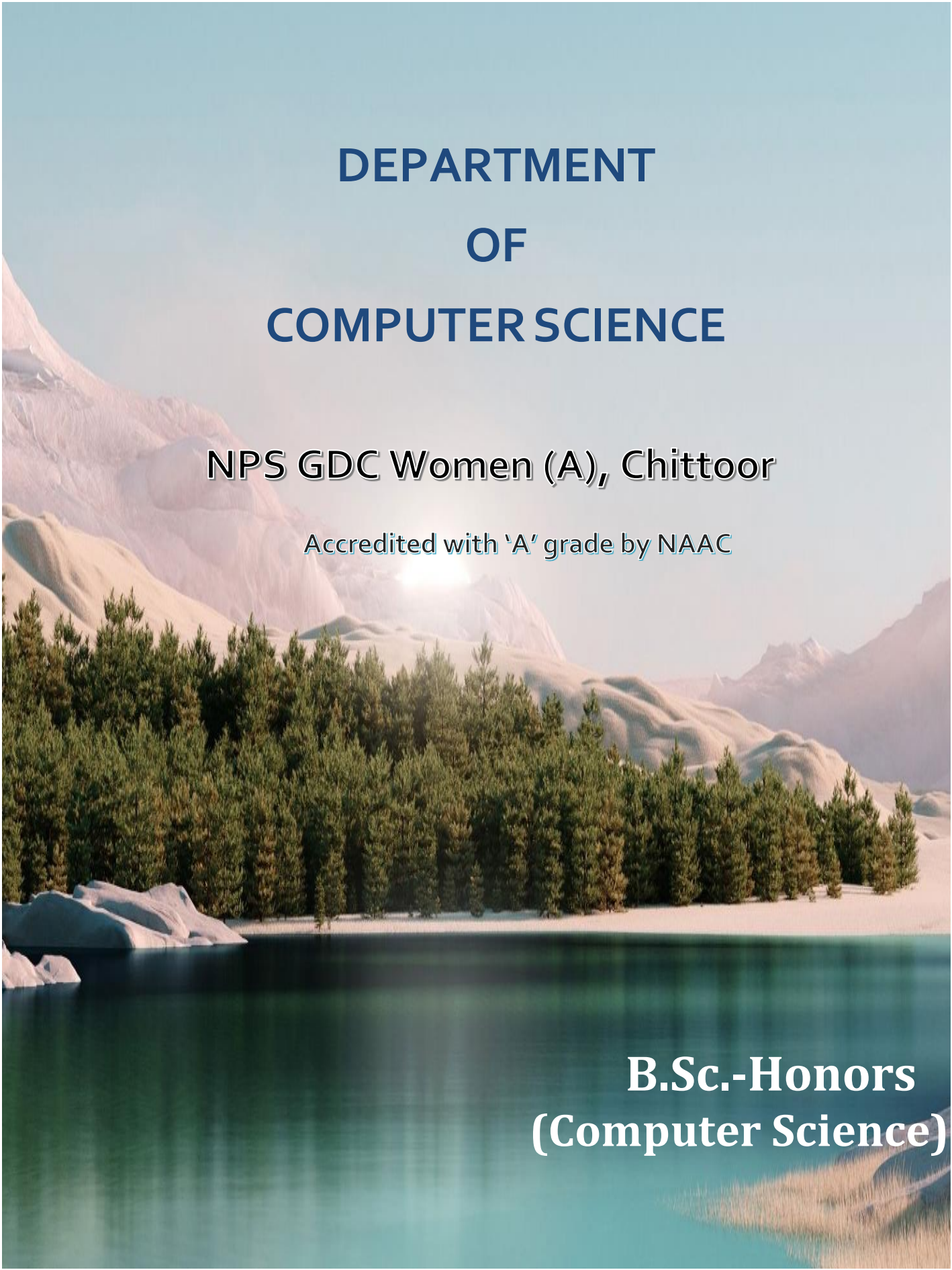




DEPARTMENT OF COMPUTER SCIENCE

NPS GDC Women (A), Chittoor

Accredited with 'A' grade by NAAC

**B.Sc.-Honors
(Computer Science)**

Proceedings of the Principal, NPS Govt. Degree College for Women(A), Chittoor
Present: Dr. K. Manohar

Rc.No.CS02 /NPSGDCW/UG-BoS/Bacthes:2025-28 and 2026-29, dt. 14-08-2026

Subject: NPS GDC Women(A), Chittoor – UG Board of Studies (BoS) – Nomination of Members – Orders issued.

Ref: 1. UGC Guidelines of for Autonomous Colleges – 2023.

2. Proc. Of the VC No: SVU/C-III (3)/BOS/Smt. NPS. Govt. Coll/Chi/2025 dt. 09-05-2025

3. Rc.No.CS01 /NPSGDCW/UG-BoS/2025-26 dt. 22-09-2025

Order

The Principal, NPS GDC Women(A), Chittoor, is pleased to nominate the following members to UG Board of Studies to frame the syllabus of **Computer Science** courses in all the semesters duly following the norms of the UGC regulations for the Autonomous Colleges 2023.

Sl.No.	Name	Designation
1	Smt. Y. Jnapika	Chairperson
2	Smt. K. Srilatha	Member
3	Smt. M. Padmavathi	Member
4	Dr. G. Vijay Kumar	Subject Expert
5	Manoj Prabhakar Darsi	Subject Expert
6	Prof. M. Humera Khanam	University Nominee
7	Murali Mohan M	Expert from Industry
8	Shaik Munwar	Special Courses Expert
9	S.J Aayesha	Alumni Nominee

The above members are requested to attend the BoS meetings for the Autonomous UG-Batches **2025-26(3rd & 4th Semesters)** and UG-Batch **2026-27(1st & 2nd Semesters)** during A.Y 2026-27 and share their valuable views, suggestions on the following functionaries.

- Prepare syllabi for the subject keeping in view the objectives of the college, interest of the stakeholders and National recruitment for consideration and approval of the IQAC and Academic Cell.
- Suggest 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 of the College.
- Suggest CLO, PLO and subject experts to develop question bank in compliance with Bloom's Taxonomy.

The above said members are requested to bestow their services for the successful organization of the events whenever scheduled.


PRINCIPAL
Principal
Smt. N.P.S.Govt. College for Women
CHITTOOR-517002.(A.P.)

DEPARTMENT OF COMPUTER SCIENCE

COMPOSITION OF BOARD OF STUDIES FOR THE A.Y. 2026-27 [R25 Curriculum]

Sl.No.	Category	Name & Designation	Chairperson/ Member
1	Chairman	Smt. Y Jnapika Head of the Department Dept. of Computer Science Smt. N.P.S GDC for Women(A) Chittoor.	Chairperson Mobile: 8341341943 Email: jnapikagdl@gmail.com
2	Members of the Department	1. Smt. K. Srilatha Lecturer in Computer Applications Smt. N.P.S GDC for Women(A) Chittoor. 2. Smt. M. Padmavathi Lecturer in Computer Science Smt. N.P.S GDC for Women(A) Chittoor.	Faculty Mobile: 7893082602 Email: kadimi.srilatha80@gmail.com Faculty Mobile: 9985057603 Email: padma.manikyavelu@gmail.com
3.	Two Experts in the Subject from outside the Parent University to be nominated by Academic council	1. Dr. G. Vijay Kumar Lecturer in Computer Science SCIM Govt. Degree College(A), Tanuku, E. G. Dt. 2. Manoj Prabhakar Darsi Lecturer in Computer Science DK Govt. College for Women(A) Nellore Vikram Simhapuri University.	Subject experts outside parent University 1. Mobile: 9848141694 Email: gvjy कुमार@gmail.com 2. Mobile: 9492441242 Email: manoj07573@gmail.com
4.	One expert from to be nominated by the Vice-Chancellor from the panel of six recommended by Autonomous College Principal	Prof. M. Humera Khanam Dept. of Computer Science Dept. of Computer Science and Engineering Tirupathi	Subject experts by University Mobile: 9490923045 Email: humera.svec@gmail.com
5.	One Representative from the Industry/ Corporate Sector	Murali Mohan M Principal Software Engineer CommScope, Bangalore	Industry Expert Mobile: 9739745424 Email: murali.mandala@commscope.com
6.	One Meritorious Alumni nominated by the Principal	S.J Aayesha Teacher Sri Chaitanya Techno Curriculum School	Alumni Student Mobile: 7330809150 Email id: ayeeshasj@gmail.com
7.	Experts from outside Autonomous College (Special Courses)	Sri. Shaik. Munwar Lecturer in Computer Science Dr. YSR GDC, Vedurukuppam S V University.	Special Courses Expert Mobile: 9396899875 Email id: munwar.it@gmail.com

Signature of the Members

Signature of the BOS Chairman



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DEPARTMENT OF COMPUTER SCIENCE

Board of Studies Meeting- 2 Dated: 17-08-2026

Meeting-2 of the Board of studies is held at NRC Room for the Department of Computer Science, NPS GDC Women (A), Chittoor with the following agenda.

Agenda

- Curriculum Design for all the III & IV Semesters for B.Sc. (Honors)-Computer Science for R25 Syllabus.
- Designing of Course Outcomes and Course Objectives
- Identifying /inclusion of components of Skill Development, Employability and Entrepreneurship in the curriculum
- Additional inputs into the curriculum
- Designing Model Question Papers and identifying potential paper setters
- Innovative Teaching – Learning Methodology (Learner Centric)
- Curriculum for the Certificate Courses
- Academic activities of the Department
- Any other proposal with the permission of the chair

(Smt. Y Jnapika)
CHAIRPERSON
BOARD OF STUDIES



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Minutes and Resolutions

The BOS Team have given the following inputs on the BOS Meeting-1: (17-10-2025)

- No changes required in the framed syllabus of the course-1 “Computer Fundamentals and Office Automation(25BCS101T)” in Semester-1
- In the Course-2 “Problem Solving using C (25BCS102T)” of semester-1, suggested to swap the topic “Dynamic Memory Management: Introduction, Functions-malloc, calloc, realloc, free” from unit -V to Unit -IV as it is interlinked with pointers.
- In the Course-2 “Problem Solving using C (25BCS102T)” of semester-1, suggested to include “Files operations: Working with text files - modes: opening, reading, writing and closing text files” in unit-V as required and emphasized in further courses later.
- In the Course-3 “Data Structures using C (25BCS203T)” of semester-2, suggested to specify clearly which notation in Asymptotic Notations will be covered in the syllabus – and finalized to include “Big -O Notation”.
- In the Course-3 “Data Structures using C (25BCS203T)” of semester-2, suggested to remove Abstract Data Type (ADT)” from unit-1, to avoid ambiguity.
- In the Course-3 “Data Structures using C (25BCS203T)” of semester-2, suggested to include only Stack and Queue data structures and remove Stack ADT and Queue ADT” from unit-4, as it is good to study in advanced data structures.
- In the Course-3 “Data Structures using C (25BCS203T)” of semester-2, suggested to specify clearly which applications of Graphs is covered in the syllabus – and finalized to include “Finding Shortest Path using Dijkstra’s algorithm”.
- No changes required in the framed syllabus of the course-4 “Digital Logic Design (25BCS204T)” in Semester-2.
- Appropriate changes were made or incorporated in the skill courses “AI Fundamentals” in semester-I and “Applications of AI” in semester-II for the benefit of all groups of students.

The above suggestions are agreed by all the BOS members also incorporated while framing the UG syllabus for the B.Sc., Computer Science (Major) and AI related skills courses for all groups during first year. The approved syllabus is followed from A.Y.2025-26. **The same regulation R25 syllabus is followed and continued till the next regulation is formulated.**



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Minutes and Resolutions

The BOS Team have given the following inputs on the BOS Meeting-2: (17-08-2026)

Signature of the Members

Signature of the BOS Chairman



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CONSOLIDATED REPORT OF BOARD OF STUDIES FOR THE YEAR A.Y. 2026-27 [w.r.t R25]

The Meeting Board of Studies of Computer Science & Applications department was convened on 17-August-2026 under the Chairmanship of Smt, Y Jnapika Head / Lecturer-in-charge of Department of Computer Science and Applications. The following members are present

S.No.	Name	Designation	Signature
1	Prof. M. Humera Khanam	University Nominee	
2	Dr. G. Vijay Kumar	Local Nominee	
3	Manoj Prabhakar Darsi	Local Nominee	
4	Murali Mohan M	Industrial Nominee	
5	Smt. M. Padmavathi Smt. K. Srilatha	Faculty Members	
6	Sri. Shaik. Munwar	Subject/Special Course Expert	
7	S.J Aayesha	Alumni	
8	S. Sasikala	Student	



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Board of Studies Meeting-2 on 17-08-2026
DEPARTMENT OF COMPUTER SCIENCE
List of Paper Setters

S No	Name of the Paper Setter with Designation	Papers	Qualification	College - City
1	Prof. M. Humera Khanam Professor in Computer Science Department	ALL	Ph.D.	Dept of CSE, SVU College of Engineering, Tirupathi, SV University
2	Dr. G. Vijay Kumar Lecturer in Computer Science	ALL	Ph.D.	Dept of Computer Science, Tanuku, W.G. Dt, AKN University
3	Manoj Prabhakar Darsi Lecturer in Computer Science	ALL	M.Tech (Ph.D.)	Dept of Computer Science, Nellore, Vikram Simhapuri University,
4	Dr. G. Dayanandam Lecturer in Computer Science	ALL	Ph.D.	Dept of Computer Science, Kodur (RS), Annamayya Dt, Yogi Vemana University
5	Sri. Shaik Munwar Lecturer in Computer Science	ALL	M.Tech	Dept of Computer Science, Vedurukuppam, SV University
6	Sri. Ismail Lecturer in Computer Science	ALL	M.Tech	Dept of Computer Science, Vedurukuppam, SV University
7	Sri. T Subramanyam Lecturer in Computer Science	ALL	M.Tech	Dept of Computer Science, Vayalpad, SV University
8	Smt. A. Sumathi Lecturer in Computer Science	ALL	M.Tech	Dept of Computer Science, Srikalahasti, SV University
9	Smt. G. Satya Suneetha Lecturer in Computer Applications	ALL	M.Tech	Dept of Computer Applications, Kovvur, E.G. Dt, AKN University
10	Sri. E. Murali Mohan Reddy Lecturer in Computer Applications	ALL	MCA	Dept of Computer Applications, Puttur, SV University
11	Dr. A. Ravi Prasad Lecturer in Computer Applications	ALL	Ph.D.	Dept of Computer Applications, Srikalahasti, SV University
12	Dr. A. Sri Lakshmi Lecturer in Computer Applications	ALL	Ph.D.	Dept of Computer Applications, Nagari, Autonomous
13	Sri. Y Srinivasulu Lecturer in Computer Applications	ALL	M.Tech	Dept of Computer Applications, Vedurukuppam, SV University
14	Smt. B. Durga Anuja Lecturer in Computer Applications	ALL	M.Tech	Dept of Computer Applications, Srikalahasti, SV University
15	Dr. S. Saravana Lecturer in Computer Applications	ALL	Ph.D.	Dept of Computer Applications, PVKN(A), Chittoor
16	Sri. T Narendra Babu Lecturer in Computer Applications	ALL	M.Tech	Dept of Computer Applications, Vedurukuppam, SV University



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Board of Studies Meeting-2 on 17-08-2026

DEPARTMENT OF COMPUTER SCIENCE

List of Paper Examiners

S No	Name of the Examiner with Designation	Papers	Qualification	College - City
1	Prof. M. Humera Khanam Professor in Computer Science Department	ALL	Ph.D.	Dept of CSE, SVU College of Engineering, Tirupathi, SV University
2	Sri. Shaik Munwar Lecturer in Computer Science	ALL	M.Tech	Dept of Computer Science, Vedurukuppam, SV University
3	Sri. Ismail Lecturer in Computer Science	ALL	M.Tech	Dept of Computer Science, Vedurukuppam, SV University
4	Sri. T Subramanyam Lecturer in Computer Science	ALL	M.Tech	Dept of Computer Science, Vayalpad, SV University
5	Smt. A. Sumathi Lecturer in Computer Science	ALL	M.Tech	Dept of Computer Science, Srikalahasti, SV University
6	Sri. E. Murali Mohan Reddy Lecturer in Computer Applications	ALL	MCA	Dept of Computer Applications, Puttur, SV University
7	Dr. A. Ravi Prasad Lecturer in Computer Applications	ALL	Ph.D.	Dept of Computer Applications, Srikalahasti, SV University
8	Dr. A. Sri Lakshmi Lecturer in Computer Applications	ALL	Ph.D.	Dept of Computer Applications, Nagiri, Autonomous
9	Sri. Y Srinivasulu Lecturer in Computer Applications	ALL	M.Tech	Dept of Computer Applications, Vedurukuppam, SV University
10	Smt. B. Durga Anuja Lecturer in Computer Applications	ALL	M.Tech	Dept of Computer Applications, Srikalahasti, SV University
11	Dr. S. Saravana Lecturer in Computer Applications	ALL	Ph.D.	Dept of Computer Applications, PVKN(A), Chittoor
12	Sri. T Narendra Babu Lecturer in Computer Applications	ALL	M.Tech	Dept of Computer Applications, Vedurukuppam, SV University

(Smt. Y Jnapika)

CHAIRPERSON BOARD OF STUDIES



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DEPARTMENT OF COMPUTER SCIENCE

SCHEME OF EVALUATION

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER

(THEORY)

(Same as Approved in the BOS meeting-1 held on **17-10-2025**)

EVALUATION SCHEME

Standard Operating Procedure for Continuous Internal Assessment (Internal Marks – 30). The Internal marks in all the courses/subjects will be awarded based on continuous internal assessment made during the semester concerned. For each Courses/subject 30 marks are allotted for internal assessment and 70 marks are allotted for the End Semester Examination.

Continuous Internal Evaluation (CIA):

It has been decided to introduce Continuous Internal assessment marks for a total of 60 marks, which are to be distributed as follows:

Sl.No.	Component			Distribution of Marks
1	CIE I (after completion of 50% of syllabus)			20
2	CIE II (Online Exam)			20
3	ATTENDANCE	Above 95%	5	5
		91% to 95%	4	
		86% to 90%	3	
		81% to 85%	2	
		75% to 80%	1	
		Below 75%	0	
Pedagogical Strategies				
4	Assignment			5
5	Participation or Paper Presentation in Student Seminars/Workshops/Group Discussions/ Quiz/ Student Study Project/Field Visit/Survey			5
6	Swatch Bharat (Clean & Green)			5
TOTAL				60

The total 60 Marks is scaled down to 30 Marks

Component I: CIE I & CIE II (20+20 = 40 Marks)

Two Internal Examinations, out of which one is Mandatorily Online examination, for each Course shall be conducted for assessment. These examinations will be conducted during August/September (CIE –I) and January/February (CIE-II). CIE-I carries 20 marks and CIE-II carries 20 marks. CIE- I will be conducted after completion of 50% of syllabus. The second internal examination, i.e., CIE – II, which will cover the remaining second half of the syllabus. The sum of both the CIEs will be considered for awarding marks for CIA.

Suggestive Question Paper Pattern for CIE I & CIE II (Based on Blooms Taxonomy):

Though the faculty concerned is empowered to adopt their own pattern for question paper, a general and suggestive model for question paper is given below based on Blooms Taxonomy.

Q No	Learning Objective	Marks
1	Memory based (Remember)	3
2	Understand (Comprehension)	4
3	Application	4
4	Analysis	3
5	Evaluation	3
6	Creativity	3
	TOTAL	20 marks

The active verbs used to frame the question based on Blooms Taxonomy is given below for the convenience.

Active verbs developed based on Bloom's Taxonomy

Knowledge	Understand	Apply	Analyze	Evaluate	Create
define identify describe label list name state match recognize select examine locate memorize quote recall reproduce tabulate tell copy discover duplicate enumerate	explain describe interpret paraphrase summarize classify compare differentiate discuss distinguish extend predict associate contrast convert demonstrate estimate express Identify indicate Infer relate	solve apply illustrate modify use calculate change choose demonstrate discover experiment relate show sketch complete construct dramatize interpret Manipulate Paint Prepare produce	analyze compare classify contrast distinguish infer separate explain select categorize connect differentiate discriminate divide order point out prioritize subdivide survey advertise appraise Break down	reframe criticize evaluate order appraise judge support compare decide discriminate recommend summarize assess choose convince defend estimate find errors grade measure predict rank	design compose create plan combine formulate invent hypothesize substitute write compile construct develop generalize integrate modify organize prepare produce rearrange rewrite role-play

Important Note:

Students who absent themselves from any CIE will lose the marks for the respective test. However, if a student is not able to write the CIE I / II because of his/her participation in an important event related to NSS/NCC or Games/Sports representing the College/University/health grounds, the student has to get the prior permission of the Principal through the proper channel and submit the same to the Office of the Controller of Examinations. Deadline is 7 days after the CIE. Applications submitted after the deadline will not be considered for the retest.

Component III: Attendance (5 Marks)

Attendance mark will be awarded to the students based on their attendance percentage on a particular course. Faculty of each course has to award the attendance mark based on their subject attendance.

The marks split-up is given below

Above 95%	5
91% to 95%	4
86% to 90%	3
81% to 85%	2
75% to 80%	1
Below 75%	0

Component IV: Assignment (5 Marks)

One Assignment for each course must be submitted by a student in each semester. The marks allotted to this component will be awarded based on the performance of the student. The assignment topic may be assigned either individually or group. Assignment should be submitted by the student in the first half of the semester. Also maximum of 7 days should be given to students to submit the assignment. Assignments should be evaluated by the faculty concerned and the same to be verified by the student. The assignment should be kept in department for the Academic Audit by IQAC and also for external academic audit conducted by office of Commissionerate of Collegiate Education. The marks should be awarded by the faculty.

Component V (Pedagogical Strategies):

Participation /Paper Presentation in Student Seminars/Workshops/Group Discussions/ Quiz/ Student Study Project/Field Visit/Survey (5 Marks)

For this component, the marks will be provided to student, if he/she participate/win in the external college technical events. To score marks, the student has to participate / present papers related to subject in the technical events organized in the other colleges/other departments in the college.

	Participation	Second Prize	First Prize / Best Paper
Workshop / Seminar / Technical Symposium	2	3	5
National / International Conference	3	4	5

In case of Classroom seminar, one seminar for each course must be presented by a student in each semester. Each student should be given individual topic for seminar; the student has to submit the seminar topic as assignment and the same will be presented minimum of 10 minutes in the class through ICT. The seminar presented by the student should be evaluated by the subject faculty and based on the performance of the presentation, the marks will be awarded.

Similarly, reports on field visits, educational tours, study projects in prescribed format will be considered for awarding marks in this component.

For a student who has not participated in any events in that semester, the student will be awarded “0” for this component. If a student participates more than one event and win prize, the best would be considered for the subject.

In case of Quiz, offline/online quiz, it should be conducted after the CIE II and well before the SEE. Faculty concerned has to announce the schedule for the quiz and conduct the quiz.

Semester End Examinations (SEE)

The question paper is of 2 ½ duration for 70 marks. The suggestive question paper model is given that may be used for framing the question. This kind of question paper will be helpful in CO-PO Mapping and thereby graduate attributes.

DEPARTMENT OF COMPUTER SCIENCE

SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

(As Approved in the BOS meeting-1 held on **17-10-2025** for Autonomous **Batch 2025-2028**,
the same is followed till next regulation is formulated)

S.No.	Description	Marks
1	Procedure Explanation with Coding (including Algorithm & Flowchart if any)	15
2	Execution of Program	10
3	VIVA VOCE	10
4	RECORD	15
	Total Internal Marks	50
5	EXTERNAL PRACTICAL EXAM (At the end of II, IV& VI Semester)	50
6	EXTERNAL PRACTICAL EXAM (At the end of I, III & V Semester)	50
	GRAND TOTAL	100

****** Award of marks for number of practicals recorded in the Record.

10 Practical and Above	10
8 Practical	8
6 Practical	6
5 Practical	5
Less than 5	0



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Curriculum 2025-28 [R25]

Version: 2.0

B.Sc. (Honors) Computer Science

Program Specific Outcomes

After completion of the program, the student is able to

PSO1: Problem Solving Proficiency: Proficiently analyze intricate problems, identify requirements, and implement efficient algorithms using appropriate programming languages.

PSO2: Expert Software Development: Expertly design software, architect systems, and develop solutions with an emphasis on scalability, user experience, and best practices.

PSO3: Specialized Knowledge Application: Apply specialized knowledge in areas such as AI, data science, cyber security, contributing to practical problem-solving and innovative solutions.

PSO4: Effective Communication and Collaboration: Communicate technical concepts effectively and collaborate proficiently within multidisciplinary teams, demonstrating leadership and teamwork skills.

B.Sc. (Honors) Computer Science

Programme Outcomes

Sl. No.	Program Outcomes (POs) -A student will be able to:
PO1:	Learn the mathematics, statistics and computer science fundamentals to find the optimum solution of complex Computer Science problems.
PO2:	Identify, formulate, research literature, and analyse complex scientific problems using principles of mathematics, statistics and applied computer science
PO3:	Develop the skills to present ideas effectively and efficiently as a member and as a leader.
PO4:	Create, Solve and apply tools of programming, networking, database, Web design, AI and modern technology for solutions to significant problems.
PO5:	Design computer-based solutions for various technical problems.
PO6:	Ensure professional development growth through contextual, reflective and lifelong learning.
PO7:	Demonstrate knowledge, Design, and implement solutions to significant computational problems.
PO8:	Use research-based knowledge and methods design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO9:	Apply professional ethics, responsibilities and norms of the scientific practice
PO10:	Understand the impact of the software engineering solutions in social and environmental contexts, and demonstrate the knowledge and need for development.



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Curriculum 2025-28 [R25]

Version: 2.0

R25 CIRRICULUM FRAMEWORK

CURRICULAR FRAMEWORK B.Sc HONOURS FROM THE A.Y. 2025-26								
1st Year - Semester I								
Sl.No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major - Core	I	3	2	5	3	1	4
2	Major - Core	II	3	2	5	3	1	4
4	Minor	0	0	0	0	0	0	0
5	AECC - English	I	4	0	4	3	0	3
6	AECC - MIL (Telugu/Hindi/Sanskrit)	I	4	0	4	3	0	3
7	Multidisciplinary Course	0	0	0	0	0	0	0
8	Skill Enhancement Course (SEC) Intro' to Artificial Intelligence	I	4	2 (Practice)	6	4	0	4
End of Semester I of 1st Year		5	18	6	24	16	2	18
1st Year - Semester II								
Sl.No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major - Core	III	3	2	5	3	1	4
2	Major - Core	IV	3	2	5	3	1	4
4	Minor	0	0	0	0	0	0	0
5	English	II	4	0	4	3	0	3
6	MIL (Telugu/Hindi/Sanskrit)	II	4	0	4	3	0	3
	Multidisciplinary Course	I	2	0	2	2	0	2
7	Skill Enhancement Course (SEC) Application of Artificial Intelligence (Discipline Specific)	II	4	2 (Practice)	6	4	0	4
8	Indian Knowledge System	I	2	0	2	0	0	0
9	Community Service Project (minimum of 80 hours with 1 Credit)							1
End of Semester II of 1st Year		7	22	6	28	18	3	21

CURRICULAR FRAMEWORK B.Sc HONOURS FROM THE A.Y. 2026-27
(Major + Minor with CSP & VI Semester Internship)

2nd Year - Semester III

Sl. No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major - Core	VI	3	2	5	3	1	4
2	Major - Core	VII	3	2	5	3	1	4
3	Major - Core	VIII	3	2	5	3	1	4
4	Minor	I	3	2	5	3	1	4
5	AECC (Creative Writing/Business Writing in English)	III	4	0	4	3	0	3
6	AECC (Creative Writing/Journalistic Writing in MIL - Telugu/Hindi/Sanskrit)	III	4	0	4	3	0	3
	Multidisciplinary Course	II	2	0	2	2	0	2
7	Skill Enhancement Course (SEC) Design Thinking/Problem Solving / Others	III	2	0	2	2	0	2
End of Semester III of 2nd Year		8	24	8	32	22	4	26

2nd Year - Semester IV

Sl. No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major - Core	IX	3	2	5	3	1	4
2	Major - Core	X	3	2	5	3	1	4
3	Major - Core	XI	3	2	5	3	1	4
4	Minor	II	3	2	5	3	1	4
	Multidisciplinary Course	IV	2	0	2	2	0	2
7	Skill Enhancement Course (SEC) Design Thinking/Problem Solving / Others	IV	2	0	2	2	0	2
End of Semester IV of 2nd Year		6	16	8	24	16	4	20

CURRICULAR FRAMEWORK B.Sc HONOURS FROM THE A.Y. 2027-28
(Major + Minor with CSP & VI Semester Internship)

3rd Year - Semester V

Sl.No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major - Core	V	3	2	5	3	1	4
2	Major - Elective	XII	3	2	5	3	1	4
3	Major - Elective	XIII	3	2	5	3	1	4
4	Minor	III	3	2	5	3	1	4
5	Minor	IV	3	2	5	3	1	4
6	Environmental Education	I	2	0	2	2	0	2
End of Semester V of 3rd Year		6	17	10	27	17	5	22

3rd Year - Semester VI

Sl.No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major - Elective	XIV	3	2	5	3	1	4
2	Major - Elective	XV	3	2	5	3	1	4
3	Minor	VII	3	2	5	3	1	4
4	Minor	VIII	3	2	5	3	1	4
5	Semester Internship (minimum of 180 hours with 3 Credits)							3
End of Semester VI of 3rd Year		4	12	8	20	12	7	19

Credit Framework for 3-year UG Program

Credits for Major - $11 \times 4 = 44 + 4 \times 4 = 16$. Total 60 Credits

Credits for Minor - $6 \times 4 = 24$ Credits

Credits for AECC (Languages) - $3 \times 3 = 9$ for Eng + $3 \times 3 = 9$ for MIL. Total = 18

Credits for Multidisciplinary Courses - $3 \times 2 = 6$ Credits

Credits for Skill Enhancement Courses - $2 \times 4 = 8$ for AI + 2×2 for others. Total 12 Credits

Credits for Value Added Courses - Env.Edn 2 Credits

Credits for Internships - 4 Credits

TOTAL CREDITS FOR 3-YEAR UG PROGRAMME - 126 Credits.

For Mathematics and Statistics, the number of instructional hours shall be five (5) for courses involving problem-solving, and four (4) for courses comprising only theory.



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Curriculum 2025-28 [R25]

Version: 2.0

R26 COURSE STRUCTURE (Same as APSCHE)

	ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION
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**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**

COURSE STRUCTURE (for Semester I to VI)

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1	Computer Fundamentals and Office Automation	3	3
			Computer Fundamentals and Office Automation-Practical	2	1
		2	Problem Solving Using C	3	3
			Problem Solving Using C-Practical	2	1
	II	3	Data Structures using C	3	3
			Data Structures using C-Practical	2	1
		4	Digital Logic Design	3	3
			Digital Logic Design -Practical	2	1
II	III	5	OOPS Through JAVA	3	3
			OOPS Through JAVA-Practical	2	1
		6	Data Base Management	3	3
			Data Base Management -Practical	2	1
		7	Computer Organisation	3	3
			Computer Organisation-Practical	2	1
	IV	8	Operating Systems	3	3
			Operating Systems-Practical	2	1
		9	Computer Networks	3	3
			Computer Networks	2	1
		10	Python Programming	3	3
			Python Programming-Practical	2	1

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
III	V	11	Software Engineering	3	3
			Software Engineering-Practical	2	1
		12 A	Web Interface Design Technologies	3	3
			Web Interface Design Technologies-Practical	2	1
		OR			
		12 B	SEB1:Data Science with R	3	3
			SEB1:Data Science with R-Practical	2	1
		13 A	Web Application Development using PHP & MySQL	3	3
			Web Application Development using PHP & MySQL-Practical	2	1
		OR			
		13 B	Python for Data Science	3	3
			Python for Data Science Practical	2	1
	VI	14 A	Mobile Application Development	3	3
			Mobile Application Development-Practical	2	1
		OR			
		14 B	Data Visualization Tools	3	3
			Data Visualization Tools-Practical	2	1
		15 A	MERN Stack	3	3
			MERN Stack-Practical	2	1
		OR			
		15 B	Machine Learning	3	3
			Machine Learning-Practical	2	1

Note: In the III Year (during the V and VI Semesters), students are required to select a pair of electives from one of the **Two** specified domains. **For example: if set 'A' is chosen, courses 12 to 15 to be chosen as 12 A, 13 A, 14 A and 15 A.** To ensure in-depth understanding and skill development in the chosen domain, students must continue with the same domain electives in both the V and VI Semesters.

SEMESTER-III



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Curriculum 2025-28 [R25]

Version: 2.0

Course Code	Title of the Course	L	S/M	P	C
25BCS301T	OOPS Through JAVA	3			3
Prerequisites	Basic Programming Knowledge				

COURSE OBJECTIVES

1	To introduce core OOP principles and contrast procedural and object-oriented paradigms within the Java ecosystem.
2	To equip learners with foundational and advanced Java syntax including variables, control statements, arrays, strings, and classes.
3	To demonstrate the use of inheritance, polymorphism, interfaces, and exception handling in creating maintainable and reusable code.
4	To train students in concurrent programming and stream-based I/O operations including file management and serialization.
5	To empower learners to design, build, and manage GUI programs using Swing components, layout managers, and event handling techniques.

COURSE OUTCOMES

BTL

Upon successful completion of the course, the student will be able to:

CO1	Relate OOP principles such as encapsulation, inheritance, and polymorphism in Java applications	Understanding
CO2	Demonstrate writing, compiling, and debugging Java code using control statements, arrays, classes, and methods effectively.	Understanding
CO3	Construct modular code leveraging interfaces, abstract classes, and package hierarchies	Applying
CO4	Interpret thread lifecycles, synchronization, and I/O streams for file handling and console interaction	Applying
CO5	Analyze user interfaces using Swing and handle keyboard/mouse input through event-driven programming.	Analyzing

Syllabus

COURSE CONTENT	
UNIT I	Introduction to Object-Oriented concepts, procedural and object-oriented programming paradigm Java programming: An Overview of Java, Java Environment, Data types, Variables, constants, scope and life time of variables, operators, type conversion and casting, Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output, Displaying Formatted Output with String.format(), Control Statements.
	Activity: Develop a class hierarchy for a zoo management system using inheritance and polymorphism (e.g., Animal → Mammal → Dog). Implement encapsulation through private fields and public getters/setters. Evaluation Method: Code review and oral explanation focusing on class relationships, method overriding, and encapsulation practices.
	Arrays, Command Line Arguments, Strings-String Class Methods Classes & Objects: Creating Classes, declaring objects, Methods, parameter passing, static fields and methods, Constructors, and ‘this’ keyword, overloading methods and access Inheritance: Inheritance hierarchies, super and subclasses, member access rules, ‘super’ keyword, preventing inheritance: final classes and methods, the object class and its methods; Polymorphism: Dynamic binding, method overriding, abstract classes and methods;
UNIT II	Activity: Create a console-based student grade calculator using loops, conditionals, arrays, and modular methods. Evaluation Method: Practical test with debugging tasks and output validation across multiple input scenarios.
	Interfaces VS Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface; Packages: Defining, creating and accessing a package, importing packages. Exception Handling: Benefits of exception handling, the classification of exceptions, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes.
	Activity: Design a payment processing system with abstract classes for Payment, interfaces for Taxable, and organize classes into packages (e.g., com. billing, com.tax). Evaluation Method: Project submission assessed for modularity, interface implementation, abstraction usage, and package structure.
UNIT III	Threads: Differences between multiple processes and multiple threads, thread states, thread life cycle, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication. Stream based I/O (java.io) – The Stream Classes-Byte streams and Character streams, reading console Input and Writing Console Output, File class, Reading and writing Files, The Console class, Serialization.

	Activity: Build a multithreaded logger that reads input from the console and writes to a file using synchronized threads and buffered streams. Evaluation Method: Lab demonstration with thread state tracing and file output verification under concurrent input.
UNIT V	Introduction, MVC architecture, components, containers. Understanding Layout Managers - Flow Layout, Border Layout, Grid Layout, Card Layout, GridBag Layout. Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes.
	Activity: Create a GUI-based quiz application using Swing components (JFrame, JButton, JTextField) with event listeners for mouse clicks and key presses. Evaluation Method: Live demo and rubric-based assessment of UI responsiveness, event handling accuracy, and layout design.

TEXT BOOKS

1. **Java The complete reference**, Herbert Schildt, 9th edition, McGraw Hill.
2. **Programming in Java**, S. Malhotra, S. Chaudhary, 2nd edition, Oxford Univ. Press.

REFERENCE BOOKS

1. **Programming with JAVA - A Primer**, E Bala Guruswamy, 3rd Edition, McGraw Hill
2. **Head First Java: A Brain-Friendly Guide**, Katty Sierra, Bert Bates, 2nd Edition, O'Reilly

WEB RESOURCES

1. <https://www.w3schools.com/java/>
2. <https://www.geeksforgeeks.org/java/java/>
3. **Java Programming Digital Notes:** Accessible via [MRCET Academic Resource](#).

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	0	0	1	0	0	0	0	0	0	1	0	0
CO2	2	2	1	0	2	1	0	0	0	0	0	1	0	0
CO3	2	3	2	1	2	1	0	1	0	0	0	1	1	1
CO4	3	2	1	1	2	1	0	2	0	0	0	1	1	1
CO5	3	3	2	1	2	1	1	2	1	0	0	1	2	0

Model Blue print for the question paper setter

S.No.	UNIT-	Essay 10M	Short 4 M	Weightage
1	I	2	2	20%
2	II	2	2	20%
3	III	2	2	20%
4	IV	2	2	20%
5	V	2	2	20%
		100	40	100%



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II B.Sc. (Hons) Computer Science

Semester-III

Recommended Format of Question Paper for all Courses

Time: 3 Hours

Max. Marks: 70

Section-A

Answer any FIVE of the following questions.

5X4=20M

1. From Contents of Unit-I
2. From Contents of Unit-I
3. From Contents of Unit -II
4. From Contents of Unit -II
5. From Contents of Unit -III
6. From Contents of Unit -III
7. From Contents of Unit -IV
8. From Contents of Unit -IV
9. From Contents of Unit -V
10. From Contents of Unit -V

Section-B

Answer FIVE questions.

5X10=50M

11. A) From Contents of Unit-I

OR

B) From Contents of Unit-I

12. A) From Contents of Unit-II

OR

B) From Contents of Unit -II

13. A) From Contents of Unit -III

OR

B) From Contents of Unit -III

14. A) From Contents of Unit -IV

OR

B) From Contents of Unit -IV

15. A) From Contents of Unit -V

OR

B) From Contents of Unit -V



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OOPS Through JAVA

MODEL QUESTION PAPER

Time: 2 ½ Hrs.

Max Marks: 70

Q. No	Question	Marks	BL	CO
SECTION – A				
Answer any Five of the Following		5 X 4 = 20M		
1	Differentiate between procedural programming and object-oriented programming.	4M	2	1
2	Write about type casting in Java? Mention its types.	4M	2	1
3	Explain about command-line arguments in Java?	4M	2	2
4	Interpret the purpose of constructors. How are they different from methods?	4M	2	2
5	Show how abstract classes are used in Java?	4M	2	3
6	Explain shortly about packages in Java?	4M	2	3
7	Show the life cycle of a thread?	4M	3	4
8	Explain about Multithreading?	4M	2	4
9	Describe the MVC architecture.	4M	2	5
10	Explain in brief about Adapter classes.	4M	4	5

SECTION – B**Answer All Questions****5 X 10 = 50M**

11	a). Explain the principles of Object-Oriented Programming. Compare procedural programming with object-oriented programming. (OR) b) Demonstrate the use of control statements and keyboard input using the Scanner class with an example Java program.	10M	2	1
		10M	2	1
12	a) Discuss about Inheritance in Java: superclass, subclass, super keyword, final keyword, and the Object class with example program. (OR) b) Summarize the polymorphism in Java? Differentiate between method overloading and method overriding.	10M	2	2
		10M	2	2
13	a) Illustrate the concept of Exception Handling with an example? (OR) b) Compare interfaces and abstract classes with suitable examples.	10M	3	3
		10M	4	3
14	a) Interpret the concept of threads in Java and inter-thread communication with examples. (OR) b) Illustrate the byte streams and character streams in Java with examples?	10M	2	4
		10M	3	4
15	a) Explain about Border Layout and Grid Layout with suitable example? (OR) b) Construct a Java program to handle the keyboard and mouse events?	10M	4	5
		10M	3	5



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Course Code	Title of the Course	L	S/M	P	C
25BCS301P	OOPS Through JAVA			2	1
Prerequisites	Basic Programming Knowledge				

Objectives:

1. Learn basics of OOPs concepts.
2. Learn how to work Java components.

List of Experiments:

1. Write a Java program to print Fibonacci series.
2. Write a Java program to calculate multiplication of 2 matrices.
3. Write a Java program for sorting a given list of names in ascending order.
4. Create a class Rectangle. The class has attributes length and width. It should have methods that calculate the perimeter and area of the rectangle. It should have read Attributes () method to read length and width from the user.
5. Write a Java program that implements method overloading.
6. Write a Java program to implement various types of inheritance
 - i. Single
 - ii. Multi-Level
 - iii. Hierarchical
 - iv. Hybrid
7. Write a java program to implement runtime polymorphism.
8. Write a Java program which accepts withdrawal amount from the user and throws an exception In Sufficient Funds when withdrawal amount is more than available amount.
9. Write a Java program to create three threads and that displays good morning, for every one second, hello for every 2 seconds and welcome for every 3 seconds by using extending Thread class.
10. Write a Java program that creates three threads. The first thread displays OOPS, the second thread displays Through and the third thread displays JAVA by using Runnable interface.
11. Write a Java program that displays the number of characters, lines and words in a text file.
12. Implement a Java program for handling mouse events when the mouse entered, exited, clicked, pressed, released, dragged and moved in the client area.
13. Implement a Java program for handling key events when the key board is pressed, released, typed.
14. Write a Java swing program that reads two numbers from two separate text fields and displays the sum of two numbers in the third text field when the button add is pressed.
15. Write a Java program to design student registration form using Swing Controls. The form which having the following fields and button SAVE
Form Fields are: Name, RNO, Mailid, Gender, Branch, Address.



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Curriculum 2025-28 [R25]

Version: 2.0

Course Code	Title of the Course	L	S/ M	P	C
25BCS302T	DATABASE MANAGEMENT SYSTEMS	3			3
Prerequisites	Basic Computer Knowledge and Understanding of data and information				

COURSE OBJECTIVES

1	To understand the fundamentals of data, information, and the evolution from file-based systems to modern database management systems.
2	To design conceptual data models using Entity-Relationship (ER) and Enhanced ER diagrams.
3	To apply relational model principles, such as keys, integrity constraints, relational algebra and calculus, and normalization.
4	To use data definition and manipulation using SQL commands including queries, joins, subqueries, views, and set operations.
5	To implement procedural logic using PL/SQL, incorporating control structures, functions, procedures, and database triggers.

COURSE OUTCOMES

COURSE OUTCOMES		BTL
Upon successful completion of the course, the student will be able to:		
CO1	Describe the fundamentals database systems, classify various DBMS architectures, data models including the three-schema architecture	Understanding
CO2	Design conceptual data models using Entity-Relationship and Enhanced ER diagrams, applying generalization, specialization, and constraints	Create
CO3	Make use of various constraints in building a normalized database.	Applying
CO4	Construct and execute various SQL queries.	Applying
CO5	Develop PL/SQL programs to manage database behavior effectively.	Create

Syllabus

COURSE CONTENT

UNIT I

Overview of Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of database, costs and risks of database approach.

Activity: Create a comparative presentation or infographic illustrating:

- File-based vs. DBMS approaches
- Types of DBMS architectures (1-tier, 2-tier, 3-tier)
- Data models and the three-schema architecture

Evaluation Method: Rubric-based assessment of the presentation covering clarity, accuracy, and depth of comparison. Include a short quiz to test conceptual understanding.

UNIT II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, ISA relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modeling.

Activity: Model a university or hospital database using ER and Enhanced ER diagrams that shows:

- Entity sets, relationships
- Generalization/specialization
- Participation and cardinality constraints

Evaluation Method: Diagram submission with peer review and instructor feedback. Use a checklist to assess completeness, correctness, and notation usage.

UNIT III

Relational Model: Introduction, Codd Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, Functional dependencies and Normal Forms (**Up to 3rd Normal Form**).

Activity: Normalize a given unstructured dataset up to 3NF. Then, write relational algebra expressions for sample queries.

Evaluation Method: Written assignment graded on:

- Correctness of normalization steps
- Accuracy of relational algebra expressions
- Short-answer questions on Codd rules and relational calculus

UNIT IV	Structured Query Language: Introduction, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query.
	Activity: Implement a mini-project (e.g., Library or Inventory DB) using SQL. Include: • Table creation (DDL) • Data manipulation (DML) • Aggregation, joins, subqueries, views, and set operations Evaluation Method: Lab-based practical test with query execution and output validation. Include a viva to explain logic and optimization.
UNIT V	PL/SQL: Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structures, Steps to Create a PL/SQL, Program, Iterative Control, Procedures, Functions.
	Activity: Build a PL/SQL-based payroll or student grading system using: • Procedures and functions • Control structures (IF, LOOP) • Triggers for automated updates Evaluation Method: Code review and demonstration. Evaluate based on: • Syntax correctness • Logical flow

TEXT BOOKS	
1.	Database System Concepts, Avi Silberschatz, Henry F. Korth, S. Sudarshan, Seventh Edition, McGraw-Hill
2.	Database Management Systems by Raghu Ramakrishnan, McGrawhill
REFERENCE BOOKS	
1.	Fundamentals of Database Systems, Elmasri Navathe Pearson Education
2.	An Introduction to Database systems, C.J. Date, A. Kannan, S. Swami Nadhan, Pearson
WEB RESOURCES	
1.	DBMS Course: https://www.scaler.com/topics/course/dbms/
2.	Explore databases with online courses: https://www.edx.org/learn/databases

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PS O1	PS O2	PS O3	PS O4
CO1	2	1	0	2	2	1	1	0	1	1	0	1	0	0
CO2	2	2	1	2	2	1	2	1	0	1	1	1	1	0
CO3	1	2	1	3	3	1	1	1	1	1	1	1	2	1
CO4	2	2	0	2	3	1	2	2	1	1	2	2	2	1
CO5	1	2	0	2	2	1	2	0	0	1	2	2	2	1

Model Blue print for the question paper setter

S. No.	UNI T-	Essay 10M	Short 4 M	Weightage
1	I	2	2	20%
2	II	2	2	20%
3	III	2	2	20%
4	IV	2	2	20%
5	V	2	2	20%
		100	40	100%



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II B.Sc. (Hons) Computer Science

Semester-III

Recommended Format of Question Paper for all Courses

Time: 3 Hours

Max. Marks: 70

Section-A

Answer any FIVE of the following questions.

5X4=20

1. From Contents of Unit-I
2. From Contents of Unit-I
3. From Contents of Unit -II
4. From Contents of Unit -II
5. From Contents of Unit -III
6. From Contents of Unit -III
7. From Contents of Unit -IV
8. From Contents of Unit -IV
9. From Contents of Unit -V
10. From Contents of Unit -V

Section-B

Answer FIVE questions.

5X10=50

11. A) From Contents of Unit-I

OR

B) From Contents of Unit-I

12. A) From Contents of Unit-II

OR

B) From Contents of Unit -II

13. A) From Contents of Unit -III

OR

B) From Contents of Unit -III

14. A) From Contents of Unit -IV

OR

B) From Contents of Unit -IV

15. A) From Contents of Unit -V

OR

B) From Contents of Unit -V



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DATABASE MANAGEMENT SYSTEMS

MODEL QUESTION PAPER (W.E.F 2025-2026)

Time: 3 Hrs.

Max Marks: 70

Q. No	Question	Marks	BL	C O
SECTION – B				
Answer any Five of the Following 20M		5 X 4 =		
1	Define DBMS. Explain components of Database.	4M	1	1
2	Explain the cost and risks of the database approach.	4M	2	1
3	Distinguish between weak entity and strong entity?	4M	2	2
4	Explain about IS-A relationship and attribute inheritance.	4M	2	2
5	Quote the CODD rules for relational models.	4M	1	3
6	Define Partial and Full Functional Dependencies.	4M	1	3
7	Explain different data types in SQL	4M	2	4
8	Explain different aggregate functions in SQL.	4M	2	4
9	Illustrate the structure of PL/SQL with example.	4M	2	5
10	Construct a PL/SQL program to swap two numbers.	4M	6	5

SECTION – B				
Answer All Questions			5 X 10 = 50M	
11	a) Outline the three-schema architecture with neat diagram. Illustrate the schema diagram for a university database (OR)	10M	1	1
	b) Explain different types of Data models with an example.	10M	2	1
12	a) Design an ER-Model showing degrees of relationship in ER Model with suitable example? (OR)	10M	6	2
	b) Explain different types of constraints that are possible on generalization and specialization?	10M	2	2
13	a) Discuss in detail about Relational Algebra (OR)	10M	2	3
	b) Illustrate Normal forms with suitable examples.	10M	3	3
14	a) Demonstrate DDL and DML statements. (OR)	10M	3	4
	b) Explain different types of SQL joins?	10M	2	4
15	a) Explain different types of Iterative controls in PL/SQL? (OR)	10M	2	5
	b) Construct a PL/SQL program using Procedures or Functions?	10M	2	5



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Course Code	Title of the Course	L	S/M	P	C
25BCS302P	DATABASE MANAGEMENT SYSTEMS			2	1
Prerequisites	Basic Computer Knowledge and Understanding of data and information				

Objectives:

1. Learn basics of data, database systems.
2. Learn how to work with Oracle and SQL plus.

List of Experiments:

Experiment 1 : Database: Inventory Management

Table 1: Products

Structure:

Column Name	Data Type	Constraints
product_id	INT	PRIMARY KEY
product_name	VARCHAR(50)	NOT NULL
price	DECIMAL(10,2)	CHECK(price > 0)
stock_qty	INT	CHECK(stock_qty >= 0)

Sample Data:

product_id	product_name	price	stock_qty
1	Pen	10.00	100
2	Notebook	50.00	200
3	Stapler	120.00	50
4	Marker	25.00	80
5	File Folder	60.00	150

Table 2: Suppliers

Structure:

Column Name	Data Type	Constraints
supplier_id	INT	PRIMARY KEY
supplier_name	VARCHAR(50)	NOT NULL
contact_no	VARCHAR(20)	UNIQUE
product_id	INT	FOREIGN KEY REFERENCES Products(product_id)

Sample Data:

supplier_id	supplier_name	contact_no	product_id
101	StationeryMart	9876543210	1
102	PaperWorld	9876500000	2
103	OfficeSupplies	9876512345	3
104	MarkerHub	9876522222	4
105	FileDepot	9876533333	5

Section A: DDL (Data Definition Language)

1. Create a database called Inventory DB.
2. Create a table Products and table Suppliers with the specified columns and constraints:

Section B: DML (Data Manipulation Language)

3. Insert at least 5 rows into the Products table.
4. Update the stock quantity of product 'Pen' to 120.
5. Delete a supplier with a specific supplier_id.
6. Write a query to rename 'Notebook' to 'NoteBook A4'

Section C: DQL (SELECT Queries)

7. Display all records from the Products table.
8. List all products that have a stock quantity less than 100.
9. Show all products between 20 and 100 price range.
10. Find the average price of products.
11. Display the total number of products in the inventory.

Section E: PL/SQL Programming

12. Write a procedure GetEmpInfo that takes emp_id as input and displays name, salary, and department.
13. Write a PL/SQL block that checks if an employee's salary is above 50,000.
If yes, print "High Salary"; Otherwise print "Standard Salary".
14. Write a PL/SQL program to display the top 10 rows in the Emp table based on their job and salary
15. Write a stored procedure Give Bonus that takes department ID and a designation as input, along with a bonus amount, and updates the salary of all employees in that department who have the specified designation by adding the bonus amount to their current salary.



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Curriculum 2025-28 [R25]

Version: 2.0

Course Code	Title of the Course	L	S/M	P	C
25BCS303T	Computer Organization	3			3
Prerequisites	Basic concepts of Digital Logic Design				

COURSE OBJECTIVES

1	To impart adequate knowledge on register transfer language and micro-operations, enabling understanding of basic computer organization.
2	To interpret CPU architecture and the control unit's design through hardwired and microprogrammed approaches
3	To explore various memory organization strategies, including hierarchy, cache mapping, and associative techniques.
4	To demonstrate input-output systems and data transfer mechanisms using I/O interfaces and DMA methods.
5	To make use of arithmetic algorithms.

COURSE OUTCOMES		BTL
Upon successful completion of the course, the student will be able to:		
CO1	Interpret register-level operations and perform arithmetic, logic, and shift micro-operations within a basic computer framework.	Understanding
CO2	Illustrate CPU functionality, addressing modes, and control unit design with both hardware-based and micro-programmed techniques.	Understanding
CO3	Categorize types of memory and explain memory hierarchy, access methods, and mapping techniques.	Applying
CO4	Illustrate the I/O organization, including asynchronous transfer modes, DMA, and interrupt-driven processing.	Applying

CO5	Apply arithmetic algorithms on fixed- and floating-point data.	Applying
-----	--	----------

Syllabus

COURSE CONTENT	
UNIT I	Introduction- Functional units, computer registers, register transfer language, register transfer, bus and memory transfers, arithmetic, logic and shift micro-operations, arithmetic logic shift unit. Basic Computer Organization and Design: Instruction codes, instruction cycle. Register reference instructions, Memory – reference instructions, input – output and interrupt.
	Activity: Use a simulation tool (e.g., Logisim or Digital Works) to design a simple 4-bit ALU that performs: ○ Addition, subtraction ○ AND, OR ○ Logical and arithmetic shifts Evaluation Method: Demonstration-based assessment where students explain each operation using test inputs. Include a short worksheet with expected vs. actual outputs.
UNIT II	Central Processing unit: Introduction, instruction formats, addressing modes. Control memory, address sequencing, design of control unit - hard wired control, micro programmed control.
	Activity: Create a flowchart or block diagram showing: ○ CPU components (ALU, registers, control unit) ○ Addressing modes (immediate, direct, indirect, etc.) ○ Control unit types (hardwired vs. microprogrammed) Evaluation Method: Oral presentation or peer-reviewed poster session. Use a rubric to assess clarity, completeness, and correct identification of modes and control logic on 1 10-point scale.
UNIT III	Memory Organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache Memory and mappings.
	Activity: Build a memory hierarchy chart using coloured cards or digital tools. Include: ○ Registers, cache, RAM, secondary storage ○ Access methods (direct, associative, etc.) ○ Mapping techniques (direct, associative, set-associative) Evaluation Method: Quiz with matching and short-answer questions. Include a scenario-based question where students choose the best memory type for a given task.

UNIT IV	Input-Output Organization: Peripheral Devices, input-output interface, asynchronous data transfer, modes of transfer- programmed I/O, priority interrupt, direct memory access, Input – Output Processor (IOP).
	Activity: Role-play simulation: Assign students’ roles (CPU, DMA controller, I/O device) and simulate data transfer using cards or tokens to represent data and control signals. Evaluation Method: Reflective worksheet where students describe the flow of control and data in each mode. Include a diagram labelling key signals and steps.
UNIT V	Computer Arithmetic: Data representation- fixed point, floating point, addition and subtraction, multiplication [Booth’s] and division algorithm [Slow Division (Restoring Division Algorithm)].
	Activity: Use a spreadsheet or visual tool to simulate floating point arithmetic operations. Evaluation Method: Submission of simulation results with explanation. Evaluate the report on a 10-point scale.

TEXT BOOKS

1. Computer Systems Architecture, M. Moris Mano, 3rd edition, Pearson/ PHI
2. Computer Organization and Architecture, William Stallings, 8th edition, Pearson/PHI

REFERENCE BOOKS

1. Computer Organisation and Architecture, V. Rajaraman, T. Radha Krishnan, PHI
2. Computer Organization and Architecture Hamacher, Vranesic, Zaky, 5th edition, McGraw Hill

WEB RESOURCES

1. <https://www.geeksforgeeks.org/computer-organization-architecture/computer-organization-and-architecture-tutorials/>
2. https://mrcet.com/downloads/digital_notes/CSE/II%20Year/COMPUTER%20ORGANIZATION%20NOTES.pdf

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	0	1	1	1	0	0	0	0	1	1	1	0
CO2	2	3	0	1	1	1	0	0	0	0	1	1	1	0
CO3	2	3	0	1	1	1	1	0	0	0	2	1	1	0
CO4	2	3	0	2	1	1	1	1	0	0	2	2	1	0
CO5	2	3	0	2	1	1	1	0	0	0	2	2	1	0

Model Blue print for the question paper setter

Sl. No.	UNIT-	Essay 10M	Short 4 M	Weightage
1	I	2	2	20%
2	II	2	2	20%
3	III	2	2	20%
4	IV	2	2	20%
5	V	2	2	20%
		100	40	100%



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II B.Sc. (Hons) Computer Science

Semester-III

Recommended Format of Question Paper for all Courses

Time: 3 Hours

Max. Marks: 70

Section-A

Answer any FIVE of the following questions.

5X4=20

1. From Contents of Unit-I
2. From Contents of Unit-I
3. From Contents of Unit -II
4. From Contents of Unit -II
5. From Contents of Unit -III
6. From Contents of Unit -III
7. From Contents of Unit -IV
8. From Contents of Unit -IV
9. From Contents of Unit -V
10. From Contents of Unit -V

Section-B

Answer FIVE questions.

5X10=50

11. A) From Contents of Unit-I

OR

B) From Contents of Unit-I

12. A) From Contents of Unit-II

OR

B) From Contents of Unit -II

13. A) From Contents of Unit -III

OR

B) From Contents of Unit -III

14. A) From Contents of Unit -IV

OR

B) From Contents of Unit -IV

15. A) From Contents of Unit -V

OR

B) From Contents of Unit -V



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Computer Organization

MODEL QUESTION PAPER (W.E.F 2025-2026)

Time: 2 ½ Hrs.

Max Marks: 70

Q. No	Question	Marks	BL	CO
SECTION – A				
Answer any Five of the Following		5 X 4 = 20M		
1	List the types of micro-operations.	4M	1	1
2	Interpret the instruction cycle?	4M	2	1
3	Define instruction format.	4M	1	2
4	Explain control memory in brief?	4M	2	2
5	Discuss memory hierarchy?	4M	2	3
6	Differentiate between main memory and auxiliary memory.	4M	2	3
7	Explain asynchronous data transfer?	4M	2	4
8	Compare Programmed I/O and Interrupt-driven I/O.	4M	2	4
9	Express floating-point representation.	4M	2	5
10	Identify the purpose of the division algorithm in computer arithmetic?	4M	2	5

SECTION – B				
Answer All Questions		5 X 10 = 50 M		
11	a) Explain bus transfers and memory transfers with diagrams. (OR)	10M	2	1
	b) Summarize memory-reference, register-reference, and input-output instructions with examples.	10M	2	1
12	a) Discuss different instruction formats and addressing modes with suitable examples. (OR)	10 M	2	2
	b) Compare hardwired control and microprogrammed control units with their advantages and disadvantages.	10M	2	2
13	a) Explain associative memory and its applications (OR)	10M	2	3
	b) Describe cache memory organization and explain different cache mapping techniques.	10M	2	3
14	a) Illustrate Direct Memory Access (DMA) with a flowchart. (OR)	10M	3	4
	b) Explain the working of an Input-Output Processor (IOP) and discuss its advantages.	10M	4	4
15	a) Explain binary addition and subtraction algorithms in detail. Illustrate the operations using suitable numerical examples. (OR)	10M	2	5
	b) Describe binary multiplication algorithms in detail. Explain Booth's multiplication algorithm with a suitable example.	10M	2	5

All the Best



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Course Code	Title of the Course	L	S/M	P	C
25BCS303P	Computer Organization Lab			2	1
Prerequisites	Basic Computer Knowledge				

Objectives:

1. Learn how to solve common configurations of computer hardware.
2. Learn to simulate the assembly language code to understand the internal hardware organization and computation.

List of Experiments/Syllabus:

1. Simulate Register Transfer Using Logisim
2. Build a microprogrammed control unit using Logisim or VHDL (GHDL).
3. Simple Register Transfers and Arithmetic Operations using EMU8086 Simulator
4. Simulate a Simple Instruction Cycle in Emu8086
5. Demonstrate Addressing Modes (Immediate, Register, Direct, Indexed) in Emu8086
6. Implement Subroutines Using CALL and RET in Emu8086
7. Simulate DMA Transfer in Ripes or Logisim
8. Simulate Booth's Algorithm for multiplication and restoring division in Python/C or Logisim
9. Write assembly language code for $A+B*(C-D)$ using various instruction formats in any open-source assembler.
10. Write assembly language code for $A+B*C$ using various addressing modes in any open-source assembler.

SEMESTER-IV



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Curriculum 2025-28 [R25]

Version: 2.0

Course Code	Title of the Course	L	S/M	P	C
25BCS401T	OPERATING SYSTEMS	3			3
Prerequisites	Basic of Software & Hardware				

COURSE OBJECTIVES

1	To understand the evolution and core functions of operating systems, including resource management and system types.
2	To choose appropriate scheduling algorithm for process execution and manage threads.
3	To solve problems associated with Process, Memory and I/O management.

COURSE OUTCOMES		BTL
Upon successful completion of the course, the student will be able to:		
CO1	Understand various types of operating systems and their basic functionalities	Knowledge
CO2	Interpret the concepts of processes and threads	Understand
CO3	Implement algorithms for process management	Applying
CO4	Illustrate memory management strategies	Applying
CO5	Make use of File and I/O operations and their scheduling algorithms.	Applying

Syllabus

COURSE CONTENT	
UNIT I	Operating System Fundamentals: Operating System Definition, History and Evolution of OS, Basic OS functions, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.
	Activity: Timeline Creation & Concept Mapping - Students will collaboratively build a visual timeline showing the evolution of operating systems from early batch systems to modern distributed and mobile OS. They will also create a concept map illustrating core management functions (e.g., process, memory, file, device management). Evaluation Method: Rubric-based assessment of timeline and concept map: ○ Historical accuracy ○ Inclusion of core OS functions ○ Presentation and teamwork
UNIT II	Process & Thread: Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling- Non-Preemptive (FCFS, SJF) and Preemptive Scheduling (Round Robin) Algorithms.
	Activity: Comparative Analysis Table & Case Study Discussion - Students will research and fill out a comparison table for OS types (multiprogramming, batch, time-sharing, real-time, personal device-based), focusing on architecture, scheduling, responsiveness, and use cases. Followed by a group discussion using real-world examples (e.g., RTOS in pacemakers vs. Android in smartphones). Evaluation Method: Students will be evaluated on a 10-point scale based on ● Individual submission of comparison table ● Group participation score in discussion
UNIT III	Process Management: Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter process Communication; Process Synchronization - Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer. Deadlock: Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery.
	Activity: Simulation & Code Walkthrough - Students will simulate process scheduling using tools or pseudocode (e.g., Round Robin). They will also analyze thread creation and system calls using a simple multithreaded program in Java. Evaluation Method: Students will be assessed on a 10-point scale based on ○ Scheduling algorithm simulation results ○ Explanation of processor modes and system calls ○ Code annotations for kernel functions
UNIT IV	Memory Management: Physical and Virtual Address Space; Memory Allocation Strategies–Fixed and -Variable Partitions, Paging (FIFO, LRU), Segmentation, Virtual Memory

UNIT V

Activity: Role-play & Coding Challenge - Students will role-play classical problems (e.g., Dining Philosophers, Producer-Consumer) to understand synchronization. Then, they'll implement semaphore or monitor-based solutions in code and simulate deadlock detection or avoidance.

Evaluation Method: Students will be evaluated for 10 marks based on

- Code review for correctness and use of synchronization primitives
- Peer evaluation of role-play clarity and engagement
- Written test with deadlock scenarios and solution strategies

File and I/O Management: Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Disk Scheduling algorithms [(a)FCFS or **SSTF** (b) SCAN or **CSCAN**]

Activity: Interactive Lab & Design Task - Students will use OS simulators to experiment with memory allocation (paging, segmentation), disk scheduling (FCFS, SSTF, SCAN), and file system operations.

Evaluation Method: Students will be evaluated for 10 points based on

- Correct use of allocation techniques
- Disk scheduling output analysis
- Virtual memory behaviour observation

TEXT BOOKS

- | | |
|----|--|
| 1. | Operating System Principles, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, 7th Edition, Wiley India Edition. |
| 2. | Operating Systems: Internals and Design Principles, Stallings, Pearson edition |

REFERENCE BOOKS

- | | |
|----|--|
| 1. | Operating Systems Design and Implementation, Andrew S. Tanenbaum, 3rd Edition, Pearson |
| 2. | A Text Book of Operating Systems, Singh, Kaur and Gupta, Khanna Publishers |

WEB RESOURCES

- | | |
|----|---|
| 1. | https://www.geeksforgeeks.org/operating-systems/ |
| 2. | https://www.tutorialspoint.com/operating_system/ |

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	1	0	1	1	1	1	1	1	0	1	1	1	0
CO2	3	3	0	1	1	1	1	1	1	0	2	1	0	0
CO3	2	3	0	1	1	1	1	1	1	0	1	1	0	0
CO4	2	3	0	1	1	1	1	1	1	0	1	1	0	0
CO5	3	3	0	2	1	1	2	1	1	0	1	1	1	0

Model Blue print for the question paper setter

Sl. No.	UNIT-	Essay 10M	Short 4 M	Weightage
1	I	2	2	20%
2	II	2	2	20%
3	III	2	2	20%
4	IV	2	2	20%
5	V	2	2	20%
		100	40	100%



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II B.Sc. (Hons) Computer Science

Semester-IV

Recommended Format of Question Paper for all Courses

Time: 3 Hours

Max. Marks: 70

Section-A

Answer any FIVE of the following questions.

5X4=20

1. From Contents of Unit-I
2. From Contents of Unit-I
3. From Contents of Unit -II
4. From Contents of Unit -II
5. From Contents of Unit -III
6. From Contents of Unit -III
7. From Contents of Unit -IV
8. From Contents of Unit -IV
9. From Contents of Unit -V
10. From Contents of Unit -V

Section-B

Answer FIVE questions.

5X10=50

11. A) From Contents of Unit-I

OR

B) From Contents of Unit-I

12. A) From Contents of Unit-II

OR

B) From Contents of Unit -II

13. A) From Contents of Unit -III

OR

B) From Contents of Unit -III

14. A) From Contents of Unit -IV

OR

B) From Contents of Unit -IV

15. A) From Contents of Unit -V

OR

B) From Contents of Unit -V



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OPERATING SYSTEMS

MODEL QUESTION PAPER (W.E.F 2025-2026)

Time: 2 ½ Hrs.

Max Marks: 70

Q. No	Question	Marks	BL	CO	PO	PI
SECTION – A						
Answer any Five of the Following			5 X 4 = 20M			
1	Define an Operating System and explain its primary objectives.	4M	1	1		
2	Discuss about Real-Time Operating System? Mention its applications.	4M	2	1		
3	Distinguish between User Mode and Kernel Mode.	4M	2	2		
4	What are System Calls? Give any two examples.	4M	1	2		
5	Discuss about Critical Section and Semaphore.	4M	2	3		
6	What is Inter-Process Communication (IPC)?	4M	1	3		
7	Differentiate between Physical Address Space and Virtual Address Space	4M	2	4		
8	Define Segmentation with an example.	4M	1	4		
9	List the different File Allocation Methods.	4M	1	5		
10	Explain in brief about Buffer and Pipe.	4M	2	5		

SECTION – B						
Answer All Questions			5 X 10 = 50 M			
11	a) Explain the evolution of Operating Systems.	5M	2	1		
	b) Explain the basic functions of Operating System.	5M	2	1		
	(OR) c) Compare Batch, Multiprogramming, and Time-Sharing Operating Systems with suitable examples.	10M	2	1		
12	a) Explain Threads, Thread Libraries, and Threading Issues in detail.	10M	2	2		
	(OR) b) Describe the FCFS and Shortest Job First (SJF) Non-Preemptive scheduling algorithms with suitable examples.	10M	2	2		
13	a) Illustrate Producer–Consumer synchronization problem with solution.	10M	3	3		
	(OR) b) Implement Bankers Algorithm Dead Lock Prevention.	10M	3	3		
14	a) Explain Paging with LRU page replacement algorithm using suitable example.	10M	2	4		
	(OR) b) Describe the concept of Virtual Memory and explain its advantages and limitations.	10M	2	4		
15	a) Explain the directory structure and various file operations in an Operating System.	10M	2	5		
	(OR) b) Implement any disk scheduling algorithms with suitable example.	10M	3	5		

****All the Best****



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Course Code	Title of the Course	L	S/M	P	C
25BCS401P	OPERATING SYSTEMS-PRACTICAL			2	1
Prerequisites	C Programming				

Objectives:

1. To provide hands on experience to implement and solve Operating Systems problems

List of Experiments/Syllabus:

1. Illustrate the LINUX commands
 - a) pwd
 - b) mkdir
 - c) rmdir
 - d) grep
 - e) chmod
 - f) ls
 - g) rm
 - h) cp
2. Write a program to calculate average waiting time and turnaround time of each process using the following CPU Scheduling algorithm for the given process schedules.
 - a) FCFS
 - b) SJF
 - c) Round Robin
 - d) **Priority**
3. Simulate MVT and MFT memory management techniques
4. Write a program for Bankers Algorithm for Dead Lock Avoidance
5. Implement Bankers Algorithm Dead Lock Prevention.
6. Write a program to simulate Producer-Consumer problem.
7. Simulate all Page replacement algorithms.
 - a) FIFO
 - b) LRU
 - c) **LFU**
 - d) **Optimal**
8. Simulate Paging Techniques of memory management
9. Simulate the following disk scheduling algorithms
 - a) FCFS or **SSTF**
 - b) SCAN or **CSCAN**



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Curriculum 2025-28 [R25]

Version: 2.0

Course Code	Title of the Course	L	S/M	P	C
25BCS402T	COMPUTER NETWORKS	3			3
Prerequisites	Basics of Computers				

COURSE OBJECTIVES

1	To introduce foundational concepts and architecture of computer networks, including OSI and TCP/IP models.
2	To explore data transmission technologies, error handling mechanisms, including guided and wireless media, and assess their real-world applications.
3	To use various routing and congestion control algorithms.
4	To discover core transport protocols in modern networks.
5	To demonstrate how network services operate, focusing on protocols like TCP, UDP, DNS and their relevance in global connectivity.

COURSE OUTCOMES		BTL
Upon successful completion of the course, the student will be able to:		
CO1	Interpret various network models (OSI, TCP/IP) and select appropriate media for specific networking scenarios.	Understanding
CO2	Demonstrate error control, flow control and collision free protocols.	Understanding
CO3	Choose various routing strategies and congestion control algorithms.	Applying
CO4	Show how the Transport layer protocols are used in resolving design issues and managing the connections.	Applying
CO5	Implement basic Application-layer protocols and illustrate how services like email, web browsing, and streaming are supported on networks.	Applying

Syllabus

COURSE CONTENT	
UNIT I	Introduction to Computer Networks: Network hardware: classification based on scale and relationship; Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet. Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics. Unguided Transmission media: Radiowaves, Microwaves, Infrared waves.
	Activity-1: Create a layered diagram of OSI and TCP/IP models using coloured cards or digital tools. Label each layer with its function and examples of hardware (e.g., router, switch) and software (e.g., protocols, applications). Evaluation Method: Short quiz with: ○ Matching layers to functions ○ Identifying hardware/software roles ○ One scenario-based question (e.g., Which layer handles routing?) Activity-2: Use a scenario worksheet with different environments (e.g., office LAN, rural broadband, mobile network). Students choose appropriate transmission media (e.g., fiber, coaxial, wireless) and justify their choices. Evaluation Method: Peer-reviewed worksheet with rubric: ○ Correct media selection ○ Justification clarity ○ Understanding of bandwidth, cost, and distance factors
UNIT II	Data link layer: Design issues, framing, Error detection and correction. Data link protocols (Asynchronous Synchronous), Flow Control Protocols (Stop & Wait, Sliding Window). Medium Access sub layer: The channel allocation problem. Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs (IEEE 802.11 Services and Station Types), Data link layer switching.
	Activity: Simulate sliding window and ALOHA protocols using tokens or cards to represent frames. Students act as sender/receiver and demonstrate retransmission, acknowledgments, and flow control. Evaluation Method: Evaluate students on a 10-point scale based on: ○ Correct protocol steps ○ Handling of errors and retransmissions ○ Flow control logic Plus a brief reflection sheet explaining what they learned
UNIT III	Network Layer: Design issues, Routing algorithms: Static (shortest path routing, Flooding), Broadcast, Multicast, Dynamic (distance vector routing, Hierarchical routing), Congestion Control Algorithms (Leaky Bucket, Token Bucket), Quality of Service, Internetworking, The Network layer in the internet. Internet Protocol and IPV4 & IPV6 addressing

	Activity: Use a network simulation tool (e.g., Cisco Packet Tracer or Net Sim) to compare routing algorithms (e.g., Dijkstra, Distance Vector). Introduce congestion and observe how algorithms respond. Evaluation Method: Evaluate students on a 10-point scale based on Lab report submitted by students with: ○ Routing table snapshots ○ Congestion response analysis ○ Efficiency comparison Include a rubric for clarity, accuracy, and insight
UNIT IV	Transport Layer: Transport Design Issues Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.
	Application Layer: Domain name system, World Wide Web, HTTP and HTTPS, Electronic Mail, SMTP, SNMP.
UNIT V	Activity: Set up a mini-network or use simulation to demonstrate: ○ Email (SMTP/POP3) ○ Web browsing (HTTP/HTTPS) Evaluation Method: Practical demo + oral explanation on a 10-point scale: ○ Protocol identification ○ Service flow (client-server interaction)

TEXT BOOKS

1. **Computer Networks** -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI.
2. **Data Communications and Networking** – Behrouz A. Forouzan. Third Edition TMH.

REFERENCE BOOKS

1. An Introduction to Computer Networks- Peter Lars Dordal, Loyola University Chicago (2022); eBook (Creative Commons Licensed)
2. The TCP/IP Guide: A comprehensive, Illustrated Internet Protocols reference, Charles M. Kozierok
3. **Computer Networking: A Top-Down Approach** by James Kurose and Keith Ross: Uses a top-down approach.

WEB RESOURCES

1. <https://www.geeksforgeeks.org/computer-networks>

2.	https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm
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CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
CO2	1	0	0	0	1	0	1	0	0	0	0	0	1	0
CO3	1	1	0	0	1	0	1	1	0	0	1	1	1	0
CO4	1	1	0	1	1	0	1	1	0	0	1	1	1	0
CO5	1	1	0	0	1	0	1	1	0	0	1	1	1	0

Model Blue print for the question paper setter

Sl. No.	UNIT-	Essay 10M	Short 4 M	Weightage
1	I	2	2	20%
2	II	2	2	20%
3	III	2	2	20%
4	IV	2	2	20%
5	V	2	2	20%
		100	40	100%



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II B.Sc. (Hons) Computer Science

Semester-IV

Recommended Format of Question Paper for all Courses

Time: 3 Hours

Max. Marks: 70

Section-A

Answer any FIVE of the following questions.

5X4=20

1. From Contents of Unit-I
2. From Contents of Unit-I
3. From Contents of Unit -II
4. From Contents of Unit -II
5. From Contents of Unit -III
6. From Contents of Unit -III
7. From Contents of Unit -IV
8. From Contents of Unit -IV
9. From Contents of Unit -V
10. From Contents of Unit -V

Section-B

Answer FIVE questions.

5X10=50

11. A) From Contents of Unit-I

OR

B) From Contents of Unit-I

12. A) From Contents of Unit-II

OR

B) From Contents of Unit -II

13. A) From Contents of Unit -III

OR

B) From Contents of Unit -III

14. A) From Contents of Unit -IV

OR

B) From Contents of Unit -IV

15. A) From Contents of Unit -V

OR

B) From Contents of Unit -V



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COMPUTER NETWORKS

MODEL QUESTION PAPER (W.E.F 2025-2026)

Time: 2 ½ Hrs.

Max Marks: 70

Q. No	Question	Marks	BL	CO	PO	PI
SECTION – A						
Answer any Five of the Following			5 X 4 = 20M			
1	What is wireless transmission? Mention its major types.	4M	1	1		
2	Define Internet? How is it different from ARPANET?	4M	1	1		
3	What is framing? Explain any two framing methods.	4M	1	2		
4	Explain the basic principle of the ALOHA protocol.	4M	2	2		
5	What is internetworking?	4M	1	3		
6	Differentiate between IPV4 and IPV6 addressing.	4M	2	3		
7	What are the major design issues of the transport layer?	4M	1	4		
8	Differentiate between connection-oriented and connectionless transport services.	4M	2	4		
9	Explain about Domain Name System (DNS).	4M	2	5		
10	Differentiate between HTTP and HTTPS.	4M	2	5		

SECTION – B						
Answer All Questions			5 X 10 = 50 M			
11	a) Explain the OSI Reference Model in detail. Discuss the functions of each layer.	10M	2	1		
	(OR)					
	b) Compare different types of guided transmission media.	10M	2	1		
12	a) Explain any two error detection techniques used at the data link layer.	10M	2	2		
	(OR)					
	b) Discuss collision-free protocols and explain how they solve the channel allocation problem.	10M	2	2		
13	a) Illustrate Dijkstra's shortest path routing with a suitable example.	10M	3	3		
	(OR)					
	b) Discuss Leaky Bucket congestion control algorithm used in computer networks.	10M	2	3		
14	a) Explain the major elements of transport protocols.	10M	2	4		
	(OR)					
	b) Compare TCP and UDP Protocols.	10M	2	4		
15	a) Explain the architecture and working of the World Wide Web (WWW).	10M	2	5		
	(OR)					
	b) Summarize in detail about SMTP.	10M	2	5		

****All the Best****



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Course Code	Title of the Course	L	T	P	C
25BCS402P	COMPUTER NETWORKS			2	1
Prerequisites	Basic Computer Knowledge				

Objectives:

1. To provide hands on experience to understand and implement basic networking technologies.

List of Experiments/Syllabus:

1. Understanding various network tools in Windows and Linux
2. Study different types of Network devices and Cables
3. Building a Local Area Network.
4. Concept of Network IP Address
5. Introduction to Network Simulator – Packet Tracer (PT)
6. Configuration of a Router using Packet Tracer
7. Implementation of a Network using Packet Tracer
8. Implementation of Static Routing using Packet Tracer
9. Implementation of RIP using Packet Tracer
10. Implementation of OSPF using Packet Tracer
11. Implement DNS using packet tracer
12. Implementation of a VLAN using Packet Tracer



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Curriculum 2025-28 [R25]

Version: 2.0

Course Code	Title of the Course	L	S/M	P	C
25BCS403T	PYTHON PROGRAMMING	3			3
Prerequisites	Basic Computer Knowledge and Understanding of Integrated Development Environment (IDE)				

COURSE OBJECTIVES

1	To introduce the foundational concepts of Python programming.
2	To explore core data structures like strings, lists, tuples, and dictionaries for effective data manipulation.
3	To develop proficiency in modular programming using functions, lambda expressions, recursion, and Python's built-in modules and packages .
4	To make use of exception handling mechanisms for robust error handling.
5	To interact with files and databases using Python to build real-world applications.

COURSE OUTCOMES		BTL
Upon successful completion of the course, the student will be able to:		
CO1	Demonstrate basic Python programs using variables, expressions, and flow control statements.	Understanding
CO2	Manipulate and organize data efficiently using Python’s string operations and complex data structures.	Understanding
CO3	Summarize modular code leveraging functions, argument types, recursion, and reusable libraries.	Applying
CO4	Illustrate runtime errors and apply regular expressions for robust and flexible program behaviour.	Applying
CO5	Interact with files using file operations and connect to databases through Python scripts to store, retrieve, and manage data effectively.	Applying

Syllabus

COURSE CONTENT	
UNIT I	Basics of Python Programming: Features of python, history of python, Python IDEs, Writing and Executing Python Program, literal constants, variables and identifiers, Data types, input operation- comments, Reserved words, Indentation. Operators and Expressions: Expressions in python, Operations in Strings, Other Data types, Type conversion, Decision control Statements, Iterative Statements, Nested loops, break, Continue, Pass Statements, else statements used with loops.
	Activity: Create a calculator program that uses variables, arithmetic expressions, and flow control (if-else) to perform basic operations (add, subtract, multiply, divide) based on user input. Evaluation Method: Code walkthrough and output validation. Use a checklist to assess on a 10-point scale to check the: • Correct use of variables and expressions • Proper flow control logic • Accurate results for different inputs
UNIT II	Strings and Collections: Strings: Built-in String Methods and Functions Lists: creating a list-Access values in List, Updating values in Lists, Nested lists, Basic list operations, List Methods. Tuple: Creating, Accessing, Updating and Deleting Elements in a tuple, Nested tuples. Dictionaries: Creating a dictionary, Accessing values, Modifying an Entry, Deleting items, Built-in Dictionary Functions and Methods
	Activity: Build a factorial calculator using both iterative and recursive functions. Include parameterized functions and import the math library for comparison. Evaluation Method: Code review and oral explanation. Assess on 10-point scale based on: • Function structure and argument usage • Recursion logic • Use of reusable libraries
UNIT III	Functions and Modules: Function Definition, Function Call, Variable Scope and lifetime, the return statement, Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments, Lambda Functions, Recursive Functions. Importing Libraries, Modules, Packages in python, Standard library modules- Globals(), Locals(), and Reload(), Function Redefinition.
	Activity: Develop a contact manager that stores names and phone numbers using dictionaries and lists. Include string formatting and search functionality. Evaluation Method: Practical demo with test cases. Evaluate based on: • Use of string methods (split, join, format) • Data structure selection and manipulation • Search and retrieval accuracy

UNIT IV	Exception Handling: Errors and Exceptions, Handling Exceptions, Multiple Except blocks, Multiple Exceptions in a single block, Except Block without Exception, The else clause, Built-in and user-defined Exceptions, the finally block, Re-raising Exception, Assertions in python.
	Activity: Create a form validator that checks email and phone number formats using regular expressions. Include try-except blocks to handle invalid inputs. Evaluation Method: Scenario-based testing. Assess based on: ● Regex accuracy for pattern matching ● Robust error handling ● Program stability with edge cases
UNIT V	File Handling & Database Connectivity: Types of files in Python, Opening and Closing files, Reading and Writing files: write() and writelines() methods- append() method - read() and readlines() methods - Splitting words File methods - File positions, Renaming and deleting files Database connectivity using Python, Executing SQL commands using python, Assimilating SQL command results using python.
	Activity: Build a student grade logger that reads from a CSV file, stores data in a SQLite database, and allows querying by student name. Evaluation Method: Lab test with sample data. Evaluate on a 10-point scale: ● File read/write operations ● Database connection and query execution ● Data integrity and retrieval accuracy

TEXT BOOKS

1.	Python Programming using Problem Solving Approach Reema Thareja Oxford University Press 2020
2.	Exploring Python, Budd T A, McGraw-Hill Education, 1st Edition, 2011.

REFERENCE BOOKS

1.	Python: The Complete Reference, Martin C. Brown, Mc Graw-Hill, 2018
2.	Fundamentals of Python, Kenneth A. Lambert. (2019), First Programs, 2nd Edition, CENGAGE Publication.

WEB RESOURCES

1.	https://www.w3schools.com/python/python_intro.asp
2.	https://www.geeksforgeeks.org/python-programming-language/

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	1	0	1	1	1	1	1	1	1	1	0	0	0
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

S.No.	UNI T-	Essay 10M	Short 4 M	Weightage
1	I	2	2	20%
2	II	2	2	20%
3	III	2	2	20%
4	IV	2	2	20%
5	V	2	2	20%
		100	40	100%



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Semester-IV

Recommended Format of Question Paper for all Courses

Time: 3 Hours

Max. Marks: 70

Section-A

Answer any FIVE of the following questions.

5X4=20

1. From Contents of Unit-I
2. From Contents of Unit-I
3. From Contents of Unit -II
4. From Contents of Unit -II
5. From Contents of Unit -III
6. From Contents of Unit -III
7. From Contents of Unit -IV
8. From Contents of Unit -IV
9. From Contents of Unit -V
10. From Contents of Unit -V

Section-B

Answer FIVE questions.

5X10=50

11. A) From Contents of Unit-I

OR

B) From Contents of Unit-I

12. A) From Contents of Unit-II

OR

B) From Contents of Unit -II

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OR

B) From Contents of Unit -III

14. A) From Contents of Unit -IV

OR

B) From Contents of Unit -IV

15. A) From Contents of Unit -V

OR

B) From Contents of Unit -V



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PYTHON PROGRAMMING

MODEL QUESTION PAPER (W.E.F 2025-2026)

Time: 3Hrs.

Max Marks: 70

Q. No	Question	Marks	BL	CO
SECTION – B				
Answer any Five of the Following 20M		5 X 4 =		
1	Explain the features of Python.	4M	2	1
2	What is the use of pass statements in Python?	4M	1	1
3	Differentiate between tuple and dictionary.	4M	2	2
4	What are built-in functions in Python? Give an example.	4M	1	2
5	What is the Lambda function? Give an example.	4M	1	3
6	Explain the standard library modules?	4M	2	3
7	Write a short note on exception handling.	4M	1	4
8	Differentiate between syntax error and runtime error with examples.	4M	2	4
9	List the types of files in Python?	4M	1	5
10	Compare between Java and Python.	4M	2	5

SECTION – B				
Answer All Questions		5 X 10 = 50M		
11	a) Explain each looping control statement in Python with examples. (OR)	10M	2	1
	b) Summarize the operators in Python with an example	10M	2	1
12	a) Explain the string operations in Python for slicing concatenation, repetition and comparison with suitable examples. (OR)	10M	2	2
	b) Discuss about list? How they used to store and manipulate collections of data.	10M	2	2
13	a) Explain about functions? How to define and call a function in python? Explain with examples. (OR)	10M	2	3
	b) Make use of a recursive function to write a Python program to calculate the factorial of a given number.	10M	3	3
14	a) Illustrate try, except, else, finally clauses with a sample program. (OR)	10M	2	4
	b) Demonstrate using a Python program to accept an integer number and use try/except to catch the exception.	10M	2	4
15	a) Explain with an example program to show how you perform reading and writing files in python? (OR)	10M	2	5
	b) Explain the concept of file handling. Also explain the reading and writing process with suitable examples.	10M	2	5



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Course Code	Title of the Course	L	S/M	P	C
25BCS403P	PYTHON PROGRAMMING			2	1
Prerequisites	Basic Computer Knowledge and Understanding of Integrated Development Environment (IDE)				

Objectives:

1. Be able to design and program Python applications.
2. Be able to build and package Python modules for reusability

List of Experiments:

1. Display a welcome message using print().
2. Declare and use identifiers belonging to strings, integers, floats, and booleans.
3. Accept user input (name, age, height, student status) and display each value with its type using type().
4. Perform operations like - upper(), find(), replace() on strings.
5. Write a program to reverse the string, count vowels and words.
6. Write a program for slicing, sorting, and list comprehension.
7. Program to apply list methods: append(), extend(), insert(), remove(), pop(), sort().
8. Create tuples to store student (name, age, course) data and perform
 - a. Accessing elements using indexing and slicing.
 - b. Demonstrate immutability by attempting to modify a tuple.
 - c. Create and navigate nested tuples.
9. Create a dictionary with student roll numbers as keys and names/marks as values.
 - a. Accessing, adding, updating, and deleting key-value pairs.
 - b. Iterating through keys, values, and items.
10. Write a program to demonstrate variable length arguments.
11. Write a program to illustrate lambda and recursive functions.
12. Write a program to demonstrate Globals(), Locals(), and Reload() functions.
13. Demonstrate exception handling and assertions in Python.
14. Write a Python program to copy the contents of one file into another in reverse order.
15. Write a program to connect to the database and retrieve the required information using SQL commands.

The Following are planned for this A.Y 2026-27 (R25 Curriculum).

- A certificate course would be conducted for the students in II Year.
- The multi-disciplinary and skill-courses would be conducted by various concerned departments and the syllabus is approved by concerned BOS members of those departments.