

Scheme & Syllabus of Bachelor of Science in Information Technology (B.Sc. IT)

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 Science in Information Technology (B.Sc. IT)

Bachelor of Science (Information Technology) B.Sc.(IT):

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.

B. Sc. (IT) (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.

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PROGRAM OUTCOMES (POs)

Program: B. Sc. (IT)

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
UGCA1908	Core Theory	Computer System Architecture	3	1	0	40	60	100	4
UGCA1958	Core Practical/Laboratory	Workshop on Multimedia Tools	0	0	4	60	40	100	2
UGCA1912	Core Practical/Laboratory	Computer System Architecture 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	0	25	1
BMPD102-18		Mentoring and Professional Development	0	0	1	25	0	25	1
TOTAL			13	03	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		
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
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
UGCA1926	Core Practical/Laboratory	Operating Systems Laboratory	0	0	4	60	40	100	2
UGCA1925	Core Practical/Laboratory	Database Management Systems Laboratory	0	0	4	60	40	100	2
EVS102-18	Ability Enhancement Compulsory Course (AECC) -III	Environmental Science	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		
UGCA1921	Core Theory	Software Engineering	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
UGCA1924	Core Practical/Laboratory	Software Engineering 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
UGCA1959	Skill Enhancement Course-I	Internet Tools & Applications	3	0	0	40	60	100	3
UGCA1960	Skill Enhancement Course- Laboratory	Internet Tools & Applications Laboratory	0	0	2	30	20	50	1
BMPD302-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		12	03	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		
UGCA1913	Core Theory	Computer Networks	3	1	0	40	60	100	4
UGCA1932	Core Theory	Programming in Java	3	1	0	40	60	100	4
UGCA1961	Core Theory	Basic Accounting	3	1	0	40	60	100	4
UGCA1916	Core Practical/Laboratory	Computer Networks Laboratory	0	0	4	60	40	100	2
UGCA1938	Core Practical/Laboratory	Programming in Java Laboratory	0	0	4	60	40	100	2
UGCA1962	Core Practical/Laboratory	Basic Accounting 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
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: B.Sc. IT	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.	
<u>Unit-IV</u> 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

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Course Code: UGCA1902

Course Name: Fundamentals of Computer and IT

Program: B.Sc. IT	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	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>	12

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<p>Data Representation: Bit, Byte, Binary, Decimal, Hexadecimal, and Octal Systems, Conversions and Binary Arithmetic (Addition/ Subtraction/ Multiplication) Applications of IT.</p>	
<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 formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs.</p> <p>Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows.</p>	10
<p>Unit-IV</p> <p>The Impact of Computing and Internet on Society Introduction to 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.</p> <p>Concept of Mobile Computing, Cloud Computing, Big Data and Internet of Things (IoT)</p>	12

Text Books:

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education
2. Fundamentals of Computers, P. K. Sinha & P. Sinha, 2007, BPB Publishers.
3. IT Tools, R.K. Jain, Khanna Publishing House

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4. “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.
5. Computer Fundamentals, A. Goel, 2010, Pearson Education

E Books/ Online learning material

1. www.sakshat.ac.in
 2. <https://swayam.gov.in/course/4067-computer-fundamentals>
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Course Code: UGCA1908

Course Name: Computer System Architecture

Program: B.Sc. IT	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: 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
<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

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Unit-III	
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.	8
Unit-IV	
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.	
Register Transfer and Micro operations- Introduction to Registers, Instruction Format, Types of Instructions- Memory Reference Instructions, Register Reference Instructions and Input-Output Instructions.	12
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.	

Text Books:

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

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

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Course Code: UGCA1958

Course Name: Workshop on Multimedia Tools

Program: B.Sc. IT	L: 0 T: 0 P: 4
Branch: Computer Applications	Credits: 2
Semester: 1 st	Contact hours: 2 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 understanding of computer system and images.

Co requisite: -NA-

Additional material required in ESE: -NA-

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

CO#	Course outcomes
CO1	Define terms related to multimedia technologies.
CO2	Implement basic image editing.

Detailed contents	Contact hours
<p>Unit-I</p> <p>Introduction: Objectives – History of Multimedia – Its market – Content copyright – Resources for multimedia developers – Types of produces – Evaluation – Hardware Architecture – OS and Software – Multimedia Architecture – Software library – Drivers.</p>	4
<p>Unit-II</p> <p>Downloading and installing free open source multimedia tool like GIMP, understanding its workspace (toolbox, menus, panels).</p> <p>Paint Tools: Common Features, Dynamics, Brush Tools (Pencil, Paintbrush, Airbrush), Bucket Fill, Blend, Pencil, Paintbrush, Eraser, Airbrush, Ink, Clone, Heal, Perspective Clone, Blur/Sharpen, Smudge, Dodge/Burn, applying fills and outlines – creating default fills and outlines – gradient fill – types – custom fill – copy – clone – mesh – gradient mesh</p>	8
<p>Unit-III</p> <p>Transform Tools: Common Features, Align, Move, Crop, Rotate, Scale, Shear, Perspective, Flip, The Cage Tool.</p>	5

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Color Tools: Overview, Color Balance, Hue-Saturation, Colorize, Brightness-Contrast, Threshold, Levels, Curves, Posterize, Desaturate.	
Unit-IV Animation: Text Animation methods, building an animated GIF, Animating a still image, Morphing, re-synthesizer tool. Designing for a webpage: Web Design tools, Variable and fixed sized designs, Optimizing images for web.	5

*** Students can choose multimedia tool of their choice. Recommended tool is GIMP.**

Text Book:

1. A book of GIMP: A guide to nearly everything, Olivier Lecarme, Karine Delvare
Published by no starch press, California.
 2. Multimedia Technology and Applications – David Hillman-Galgotia
Publications pvt. Ltd, 1998.
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Course Code: UGCA1912

Course Name: Computer System Architecture Laboratory

Program: B.Sc. IT	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: 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

Instructions:

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

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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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Course Code: UGCA1906

Course Name: Fundamentals of Computer and IT Laboratory

Program: B.Sc. IT	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, ITL 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
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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
- 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

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- 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.
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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

- 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
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Course Code: HVPE101-18

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

Program: B.Sc. IT	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.
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 	8

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<ol style="list-style-type: none"> 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 	
<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' 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 6. Programs to ensure <i>Sanyam</i> and <i>Swasthya</i> - Practice Exercises and Case Studies will be taken up in Practice Sessions. 	8
<p>Unit-III</p> <p>Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship</p> <ol style="list-style-type: none"> 1. Understanding harmony in the Family- the basic unit of human interaction 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 3. Understanding the meaning of <i>Vishwas</i>; Difference between intention and competence 4. Understanding the meaning of <i>Samman</i>, Difference between respect and differentiation; the other salient values in relationship 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 	8

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<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>	
<p>Unit-IV</p> <p>Understanding Harmony in the Nature and Existence - Whole existence as Co-existence</p> <ol style="list-style-type: none"> 1. Understanding the harmony in the Nature 2. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature 3. Understanding Existence as Co-existence (<i>Sah-astitva</i>) of mutually interacting units in all-pervasive space 4. Holistic perception of harmony at all levels of existence - Practice Exercises and Case Studies will be taken up in Practice Sessions. 	4
<p>Unit-V</p> <p>Implications of the above Holistic Understanding of Harmony on Professional Ethics</p> <ol style="list-style-type: none"> 1. Natural acceptance of human values 2. Definitiveness of Ethical Human Conduct 3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order 4. 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 systems 6. 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 managers b) At the level of society: as mutually enriching institutions and organizations. 	5

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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
10. M Govindrajan, 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*
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I. K. Gujral Punjab Technical University
Bachelor of Science in Information Technology (B.Sc. IT)

Course Code: HVPE102-18

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

Program: B.Sc. IT	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

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

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: UGCA1922

Course Name: Database Management Systems

Program: B. Sc. IT	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	Understand the basic concepts of DBMS.
CO2	Formulate, using SQL, solutions to a broad range of query and data update problems.
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.</p> <p>Introduction to Data Models, Hierarchical, Network and Relational Model, Comparison of Network, Hierarchical and Relational Model, Entity Relationship Model.</p>	12
<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</p>	10

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Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Domain-key normal form (DKNF).	
Unit-IV Database Recovery, Concurrency Management, Database Security, Integrity and Control. Structure of a Distributed Database, Design of Distributed Databases.	10

Text Books:

1. "An Introduction to Database System", Bipin C. Desai, Galgotia Publications Pvt Ltd-New Delhi, Revised Edition, (2012).

Reference Books:

1. "SQL, PL/SQL The Programming Language of Oracle", Ivan Bayross, BPB Publications, 4th Revised Edition (2009)
 2. "An Introduction to Database Systems", C. J. Date, A. Kannan, S. Swamynathan, 8th Edition, Pearson Education, (2006).
 3. "Database System Concepts", Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Tata McGraw Hill, 6th Edition, (2013).
 4. Database Management Systems, Raghu Ramakrishnan, McGraw-Hill, Third Edition, 2014.
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I. K. Gujral Punjab Technical University
Bachelor of Science in Information Technology (B.Sc. IT)

Course Code: UGCA1923

Course Name: Operating Systems

Program: B.Sc. IT	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: Basic understanding of computer system.

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: After completing this course, 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, synchronization issues.</p> <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>	12
Unit-II	11

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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.	
Unit-III I/O Device Management: I/O devices and controllers, device drivers; disk storage. File Management: Basic concepts, file operations, access methods, directory structures and management, remote file systems; file protection.	10
Unit-IV 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.	11

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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I. K. Gujral Punjab Technical University
Bachelor of Science in Information Technology (B.Sc. IT)

Course Code: UGCA1909

Course Name: Object Oriented Programming using C++

Program: B.Sc. IT	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
<p>Unit-I</p> <p>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</p>	12
<p>Unit-II</p> <p>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.</p> <p>Introduction to constructors, Parameterized constructors, Copy Constructor, Multiple constructors in class, Dynamic initialization of objects, Destructors.</p>	10

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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. Object Oriented Programming Using C++, Salaria, R. S, Fourth Edition, Khanna Book Publishing.

Reference Books:

1. The C++ Programming Language, Bjarna Stroustrup, Third Edition, Addison-Wesley Publishing Company.
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Course Code: UGCA1910

Course Name: Object Oriented Programming using C++ Laboratory

Program: B.Sc. IT	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:

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 lass 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: UGCA1926

Course Name: Operating Systems Laboratory

Program: B.Sc. IT	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: 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
14	Shell Scripting- while control statement
15	Shell Scripting- for control statement

- Instructor can select programs of their own for implementing different concepts.

Reference Books:

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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.
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Course Code: UGCA1925

Course Name: Database Management Systems Laboratory

Program: B.Sc. IT	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	Able to understand various queries and their execution
CO2	Populate and query a database using SQL DML/DDI 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.
6.	Use of aggregate functions.
7.	Use of substring comparison.
8.	Use of order by statement.
9.	Consider the following schema for a Library Database: BOOK (<i>Book_id, Title, Publisher_Name, Pub_Year</i>)

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	<p>BOOK_AUTHORS (<i>Book_id, Author_Name</i>) PUBLISHER (<i>Name, Address, Phone</i>) BOOK_COPIES (<i>Book_id, Branch_id, No-of_Copies</i>) BOOK_LENDING (<i>Book_id, Branch_id, Card_No, Date_Out, Due_Date</i>) 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: SALESMAN (<i>Salesman_id, Name, City, Commission</i>) CUSTOMER (<i>Customer_id, Cust_Name, City, Grade, Salesman_id</i>) 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.
16.	Write a PL/SQL code to multiply two numbers using procedure inside the block.
17.	Write a PL/SQL code to calculate factorial of a given number using function.
18.	Create a package that contains function and procedure.
19.	Design database for Student Management System for your college using E-R model and Normalization.

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20.	Design and Develop Conceptual Data Model (E-R Diagram) for Library management System with all the necessary entities, attributes, constraints and relationships. Design and build Relational Data Model for application specifying all possible constraints.
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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: EVS102-18

Course Name: Environmental Science

Program: B.Sc. IT	L: 2 T: 0 P: 0
Branch: Computer Applications	Credits: 2
Semester: 2 nd	Contact hours: 22 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	Students will enable to understand environmental problems at local and national level through literature and general awareness.
CO2	The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues.
CO3	The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate these problems.
CO4	Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world

Detailed Contents	Contact hours
Unit-I Introduction to Environmental Studies	2

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<p>Multidisciplinary nature of Environmental Studies: Scope & Importance Need for Public Awareness.</p>	
<p>Unit-II</p> <p>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:</p> <ul style="list-style-type: none"> • Forest Ecosystem • Aquatic Ecosystem (Ponds, Lakes, River & Ocean) 	4
<p>Unit-III</p> <p>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</p> <p>Energy Resources: Renewable & non-renewable energy resources, use of alternate energy resources (Solar, Wind, Biomass, Thermal), Urban problems related to Energy</p>	4
<p>Unit-IV</p> <p>Biodiversity & its conservation Types of Biodiversity: Species, Genetic & Ecosystem India as a mega biodiversity nation, Biodiversity hot spots and biogeographic regions of India Examples of Endangered & Endemic species of India, Red data book</p>	4
<p>Unit-V</p> <p>Environmental Pollution & Social Issues</p>	4

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<p>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</p>	
<p>Unit-VI</p> <p>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</p>	4

Text 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, Clarendon Press Oxford (TB)
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 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)

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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.
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: UGCA1921

Course Name: Software Engineering

Program: B.Sc. IT	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): -
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	10

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The Nature of Software, Need of Software Engineering, Prescriptive Process Models, Specialized Process Models, The Unified Process.	
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, Structured Analysis, Function Oriented Design, Object-Oriented Design.	12
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
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I. K. Gujral Punjab Technical University
Bachelor of Science in Information Technology (B.Sc. IT)

Course Code: UGCA1914

Course Name: Programming in Python

Program: B.Sc. IT	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
<p>Unit-I</p> <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>	12

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<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> <p>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.</p>	10

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.

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2. Python in a Nutshell, A. Martelli, A. Ravenscroft, S. Holden, OREILLY.

Course Code: UGCA1915

Course Name: Data Structures

Program: B.Sc. IT	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
<p>Unit-I</p> <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>	10
Unit-II	8

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<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>	
<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> <p>Hashing: Hash Function, Types of Hash Functions, Collision, Collision Resolution Technique (CRT), Perfect Hashing</p>	12

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.

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3. Horowitz, S. Sahni, and S. Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt. Ltd., 1998.

Course Code: UGCA1924

Course Name: Software Engineering Laboratory

Program: B.Sc. IT	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: 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

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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

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: UGCA1917

Course Name: Programming in Python Laboratory

Program: B.Sc. IT	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
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.
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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.
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.

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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: B.Sc. IT	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: 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.

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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.
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.

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Course Code: UGCA1959

Course Name: Internet Tools and Applications

Program: B.Sc. IT	L:3 T:0 P:0
Branch: Computer Applications	Credits: 3
Semester: 3 rd	Contact hours: 33 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: 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	Understand basic concepts of Internet.
CO2	Design a web page.
CO3	Understand various applications of Internet .

Detailed contents	Contact hours
<p>Unit-I</p> <p>Internet: Internet, its advantages, disadvantages, internet facilities through WWW and HTML, Internet Protocols, TCP/IP, FTP, newsgroups, remote logins, chat groups etc.</p>	8
<p>Unit-II</p> <p>WWW: Client side, Server side, web browsers, web pages, locating information on the web.</p> <p>E-Mail: Architecture, various aspects, the user agent, message format, message transfer, e-mail privacy.</p> <p>Domain Name Server and its working</p>	9
<p>Unit-III</p> <p>HTML: Introduction to HTML, Web structure of HTML document.</p>	8

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<p>Starting an HTML document: Head element, body element, style element, Script element, Text formatting, using lists to organize information.</p> <p>Organizing Data with Table: Basic table Structures, individual cells and headings, vertical controls, database considerations, displaying real data with a table.</p> <p>Table Layout and Presentation: Table Syntax, two column layout, staggered body with an index, traditional newspaper layout.</p>	
<p>Unit-IV</p> <p>Uniform Resource Locators (URLs): Absolute URLs, Relative URLs, fragment URLs, Types of URL Schemes- HTTP, mailto, news, FTP, Telnet, File etc.</p> <p>Using Hyper Links and Anchors: Uses to Hyper Links, Structure of Hyper Links, Links to specialized contents.</p> <p>Images: Adding Images to web page, using images as links, creating menus with image maps, image formats-GIF, JPEG etc.</p>	8

Text Books:

1. Corner, Internetworking with TCP-IP: Principles, Protocols and Architecture, PHI.
 2. Stephan Mack, Janan Platt, HTML 4.0 No Experience Required, BPB Publication.
 3. Rick Darnell et al, HTML 4 Unleashed, Tech media Publications.
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Course Code: UGCA1960

Course Name: Internet Tools and Applications Laboratory

Program: B.Sc. IT	L: 0 T: 0 P: 2
Branch: Computer Applications	Credits: 1
Semester: 3 rd	Contact hours: 2 hours per week
Theory/Practical: Practical	Percentage of numerical/design problems: --
Internal max. marks: 30	Duration of end semester exam (ESE): 3hrs
External max. marks: 20	Elective status: Skill Enhancement
Total marks: 50	

Prerequisite: No pre-requisite

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to

CO#	Course outcomes
CO1	Understand basic concepts of Internet.
CO2	Design a web page.
CO3	Understand various applications of Internet .

Instructions:

1	Create a web page to show the structure of HTML
2	Show the use of formatting tags in HTML
3	Write HTML code to show the use of absolute and relative URL with Anchor Tag
4	Create a table in which colspan and rowspan elements are used.
5	Create a webpage to show the use of different lists available in HTML
6	Create a webpage to show the use of frame tag in HTML.
7	Create a webpage to show the use of different types of CSS
8	Create admission form for a college
9	Show the use of image tag and show images as buttons
10	Create a web page to show the use of image maps.

Text Books:

1. Corner, Internetworking with TCP-IP: Principles, Protocols and Architecture, PHI.
2. Stephan Mack, Janan Platt, HTML 4.0 No Experience Required, BPB Publication.
3. Rick Darnell et al, HTML 4 Unleashed, Tech media Publications.

I. K. Gujral Punjab Technical University
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Course Code: UGCA1913

Course Name: Computer Networks

Program: B.Sc. IT	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: 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
<p>Unit-I</p> <p>Data communications concepts: Digital and analog transmissions-Modem, parallel and serial transmission, synchronous and asynchronous communication. Modes of communication: Simplex, half duplex, full duplex.</p> <p>Types of Networks: LAN, MAN, WAN</p> <p>Network Topologies: Bus, Star, Ring, Mesh, Tree, Hybrid</p> <p>Communication Channels: Wired transmissions: Telephone lines, leased lines, switch line, coaxial cables-base band, broadband, optical fiber transmission.</p> <p>Communication Switching Techniques: Circuit Switching, Message Switching, Packet Switching.</p>	12
<p>Unit-II</p> <p>Network Reference Models: OSI Reference Model, TCP/IP Reference Model, Comparison of OSI and TCP/IP Reference Models.</p>	10

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<p>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>	
<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.

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.

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Course Name: Programming in Java

Program: B.Sc. IT	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: 40%
Internal max. marks: 40	Duration of end semester exam (ESE): 3hrs
External max. marks: 60	Elective status: Elective
Total marks: 100	

Prerequisite: Basic knowledge of programming like Programming in C.

Co requisite: - Knowledge of Object Oriented Concepts through any language like C++.

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to

CO#	Course outcomes
CO1	Familiarize with the concept of Object Oriented concepts by implementing Java Programming.
CO2	Learn the concepts of classes & objects with the features of reusability and implementation of the same with various control structures to solve real world problems.
CO3	Understand and design built-in and user defined functions/methods, interfaces and packages etc.
CO4	Handle various types of data using arrays & strings and handling of exceptions occurred in programs.
CO5	Utilize multithreading and applet features of Java for efficient and effective programming.
CO6	Create and handle files in Java.

Detailed Contents	Contact hours
Unit-I Java Programming Fundamentals: Introduction to Java, Stage for Java, Origin, Challenges of Java, Java Features, Java Program Development, Object Oriented Programming. Java Essentials: Elements of Java Program, Java API, Variables and Literals, Primitive Data Types, The String class, Variables, Constants, Operators, Scope of Variables & Blocks, Types of Comment in Java.	10
Unit-II	12

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<p>Control Statements: Decision making statements (if, if-else, nested if, else if ladder, switch, conditional operator), Looping statements (while, do-while, for, nested loops), Jumping statements (Break and Continue).</p> <p>Classes and Objects: Basic concepts of OOPS, Classes and Objects, Modifiers, Passing arguments, Constructors, Overloaded Constructors, Overloaded Operators, Static Class Members, Garbage Collection.</p> <p>Inheritance: Basics of inheritance, Inheriting and Overriding Superclass methods, Calling Superclass Constructor, Polymorphism, Abstract Classes, Final Class.</p>	
<p>Unit-III</p> <p>Arrays and Strings: Introduction to array, Processing Array Contents, Passing array as argument, Returning array from methods, Array of objects, 2D arrays, Array with three or more dimensions. String class, string concatenation, Comparing strings, Substring, Difference between String and String Buffer class, String Tokenizer class.</p> <p>Interface and Packages: Basics of interface, Multiple Interfaces, Multiple Inheritance Using Interface, Multilevel Interface, Packages, Create and Access Packages, Static Import and Package Class, Access Specifiers.</p> <p>Exception Handling: Introduction, Try and Catch Blocks, Multiple Catch, Nested Try, Finally, Throw Statement, Built-In Exceptions.</p>	10
<p>Unit-IV</p> <p>Multithreading: Introduction, Threads in Java, Thread Creation, Lifecycle of Thread, Joining a Thread, Thread Scheduler, Thread Priority, Thread Synchronization.</p> <p>Applets: Introduction, Applet Class, Applet Life Cycle, Graphics in Applet, Event-Handling.</p> <p>File and I/O Streams: File Class, Streams, Byte Streams, Filtered Byte Streams, Random Access File Class, Character Streams.</p>	12

Text Books:

1. Programming with Java A Primer, 5th Edition, E. Balagurusamy, TMH.
2. Java Programming for Core and Advanced Learners, Sagayaraja, Denis, Karthik, Gajalakshmi, Universities Press.

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3. Java Fundamentals, A Comprehensive Introduction, H. Schildt, D. Skrien, TMH.

Reference Books:

1. Java, The complete Reference, H. Schildt, 7th Edition, TMH.

Course Code: UGCA1961

Course Name: Basic Accounting

Program: B.Sc. IT	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: 75%
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: After completing this course, students will be able to:

CO#	Course outcomes
CO1	Justify the need of accounting books.
CO2	Define various accounting terms.
CO3	Prepare different accounting statements.
CO4	Discuss the role of computer technology in accounting.

Detailed contents	Contact hours
Unit-I Basic Accounting Concepts: Background of Accounting, Introduction, importance and scope, Accounts – Types and classification; basic terms– Capital, Income, Expenditure, Expenses, Assets, Liabilities and application to Problems., Accounting Equation, Double Entry System. Generally accepted accounting principles.	10
Unit-II Journal and Ledger- Journal and recording of entries in journal with narration; Ledger –Posting from Journal to respective ledger accounts. Basic concepts of purchase book, sales book and cashbook.	12

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<p>Unit-III</p> <p>Trial Balance: Need and objectives; Application of Trial Balance; different types of errors escaped, trial Balance preparation. Final Accounts: Final Accounts without adjustments.</p>	8
<p>Unit-IV</p> <p>Bank Reconciliation Statement: Bank transactions, Preparation of simple bank reconciliation statement. Sources of raising of capital in corporate undertaking: working Capital and Long-term Capital. Application of computers in accounting.</p>	12

Text Books:

1. Managerial Accounting, Jawahar Lal, First Edition, published by Himalya Publishing House.
2. Financial Accounting, R.K. Mittal & M.R. Bansal, First Edition, VK Publication.

Course Code: UGCA1916

Course Name: Computer Networks Laboratory

Program: B.Sc. IT	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:

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: UGCA1938

Course Name: Programming in Java Laboratory

Program: B.Sc. IT	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: 90%
Internal max. marks: 60	Duration of end semester exam (ESE): 3hrs
External max. marks: 40	Elective status: Core
Total marks: 100	

Prerequisite: - Basic knowledge of Programming language like Programming in C.

Co requisite: - Knowledge of Object Oriented Concepts through any language like C++.

Additional material required in ESE: - Minor Project.

Course Outcomes: Students will be able to

CO#	Course Outcomes
CO1	Implement Core Java concepts.

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CO2	Solve computational problems using various operators of Java.
CO3	Design solutions to complex by handling exceptions that may occur in the programs.
CO4	Solve complex and large problems using the concept of multithreading.
CO5	Implement interfaces and design packages.

Instructions: All programs are to be developed in Java programming language.

List of assignments:

1.	Write a program to perform following operations on two numbers input by the user: 1) Addition 2) subtraction 3) multiplication 4) division
2.	Write a Java program to print result of the following operations. 1. $-15 + 58 * 45$ 2. $(35+8) \% 6$ 3. $24 + -5*3 / 7$ 4. $15 + 18 / 3 * 2 - 9 \% 3$
3.	Write a Java program to compute area of: 1) Circle 2) rectangle 3) triangle 4) square
4.	Write a program to convert temperature from Fahrenheit to Celsius degree using Java.
5.	Write a program through Java that reads a number in inches, converts it to meters.
6.	Write a program to convert minutes into a number of years and days.
7.	Write a Java program that prints current time in GMT.
8.	Design a program in Java to solve quadratic equations using if, if else
9.	Write a Java program to determine greatest number of three numbers.
10.	Write program that gets a number from the user and generates an integer between 1 and 7 subsequently should display the name of the weekday as per that number.
11.	Construct a Java program to find the number of days in a month.
12.	Write a program to sum values of an Single Dimensional array.
13.	Design & execute a program in Java to sort a numeric array and a string array.
14.	Calculate the average value of array elements through Java Program.
15.	Write a Java program to test if an array contains a specific value.
16.	Find the index of an array element by writing a program in Java.
17.	Write a Java program to remove a specific element from an array.
18.	Design a program to copy an array by iterating the array.
19.	Write a Java program to insert an element (on a specific position) into Multidimensional array.
20.	Write a program to perform following operations on strings: 1) Compare two strings. 2) Count string length. 3) Convert upper case to lower case & vice versa. 4) Concatenate two strings. 5) Print a substring.

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21.	Developed Program & design a method to find the smallest number among three numbers.
22.	Compute the average of three numbers through a Java Program.
23.	Write a Program & design a method to count all vowels in a string.
24.	Write a Java method to count all words in a string.
25.	Write a method in Java program to count all words in a string.
26.	Write a Java program to handle following exceptions: 1) Divide by Zero Exception. 2) Array Index Out Of B bound Exception.
27.	To represent the concept of <i>Multithreading</i> write a Java program.
28.	To represent the concept of all types of inheritance supported by Java, design a program.
29.	Write a program to implement <i>Multiple Inheritance</i> using interface.
30.	Construct a program to design a package in Java.
31.	To write and read a plain text file, write a Java program.
32.	Write a Java program to append text to an existing file.
33.	Design a program in Java to get a list of all file/directory names from the given.
34.	Develop a Java program to check if a file or directory specified by pathname exists or not.
35.	Write a Java program to check if a file or directory has read and write permission.

Text Books:

1. Programming with Java A Primer, 5th Edition, E. Balagurusamy, TMH.
2. Java Programming for Core and Advanced Learners, Sagayaraja, Denis, Karthik, Gajalakshmi, Universities Press.
3. Java Fundamentals, A Comprehensive Introduction, H. Schildt, D. Skrien, TMH.

Reference Books:

1. Java, The complete Reference, H. Schildt, 7th Edition, TMH.
2. Data Analytics using R, Seema Acharya, TMH.

Course Code: UGCA1962

Course Name: Basic Accounting Laboratory

Program: B.Sc. IT	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	

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Prerequisite: Basic knowledge of MS Excel.

Co requisite: -NA-

Additional material required in ESE: -NA-

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

CO#	Course outcomes
CO1	Create different accounting statements in MS Excel.
CO2	Implement basic accounting project for small businesses in MS Excel

Instructions:

1.	Create Ledger in Excel *(create different types of ledgers)
2.	Create Trial balance in Excel
3.	Create trading and Profit & Loss account in Excel
4.	Creating day book account entry in Excel
5.	Implement basic accounting formulae using Excel
6.	Implement a project such as school managements system, inventory management system using Excel.

Online Tutorials:

1. Please refer to channel “Learn with purpose” to create different types of books and to create projects in MS Excel”.

Text Books:

1. Managerial Accounting, Jawahar Lal, First Edition, published by Himalya Publishing House.
2. Financial Accounting, R.K. Mittal & M.R. Bansal, First Edition, VK Publication.

Course Code: UGCA1927

Course Name: Web Designing

Program: B.Sc. IT	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.

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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
<p>Unit-I</p> <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</p> <p>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,</p>	9

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<p>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>	
<p>Unit-III</p> <p>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) Element, The Checkbox Element, The Radio Element, The Text Area Element, The Select and Option Element, The Multi Choice Select Lists Element).</p>	8
<p>Unit 4</p> <p>Introduction to JavaScript</p> <p>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</p> <p>JS Functions, Function Definitions, Function Parameters, Function Invocation, Function Call, Function Apply, Function Closures</p>	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:

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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/ww/Html.Prmter](http://www.Ncsa.Nine.Edit/General/Internet/ww/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
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Course Code: UGCA1928

Course Name: Web Designing Laboratory

Program: B.Sc. IT	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.

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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.
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
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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.