic Memory Allocation, Function, Recursion.</p> <p>Arrays, Pointers and Strings: Introduction to Arrays, Definition, One Dimensional Array and Multi-Dimensional Arrays, Pointer, Pointer to Structure, various Programs for Array and Pointer. Strings. Introduction to Strings, Definition, Library Functions of Strings.</p> | |
| <p>Unit-II</p> <p>Stacks and Queue Introduction to Stack, Definition, Stack Implementation, Operations of Stack, Applications of Stack and Multiple Stacks. Implementation of Multiple Stack Queues, Introduction to Queue, Definition, Queue Implementation, Operations of Queue, Circular Queue, De-queue and Priority Queue.</p> | 8 |
| <p>Unit-III</p> <p>Linked Lists and Trees Introduction, Representation and Operations of Linked Lists, Singly Linked List, Doubly Linked List, Circular Linked List, And Circular Doubly Linked List.</p> <p>Trees Introduction to Tree, Tree Terminology Binary Tree, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree, Tree Traversal, Threaded Binary Tree, AVL Tree B Tree, B+ Tree.</p> | 14 |
| <p>Unit-IV</p> <p>Graphs, Searching, Sorting and Hashing Graphs: Introduction, Representation to Graphs, Graph Traversals Shortest Path Algorithms.</p> <p>Searching and Sorting: Searching, Types of Searching, Sorting, Types of sorting like quick sort, bubble sort, merge sort, selection sort.</p> | 12 |

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|--|--|
| Hashing: Hash Function, Types of Hash Functions, Collision, Collision Resolution Technique (CRT), Perfect Hashing | |
|--|--|

Text Books

1. Brijesh Bakariya. Data Structures and Algorithms Implementation through C, BPB Publications.
2. Kruse R.L. Data Structures and Program Design in C; PHI
3. Aho Alfred V., Hopperoft John E., Ullman Jeffrey D., “Data Structures and Algorithms”, AddisonWesley

Reference books

1. Horowitz & Sawhaney: Fundamentals of Data Structures, Galgotia Publishers.
2. Yashwant Kanetkar, Understanding Pointers in C, BPB Publications.
3. Horowitz, S. Sahni, and S. Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt. Ltd., 1998.

Course Code: UGCA1916

Course Name: Computer Networks Laboratory

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 3 rd | Contact hours: 4 hours per week |
| Theory/Practical: Practical | Percentage of numerical/design problems: -- |
| Internal max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 40 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|------------|--|
| CO1 | Understand different network technologies and their application. |
| CO2 | Be updated with different advanced network technologies that can be used to connect different networks |
| CO3 | Be familiar with various hardware and software that can help run a smooth network |

List of assignments:

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| | |
|-----|--|
| 1. | Familiarization with networking components and devices: LAN Adapters, Hubs, Switches, Routers etc |
| 2. | Familiarization with transmission media and tools: Coaxial cable, UTP cable, Crimping tool, Connectors etc |
| 3. | Preparing straight and cross cables |
| 4. | Study of various LAN topologies and their creation using network devices, cables and computers |
| 5. | Configuration of TCP/IP Protocols in Windows and Linux |
| 6. | Implementation of resource sharing (file, printer etc.) |
| 7. | Designing and implementing class A, B and C networks |
| 8. | Subnet planning and its implementation |
| 9. | To configure dynamic IP address for a computer connected to a LAN |
| 10. | Use of commands like ping, ipconfig for trouble shooting network related problems |
| 11. | Develop a program to compute the Hamming Distance between any two code words |
| 12. | Installation of FTP server and client |
| 13. | To configure proxy server |
| 14. | Familiarization with network simulation tools. |

Reference Books:

1. Data Communication and Networking, Behrouz A. Forouzan, Fourth Edition.
2. Douglas E. Comer, "Internetworking with TCP/IP", Volume-I, Prentice Hall, India.

Course Code: UGCA1917

Course Name: Programming in Python Laboratory

| | |
|--------------------------------------|---|
| Program: BCA | L: 0 T: 0 P:4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 3 rd | Contact hours: 4 hours per week |
| Theory/Practical: Practical | Percentage of numerical/design problems: 90% |
| Internal max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 40 | Elective Status : Core |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: - Maintain practical note book as per the instructions given by the instructor.

Course Outcomes: Students will be able to :

| CO# | Course outcomes |
|-----|-----------------|
|-----|-----------------|

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| | |
|-----|---|
| CO1 | Solve simple to advanced problems using Python language. |
| CO2 | Develop logic of various programming problems using numerous data types and control structures of Python. |
| CO3 | Implement different data structures. |
| CO4 | Implement modules and functions. |
| CO5 | Design and implement the concept of object oriented programming structures. |
| CO6 | Implement file handling. |

List of assignments:

| | |
|-----|--|
| 1. | Compute sum, subtraction, multiplication, division and exponent of given variables input by the user. |
| 2. | Compute area of following shapes: circle, rectangle, triangle, square, trapezoid and parallelogram. |
| 3. | Compute volume of following 3D shapes: cube, cylinder, cone and sphere. |
| 4. | Compute and print roots of quadratic equation $ax^2+bx+c=0$, where the values of a, b, and c are input by the user. |
| 5. | Print numbers up to N which are not divisible by 3, 6, 9,, e.g., 1, 2, 4, 5, 7,.... |
| 6. | Write a program to determine whether a triangle is isosceles or not? |
| 7. | Print multiplication table of a number input by the user. |
| 8. | Compute sum of natural numbers from one to n number. |
| 9. | Print Fibonacci series up to n numbers e.g. 0 1 1 2 3 5 8 13.....n |
| 10. | Compute factorial of a given number. |
| 11. | Count occurrence of a digit 5 in a given integer number input by the user. |
| 12. | Print Geometric and Harmonic means of a series input by the user. |
| 13. | Evaluate the following expressions: a. $x-x^2/2!+x^3/3!- x^4/4!+... x^n/n!$ b. $x-x^3/3!+x^5/5!- x^7/7!+... x^n/n!$ |
| 14. | Print all possible combinations of 4, 5, and 6. |
| 15. | Determine prime numbers within a specific range. |
| 16. | Count number of persons of age above 60 and below 90. |
| 17. | Compute transpose of a matrix. |
| 18. | Perform following operations on two matrices. 1) Addition 2) Subtraction 3) Multiplication |
| 19. | Count occurrence of vowels. |
| 20. | Count total number of vowels in a word. |
| 21. | Determine whether a string is palindrome or not. |
| 22. | Perform following operations on a list of numbers: 1) Insert an element 2) delete an element 3) sort the list 4) delete entire list |
| 23. | Display word after Sorting in alphabetical order. |
| 24. | Perform sequential search on a list of given numbers. |

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|-----|--|
| 25. | Perform sequential search on ordered list of given numbers. |
| 26. | Maintain practical note book as per their serial numbers in library using Python dictionary. |
| 27. | Perform following operations on dictionary 1) Insert 2) delete 3) change |
| 28. | Check whether a number is in a given range using functions. |
| 29. | Write a Python function that accepts a string and calculates number of upper case letters and lower case letters available in that string. |
| 30. | To find the Max of three numbers using functions. |
| 31. | Multiply all the numbers in a list using functions. |
| 32. | Solve the Fibonacci sequence using recursion. |
| 33. | Get the factorial of a non-negative integer using recursion. |
| 34. | Write a program to create a module of factorial in Python. |
| 35. | Design a Python class named <i>Rectangle</i> , constructed by a length & width, also design a method which will compute the area of a rectangle. |
| 36. | Design a Python class named <i>Circle</i> constructed by a radius and two methods which will compute the area and the perimeter of a circle. |
| 37. | Design a Python class to reverse a string 'word by word'. |
| 38. | Write a Python program to read an entire <i>text file</i> . |
| 39. | Design a Python program to read first n lines of a <i>text file</i> . |
| 40. | Construct a Python program to write and append text to a file and display the text. |

Text Books:

1. Programming in Python, Pooja Sharma, BPB Publications, 2017.
2. Core Python Programming, R. Nageswara Rao, 2nd Edition, Dreamtech.

Reference Books:

1. Python, The complete Reference, Martin C. Brown, Mc Graw Hill Education.
2. Python in a Nutshell, A. Martelli, A. Ravenscroft, S. Holden, OREILLY.

Course Code: UGCA1918

Course Name: Data Structures Laboratory

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 3 rd | Contact hours: 4 hours per week |
| Theory/Practical: Practical | Percentage of numerical/design problems: -- |
| Internal max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 40 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: -NA-

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Co requisite: -NA-

Additional material required in ESE: - NA-

Course Outcomes: Student will be able to

| CO# | Course outcomes |
|-----|--|
| CO1 | Apply appropriate constructs of Programming language, coding standards for application development |
| CO2 | Develop programming skills for solving problems. |
| CO3 | Apply appropriate searching and/or sorting techniques for application development. |

Instructions: Programs may be developed in C/C++/Python/Java language.

List of assignments:

| | |
|----|---|
| 1 | Program for using Dynamic Functions (malloc(), calloc(), realloc() and free()) functions. |
| 2 | Program to insert, delete and traverse an element from an array |
| 3 | Program to merge one dimensional arrays |
| 4 | Program for addition and subtraction of two matrices. |
| 5 | Program for implementing multiplication of two matrices |
| 6 | Implement linear search using one and two dimensional array. |
| 7 | Program for implementing selection sort. |
| 8 | Program for implementing insertion sort. |
| 9 | Program for implementing quick sort. |
| 10 | Program for implementing merge sort. |
| 11 | Program to calculate length of the string using user defined function. |
| 12 | Program to concatenate and compare two strings using user defined function. |
| 13 | Program for using the concept of pointer to string. |
| 14 | Program to reverse a sentence by recursion. |
| 15 | Program to delete all repeated words in string. |
| 16 | Program to find the number of vowels, consonants, digits and white space in a string. |
| 17 | Program to find the length of the longest repeating sequence in a string. |
| 18 | Program to find highest and lowest frequency character in a string. |
| 19 | Program for implementing Stack using array. |
| 20 | Program for implementing Stack using pointer. |
| 21 | Program for implementing multiple stack. |
| 22 | Program for converting infix to postfix form. |
| 23 | Program for implementing Queue using array. |
| 24 | Program for dynamic implementation of queue. |
| 25 | Program for implementing circular queue. |
| 26 | Program for implementing dequeue. |
| 27 | Program for implementing priority queue. |
| 28 | Program for implementing Singly Linked list. |
| 29 | Program for implementing Doubly Linked list. |

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|----|---|
| 30 | Program for implementing Binary Search Tree. |
| 31 | Program for Breadth First Search (BFS) for graph traversal. |
| 32 | Program for Depth First Search (DFS) for graph traversal. |

Reference Books:

1. Brijesh Bakariya. Data Structures and Algorithms Implementation through C, BPB Publications.
2. Aho Alfred V., Hopperoft John E., Ullman Jeffrey D., “Data Structures and Algorithms”, AddisonWesley
3. Horowitz & Sawhaney: Fundamentals of Data Structures, Galgotia Publishers.

Course Code: UGCA1919

Course Name: PC Assembly & Troubleshooting

| | |
|--------------------------------------|---|
| Program: BCA | L:3T:0 P:0 |
| Branch: Computer Applications | Credits: 3 |
| Semester : 3 rd | Contact hours: 33 hours |
| Theory/Practical: Theory | Percentage of numerical/design problems: 80% |
| Internal max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 60 | Elective status: Skill Enhancement |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to

| CO# | Course outcomes |
|-----|---|
| CO1 | Assemble and set up computer systems. |
| CO2 | Configure and install computers |
| CO3 | Install, connect and configure various peripheral devices |
| CO4 | Diagnose and Troubleshoot issues in Computer Systems |

| Detailed contents | Contact hours |
|---|---------------|
| <p>Unit I:</p> <p>Brief history of computer on the basis Hardware. Computer system modules/ components and its operations, need of hardware and software for computer to work, different hardware components within a computer and connected to a computer as peripheral devices, different processors used for personal computers and notebook computers.</p> | 9 |

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|---|---|
| Unit II: | |
| Perform installation, configuration, and upgrading of microcomputer/ computer: Hardware and software requirement, Assemble/setup microcomputer/ computer systems, accessory boards, types of motherboards, selection of right motherboard, Installation replacement of motherboard, troubleshooting problems with memory. | 8 |
| Unit III: | |
| Install/connect associated peripherals: Working of printers and scanners, Installation of printers and scanners, sharing a printer over a local area network, troubleshooting printer and scanner problems, troubleshooting hard drive problems. Drivers: Meaning, role and types. | 8 |
| Unit IV: | |
| Diagnose and troubleshooting of microcomputer/ computer systems hardware & software and other peripheral equipment: Approaches to solve a PC problem, troubleshooting a failed boot before the OS is loaded, different approaches to installing and supporting I/O device, managing faulty components. Booting and its types. | 8 |

Text Books:

1. PC Hardware: The Complete Reference, McGraw-Hills

Reference Books:

1. The Indispensable PC Hardware Book (4th Edition) Hans-Peter Messmer
2. PC Hardware: A Beginner's Guide by Ron Gilster.

Course Code: UGCA1920

Course Name: PC Assembly & Troubleshooting Laboratory

| | |
|-------------------------------------|---|
| Program: BCA | L:0 T:0 P:2 |
| Branch: Computer Application | Credits:1 |
| Semester: 3 rd | Contact hours: 2 hours per week |
| Theory/Practical: Practical | Percentage of numerical/design problems: 95% |

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| | |
|--------------------------------|--|
| Internal max. marks: 30 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 20 | Elective status: Skill Enhancement |
| Total marks: 50 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|------------|---|
| CO1 | Assemble and set up computer systems. |
| CO2 | Configure and install computers |
| CO3 | Install, connect and configure various peripheral devices |
| CO4 | Diagnose and Troubleshoot issues in Computer Systems |

List of assignments:

| | |
|----|---|
| 1. | Assembling and De Assembling of Computer System |
| 2. | Loading and configuration procedure of Microsoft Client O/S Win XP /Win 7 and Windows 8 |
| 3. | Installation of utility tools (Software) |
| 4. | Installation of utility tools (Drivers) |
| 5. | Firewall configuration, Antivirus/Internet security loading and configuration procedure |
| 6. | Installation and configuration of I/O devices – Printers, Webcams, Scanners. |
| 7. | Installation and configuration of I/O devices – Digital Camera, USB Wi-fi, USB BT, USB Storages, Projectors |
| 8. | Multiple OS loading and trouble shooting |

Recommended Hardware:

All hardware component as mentioned above in the syllabus.

Text Books:

1. PC Hardware: The Complete Reference, McGraw-Hills

Reference Books:

1. The Indispensable PC Hardware Book (4th Edition) Hans-Peter Messmer
PC Hardware: A Beginner's Guide by Ron Gilster

Course Code: UGCA1921

Course Name: Software Engineering

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|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 4 th | Contact hours: 44 hours |
| Theory/Practical: Theory | Percentage of numerical/design problems:- |
| Internal max. marks: 40 | Duration of end semester exam (ESE): - |
| External max. marks: 60 | Core/Elective status: core |
| Total marks: 100 | |

Prerequisite: -

Co requisite:-

Additional material required in ESE:-

Course Outcomes: Students will be able to

| CO# | Course outcomes |
|------------|---|
| CO1 | Aware about the engineering approach to analysis, design and built the software |
| CO2 | Understand the phases and activities involved in the conventional software life cycle models |
| CO3 | Analyse problems, and identify and define the computing requirements appropriate to its solution. |
| CO4 | Apply design and development principles in the construction of software systems of varying complexity |
| CO5 | Apply current techniques, skills, and tools necessary for computing practice. |

| Detailed contents | Contact hours |
|---|----------------------|
| Unit 1 The Nature of Software, Need of Software Engineering, Prescriptive Process Models, Specialized Process Models, The Unified Process. | 10 |
| Unit 2 Role of a system analyst, SRS, Properties of a good SRS document, functional and non-functional requirements, Decision tree and Decision table, Formal Requirements Specification, Software Cost Estimation. | 10 |
| Unit 3 Software design and its activities, Preliminary and detailed design activities, Characteristics of a good software design, Features of a design document, Cohesion and Coupling, | 12 |

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| | |
|---|----|
| Structured Analysis, Function Oriented Design, Object-Oriented Design. | |
| Unit 4 Testing Fundamentals, Unit Testing, Integration Testing, Validation Testing, System Testing, Maintenance and Reengineering, Measures, Metrics, and Indicators, Software Measurement, Metrics for Requirements Model, Metrics for Design Model, Metrics for Testing, Metrics for Maintenance. | 12 |

Text Books:

1. Software Engineering–A Practitioner’s Approach, Roger S.Pressman, Seventh Edition, McGrawHill, 2010.

Reference Books:

1. An Integrated Approach to Software Engineering, Pankaj Jalota, Third Edition, Narosa Publishing House, 2005
2. Software Engineering, Ian Sommerville, Ninth Edition, Addison-Wesley, 2011

Course Code: UGCA1922

Course Name: Database Management Systems

| | |
|--------------------------------------|--|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 4 th | Contact hours: 44 hours |
| Theory/Practical: Theory | Percentage of numerical/design problems: -- |
| Internal max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 60 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to

| CO# | Course outcomes |
|------------|---|
| CO1 | Understand the basic concepts of DBMS. |
| CO2 | Formulate, using SQL, solutions to a broad range of query and data update problems. |

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|-----|---|
| CO3 | Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database. |
| CO4 | Understand the concept of Transaction and Query processing in DBMS. |

| Detailed contents | Contact hours |
|---|---------------|
| <p>Unit-I</p> <p>Introduction of DBMS, Data Modeling for a Database, Three level Architecture of DBMS, Components of a DBMS. Introduction to Data Models, Hierarchical, Network and Relational Model, Comparison of Network, Hierarchical and Relational Model, Entity Relationship Model.</p> | 10 |
| <p>Unit-II</p> <p>Relational Database, Relational Algebra and Calculus, SQL Fundamentals, DDL, DML, DCL, PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions, Database Triggers.</p> | 12 |
| <p>Unit-III</p> <p>Introduction to Normalization, First, Second, Third Normal Forms, Dependency Preservation, Boyce-Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Domain-key normal form (DKNF).</p> | 12 |
| <p>Unit-IV</p> <p>Database Recovery, Concurrency Management, Database Security, Integrity and Control. Structure of a Distributed Database, Design of Distributed Databases.</p> | 10 |

Text Books:

1. "An Introduction to Database System", Bipin C. Desai, Galgotia Publications Pvt Ltd-New Delhi, Revised Edition, (2012).
2. "Database System Concepts", Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Tata McGraw Hill, 6th Edition, (2013).

Reference Books:

1. "SQL, PL/SQL The Programming Language of Oracle", Ivan Bayross, BPB Publications, 4th Revised Edition (2009)

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2. “An Introduction to Database Systems”, C. J. Date, A. Kannan, S. Swamynathan, 8th Edition, Pearson Education, (2006).
3. Database Management Systems, Raghu Ramakrishnan, McGraw-Hill, Third Edition, 2014.

Course Code: UGCA1923

Course Name: Operating Systems

| | |
|--------------------------------------|---|
| Program: BCA | L: 3 T: 1 P: 0 |
| Branch: Computer Applications | Credits: 4 |
| Semester: 4 th | Contact hours: 44 hours |
| Theory/Practical: Theory | Percentage of numerical/design problems: 15% |
| Internal max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 60 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: Basic understanding of computer system.

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to:

| CO# | Course outcomes |
|------------|--|
| CO1 | Discuss the evaluation of operating systems. |
| CO2 | Explain different resource managements performed by operating system. |
| CO3 | Describe the architecture in terms of functions performed by different types of operating systems. |
| CO4 | Analyze the performance of different algorithms used in design of operating system components. |

| Detailed contents | Contact hours |
|--|----------------------|
| <p>Unit-I</p> <p>Fundamentals of Operating system: Introduction to Operating system, Functions of an operating system. Operating system as a resource manager. Structure of operating system (Role of kernel and Shell). Views of operating system. Evolution and types of operating systems.</p> <p>Process & Thread Management: Program vs. Process; PCB, State transition diagram, Scheduling Queues, Types of schedulers, Concept of Thread, Benefits, Types of threads, Process synchronization.</p> | 12 |

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|--|----|
| <p>CPU Scheduling: Need of CPU scheduling, CPU I/O Burst Cycle, Pre-emptive vs. Non-pre-emptive scheduling, Different scheduling criteria's, scheduling algorithms (FCFS, SJF, Round-Robin, Multilevel Queue).</p> | |
| <p>Unit-II</p> <p>Memory Management: Introduction, address binding, relocation, loading, linking, memory sharing and protection; Paging and segmentation; Virtual memory: basic concepts of demand paging, page replacement algorithms.</p> | 12 |
| <p>Unit-III</p> <p>I/O Device Management: I/O devices and controllers, device drivers; disk storage.</p> <p>File Management: Basic concepts, file operations, access methods, directory structures and management, remote file systems; file protection.</p> | 08 |
| <p>Unit-IV</p> <p>Advanced Operating systems: Introduction to Distributed Operating system, Characteristics, architecture, Issues, Communication & Synchronization; Introduction Multiprocessor Operating system, Architecture, Structure, Synchronization & Scheduling; Introduction to Real-Time Operating System, Characteristics, Structure & Scheduling. Case study of Linux operating system</p> | 12 |

Text Books:

1. Operating System Principles by Abraham Silberschatz and Peter Baer Galvin, Seventh Edition, Published by Wiley-India.
2. Principals of Operating System by Naresh Chauhan, Published by OXFORD University Press, India.

Reference Books:

1. Operating Systems by Sibsankar Haldar and Alex A. Aravind, Published by Pearson Education.
2. Operating system by Stalling, W., Sixth Edition, Published by Prentice Hall (India)

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Course Code: UGCA1924

Course Name: Software Engineering Laboratory

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 4 th | Contact hours: 4 hours per week |
| Theory/Practical: Practical | Percentage of numerical/design problems: -- |
| Internal max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 40 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to

| CO# | Course outcomes |
|------------|---|
| CO1 | Elicit, analyze and specify software requirements. |
| CO2 | Analyze and translate a specification into a design |
| CO3 | Realize design practically, using an appropriate software engineering methodology. |
| CO4 | Plan a software engineering process life cycle. |
| CO5 | Use modern engineering tools for specification, design, implementation, and testing |

Assignments:

| | |
|-----|--|
| 1. | Identify project scope and objective of given problem: <i>a. College automation system.</i> <i>b. Banking Management System.</i> |
| 2. | Develop software requirements specification for (1 a.) and (1 b.) problem. |
| 3. | Develop UML Use case model for a problem. |
| 4. | Develop Class diagrams |
| 5. | Represent project Scheduling of above-mentioned projects |
| 6. | Use any model for estimating the effort, schedule and cost of software project |
| 7. | Develop DFD model (level-0, level-1 DFD and Data dictionary) of the project |
| 8. | Develop sequence diagram |
| 9. | Develop Structured design for the DFD model developed |
| 10. | Develop the waterfall model, prototype model and spiral model of the product |
| 11. | Explain with reason which model is best suited for the product |
| 12. | Develop a working protocol of any of two problem |
| 13. | Use LOC, FP and Cyclomatic Complexity Metric of above-mentioned problem |
| 14. | Find Maintainability Index and Reusability Index of above-mentioned problem |
| 15. | Using any Case Tool find number of statements, depth and complexity of the prototype |

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Reference Books:

1. Software Engineering–A Practitioner’s Approach, Roger S.Pressman, Seventh Edition, McGrawHill, 2010.
 2. The Unified Modeling Language Reference Manual, Grady Booch, Second Edition, Addison Wesley, 2005.
 3. An Integrated Approach to Software Engineering, Pankaj Jalota, Third Edition, Narosa Publishing House, 2005.
-

Course Code: UGCA1925

Course Name: Database Management Systems Laboratory

| | |
|--------------------------------------|--|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 4 th | Contact hours: 4 hours per week |
| Theory/Practical: Practical | Percentage of numerical/design problems: 100% |
| Internal max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 40 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

| CO# | Course outcomes |
|------------|---|
| CO1 | Able to understand various queries and their execution |
| CO2 | Populate and query a database using SQL DML/DDL commands. |
| CO3 | Declare and enforce integrity constraints on a database |
| CO4 | Programming PL/SQL including stored procedures, stored functions, cursors, packages |
| CO5 | Able to design new database and modify existing ones for new applications and reason about the efficiency of the result |

Instructions:

| | |
|----|---|
| 1. | Used of CREATE, ALTER, RENAME and DROP statement in the database tables (relations) |
| 2. | Used of INSERT INTO, DELETE and UPDATE statement in the database tables (relations) |
| 3. | Use of simple select statement. |
| 4. | Use of select query on two relations |
| 5. | Use of nesting of queries. |

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|-----|--|
| 6. | Use of aggregate functions. |
| 7. | Use of substring comparison. |
| 8. | Use of order by statement. |
| 9. | <p>Consider the following schema for a Library Database:</p> <p>BOOK (<i>Book_id, Title, Publisher_Name, Pub_Year</i>)</p> <p>BOOK_AUTHORS (<i>Book_id, Author_Name</i>)</p> <p>PUBLISHER (<i>Name, Address, Phone</i>)</p> <p>BOOK_COPIES (<i>Book_id, Branch_id, No-of_Copies</i>)</p> <p>BOOK_LENDING (<i>Book_id, Branch_id, Card_No, Date_Out, Due_Date</i>)</p> <p>LIBRARY_BRANCH (<i>Branch_id, Branch_Name, Address</i>)</p> <p>Write SQL queries to</p> <ol style="list-style-type: none"> 1. Retrieve details of all books in the library_id, title, name of publisher, authors, number of copies in each branch, etc. 2. Get the particulars of borrowers who have borrowed more than 3 books between Jan 2018 to Jun 2018 3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation. 4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query. 5. Create a view of all books and its number of copies that are currently available in the Library. |
| 10. | <p>Consider the following schema for Order Database:</p> <p>SALESMAN (<i>Salesman_id, Name, City, Commission</i>)</p> <p>CUSTOMER (<i>Customer_id, Cust_Name, City, Grade, Salesman_id</i>)</p> <p>ORDERS (<i>Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id</i>)</p> <p>Write SQL queries to</p> <ol style="list-style-type: none"> 1. Count the customers with grades above Amritsar's average. 2. Find the name and numbers of all salesmen who had more than one customer. 3. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.) 4. Create a view that finds the salesman who has the customer with the highest order of a day. 5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted. |
| 11. | Write a PL/SQL code to add two numbers and display the result. Read the numbers during run time. |
| 12. | Write a PL/SQL code to find sum of first 10 natural numbers using while and for loop. |
| 13. | Write a program to create a trigger which will convert the name of a student to upper case before inserting or updating the name column of student table. |
| 14. | Write a PL/SQL block to count the number of rows affected by an update statement using SQL%ROWCOUNT |
| 15. | Write a PL/SQL block to increase the salary of all doctors by 1000. |

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Reference Books:

1. "SQL, PL/SQL The Programming Language of Oracle", 4th Revised Edition, Ivan Bayross (2009).
 2. "Oracle PL/SQL Programming", 5th Edition, Steven Feuerstein and Bill Pribyl (2009).
-

Course Code: UGCA1926

Course Name: Operating Systems Laboratory

| | |
|--------------------------------------|---|
| Program: BCA | L: 0 T: 0 P: 4 |
| Branch: Computer Applications | Credits: 2 |
| Semester: 4 th | Contact hours: 4 hours per week |
| Theory/Practical: Practical | Percentage of numerical/design problems: 100 |
| Internal max. marks: 60 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 40 | Elective status: Core |
| Total marks: 100 | |

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: After going through the practical, student will be able to:

| CO# | Course outcomes |
|------------|--|
| CO1 | Install & configure different operating systems. |
| CO2 | Write programs/ scripts for different scheduling algorithms. |

Instructions:

| | |
|----|--|
| 1 | Installation of windows OS. |
| 2 | Installation of Linux OS. |
| 3 | Dual boot installation of Operating systems. |
| 4 | Implementation of FCFS Scheduling algorithm |
| 5 | Implementation of SJF Scheduling algorithm |
| 6 | Implementation of Round-Robin Scheduling algorithm |
| 7 | Vi Editor & its commands |
| 8 | Shell Commands |
| 9 | Shell Scripting- Using variables |
| 10 | Shell Scripting- Input & Output |
| 11 | Shell Scripting- Data types |
| 12 | Shell Scripting- Use of arithmetic operators |
| 13 | Shell Scripting- if control statement programs |

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|----|--|
| 14 | Shell Scripting- while control statement |
| 15 | Shell Scripting- for control statement |

Reference Books:

1. Linux: The complete reference by Richard Petersen, Published by Tata McGraw-Hill Publication.
2. Operating System Principles by Abraham Silberschatz and Peter Baer Galvin, Seventh Edition, Published by Wiley-India.

Course Code: UGCA1927

Course Name: Web Designing

| | |
|--------------------------------------|---|
| Program: BCA | L: 3 T: 0 P: 0 |
| Branch: Computer Applications | Credits: 3 |
| Semester: 4 th | Contact hours: 33 hours |
| Theory/Practical: Theory | Percentage of numerical/design problems: 80% |
| Internal max. marks: 40 | Duration of end semester exam (ESE): 3hrs |
| External max. marks: 60 | Elective status: Skill Enhancement |
| Total marks: 100 | |

Prerequisite: Student must have the basic knowledge of any text editor like notepad, notepad++ and Edit plus etc.

Co requisite: Student must know the background of Markup Language.

Additional material required in ESE:

- Demonstration of the website of college/ specific department/specific cells etc. will be presented by the students during the final practical.
- Developed Website/s must be made online by the student/s.
- Printouts of the Main Page of the website must be arranged on Practical file during daily lab work and must be submitted in the final examinations.

Course Outcomes: The students will be able to:

| CO# | Course Outcomes |
|-----|--|
| CO1 | Understand the core concepts of Internet and Web Services. |
| CO2 | Describe and differentiate Programming Language and Markup Language. |
| CO3 | List various web pages and web sites together. |
| CO4 | Capture user input from the remote users. |
| CO5 | Learn connectivity concepts of Front End and Back End process. |

| Detailed Contents | Contact hours |
|-------------------|---------------|
| Unit-I | |

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| <p>Internet Basics Basic concepts, communicating on the internet, internet domains, internet server identities, establishing connectivity on the internet client IP address.</p> <p>Introduction To HTML Information Files Creation, Web Server, Web Client/Browser, Hyper Text Markup Language (HTML Tags, Paired Tags, Singular Tags), Commonly Used Html Commands (Document Head, Document Body), Title and Footer, Text Formatting (Paragraph Breaks, Line Breaks), Emphasizing Material in a Web Page (Heading Styles, Drawing Lines). Basic Formatting Tags HTML Basic Tags, Text Formatting (Paragraph Breaks, Line Breaks), Emphasizing Material in a Web Page (Heading Styles, Drawing Lines), Text Styles (Bold, Italics, Underline), Other Text Effects (Centering (Text, Images etc.), Spacing (Indenting Text), HTML Color Coding.</p> | 8 |
| <p>Unit-II Lists Type of Lists (Unordered List (Bullets), Ordered Lists (Numbering), Definition Lists.</p> <p>Adding Graphics To Html Documents Using The Border Attribute, Using The Width And Height Attribute, Using The Align Attribute, Using The Alt Attribute.</p> <p>Tables Introduction (Header, Data rows, The Caption Tag), Using the Width and Border Attribute, Using the Cell padding Attribute, Using the Cell spacing Attribute, Using the BGCOLOR Attribute, Using the COLSPAN and ROWSPAN Attributes</p> <p>Linking Documents Links (External Document References, Internal Document References), Image As Hyperlinks.</p> <p>Frames Introduction to Frames: The<FRAMESET> tag, The <FRAME> tag, Targeting Named Frames. DHTML: Cascading Style Sheets, Style Tag.</p> | 9 |
| <p>Unit-III Forms Used by a Web Site The Form Object, The Form Object's Methods (The Text Element, The Password Element, The Button Element, The Submit (Button) Element, The Reset (Button)</p> | 8 |

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|--|---|
| Element, The Checkbox Element, The Radio Element, The Text Area Element, The Select and Option Element, The Multi Choice Select Lists Element). | |
| Unit 4 Introduction to JavaScript JS Introduction, Where To, Output, Statements, Syntax, Comments, Variables, Operators, Arithmetic, Assignment, Data Types, Functions, Objects, Events, Strings, String Methods, Numbers, Number Methods, Arrays, Array Methods, Array Sort, Array Iteration, Dates, Date Formats, Date Get Methods, Date Set Methods, Math, Random, Booleans, Comparisons, Conditions, Switch, Loop For, Loop While, Break, Type Conversion, Bitwise, RegExp, Errors, Scope, Hoisting, Strict Mode, JSON, Forms, Forms API JS Functions, Function Definitions, Function Parameters, Function Invocation, Function Call, Function Apply, Function Closures | 8 |

Text Books/Reference Books:

1. Internet for EveryOne: Alexis Leon, 1st Edition, Leon Techworld, Publication, 2009.
2. Greenlaw R; Heppe, “Fundamentals of Internet and WWW”, 2nd Edition, Tata McGraw-Hill, 2007.
3. Raj Kamal, “Internet& Web Technologies”, edition Tata McGraw-Hill Education.2009.

E-Books/ Online learning material:

1. BayrossIvan, “HTML, DHTML, JavaScript, PERL, CGI”, 3rd Edition, BPB Publication,2009.
2. Chris Payne, “Asp in 21 Days”, 2nd Edition, Sams Publishing, 2003 PDCA.
3. A Beginner's Guide To Html [Http://www.Ncsa.Nine.Edit/General/Internet/www/Html.Prmter](http://www.Ncsa.Nine.Edit/General/Internet/www/Html.Prmter)
4. https://www.tutorialspoint.com/html/html_tutorial.pdf
5. <https://www.w3schools.com/js/>
6. <https://www.w3schools.com/html/>
7. https://www.cs.uct.ac.za/mit_notes/web_programming.html
8. http://www.pagetutor.com/table_tutor/index.html

Course Code: UGCA1928

Course Name: Web Designing Laboratory

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|--------------------------------------|---|
| Program: BCA | L: 0 T: 0 P: 2 |
| Branch: Computer Applications | Credits: 1 |
| Semester: 4 th | Contact hours: 2 hours per week |
| Theory/Practical: Practical | Percentage of numerical/design problems: 80% |
| Internal max. marks: 30 | Duration of End Semester Exam (ESE): 3hrs |
| External max. marks: 20 | Elective status: Skill Enhancement |
| Total marks: 50 | |

Prerequisite: Students must have the knowledge of editors like Notepad etc.

Co requisite: Knowledge of Networking, Internet, Client Server concepts, Static & Dynamic environment of the websites etc.

Additional material required in ESE:

- Demonstration of the website of college/ specific department/specific cells etc. will be presented by the students during the final practical.
- Developed Website/s must be made online by the student/s.
- Printouts of the Main Page of the website must be arranged on Practical file during daily lab work and must be submitted in the final examinations.

Course Outcomes: After studying this course, students will be able to:

| CO# | Course Outcomes |
|------------|--|
| CO1 | Implement Static/Dynamic concepts of web designing. |
| CO2 | Develop ability to retrieve data from a database and present it in a web page. |
| CO3 | Design web pages that apply various dynamic effects on the web site. |

Instructions: Instructor can increase/decrease the experiments as per the requirement.

| | |
|-----|---|
| 1. | Create a simple HTML page to demonstrate the use of different tags. |
| 2. | Design index page of a book on web designing. |
| 3. | Display Letter Head of your college on a web page. |
| 4. | Create a Hyperlink to move around within a single page rather than to load another page. |
| 5. | Display letter using different Text formatting Tags. |
| 6. | Design Time Table of your department and highlights of most important periods. |
| 7. | Use Tables to provide layout to your web page. |
| 8. | Embed Audio and Video into your web page. |
| 9. | Divide a web page vertically and horizontally and display logo of your college in left pane and logo of university in right pane. |
| 10. | Create a student Bio- Data. |
| 11. | Design front page of hospital with different style sheets. |
| 12. | Design a web page and display two different pages at a time. |

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|-----|---|
| 13. | Write a program to create a login form. On submitting the form, the user should get navigated to a profile page using JavaScript. |
| 14. | Write a code to create a Registration Form. On submitting the form, the user should be asked to login with the new credentials using JavaScript. |
| 15. | Write an HTML code to create your Institute website/Department website/ Tutorial website for specific subject. Also use Java Script for validation. |

Reference Books:

1. Greenlaw R; Hepp E, "Fundamentals of Internet and www", 2nd Edition, Tata. McGraw-Hill, 2007.
2. A Beginner's Guide to HTML
<http://www.Ncsa.Nine.Edit/General/Internet/www/a.html.prmter>.

Online Experiment material:

1. https://www.w3schools.com/html/html_examples.asp
 2. https://www.cs.uct.ac.za/mit_notes/web_programming.html
-

Guidelines regarding Mentoring and Professional Development

The objective of mentoring will be development of:

- Overall Personality
- Aptitude (Technical and General)
- General Awareness (Current Affairs and GK)
- Communication Skills
- Presentation Skills

The course shall be split in two sections i.e. outdoor activities and class activities.
For achieving the above, suggestive list of activities to be conducted are:

Part – A (Class Activities)

1. Expert and video lectures
2. Aptitude Test
3. Group Discussion
4. Quiz (General/Technical)
5. Presentations by the students
6. Team building Exercises

Part – B (Outdoor Activities)

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.

Evaluation shall be based on rubrics for Part – A & B

Mentors/Faculty incharges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.