CURRICULUM FRAMEWORK AND SYLLABUS
FOR OUTCOME BASED EDUCATION IN
Bachelor of Computer Applications (BCA) Degree Program
FOR THE STUDENTS ADMITTED FROM
THE ACADEMIC YEAR 2022 ONWARDS

Naipunnya Institute of Management and Information Technology
(Affiliated to the University of Calicut , Accredited by NAAC with B++,ISO 9001-2015 Certified)
Pongam ,Koratty East , Thrissur District ,Kerala - 680308

Table of Contents

Sl No	Contents	Pg. No.
1	About the Department	3
2	Program Outcomes	4
3	Programme Specific Outcome	4
4	CO-PO and CO-PSO Mapping	5
5	Programme Structure in NIMIT	7
6	Semester wise Courses	9
7	Semester wise Activities	13
8	Detailed syllabus with Course outcomes , Course Objectives and CO-PO Mapping	15
9	Detailed Description of Activities	15
10	Course Evaluation and CIE	123

DEPARTMENT OF COMPUTER SCIENCE

VISION

"Be the very pinnacle of academic and research excellence in Computer Applications"

MISSION

As a Department, we are committed to

- Achieve academic excellence in Computer Applications through innovative teaching and learning processes.
- To prepare the students to be professionally competent to face the challenges in the industry.
- Promote inter-disciplinary research among the faculty and the students to create state of art research facilities.
- To promote quality and ethics among the students.
- Motivate the students to acquire entrepreneurial skills to become global leaders.

Courses Offered

- BSc Computer Science
- BCA
- MSc Computer Science

2. Program Outcomes

PO1. Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2. Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO3. Citizenship ethics, and sustainability: Demonstrate empathetic social concern and equity centered national development. Guided by ethics. Promoting social, economic and environment sustainability.

PO4: Use of computer skills: Use the knowledge of computers and information technology for data acquisition and data analysis in experimental investigations and in communication.

PO5. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

4. Programme Specific Outcome

PSO1: Get familiar with the potentially rich and employable field of computer applications

PSO2: Become eligible for higher studies in the area of Computer Science/ Applications.

PSO3: Develop skills in software development to take up self-employment in the Indian and global software market.

PSO4: Get trained and equipped with meeting the requirements of the software industry in the country and outside.

5. PSO-PO Mapping

	PSO1	PSO2	PSO3	PSO4
PO1.Critical Thinking	3	2	3	3
PO2.Effective Communication	3	2	3	2
PO3. Citizenship, ethics and Sustainability	3	3	3	1
PO4. Use of computer skills	2	2	3	3
PO5.Self-directed and Life-long Learning	1	2	2	2

5. Programme Structure

BACHELOR OF COMPUTER APPLICATION
(B. C. A)
(Choice Based Credit and Semester System for Undergraduate Curriculum 2019)

The basic objective of the Programme is to open a channel of admission for computing courses for students, who have done the 10+2 and are interested in taking computing/IT as a career. After acquiring the Bachelor's Degree (BCA) at University of Calicut, there is further educational opportunity to go for an MCA or other Master's Programme like MSc (Computer Science), MSc (IT), MBA, etc., at this university or at any other University/Institute. Also after completing the BCA Programme, a student should be able to get an entry level job in the field of Information Technology or ITES or they can take up self-employment in the Indian & global software market. The specific objectives of the Programme include

Duration: The duration of the BCA Programme shall be six semesters distributed over a period of three academic years. The odd semesters (1, 3, 5) shall be from June to October and the even Semesters (2, 4, 6) shall be from November to March. Each semester shall have 90 working days inclusive of all examinations. Courses: The UG programme shall include five types of courses, viz; Common Courses (Code A), Core courses (Code B), Complementary courses (Code C), Open Course (Code D) and Audit courses (Code E).

Add-on Courses (Code NCSAOC), Bridge Course (Code NCSBC), Additional Certification Courses (Code NCSACC) , walk with the scholar program(NCSWWS) and various activities (NCSACT)   are provided by the department in various semesters in addition to the university's insisted courses.

Credits(C): Each course shall have certain credits. A student is required to acquire a minimum of 140 credits for the completion of the UG programme, of which 120 credits are to be acquired from class room study and shall only be counted for SGPA and CGPA. Out of the 120 credits, 14 credits for common courses (English), 8 credits for additional language courses and 16 credits for General courses. The maximum credits for a course shall not exceed 5. Audit courses shall have 4 credits per course and a total of 16 credits in the entire programme. The maximum credit acquired under extra credit shall be 4. If more Extra credit activities are done by a student, it may be mentioned in the Grade card. The credits of audited courses or extra credits are not counted for SGPA orCGPA. 'Letter Grade" or simply „Grade" (G): in a course is a letter symbol (O, A+, A, B+, B, C, P, F, I and Ab). Grade shall mean the prescribed alphabetical grade awarded to a student based on his/her performance in various examinations. `Credit Point" (P) of a course is the value obtained by multiplying the grade point (G) by the credit (C) of the course: P=G x C. 'Extra Credit" is the additional credit awarded to a student over and above the minimum credits required in a programme, for achievements in co-curricular activities and social activities conducted outside the regular class hours, as decided by the University. For calculating CGPA, extra credits will not be considered.

Attendance: A student shall be permitted to appear for the semester examination, only if he/she secures not less than 75% attendance in each semester. Attendance shall be maintained by the Department concerned. Condonation of shortage of attendance to a maximum of 10% in the case of single condonation and 20% in the case of double condonation in a semester shall be granted by University remitting the required fee. Benefits of attendance may be granted to students who attend the approved activities of the college/university with the prior concurrence of the Head of the institution. Participation in such activities may be treated as presence in lieu of their absence on production of participation/attendance certificate (within two weeks) in curricular/extracurricular activities (maximum 9 days in a semester). Students can avail of condonation of shortage of attendance in a maximum of four semesters during the entire programme (Either four single condonations or one double condonation and two single condonations during the entire programme). If a student fails to get 65% attendance, he/she can move to the next semester only if he/she acquires 50% attendance. In that case, a provisional

6

registration is needed. Such students can appear for supplementary examinations for such semesters after the completion of the programme. Less than 50% attendance requires Readmission. Readmission is permitted only once during the entire programme. Strike off the roll: A student who is continuously absent for 14 days without sufficient reason and proper intimation to the Principal of the college shall be removed from the roll.

Ability Enhancement courses/Audit courses: These are courses which are mandatory for a programme but not counted for the calculation of SGPA or CGPA. There shall be one Audit course each in the first four semesters. These courses are not meant for classroom study. The students can attain only pass (Grade P) for these courses. At the end of each semester there shall be an examination conducted by the college from a pool of questions (Question Bank) set by the University. The students can also attain these credits through online courses like SWAYAM, MOOC etc. (optional). The list of passed students must be sent to the University from the colleges at least before the fifth semester examination.

Grace Marks: Grace Marks may be awarded to a student for meritorious achievements in co-curricular activities (in Sports/Arts/ NSS/NCC/ Student Entrepreneurship) carried out besides the regular class hours. Such a benefit is applicable and limited to a maximum of 8 courses in an academic year spreading over two semesters. No credit shall be assigned for such activities. In addition, a maximum of 6 marks per semester can be awarded to the students of UG Programmes, for participating in the College Fitness Education Programme (COFE).

Project: Every student of a UG degree programme shall have to work on a project of 2 credits under the supervision of a faculty member or shall write a theory course based on Research Methodology as per the curriculum. College shall have the liberty to choose either of the above.

Extension Activities: Compulsory social service (CSS) for a period of 15 days is essential for the successful completion of the B.Sc. Computer Science Programme.

PROGRAMME STRUCTURE IN NIMIT

- The Bachelor of Computer Application programme will equip the students with the necessary knowledge and skills for the existing and emerging challenges that a career in computing and software technology will entail.
- In addition it prepares graduates to show high quality of independent thought, flexibility and maturity based on a sound technical knowledge of the field.
- The Bachelor of Computer Application programme aims to provide graduates with the skills and methods needed to create new generations of software applications and to appreciate the technical basis on which they should be built.
- The emphasis throughout is on a thorough understanding of the foundations on which modern development rests, on the software life cycle and project control, on program specification and

implementation, on modern software architectures and on human-computer interaction issues through Mathematical and Statistical concepts.

- After the successful completion of first year, the students will develop problem-solving strategies, techniques and skills that can be applied to computers and problems in other areas which give students an introduction to computer and analytical skills to use in their subsequent course work and professional development. Students will learn in detail about the mathematical foundations for various computer applications and discrete mathematics. Develop proficiency in the C programming language. Develop fundamental ideas of Mathematical Logic. Develop data reduction techniques. Understand probability theory and random variables. Students will also accrue knowledge of various accounting principles and optimization techniques.

- In addition to the university syllabus, students will also learn "Basic Communication skills", "Basics Skill Enrichment Program" and "Advanced Excel". Students will also learn to develop Simple websites using HTML through Mini Projects.

- After the successful completion of second year, the students will be familiar with major algorithms and data structures such as balanced search trees, hash tables, priority queues etc. Be familiar with the role of project management including planning, scheduling, risk management, etc. Understand the approaches to verification and validation including static analysis, and reviews. Be proficient TOC and MY SQL Be able to interpret equations of lines and planes in space expose the real-life applications of Probability distributions. Explain standard error and testing procedures for parameters of a Normal population using large and small samples. Students will also be familiar with Python Programming Microprocessors, Data communication, Sensors and transducers.

- In addition to the university syllabus, students will also learn "Intermediate Skill Enrichment", "Basic OOPs concepts" and "Digital Marketing". Students will also learn to develop Simple Python Applications, Database design in real world organizations and Computer Graphics Algorithms through Mini Projects.

- After the successful completion of third year, the students will, be proficient in Object Oriented Programming and JAVA IDE. Be able to develop and manage a Website. Be familiar with different operating systems. Be able to develop Android applications. Be able to develop quality software solution by following the software engineering principles and practices. Be able to understand, design, and analyze precise specifications of algorithms, procedures, and interaction behavior. Have experience of working in teams to build software systems.

- In addition to the university syllabus, students will also learn "Introductory concepts of Digital Computing", "Advanced Skill Enrichment" and "Introduction to Image Processing and Machine Learning". Students will also learn to develop software's/applications through their final year projects.

- Students will also develop their Aptitude and technical interview skills.

- Students will also learn "Basics Industrial practices and Ethics" through Industrial visits and interactions.

6. Semester wise Courses

Seme ster	Sl No	Course Type	Course Code	Course Description	Number of Hours
1	1	University Insisted Course	A01	Litmosphere: The World of Literature	72 hrs.
	2		A02	Functional Grammar And Communication In English	72 hrs.
	3		A07	Languages other than English	90 hrs.
	4		BCA1B01	Computer Fundamentals & HTML	64 hrs.
	5		BCA1C01	Mathematical Foundation for Computer Applications	64 hrs.
	6		BCA1C01	Discrete Mathematics	64 hrs.
	7		Audit Course	Environment Studies	-
	7	Add-on Course	NCSAOC1	Communication Skills	30 hrs.
	8	Bridge Course	NCSBC01	Mathematics	20 hrs.
1 & 2	9	Additional Certification Course	NCSACC1	Basics Skill Enrichment Program	30 hrs.
2	10	University Insisted Course	A03	Readings from the Fringes	72hrs.
	11		A04	Readings on Kerala	90hrs.

		12		A08	Literature in Languages other than English	90hrs.
		13		BCA2B02	Problem Solving using C	64hrs.
		14		BCA2B03	Programming Laboratory I: HTML and Programming in C	
		15		BCA2C03	Financial and Management Accounting	64hrs.
		16		BCA2C04	Operations Research	64hrs.
		17		Audit Course	Environment Studies	
		18	Bridge Course	NCSBC02	Basics of C Programming	20 hrs.
		19	Additional Certification Course	NCSACC2	Advanced Excel	5 hrs.
3		20		A11	Python Programming	64 hrs.
		21		A12	Sensors and Transducers	64 hrs.
		22	University Insisted Course	BCA3B04	Data Structures using C	112 hrs.
		23		BCA3C05	Computer Oriented Numerical and Statistical Methods	80 hrs.
		24		BCA3C06	Theory of Computation	80 hrs.
		25		Audit Course	Environment Studies	
		26	Add-on Course	NCSAOC2	Coursera - Python Programming	

3 & 4	27	Additional Certification Course	NCSACC3	Intermediate Skill Enrichment	30 hrs.
4	28	University Insisted Course	A13	Data Communication and Optical Fibers	64 hrs.
	29		A14	Microprocessors-Architecture and Programming	64 hrs.
	30		BCA4B05	Database Management System and RDBMS	112 hrs.
	31		BCA4B06	Programming Laboratory II: Data Structures and RDBMS	
	32		BCA4C07	E-Commerce	80 hrs.
	33		BCA4C08	Computer Graphics	80 hrs.
	34		Audit Course	Environmental studies	
	35	Bridge Course	NCSBC03	Introduction to OOPs Concepts	20 hrs.
	36	Additional Certification Course	NCSACC4	Digital Marketing	5hrs
5	37	University Insisted Course	BCA5B07	Computer Organization and Architecture	64 hrs.
	38		BCA5B08	Java Programming	96 hrs.
	39		BCA5B09	Web Programming Using PHP	96 hrs.
	40		BCA5B10	Principles of Software Engineering	64 hrs.

	41		XXX5DXX	Open Course	48 hrs.
	42	Add-on Course	NCSAOC3	MOOC Course- Introductory concepts of Digital Computing	30 hrs.
5 & 6	43	Additional Certification Course	NCSACC5	Advanced Skill Enrichment	30 hrs.
6	44	University Insisted Course	BCA6B11	Android Programming	112 hrs.
	45		BCA6B12	Operating Systems	112 hrs.
	46		BCA6B13	Computer Networks	80 hrs.
	47		BCA6B14	Programming Laboratory III: Java and PHP Programming	
	48		BCA6B15	Programming Laboratory IV: Android and Linux shell Programming	
	49		BCA6B16X	Elective Course- Software Testing	64 hrs.
	50		BCA6B17	Industrial Visit & Project Work	64 hrs.
	51	Additional Certification Course	NCSACC5	Introduction to Image Processing and Machine Learning	5hrs

Ability Enhancement courses/Audit courses:

Courses	Semester	Credit
Environment Studies	1	4
Disaster Management	2	4
*Human Rights / Intellectual Property Rights / Consumer Protection	3	4
*Gender Studies/Gerontology	4	4

7. Semester wise Activities

Sem	Sl No	Activity Code	Activity Type	Activity Details
1	1	NCSACT01	Ability test	Mathematics
	2	NCSACT02	Ability test	Basic Computer fundamentals
	3	NCSACT03	Mini Project	Computer Fundamentals & HTML
	4	NCSWWS01	WWS	Introduction to JavaScript
2	5	NCSACT04	Competition	PPT presentation on Recent Trends in IT

	6	NCSACT05	Workshop	Introduction to system hardware
3	7	NCSACT06	Mini Project	Python
	8	NCSACT07	Training	Aptitude Training
	9	NCAWWS02	WWS	Research paper Writing
4	10	NCSACT06	Industrial Interaction	Industry Ethics & Practices
	11	NCSACT07	Mini Project	Computer Graphics
	12	NCSACT08	Competition	Research paper review competition
	13	NCSACT09	Training	Technical Interview preparation
5	14	NCSACT10	Seminar	how to become an Entrepreneur
	15	NCSACT11	Industrial Interaction	Getting ready for placements
6	16	NCSACT12	Workshop	Introduction to Manual & Automation testing
	17	NCSACT13	Industrial visit	visit to an IT Industry

8. Detailed Syllabus of Courses with Course Outcomes, Course Objectives and CO-PO/PSO Mapping

Semester 1

ENG1A01: LITMOSPHERE: THE WORLD OF LITERATURE   **No. of sessions: 72**

Course Objectives
1. To develop the ability to appreciate life and literature
2. To cultivate an interest in society and culture
3. To envisage creative approach to life and literature

Course Outcomes
CO1: Develop the qualities necessary to become good, kind and responsible human being
CO2: Attain confidence to ask questions
CO3: Apply logical and analytical skills in various situations
CO4: Understand and apply problem solving skills
CO5: Assimilate new perspectives on life
CO6: Enhance the ability to express themselves through writing

CO-PO/PSO Mapping

PO → CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	2	3	3	3	2	3	2	2	2
CO2	3	3	2	2	3	2	3	2	2
CO3	2	3	2	3	3	2	2	3	2
CO4	3	3	2	3	2	2	2	2	3
CO5	3	3	2	3	3	3	2	2	2
C06	2	3	3	3	2	2	3	2	2

COURSE SUMMARY

Module 1: 14 hrs.

15

Module 2: 16 hrs.

Module 3: 14 hrs.

Module 4: 16 hrs.

Evaluation: 12 hrs.

Total: 72 hrs.

COURSE DETAILS:

MODULE 1: Literature- Initiation

1. To Posterity (poem) - Louis MacNeice

2. The Rocking Horse Winner (Short Story) -D H Lawrence

3. ''Memoirs of a Mad Man (Prose excerpts from Autobiography)-Gustave Flaubert

MODULE 2: Creative Thinking and Writing

1. The Thought Fox (poem)-Ted Hughes

2. Poetry (poem)-Marianne Moore

3. Excerpt from an Autobiography (Prose)-Agatha Christie

4. Half a Day (Short story)-Naguib Mahfouz

MODULE 3: Critical Thinking

1. To a Reason (Poem) - Arthur Rimbaud

2. The Adventures of the Retired Colourman (Short Story)--Arthur Conan Doyle

3. Trifles (One-Act Play)-Susan Glaspe

MODULE 4: Perspectives

1. Body without the "d" (Poem)-Justice Ameer

2. Sleeping Fool (Poem)-Suniti Namjoshi

16

3. The Cockroach (Short Story)-Luis Fernando Verissimo; translated by Anna Vilner

4. About Dalit Literature" (Prose)-Sharankumar Limbale

5. Purl (Short Film)-Kristen Lester

ENG1A02: FUNCTIONAL GRAMMAR AND COMMUNICATION IN ENGLISH

Number of Hours: 90

Course Objectives
1. To identify the key concepts of English grammar.
2. To describe the use of appropriate language through the understanding of the sentence patterns in English.
Course Outcomes
CO1: Demonstrate the ability to use the syntactic structures within English texts.
CO2: Distinguish logical and analytical skills in the use of language for communication.
CO3: Develop writing skills in various professional and career related situations
CO4: Formulate the basic skills in spoken communication in formal contexts

CO-PO/PSO Mapping

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4

CO ↓									
CO1	3	3	3	2	2	3	2	3	2
CO2	3	3	2	1	3	3	3	3	1
CO3	3	1	2	1	2	3	3	3	3
CO4	1	3	2	3	1	3	3	3	3

COURSE SUMMARY

Module 1: 26 hrs.

Module 2: 26 hrs.

Module 3: 26 hrs.

Evaluation: 12 hrs.

Total: 90 hrs.

COURSE DETAILS:

Module1: Basic Concepts of Syntax

Word order and Sentence Patterns - Concord/ Subject-Verb Agreement - Types of Sentences based on Functions - Types of Sentences based on Clauses - Transformation of Sentences - Affirmative and Negative Sentences - Connectives- Collocations - Punctuations

Module 2: Basic Functional Aspects of Grammar Use of major tense forms (Emphasis on tense forms in use in everyday transactions) – Use of Active and Passive Voice – Making use of Reported Speech – Use of functional elements in sentences – Articles – Prepositions.

Module 3: Skills for Communication Aspects of Formal Communication – Barriers to Communication – Preparation for Minutes of Meeting – Writing of Memos - Emails – Letter writing – Writing Curriculum Vitae/Resume - Proposals and Statements of Purpose – Reviews - Case Studies – Group discussion – Presentation skills

MAL1A07 (3) Malayalabhashayum Sahithyavum-1   No. of sessions: 90

Course Objectives
1. Implant an interest in Science and literature in students of conventional graduate courses.
2. Make the students to prepare Science essays and studies in Mother tongue.
3. Improve the communication skills and the taste for creative writing.
Course Outcomes
CO1: Inculcate an interest in Mother tongue and regional literature thereby improve their cultural development.
CO2: Improve the language skills.
CO3: Familiarize with Malayalam literature and the stylistic use of language in various periods.
CO4: Improve the basic grammatical structure of language use of students.
CO5: Familiarize with different and varied cultural realms of Kerala culture.

CO-PO/PSO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	3	2	0	1	0	2	3	3	2	2	1	0

19

CO2	2	2	2	3	1	3	2	3	1	1	2	2
CO3	3	1	2	0	2	2	2	1	1	2	1	2
CO4	2	2	2	1	2	2	3	2	2	1	2	3
CO5	1	2	2	3	1	2	1	1	3	1	2	2

Module 1: Essays
Kalayum Avishkaravum**-**Nithyachaithanya Yathi,
Njangal Ningalkku Bhoomi Vittal-Siyatil Moopan,
Kandal Jeevitham-Pokkudan

Module 2: Stories
Bonsayikal –Kovilan,
Lola enna American Penkidavu-Pathmarajan,
Vismayachihnangal-Ashitha

Module 3: Travelogue
Kappirikalude Nattil – S K Pottekkattu

Module 4: Poems
Budhanum Njanum Nariyum-Idassery,
Kollendathengane-Sugathakumari,
Meera Padunnu-Sachidanandan,
Pala posilulla Photokal-K G S

HIN 1A 07(3)   **No. of sessions: 90**

Course Objectives

Acquaint the students with different forms of thoughts and styles used in Hindi prose writing ,to make them express their thoughts in these different forms.
Introduce Hindi one act plays to the students for appreciation and critical analysis.
Help them to develop their creative thinking and writing.

Course Outcomes
CO1:Approach literary texts in terms of genre, gender and the canon
CO2: Understand and use academic conventions: referencing and bibliography.
CO3: The learner will be aware of socio-political and economic conditions of the society from different periods.
CO4:Be familiar with the theoretical foundations of the genre;
CO5:Be able to compare and contrast the genre with other dramatic forms;

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	2	2	0	2	0	1	2	1	1
CO2	2	2	0	2	0	1	1	2	1
CO3	2	2	0	2	0	1	2	1	1
CO4	2	2	0	1	0	1	1	2	1
CO5	2	2	0	1	0	1	2	1	1

Module 1

Selected prose –

1.Ramvriksh Benipuri – Subhan Khan

21

2. Hazariprasad Dwivedi – Bheeshm ko kshama nahin kiya gaya

3.Harishankar Parsaee – Trishanku Bechaara

4. Mohan Rakesh – Yatra ka Romance

Module 2

One act plays

1.Mamta Kaliya – Jan se pyare

2.Vinod Rastogee – Bahu kee vida

Module 3

3.Swadesh Deepak – Shadee kee Bath

.Omprakash Aditya-Rehearsal

4. BCA1B01 – Computer Fundamentals and HTML   No. of sessions: 64

Course Objectives
1. To equip the students with fundamentals of Computer
2. To learn the basics of Computer organization in personal and professional contexts.
3.To equip the students to write algorithm and draw flowchart for solving simple problems
4.To learn the basics of Internet and web page design
Course Outcomes
CO1:Identify and understand the basics of computer organization and gain functional knowledge of the hardware used in computers and how a software is being executed in a computer
CO2: Explain and apply the basic concepts of number systems and the use of Binary, Decimal and Hexadecimal number systems, and demonstrate competence in the conversion of numbers from one representation to another.
CO3: Demonstrate familiarity with Boolean Operations, the Laws of Boolean Algebra, DE Morgan Theorems and the application of Boolean Algebra and Karnaugh Maps to simplify logic circuits.
CO4: Develop problem-solving strategies, Algorithms and Flowcharts that can be applied to computers and

problems in other areas which give students an introduction to computer and analytical skills to use in their subsequent course work and professional development.

CO5: Enable students to understand the internet and develop web page creation using basic HTML Tags and students will be able to create web pages with different styles and formats.

CO-PO/PSO Mapping

PO→ CO↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	2	0	1	3	1	3	3	2	2
CO2	1	0	0	1	0	0	1	1	1
CO3	1	0	0	1	0	0	1	1	0
CO4	3	1	2	2	3	3	3	3	2
CO5	3	1	2	3	3	3	3	3	3

Unit I

Concepts of Hardware and Software: Computer Languages, Language Translators, Features of good language, Basics Computer Organization: Von Neumann Model, Input Unit, Output Unit, Storage Unit, Control Unit, Memory Hierarchy, Primary Storage, Cache Memory, Registers, Secondary Storage Devices, Basics of Hardware Components – SMPS, Motherboard, Add-on Cards, Ports, Memory, Adapters, Network cables, Basic Computer Configuration

Unit II

Number Systems and Boolean Algebra – Decimal, Binary, Octal and Hexadecimal Numbers, Arithmetic involving Number Systems, Inter Conversions of Number Systems, 1"s and 2"s Complements, Complement Subtractions, Digital Codes – Binary Coded Decimal (BCD), ASCII Code ,Unicode, Gray Code, Excess-3 Code. Boolean Algebra: Boolean Operations, Logic

23

Expressions, Postulates, Rules and Laws of Boolean Algebra, DeMorgan's Theorem, Minterms, Maxterms, SOP and POS form of Boolean Expressions for Gate Network, Simplification of Boolean Expressions using Boolean Algebra and Karnaugh Map Techniques (up to 4 variables)

Unit III

Fundamentals of Problem Solving – The Problem Solving Aspect, Top-down Design, Definition – Algorithm, Flowchart, Program - Properties of Flowcharts – Flowchart Symbols for Designing Application Programs, Sample Algorithms – Sum, Average, Finding Smallest Number, Checking Odd/Even Number, Prime Number, Quadratic Equation

Unit IV

Basics of Web Design – www, W3C, Web Browser, Web Server, Web Hosting, Web Pages, DNS, URL, Introduction to HTML, XHTML, DHTML, HTTP.

Overview of HTML 5 – Basic Formatting Tags: heading, paragraph, break, underline, bold, italic, superscript, subscript, font and image, attributes: align, color, bgcolor, font face, border, size, navigation links using anchor tag: internal, external, mail and image, lists: ordered, unordered and definition, HTML media tags: audio and video

Unit V

Creating Simple Tables: row, col, heading, cell, border, spanning – Form Controls: Input types – text, password, text area, button, checkbox, radio button, select box, hidden controls, frames and frame sets

CSS: Introduction - Concept of CSS, Creating Style Sheet: inline and internal, CSS Properties, CSS Styling: Background, Text Format, Controlling Fonts - Working with Block Elements and Objects, CSS ID and Class

5. BCA1C02 – Discrete Mathematics   **No. of sessions: 64**

Course Objectives
1. To learn mathematical logic and Boolean algebra.
1.   2. To learn Graph theory and trees.

Course Outcomes
CO1:To explain basic notions of symbolic logic and prove boolean expressions
CO2: To Perform the operations of union, intersection, complement, and difference on sets using proper notation
CO3: To define the basic concepts of graphs, directed graphs, and weighted graphs and understand Eulerian and Hamitonian graphs
CO4: Will be able to understand the concept of plane graph and theory & is able to understand Eulerian and Hamitonian graphs
CO5: To understand various types of trees and methods for traversing trees.

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	0	1	0	3	3	1	2
CO2	3	0	0	1	0	3	3	1	2
CO3	3	0	0	1	0	3	3	1	2
CO4	3	0	0	1	0	3	3	1	2
CO5	3	0	0	1	0	3	3	1	2

UNIT I

Mathematical Logic: Propositions and logical operators, Truth tables, equivalence and implementation, Laws of logic, Quantifiers. Set theory: Introduction, concept of set of theory relation, types of relation, equivalence relation.

UNIT II

25

Boolean Algebra and its properties, Algebra of propositions & examples, De-Morgan's Laws, Partial order relations, greatest lower bound , least upper bound, Algebra of electric circuits & its applications. Design of simple automatic control system

UNIT III

Graph: Simple and multigraph, Incidence and degree, Isomorphism, Sub graphs and Union of graphs, connectedness, Walks, Paths and Circuits, Euler's Formula, Eulerian graph, Hamiltonian graph, Chromatic Graphs, Planar Graphs, Travelling salesman problem, Complete, Regular and Bipartite graphs, Directed Graphs

UNIT IV

Trees: Properties of trees, pendant vertices. Centre of a tree, rooted and binary trees, spanning trees, spanning tree algorithms, fundamental. Circuits; spanning trees of a weighted graph: cut sets and cut-vertices; fundamental cut sets; connectivity and separativity; network. Flows; max-flow min-cut theorem.

UNIT V

Plan on graphs, dual graphs, and Kuratowski's two graph, matrix representation of graphs, incidence matrix, directed graphs, digraphs, directed paths and connectedness. Euler digraphs.

BCA1C01 – Mathematical Foundation for Computer Applications

Course Objectives
1. To learn the basic principles of linear algebra and vectors.
2. To learn the basic principles of differential and integral Calculus.
3. To learn mathematical modeling using ordinary and partial equations.

Course Outcomes
CO1:To Acquire knowledge of the principles of linear algebra and vectors, as well as their application in definite integrals
CO2: To Demonstrate an understanding of matrices and their operations, grasping the fundamental concepts associated with these mathematical structures.
CO3: To Apply the concept of Cayley Hamilton and solve systems of equations, showcasing the practical

application of linear algebra in solving mathematical problems.

CO4: To Analyze the concept of vectors in two and three dimensions, breaking down their components and understanding their geometric and algebraic properties

CO5: To Integrate knowledge to comprehend the basic principles of differential and integral calculus, including definite and indefinite integrals, synthesizing various mathematical concepts for problem solving

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	1	0	1	1	3	3	1	2
CO2	3	0	1	1	0	3	3	1	1
CO3	3	0	0	1	1	3	3	1	2
CO4	3	1	1	1	0	3	3	1	1
CO5	3	0	0	1	1	3	3	1	2

UNIT I (12T)

Linear Algebra and Vector Calculus: Matrices: Matrix definition, order of a matrix, types of matrices, addition of matrices, multiplication of matrices, various kinds of matrices, transpose of a matrix.

UNIT II (12T)

Linear system of equations and solutions using gauss elimination, Gauss Jordan, and Gauss Siedel methods. Linear independence and rank, determinants, inverse, Eigen values. Vectors: Vectors in 2- and 3-space, dot and cross products.

UNIT III (14T)

Differentiation: Limits (definition only).Derivative at a point, Derivative of a Function, Differentiation from first principle, Differentiation of important functions, Product rule, Quotient rule, Differentiation of a function of a function (problem based)

UNIT IV (12T)

Integration: Integral as Anti-derivative, Indefinite integral &constant of integration, Fundamental theorems, Elementary Standard results.

UNIT V (14T)

Methods of Integration, Integration through Partial Functions, Integration by parts. Definite Integral: Evaluation by Substitution, Properties of definite integrals (Problem Based)

AUD1E01 ENVIRONMENTAL STUDIES

Course Objectives
1 The study aims at imparting basic knowledge about the environment and its allied problems and acquiring an environmentally conscious mindset.
Course Outcomes
C01:Comprehend the importance of ecosystem and biodiversity
C02:To correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention Identify different types of environmental pollution and control measures
C03:To correlate the exploitation and utilization of conventional and non-conventional resources

Syllabus

Module 1: Introduction – Environment in the Indian context: Concept of an ecosystem, Multidisciplinary nature of environmental studies. Components of environment- Atmosphere, hydrosphere, lithosphere and biosphere. Definition, scope and importance. Concept of sustainability and sustainable development.

Module 2:

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food

Problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. Carbon footprint Water conservation, rain water harvesting, watershed management

Module 3:

Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. • Introduction, types, characteristic

28

features, structure and function of the following ecosystem: - a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Module 4:

Biodiversity and its conservation • Introduction – Definition: genetic, species and ecosystem diversity. • Biogeographically classification of India • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values • Biodiversity at global, National and local levels. • Hot-spots of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. • Endangered and endemic species of India • Conservation of biodiversity:

Module 5:

Environmental Pollution Definition • Cause, effects and control measures of: - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards • Solid waste Management : Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution.

Module 6:

Environmental Policies and practices: Climate change, Climate change, global Warming, acid rain, ozone layer depletion, nuclear accidents.

NCSAOC01- Communication Skills

Description:
The add on course on **"Communication Skills"** aims to provide the students with increasing the communication skills of students so that they will be able to communicate effectively in English with others. The training will be provided by the Department of English. It is a 30 hour program. Certificate will be provided to the students after successful completion of the course.

Course Objectives
1. Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others.
Course Outcomes
CO1: Understand the relevance of the English language in the contemporary society and how this language acts as a lingua franca in a multilingual context
CO2: Develop language and vocabulary skills relevant to a professional

CO3: Interpret, summarize and analyze different sorts of textual content
CO4: Improve the basic aspects of LSRW and use it accordingly
CO5: Create technical and professional documents that are precise and vivid.

CO-PO/PSO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	3	0	2	2	3	3	2
CO2	3	2	3	0	2	2	3	3	2
CO3	3	2	3	0	2	3	3	3	3
CO4	3	2	3	0	2	3	3	3	3
CO5	3	2	3	0	2	3	3	3	3

Module 1 (2 hrs.)

Introduction to the English Language: English as the lingua franca: The relevance of using English in multilingual contexts and communication.

English as a non-phonetic language, change in the meaning of words with respect to pronunciation, loan words from other languages such as French, German, and Chinese etc.

Module 2 (4 hrs.)

Grammar: Basic Verb forms, pragmatic usage in sentences, auxiliary verbs, Subject-Verb agreement, common errors in the usage of the English language.

Module 3 (10 hrs.)

Tenses: Present Tense, Past Tense and Future Tense; Sentences: declarative sentences, imperative sentences, interrogative sentences, exclamatory sentences; using different sentence types in your writing, dependent clause, independent clause

Module 4 (5 hrs.)

Sentence types: Simple Sentences, Compound Sentences, Complex Sentences and Compound-Complex Sentences; Practice Questions; Conjunctions, linkers, connectors; degrees of comparison; idioms, onomatopoeic words, acronyms, homophones, Punctuation marks and its uses, the differences that punctuation marks make in a sentence

Module 5 (9 hrs.)

Introduction to LSRW: listening, speaking, reading and writing; Verbal communication, Non-verbal communication, Barriers to effective communication, fluency and accuracy, skimming, scanning, summarizing, paraphrasing

NCSBC01-Bridge Course-Mathematics

Description: The bridge course aims to act as a buffer for the new entrants with an objective to provide adequate time for the transition to hardcore of degree courses. The syllabus for the course is framed in such a way that they get basic knowledge on the subjects which they would be learning through graduation. The course consist of 30 Hrs. of interactive sessions.

Course Objectives
1. To provide students the confidence and skills to successfully transition to new system
Course Outcomes
CO1: To define the basic concepts in mathematics
CO2: To develop academic skills and assist the students in mathematics.

CO-PO/PSO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

Unit I

Limits and continuity- Properties of limits-infinite limits-continuity of functions

Unit II

Trigonometric functions: Laws of trigonometric functions-Identities

Unit III

Derivatives- formulas - rules of derivatives- substitution method-chain rule-exponential method

Unit IV

Integration: Formulas-Rules of integration-Application of integration

Unit V

Linear equations: Solution of linear equations Introduction of matrices

NCSACC01- Basic Skill Enrichment program

Description: The additional certification program on "Basic Skill Enrichment Program" is given to students by the Training Department. It is a 30 hour course. Certificate will be provided to students after the completion of the course.

Course Objectives
1. To ensure that 'all education and training develops self-reliance, flexibility and breadth'. Learn the process of setting and reaching through learning the steps to goal setting and applying those steps in real life.
Course Outcomes
CO1: By the end of this program, students will be equipped with all skills needed to successfully face the interview and gets easily hired.

CO-PO/PSO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	2	3	3	3	3	3

Session 1: Orientation Class - Familiarize with language lab - do's and don'ts, introduce Tell Me More

32

Software and its applications, discuss the syllabus.

Session 2: Listening Skill - Listen and draw, word search and crossword puzzle, video & questions.

Session 3: Speaking Skill - I have never, continue the story, and describe the image.

Session 4: Reading Skill - Reading comprehension, word jumble race, sentence pronunciation, Word scramble.

Session 5: Writing Skill - Written expression, fill in the blanks, sentence practice and grammar practice, write story

NCSACT02-Ability test-Basic Computer fundamentals

Description -This test has been designed to assess the ability of a candidate to work using a computer. It tests if an individual is aware of the functions in a computer including basic hardware, and computer fundamentals. The test uses different difficulty levels of questions to accurately identify candidates who understand computer fundamentals.

Course Objectives
1. To understand the basic hardware and software functionalities.
Course Outcomes
CO1: To define the basic concepts computer fundamentals
CO2:.Will be able to understand the common hardware units

CO-PO/PSO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

NCSACT03-Mini Project-Computer Fundamentals & HTML

Description: It enables the candidate to create a web page using HTML and can also be able to customize an existing web template which is available online. HTML can be used to create the web pages which are available on the web.

Course Objectives
1. To understand the real time software development environment. The student can gain a thorough knowledge in developing a web page using basic HTML tags.
2. Introduces style sheets (CSS) and responsive (mobile) web design.
Course Outcomes
CO1: Use knowledge of HTML and CSS code and an HTML editor to create personal websites following current professional standards.
CO2:.Use critical thinking skills to design and create websites.

CO-PO/PSO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

NCSW S01-Walk with the scholar: Introduction to JavaScript

Description: The scheme originally introduced the idea of mentoring, building on the concept of mentor as a "Guide and Friend". The outcome of the programme indicated positive changes in the student participants such as increased self-confidence, improved communication skills, better academic performance, increased awareness regarding higher studies and career options in one's academic field and improved interpersonal functioning. The selection of the students was based on screening of their Marks, Interests, Potentials and Capabilities.

34

Course Objectives
1. To help the students to identify a better career option.
Course Outcomes
CO1: To develop certain generic skills, non-technical competencies, attitudes and behaviors
CO2:.To provide necessary orientation, guidance, motivation and support to enrich and nourish their talents.

Introduction, Client side programming, script tag, comments, variables. Including JavaScript in HTML, Data types, Operators, Conditional Statements, Loops, break and continue. Functions and Objects.

Semester 2

ENG2A03: READINGS FROM THE FRINGES   No. of hours: 72

Course Objectives
1. To inculcate and apply the concepts of democracy and freedom in life and understand the basic tenets of our constitution
2. To critically think and examine various social issues prevailing in our society
Course Outcomes
CO1: Discuss and contemplate on the areas of gender inequality, marginalization, disability studies, racism and casteism
CO2: Develop sensitivity towards environmental concerns and feel responsible towards protecting nature.

CO3: Understand the everyday realities of the marginalized sections of the society and negate the stereotypes surrounding them and accept them as allies.

CO4: To develop scientific temper and scientific thinking

CO-PO MAPPING

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	2	1	1	1	1
CO2	1	3	1	1	2	1	1	1	0
CO3	2	2	1	1	1	0	1	1	0
CO4	2	2	1	2	3	1	1	0	1

COURSE SUMMARY

Module 1: 15 hrs.

Module 2: 15 hrs.

Module 3: 15 hrs.

Module 4: 15 hrs.

Evaluation: 12 hrs.

Total: 72 hrs.

COURSE DETAILS:

36

Module 1: Constitution, Democracy and Freedom

1.   "The Objectives Resolution" (Speech excerpt) - Jawaharlal Nehru

2.   "How Many More Days, Democracy" (Poem) - Sameer Tanti

3.   "When Salihan took on the Raj" (Article) - P. Sainath

Module 2: Ecology and Science

1.   "Knowledge is Power"(Excerpt from Chapter 14 of Sapiens: A Brief History of Humankind)- Yuval
Noah Harari

2.   "A White Heron" (Short story) - Sarah Orne Jewett

3.   "The Fish" (poem) - Elizabeth Bishop

4.   "Everything I Need to Know I Learned in the Forest" (essay) - Vandana Shiva

Module 3: Gender Equality

1.   "Fire" - Nikita Gill - Poem

2.   "Accept Me" from I am Vidya: A Transgender's Journey - Living Smile Vidya

3.   Dear Ijeawele (Letter-excerpt) - Chimamanda Ngozi Adichie

Module 4: Human Rights

1.   "Entre-vous to Adulthood" from One Little Finger - Malini Chib

2.   "The Body Politic" (Poem) - Hiromi Goto

3.   "Love- lines in the time of Chathurvarna" (Article) - Chandra Bhan
Prasad

4.   "The History Lesson "(Poem) - Jeanette Armstrong

ENG2AO4: READINGS ON KERALA   No. of hours: 90

Course Objectives
1. To enable the students to read and critically appreciate the different varieties of Kerala literature, writings and films

2. To read and understand the diversity of Malayalam literature and understand its distinctions

Course Outcomes
CO1: Develop critical understanding of literature of Kerala
CO2: Interrelate the cultural and historical tradition of the society and the development of literary sensibility
CO3: Identity the diversity of literary endeavors and the cultural representations
CO4: Identify and apply the insights and values in everyday life as a Keralite
CO5: Critically analyze and interpret the present cultural production

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	2	1	0	1	0
CO2	1	1	2	1	3	1	0	1	1
CO3	3	2	3	1	3	1	0	1	1
CO4	3	2	3	1	1	1	1	1	1
CO5	2	2	3	1	1	0	1	1	1

COURSE SUMMARY:

Module 1: Formation 15 hrs.

Module 2: Evolution   22 hrs.

Module 3: Stimulation   16 hrs.

Module 4: Propagation   25 hrs.

Evaluation   12 hrs.

Total 90 hrs.

 COURSE DETAILS:

Module 1: Formation

1.   "History" (Prose) excerpt from Malabar Manual – William Logan

2.   "Tribal Tale of Kerala" (Prose) excerpt from Kerala Culture – Prof S Achutha Warrier

3.   "Ghoshayatra" (Poem excerpt) – Kunchan Nambiar

Module 2: Evolution

1.   Excerpt from Indulekha (Novel) -O. Chandu Menon

2.   Excerpt from "Atmopadeshashathakam" (Poem) - Sree Narayana Guru

3.   "Not an Alphabet in Sight" (Poem) – Poykayil Appachan

4.   "Ayyankali: A Dalit Leader of Organic Protest" (Prose-excerpt) -

M. Nisar,Meena Kandasamy

5.   "Vakkom Moulavi: My Grandfather, the Rebel" (Prose) - Sabin Iqbal

Module 3: Stimulation

1.   "Daughter of Humanity" (Story) - Lalithambika Antharjanam

2.   "Kuttippuram Paalam"(Poem) – Edasseri

3.   "Christian Heritage" (Story) - Vaikom Muhammad Basheer

Module 4: Propagation

1.   "Myth and Literature" (Speech) -M T Vasudhevan Nair

2.   "Rain at Heart" (Poem) –Sugathakumari

3.   "Fifty years of Malayalam Cinema" (Prose) - VC Harris

4.   "Malayalam's Ghazal" (Poem) – Jeet Thayil

5.   "Agni" (Story) - Sithara A

6.   "Pictures Drawn on Water"(poem) - K.Satchidanandan

MAL2A08(3) Malayalabhashayum Sahithyavum-   **No. of sessions: 90**

Course Objectives
1. Realize the different and varied cultural realms
2. Make the students to prepare Science essays and studies in Mother tongue.
3. Familiarize with Malayalam literature and the stylistic use of language in various periods
Course Outcomes
CO1: Familiarize with different literary forms and communication modes of Malayalam.
CO2: Students will be able to enhance their vocabulary.

40

CO3: Students will be able to demonstrate understanding of grammatical structures in appropriate context.

CO4: Inculcate an interest in Mother tongue and regional literature thereby improve their cultural development.

CO5: Implant an interest in Science and literature in students of conventional graduate courses.

CO-PO/PSO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	2	3	0	2	1	3	2	1	3	2	1	0
CO2	2	2	1	3	1	2	2	3	2	1	3	2
CO3	2	1	3	0	2	2	1	1	1	2	1	2
CO4	2	2	1	1	2	2	2	2	2	1	2	3
CO5	1	2	3	3	1	2	2	2	3	2	2	2

Module 1: Stories
Oru manushyan-Basheer,
Vanmarangal veezhumpol-N S
Madhavan,Payaru vallikalil ini nammalokke-Priya A S

Module 2: Novel
Enmagaje-Ambika Suthan Mangad

Module 3: Drama
Bhagnabhavanam-N Krishnapillai
Module 4: Autobiography, Memoire

Pavam manushyan-Cherukadu(Jeevithappatha)
Santhanagopalam-M N Palooru(Kadhayillathavante Kadha)
Ulsavakalam –Chandramathi(Njandukalude nattil oridavela)

HIN2A08(3) Poetry and Short Stories

No. of sessions: 80 hrs.

41

Course Objectives
1. Appreciation of literature using the best specimens provided as reading list
2. Understanding literary works as cultural and communicative events.
3. Understanding different periods and movements ; literature and society.
Course Outcomes
CO1: Understand the common techniques underlying free verse and traditional forms of poetry
CO2: Identify personal experiences that can be used when writing poems
CO3: Understand the basic terminology and practical elements of poetry.
CO4: Students get to know various cultures and construction of gender, nation and race throughout the history.
CO5: The prescribed fiction helps the students to learn human values and the behavioral patterns from great works of art, and develops the ability to understand human race.

CO-PO/PSO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	2	3	0	2	1	3	2	1	3	2	1	0
CO2	2	2	1	3	1	2	2	3	2	1	3	2
CO3	2	1	3	0	2	2	1	1	1	2	1	2
CO4	2	2	1	1	2	2	2	2	2	1	2	3
CO5	1	2	3	3	1	2	2	2	3	2	2	2

Module 1

1 Kabir – 5 Dohas

2.Rahim – 5 Dohas

3.Meera Bai – one pada

4.Jayashankar Prasad –Madhumaya Desh

Module 2

5.Kedarnath singh—Akal mein doob

6 Sarveswar Dayal Saksena –Mukti kee Akanksha

7.Mahendra Bhatnagar –Nayee Naari

8.Gyanendrapathi -Pyasaa Kuan

Module 3

Premchand - Bade Ghar kee Beti

Yashpal – Aadmi Ka Bacha

Module 4

Bheeshm Sahni - Chief kee Dawat Madhukankariya – File

TRANSLATION AND COMMUNICATION IN FRENCH FRE 2A08(2)

Course objective: Improve language skills, learn about culture, and analyze translated texts. By doing this, students will become better at understanding and using the language.

CO1: To ameliorate the level of language proficiency.
CO2: To inculcate the cultural aspect of the region.
CO3: To analyze & evaluate other translated texts.

CO-PO-PSO MAPPING

PO/PSO	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	0	2	0	0	0	0	1	1
CO2	1	1	1	0	0	0	1	1
CO3	0	1	0	0	0	0	1	1

Course Outline: 4 Modules

1. Module I: Translation as Communication, translation as transmission, social and cultural factors.

2. Module II: Literary translation, commercial translation from source language to target language and vice-versa.

3. Module III: Analysis of translated texts, treatment of technical terminology in the translated texts. General principles for the translation of key words and culture-specific terms.

4. Module IV: Business translation, translation of advertisements.

TEXTBOOK : La correspondence commerciale francais (Lessons in pages 1to39)

by L.Bas / C.Driot-Hesnard, Nathan, Paris.

BCA2B02 – Problem Solving using C   **No. of sessions: 64**

43

Course Objectives
1. To equip the students with fundamental principles of Problem Solving aspects.
2.To learn the concept of programming
3.To study C language
4.To equip the students to write programs for solving simple computing problems

Course Outcomes
CO1: Identify and understand the basics of C program structure ,Familiarization of IDE,Tokens,Variable Declaration and how to define symbolic constant.
CO2: Explain and apply the basic concepts of operators and Expressions,Type conversions and operator precedence and associativity.
CO3: Demonstrate familiarity with control structures such as branching, loops and expressions and simple programs
CO4: Develop the ability to create and use functions and to create arrays of elementary objects as well as equip with the basic concepts of Structures and Union and analytical skills to use in their subsequent coursework and professional development
CO5: Enable students to understand the creation and processing of files and command line operations.Student will be able to develop programs and understand a defensive programming concept as well as equip the ability to handle possible errors during program execution.

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	3	3	2	3	3	2
CO2	3	0	1	2	1	1	1	1	1

44

CO3	**3**	**2**	**2**	**2**	**2**	**3**	**2**	**3**	**3**
CO4	**3**	**2**	**3**	**2**	**3**	**3**	**2**	**3**	**3**
CO5	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Unit I

Introduction to C Programming - Overview and Importance of C, C Program Structure, Sample programs. Familiarization of Integrated Development Environment - Invoking IDE, Opening a new window in
IDE, Writing, Saving and Compiling a C program, making an Executable File. Elements of C Language and Program Constructs: Character Set, C Tokens, Keywords and Identifier, Constants, Variables, Data types, Variable Declaration and Assignment of Values,Symbolic Constant Definition.

Unit II

C Operators - Arithmetic operators, relational operators, and logical operators, assignment operators, increment and decrement operators, conditional operators, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, Type conversion in expressions, operator precedence and associativity, Mathematical Functions, I/O operations - Library functions.

Unit III

Data input output functions - Simple C programs – Flow of Control - Decision making with IF statement, Simple IF statement, If-else statement, Nesting of If-else and else-if Ladder, Switch statement, Conditional operator, goto statement. Looping - While loop, Do-While, and For Loops, Nesting of loops, jumps in loop, skipping of loops.

Unit IV

Arrays and Strings - One dimensional array, two dimensional and multidimensional arrays, strings and string manipulation functions.The Concept of modularization and User defined functions - Definition - Multifunction Program,proto-types, Passing arguments, calling functions, various categories of functions, Nesting of functions and recursion, functions and arrays, scope and lifetime of variables in functions, multi-file programs.Structures & Union structure definition - giving values to members, structure initialization,
comparison of structure variables, arrays of structures, arrays within structures, structures within arrays, structures and functions, Unions, bit fields.

Unit V

Pointers - Understanding pointers, accessing the address of a variable, declaring and initializing pointers, accessing a variable through its pointer, pointer expressions, pointer and arrays, pointer and character string,

pointers and functions, pointers and structures, pointer to pointer dynamic memory allocation.Files: Creating, Processing, Opening and Closing a data file, command line operations

BCA2C04 - Operations Research   **No. of sessions: 64**

Course Objectives
1. To get a general introduction in solving linear programming problems.
2.To get a general understanding of network analysis techniques.
3.To get a general understanding of different mathematical models
Course Outcomes
CO1:- To comprehend the meaning of Operations Research (OR) and its various applications in decision making and problem-solving
CO2: To apply graphical and simplex methods to solve Linear Programming Problems (LPP), demonstrating practical problem-solving skills in Operations Research.
CO3: To apply Operations Research techniques to solve transportation problems, showcasing the ability to use quantitative methods in logistics and distribution
CO4: To apply Operations Research methodologies to solve assignment problems and sequencing problems, demonstrating proficiency in optimization and decision-making.
CO5: - To analyze and construct network diagrams, as well as determine critical paths for finding project durations, showcasing higher-order thinking skills in Operations Research

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	2	0	0	1	1	1	2	1	1
CO2	3	1	1	1	1	0	1	1	1
CO3	3	1	1	1	1	0	1	1	1

CO4	2	1	1	1	1	1	1	1	1
CO5	2	1	1	1	1	1	1	1	1

UNIT I

Operation research and LPP: Operation Research and Decision making, Advantages of O.R approach in decision making, Application of O.R, uses and limitations of O.R.

UNIT II

LPP: Introduction, mathematical formulation of the problem, canonical and standard forms of LPP. Simplex method, artificial variable technique - Big M and two phase method - problem of degeneracy - concept of duality - dual simplex method.

UNIT III

Transportation model - North West corner rule, Least cost method, Vogel"s approximation method - loops in transportation table - Degeneracy in transportation table - Transshipment problem.

UNIT IV

Assignment model: Mathematical formulation of the problem - assignment algorithm impossible algorithms - traveling salesman problem

UNIT V

Network Scheduling: Concept of network, basic components, PERT and CPM, Rules of network construction, maximal flow problem, project scheduling critical path calculations, advantages of network (PERT/CPM). Sequencing models: processing n jobs through two machines, n jobs through three machines, two jobs through m machines.

BCA2B03 - Programming Laboratory I: Lab Exam of 1st & 2nd Semester –
HTML and Programming in C

Course Objectives
1.To make the students learn web designing
2.To make the students learn programming environments.
3.To practice procedural programming concepts
4.To make the students equipped to solve mathematical or scientific problems using C

Course Outcomes
CO1:Enable students to understand internet and develop web page creation using basic HTML Tags
CO2: Enable students to create web pages with different styles and formats.
CO3: Develop the students to create programs using basic C programming methods, Decision making statements, branching statements, looping statements and functions.
CO4: Develop the students to create programs using Array, structure , union, pointers and files.

CO-PO/PSO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3
CO3	3	2	3	0	3	3	3	3	3
CO4	3	2	3	0	3	3	3	3	3

Part A: HTML lab work

List of Exercises:

1) Design a web page to display the information of Computer Science department of your college by using basic page tags. Display the information in the form of paragraphs/sentences. Also use effects to highlight the information like bold, italic or underline.

2) (a) Create a webpage with HTML describing your department. Use paragraph and list tags. (b) Apply various colors to suitably distinguish key words. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags.

3) Use the above webpage to

a) Create links on the words e.g. "Wi-Fi" and "LAN" to link them to Wikipedia pages.

b) Insert an image and create a link such that clicking on the image takes the user to another page.

c) Change the background color of the page. At the bottom create a link to take the user to the top of the page.

4) Design a page to display the information in table format. Display the list of colleges offering B.Sc. Computer Science along with the details College Name, Address, Contact no. Address column will consist of sub columns as House Name, Post, City and pin code.

5) Create a webpage to create a photo Album. When the user clicks on the Image and Video Link it should open the corresponding album.

48

6) Design web pages which display the product images and its information with it. The products are computers, printers and laptops. The information displayed of the product should be configuration/ technical details, price etc.

(Purpose: - Study image tag. Display image in tabular form along with the other text information.)

7) Design a page to display the B.Sc. Computer Science syllabus by using List tag.

(Purpose: - Introduce list tag to display data in ordered or unordered format as main, sub main, sub-sub main, etc by using nos. or special types of bullets.)

8) Create HTML pages using Hyper Links

i. File Link

ii. Single Page Link

9) Create a hyperlink to show the information and syllabus of B.Sc. Computer Science. When click on the links each page should display the objective of respective course, Lesson plan,

Course duration etc.

(Purpose: - Introduce anchor tag to create links between pages. One can able to transfer the control to next page, previous page or to a specific page like Home page.)

10) Design an HTML page describing your University infrastructure. Use tables to provide layout to your HTML page.

11) Use <span> and <div> tags to provide a layout to the above HTML page instead of a table layout.

12) HTML pages with Tables

i. Use Tables to layout HTML pages

ii. Use <span> and <div> tags to provide a layout to the above page instead of table layout

iii. Use Frames to divide the page contents into different parts

iv. Embed Audio and Video into your HTML webpage

13) Design a page to display the information in table format. Display the list of colleges offering Computer Science along with the details College Name, Address, Contact no.Address column will consist of sub columns as Post Office, City, District and Pin code.

(Purpose: - Introduction of table tags along with the sub columns and other supportive tags like caption, cell spacing, cell padding etc.)

14) Create an HTML page to show the use of Navigation Frame

15) Create an HTML page to show the use of Floating Frame

16) Create an HTML page to show the use of Inline Frame

17) Design web pages to display the information about your college and UG Programmes offered in your college. Divide the page into three frames. The top frame should display the title of the college, left frame shout display the UG Programmes and the right frame display the details of selected programmes like fees, syllabus etc.

(Purpose: - Study frame tag which allows to divide the screen into no of sections.)

49

18) Design web pages to accept the student information. Student should enter the details like first name, last name, middle name, city up to 25 characters, and address up to 50 characters. Show the combo box to select the qualification, option button for gender selection. Display the information accepted in a formatted form.
(Purpose: - Study form tag which allow to design the formatted screen to accept the information from the user.)
19) Design a website to show the use of the following input controls
i. Checkbox,
ii. Radio button,
20) Design a website to show the use of the following input controls
i. Select box,
ii. Hidden controls
21) Design CSS style sheet to define settings for heading, body, table and links.
(Purpose: - Study CSS style sheet facility. This allows setting the default settings for all the pages.)
22) Design a webpage to show the use of External Style Sheets

Part B: C Programming

Write programs to do the following:
1. Find the sum of digits and reverse of a number.
2. Find the distance between two points.
3. Find the factorial of a number.
4. Find the Nth Fibonacci number using recursion.
5. Print the reverse of a string using recursion.
6. Solve the problem of Towers of Hanoi using recursion.
7. Find Sin(x) and Cos(x) in the range 0o to 180o (interval 30o) using functions.
8. Create a pyramid using „*".
9. Display the multiplication tables up to the number N.
10. Find the number of words in a sentence.
11. Perform matrix addition, subtraction, multiplication, inverse, and transpose using pointers and functions.
12. Replace a part of the string with another string.
13. Find the power of a number using structure and union.
14. Find the average of prime numbers in a group of N numbers using a function.
15. Find the sum of the series S = 1 + (½)2 + (1/3)3 + ... to 0.0001% accuracy.
16. Display the rightmost digit in a floating point number.
17. Create a pattern with the number N.
e.g. N = 39174 Pattern: 3 9 1 7 4
9 1 7 4
1 7 4
7 4

50

4

18. Display the short form of a string. E.g. Computer Science : CS
19. Currency conversion (any four currencies)
20. Find the currency denomination of a given amount.
21. Prepare a sales bill using an array of structures.
22. Addition and subtraction of complex numbers using structure.
23. Find the armstrong numbers within a given range.
24. Check for palindrome string/number.
25. Check for leap years.
26. Find the number of special characters in a given string.
27. Store and read data from a text file.
28. Write odd and even numbers into separate files.
29. Swapping of two numbers using call-by-reference method.
30. Copy the contents of one file into another one using command line parameters.
31. Base conversion of numbers.
32. Calculate the percentage of marks obtained for N students appeared for examination in M subjects using an array of structures.
33. Display a table of the values of function $y = \exp(-x)$ for x varying from 0.0 to N in steps of 0.1
34. Design a Scientific Calculator and include as many functions as possible.
35. Merge two numeric arrays in sorted order.
36. Fill the upper triangle with 1, lower triangle with -1 and diagonal elements with 0.
37. Count the occurrence of different words in a sentence.
38. Convert an input amount into words.
39. Convert a time in a 24 hour clock to a time in 12 hours.
40. Change the date/time format using structure.

AUD2E02 DISASTER MANAGEMENT

Course Objectives
1. The study aims at providing an understanding on disaster management and various types of disasters.
2. It provides an awareness about disaster prevention and risk reduction and enables to impart knowledge on climate change adaptation and scenarios.
Course Outcomes
C01:Understand the need and significance of studying disaster management
C02:Understand the different types of disasters and causes for disasters.

C03:Gain knowledge on the impacts Disasters on environment and society	
C04: Study and assess vulnerability of a geographical area.	
C05: Students will be equipped with various methods of risk reduction measures and risk mitigation.	

Module 1:

Introduction – Hazard and Disaster. Concepts of Hazard, Vulnerability, Risks. Different Types of Disaster : A) Natural Disaster: such as Flood, Cyclone, Earthquakes, Landslides etc B) Manmade Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures(Building and Bridge), War & Terrorism etc. Slow Disasters (famine, draught, epidemics) and Rapid Onset Disasters(Air Crash, tidal waves, Tsunami) Causes, effects and practical examples for all disasters. Water and Climate Disaster: flood, hail storms, cloudburst, cyclones, heat and snow avalanches, cold waves, droughts, sea erosion, thunder and lightning. Geological Disaster: landslides, earthquakes, Tsunami, mine fires, dam failures and general fires. Biological Disaster: epidemics, pest attacks, cattle epidemic and food poisoning. Nuclear and Industrial Disaster: chemical and industrial disasters , nuclear accidents. Accidental Disaster: urban and forest fires, oil spill, mine flooding incidents, collapse of huge building structures.

Module 2:

Natural disasters- Earthquakes, Tsunami, Floods, Drought, Landslides, Cyclones and Volcanic eruptions. Their case studies. Coastal disasters. Coastal regulation Zone. Risk and Vulnerability Analysis 1. Risk : Its concept and analysis 2. Risk Reduction 3. Vulnerability : Its concept and analysis 4. Strategic Development for Vulnerability Reduction Disaster Prevention and Mitigation. Refugee operations during disasters, Human Resettlement and Rehabilitation issues during and after disasters, Inter-sectoral coordination during disasters,Models in Disasters.

Module 3:

Disaster Preparedness and Response Concept and Nature Disaster Preparedness Plan Prediction, Early Warnings and Safety Measures of Disaster. Role of Information, Education, Communication, and Training, Disaster Management : Role of Government, International and NGO Bodies. Role of IT in Disaster Preparedness Role of Engineers on Disaster Management. Response Disaster Response : Introduction Disaster Response Plan Communication, Participation, and Activation of Emergency Preparedness Plan Search, Rescue, Evacuation and Logistic Management Role of Government, International and NGO Bodies Psychological Response and Management (Trauma, Stress, Rumor and Panic) Relief and Recovery Medical Health Response to Different Disasters.

Module 4:

Rehabilitation, Reconstruction and Recovery Reconstruction and Rehabilitation as a Means of Development. Damage Assessment Post Disaster effects and Remedial Measures. Creation of Long-term Job Opportunities and Livelihood Options, Disaster Resistant House Construction Sanitation and Hygiene Education and Awareness, Dealing with Victims' Psychology, Longterm Counter Disaster Planning Role of Educational Institute.

Module 5:

52

The vulnerability atlas of India. Disaster Prevention and Mitigation. Agencies involved in Disaster Management. Warning and Prediction

NCSBC01-Bridge Course-Basics of C programming

Course Objectives
1. To provide students the confidence and skills to successfully transition to new system
Course Outcomes
CO1: To define the basic concepts in C
CO2:.To develop academic skills and assist the students in C.

PO / CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

Unit I

Structure of C: Header and body, Use of comments, Compilation of a program

Unit II

Data Concepts: Variables, Constants, data types like: int, float char, double and void. Declaring and initialize variables

Unit III

Types of operators: Arithmetic, Relational, Logical, Compound Assignment, Increment and decrement, Conditional or ternary, Bitwise and Comma operators.Statements and Expressions.

Unit IV

Data Input and Output functions:printf(), scanf()

Unit V

Iterations: Control statements for decision making:Branching: if statement, else… if statement, switch statement.Looping: while loop, do.. while, for loop.Jump statements: break, continue and goto.

Additional Certification Course:

53

Description-An additional Certification Course on Advanced Excel will be provided to 3rd semester students. The duration of the course will be 5hrs.Faculties from Computer Science Department or IT Department will handle the session.

Course Objectives
1. This course is aimed at exposing participants to the use of Advanced Excel formulas and features in intensive data analyse
Course Outcomes
CO1: To explore the magic of analyzing data using Advanced Excel

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

Course Outline are
- Excel Basics
- Work with Cells and Worksheets
- Calculate Your Data
- Format your Workbook
- Add Charts and Graphics
- Collaborate with Others
- Analyze your Data
- Work with Macros and the Web

Basic Skills Enrichment

Program Objective:
To make the students aware of themselves, their environment, about the challenges and to equip them with the basic communication and technical skills, along with practical training sessions.
Course Outcome:

To develop their self-management and communicational skills and also equip them with the basic technical skills.

Module 1: Effective Communication (LSRW)

Session 16: Listening skills: Listening to the words, sentences and passages. Sharing You Tube videos, homework related to the topics and its presentation in class.

Session 17: Speaking skills: vocabulary, speech, pronunciation of the words, sentences and passages. Assigning Situational conversation exercises.

Session 18: Reading skills: Comprehension passages, question and answers

Session 19-20: Writing skills: Grammar, basics, exercises, sentence formations

Module 2: MS office Suite

Session 21-23: Starting MS Word, working with symbols, working with tables, headers, footers and other controls, formatting

Session 24-26: MS Excel, MS PPT - Formatting a worksheet, formatting cells, Using formula & graphs

Session 27-28: Google docs, Google forms, Google spreadsheet, Google Meet

Session 29-30: Introduction to Photoshop/poster making and video editing

Semester 3

1. A11 – Python Programming

Course Objectives
1. To learn basics of Python programming
2.To learn decision making, looping and functions in Python
3.Understand Object Oriented Programming using Python
Course Outcomes
CO1: Identify and recall Python programming basics and paradigm, demonstrating an understanding of fundamental concepts in Python programming.
CO2: Demonstrate an understanding of Python looping and control statements, interpreting how they function within the context of programming tasks.
CO3: Apply knowledge to develop the ability to create and use functions, global variables, recursion, and analytical skills. Demonstrate the practical application of Python programming in coursework and

55

professional development.

CO4: Analyze and comprehend the use of Python string, list, tuple, dictionary, and manipulations on them, showcasing the ability to break down and understand complex data structures in Python programming.

CO5: Equip students for developing mini projects using Python standards.

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	1	3	3	2	3	3	2
CO2	3	0	0	3	3	3	3	3	2
CO3	3	0	1	3	3	3	3	3	2
CO4	3	0	1	3	3	3	3	3	2
CO5	3	0	3	3	3	3	3	3	2

UNIT I
Introduction to python, features, IDLE, python interpreter, Writing and executing python scripts, comments, identifiers, keywords, variables, data type, operators, operator precedence and associativity, statements, expressions, user inputs, type function, eval function, print function.

UNIT II
Boolean expressions, Simple if statement, if-elif-else statement, compound boolean expressions, nesting, multi way decisions. Loops: The while statement, range functions, the for statement, nested loops, break and continue statements, infinite loops.

UNIT III
Functions, built-in functions, mathematical functions, date time functions, random numbers, writing user defined functions, composition of functions, parameter and arguments, default parameters, function calls, return statement, using global variables, recursion.

UNIT IV
String and string operations, List- creating list, accessing, updating and deleting elements from a list, basic list operations. Tuple- creating and accessing tuples in python, basic tuple operations. Dictionary, built in methods to access, update and delete dictionary values. Set and basic operations on a set.

A12-Sensors and Transducers No. of sessions: 64

Course Objectives
1. To learn basics of transducers
2.To learn construction and working of transducers
3. To understand various types of transducers
Course Outcomes
CO1:Explain resistance, inductance and capacitance transducers.
CO2: Perceive the concepts of temperature and pressure transducers.
CO3: Perceive the concepts level transducers such as and flow transducers
CO4: Explain Electromagnetic transducers and radiation sensors.
CO5:Explain force and torque transducers and sound transducers

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	1	2	3	0	1	2	0	2	2
CO2	3	0	1	2	0	2	2	1	2
CO3	0	1	2	0	2	3	1	2	3
CO4	2	2	1	2	3	0	1	2	2
CO5	2	0	1	2	3	2	2	2	2

Unit I [16 T]

Transducers: Definition, Principle of sensing & transduction, Classification, Characteristics of transducers. Basic requirement of transducers.

Resistance Transducer: Basic principle – Potentiometer –Loading effects, Resistance strain gauge– Types.

57

Inductance Transducer: - Basic principle – Linear variable differential transformer – RVDT-types. Capacitance Transducer: Basic principle- transducers using change in area of plates – distance between plates- variation of dielectric constants –Types

Unit II [16 T]
Thermal sensors: Resistance change type: RTD - materials, construction, types, working principle, Thermistor - materials, construction, types, working principle, Thermo emf sensors: Thermocouple – Principle and types, Radiation sensors: Principle and types.
Pressure Transducers: basic principle- different types of manometers-u tube manometer-well type manometers.

Unit III [16 T]
Level transducer-continuous level measurement-discrete level measurement-mass – capacitive level gauges
Flow Transducers: Bernoulli's principle and continuity, Orifice plate, nozzle plate, venture tube, Rotameter, anemometers, electromagnetic flow meter, impeller meter and turbid flow meter

Unit IV [16 T]
Hall effect transducers, Digital transducers, Piezo-electric sensors, eddy current transducers, tacho generators and stroboscope, Magnetostrictive transducers
Radiation sensors: LDR, Photovoltaic cells, photodiodes, photo emissive cell types
Force and Torque Transducers: Proving ring, hydraulic and pneumatic load cell, dynamometer and gyroscopes.
Sound Transducers: Sound level meter, Microphone.

BCA3C05- Computer Oriented Numerical & Statistical Methods   **No. of sessions: 80**

Course Objectives
1.To learn the floating point arithmetic
2.Learning to solve linear equations.
3.To learn numerical differentiation and integration.
4.To learn the basics of statistics and probability theory
Course Outcomes

CO1: To learn the application and statistical methods such as correlation and regression.
CO2:To Learn the techniques to calculate the measures of central tendency and different measures of dispersion
CO3: To gain insight into consequences of plan by probability techniques and processing samples using sampling techniques
CO4:To demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems sampling techniques
CO5: To derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	2	0	0	1	1	1	1	0	1
CO2	2	1	1	0	1	0	1	1	1
CO3	2	0	0	0	1	0	1	1	0
CO4	2	1	1	0	1	0	1	1	1
CO5	2	1	1	0	1	0	1	0	1

UNIT I

Floating Point Arithmetic - Errors, Significant digits and Numerical Instability, Roots of Algebraic Equations - Bisection Method - Method of False Position - Newton Raphson Method.

UNIT II

Interpolation and Approximation–Lagrange & Newton; Interpolations- Finite Difference Operators, Interpolating; Polynomials using finite differences, Simpson"s 1/3rd rule ,Trapezoidal method.

UNIT III

Basics statistics: Measures of central tendencies - Mean, Median, Mode, Geometric mean and Harmonic mean. Measures of dispersion - Range, quartile deviation, Lorenz curve. Mean deviation and standard deviation.

UNIT IV

Curve fitting- Principles of least squares, fitting of straight lines. Correlation (Bivariate case only) Pearson"s coefficient of correlation. Rank correlation and Regression analysis. Probability theory: Random experiment. Sample point, sample space, events, union, intersection and compliment of event

BCA3C06 –Theory of Computation   **No. of sessions: 80**

Course Objectives
1. To get a general introduction to the theory of Computer Science
2. To get a general understanding on different languages, grammar and automata
Course Outcomes
CO1:To understand the basic concepts of mathematical preliminaries
CO2:To use basic concepts of formal languages of finite automata techniques
CO3: To Design Finite Automata for different Regular Expressions and Languages
CO4: Explain the models of computation, including formal languages, grammars and automata, and their connections
CO5: Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4

CO1	3	1	1	3	3	2	3	3	3
CO2	3	3	3	1	3	2	2	3	3
CO3	3	1	2	3	3	3	3	3	2
CO4	2	2	2	3	2	3	3	3	3
CO5	3	1	3	3	3	3	3	3	3

UNIT I (10T)

Introduction to Mathematical preliminaries: Sets, Functions and Relations, graphs and trees,
Strings and their Properties, Proof techniques: By induction, by contradiction.

UNIT II (10T)

Formal languages: Definitions and examples, Chomsky classification of languages, Languages
and their relation, Recursive and Recursively enumerable sets, Languages and automata.

UNIT III (20T)

Theory of Automata: Definition of automaton, description of a finite automaton, DFA, transition systems, properties of transition functions, acceptability of a string by a finite automaton, Non deterministic finite state machines: with epsilon moves and without epsilon moves, equivalence of DFA and NDFA, Mealy and Moore Models, minimization of finite automata. Regular sets and grammar: Regular expressions, Finite automata and regular expressions, closure properties of regular sets, Algebraic laws for regular expressions, regular sets and regular grammars

UNIT IV (20T)

Context free languages: Context free languages and derivation trees, Ambiguity in context free grammars, Simplification of context free languages, normal forms for context free languages.

UNIT V (20T)

Pushdown automata: Definition, Acceptance by PDA, Pushdown automata and Context-free languages, Parsing and Pushdown Automata. Turing Machines: Turing machine model, representation of Turing machines, languages accepted by Turing machine.

BCA3B04 – Data Structures Using C

61

Course Objectives
1. To introduce the concept of data structures
2. To make the students aware of various data structures
3. To equip the students implement fundamental data structures
Course Outcomes
CO1 - Develop ability to analyze algorithms and algorithm correctness and impart the basic concepts of data structures and algorithms
CO2 -Enable students to describe how arrays,, linked structures are represented in memory and used by algorithms as well as describe common applications for arrays, linked structures
CO3 - Demonstrate stacks, queues are represented in memory and used by algorithms and describe common applications for stacks, queues
CO4 - Demonstrate different methods for traversing trees and how represented in memory
CO5-Enable students to Design and implement an appropriate hashing function, searching and sorting techniques

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	1	0	3	3	2	3	2	1
CO2	3	1	0	3	3	3	3	2	3
CO3	3	1	0	3	3	3	3	2	3
CO4	3	1	0	3	3	2	3	2	3
CO5	3	1	0	3	3	3	3	2	3

UNIT I [9 T + 7L]

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure,

62

Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space trade off, Big-O notation.

Strings: Introduction, strings, String operations, Pattern matching algorithms

UNIT II [10 T + 14 L]

Arrays: Introduction, Linear arrays, Representation of linear array in memory, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, sparse matrix.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Applications of linked lists, Algorithm of insertion/deletion in Singly Linked List (SLL).

UNIT III [10 T + 14 L]

Stack: primitive operation on stack, algorithms for push and pop. Representation of Stack as Linked List and array, Stacks applications: polish notation, recursion.

Introduction to queues: Primitive Operations on the Queues, Circular queue, Priority queue, Representation of Queues as Linked List and array, Applications of queue: Algorithm on insertion and deletion in simple queue and circular queue.

UNIT IV [10 T + 14 L]

Trees - Basic Terminology, representation, Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree: insertion, deletion and processing, Traversal of binary trees: In order, Pre-order & post-order, Algorithm of tree traversal with and without recursion, Binary Search Tree, Operation on Binary Search Tree, expression trees, implementation using pointers, applications.

UNIT V [10 T + 14 L]

Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, graph traversal- depth-first and breadth-first traversal of graphs, applications.

Searching: sequential searching, binary searching, Hashing – linear hashing, hash functions, hash table searching; Sorting: Quick Sort, Exchange sort, Selection sort and Insertion sort.

NCSACT06-Mini Project-Python

Description:It provides a fundamental understanding of the Python programming language and enables one to have the skills and understanding of Python to confidently apply for Python programming jobs.It also acquire the prerequisite Python skills to move into specific branches - Machine Learning, Data Science, etc..

Course Objectives
1. To understand the real time software development environment. The student can gain a thorough knowledge in developing a application using python
Course Outcomes
CO1: To acquire programming skills in core Python and Object Oriented Skills in Python
CO2:.To develop the skill of designing Graphical user Interfaces in Python

CO-PO/PSO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

AUD3E03- HUMAN RIGHTS

Course Objectives
In-depth insight into the constitutional, statutory and institutional aspects of human rights and special legislations dealing with protection of vulnerable and marginalized groups.
Course Outcomes
C01. Understand the importance and different approaches to Human rights
C02. Understand the different mechanisms of United Nations to ensure and protect the Human Rights
C03. Understand the different Constitutional provisions and legislations to protect Human Rights in India
C04. Analyse the functions of NHRC, Judiciary and PIL for protecting Human Rights in India
C05. Examine the challenges to Human Rights of different vulnerable sections

MODULE –I

HUMAN RIGHTS; Meaning, Evolution and Importance Approaches; Western, Marxian, Feminist and Third World

MODULE – II

U N O AND HUMAN RIGHTS (a)Universal Declaration of Human Rights (b)International Covenants on Civil and Political Rights(ICCPR), International Covenant on Social Economic and Cultural Rights(ICSECR) (c) The Office of the United Nations High Commissioners for Human Rights(UNHCHR)

MODULE- III

HUMAN RIGHTS IN INDIA (a)Constitutional Provisions- Fundamental Rights, Directive Principles of

State Policy (b)Some important Legislations 1) Protection of Civil Rights Act-1955 2) Prevention of Atrocities (SC and ST) Act 1989 3) Sexual Harassment of Women at workplace (Prevention, Prohibition and Redressal) Act, 2013 4) The Rights of Persons with Disabilities Act-2016 5) Right to information Act 2005

(c) Agencies Protecting Human Rights ; Judiciary, Public Interest Litigation, National Human Rights Commission and Media

MODULE- IV
CHALLENGES TO HUMAN RIGHTS Human Rights Violations against Women, Children, Other marginalized sections like Minorities, Dalits, Adivasis and Women, Refugees

NCSACC1-Add on Course -Python Programming
Description:An add on course on Python Programming will be provided to students.All the students should register for the course via Coursera. The duration of the course will be 30 hours.The course aims to increase the basic knowledge of Python and to improve the problem solving skills of students through the implementation programs using Python.

Course Objectives
This course aims to teach everyone the basics of programming computers using Python.. The course has no pre-requisites and avoids all but the simplest mathematics. Anyone with moderate computer experience should be able to master the materials in this course.The course is designed to provide Basic knowledge of Python and to develop the skill of designing Graphical user Interfaces in Python
Course Outcomes
CO1: To cover the basics of how one constructs a program from a series of simple instructions in Python.
CO2: To prepare students to take more advanced programming courses.
CO3: To develop the ability to write applications in Python

CO-PO/PSO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	3	3	3	2
CO3	2	2	3	0	3	3	3	3	3

UNIT I

Introduction to python, features, IDLE, python interpreter, Writing and executing python scripts, comments, identifiers, keywords, variables, data type, operators, operator precedence and associativity, statements, expressions, user inputs, type function, eval function, print function.

UNIT II

Boolean expressions, Simple if statement, if-elif-else statement, compound boolean expressions, nesting, multi way decisions. Loops: The while statement, range functions, the for statement, nested loops, break and continue statements, infinite loops.

UNIT III

Functions, built-in functions, mathematical functions, date time functions, random numbers, writing user defined functions, composition of functions, parameter and arguments, default parameters, function calls, return statement, using global variables, recursion.

UNIT IV

String and string operations, List- creating list, accessing, updating and deleting elements from a list, basic list operations. Tuple- creating and accessing tuples in python, basic tuple operations. Dictionary, built in methods to access, update and delete dictionary values. Set and basic operations on a set, practicing lab programs

NCSACT05-Workshop-Introduction to system hardware

Description: The objective of this workshop is to acquaint the students with the basic principles, developments and research trends in the area of Computer Hardware. The workshop covers the perfect combination of theory and practical sessions in the well balanced manner. This workshop will certainly help students to improve technical skill set and hence employability, and the faculty members to improve teaching methodology and efficiency.

Course Objectives
1. To impart the skills needed to assemble a PC, PC troubleshooting, installation of system/application software. Student will be able to prepare cables for LAN, assemble a PC
Course Outcomes
CO1: To acquire knowledge about Computer Hardware components
CO2:.To develop the skill of assembling a PC

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

Intermediate Skills Enrichment

Program Objective: To make the students aware of their career choices and competencies required to be successful in their domain and equip them with the required skills.
Course Outcome:
 To equip the students with the skills required to excel in their respective domains.
Includes domain specific activities

MODULE 1: Session 1- 3 (Quantitative Aptitude)   3 Hrs

➢ Divisibility, LCM, HCF ➢ Numbers, Decimals, Fractions ➢ Powers, Algebra, Percentages

MODULE 2: Session 4-5 (Quantitative Aptitude)   2 Hrs

➢ Profit, Loss ➢ Simple interest, Compound interest

MODULE 3: Session 6-8 (Quantitative Aptitude)   3 Hrs

➢ Speed, Distance, Time ➢ Work & wages ➢ Ratio, proportion and partnerships

MODULE 4: Session 9-11(Quantitative Aptitude)   3 Hrs

➢ Searing arrangements, Calendar dates ➢ Probability ➢ Permutations and combinations

MODULE 5: Session 12-14 (Quantitative Aptitude)   3 Hrs

➢ Train, Boat, Streams- Upstream/Downstream ➢ Cisterns and pipes ➢ Mensuration

Assessment Test -1 Hour at the end of semester

Semester 4

1. A13 – Data Communication and Optical Fibers

No. of sessions: 64

Course Objectives
1. To learn basics of data communication, Networking architectures and applications.
2. Expose the students to the basic of signal propagation through optical fibers, fiber impairments, components and devices and system design
Course Outcomes
CO1: Identify and understand processes to communicate with each other across a computer network.
CO2:Able to understand the concept of network topology
CO3: Understand the concept of multiplexing, GSM and its applications.
CO4: Analyze the services, roles and features of the data link control of data networks
CO5: Identify and understand the fundamental knowledge about optical fiber communication systems.

CO-PO/PSO Mapping

PO→ CO↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	3	3	3	3	3	3

68

CO2	3	2	2	3	3	3	3	3	3
CO3	3	2	2	3	2	2	3	3	3
CO4	3	2	2	3	2	3	3	3	3
CO5	3	2	2	3	3	3	3	3	3

Unit I

Introduction- Components, Networks, Protocols and standards, Basic Concepts: Line Configuration, Topology Transmission mode, analog and digital signals, Encoding and modulating analog- to-digital conversion, digital to analog conversion, digital data transmission, DTE-DCE interface, modems, cable modems. Transmission media: guided media, unguided media, and transmission impairment.

Unit II

Multiplexing: Many to one/ one to many, frequency division multiplexing, wave division multiplexing, TDM, multiplexing applications: the telephone system, Cellular System, Mobile Communication-GSM, Mobile Services, GSM system Architecture, Radio Interface in GSM

Unit III

Data link Control: Line Discipline, flow control, error control, Data link Protocols: Asynchronous Protocols, synchronous protocols, character oriented protocols, bit – oriented protocols, link access procedures. Local Area Networks: Ethernet, token bus, token ring, FDDI, Comparison, Switching Circuit switching, packet switching, message switching, integrated services digital networks (ISDN): services, history, subscriber access to ISDN.

Unit IV

Overview of Optical Fiber Communication - Introduction, historical development, general system, advantages, disadvantages, and applications of optical fiber communication, optical fiber waveguides, fiber materials, Optical Sources And Detectors- Introduction, LED"s, LASER diodes, Photo detectors. Ray theory, cylindrical fiber, single mode fiber, cutoff wavelength, mode field

A14 Microprocessors-Architecture and Programming
Number of Contact Hours: 64 Hrs.

Course Objectives
1. To understand internals of Microprocessor
2. To learn architecture of 8085 Microprocessor
3.To learn instruction set of 8085 Microprocessor

69

Course Outcomes
CO1: Enable students to understand internals of Microprocessor
CO2: Enable students to understand architecture of 8085 Microprocessor
CO3: Enable students to understand instruction set of 8085 Microprocessor
CO4:Enable students to program a Microprocessor
CO5: Enable students to understand basics of 8086 microprocessor

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	3	0	0	3	3	3	3	3
CO2	3	3	1	1	3	3	3	3	3
CO3	3	3	2	3	3	3	3	3	3
CO4	3	3	1	3	3	3	3	3	3
CO5	3	3	0	3	3	3	3	3	3

Module I
General architecture of computer, Introduction to Microprocessor, Memory classification, Introduction to 8085,Microprocessor bus organizations ,data bus, address bus, control bus. Memory addressing, memory mapping. 8085 architecture in detail. General purpose registers and special purpose registers, flag register -8085 pins and signals.

Module II
Assembly language programming basics. Opcode, Mnemonics etc. 8085 instruction set ,Data transfer ,Arithmetic and Logic, Shifting and rotating, Branching/Jump, Program control. Addressing modes. Memory read and write cycle. Timing diagram. Instruction cycle , machine cycle and T-states. Types of I/O addressing .Simple programs.

Module III

Types of programming techniques looping, indexing (pointers),delay generation. Stack in 8085, call and return Instructions. Data transfer between stack and microprocessor. Subroutine and delay programs. Interrupts in 8085. Interrupt driven programs. Interfacing - Programmable peripheral devices - 8255A, 8254, 8237.

Module IV

Introduction to 8086/88 microprocessors – overview, 8086 internal architecture. The execution unit, BIU, Registers, Flags, Segmentation, physical address calculation, addressing modes.

BCA4B05 – Database Management System and RDBMS　　　　　　　**No. of sessions: 112**

Course Objectives
1. To learn the basic principles of database and database design
2.To learn the basics of RDBMS
3.To learn the concepts of database manipulation SQL
4.To study PL/SQL language
Course Outcomes
CO1:To learn the basic concepts of databases and data models and explains the features of database management systems, architecture of database systems, and the role of database users.
CO2: Develops an Entity-Relationship model based on user requirements and Convert an Entity-Relationship diagram to Relational Schema.
CO3: Learn Functional Dependency and Functional Decomposition and Applies various Normalization techniques for database design improvement.
CO4:   Use the basics of SQL and construct queries using SQL in database creation and interaction.
CO5: To understand the principle of transaction management design and Design a commercial relational database system (Postgres) by writing SQL using the system.

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	2	1	1	1	3	3	3	3	2

CO2	2	2	1	2	3	2	3	3	3
CO3	3	2	2	3	3	3	3	3	3
CO4	3	2	1	3	3	3	3	3	3
CO5	3	2	1	3	3	3	3	3	3

Unit I [8 T+ 2L]
Database System concepts and applications Introduction to databases, File Systems vs. DBMS, Advantages and Disadvantages of using DBMS Approach, Database administrators and user, Data Models, Schemas, and Instances, Types of Data Models, Three Schema Architecture and Data Independence, Database Languages and Interfaces.

Unit II [10 T+ 6L]
Entity-Relationship Model - Conceptual Data Models for Database Design Entity Relationship Models, Concept of Entity, Entity Sets, Relationship Sets, Attributes, Domains, Constraints, Keys, Strong and Weak Entities, Concepts of EER. Relational Data Model Relations, Domains and Attributes, Tuples, Keys. Integrity Rules, Relational Algebra and Operations, Relational Calculus and Domain Calculus, Relational Database Design using ER to Relational Mapping.

Unit III [10 T+12L]
Relational Database Design - Relational database design Anomalies in a Database, Normalization Theory, Functional Dependencies, First, Second and Third Normal Forms, Relations with more than one Candidate Key, Good and Bad Decompositions, Boyce Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

Unit IV [10 T +20L]
SQL Concepts: Basics of SQL, DDL, DML, DCL, Tables – Create, Modify and Delete table structures, Rename and Drop tables, Defining constraints – Primary key, foreign key, unique, not null, check, IN operator Select Command, Logical Operators, Functions - aggregate functions, Built-in functions –numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All. View - Creation, Renaming the column of a view, destroys view.

Unit V [10 T+24L]
Transaction Management and Concurrency Control - Transaction Properties (ACID), states, Commit, Rollback; Concurrency Control Lost update problems, Locks, two phase locking. Programming with SQL: Data types: Base and Composite, Attributes. Variables – Constants - Using set and select commands, Control Structures: IF, IF THEN ELSE, IF THEN ELSEIF, CASE. Loops: LOOP, EXIT, CONTINUE, WHILE, FOR, and FOREACH -

72

Looping Through Arrays - Looping Through Query Results. Security: Locks: Table-level Lock, Row-level Lock, Deadlock, Advisory Lock. Cursors: Boud and Unbound Cursors, Declaration, Opening, Working with cursors: FETCH, MOVE, UPDATE/DELETE, CLOSE, Looping through a Cursor. Concept of Stored Procedures – Advantages and Disadvantages – Creation – Parameters Setting for Function- Alter – Drop – Grant and Revoke - Passing and Returning data to/from Stored Procedures - Using stored procedures within queries – Triggers: Creation, Modification, Deletion, Error Handling: Control Structures, Cursors, Functions, Triggers.

BCA4C08 – Computer Graphics   **No. of sessions: 80**

Course Objectives
1. To learn the basics of computer graphics
2.To learn the applications of Computer graphics in various contexts
3.To equip the students to execute graphics algorithms and and solve simple problems
4.To learn the basics of GIMP
Course Outcomes
CO1:Students will be able to learn the basics and applications of computer graphics
CO2: Students will be able to understand line drawing and filling algorithms
CO3: Students will be able to understand various 2D transformations
CO4: Students will be able to understand line and polygon clipping algorithms
CO5: Students will be able to learn the basics of color models and GIMP

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	1	0	1	2	2	1	1	1	1
CO2	3	2	2	1	1	1	2	2	1
CO3	3	2	0	2	2	2	2	2	1
CO4	3	2	2	1	1	1	2	2	1

73

CO5	3	2	2	3	3	3	3	3	3

Unit 1

Introduction to computer graphics definition, Application, Pixel, Frame Buffer, Raster and Random Scan Display, Display Devices CRT, Color CRT Monitors, basics of LCD and LED Monitors

Unit 2

Scan Conversion of Line, DDA Algorithm of Line Drawing, Scan Conversion of Circles- Bradenham's Circle Generating algorithm, Polygon Filling, Scan Line Polygon Filling
Algorithm

Unit 3

Two-Dimensional Transformation, Translation, Rotation, Scaling, Homogeneous Coordinates, Reflection, Shear

Unit 4

Window to Viewport Transformation, Clipping, Line Clipping, Cohen Sutherland Line Clipping, Polygon Clipping, Sutherland and Gray Hodgman Polygon Clipping Algorithm.

Unit 5

Color Models and Color Applications Light and Color, Different color models, RGB, CMY,,YIQ. Introduction to GIMP, Image Manipulation Using GIMP.

BCA4C07- E-Commerce

No : of sessions :80

Course Objectives
1. To get a general introduction of the Electronic Commerce framework.
2.To get a general understanding on the various electronic payment system
3.To get a general understanding on the Internal information systems.
4.To get a general understanding on the new age information.
Course Outcomes
CO1:Understand the concept of E-commerce and its transition in India
CO2: Identify the different models for E-commerce
CO3: Understand the networking technologies that facilitate E-commerce

| CO4: Identify the key security threats in the E-commerce environment. |
| C05: Able to do online transactions through different payment methods |

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	2	1	1	1	3	2	2	2	2
CO2	2	1	0	2	3	3	2	2	2
CO3	3	2	1	2	3	3	2	3	3
CO4	3	0	2	2	3	2	2	2	3
CO5	3	2	3	3	3	3	2	2	3

UNIT I (15T)

History of E-commerce and Indian Business Context : E-Commerce, Emergence of the Internet, Emergence of the WWW, Advantages of E-Commerce, Transition to E-Commerce in India, The Internet and India, E-transition Challenges for Indian Corporates.

UNIT II (15T)

Business Models for E-commerce: Business Model, E-business Models Based on them Relationship of Transaction Parties - E-business Models Based on the Relationship of, Transaction Types.

UNIT III (18T)

Enabling Technologies of the World Wide Web: World Wide Web, Internet Client-Server Applications, Networks and Internets, Software Agents, Internet Standards and Specifications, ISP.e-Marketing: Traditional Marketing, Identifying Web Presence Goals, Online Marketing, Advertising-branding.

UNIT IV (17T)

e-Security : Information system Security, Security on the Internet, E-business Risk Management Issues, Information Security Environment in India. Legal and Ethical Issues: Cyber stalking, Privacy is at Risk in the Internet Age, Phishing, Application Fraud, Skimming, Copyright, Internet Gambling, Threats to Children.

75

UNIT V (15T)

e-P ayment Systems: Main Concerns in Internet Banking, Digital Payment Requirements, Digital Token-based e-payment Systems, Classification of New Payment Systems, Properties of Electronic Cash, Cheque Payment Systems on the Internet, Risk and e-Payment Systems, Designing e-payment Systems, Digital Signature.

AUD4E06-Gender Studies

Course Objectives
1.   To provide the relevance and significance of the ideas of gender equality and gender justice in our society
2.   To develop an understanding about the basic concepts of gender studies
3.   To provide a historical background of women's movements and its relevance
4.   To understand the major debates around gendered ways of violence and to introduce gender perspectives on popular culture

Course Outcomes
C01. It helps the student to acquire knowledge about the importance of gender equality and women's rights
C02. It helps the student to develop gender sensitivity through an analysis of contemporary social issues at the global, national and local levels
C03. It helps the student to familiarize with analyzing the popular culture and media with a gender perspective
C04. It equips the student to acquire knowledge about the various organs, conventions, constitutional provisions and redressal systems to combat gender discrimination

Module I

Introducing the concepts of sex and gender, gender division of labour, patriarchy, sexualities and sexual orientations, gender stereotypes, masculinities, intersectionalities of race, class, caste and gender in family and society

Module II

Women's Experiences in family & work, community, public sphere kinship structures,various forms of violence against women – female foeticide, infanticide, dowry, domestic violence, sexual assaults, rape, sexual harassment at workplace, honour killings –Government mechanisms to combat Violence against women in India

Module III

Historical Roots of Women's Movements in India and global – Right to vote –Women'sQuestion and social reform in 19th early 20th Century in India and Kerala –Women in National Movement – Left Movement- The Contemporary Women's Movements in India – Queer movements – International human rights instruments & UN conventions on gender rights, Indian Constitutional guarantees of equality and citizenship rights – gender in higher Education

Module IV

76

Gender perspectives on popular culture, discourse and practices of cinema, television,popular music, magazines and advertisements, representations of women and gender/sexual minorities in media, gendered dimensions of social media – analysis of gender in news – print, television, web and women's media initiatives

NCSBC01-Bridge Course-Introduction to Object Oriented Programming

Course Objectives
1. To provide students the confidence and skills to successfully transition to new system
Course Outcomes
CO1: To define the basic concepts in object oriented programming.
CO2:.To develop academic skills and assist the students in object oriented programming.

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

Unit I

Introduction to Object Oriented Programming: Characteristics of OOPS, Object oriented languages, comparison between procedural and object oriented programming.

Unit II

Basic principles of Object Orientation-class, object,abstraction, encapsulation, inheritance, polymorphism, modularity, and message passing.

Unit III

Features of object orientation - attributes, state, identity, operation, behaviour.Access specifiers-private,public,protected

Unit IV

Classes and Objects:Introduction,class fundamentals,Defining a class,Creating objects,Accessing class members.

Unit V

Inheritance and polymorphism - Introduction - Defining derived classes - Types of

77

inheritances,Compile time and Runtime polymorphism(concepts only)

NCAWWS02-Walk with the Scholar-Research Writing

Course Objectives
1. To help the students to to learn basics of research.
Course Outcomes
CO1: To develop certain generic skills, non-technical competencies, attitudes and behaviours
CO2:To provide necessary orientation,guidance ,motivation and support to enrich and nourish their talents.

Overview of Research,Overview of Literature Survey: Literature Survey using Web of Science, Literature Survey using Scopus,Data Analysis,How to make Technical presentation – Technical Writing,Intellectual property,Research in Computer Science & Engineering

NCSACT06- Industrial Interaction-Industry Ethics & Practices

Description:The main purpose is to give students an insight into the regular, internal workings of a company.It gives good understanding of the industry and helps in building up useful case studies for improving the quality of future teaching. It provides an ability to identify research programmes of industrial importance.

Course Objectives
To make students aware about the ethics and practices in the industry
Course Outcomes
CO1: To learn as to how theatrical concepts are put into action, thereby aiding their practical learning.
CO2:.To enhance interpersonal skills and communication techniques and to become more aware of industry practices and regulations

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4

CO									
CO1	3	2	3	3	3	3	3	3	3
CO2	3	2	3	2	3	3	3	3	3

NCSACT07-Mini Project-Computer Graphics

Description:The main aim is to illustrate the concepts and usage of pre-built functions in OpenGL. Creating Figures and the surrounding environment using inbuilt functions provided by the glut library.

Course Objectives
1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
2.Render projected objects to naturalize the scene in 2D view and use of illumination models for this.
Course Outcomes
CO1: To acquire programming skills in developing graphics based applications
CO2:.To develop the skill of animation

PO / CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

NCSACC4-Additional Certification Course

Description:An additional Certification Course on "Research Paper Writing and Publication" will be provided to students.The duration of the course will be 5 hours.Faculties of Computer Science Department will handle the session.The session will provide more insight towards research paper writing skills and publication of papers by the students.

Course Objectives

79

1.The major purpose of this course is to provide you with technical knowledge and skills necessary to write and to publish professional papers.
2.Understand research terminology
3.Be aware of the ethical principles of research
Course Outcomes
CO1: To learn and synthesize new concepts in writing a research paper

PO CO	PO1	PO2	PO3	PO2	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	2

Topics:

- Overview of Research
- Overview of Literature Survey: Literature Survey using Web of Science, Literature Survey using Scopus, Writing Up, Tutorial on using BibTeX with LaTeX to add references to a document, Tutorial on using Microsoft Word with Bibliographic Sources, Tutorial on using Microsoft Word with endnote entries
- Data Analysis
- How to make Technical presentation – Technical Writing
- Intellectual property
- Research in Computer Science & Engineering

Intermediate Skills Enrichment

Program Objective: To make the students aware of their career choices and competencies required to be successful in their domain and equip them with the required skills.

Course Outcome:

 To equip the students with the skills required to excel in their respective domains.

MODULE 1: Session 1-3 (Logical Reasoning)   3 Hrs

➢ Coding – decoding ➢ Series missing number ➢ Statements & Assumptions ➢ Statements & Arguments

MODULE 2: Session 4-6 (Logical Reasoning)   3 Hrs

80

➢ Blood relations ➢ Matrix arrangement ➢ Analogy Test

MODULE 3: Session 7-8 (Logical Reasoning)   2Hrs

➢ Direction & ranking ➢ Cause and effect ➢ Syllogism

MODULE 4: Session 9-11(Verbal Reasoning)   3 Hrs

➢ Reading comprehension ➢ Vocabulary – synonyms & antonyms

MODULE 5: Session 12-14 (Verbal Reasoning)   3 Hrs

➢ Jumbled words ➢ Idioms & phrases

Assessment Test -1 Hour at the end of semester

Semester 5

BCA5B07 – Computer Organization and Architecture   **No. of sessions: 64**

Course Objectives
1. To learn logic gates, combinational circuits and sequential circuits
2.To learn basics of computer organization and architecture
3.To equip the students to understand the method of program execution in computers
4.To learn the basics of memory organization
Course Outcomes
CO1:Students will be able to learn the basics of digital circuits,logic gates and combinational circuits
CO2: Students will be able to learn the basics of flip flops and its applications
CO3: Students will be able to understand the basics of computer organization
CO4: Students will be able to understand the basics of microprogramming and addressing modes
CO5: Students will be able to understand the basics of memory organization

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	3	3	2	3	3	3	3	3	3
CO2	3	3	1	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3
CO4	3	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Unit 1

Digital Logic - Positive and negative logic, logic gates ,NOT gate, OR gate, AND gate, XOR and X-NOR gates, Universal gates- NAND gate, NOR gate,. Combinational circuits- Half adder, half subtractor, full adder, full subtractor, ripple carry adders, look-ahead carry adders, decoders, BCD to 7-segment decoder, encoders, multiplexers and demultiplexers.

Unit 2

Sequential Logic Circuits: Edge triggering, Pulse triggering ,SR latch, SR flip flop, JK flip flop, Master Slave JK flip flop, D flip flop, T flip flop. Shift register: serial in - serial out, serial in - parallel out, parallel in - serial out, parallel in-parallel out configurations. counters (asynchronous & synchronous), up/down counter, decade counter, mod N counter, Ring counter, Johnson"s counter

Unit 3

Basic Computer Organization and Design: Instruction Codes , Computer Registers, Computer Instructions, Instruction types, Timing and Control, Instruction Cycle, Memory reference Instructions, Register reference instructions, Input, Output and Interrupt Design of Basic Computer, Design of Accumulator logic

Unit 4

Micro programmed Control: Control Memory, Address sequencing, Micro program Example, Design of control unit. Processor Organization: general register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation, program control

Unit 5

Memory Organization: Memory mapping, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware, hit/miss ratio, Input-Output Organization: Peripheral devices, I/O interface, Modes of Transfer-asynchronous and synchronous, Priority Interrupt, Strobe Control, Handshaking. Direct Memory Access, Input-Output Processor, Serial Communication. I/O Controllers

BCA5B08 -Java Programming   **No. of sessions: 96**

Course Objectives
1.To understand the concepts and features of object oriented programming
2.To examine key aspects of java Standard API library such as util, io
3.To provide basics of multithreading, exception handling and database connectivity etc
4 To impart the techniques of creating GUI based applications.
Course Outcomes
CO1:Apply object oriented programming features and concepts for solving given problems.
CO2: Able to use java standard API library to write complex programs .
CO3:Implement object oriented programming concepts
CO4:Implement Exception Handling and database connections in java.
CO5: Use graphical user interface and Event Handling in java

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	2	2	1	3	1	3	3	3	3
CO2	3	1	1	3	2	3	2	3	1
CO3	2	2	1	2	1	2	3	2	2
CO4	2	3	1	2	3	3	2	2	2
CO5	3	2	1	3	1	3	3	3	3

Unit I

83

Introduction to OOPS, Characteristics of OOPS, Object oriented languages, comparison between procedural and object oriented programming, basic principles of Object Orientation-class, object, abstraction, encapsulation, inheritance, polymorphism, modularity, and message passing. Features of object orientation - attributes, state, identity, operation, behaviour.

Unit II

Introduction to Java: History, Versioning, The Java Virtual Machine, Byte code, Writing simple java program, Language Components: Primitive Data Types, Comments, Keywords, literals, The break Statement, The continue Statement, Operators – Casts and Conversions, Arrays. Introduction to classes and methods, constructors, Passing Objects to Methods, Method Overloading, Static and final, The this Reference, finalize, inner and nested classes. Inheriting class, extends, member access and inheritance, super keyword, Object class. Dynamic method dispatch, method overriding, abstract class, interface, packages, import statement.

Unit III

Exceptions, I/O and Threads Input and Output in Java: The File Class, Standard Streams, Keyboard Input, File I/O Using Byte Streams, Character Streams, File I/O Using Character Streams - Buffered Streams, File I/O Using a Buffered Stream, Keyboard Input Using a Buffered Stream,Writing Text Files. Threads: Threads vs. Processes, Creating Threads by Extending Thread, Creating Threads by Implementing Runnable, Advantages of Using Threads, Daemon Threads, Thread States, Thread Problems, Synchronization. Exceptions: Exception Handling, The Exception Hierarchy, throws statement, throw statement, Developing user defined Exception Classes- The finally Block.

Unit IV

Database Connectivity & Applets: Introduction to JDBC : The JDBC Connectivity Model, Database Programming, Connecting to the Database, Creating a SQL Query, Executing SQL Queries, Getting the Results, Updating Database Data, Executing SQL Update/Delete, The Statement Interface, The ResultSet Interface, ResultSetMetaData. Introduction to GUI Applications - Applets - Types of Applet, Applet Skeleton, Update method, repaint Methods, Html Applet tag and passing parameter to applet.

Unit V

Events and GUI Applications: Event Handling: The Delegation Event Model, Event Classes, Event Listener Interfaces, Adapter Classes. Java Desktop Applications, Introduction to the AWT, Overview of the AWT, Structure of the AWT, The AWT hierarchy, Containers, Components, Canvas, Frame Working with: Color, Font, FontMetrics, Simple Graphics- Point, line, Rectangle, Polygon, Controls - Button, , Checkbox, Choice, , Label, List, Scroll bar, TextArea, TextField, Layout Manager, MenuBar, Menu, MenuItem , Checkbox MenuItem.

Text Books

1. Herbert Scheldt, Java The Complete Reference, 8th Edition, Tata McGraw-Hill Edition, ISBN: 9781259002465

References

84

1. E Balaguruswamy, Programming in Java: A Primer, 4th Edition, Tata McGraw Hill Education Private Limited, ISBN: 007014169X.
2. Kathy Sierra, Head First Java, 2nd Edition, Shroff Publishers and Distributors Pvt Ltd, ISBN: 8173666024. 3. David Flanagan, Jim Farley, William Crawford and Kris Magnusson, Java Enterprise in a Nutshell: A Desktop Quick Reference, 3rd Edition, O'Reilly Media, ISBN: 0596101422.

BCA5B09 -Web Programming using PHP   **No. of sessions: 96**

Course Objectives
1. To learn html concept
2.To learn the basics server side programming using Javascript
3.To study PHP language concepts
4.To study database connectivity using PHP and Postgres
Course Outcomes
CO1:To learn the basic concepts of creating web pages using HTML
CO2: write server side scripting programs using java script
CO3: Learn basics of PHP programming language
CO4:   Create PHP programs that use various PHP library functions, and that manipulate files and directories.
CO5: Analyze and solve various database tasks using the PHP language.

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	1	1	0	2	2	3	3	2	3
CO2	2	1	1	3	2	2	2	3	2
CO3	1	2	1	3	1	3	3	3	3
CO4	2	1	1	2	2	2	2	3	3
CO5	3	2	1	2	1	2	3	3	3

NCSACT11-Industrial Interaction-Getting ready for placements

Description:The main purpose is to give students an insight into the regular, internal workings of a company.It gives good understanding of the industry and helps in building up useful case studies for improving the quality of future teaching. It provides an ability to identify research programmes of industrial importance.
85

Course Objectives
To prepare students for jobs in multinational companies, by exposing them to newer technologies and development methodologies.
Course Outcomes
CO1: To learn as to how theatrical concepts are put into action, thereby aiding their practical learning.
CO2:.To enhance interpersonal skills and communication techniques and to become more aware of industry practices and regulations

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	3	3	3	3	3
CO2	3	2	3	2	3	3	3	3	3

Unit I [9 T + 9L]

Introduction web-documents: Static, Dynamic, Active - Web programming: client side and server side scripting. HTML 5: Document Structure, Elements, Attributes, Types of Elements and Attributes, Basic HTML Data types. Using HTML5 form elements: datalist, keygen, output, progress, meter. File uploading using forms - Frameset and frames. CSS: External CSS, CSS3 Syntax, Selector: Universal, Class, ID. Working with Lists and Tables, CSS ID and Class – Navigation Bar - Image Gallery – Image Opacity.

Unit II [9 T + 9L]

Javascript: Introduction, Client side programming, script tag, comments, variables. Including JavaScript in HTML: head, body, external. Data types. Operators: Arithmetic, Assignment, Relational, Logical. Conditional Statements, Loops, break and continue. Output functions: write, writeln, popup boxes: prompt, alert, confirm. Functions: Built-in Global Functions: alert(), prompt(), confirm(), isNan(), Number(), parseInt(). User Defined Functions, Calling Functions with Timer, Events Familiarization: onLoad, onClick, onBlur, onSubmit, onChange, Document Object Model (Concept). Objects: String, Array, Date.

Unit III [10 T + 10 L]

PHP: Introduction, Server side programming, Role of Web Server software, Including PHP Script in HTML: head, body, external. Comments, Data types, variables and scope, echo and print. Operators: Arithmetic, Assignment, Relational, Logical. Conditional Statements, Loops, break and continue. User Defined Functions.

86

Unit IV [10 T + 10 L]

Working with PHP: Passing information between pages, HTTP GET and POST method, Cookie,Session. String functions: strlen, strops, strstr, strcmp, substr, str_replace, string case, Array constructs: array(),list() and foreach(). Header().

Unit V [10 T + 10 L]

PHP & PostgreSQL: Features of PostgreSQL, data types, PostgreSQL commands – CREATE DATABASE, CREATE TABLE, DESCRIBE TABLE (\d table_name or using usinginformation_schema), SELECT, SELECT INTO, CREATE AS, DELETE, UPDATE, INSERT. PHP - PostgreSQL Integration: Establishing Database Connection (pg_connect(), pg_connection_status(), pg_dbname()), Getting Error String (pg_last_error()), Closing database Connection (pg_close()), Executing SQL statements (pg_query(), pg_execute()), Retrieving Data (pg_fetch_row(), pg_fetch_array(), pg_fetch_all(), pg_fetch_assoc(), pg_fetch_object(), pg_num_rows(), pg_num_fields() pg_affected_rows(), pg_num_rows(), pg_free_result()), Insertion and Deletion of data using PHP, Displaying data from PostrgreSQL database in webpage. Introduction to AJAX - Implementation of AJAX in PHP - Simple example for partial page update.

BCA5B10 -Principles of Software Engineering

Course Outcomes

· CO1 To learn engineering practices in Software Development.
· CO2 Select and implement different software development process models.
· CO3 Extract and analyse software requirements specifications for different projects.
· CO4 Develops some basic level of software architecture/design.
· CO5 Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	3	3	3	3	3	3

CO2	3	2	2	3	3	3	3	3	3
CO3	3	2	2	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3
CO5	3	2	3	3	3	3	3	3	3

Course Outline
UNIT I [13T]
Software and Software Engineering: Overview of Software Engineering, Practice & Myths; Software Process; Generic process model- Framework Activity, Task Set, Process Patterns, Process Improvement; SDLC , Prescriptive process model- Waterfall Model, Spiral Model, Incremental Process Model, Evolutionary Process Model; Specialized Process Models: Component Based Development, the Formal Methods Models;
Agile development-Agile Process; Extreme Programming; Other Agile Process Models – ASD, Scrum, DSDM, FDD, LSD, Agile Modeling, Agile Unified Process..
UNIT II [13T]
Requirements Engineering- Establishing the Groundwork- Eliciting Requirements - Developing use cases – Building the requirements model - Negotiating, validating Requirements - Requirements Analysis-Requirements Modeling Strategies.
UNIT III [14T]
MODELING WITH UML: Concepts and Diagrams - Use Case Diagrams - Class Diagrams - Interaction Diagrams - State chart Diagrams – Activity Diagrams - Package Diagrams - Component Diagrams - Deployment Diagrams - Diagram Organization- Diagram Extensions. Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements.
UNIT IV [11T]
Structured coding Techniques-Coding Styles - Standards and Guidelines-Documentation Guidelines-Modern Programming Language Features: Type checking-User defined data types-Data Abstraction Exception Handling - Concurrency Mechanism.
UNIT V [13T]
TESTING: Software Quality- Software Quality Dilemma- Achieving Software Quality- Testing: Strategic Approach to software Testing- Strategic Issues - Testing: Strategies for Conventional Software, Object oriented software, Web Apps-Validating Testing- System Testing- Art of Debugging. MAINTENANCE: Software Maintenance-Software Supportability- Reengineering - Business Process Reengineering- Software Reengineering- Reverse Engineering - Restructuring- Forward Engineering- Economics of Reengineering
Text Books
1. Roger S, *"Software Engineering – A Practitioner's Approach"*, seventh edition, Pressman, 2010.
2. Pearson Education, *"Software Engineering by Ian Sommerville"*, 9th edition, 2010.

3. Roff: UML: A Beginner's Guide TMH

Reference Books

1. Hans Van Vliet, "Software Engineering: Principles and Practices", 2008.
2. Richard Fairley, "Software Engineering Concepts", 2008.
3. Rohit Khurana, Software Engineering: Principles and Practices, 2nd Edition, Vikas Publishing House Pvt Ltd.
4. Pankaj Jalote, An Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House.
5. Alhir, learning UML, SPD/O'Reily

Open Courses (XXX5DXX)

BCS5D01 - Introduction to Computers and Office Automation

Course Objective
1. Understand the terms hardware, software, I/O devices, Networks - LAN, MAN & WAN
2. Understand the features of MS Word
3. Understand the features of MS Excel
4. Understand the features of mS PowerPoint
Course Outcome
CO1:Understand different types of computers and networks, hardware units,system software.
CO2:Learn documentation using Word processing software such as MS word, Open Office Writer.
CO3: Learn calculations using spreadsheet MS Excel and Open Office Writer.
CO4:Learn presentations using Open Office Impress/MS-PowerPoint.
CO5:Able to work documents using various office automation tools.

PO-CO mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	0	1	0	3	3	3	3	3	3

89

CO2	1	3	2	3	3	3	3	3	3
CO3	3	3	2	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Unit I

Introduction to Computers: Types of Computers - DeskTop, Laptop, Notebook and Netbook.Hardware: CPU, Input / Output Devices, Storage Devices – System - Software - Operating Systems, Programming Languages, Application Software - Networks - LAN, WAN - Client - Server.

Unit II

Documentation Using a Word Processor (OpenOffice Writer / M.S. Word) - Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Advance Features - Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

Unit III

Electronic SpreadSheet (Open Office Calc/MS-Excel) - Introduction to SpreadSheet, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advanced features – Pivot table & Pivot Chart, Linking and Consolidation.

Unit IV

Presentation using (OpenOffice Impress/MS-Power Point): Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

References:

1. Michael Miller, Absolute Beginner's Guide to Computer Basics, Prentice Hall.
2. Russell A. Stultz, Learn Microsoft Office, BPB Publication.
3. H.M.Deitel, P. J. Deitel, et al., Internet & World Wide Web - How to program, Prentice Hall.

BCA5D02 - Web Designing

Course Objective
1. To learn Web designing.   2. To introduce the fundamentals of the Internet, and the principles of web design.   3. To construct basic websites using HTML and Cascading Style Sheets.   4. To build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.   5. To develop modern interactive web applications and familiarize with HTML editing.
Course Outcome
CO1:Enable students to understand internet and develop web page creation using basic HTML Tags
CO2: Understand the concept of DHTML, HTML editors and write server side scripting programs using java script
CO3: Enable students to create web pages with different styles and formats.
CO4: Develop the students to create programs using basic javascript, Decision making statements, branching statements, looping statements and functions.
CO5: Develop the students to create programs using Java script and HTML.

PO-CO mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO2	PSO3	PSO4

CO1	1	1	0	2	2	1	2	2	1
CO2	2	1	1	3	2	2	2	3	2
CO3	1	2	1	3	1	1	3	2	1
CO4	2	1	1	2	2	1	2	2	3
CO5	3	2	1	2	1	1	2	2	1

Unit I [12T]

HTML: Introduction - history of html, sgml - structure of html document, web page layout, html tags and types - font type, paragraph formatting, meta data, blockquote, hyperlinks, linking, comments, white space, horizontal ruler,images, ordered and unordered lists, frames, tables, forms

Unit II [12T]

DHTML: Introduction, DHTML technologies, elements of DHTML, document object model, events - window events, form events, keyboard events, mouse events, style sheets, properties used in style sheets - background properties, positioning properties.

Unit III [12T]

Javascript: Introduction and advantages of javascript, java script syntax, writing javascript in html, javascript operators, arrays and expressions, programming constructs - for .. in loop, while loop - dialog boxes and prompts - alert, prompt, confirm methods - functions - built-in functions and userdefined functions, scope of variables, handling events, using event handlers and event methods, form object, properties, methods, form element's properties and methods.

Unit IV [12T]

HTML Editor: Introduction, advantages, creating, opening, saving a web page, building forms, formatting and aligning

text and paragraph, adding lists, styles and themes, linking pages, working with images, frames.

Reference Book:

1. H. M. Dietel, Internet and World Wide Web, Pearson.

PE5D03: Physical Activity, Health and Wellness

<div align="center">

COURSE OBJECTIVES

</div>

1. To introduce the fundamental concepts of Physical Education Health and Fitness.

2. To provide a general understanding of nutrition, First aid, Yoga and stress management

3. To create awareness regarding hypo-kinetic diseases and Postural deformities

COURSE OUTCOMES

C01. Understand the foundational principles of physical education, health, and wellness, integrating anatomy, physiology, and nutrition knowledge to promote holistic well-being.
C02. Evaluate and apply various fitness methodologies to enhance physical performance, demonstrating an understanding of the relationship between exercise and overall health.
C03. Assess and analyze the components of physical fitness, including strength, flexibility, endurance, and body composition, to design personalized fitness plans.
C04. Apply the scientific principles of yoga to improve physical, mental, and emotional health, recognizing its benefits in promoting relaxation, flexibility, and mindfulness.
C05. Develop strategies for preventing and managing sports injuries, demonstrating proficiency in administering first aid and understanding the importance of prompt intervention in maintaining athlete well-being.

C0-PO-PSO MAPPING

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	1	3	2	1	1	2	2

CO2	3	2	3	1	3	2	1	1	2	2
CO3	3	2	3	1	3	2	1	1	2	2
CO4	2	2	3	1	3	3	1	1	2	3
CO5	2	2	3	1	3	3	1	1	2	3

Module I: Introduction to Physical Education, Health and Wellness (5 hrs)

Definition, aim, objectives and importance of physical education.Definition and Importance of Health.

Meaning and concept of wellness.

Module II: Concept of Fitness (12 hours)

Types of fitness. Definition of Physical Fitness. Types of physical fitness –Health related physical fitness, Performance related physical fitness and Cosmetic fitness. Components of physical fitness %u2013 speed, strength, endurance, flexibility and coordinative abilities. Assessment of physical fitness components. Fitness balance.

Module III: Exercise principles, (5 hrs)

Principles of exercise programme, Types of Exercise. Benefits of Exercise, Exercise and Heart Rate Zone.

Module IV:

Vital signs, Lifestyle/Hypo kinetic diseases and its management (10 hours) Vital signs- Pulse rate, Respiratory rate, Blood pressure, Body temperature, Diseases- Diabetes, Hypertension, Obesity, Osteoporosis,

CHD, arthritis. Fitness assessment- Body mass index, waist-to-hip ratio,

94

Module V: First Aid. Nutrition. Postural deformities (8 hrs)

Definition of First Aid, Aim of First Aid, Principles of First

Aid.RICE, ABC of First Aid, First Aid for sprain, strain, Fracture, Bleeding,Drowning and SnakeBite.

Nutritional balance, Nutritional deficiency diseases. BMR Meaning of good posture, causes of poor posture, importance of good posture Postural deformities and corrective measures - Kyphosis, Lordosis, Scoliosis,

Bow leg, Knock knee, Flat foot

Module VI: Science of Yoga, Emotional Control, Stress Management (8 hrs)

Definition and meaning of Yoga, Asana, and Pranayama. Eight limbs of

Ashtanga Yoga Yama, Niyama, Asana, Pranayama, Prathyahara, Dharana, Dhyana, Samadhi. Asanas and its effects: 1. Standing (Balancing) %u2013 Vrikshasana, Padahasthasana, Ardha Chakrasana.

2. Sitting (Meditative) - Vajrasana, Padmasana, 3. Prone lying - Bhujangasana, Salabhasa. 4.

Supine - Uttitha padmasana, Naukasana. 5. Relaxative – Savasana Pranayamas and its effects-1) Surya Bedhana(Heating), 2) Chandra bedhana(Cooling) 3) Nadisudhi (Balancing) Stress - Definition of stress, causes of stress and stress management.

NCSACT10- Seminar- How to become an Entrepreneur
Description: It supports the students to become an **entrepreneur** to develop their ideas and earn money. It focuses on the basics of **entrepreneurship** or how to start a sustainable company.Helps them to set long term goals and short term goals for their business.

Course Objectives

95

1. To get basic knowledge about starting and running a company/organization
Course Outcomes
CO1: Set targets /goals themselves for their business to achieve over a period of time
CO2:.To acquire knowledge about financial growth

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

NCSA0C3-Add On Course-lntroductory Concepts of Digital Computing

Description:In semester 5,all the students should enroll for any one of the MOOC COURSE provided by NPTEL.The list of courses will be provided from department.From the list of courses provided,students may choose any one course.The duration of the course will be minimum of 30 hrs.

Course Objectives

1. Introductory Concepts of Digital Computing, presents the fundamental concepts and techniques used in the designing process of digital computing devices

2.The main focus is to expose learners to the designing of combinational and sequential logic circuits.

3.This course lays a strong foundation to make a big move in the core subjects like Digital Electronics,Computer Organization,Computer Architecture etc and it forms the basics of many of the next level courses

Course Outcomes

CO1:To enable the learners to acquire basic knowledge about digital logic and digital electronic circuits.

CO2:To understand different number systems and conversions between numbers of different bases .

PO-CO-PSO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	0	3	2	3	3	2

Course Layout/Syllabus

Week : 1
Mod 1 : Introduction to Digital Computing
97

Mod 2 : Number Systems : Introduction
Mod 3 : Number Systems : Conversions
Discussion
Assignment 1

Week : 2
Mod 4 : Binary Data Representation
Mod 5 : Binary Arithmetic : Addition and Subtraction
Mod 6 : Binary Arithmetic : Multiplication and Division
Discussion
Assignment 2

Week : 3
Mod 7 : Binary Codes : Part 1
Mod 8 : Binary Codes : Part 2
Mod 9 : Error Correcting and Detecting Codes
Discussion
Assignment 3

Week : 4
Mod 10 : Basic Logic Gates
Mod 11 : Universal Gates
Mod 12 : Boolean Algebra : Part 1
Discussion
Assignment 4

Week : 5
Mod 13 : Boolean Algebra : Part 2
Mod 14 : Simplification of Boolean Expressions
Mod 15 : K-Map : Part 1
Discussion
Assignment 5

Week : 6
Mod 16 : K-Map : Part 2
Mod 17 : Combinational Circuits : Adders - Part 1
98

Mod 18 : Combinational Circuits : Adders - Part 2
Discussion
Assignment 6

Week : 7
Mod 19 : Combinational Circuits : Subtractors
Mod 20 : Combinational Circuits : Magnitude Comparators
Mod 21 : Combinational Circuits : Encoder
Discussion
Assignment 7

Week : 8
Mod 22 : Combinational Circuits : Decoder
Mod 23 : Combinational Circuits : Multiplexer
Mod 24 : Combinational Circuits : Demultiplexer
Discussion
Assignment 8

Week : 9
Mod 25 : Sequential Circuits : Introduction
Mod 26 : Sequential Circuits : Latches
Mod 27 : Sequential Circuits : Flip flops - Part 1
Discussion
Assignment 9

Week : 10
Mod 28 : Sequential Circuits : Flip flops - Part 2
Mod 29 : Sequential Circuits : Flip flops - Part 3
Mod 30 : Sequential Circuits : Flip flops - Part 4
Discussion
Assignment 10

Week : 11
Mod 31 : Sequential Circuits : Flip flops - Part 5
Mod 32 : Sequential Circuits : Registers – Part 1
Mod 33 : Sequential Circuits : Registers – Part 2

99

Discussion
Assignment 11

Week : 12
Mod 34 : Sequential Circuits : Counters – Part 1
Mod 35 : Sequential Circuits : Counters – Part 2
Mod 36 : Sequential Circuits : Counters – Part 3
Discussion
Assignment 12

Semester 6

1. BCA6B11 – Android Programming

No. of sessions: 80

Course Objectives
1.   Understand the basic concepts of Android programming.
2.   Understand the different types of resources in Android.
3.   Develop user interface for Android application.
4.   Understand the concept of Menu, Fragment and ActionBar in Android.
5.   Understand the concept of persisting data in files and SQLite databases.
Course Outcome
1.   Explain the basic concepts of Android programming.
2.   Identify the different types of resources in Android.

100

3.	Design user interface for Android application.
4.	Explain the concept of Menu, Fragment and ActionBar in Android.
5.	Develop an application with database connectivity using Android.

CO-PO/PSO Mapping

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	3	3	3	3	3	3
CO2	3	2	1	3	3	3	3	3	3
CO3	3	2	1	3	3	3	3	3	3
CO4	3	2	1	3	3	3	3	3	3
CO5	3	2	1	3	3	3	3	3	3

Syllabus

Unit I

Introducing the android computing platform, History of android, an- droid software stack, Developing end user application using Android SDK, Android java packages, Setting up the development environment, Installing

android development tools(ADT), Fundamental components, Android virtual devices, Running on real device, Structure of android application, Application life cycle..

Unit II

Understanding android resources - String resources, Layout resources, Resource reference syntax, Defining own resource IDs - Enumerating key android resources, string arrays, plurals, Colour resources, dimension resources, image resources, Understanding content providers - Android built in providers, exploring databases on emulator, architecture of content providers, structure of android content URIs ,reading data using URIs, using android cursor, working with where clause, inserting updates and deletes, implementing content, Understanding intents basics of intents, available intents, exploring intent composition, Rules for Resolving Intents to Their Components, ACTION PICK, GET CONTENT, pending intents.

Unit III

User interfaces development in android - building UI completely in code, UI using XML, UI in XML with code, Android's common controls - Text controls, button controls, checkbox control, radio button controls, image view, date and time controls, map view control, understanding adapters, adapter views, list view, gridview, spinner control, gallery control, styles and themes, Understanding layout managers - linear layout manager, table layout manager, relative layout manager, frame layout manager, grid layout manager.

Unit IV

Android menus - creating menus, working with menu groups, responding to menu items, icon menu, sub menu, context menu, dynamic menus, loading menu through XML, popup menus, Fragments in Android structure of fragment, fragment life cycle, fragment transaction and back stack, fragment manager, saving fragment state, persistence of fragments, communications with fragments, startActivity() and setTargetFragment(), using dialogs in android, dialog fragments, working with toast, Implementing action bar - tabbed navigation action bar activity, implementing base activity classes, tabbed action bar and tabbedlistener, debug text view layout, action bar and menu interaction, list navigation action bar activity, spinner adapter, list listener, list action bar, standard navigation action bar activity, action bar and search view, action bar and fragments.

Unit V

Persisting data - Files, saving state and preferences - saving application data,creating, saving and retrieving shared preferences, preference framework and preference activity, preference layout in XML, native preference controls,preference fragments, preference activity, persisting the application state, including static files as

102

resources, Working with file system, SQLLite - SQLLite types,database manipulation using SQLLite, SQL and database centric data model for Android, Android database classes.

References:

1. Satya Komatineni & Dave MacLean,Pro Android 4, Apress.

2. Retomeier, Professional Android 4 Application Development, Wrox.

3. Zigurd Mednieks, Laird Dornin, G. Blake Meike, and Masumi Nakamura, Programming Android, O'Reilly

BCA6B12 -Operating Systems   **No. of sessions: 80**

Course Objectives
1.To learn objectives & functions of Operating Systems
2.To understand processes and its life cycle.
3.To learn and understand various Memory and Scheduling Algorithms.

4.To have an overall idea about the latest developments in Operating Systems
Course Outcomes
CO1: Learn the basic concepts of operating systems. and about process management
CO2: Understand and experience the UNIX commands and language constructs in building shell scripts
CO3:Able to compare different process scheduling algorithms and process synchronization
CO4: Learn and apply different memory management techniques
CO5: Explain the basic concepts of mobile operating systems.

CO-PO/PSO Mapping

PO→	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO ↓									
CO1	2	2	0	3	2	3	2	2	3
CO2	3	2	1	3	3	2	3	3	3
CO3	3	2	1	2	3	2	2	3	3
CO4	3	3	0	2	2	3	2	2	2
CO5	2	3	1	3	2	2	2	3	3

Unit I

Operating System - Objectives and functions - The Evolution of Operating Systems: Serial Processing, Simple batch Systems, Multi Programmed batch Systems, Time Sharing Systems, Parallel Systems, Distributed Systems, Real time systems. Definition of Process, Process States, Process Control Block, Operations on Process, Process Communication, Communication in Client server System, Basic concepts of threads, Concurrency, Principles of Concurrency, Mutual exclusion, Semaphores, Messages, Deadlock: Prevention, Detection, Avoidance.

Unit II

Linux Shell Programming: Introduction – Shells available in Unix: Bourne shell (sh), C shell (csh), TC shell (tcsh), Korn shell (ksh), Bourne Again SHell (bash). Bash: special characters – getting help – man pages – Linux Directory Layout – Command for Navigating the Linux Filesystems: pwd, cd, ls, file, cat, cp, mv, mkdir, rmdir, whereis – Piping and Redirection - Informational Commands: ps, w, id, free – clear, echo, more. File

104

permissions – Setting Permissions – Making a file executable. Creating shell programs: comments, variables, operators (arithmetic, relational, logical) – single and double quotes - read – echo – test - conditionalcommands, iterative commands – break – continue - evaluating expressions using expr, bc – strings – grep – arrays.

Unit III

CPU Scheduling: Scheduling Criteria, Scheduling algorithms: FCFS, SJF, Priority, RR, Multilevel, Feedback Queue - Process synchronization, The Critical Section Problem, Synchronization Hardware, Classical Problems of Synchronization: Reader Writer, Dining Philosopher. File and Database System, File System, Functions of organization, Allocation and Free Space Management

Unit IV

Memory Management, Address Binding, Logical Vs Physical Address Space, Dynamic Loading, Dynamic Linking and Shared Libraries, Overlays, Swapping, Contiguous Memory allocation, Paging, Segmentation, Virtual memory, Demand Paging, Page Replacement, Thrashing.

Unit V

Protection and security: policy and mechanism, authentication, authorization. Mobile OS: Concepts, history, features, architecture, future scope. Case studies: Android, UNIX kernel and Microsoft Windows NT (concepts only).

Text Books

1. Silberschatz, Galvin and Gagne, Operating System Concepts, John Willey & Sons
2. William Stallings, Operating Systems, Internals and Design Principles, PHI
3. Mendel Cooper, Advanced Bash-Scripting Guide, Available at http://www.tldp.org/LDP/abs/abs-guide.pdf

References:

4. Nutt G.J, Operating Systems: A Modern Perspective, Addison Wesley

BCA6B13- Computer Networks

Objectives

· To learn about transmissions in Computer Networks.
· To learn various Protocols used in Communication.
· To have a general idea on Network Administration.

· Knowledge in data structure.
· Knowledge in Operating System.

Course Outcomes

· CO1 To understand about different network terminologies
· CO2 To familiarize with different layers of network
· CO3 To understand the functions of data link layer and network layer
· CO4 To familiarize with the functions of Transport layer
· CO5 To understand the concept of network security and Cryptography

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	3	1	3	1	3	2
CO2	2	2	2	2	2	1	2	1	2
CO3	1	3	1	2	1	0	1	2	3
CO4	3	2	1	3	0	2	3	1	2
CO5	2	3	3	2	2	3	1	3	3

Course Outline:

Unit I [16T]

Introduction to Computer networks, Topology, categories of networks, Internetwork, Internet, Network Models, Layered model, OSI and TCP/IP models, Physical layer, Switching - Circuit switching, Packet Switching and Message Switching, DTE - DCE Interface, EIA - 232 interface, X.21 modems.

Unit II [16T]

Data link layer, Error detection and correction, Types of errors, Single CSC error and Burst error, Vertical redundancy check (VRC), longitudinal redundancy Check (LRC), Cyclic Redundancy Check(CRC), Error

106

correction - Single CSC error correction, Hamming code Data compression - Huffman code, data link control, Line discipline, Flow control, Error control, Multiple Access, Random Access, ALOHA, pure ALOHA and slotted ALOHA, CSMA/CD and SCMA/CA, Polling, Wired LANs, Ethernet - IEEE standards, Wireless LANs.

Unit III [16T]

Network layer, Networking and Internetworking devices - Repeaters, Bridges, Routers, Gateways, Logical addressing - IPv4 & IPv6 addresses, Network Address Translation(NAT), Internet protocols, internetworking, Datagram, Transition from IPv4 to IPv6, Address Mapping-Error reporting and multicasting - Delivery, Forwarding and Routing algorithms, Distance Vector Routing, Link State Routing.

Unit IV [16T]

Transport layer, Process-to-process Delivery: UDP, TCP and SCTP, Congestion control and Quality of Service, Application Layer, Domain Name Systems-Remote Login-Email FTP, WWW, HTTP, Introductory concepts on Network management: SNMP.

Unit V [16T]

Cryptography and Network Security: Introduction – Goals of Security – Attacks - Services and Techniques. Basics of Cryptography: Plain Text - Cipher Text – Encryption – Decryption. Confidentiality: Basics of Symmetric Key Ciphers - Traditional Symmetric Key Ciphers: Substitution, Transposition, Stream & Lock, Modern – Components of Modern Block Cipher – DES - Modern Stream Cipher. Basics of Asymmetric Key Ciphers – RSA Cryptosystem. Integrity: Message – Message Digest – Hash Function. Authentication: MAC. Digital Signature : Analogy with Manual Signature – Process – Signing the Digest – Services – RSA Digital Signature Scheme.

Text Book:

1. Behurouz A Forozan, *Introduction to Data Communications & Networking*, TMH

Reference Books:

1. Andrew S. Tanenbaum, Computer Networks, PHI
2. William Stallings, Data and Computer Communications, VIIth Edition, Pearson Education
3. William Stallings, Cryptography and Network Security, Principles and Practices, Prentice Hall of India.
4. Steven Graham and Steve Shah, Linux Administration: A Beginners Guide, Third Edition, Dreamtech, 2003.

BCA6B16C- Software testing & Quality Assurance

Course Objectives
1. Introduce basic concepts of software testing
2. Understand white box, block box, functional and non functional testing
3.Know in details automation testing and tools used for automation testing

107

4.Understand the importance of software quality and assurance software systems development.
Course Outcomes
CO1 - Analyze the different lifecycle models of software development
CO2 - Identify major types testing
CO3 - Enable students to implement the process that should be followed in building an E-commerce presence
CO4 - Helps the students to implement Integration testing and System testing to verify requirements specifications
CO5-Demonstrate the best practices in testing

PO→ CO ↓	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	3	3	3	3	3	3
CO2	1	3	0	1	2	3	3	3	3
CO3	1	3	0	1	2	3	3	3	3
CO4	3	2	2	2	3	3	3	3	3
CO5	3	2	2	2	3	3	3	3	3

UNIT I (12T)

Phases of Software project - Quality Assurance, Quality control - Testing, Verification and
Validation - Process Model to represent Different Phases - Life Cycle models. White-Box
Testing: Static Testing - Structural Testing Challenges in White-Box Testing.

UNIT II (12T)

Black-Box Testing: What is Black, Box Testing?, Why Black, Box Testing?, When to do Black,
Box Testing?, How to do Black, Box Testing?, Challenges in White Box Testing, Integration
Testing: Integration Testing as Type of Testing, Integration Testing as a phase of Testing,

108

Scenario Testing, Defect Bash.
UNIT III (12T)
System and Acceptance Testing: system Testing Overview, Why System testing is done?
Functional versus Non, functional Testing, Functional testing, Non, functional Testing,
Acceptance Testing, Summary of Testing Phases.
UNIT IV (12T)
Performance Testing: Factors governing Performance Testing, Methodology of Performance
Testing, tools for Performance Testing, Process for Performance Testing, Challenges.
Regression Testing: What is Regression Testing? Types of Regression Testing, When to do
Regression Testing, How to do Regression Testing, Best Practices in Regression Testing.
UNIT V (12T)
Test Planning, Management, Execution and Reporting: Test Planning, Test Management, Test
Process, Test Reporting, Best Practices. Test Metrics and Measurements: Project Metrics,
Progress Metrics, Productivity Metrics, Release Metrics.

BCA6B14 -Programming Laboratory III: Java and PHP Programming

Course Objectives
1.To practice Java programming
2.To provide basics of JAVA programs and its execution
3.To practice client side and server side scripting
4 .To practice developing dynamic websites
Course Outcomes
CO1:Able to apply OOP in problem solving and develop basic programs.
CO2:Able to develop basic programs on multithreading and exception handling
CO3:Able to create GUI based applications using applets
CO4:Students able to implement dynamic websites using PHP
CO5:Able to develop Web applications with Database Connectivity.

CO-PO/PSO Mapping

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4

CO								
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	1	3	2	3	3	2
CO3	3	2	3	0	3	3	3	3	3
CO4	3	2	3	0	3	3	3	3	3
CO5	3	2	3	1	3	3	3	3	3

Part A-Java Programming

1. Write a program to find the distance between two points.

2. Write a program to find the sum, difference, product, quotient and remainder of two numbers passed as command line argument.

3. Write a java program to display Fibonacci series up to a limit.

4. Write a java program to display armstrong numbers within a range.

5. Given the sides of a triangle, write a program to check whether the triangle is equilateral, isosceles or scalene and find its area.

6. Read an array of 10 or more numbers and write a program to find the

a) Smallest element in the array

b) Largest element in the array

c) Second largest element in the array

7. Write a program to perform base conversion

a) Integer to binary

b) Integer to Octal

c) Integer to Hexadecimal

8. Write a program to verify De Morgan‟s Law

9. Write a program to merge two arrays.

10. Write a program to find the trace and transpose of a matrix

11. Write java program to find the sum of the digits and reverse of a given number using class and objects.

12. Write a program to sort a set of n numbers using a class.

13. Create a class „Account‟ to represent a bank account. Write a program to deposit and withdraw amounts from the account.

14. Using class and objects, Write a java program to find the sum of two complex numbers (Hint: Use object as parameter to function).

15. Create a class Time with hh, mm, ss as data members. Write a java program to find the sum of two time intervals (Hint: Use object as parameter to function).

110

16. Write a program to count and display total number of objects created to a class (Hint: static members).

17. Write a java program to find the volume of cube, rectangular box, cylinder using function overloading.

18. Create a class student with methods to read and display the student details. Create a derived class result with methods to read marks of 5 subjects. Write a java program to display the total and grade of students, creating objects of class result.

19. Create a class Employee with ID, Name Designation and Dept. Create a child class salary with Basic, HRA, DA and Allowance. Write a program to compute the net salary assuming that HRA is 1250, DA, Allowance are 110% and 35% of the Basic salary.

20. Write a program to demonstrate inheritance hierarchy by using class a base class shape and 'TwoDim' and 'ThreeDim' as sub classes. Create classes „square‟ and 'triangle' derivedfrom TwoDim and 'sphere and 'cube' derived from ThreeDim. A reference variable of shape is used to determine area of various shapes.

21. Write a program to demonstrate the order in which constructors are invoked in multilevel inheritance.

22. Create an abstract class shape with two data members and an abstract method area. Create two child classes rectangle and triangle. Write a program to display the area of the shapes.

23. Create an interface calculator having methods to perform basic arithmetic operation. Write a program to implement the interface to perform operation on integer and float values.

24. Create a class factorial with a method that accept a number and return its factorial in a package P1. Using the factorial class, write a program to find the factorial of a number.

25. Write a multi thread java program for displaying odd numbers and even numbers up to a limit (Hint : Implement thread using Runnable interface).

26. Write a multi thread java program for displaying numbers ascending and descending order (Hint: create thread by inheriting Thread class).

27. Write a program to handle arithmetic exception.

28. Create a user defined exception „MinBalExp‟ to be invoked when the read number is less than a pre-set value.

29. Create a user defined exception „OddValExp‟ to be invoked when the read number is an odd number.

30. Write a program to copy a file to another. Pass the file names as command line arguments

31. Write a program to track keyboard events on an applet.

32. Write an applet to display a rectangle with specified coordinate and colour passed as parameter from the HTML file.

33. Create an AWT application to add, remove items in a list box.

34. Create an AWT application to select gender using radio buttons.

35. Design a window to accept the qualifications of a user using checkboxes.

36. Create an applet for a displaying smiling face.

37. Write a program to display ip address of the system.

111

38. Write a program to implement echo server (A server that echo the messages the client sends).
39. Create a database table employee (id, name, design, dept). Write a program to list the employees using JDBC.
40. Write a program to insert a new employee record to the above table

Part B-PHP Programming
HTML and CSS
1. Design a website of an educational institution using framesets and links. A sample design is as shown below.

Top Frame	
Menu Frame	Details Frame

2. Design a webpage that illustrates the use of the following form controls: (i) input controls: single-line text, password, multi-line text. (ii) buttons: submit and reset.
3. Design a webpage that illustrates the use of the following form controls: (i) input controls: check box, radio button, select box (ii) buttons: submit and reset.
4. Design a webpage that illustrates the use of the following form controls: (i) input controls: datalist, multi-select box, grouped select box (ii) buttons: submit and reset.
5. Design a webpage that illustrates the use of field sets and legends.
6. Design a web page to demonstrate Border colors using internal CSS.
7. Design a web page to demonstrate Text alignment using CSS.
8. Design a web page to demonstrate inline CSS.
9. Design a webpage to invert the behavior of the <h1> to <h6> tags using external CSS.
10. Design a webpage for a simple image gallery
JavaScript
11. Write a javascript program to perform find the area and circumference of a circle
12. Write a javascript program to check whether a given number is perfect, abundant or deficient. Use alert box to display the output.
13. Write a javascript program to check whether the given sides can form a triangle. If yes, find the type (isosceles, equilateral and scalene) and area of the triangle. Use prompt dialogue box to accept the sides.
14. Write a javascript program to display the nth prime number. Value of n should be accepted from the user. Validate the value entered by the user: Only positive numbers except 0 are to be accepted.
15. Write a JavaScript program to find all years in which 1st January is a Sunday between a given range (eg:- between 2010 and 2017). Use

112

16. Design a webpage to illustrate image rollover.
17. Design a JavaScript program to illustrate the following events: onLoad, onClick, onBlur,onSubmit, onChange.
18. Design a JavaScript program to display the multiplication table of a no accepted from the user.
19. Design a form that accepts two integers. Provide 4 buttons for Add, Subtract, Multiply,
Divide. Add JavaScript program to add, subtract, multiply and divide the given numbers when these buttons are clicked. Use output element to display the results.
20. Write a JavaScript program to create a table after accepting row and column numbersfrom the user.
Contents of each cell should be corresponding row-column number (e.g. Row-0
Column-0).
21. Write a JavaScript program to store different colors in an array and change the background color of the page using this array elements
22. Write a JavaScript program to create clock with a timing event.
23. Write a JavaScript program for form validation for question numbers 2, 3 and 4.
24. Design a webpage to demonstrate the use of progress HTML element
PHP
25. Write a PHP program to check whether the given number is Armstrong or not.
26. Write a PHP program to check whether a given number is perfect, abundant or deficient.
27. Display the Fibonacci series up to a given number.
28. Create a php program to display the bio data of a person by reading the personal details using an HTML page.
29. Create a login page using database.
30. Create a mysql table student with fields roll no, name, mark, grade. Insert records in the table. Write a PHP program to display the mark list of a student by accepting the register no of the student.
31. Write a php application to generate the pay slip of an employee by accepting name, basic salary and designation. The net salary will be calculated based on the following conditions**.**

Designation	conveyance allowance	extra allowance
Manager	1000	500
Supervisor	750	200
Clerk	500	100
Peon	250	

HRA – 25 %

Income tax

Gross <=200 0

2500 < gross <=4000 3%

4000< gross <=5000 5%

Gross >5000 8%

Gross= basic + HRA + conveyance + extra

Net = gross – income tax

32. Create a table "product" with fields item code, itemname, unit price. Write php program to insert 5 records into the table and display it in a table format.

33. Write a php program for delete and update operation on the account table. The account table contain fields such as accountno, name and amount.

34. Write an HTML page to display a list of fruits in a list box. Write php program to display the names of the fruits which are selected by the user.

35. Write php program to store current date/time in a cookie and display the „last visited on„ date time on the web page upon reopening of the same page.

36. Design a PHP page to implement a login screen using sessions. Login details are to be verified from the server side with values stored in a database.

37. Write a php program to create an array and store 10 names in the array. Do the following operations.

a. Display the contents using for each statement.

b. Display the array in a sorted order.

c. Display the array without the duplicate elements

d. Remove the last element and display

e. Display the array in reverse order

f. Search an element in the given array.

38. Design a PHP page to illustrate the use of keygen HTML element.

39. Design a PHP page to illustrate the use of meter HTML element – accept five cities and the temperature of those cities and display the result graphically.

40. Design a PHP page to illustrate the use of file upload – uploading files of a type with a specified size to the web server.

Include any 20 Java Programming Lab questions and 20 PHP Programming Lab questions in the record book.

Note: All lab works should be neatly recorded in a Laboratory Record Book in written form.

However Program results can be pasted in the left hand side of the fare record. All students should have a rough record (observation notebook) too, in which they write all the works to be carried out in the lab prior to his/her

114

entering the lab. He/She may also note down the i/p and o/p that he gives for program verification in the observation notebook (rough record).

BCA6B15 -Programming Laboratory IV:Android and Linux Shell Programming

Course Objectives
1.To practice Android programming.
2.To practice user interface applications
3.To practice shell programming
4 .To introduce LINUX basic commands
Course Outcomes
CO1:Able to develop user interface applications
CO2:Apply the knowledge acquired on developing various mobile application using Android
CO3:Students will be able to understand the basic commands of linux operating system and can write shell scripts
CO4:Create or design different scripts using shell programming.
CO5:Able to write simple and complex shell scripts to automate various tasks using shell programming

CO-PO/PSO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	0	2	0	3	2	3	3	2
CO2	3	2	3	1	3	2	3	3	2
CO3	3	2	3	0	3	3	3	3	3
CO4	3	2	3	0	3	3	3	3	3
CO5	3	2	3	1	3	3	3	3	3

Part A: Android Programming

1. Programs to understand basic arithmetic operations

2. Programs to understand basic logic operations

3. Programs to understand loops and control statements

4. Programs to understand GUI in android

5. Android application for adding two numbers

6. Develop simple user interface to display message

7. Create two menu items-opening a file-saving a file

8. Inserting values into Spinner control using Text view and Button.

9. Implementation of background image

10. Starting another activity from your own activity using intent

11. Create a new activity that services ACTION-PICK for contact data which display each of the contact in the contact database and lets the user to select one before closing and returning the selected contacts URL to the calling activities

12. Create Android application to linkify a text view to display web and E-mail address as hyperlinks. When clicked they will open the browser and E-mail address respectively

13. Implementation of array adapter

14. Create an alert dialogs used to display a message and offer two button options to continue.

Clicking either button will close the dialog after executing the attached click listener

15. Get data from Text view control and insert into database using SQLite. Another activity shows inserted data in a List View control

16. Load menu item by parsing XML data.

17. Program to implement simple calculator

18. Program to Get IP Address

19. Program to Home and Lock Screen Widget (Temperature Widget)

116

20. Create a new contact using intent

21. A Button control shows Date picker and Text view control displays selected date.

22. Insert data into Spinner and delete selected item using SQLite.

23. Program to create simple login screen.

24. Create an Android application to display the map of your locality. Use ACTION_VIEW intent by passing latitude and longitude as parameters.

25. Create an Android application to convert a voice into text (using Google Speech to Text service)

26. Create an Android application to populate a list view by getting names & numbers from a

SQLite database table.

27. Display the saved contacts available in the android phone in a listview using content providers

28. Create an image grid. Images should be placed under the resources section.

29. Create an android app with three tabs. First tab should contain two Edit text and that should accept age and name. In the second tab you need another 3 edit texts that accept education address and phone number. After these information is proved, when the third tab is open it should display all the provided information neatly.

30. Create a custom toast with an Image and a TextView.

31. Apply a Custom List style to a ListView. ListView should have at least 10 Items.

32. Determine the acceleration of your android device along all three axes using accelerometer? (i.e. x,y,z).

33. Capture an Image from the primary camera of an android device and save that picture into the internal storage.

34. Create an app to list files under a given folder name in an EditText

35. Fetch data from an arbitrary URL given in an EditText and display it in a TextView

36. Create an SQLite database named student. Accept student details from the MainActivity and save it in the table called student. Display the calculated result in the second activity when a button on the MainActivity is clicked.

37. Create an android app to switch the wifi on and off also illustrate the use of permission in android?

38. Create a spinner that takes data from the String.xml file.

39. Create a simple android application that opens the default messaging application available in the android device?

40. Create an app to display message in the notification bar?

Part B: Shell Programming

1. Write a script to find area of a circle

2. Write a shell script to find given number is even or odd

3. Write a shell script to make a menu driven calculator using case

4. Write a shell script to find the greatest of three numbers

5. Write a shell script to compute mean and standard deviation of three numbers

6. Write a shell script to find sum of all digits from a given number

7. Write a shell script to find reverse of a number

8. Write a shell script to find prime numbers upto a given number

9. Write a shell script to find n fibonacci numbers

10. Write a shell script to check whether a given number is Amstrong or not

11. Write a shell script to reverse a string and check whether a given string is palindrom or not

12. Write a shell script to count no of line,words and characters of a input file

13. Code for Write a shell program to convert all the contents into the uppercase in a particular file in Unix

14. Write a script to find the value of one number raised to the power of another. Two numbers are entered through the keyboard.

15. Write a shell script find the factorial of a given number

16. An employee Basic salary is input through keyboard where da is 40% of basic salary and hra is 20% of basic salary. Write a program to calculate gross salary

17. Write a shell script to find the average of the number entered as command line arguments

18. Code for Shell script which whenever gets executed displays the message â€œGood

Morning/Good afternoon /Good Evening â€œdepending on the time it get executed"

118

19. Write a shell script to Display Banner, calander of given year

20. Code for a program to display current date and time, number of users , terminal name, login date and time

21. Write a shell script which uses all the file test operators

22. Write a shell script to copy the contents of file to another. Input file names through command line. The copy should not be allowed if second file exists.

23. Write a shell script to find number of vowels, consonants, numbers in a given string.

24. Code for Shell script to perform operations like display, list, make directory and copy, rename, delete

25. Write a shell script to compare two files and remove one of them if they are same

Include any 15 Android Programming Lab questions and 15 Shell Programming

Lab questions in the record book.

Note: All lab works should be neatly recorded in a Laboratory Record Book in written form. However Program results can be pasted in the left hand side of the fare record. All students should have a rough record (observation note book) too, in which they write all the works to be carried out in the lab prior to his/her entering the lab. He/She may also note down the i/p and o/p that he gives for program verification in the observation note book (rough record)

9. Detailed Description of Activities

NCSACT13 –Project and Industrial visit

Description: The objective of the BCA final project work is to develop a quality software solution by following the software engineering principles and practices. During the development of the project the students should involve in all the stages of the software development life cycle (SDLC). The main objective of this project course is to provide learners a platform to demonstrate their practical and theoretical skills gained during five semesters of study in BCA Programme. The objective of industrial visit is to give students an insight into the regular, internal workings of a company. It gives good understanding of the industry and helps in building up useful case studies for improving the quality of future teaching. It provides an ability to identify research programmes of industrial importance..

Course Objectives
To provide practical knowledge on software development process
To prepare students for jobs in multinational companies, by exposing them to newer technologies and development methodologies.
Course Outcomes
CO1: To learn as to how theatrical concepts are put into action, thereby aiding their practical learning.
CO2:.To enhance interpersonal skills and communication techniques and to become more aware of industry practices and regulations

PO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	3	3	3	3	3
CO2	3	2	3	2	3	3	3	3	3

NCSACT12-Workshop- Introduction to Manual & Automation testing

Description: It aims to find the bugs in the application under test. It is preliminary testing, must be carried out prior to start automating the test cases and also needs to check the feasibility of automation testing. The Test Plan is created & followed by the tester to ensure that the comprehensiveness of testing while executing the test cases manually without using automation testing tool.It is not necessary to have knowledge of any testing tool for manual software testing.

Course Objectives
1. To get basic knowledge to find the bugs in an application by providing testcases
Course Outcomes
CO1: To acquire knowledge manual and automation testing

CO2:.To acquire knowledge about testing tools

PO / CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

NCSACC5-Additional Certification Course

An additional certification course on "An Introduction to Image processing and Machine Learning" will be provided to students.The duration of the course will be 5 hours.The faculties from the Department of Computer Science will handle sessions.

Course Objectives
To be familiar with processing of the images, recognition of the pattern and their applications.
To introduce Machine Learning and enable students to think more scientifically
Course Outcomes
CO1: Enhance knowledge in understanding and analyzing problems

PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4

121

CO									
CO1	3	2	3	0	3	3	3	3	3
CO2	3	2	3	0	3	3	3	3	3

Topics:

1. Introduction to Image Processing
2. Libraries involved for an Image Processing
3. Why do we need Image Processing?
4. Steps in Image Processing
5. Introduction to Machine Learning : Basic definitions, types of learning

10. Course Evaluation and CIE

Total marks for each core, elective course is 75 and lab courses shall be 100 marks and Industrial Visit & Project Evaluation cum Programme viva- voce shall be 100 marks and open course shall be 75 marks. The evaluation scheme for each course shall contain two parts (1) Internal evaluation (2) external evaluation. 20% weight shall be given to the internal evaluation. The remaining 80% weight shall be for the external evaluation.

EXTERNAL EVALUATION

There shall be University examinations for each course at the end of each semester. Practical examinations shall be conducted by the University at the end of second, fourth and sixth semesters. External evaluation of Project, Industrial Visit Report and Programme viva-voce shall be conducted along with the project evaluation at the end of the sixth semester. External evaluation carries 80% of marks, i.e., 60 marks, for each theory course.The model of the question paper for external examination for theory courses of 2Hours duration:

The students can answer all the questions in Sections A and B. But there shall be Ceiling in each section.

1. Section A: Short answer type carries 2 marks each - 12 questions (Ceiling - 20)

2. Section B: Paragraph/ Problem type carries 5 marks each - 7 questions (Ceiling - 30)

3. Section C: Essay type carries 10 marks (1 out of 2)- (Ceiling - 10)

The external examination in theory courses is to be conducted with question papers set by external experts. The evaluation of the answer scripts shall be done by examiners based on a well-defined scheme of valuation and answer keys shall be provided by the University. The external examination in practical courses shall be conducted by two examiners, one internal and an external, appointed by the University. The project evaluation with Programme viva voce will be conducted by two examiners, one internal and an external (appointed by the University), at the end of the sixth semester. No practical examination will be conducted in the odd semester. Practical examinations for BCA Programme shall be conducted in the even semesters 2, 4 and 6.

The model of the question paper for external examination (lab courses) of 3 Hours duration shall be:

1. Section A: One marked question of 30 Marks from Programming Lab Part A is to be attempted (Design Algorithm/Flowchart/Interface: 10 Marks, Code: 10 Marks Result: 10 Marks. Total 30 Marks)

2. Section B: One marked question of 30 Marks from Programming Lab Part B is to be attempted (Design Algorithm/Flowchart/Interface: 10 Marks, Code: 10 Marks Result: 10 Marks. Total 30 Marks)

3. Section C: Lab viva voce (Total 10 Marks)

4. Section D:Lab Record (Total 10 Marks)

Project guidelines – Students must be encouraged to do projects in the latest tools or tools appropriate for their topic. Department should conduct a monthly evaluation of the project and give necessary instructions to the students as and when required. Number of students in a project group must be limited to 4.The scheme of evaluation for project cum Programme viva voce shall be

1. Relevance of the Topic, Statement of Objectives (Total 15 Marks)

2. Methodology (Reference/ Bibliography, Presentation, quality of Analysis/Use of Statistical Tools) (Total 15 Marks)

3. Findings and recommendations (Total 20 Marks)

4. Project cum Programme Viva Voce (Total 20 Marks)

5. Report of Industrial visit (Total 10 Marks)

Audit course: The students can attain only pass (Grade P) for these courses. At the end of each semester (up to fourth semester) there will be an examination conducted by the college from a pool of questions set by the University. The students can also attain the credits through online courses like SWAYAM, MOOC etc. The College will send the list of passed students to the University at least before the commencement of fifth semester examination.

EVALUATION AND GRADING

Evaluation (both internal and external) is carried out using Mark system. The Grade on the basis of total internal and external marks will be indicated for each course, for each semester and for the entire programme. Indirect Grading System in 10-point scale is as below:

Ten Point Indirect Grading System

Percentage of Marks (Both Internal &External put together)	Grade	Interpretation	Grade point Average (G)	Range of grade points	Class
95 and above	O	Outstanding	10	9.5 -10	First Class with Distinction
85 to below 95	A+	Excellent	9	8.5 -9.49	
75 to below 85	A	Very good	8	7.5 -8.49	
65 to below 75	B+	Good	7	6.5 -7.49	First Class
55 to below 65	B	Satisfactory	6	5.5 -6.49	
45 to below 55	C	Average	5	4.5 -5.49	Second Class
35 to below 45	P	Pass	4	3.5 -4.49	Third Class
Below 35	F	Failure	0	0	Fail
Incomplete	I	Incomplete	0	0	Fail
Absent	Ab	Absent	0	0	Fail