SPACES
Degree College
AUTONOMOUS
Permanently affiliated to Andhra University
Managed by: Sri Prakash Educational Society
Sri Prakash Academy of Computers, Electronics & Sciences

Carving Careers...

Estd. 1993
NAAC
3.11 CGPA

BOARD OF STUDIES

2025-26 ACADEMIC YEAR

Subject:
COMPUTER SCIENCE

BOARD OF STUDIES MEETING

2025-2026

INDEX

PREFACE

SPACES Degree College, Payakaraopeta has been conferred the status of an autonomous institution by the competent statutory authorities, in accordance with the provisions under the provisions of clause 13 of UGC regulations 2023, as notified by the University Grants Commission (UGC) vide letter No. F. 2-10/2023(AC-Policy) dated 27.05.2025 and according to the notification of Andhra University with Ref. No. CII (1) Conferment of Autonomous/SPACES/2025 dated 01-07-2025.

The Board of Studies (BoS) is a statutory academic body constituted under the autonomous status of SPACES Degree College, Payakaraopeta, as per the guidelines issued by the University Grants Commission (UGC) dated 3rd April, 2023 and the affiliating university, Andhra University.

The following are the guidelines regarding the composition and functions of Board of Studies of an autonomous college.

Composition of Board of Studies:

1.Head of the Department concerned (Chairperson).
2.One expert nominated by the Vice-Chancellor from a panel of six recommended by the Autonomous College Principal.

3.Two subject experts from outside the parent University nominated by the Academic Council.

4.One representative from industry/corporate sector/allied areas to be nominated by the principal.

5.One member of the College alumni to be nominated by the Principal.

6.All faculty members of the Department.

7.Two student members from second and third years

Term: The term of the nominated members shall be three years. Meetings: Meeting of the Board of Studies shall be held once in a year.

Functions: The Board of Studies shall recommend the following to the Academic Council:
(a)Courses of studies;
(b)Measures for the improvement of the standards of teaching and research;
(c)Any other academic matter.

PROCEEDINGS OF THE PRINCIPAL, SPACES DEGREE COLLEGE (AUTONOMOUS) , PAYAKARAOPETA

R.C. NO:1 /A.C/BOS/Members Nomination dated: 03-10-2025

Sub: SPACES Degree College (Autonomous), Payakaraopeta- UG Board of Studies (BOS) - Nomination of Members – Orders Issued.

Ref: UG Guidelines for Autonomous Colleges **(2018)**

ORDER:

The Principal, SPACES Degree College (Autonomous), Payakaraopeta is pleased to constitute UG Board of studies in Computer Sciences for Reviewing the syllabi in Computer Sciences subject for I and II semesters duly following the norms of the UGC Autonomous guidelines

S.No.	Category of the Member	Name of the Member	Designation
1	University Nominee	Prof. S. Viziananda Row	Department of Computer Science and Systems Engineering, A.U College of Engineering (A) Visakhapatnam
2	Representative from Industry	Sri. K. Papa Rao	Global Delivery Head, AIIDEN AI, HYD
3	Subject Expert-1	Sri.Rasmi Ranjan Khansama	Department of Computer Science, Govt. College, Tuni.
4	Subject Expert-2	Dr.SuneethaMerugula	Asst. Professor Department of Computer Science & Engineering, GITAM School of Technology, Visakhapatnam
5	Member	Miss. K. Manjusha	Lecturer, Department of Comp. Sci, SPACES Degree College(A), Payakaraopeta
6	Member	Mrs. V Sasikala	Lecturer, Department of Comp. Sci, SPACES Degree College(A), Payakaraopeta
7	Member	Miss. Y. Sravani	Lecturer, Department of Computer Sci., SPACES Degree College(A), Payakaraopeta
8	Member	Sri. K.V.Apparao	Lecturer, Department of Computer Sci., SPACES Degree College(A), Payakaraopeta
9	Member	Mrs. D.Srilakshmi	Lecturer, Department of Computer Sci., SPACES Degree College(A), Payakaraopeta
10	Member	Miss. M.R.M.Harshitha	Lecturer, Department of Computer S cl., SPACES Degree College(A), Payakaraopeta
11	Member	Sri.P.S.Gajapathiraju	Lecturer, Department of Computer Sci., SPACES Degree College(A), Payakaraopeta
12	Member	Sri.A.R.V.L.Narayana	Lecturer, Department of Computer Sci., SPACES Degree College(A), Payakaraopeta
13	Student Alumni	Miss. P.Pusha Sri	-
14	BOS Chairman	Sri.S.M.V.S.Kumar	HOD, Department of Computer Science, SPACES Degree R Peta

The above members are requested to attend the BoS meeting on 23rd October 2025 and share their valuable reviews, and suggestions on the following functionaries.

- Prepare and review the syllabi for the subject keeping in line of APSCHE and Affiliating University and interest of the stake holders for consideration and approval of the IQAC and Academic Council.
- Suggested methodologies for innovative teaching and evaluation techniques.
- Suggest the panel of Names to the academic council for appointment of Examiners.
- Coordinate research, teaching, extension and other activities in the Department.

A.R.L.Q.C.S.S
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA

Composition of the Board of Studies (BoS) the Academic Year 2025-26

S.No	Category of the Member	Name of the Member	Designation
1	University Nominee	Prof. S. Vizianandа Row	Department of Computer Science and Systems A.U College of Engineering (A) Visakhapatnam
2	Representative from Industry	Sri. K. Papa Rao	Global Delivery Head, AIIDEN AI, HYD
3	Subject Expert-1	Sri.Rasmi Ranjan Khansama	Department of Computer Science, Govt. College, Tuni.
4	Subject Expert-2	Dr. Suneetha Merugula	Asst. Professor Department of Computer Science & Engineering, GITAM School of Technology, Visakhapatnam
5	Member	Miss. K. Manjusha	Lecturer, Department of Comp. Sci, SPACES Degree College(A), Payakaraopeta
6	Member	Mrs.V Sasikala	Lecturer, Department of Comp. Sci, SPACES Degree College(A), Payakaraopeta
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13	Student Alumni	Miss. P.Pusha Sri	-
14	BOS Chairman	Sri.S.M.V.S.Kumar	HOD,Department of Computer Science, SPACES Degree College(A), P.R Peta

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

DEPARTMENT OF COMPUTER SCIENCE

BOARD OF STUDIES MEETING

AGENDA

DATE: 23-10-2025 **TIME: 11:00 AM – 12:30 PM**

Venue: SPACES Degree College, Payakaraopeta.

Agenda of the Meeting:

1. **Welcome and Introduction of Members**
2. **Presentation & Discussion of the following aspects**
    a) To Review the curriculum of I and II semesters of B.Sc – Computer Science Course with effect from academic year 2025-2026.
    b) To discuss Whether changes are required in the syllabus.
    c) To discuss and propose the criteria and pattern of internal assessment.
    d) To discuss and propose the pattern of external assessment.
    e) To discuss about PO's and PSO's
    f) To discuss Model Question papers for the I and II Semesters including Theory and Practical.
    g) To discuss about blueprint for Internal exams and Semester End Examinations.
    h) To propose the names for Question paper setters and Examiners.
    i) To discuss about remedial classes for Slow learners
    j) To discuss about Organizing Guest lecturers
    k) To discuss about implementation of certificate courses.
3. **Suggestions and feedback from experts and Members of the BOS.**
4. **Any other matter according to the discretion of the Chair person.**
5. **Resolutions**
6. **Vote of Thanks**

S. M. V. S. Kumar

Chairperson

BOARD OF STUDIES

The following members were present

S.No	Name	Designation	Signatures
1	Sri S.M.V.S Kumar	Chairperson	
2	Prof. S. Viziananda Row	University Nominee	
3	Sri. Rasmi Ranjan Khansama	Subject Expert	
4	Dr. Suneetha Merugula	Subject Expert	
5	Sri K Papa Rao	Industry Expert	
6	Miss. P.Pusha Sri	Alumna	
7	Sri. K.V.Apparao	Member	
8	Mrs. D.Srilakshmi	Member	
9	Miss. M.R.M.Harshitha	Member	
10	Sri.P.S.Gajapathiraju	Member	
11	Sri.A.R.V.L.Narayana	Member	
12	Miss. Y Sravani	Member	
13	Mrs.V.Sasikala	Member	
14	Miss. K Manjusha	Member	
15	Dr.V.V.S S B Bangarraju	Dean-Academics	
16	Dr.A K Tripathy	IQAC Coordinator	
17	Dr A Rama Krishna Reddy	Principal	

SPACES DEGREE COLLEGE(AUTONOMOUS)

PAYAKARAOPETA DEPARTMENT OF COMPUTER SCIENCE

Minutes of the Board of Studies (BoS) Meeting

The First Meeting of the Board of Studies (BoS), Department of Computer Science, SPACES Degree College, was held on 23-10-2025, SPACES Degree College, Payakaraopeta to scrutinize and approve the drafted syllabus of B.Sc. Computer Science Honours (Major) under autonomous status.

Agenda Item 1: Welcome and Introduction of Members

The Chairperson welcomed all members and introduced participants, including internal faculty, external experts, industry, and alumni representatives.

Agenda Item 2: Presentation and Ratification of Syllabus

The comprehensive syllabus was presented and discussed. Components reviewed included:

- Program Outcomes (PO), Program Specific Outcomes (PSO), Course Outcomes (CO), Learning Outcomes (LO)
- Theory and Practical syllabi
- Internal and External Assessment schemes
- Model Question Papers and Question Bank Aligning with Bloom's Taxonomy
- Innovative Teaching Methods and Pedagogy
- **Certificate Courses**

Agenda Item 3: Suggestions and Feedback

Suggestions were noted for implementation.

Agenda Item 4: Resolution and Approval of Proposed Syllabus

The Board unanimously approved all syllabus components, assessment schemes, question banks, teaching methodologies, and certificate courses**.**

Agenda Item 5: Any Other Business

No other business was raised.

Agenda Item 6: Vote of Thanks

The Chairperson thanked all members and declared the meeting adjourned.

SPACES DEGREE COLLEGE(AUTONOMOUS)

PAYAKARAOPETA DEPARTMENT OF COMPUTER SCIENCE

BOARD OF STUDIES MEETING – RESOLUTIONS

Date: 23-10-2025

Time: 11:00 Noon to 12:30

PM

Resolution1:

It was resolved that the allotted credits and workload particulars for two Major papers in semester I – Computer Fundamental and Office Automation & Problem Solving Using C, and for the two major subjects in semester -II – Datastructures Using C & Digital Logic and Design will remain unchanged and continue to follow the APSCHE norms. Each subject carries 3 credits for theory and 1 credit for practicals, with 3 hours of theory and 2 hours of practicals per week. The detailed paper titles, curriculum frame work including credits and hours/ week were presented in Annexure -1.

Resolution2:

It was resolved to make certain changes to the existing syllabus issued by APSCHE. The modifications are as follows:

Semester -1

Major-1: Computer Fundamental and Office Automation – Theory Paper
one additional concept-Characteristics of Computers is added in continuation of Fundamentals to know the importance of computers in Unit-1.

Major -1: Computer Fundamental and Office Automation – Practical
No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

Major -2: Problem solving Using C – Theory
One Concept -goto statement from unit-II is removed as it was Typically discouraged in Modern.

One Concept -Self referenced structure was additionally added in Unit-5 as

It provides Basic for building dynamic Data Structures programming practice

Major-2: Problem solving Using C – Practical

No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

Semester-2:

Major-1: Datastructures using C – Theory

One Concept -Shortest path problems from unit-5 is removed as it provides deeper exploration of algorithmic principles.

Major-1: Datastructures using C – Practical

No changes were proposed; it was resolved to adopt the syllabus as it is issued

Major -2: Digital Logic and Design – Theory

No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

Major-2: Digital Logic and Design – Practical

No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

The changes made in the syllabus, along with their justifications were presented in Annexure -2.

Resolution3:

It was resolved that the evaluation of each paper will be 100 marks in theory and 50 marks in practical. The theory component includes both internal and external assessments. The mode of internal and external assessment shall be followed as per the guidelines of the affiliating Andhra University. As per the University's current norms, 30 marks will be allotted for Internal assessment and 70 marks will be allotted for external assessment. Students should secure a minimum of 40% in both internal and external assessments to qualify for a pass. The details of internal and external assessments along with qualifying marks, were presented in Annexure -3.

Resolution4:

It was resolved that the internal assessment of students will be based on the performance in mid examinations, student seminars, assignments, and attendance. Two mid examinations will be conducted in each semester for 50 marks each and scaled down to 10 marks. The breakup of internal marks is as follows:

Mid-1: 10 marks, Mid 2: 10 Marks, Seminar and assignment-5 marks and attendance –5 marks.

Resolution5:

The blue print and Model question paper for internal assessment were reviewed, discussed and approved for implementation. It was resolved that the first mid examination is to be conducted for first two units and second mid examination is to be conducted for next 2 units. The detailed blue print and model question paper were presented in Annexure- 4.

Resolution6:

The blue print and Model paper for Semester End examination were reviewed, discussed and approved for implementation. It was resolved to conduct semester end examination for 70 marks consisting of essay type questions and short answer questions. The detailed blue print and model question paper were presented in Annexure- 5.

Resolution7:

It was resolved to introduce certificate course in the following specializations: Cloud Computing . The certificate course may be offered in the sixth semester of their course and it should be designed to enhance Hands-On experience and industrial skills for industrial readiness.

Resolution8:

It was resolve to conduct remedial classes for slow learners after Mid -1 Examinations to help improve their academic performance.

Resolution9:

The BOS resolved to organize guest lectures by inviting subject experts from reputed institutions and industries to enhance student's exposure and knowledge.

Resolution10:

The list of question paper setters and examiners for B.Sc Computer Science Honours was presented, discussed and approved by the board. The list of question paper setters and examiners, were presented in Annexure -6.

The Chairperson thanked all members for their active participation and valuable inputs. The meeting concluded with all the above resolutions being passed unanimously.

The above resolutions were approved

S.No	Name	Designation	Signatures
1	Sri S.M.V.S Kumar	Chairperson	
2	Prof. S. Viziananda Row	University Nominee	
3	Sri. Rasmi Ranjan Khansama	Subject Expert	
4	Dr. Suneetha Merugula	Subject Expert	
5	Sri K Papa Rao	Industry Expert	
6	Miss. P.Pusha Sri	Alumna	
7	Sri. K.V.Apparao	Member	
8	Mrs. D.Srilakshmi	Member	
9	Miss. M.R.M.Harshitha	Member	
10	Sri.P.S.Gajapathiraju	Member	
11	Sri.A.R.V.L.Narayana	Member	
12	Miss. Y Sravani	Member	
13	Mrs.V.Sasikala	Member	
14	Miss. K Manjusha	Member	
15	Dr.V.V.S [illegible] B Bangarraju	Dean-Academics	
16	Dr.A K Tripathy	IQAC Coordinator	
17	Dr A Rama Krishna Reddy	Principal	

PROGRAMME OUTCOMES (POs)

Students of Undergraduate Programme (B. Sc, B. Com, BCA) at the time of graduation will be able to:

PO1: Domain Expertise:

- ✓ Acquire comprehensive knowledge and Skills.
- ✓ Make use of knowledge In an innovative manner.
- ✓ Effectively apply the knowledge and skllls to address various issues.

PO2: Llfe- long learning:

- ✓ Learn "How to learn " — self motivated and self directed learning
- ✓ Be inquisitive and establish cause and effective relationship
- ✓ Adapt to the ever emerging demand of work place and life.

PO3: Problem Solving:

- ✓ Predict and analyze problems
- ✓ Frame hypothesis
- ✓ Investigate and interpret empirical data.
- ✓ Plan and Execute action

PO4: Good at Communication and Life Skills:

- ✓ Express thoughts in an effective manner
- ✓ Listen, understand and project views in a convlncing manner
- ✓ Develop skills to present significant information clearly and concisely to interested groups.

PO5: Computing Skills and Ethics:

- ✓ Develop rationale and scientific thinking process..
- ✓ Use technology intelligently for communication entertainment and for the benefit of man-kind.
- ✓ Ensures ethical practices throughout ones endeavors for the well being of human race.
- ✓

PO6: Modem Equipment Usage:

- ✓ Use ICT effectively
- ✓ Access, retrieve and use authenticated information.

PO7: Environmental sustainability:

- ✓ Think critically on environment sustainability measures.
- ✓ Propagate and follow environment friendly practices.

PROGRAMME SPECIFIC OUTCOMES (PSO's)

PSO1: Understand the fundamental theories, concepts and applications in basic areas of research in Computer Science

PS02: To Provide adequate understanding about computer science and its applications.

PS03: To understand the principles and working of computer systems and be able to apply computational knowledge and project development skills to provide innovative solutions.

PSO4: To design and develop computer programs and understand the structure and development methodologies of software systems.

PSO5: To apply their skills in the field of algorithms, web designing, Software development and data analytics.

PSO6: To inculcate training and practical approach , internship is given to be trained among the students in the field of Computer Science.

PSO7: To equip the students with sufficient exposure and skills to enable them in attaining a deserving postion in software industry.

B.Sc. Computer Science HONOURS

Course Structure(A.Y. 2025-26) - 1st Year

Annexure-1

Year	Semester	Course	Course Title	No.of Hours (Theory)	No of Hours (Practical)	Total No. of Hours	No.of Credits (Theory)	No.of Credits (Practical)	Total No. of Credits
I YEAR	Semester-1	1	Computer Fundamental and Office Automation	3	2	5	3	1	4
		2	Problem Solving Using C	3	2	5	3	1	4
	Semester-2	3	DataStructures Using C	3	2	5	3	1	4
		4	Digital Logic and Design	3	2	5	3	1	4

Annexure-2

ADDITIONAL INPUTS/MODIFICATIONS IN THE SYLLABUS- SEMESTER I

COURSE-1 (Computer Fundamentals and Office Automation)

S.No	Course Title	Unit	Added topics	Deleted Topics	Justification
1	Computer Fundamentals and Office Automation	1	Characteristics of computers	NIL	Tells What makes a computer system uniquely powerful and how those qualities impact its use and capabilities.
3	Computer Fundamentals and Office Automation-PRACTICAL		NIL	NIL	---

COURSE-2 (Problem Solving Using C)

S.No	Course Title	Unit	Added topics	Deleted Topics	Justification
1	Problem solving using C	2	NIL	Goto statement in Jump statements	Typically discouraged in Modern programming practice.
2	Problem solving using C	5	Self-referenced Structures	NIL	Provides Basic for building dynamic Data Structures
3	Problem solving using C-Practical		NIL	NIL	----

ADDITIONAL INPUTS/MODIFICATIONS IN THE SYLLABUS- SEMESTER II

COURSE-3 (DataStructures Using C)

S.No	Course Title	Unit	Added topics	Deleted Topics	Justification
1	Datastructures uing c	5	---	Concept of Shortest Path Problems	Removing these concepts provides time for deeper exploration of core algorithmic principles or more application-oriented learning.
2	Datastructures uing c- PRACTICAL	-	NIL	NIL	---

COURSE-4 (Digital Logic and Design)

S.No	Course Title	Unit	Added topics	Deleted Topics	Justification
1	Digital Logic and Design	-	NIL	**NIL**	--
2	Digital Logic and Design- PRACTICAL	-	NIL	**NIL**	--

Annexure-3

Internal & External Assessment
Evaluation Pattern

INTERNAL ASSESSMENT

S.No	Examination	Marks	Scaled down	Duration
1	Mid Exam 1	50	10	2 hrs
2	Mid Exam 2	50	10	2hrs
3	Seminar & Assignments,	-	05	
4	Attendance	-	05	
Total			**30**	

EXTERNAL ASSESSMENT

Examination	Marks	Duration
Theory Examination	70	3 Hours
Practical Examination	50	3 Hours

Assessment and Qualifying Marks

S. No	Assessment	Total Marks	Qualifying Marks
1	Internal Assessment	30	12
2	Semester End Exam - Theory	70	28
3	Semester End Exam- Practical Lab	50	20

Internal Assessment Breakup

S. No	Activity	Marks Allotted
1	Mid -term Examination 1	10
2	Mid -term Examination 2	10
3	Student Seminars & Assignments	05
4	Attendance	05

Rubrics for Awarding Attendance marks

S. No	Attendance Percentage	Marks allotted
1	75%	1
2	76 – 80 %	2
3	81 – 85 %	3
4	86 – 90 %	4
5	90.01 to 100 %	5

Annexure – 4

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

I B.Sc Computer Science (Honours)

Blueprint – Mid Examination

Max Marks :50 **Duration: 2 hours**

Question Type	Questions to be given	Questions to Answer	Marks per Question	Total Marks
Short Questions	7	5	4	20
Essay Questions	6	3	10	30
Total	-	-	-	50

Annexure – 5

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

I B.Sc Computer Science (Honours)

Blueprint – Semester End Examinations

Theory Examination

Max Marks :70 Marks **Credits: 3** **Duration: 3 Hours**

Question Type	Questions to be Given	Questions to Answer	Marks per Question	Total Marks
Short Questions	8	5	4	20
Essay Questions	10	5	10	50
Total	-	-	-	70

Practical Examination

Max Marks: 50 Marks **Credits: 1** **Duration: 3 Hours**

Component	Max Marks
Documentation / Practical Writing	10
Practical Execution	20
Record submission	10
Viva	10

Model Syllabus for 4-Year UG Honours in B.Sc. (Computer Science) as Major in consonance with Curriculum framework w.e.f. AY 2025-26

SEMESTER-I

COURSE 1: COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION

Theory **Credits: 3** **3 hrs/week**

COURSE OBJECTIVES:

1. **Understand foundational computing concepts**, including number systems, the evolution of computers, block diagrams, and generational progress.
2. **Develop knowledge of computer architecture**, focusing on system organization and networking fundamentals.
3. **Acquire practical skills in document creation**, formatting, and digital presentations using word processing tools.
4. **Gain proficiency in spreadsheet operations**, such as data entry, formulas, functions, and charting techniques.
5. **Introduce data visualization and basic modelling principles**, fostering analytical thinking in structuring and interpreting data sets.

Course Outcomes

1. At the End of the Course, The Students will be able to **explain different number systems**, the historical evolution of computers, and identify key components in a block diagram.
2. Learners will demonstrate **basic blocks of a computer and fundamental networking knowledge.**
3. Learners will create professional-level documents and **design visually appealing presentations** using word processing software and presentation software.
4. Learners will manipulate data within spreadsheets, apply formulas, and **generate accurate summaries and visualizations.**
5. Learners will apply data modelling techniques to **analyze, organize, and represent data effectively** in various scenarios.

Unit 1. Number Systems, Evolution, Block Diagram and Generations:

Number Systems: Binary, Decimal, Octal, Hexadecimal; conversions between number systems.

Evolution of Computers: History from early mechanical devices to modern-day systems.

Block Diagram of a Computer: Components like Input Unit, Output Unit, Memory, CPU (ALU+ CU), characteristics of computers.

Generations of Computers: First to Fifth Generation – technologies, characteristics, examples.

Unit 2. Basic organization and N/W fundamentals:

Computer Organization: Functional components – Input/Output devices, Storage types, Memory hierarchy.

Types of Computers: Micro, Mini, Mainframe, and Supercomputers.

Networking Fundamentals: Definition, need for networks, types (LAN, WAN, MAN), topology (Star, Ring, Bus).

Internet Basics: IP Address, Domain Name, Web Browser, Email, WWW.

Unit 3. Word Processing and presentations:

Word Processing Basics: Using MS Word/Google Docs – formatting, styles, tables, mail merge.

Presentation Tools: Using PowerPoint/Google Slides – slide design, animations, transitions.

Applications: Creating resumes, reports, brochures, and presentations.

Keyboard Shortcuts

Unit 4. Spreadsheet Basics:

Spreadsheet Concepts: Understanding rows, columns, cells in tools like MS Excel/Google Sheets, cell referencing.

Functions and Formulae: SUM, AVERAGE, IF, COUNT.

Charts and Graphs: Creating visual representations

Data Handling: Sorting, filtering, conditional formatting.

Text Functions: LEFT, RIGHT, MID, LEN, TRIM, CONCAT, TEXTJOIN

Advanced Functions: **Logical**: IF, AND, OR, IFERROR,
Lookup: VLOOKUP, HLOOKUP, XLOOKUP, INDEX, MATCH

Unit 5. Data Analysis and Visualization:

Conditional Formatting: Custom rules, Color scales, Icon sets, Data bars

Data Analysis Tools: Pivot Tables and Pivot Charts, Data Validation (Drop-downs, Input Messages, Error Alerts), What-If Analysis: Goal Seek, Scenario Manager, Data Tables

Charts and Dashboards:Creating Interactive Dashboards, Using slicers with Pivot Tables,Combo Charts and Sparklines

Productivity Tips: Using Named Ranges, Freeze Panes, Split View

Textbooks:

1. **Fundamentals of Computers,** Reema Thareja, Oxford University Press, Second Edition
2. **Fundamentals of Computers**, V. Rajaraman – PHI Learning
3. **Introduction to Computers** by Peter Norton – McGraw Hill
4. **Microsoft Office 365 In Practice** by Randy Nordell – McGraw Hill Education

References:

1. **Excel 2021 Bible** by Michael Alexander, Richard Kusleika – Wiley
2. **Networking All-in-One For Dummies** by Doug Lowe – Wiley
3. **Microsoft Official Docs and Training**: https://learn.microsoft.com
4. **Google Workspace Learning Center**: https://support.google.com/a/users/

Activities:

Outcome: At the End of the Course, The Students will be able to **explain different number systems**, the historical evolution of computers, and identify key components in a block diagram.

Activity: Create a digital poster or infographic comparing number systems (binary, decimal, octal, hexadecimal) and illustrating the timeline of computer generations with key innovations.

Evaluation Method: Rubric-based assessment of the poster presentation on a 10-point scale focusing on:

- Accuracy of number system conversions
- Correct identification of block diagram components
- Visual organization and creativity

Outcome: Learners will demonstrate **basic blocks of a computer and fundamental networking knowledge.**

Activity: Design a concept map showing the internal architecture of a computer and types of networks (LAN, WAN, MAN), including devices and topologies.

Evaluation Method: Checklist-based peer review and instructor validation:

- Completeness of the map
- Correctness of networking concepts
- Use of appropriate terminology
- Logical flow and structure of the map

Outcome: Learners will create professional-level documents and **design visually appealing presentations** using word processing software and presentation software.

Activity: Prepare a formal report (e.g., project proposal) in a word processor and present it using a slide deck with transitions, embedded media, and design elements.

Evaluation Method: Performance-based evaluation using a 10-point scoring scale:

- Formatting and structure of the document
- Presentation aesthetics and clarity
- Communication skills during presentation

Outcome: Learners will manipulate data within spreadsheets, apply formulas, and **generate accurate summaries and visualizations.**

Activity: Analyze a dataset (e.g., student scores or sales data) using spreadsheet software. Apply formulas (SUM, AVERAGE, IF, VLOOKUP) and create relevant charts.

Evaluation Method: Practical test with a rubric:

- Correct use of formulas
- Accuracy of data summaries

Outcome: Learners will apply data modelling techniques to **analyze, organize, and represent data effectively** in various scenarios.

Activity: Prepare an interactive dashboard for a given data set using EXCEL.

Evaluation Method: Evaluation of the dashboard on a 10-point scoring scale:

- Presentation aesthetics and clarity
- Interactiveness
- Communication skills during presentation

SEMESTER-I

COURSE 1: COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION

Practical **Credits: 1** **2 hrs/week**

List of Experiments:

1. Demonstration of Assembling and Dessembling of Computer Systems.
2. Identify and prepare notes on the type of Network topology of your institution.
3. Prepare your resume in Word.
4. Using Word, write a letter to your higher official seeking 10-days leave.
5. Prepare a presentation that contains text, audio and video.
6. Using a spreadsheet, prepare your class Time Table.
7. Using a Spreadsheet, calculate the Gross and Net salary of employees(Min 5) considering all the allowances.
8. Generate the class-wise and subject-wise results for a class of 20 students. Also generate the highest and lowest marks in each subject.
9. Using IF, AND, OR, and IFERROR to Automate Grade Evaluation.
    a. Create a table of student scores in different subjects.
    b. Use IF to assign grades (A/B/C/Fail).
    c. Use IFERROR to handle missing scores or invalid data.
10. *Employee Database Search Using VLOOKUP, HLOOKUP, XLOOKUP, INDEX, and MATCH*
    a. Create a database of employees (Name, ID, Department, Salary).
    b. Implement VLOOKUP to search by employee ID.
    c. Use HLOOKUP to extract department heads by role.
    d. Apply XLOOKUP for more flexible searches.
    e. Use INDEX + MATCH as an alternative to VLOOKUP.
11. Sales Report Analysis Using Pivot Tables and Charts
    a. Use a dataset of product sales (Product, Region, Date, Quantity, Revenue).
    b. Create Pivot Tables to summarize data by region/product.
    c. Insert Pivot Charts for visual analysis (e.g., bar, line).
    d. Add slicers to make the dashboard interactive.
12. Designing a Data Entry Form with Drop-downs and Input Rules
    a. Create a student registration form.
    b. Add drop-down lists for course selection using Data Validation.
    c. Add input messages to guide users.
    d. Add error alerts for wrong entries.
13. Monthly Budget Planning using Goal Seek and Scenario Manager
    a. Create a simple personal budget (income, expenses, savings).
    b. Use Goal Seek to determine income needed to save a desired amount.
    c. Use Scenario Manager to compare different budgeting scenarios (best/ worst/ realistic case).
    d. Create a one-variable Data Table to analyze how different expenses affect savings.
14. Dashboard Creation Using Combo Charts, Sparklines & Slicers
    a. Use existing sales or attendance data.
    b. Insert combo charts (e.g., column + line).
    c. Add sparklines to show trends.
    d. Use slicers with Pivot Tables to control dashboard elements.
    e. Finalize and format for interactivity.

Course: 1 – COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION

Credits:3

BLUE PRINT

Unit	Shorts	Essays(Internal choice)
Unit 1	2	2
Unit 2	1	2
Unit 3	2	2
Unit 4	2	2
Unit 5	1	2
Total	8 Out of 8, 5 questions should be answered 5×4 = 20 Marks	10 Out of 10, 5 questions should be answered 5×10 = 50 Marks

Course: 1 – COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION
Credits:3
BLUE PRINT

SECTION -A

Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-III
5. Unit-III
6. Unit-IV
7. Unit-IV
8. Unit-V

SECTION- B

Answer all questions. Each question carries 10 marks. (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. **A**) Unit I

Or

B) Unit I

10. **A**) Unit II

Or

B) Unit II

11. **A**) Unit III

Or

B) Unit III

12. **A**) Unit IV

Or

B) Unit IV

13. **A**) Unit V

Or

B) Unit V

SEMESTER-I

COURSE 2: PROBLEM SOLVING USING C

Theory Credits: 3 3hrs/week

Course Objectives:

1. Understand the fundamentals of computer programming, Apply structured problem-solving approaches using algorithms, flowcharts, and C programming constructs.
2. Develop efficient logic using decision-making, loop, and jump control statements.
3. Utilize derived data types like arrays and strings for modular program design.
4. Design and implement modular solutions using functions, recursive logic, pointer operations, and dynamic memory management.
5. Handle complex data structures including structures, unions, and text file operations.

Course Outcomes:

At the end of the course, students will be able to:

1. Understand basic computing concepts, programming paradigms and write structured C programs.
2. Apply control flow statements to solve logical and repetitive tasks in C.
3. Implement arrays and string operations to manage and manipulate data efficiently.
4. Design modular code using functions, recursion, and appropriate parameter passing.
5. Utilize pointers and memory operations for effective data handling. Demonstrate competence in dynamic memory allocation and text file processing.

Unit 1. Introduction to computer programming:

Introduction, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-level programming, Flowcharts and Algorithms, Fundamentals of C: History of C, Features of C, C Tokens-variables and keywords and identifiers, constants and Data types, Rules for constructing variable names, Operators, Structure of C program, Input /output statements in C-Formatted and Unformatted I/O

Unit 2. Control statements:

Decision making statements: if, if else, else if ladder, switch statements. Loop control statements: while loop, for loop and do-while loop. Jump Control statements: break,continue .

Unit 3. Derived data types in C:

Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation. Strings: Declaring & Initializing string variables; String handling functions, Character handling functions

Unit 4. Functions:

Pointers: Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic, Pointers and arrays.

Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion (Basic Concept only). Parameter Passing by address & by value. Local and Global variables. Storage classes: automatic, external, static and register.

Unit 5. Dynamic Memory Management:

Introduction, Functions-malloc, calloc, realloc, free Structures: Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers.Self-referenced Structures. Unions - Union definition; difference between Structures and Unions. Working with text files - modes: opening, reading, writing and closing text files.

Text Books:

1. Programming in ANSI C, E. Balagurusamy, Tata McGraw Hill, 6 th Edn,
2. Computer fundamentals and programming in C, Reema Theraja, Oxford University Press

Reference Books:

1. Let us C, Y Kanetkar, BPB publications
2. Head First C: A Brain-Friendly Guide, David Griffiths, Dawn Griffiths

Activities:

Outcome: Understand basic computing concepts, programming paradigms and write structured C programs.

Activity: Create a concept map of computing fundamentals and programming paradigms (procedural, structured, object-oriented). Then, they write a structured C program (e.g., a calculator or student grade system) using proper syntax, indentation, and modular design.

Evaluation Method: Rubric-based Code Review & Viva to check the

- The correctness of the concept map
- Correct use of structure (main + functions)
- Identification of paradigm used
- Code readability and documentation

Outcome: Apply control flow statements to solve logical and repetitive tasks in C.

Activity: Implement a program that solves a logic puzzle (e.g., number guessing game, pattern generation, or prime number finder) using if, switch, for, while, and do-while.

Evaluation Method: Automated Test Cases + Peer Review to check the

- Correct use of control statements
- Logical correctness of output

- Efficiency and edge case handling
- Peer feedback on clarity and logic

Outcome: Implement arrays and string operations to manage and manipulate data efficiently.

Activity: Build a program that stores and arranges student marks in ascending and descending order using arrays and performs string operations like concatenation, comparing, and formatting names.

Evaluation Method: Functional Demonstration + Code Walkthrough to check the

- Correct array and string usage
- Memory efficiency
- Handling of invalid inputs
- Explanation of sorting/searching logic

Activity:

- **Recursive Problem Solver**

Students write a modular program to solve a recursive problem (e.g., factorial, Fibonacci, or Tower of Hanoi) using functions with parameters and return values.

Evaluation Method:

- **Code Trace + Written Quiz**
  - Correct function decomposition
  - Proper parameter passing (by value/reference)
  - Recursion depth and base case handling
  - Quiz on tracing recursive calls

Outcome: Utilize pointers and memory operations for effective data handling. Demonstrate competence in dynamic memory allocation and text file processing.

Activity: Create a program that dynamically stores user input (e.g., survey responses) using pointers and writes/reads the data to/from a text file.

Evaluation Method: Memory Debugging + File I/O Assessment to check the

- Proper use of malloc, calloc, realloc, and free
- Pointer arithmetic and dereferencing
- File creation, reading, writing, and error handling
- Use of tools like Valgrind or manual memory trace (Optional for Unix flavours)

SEMESTER-I

COURSE 2: PROBLEM SOLVING USING C

Practical **Credits: 1** **2 hrs/week**

List of Experiments:

1. Write a program to check whether the given number is Armstrong or not.
2. Write a program to find the sum of individual digits of a positive integer.
3. Write a program to generate the first n terms of the Fibonacci sequence.
4. Write a program to find both the largest and smallest number in a list of integer values
5. Write a program to demonstrate change in parameter values while swapping two integer variables using Call by Value & Call by Address
6. Write a program to perform various string operations.
7. Write a program to search an element in a given list of values.
8. Write a program that uses functions to add two matrices.
9. Write a program to calculate factorial of given integer value using recursive functions
10. Write a program for multiplication of two N X N matrices.
11. Write a program to sort a given list of integers in ascending order.
12. Write a program to calculate the salaries of all employees using Employee (ID, Name, Designation, Basic Pay, DA, HRA, Gross Salary, Deduction, Net Salary) structure.
    a. DA is 30 % of Basic Pay
    b. HRA is 15% of Basic Pay
    c. Deduction is 10% of (Basic Pay + DA)
    d. Gross Salary = Basic Pay + DA+ HRA
    e. Net Salary = Gross Salary - Deduction
13. Write a program to read / write the data from / to a file.
14. Write a program to reverse the contents of a file and store in another file.
15. Write a program to create Book (ISBN,Title, Author, Price, Pages, Publisher)structure and store book details in a file and perform the following operations
    a. Add book details
    b. Search a book details for a given ISBN and display book details, if available
    c. Update a book details using ISBN
    d. Delete book details for a given ISBN and display list of remaining Books

Course: 2 – PROBLEM SOLVING USING C

Credits:3

BLUE PRINT

SECTION -A

Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-III
5. Unit-III
6. Unit-IV
7. Unit-IV
8. Unit-V

SECTION- B

Answer all questions. Each question carries 10 marks. (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. **A**) Unit I

Or

B) Unit I

10. **A**) Unit II

Or

B) Unit II

11. **A**) Unit III

Or

B) Unit III

12. **A**) Unit IV

Or

B) Unit IV

13. **A**) Unit V

Or

B) Unit V

SEMESTER-II

COURSE 3: DATA STRUCTURES USING C

Theory **Credits: 3** **3 hrs/week**

Course Objectives:

1. Understand fundamental concepts of algorithms and data structures with focus on complexity analysis and abstract data types.
2. Explore various types of linked lists and their dynamic memory representations and operations.
3. Analyze and implement linear data structures, such as stacks and queues, and examine their real-world applications.
4. Apply sorting and searching algorithms, understanding their performance implications and optimization strategies.
5. Design and manipulate hierarchical and graph-based structures, applying traversal algorithms and understanding their practical uses in computing.

Course Outcomes:

Learners will be able to:

1. Explain algorithm characteristics, time and space complexity, and asymptotic notations with clarity.
2. Implement and analyze different types of linked lists, including insertion, deletion, and traversal operations.
3. Develop stack and queue data structures using arrays and linked lists, and apply them in expression evaluation.
4. Apply efficient searching and sorting algorithms to solve computational problems and evaluate performance trade-offs.
5. Construct and traverse tree and graph structures, using them to solve problems like shortest path and spanning trees.

Unit 1. Basic Concepts:

Algorithm: Definition and characteristics, Complexity analysis: Space Complexity, Time Complexity, Asymptotic Notations.

Introduction to Data structures: Definition, Types of Data structures, Abstract Data Types (ADT), Introduction to Linked Lists, Representation of linked lists in Memory, Comparison between Linked List and Array.

Unit 2. Linked Lists:

Types of Linked Lists - Singly Linked list, Doubly Linked list, Circularly Singly Linked list, Circularly Doubly Linked list; Implementation of Single Linked List ADT: Creating a List, Traversing a linked list, Searching in linked list, Insertion and deletion into linked list (At first Node, Specified Position, Last node).

Unit 3. Stacks and Queues:

Introduction to stack ADT, Implementation of stacks using array and Linked List, Application of stacks - Polish Notations - Converting Infix to Post Fix Notation - Evaluation of Post Fix Notation.

Queues: Introduction to Queue ADT, Implementation of Queues using array and Linked List, Application of Queues Types of Queues- Circular Queues, De-queues, Priority Queue, Heaps.

Unit 4. Searching and Sorting:

Linear or Sequential Search, Binary Search, Hashing and collision resolution.

Sorting: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort and Merge Sort

Unit 5. Trees and Graphs:

Tree Terminology, Binary Tree Representation, Traversal techniques, Expression Tree, Binary Search Tree- Definition, Operations on a Binary Search Tree: Creation, Search, Insertion & deletion.

Graphs: Introduction to Graphs, Terminology, Representation (Adjacency Matrix, Adjacency List), Traversal of Graphs (DFS, BFS), Applications of Graphs, Concept of Minimum Cost Spanning Tree

Textbooks:

1. Data Structures Using C, Balagurusamy E. Tata MCGraw Hill
2. Data Structures using C, Reema Thareja, Third Edition, Oxford University Press

Reference Books:

1. Data Structures, Lipschutz, Schaum's Outline Series, Tata Mcgraw-hill
2. Data Structures Using C, Ch. Vijay Kumar, Pen Press International

Activities:

Outcome: Explain algorithm characteristics, time and space complexity, and asymptotic notations with clarity

Activity: Create a comparative chart of algorithms with different notations related to time and space complexities.

Evaluation Method: Rubric-based assessment of the chart for correctness, clarity, and depth of explanation on a 10-point scale.

Outcome: Implement and analyze different types of linked lists, including insertion, deletion, and traversal operations

Activity: Code a menu-driven program in C to implement single linked lists with all basic operations.

Evaluation Method: Practical lab assessment with test cases and Viva-style questioning to explain pointer manipulation.

Outcome: Develop stack and queue data structures using arrays and linked lists, and apply them in expression evaluation

Activity: Build a program to convert infix expressions to postfix and evaluate them using stacks; Implement queues using both arrays and linked lists with enqueue/dequeue operations.

Evaluation Method: Code review and execution of programs for sample cases and evaluation based on correctness and efficiency.

Outcome: Apply efficient searching and sorting algorithms to solve computational problems and evaluate performance trade-offs

Activity: Implement and compare sorting algorithms (e.g., selection sort and bubble sort) and searching algorithms (e.g., Linear vs. Binary Search) on datasets of varying sizes. Record number of swaps and iterations for preparing a chart to assimilate the results.

Evaluation Method: Performance report with graphs and analysis. Oral presentation or peer review discussing trade-offs and algorithm selection rationale.

Outcome: Construct and traverse tree and graph structures, using them to solve problems like shortest path and spanning trees

Activity: Implement binary trees and graphs using adjacency lists/matrices.

Evaluation Method: Lab demo with sample inputs and visual output (e.g., tree traversal order, graph paths).

SEMESTER-II

COURSE 3: DATA STRUCTURES USING C

Practical **Credits: 1** **2 hrs/week**

List of Experiments

1. Write a program to read 'N' numbers of elements into an array and also perform the following operation on an array
   a. Add an element at the beginning of an array
   b. Insert an element at given index of array
   c. Update an element using a values and index
   d. Delete an existing element
2. Write a program to implement Single Linked List with insertion, deletion and traversal operations
3. Write a program to implement Doubly Linked List with insertion, deletion and traversal operations
4. Write a program to implement the Stack operations using Arrays and Linked Lists.
5. Write a program to convert a given infix expression to a postfix expression using stacks.
6. Write a program to implement the Queue operations using Arrays and Linked Lists.
7. Write a program to implement the Circular Queue operations using Arrays.
8. Write a program for Binary Search Tree Traversals
9. Write a program to search an item in a given list using the following Searching Algorithms
   a. Linear Search
   b. Binary Search.
10. Write a program for implementation of the following Sorting Algorithms
    a. Bubble Sort
    b. Insertion Sort
    c. Quick Sort
    d. Merge Sort

Course: 3 – DATASTRUCTURES UISNG C
Credits:3
BLUE PRINT

SECTION -A

Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-III
5. Unit-III
6. Unit-IV
7. Unit-V
8. Unit-V

SECTION- B

Answer all questions. Each question carries 10 marks. (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. **A**) Unit I

Or

B) Unit I

10. **A**) Unit II

Or

B) Unit II

11. **A**) Unit III

Or

B) Unit III

12. **A**) Unit IV

Or

B) Unit IV

13. **A**) Unit V

Or

B) Unit V

SEMESTER-II

COURSE 4: DIGITAL LOGIC DESIGN

Theory **Credits: 3** **3 hrs/week**

Course Objectives

1. Introduce the fundamentals of number systems, their conversions, and binary arithmetic operations.
2. Explore digital logic through gates, Boolean algebra, and simplification techniques for logic functions.
3. Develop proficiency in designing basic combinational circuits like adders and subtractors.
4. Equip students with the skills to implement advanced combinational components such as multiplexers, encoders, and decoders.
5. Foster understanding of sequential circuits, flip-flops, counters, and shift registers for system-level design.

Course Outcomes

At the end of the course, students will be able to:

1. Apply concepts of number systems to perform radix conversions and binary arithmetic using signed and unsigned formats.
2. Simplify logic functions using Boolean algebra, Karnaugh maps, and universal gates.
3. Design and analyze combinational circuits such as half adders, full adders, and subtractors.
4. Construct advanced combinational logic modules, including multiplexers, demultiplexers, encoders, decoders, and their hierarchical versions. Realize complex Boolean functions using combinations of logic modules.
5. Develop and evaluate sequential circuits such as flip-flops, latches, counters, and shift registers.

Unit 1: Number Systems:

Conversion of numbers from one radix to another radix, r's, (r-1)'s complements, signed binary numbers, addition and subtraction of unsigned and signed numbers, weighted and unweighted codes.

Unit 2. Logic Gates and Boolean Algebra:

NOT, AND, OR, universal gates, X-OR and X-NOR gates, Boolean laws and theorems, complement and dual of a logic function, canonical and standard forms, two level realization of logic functions using universal gates, minimizations of logic functions (POS and SOP) using Boolean theorems, K-map (up to four variables), don't care conditions.

Unit 3. Combinational Logic Circuits – 1:

Design of half adder, full adder, half subtractor, full subtractor, ripple adders and subtractors, ripple adder / subtractor.

Unit 4. Combinational Logic Circuits – 2:

Design of decoders, encoders, priority encoder, multiplexers, demultiplexers, higher order decoders, demultiplexers and multiplexers, realization of Boolean functions using decoders, multiplexers.

Unit 5. Sequential Logic Circuits:

Classification of sequential circuits, latch and flip-flop, RS- latch using NAND and NOR Gates, RS, JK, T and D flip-flops, truth tables and excitation tables, conversion of flip- flops, flip-flops with asynchronous inputs (preset and clear). Registers- shift registers, bidirectional shift registers, universal shift register, design of ripple counters, modulus counters.

Text Books:

1. Digital Design, M. Morris Mano, Michael D Ciletti,5th edition, Pearson.
2. Digital Logic Design, K.C. Rao, Ramana, Pen International Press

Reference Books:

1. Digital Electronics and Logic Design, Jaydeep Chakravorty, Universities Press
2. Digital Logic Design, Sonali Singh, BPB Publications

Activities:

Outcome: Apply concepts of number systems to perform radix conversions and binary arithmetic using signed and unsigned formats

Activity: Design a calculator in a spreadsheet or simulation tool (e.g., Logisim) that performs: Decimal ↔ Binary ↔ Hexadecimal conversions and binary arithmetic (addition, subtraction).

Evaluation Method: Rubric-based evaluation on a 10point scale (conversion accuracy, arithmetic correctness)

Outcome: Simplify logic functions using Boolean algebra, Karnaugh maps, and universal gates

Activity: Provide students with complex Boolean expressions and truth tables. Ask them to: Simplify using Boolean laws, Minimize using Karnaugh maps and Implement using only NAND or NOR gates

Evaluation Method: Worksheet submission with step-by-step simplification and evaluation of gate-level implementation using a 10-point scale.

Outcome: Design and analyze combinational circuits such as half adders, full adders, and subtractors

Activity: Build and simulate: Half adder and full adder using logic gates, and half and full subtractor circuits

Evaluation Method: Evaluate the correctness of the circuits for different inputs on a 10-point scale.

Outcome: Construct advanced combinational circuits, including multiplexers, demultiplexers, encoders and decoders.

Activity: Design Multiplexers for function selection, Decoders for control signal generation and Encoders for input compression

Evaluation Method: Project-based evaluation with functional demo and assessments based on a 10-point scale.

Outcome: Develop and evaluate sequential circuits such as flip-flops, latches, counters, and shift registers

Activity: Implement and test SR, JK, D, T flip-flops, asynchronous and synchronous counters using a simulator (E.g. Logisim, Multisim)

Evaluation Method: Lab assessment on a 10-point scale to understand the correctness of the circuit and presentation of the design.

SEMESTER-II
COURSE 4: DIGITAL LOGIC DESIGN

Practical **Credits: 1** **2 hrs/week**

List of Experiments

The laboratory work can be done by using physical gates and necessary equipment or simulators.

Simulators: https://sourceforge.net/projects/gatesim/ or https://circuitverse.org/ or any free open- source simulator

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of Vcc and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation of the given Boolean functions using logic gates in both SOP and POS forms
3. Realization of basic gates using universal gates.
4. Design and implementation of half and full adder circuits using logic gates.
5. Design and implementation of half and full subtractor circuits using logic gates.
6. Verification of stable tables of RS, JK, T and D flip-flops using NAND gates.
7. Implementation and verification of Decoder and encoder using logic gates.
8. Implementation of 4X1 MUX and DeMUX using logic gates.
9. Implementation of 8X1 MUX using suitable lower order MUX.
10. Implementation of 7-segment decoder circuit.
11. Implementation of 4-bit parallel adder.
12. Design and verification of 4-bit modulus counter.

Course: 4 – DIGITAL LOGIC AND DESIGN

Credits:3

BLUE PRINT

SECTION -A

Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-III
5. Unit-III
6. Unit-IV
7. Unit-IV
8. Unit-V

SECTION- B

Answer all questions. Each question carries 10 marks. (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. **A)** Unit I

Or

C) Unit I

10. **A)** Unit II

Or

C) Unit II

11. **A)** Unit III

Or

C) Unit III

12. **A)** Unit IV

Or

C) Unit IV

13. **A)** Unit V

Or

C) Unit V

MODEL PAPERS

Course: 1 – COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION
Credits:3

MODEL PAPER

SECTION -A

Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)

1. Write down the binary equivalent of the following:
   (i) $(FA3)_{16}$ (ii) $(777)_8$ (iii) $(1020)_{10}$ iv)$(11010)_2=(?)_{10}$ v) $(11111)_{16}=(?)_2$
2. Discuss the characteristics of computer ? Draw Block diagram of computer?
3. Write about memory hierarchy?
4. What are the main features of MS-Excel?
5. Write the process of working with Tables in Google docs?
6. llustrate Lookup functions with examples?
7. Write about working of charts and Graphs in Excel?
8. Write about Pivot Tables and Pivot charts ?

SECTION- B

Answer all questions. Each question carries 10 marks. (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. A) Explain all computer generations with their technologies?

Or

B) Explain about Peripheral devices?

10. A) Discuss various types of primary and secondary memories.

Or

B) What is Network & Topology? Explain different types of Networks?

11. A) What is mail merge ? Explain steps involved in mail merge?

Or

B) Define Slide?Explain Animations and Transition in PowerPoint?

12. A) Discuss the role of formulas in MS-Excel? Explain the three types of addressing modes available in MS-Excel.

Or

B) Explain Functions in Excel with clear syntax and examples for each?

13. A) Explain about What-If Analysis?Write about Data Validation?

Or

B) Explain about Data bars ,Color scales and Icon sets in Conditional formatting ?

Course: 2– PROBLEM SOLVING USING C
Credits:3

MODEL PAPER

SECTION -A

Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)

1. Write about flowcharts and symbols used in flowcharts?
2. Write about standard Datatypes?
3. Write about Jump control statements?
4. Write about 2D arrays?
5. Write about Character Handling functions?
6. Write a program for factorial using Recursion?
7. Differentiate between pointers and Arrays ?
8. Write about DMA functions ?

SECTION- B

Answer all questions. Each question carries 10 marks. (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. **A**) Explain different types of Software?

Or

B) Explain various Operators in C?

10. **A**) Explain about Decision making statements?

Or

B) Write a program to print Prime numbers from 1 - 100?

11. **A**) Write a program for Matrix Multiplication?

Or

B) Explain various String Handling Functions?

12. **A**) Explain various storage Classes?

Or

B) Explain about Pointer Arithmetic?

13. **A**) Explain about Nested Structures ?

Or

B) Explain various File Operations?

Course: 3 – DATA STRUCTURES USING C
Credits:3

MODEL PAPER

SECTION -A

Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)

1. Write about Time complexity?
2. Differentiate between linked list and array?
3. Write about the insertion operation in linked list?
4. Write about push and pop operation in Stack?
5. Write about the applications of Queues?
6. Write about Hashing?
7. Write about Binary tree representation?
8. Write about Minimum cost spanning tree?

SECTION- B

Answer all questions. Each question carries 10 marks. (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. **A**) Explain about different types of Data structures?

Or

B) Explain about Asymptotic Notations?

10. **A**) Explain various operations in Doubly linked list?

Or

B) Write about insertion and Deletion operations in Single Linked List?

11. **A**) Explain various operations of Linked Stack?

Or

B) Explain different types of Queues ?

12. **A**) Write an algorithm for Quick sort?

Or

B) Write an algorithm for Binary search?

13. **A**) Explain various Tree traversal techniques ?

Or

B) Explain about Graph Representations ?

Course: 4 – DIGITAL LOGIC AND DESIGN
Credits:3 MODEL PAPER

SECTION -A

Answer any 5 questions. Each question carries 4 marks. (5 x 4 =20M)

1. Discuss 1's and 2's complement methods of subtraction?
2. State and prove De-Morgan theorem?
3. Prove NAND as universal Gate?
4. Summarize the Boolean function **x′yz + x′yz′ + xy′z′ + xy′z** using K-map?
5. Design a full adder?
6. **Explain** the design procedure for combinational circuits?
7. .Define a Flip-Flop?
8. Define shift register?

SECTION- B

Answer all questions. Each question carries 10 marks. (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. A) Convert the octal numbers into binary,decimal,BCD and Hexadecimal numbers $(3600)_8$

   Or

   B) Convert 10101101.0111 to octal equivalent and hexadecimal equivalent?

10. A) Explain the truth tables of X-OR, NAND and NOR gates?

    Or

    B) Solve the following Boolean functions using decoder and OR gates: $F1(A,B,C,D)=\sum(2,4,7,9)$

11. A) Explain the Ripple counter design. Also the decade counter design?

    Or

    B) Explain the priority encoder with a neat logic diagram?

12. A) Design a full adder using two half adders?

    Or

    B) What do you menat by Universal shift register? Draw and explain its circuit diagram and operation?

13. A) Design and explain a synchronous MOD-10 down - counter using JK flip-flop?

    Or

    B) What is a shift register? Explain about the following modes of operations in a four bit shift Register i) shift right ii) shift left iii) bidirectional

Annexure -6

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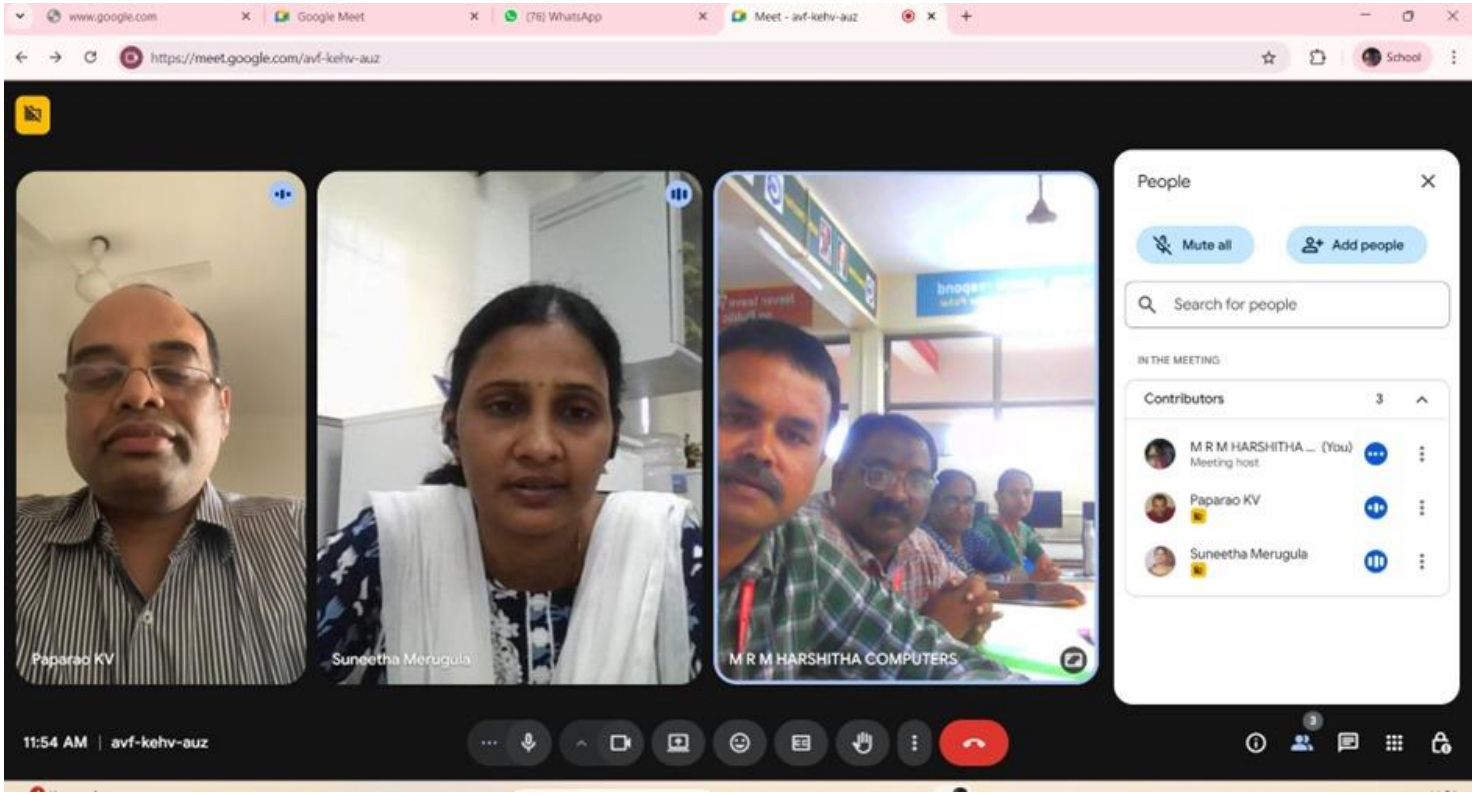
BOARD OF STUDIES MEETING



Date: 23-10-2025

Time: 11 a.m to 12.30 p.m

Mode: off-line & On-line

Link: https://meet.google.com/avf-kehv-auz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