

BOARD OF STUDIES

2025-26 ACADEMIC YEAR

SUBJECT
ARTIFICIAL INTELLIGENCE

BOARD OF STUDIES MEETING

2025-2026

INDEX

S.No.	Content
1	Preface
2	Proceedings of the Principal
3	Composition of Board of Studies (BoS)
4	Agenda & Minutes of BoS Meeting
5	Resolutions
6	Programme Outcomes (POs)
7	Programme Specific Outcomes (PSOs)
8	Annexure-1: Course Curriculum Frame work for I & II Semesters
9	Annexure-2: Additional Inputs/Modifications in Syllabus
10	Annexure-3:Internal & External Assessment
11	Annexure-4: Blue print & Model Question paper – Mid-term Exams
12	Annexure-5: Blue print & Model Question paper – Semester End Exam
13	Model syllabus for B.Sc Artificial Intelligence
14	Model papers for B.Sc Artificial Intelligence (Semester 1 &2)
15	Annexure-6:List of Question paper Setters & Examiners

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 Artificial Intelligence for Reviewing the syllabi in Artificial Intelligence 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 College(A), P.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. G. Qeððð
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. Viziananda 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
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 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 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 –Artificial Intelligence Honours. (Major) 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**



Chairperson

BOARD OF STUDIES

BOARD OF STUDIES

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. Artificial Intelligence 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.

The following members were present

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

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 Fundamentals and Office Automation & Mathematical Foundation for AI , and for the two major subjects in semester-II – Python Programming and Data Structures & Artificial & Computational Intelligence Theory will remain unchanged and continue to follow the APSCHE norms. In semester I Computer Fundamentals and Office Automation subject carries 3 credits for Theory and 1 credit for practical's, with 3 hours of theory and 2 hours of practicals per week & paper Mathematical Foundation for AI carries 4 credits for theory with 4 hours of theory per week. In semester II each subject carries 3 credits for Theory and 1 credit for practical's, with 3 hours of theory and 2 hours of practical's 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 Fundamentals 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 Fundamentals and Office Automation– Practical

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

Major -2:Mathematical Foundation for AI– Theory Paper:

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

Semester-2:

Major-1: Python Programming and Data Structures – Theory Paper

Three concepts -Documentation strings ,Recursive functions and Anonymous functions(Lambda),Library functions were removed from Unit-2 as of Time Constraint.

Major-1 Python Programming and Data Structures – Practical

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

Major -2: – Artificial & Computational Intelligence Theory Paper

In Unit 4 classification ,Regression ,Clustering and association were specifically mentioned as of time constraint.

Major-2: Artificial & Computational Intelligence – 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:

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. (Artificial Intelligence) 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	S. M. V. S. Kumar
2	Prof. S. Viziananda Row	University Nominee	Prof. S. Viziananda Row
3	Sri. Rasmi Ranjan Khansama	Subject Expert	Rasmi
4	Dr. Suneetha Merugula	Subject Expert	Suneetha M
5	Sri K Papa Rao	Industry Expert	K. Papa Rao
6	Miss. P.Pusha Sri	Alumna	p. pushpa Sai .
7	Sri. K.V.Apparao	Member	K.V. Apparao
8	Mrs. D.Srilakshmi	Member	D. Srilakshmi
9	Miss. M.R.M.Harshitha	Member	M. R. M. Harshitha
10	Sri.P.S.Gajapathiraju	Member	P. S. Gajapathiraju
11	Sri.A.R.V.L.Narayana	Member	A. R. V. L. Narayana
12	Miss. Y Sravani	Member	Y. Sravani
13	Mrs.V.Sasikala	Member	V. Sasikala
14	Miss. K Manjusha	Member	K. Manjusha
15	Dr.V.V.S B Bangarraju	Dean-Academics	V. V. S. B. Bangarraju
16	Dr.A K Tripathy	IQAC Coordinator	A. K. Tripathy
17	Dr A Rama Krishna Reddy	Principal	A. Rama Krishna Reddy

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 skills to address various issues.

PO2: Life- 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 convincing 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: Modern 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

PSO 2: To Provide adequate understanding about computer science and its applications.

PSO 3: 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 position in software industry.

Annexure- 1

B. Sc. Artificial Intelligence HONOURS

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

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	Mathematical Foundation for AI	4	0	4	4	0	4
	Semester-2	3	Python Programming and Data Structures	3	2	5	3	1	4
		4	Artificial & Computational Intelligence	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 (Mathematical Foundation for AI)

S.No	Course Title	Unit	Added topics	Deleted Topics	Justification
1	Mathematical Foundation for AI	-	NIL	NIL	NIL
2	Mathematical Foundation for AI	-	NIL	NIL	NIL

ADDITIONAL INPUTS/MODIFICATIONS IN THE SYLLABUS- SEMESTER II

COURSE-3 (PYTHON PROGRAMMING & DATA STRUCTURES)

S.No	Course Title	Unit	Added topics	Deleted Topics	Justification
1	Python Programming & Data structures	2	NIL	Documentation strings, recursive functions, Anonymous functions (Lambda), Library functions	Time Constraint
2	Python Programming & Data structures- Practical	-	NIL	NIL	---

COURSE-4 (Artificial & Computational Intelligence)

S.No	Course Title	Unit	Added topics	Deleted topics	Justification
1	Artificial & Computational Intelligence	4	Classification – K-Nearest Neighbors (KNN), Decision Tree; Regression – Linear Regression, Logistic Regression; Clustering – K-Means Clustering, Hierarchical Clustering; and Association – Apriori, FP-Growth.	NIL	Specifically mentioned
2	Artificial & Computational Intelligence 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 Artificial Intelligence (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 Artificial Intelligence (Honours)

Blueprint – Semester End Theory & Practical Examinations

Blue print for 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

Blue print for 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. (Artificial Intelligence) 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 Desassembling 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 $5 \times 4 = 20$ Marks	10 Out of 10, 5 questions should be answered $5 \times 10 = 50$ 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: MATHEMATICAL FOUNDATION FOR AI

Theory

Credits: 4

4 hrs/week

Course Objectives

1. Develop a strong foundation in linear algebra, set theory, and functions essential for AI.
2. Understand and solve systems of linear equations using matrix methods.
3. Gain knowledge of eigenvalues, eigenvectors, and matrix diagonalization.
4. Learn fundamental concepts of probability and statistics for data analysis.
5. Explore functions and their applications relevant to AI problem-solving.

Course Outcomes

1. Solve complex linear algebra problems including matrix properties.
2. Apply set theory rigorously and compute eigenvalues/eigenvectors for intermediate examples.
3. Understand differentiation rules and solve constrained optimization problems.
4. Calculate probabilities in varied scenarios and explore discrete random variables.
5. Analyze data using comprehensive statistical measures and interpret visualizations.

Unit 1.

Basic Linear Algebra and Systems of Linear Equations

Vectors and matrices: basics and operations (addition, multiplication, transpose, inverse)

Elementary row operations: row swapping, scalar multiplication, row addition Row

Echelon Form (REF), Reduced Row Echelon Form (RREF), Rank of matrix **System of**

linear equations: coefficient and augmented matrix representation **Types of solutions:**

unique, infinite, no solution

Gaussian elimination method using REF and back substitution

Unit 2.

Set Theory and Eigen Concepts

Sets, subsets, set operations (union, intersection, difference, complement), Venn diagrams,

Cartesian products

Relations and functions: definitions and properties, linear transformations, Eigenvalues, eigenvectors, characteristic polynomial, Diagonalization of matrices and symmetric matrices

Unit 3.

Functions and their Properties

Definition, types of functions (polynomial, rational, exponential, logarithmic), Domain, range, and inverses of functions, Composition of functions, Continuity and basic limits, Graphical representation of functions, Maxima & Minima of functions.

Unit 4. Vector Differentiation

Vector differentiation –ordinary – derivatives of vectors – Differentiability – Gradient – Divergence - Curl operators - Directional derivatives of functions.

Unit 5. Fundamentals of Probability & Basic Statistics

Probability: Concept of Uncertainty, Axioms and rules of probability, Conditional probability and independence, Law of total probability and Bayes' theorem

Measures of central tendency: Mean, Median, Mode

Measures of dispersion: range, interquartile range, variance, standard deviation Introduction to correlation and covariance

Data representation: histograms, bar charts, scatter plots

Text Books and References:

1. Mathematics for Machine Learning, M. P. Deisenroth, A. A. Faisal, C. S. Ong, Cambridge University Press, 2020.
2. Introductory Linear Algebra, Howard Anton, Wiley.
3. Probability and Statistics for Engineers and Scientists, Ronald E. Walpole, Wiley.
4. Discrete Mathematics and its Applications, Kenneth H. Rosen, McGraw Hill.
5. Online Resources: Khan Academy, MIT OpenCourseWare (Linear Algebra, Probability, Statistics, Functions).

Unit 1

Activity: Solve advanced linear equation systems using elementary row operations; explore matrix rank with concrete examples; interpret solutions graphically.

Evaluation Method: Assess problem-solving accuracy, clarity of solution process, and ability to classify solution types.

Unit 2

Activity: Practice set theory problems including Venn diagrams, unions, intersections; compute eigenvalues/eigenvectors for 3x3 matrices; perform matrix diagonalization exercises.

Evaluation Method: Evaluate completeness of set operations, correctness of eigen computations, and accuracy in diagonalization.

Unit 3

Activity: Plot and analyze various types of functions (polynomial, exponential, logarithmic); solve problems on function composition and inverses; perform simple graphical interpretations.

Evaluation Method: Assess quality of function plots, conceptual clarity of compositions and inverses, and accuracy of graphical analyses.

Unit 4

4

Activity: Calculate conditional probabilities; simulate discrete probability distributions; apply Bayes' theorem in practical scenarios (e.g., medical testing, reliability analysis). **Evaluation Method:** Evaluate correct application of probability laws and rules, and logical use of Bayesian inference.

Unit 5

Activity: Analyze sample datasets to calculate central tendency measures and dispersion; compute correlation coefficients; create histograms and scatter plots; interpret data insights.

Evaluation Method: Assess accuracy of statistical calculations, clarity and correctness of visual data representation, and quality of interpretation.

Course: 2 – MATHEMATICAL FOUNDATION FOR AI
Credits:4
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.

1. **A)** Unit I
 Or
 B) Unit I
2. **A)** Unit II
 Or
 B) Unit II
3. **A)** Unit III
 Or
 B) Unit III
4. **A)** Unit IV
 Or
 B) Unit IV
5. **A)** Unit V
 Or
 B) Unit V

SEMESTER-II

COURSE 3: PYTHON PROGRAMMING AND DATA STRUCTURES

Theory

Credits: 3

3 hrs/week

Course Objectives

1. To introduce the fundamentals of Python programming, including environment setup, syntax, and core concepts.
2. To develop problem-solving skills using control flow, functions, and modules.
3. To provide knowledge of Python data structures, file handling, and exception handling for effective programming.
4. To impart object-oriented programming concepts and GUI development skills for building applications.

Course Outcomes (COs)

After successful completion of the course, students will be able to:

1. Explain the basic features, syntax, data types, and operators of Python programming.
2. Apply control flow constructs, functions, and modules to develop structured Python programs.
3. Demonstrate the use of sequences, sets, and dictionaries for effective data handling and manipulation.
4. Implement file handling techniques and apply exception handling mechanisms for robust applications.
5. Develop object-oriented and GUI-based applications using Python.

Unit 1: Basics of Python Programming:

Introduction to Python, Features of Python, Programming Modes - Interactive Mode & Script Mode, Identifiers, Naming Conventions, Keywords (Reserved Words), Built-in Data Types, Literals - Integer, Float, Complex, Boolean, String, Variables, Operators, Expressions, Assignment Statements, Input/Output Statements, Python Syntax (Lines, Comments, Indentation), Operators & Operands, Classification of Operators - Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Assignment, Augmented Assignment, Identity Operators, Expressions & Precedence Rules

Unit 2: Control Flow, Functions & Modules:

Control Flow - if Statement, if-else, if-elif-else. Iterative Statements – while, for, Nested Loops, Loop Control Statements – break, continue, pass; else with loops

Need for Functions, Defining & Invoking User-defined Functions, Return Statement, Function Input/Output Cases, Scope of Variables - Local, Global, Nested Functions, Function Arguments - Required, Positional, Default, Variable-length, main() Function, Modules - Import, from..import, Creating & Using Modules, Namespaces

Unit 3: Core Data Types and Python Collections

Strings: Representation, Indexing, Slicing, Immutability, Operators, Methods, Formatting

Lists: Creation, Indexing, Slicing, Mutability, Common Methods, List Comprehension

Tuples: Immutability, Operations, Tuple Assignment

Sets and Frozensets: Methods, Mathematical Operations, Comprehension

Dictionaries: Key-Value Structure, Methods, Traversal, Nested Dictionaries

Unit 4: File Handling, Exception Management & Object-Oriented Programming

File Handling: Types, Opening, Reading, Writing, Closing, CSV Files, OS/Pathlib Error Types, Exception Handling: try-except, raise, User-defined Exceptions, Assertions **OOP**

Concepts: Classes, Objects, Attributes, Methods, Constructor and Destructors

Encapsulation: Private and Public Members

Inheritance: Single, Multilevel, Multiple, Method Overriding

Unit 5: Abstract Data Structures and GUI Programming

Abstract Data Structures (ADTs): Concepts and Importance

Linked Lists: Definition, Types-Singly, Doubly, Circular; Node Structure, Insertion, Deletion, Traversal (Single Linked list implementation only)

Stacks: LIFO Principle, Implementation using List, Applications

Queues: FIFO Principle, Implementation using List

GUI Programming with Tkinter: Widgets (Label, Button, Entry, Menu, Listbox, Canvas etc.), Event Handling, Building Simple GUI Apps

Textbooks:

1. Python Programming-An Object Oriented approach, Anita Goel, Universities Press
2. Python Programming using Problem Solving Approach Reema Thareja Oxford University Press 2020
3. Exploring Python, Budd T A, McGraw-Hill Education, 1st Edition, 2011.

Reference Book:

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.

Activities:

Outcome: Explain the basic features, syntax, data types, and operators of Python programming.

Activity: Conduct a "Python Basics Lab" where students write small programs to demonstrate literals, variables, data types, and operators (e.g., swapping numbers, simple calculator).

Evaluation Method:

- Lab performance checklist (execution of 3 mini tasks)
- Short quiz with multiple-choice and fill-in-the-blanks on syntax, data types, and operators

Outcome: Apply control flow constructs, functions, and modules to develop structured Python programs.

Activity: Group activity - "Python Problem Solving Challenge": Students solve real-life problems (e.g., finding prime numbers, grade calculator, menu-driven calculator) using control structures, functions, and importing standard modules.

Evaluation Method:

- Code submission with proper use of functions/modules (20%)
- Viva-voce to explain logic and flow of control (40%)
- Unit test with scenario-based programming questions (40%)

Outcome: Demonstrate the use of sequences, sets, and dictionaries for effective data handling and manipulation.

Activity: Hands-on mini project – "Student Data Manager": Students create a program using lists, tuples, sets, and dictionaries to store and manipulate student records (e.g., marks, courses, hobbies).

Evaluation Method:

- Practical demo of program with at least 5 data operations (add, search, delete, update, traverse)
- Evaluation rubric for correctness, efficiency, and use of appropriate data structure

Outcome: Implement file handling techniques and apply exception handling mechanisms for robust applications.

Activity: Individual assignment - "File-Based Address Book": Students create a program to store, update, and retrieve data from files, with exception handling for invalid inputs or missing files.

Evaluation Method:

- Assessment of program correctness (file read/write, append, delete, exception handling)
- Short quiz with error-tracing and debugging questions (given code with errors, students identify and correct)

Outcome: Develop object-oriented and GUI-based applications using Python.

Activity: Mini Project – "Student Information System with GUI": Students design a simple Tkinter-based application with classes/objects for handling student data, including basic GUI widgets (Entry, Button, Listbox).

Evaluation Method:

- Project demo and presentation (50%)
- Rubric-based evaluation for OOP concepts (classes, inheritance, encapsulation) and GUI design (widgets, event handling) (30%)
- Peer review/feedback on usability (20%)

COURSE 3: PYTHON PROGRAMMING AND DATA STRUCTURES

Practical

Credits: 1

2 hrs/week

1. Basic Python Programs:
 - a. Write a program to display basic details (name, roll number, department) using print() and demonstrate different literal types (int, float, string, boolean, complex).
 - b. Write a program to perform arithmetic, relational, logical, bitwise, and assignment operations on given inputs.
2. Control Flow Practice
 - a. Write a program to find the largest of three numbers using if-elif-else.
 - b. Write a program to check whether a number is prime or not using loops.
 - c. Write a program to illustrate the use of loop control statements (break, continue, pass).
3. Functions and Recursion
 - a. Write a program to define a function to calculate factorial of a number (using recursion).
 - b. Write a program to demonstrate different types of function arguments (default, positional, keyword, variable-length).
4. Write a program to illustrate string slicing, concatenation, repetition, and built-in methods.
5. Write a program to create a list of numbers, perform insertion, deletion, searching, sorting, and list comprehension.
6. Write a program to demonstrate tuple packing, unpacking, and immutability.
7. Write a program to implement set operations (union, intersection, difference, subset, superset).
8. Write a program to create a dictionary of student roll numbers and marks, and perform add, update, delete, and traversal operations.
9. Write a program to read and display count of vowels, consonants, digits, and spaces of a text file.
10. Write a program to copy the contents of one file into another file.
11. Write a program to read and process student marks from a CSV file (calculate average, highest, lowest).

12. Write a program to demonstrate exception handling using try-except-finally.
13. Write a program to create a class Student with attributes and methods to display details.
14. Write a program to demonstrate single and multilevel inheritance.
15. Implement stack (LIFO) and queue (FIFO) using lists.
16. Implement singly linked lists: node creation, insertion, deletion, traversal.
17. Write a Tkinter program with Label, Entry, and Button widgets to take user input and display it.
18. Write a Tkinter program to create a simple calculator application.

Course: 3 – PYTHON PROGRAMMING AND DATA STRUCTURES
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 4: ARTIFICIAL & COMPUTATIONAL INTELLIGENCE

Theory

Credits: 3

3 hrs/week

Course Objectives

- Introduce foundational concepts and history of Artificial Intelligence (AI).
- Teach the PEAS framework and agent-based problem solving.
- Develop understanding of uninformed and informed search methods.
- Provide basic knowledge of machine learning concepts and computational intelligence.
- Instill awareness of ethical considerations in AI.
- Introduce logic programming fundamentals using Prolog as a practical tool.

Course Outcomes

Students completing this course will be able to:

- Explain basic AI terminology, agent models, and the PEAS framework.
- Formulate AI problems using search strategies and implement basic algorithms conceptually.
- Understand core machine learning categories and their applications.
- Describe computational intelligence approaches and their role in AI.
- Analyze ethical issues related to AI technologies.
- Write and execute simple Prolog programs demonstrating logic programming fundamentals.

Unit 1: Introduction to Artificial Intelligence and PEAS Framework

Introduction to AI: Definition, history, applications, and scope

The PEAS framework: Performance Measure, Environment, Actuators, Sensors,

Examples of PEAS in real-world AI systems

Intelligent agents: Intelligent agents and their environments, **Types of intelligent agents:**

Simple reflex, model-based, goal-based, utility-based, Agent architectures and rationality

Unit 2: Expert Systems

Definition and components of Expert Systems (Knowledge Base, Inference Engine, User Interface), Rule-based systems and knowledge representation, Examples of expert systems: medical diagnosis, decision support, Limitations and comparison with AI agents, Role and significance of expert systems in AI evolution

Unit 3: Search Strategies in AI

Problem-solving as search: problem formulation, states, actions, goal test, Traveller's problem

Uninformed (Blind) Search: Breadth-first search, Depth-first search, Uniform-cost search

Informed (Heuristic) Search: Greedy best-first search, A* algorithm

Applications of search in AI problems

Unit 4: Introduction to Machine Learning

What is machine learning, definitions, Types of learning: Supervised, Unsupervised,

Reinforcement learning (basic ideas), classification--KNN, Decision Tree,, Regression-

Linear,Logical , clustering-K-Mean clustering,Hierarchical Clustering, and Association-Apriori,FP-growth, Basic learning algorithms overview and applications

Unit 5: Computational Intelligence and Ethics in AI

Overview of computational intelligence (Basics of fuzzy logic, neural networks), Role of computational intelligence in AI, Ethics and societal challenges in AI, Responsible AI, fairness, transparency, and safety concerns

Activities:

Unit 1: Introduction to AI, PEAS Framework & Intelligent Agents

Activities:

Interactive lecture with real-world AI examples

Group discussion on PEAS framework for different environments

Case study analysis of intelligent agents in everyday AI applications

Quiz on AI fundamentals and agent types

Outcomes:

Students will explain AI basics and describe the PEAS components.

Students will identify types of intelligent agents and their roles.

Evaluation Method:

Quiz and participation: 10%

Assignment on PEAS and agent modeling: 10%

Unit 2: Expert Systems Activities:

Lecture with multimedia explaining components of expert systems

Hands-on group activity designing rule-based systems for simple decision problems

Case study review of medical diagnosis expert systems

Class debate on limitations and advantages of expert systems

Outcomes:

Understand expert system architecture and knowledge representation.

Develop simple rule-based systems for decision making.

Analyze real-world expert system examples critically.

Evaluation Method:

Group assignment designing rule base: 15% Written test on expert system concepts: 10%

Unit 3: Search Strategies in AI

Activities:

Demonstration of uninformed search algorithms Interactive exercises formulating search problems.

Simulation of heuristic search and A* algorithm Problem-solving sessions applying search to puzzles.

Outcomes:

Formulate search problems and apply uninformed and heuristic algorithms conceptually.

Explain the working and use cases of different search strategies.

Evaluation Method:

Problem formulation assignment: 10%

Class test on search algorithms: 10%

Unit 4: Basics of Machine Learning Activities:

Video lectures on different machine learning paradigms Simple data classification exercises/classification demos

Group presentations on various ML types and applications

Quiz on ML types and terminology

Outcomes:

Explain supervised, unsupervised, and reinforcement learning basics.

Identify sample use cases for machine learning.

Evaluation Method:

Quiz and presentation: 10%

Written assignment on ML overview: 5%

Unit 5: Computational Intelligence & Ethics

Activities:

Lecture introducing fuzzy logic, neural networks overview
Ethical dilemma discussions and case studies in AI technology
Role play on AI responsibility and fairness
Group project: Develop guidelines for responsible AI use

Outcomes:

Understand computational intelligence basics and ethical AI challenges.
Propose responsible AI practices for diverse scenarios.

Evaluation Method:

Participation in ethics discussions: 5% Group
project report and presentation: 15%

Recommended Textbooks and References

- Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 4th Edition
- Elaine Rich, Kevin Knight, Artificial Intelligence, 3rd Edition
- Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems
- Ivan Bratko, Prolog Programming for Artificial Intelligence, 4th Edition
- Online resources: AI course materials from Coursera, NPTEL, GeeksforGeeks AI tutorials.

SEMESTER-II

COURSE 4: ARTIFICIAL & COMPUTATIONAL INTELLIGENCE

Practical

Credits: 1

2 hrs/week

Note: Experiments have to be conducted using Prolog

1. Introduction to Prolog Environment and Syntax
 - Setting up Prolog, understanding facts, rules, and queries.
2. Defining Simple Facts and Queries
 - Write and test simple facts like family relationships, likes/dislikes.
3. Creating Rules in Prolog
 - Define logical rules with conditions and test queries.
4. List Handling in Prolog
 - Write programs to manipulate lists (head, tail, concatenation).
5. Recursion in Prolog
 - Implement recursive relations such as factorial and Fibonacci.
6. Search and Backtracking
 - Demonstrate Prolog's backtracking with sample queries and control cuts.
7. Family Relationship Programs
 - Model family trees and query relationships like siblings, ancestors.
8. Solve the Eight Queens Problem
 - Classic AI problem solved using backtracking.
9. Implement Simple Arithmetic Operations
 - Addition, subtraction, multiplication using Prolog predicates.
10. Monkey and Banana Problem
 - Logic problem modeling and solution.
11. Basic Expert System Prototype
 - Write rules for a simple medical diagnosis or recommendation system.
12. Implement Search Algorithms (Conceptual)
 - Demonstrate basic search algorithms like best-first search using Prolog rules.

Course: 4 – ARTIFICIAL & COMPUTATIONAL INTELLIGENCE

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



SPACES
Degree College
AUTONOMOUS

Accredited by NAAC with 'A' Grade
Permanently affiliated to Andhra University
Approved by AICTE, New Delhi
Under the management of Sri Prakash Educational Society, Tuni



MODEL PAPERS

Sri Prakash Academy of Computers, Electronics & Sciences

Sri Prakash Vidya Soudham, P.L.Puram, Payakaraopeta-531126, Anakapalli Dt., A.P.
☎ 92466 93833 ✉ sdprincipal@sriprakash.org 🌐 www.spacescollege.ac.in

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. Illustrate 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– Mathematical Foundation for AI**Credits:4****SECTION -A Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)**

1. Find the Row Echelon Form of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{bmatrix}$ and determine its rank.
2. Solve the system of linear equations using Gaussian elimination:
 $x + 2y + z = 6, 2x + 3y + 3z = 14, 3x + y + 2z = 13$
3. Let $A = \{1,2,3\}, B = \{2,4\}$. Find (i) $A \cup B$, (ii) $A \cap B$, (iii) $A - B$, (iv) $B - A$
Draw a Venn diagram representing these sets.
4. Define polynomial, exponential, and logarithmic functions.
Give one example of each, and sketch their basic graphs.
5. Let $f(x) = x^2 - 4, g(x) = \sqrt{x}$. Find $(f \circ g)(x)$ and state its domain.
6. Define the gradient, divergence, and curl of a vector field.
Give one physical interpretation for each.
7. Given the vector field $\vec{F}(x, y, z) = x^2\hat{i} + y^2\hat{j} + z^2\hat{k}$ Compute its divergence and curl.
8. Define the following with formulas:
(i) Mean (ii) Median (iii) Mode (iv) Variance (v) Standard Deviation

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) Reduce the matrix $A = \begin{bmatrix} 2 & 4 & 6 \\ 1 & -1 & 0 \\ 3 & 5 & 9 \end{bmatrix}$ to RREF, and find the rank.

Also determine the nature of the solution to the corresponding system of equations.

OR**B) Explain and apply Gaussian Elimination to solve:**

10. A) Find the eigenvalues and eigenvectors of the matrix $A = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$

Also, verify that $A \cdot v = \lambda v$ holds for one eigen pair.

OR

B) (i) What is meant by diagonalization of a matrix?

(ii) Determine whether the matrix $A = \begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}$ is diagonalizable. If yes,

diagonalize it. Also comment on whether it is a symmetric matrix.

11. A) Let $f(x) = x^3 - 6x^2 + 9x + 1$.

(i) Find its critical points

(ii) Determine local maxima and minima

OR

B) Define inverse function. Let $f(x) = \frac{2x-3}{x+1}$.

(i) Find the inverse of f ,

(ii) State the domain and range of f and f^{-1}

12. A) Let $\vec{F}(x, y, z) = yz\hat{i} + xz\hat{j} + xy\hat{k}$. Compute the gradient, divergence, and curl of this vector field.

OR

B) Define and explain the concept of directional derivative.

Given $f(x, y) = x^2 + y^2$, compute the directional derivative at point $(1, 1)$ in the direction of vector $\vec{v} = \hat{i} + 2\hat{j}$.

13. A)(i) State and prove **Bayes' Theorem**.

(ii) In a certain population, 1% have a disease. A test is 95% accurate in detecting the disease and 90% accurate in identifying healthy individuals.

If a person tests positive, what is the probability that they actually have the disease?

OR

B) The marks of 10 students in a test are: 45, 55, 60, 70, 75, 80, 85, 90, 95, 100

(i) Compute mean, median, and mode

(ii) Compute variance and standard deviation

(iii) Represent the data using a bar chart and scatter plot

Course: 3 PYTHON PROGRAMMING & DATA STRUCTURES**Credits: 3****SECTION -A****Answer any 5 questions .Each question carries 4 marks. (5 x 4 =20)**

1. What is the difference between Interactive mode and Script mode?
2. What are the basic features of Python?
3. What are Anonymous Functions(Lambda)
4. Explain about Tuples operations?
5. Write about indexing and slicing in Strings?
6. Write about classes ,objects ,attributes and methods ?
7. How do you open and read a CSV file?
8. What is ADT and write its importance?

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 Operators ?
Or
B) Write various Input /Output statements and Literals?
10. A) Explain about Iterative statements?
Or
B) Explain about Module and its usage ?
11. A) Explain about List creation and methods used in Lists?
Or
B) Explain various Operations in Dictionaries including Nesting ,traversed?
12. A) Explain about Exception Handling in Python?
Or
B) Write about various types of Inheritance?
13. A) Write various operations of single Linked list?
Or
B) How do you create simple GUI APPS using Tkinter?

Course 4: Artificial & Computational Intelligence

Credits: 3

SECTION -A

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

1. Define Artificial Intelligence. Discuss its applications and scope.
2. Explain the PEAS framework with suitable real-world examples.
3. Describe the main components of an Expert System.
4. Differentiate between uninformed and informed search strategies in AI.
5. Explain the A* algorithm.
6. Define supervised and unsupervised learning with examples.
7. Write short notes on clustering and association in machine learning.
8. Discuss ethical and societal challenges in Artificial Intelligence.

SECTION – B

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

9. (a) Define Artificial Intelligence. Explain its history, applications, and scope in detail.
(or)
(b) Explain intelligent agents, their types, and the concept of rationality in AI.
- 10.(a) Explain the architecture and components of an Expert System.
(or)
(b) Discuss rule-based systems and their role in AI. Give examples of real-world expert systems.
- 11.(a) Explain problem-solving as search in AI with suitable examples.
(or)
(b) Describe in detail the differences between Breadth-first search and Depth-first search with examples.
- 12.(a) What is machine learning? Explain its types: supervised, unsupervised, and reinforcement learning.
(or)
(b) Discuss classification, regression, and clustering with suitable applications.
- 13.(a) Explain the basics of computational intelligence: fuzzy logic and neural networks.
(or)
(b) Discuss the importance of ethics in AI, focusing on fairness, transparency, and safety.

Annexure-6

List of Question Paper Setters & Examiners

- 1) **NVS SRIDEVI KELLA,**
Lecturer in Computer Science,
Government Degree College(A),
TUNI
Contact: 9985135993
Mail-id: nvssridevikella@gmail.com
- 2) **MEDISETTY KAMESWARARAO,**
Asst.Professor
Ideal College of Arts and Sciences (A),
KAKINADA
Contact: 8106993994
Mail-id: kingkamz777@gmail.com
- 3) **V S K DEEPAK**
Asst. Professor
Ideal College of Arts and Sciences (A),
KAKINADA
Contact: 8686003353
Mail-id: vsvdeepak1983@gmail.com
- 4) **K LEELA PAVANI**
Lecturer in Computer Science,
Govt. Degree College,
CHINTAPALLI
Contact: 9948487769
Mail-id: leelapavani94@gmail.com
- 5) **D ARUNA PADMA**
Lecturer in Computer Science,
Visakha Govt. Degree College for Women(A)
VISAKHAPATNAM
Contact: 9030615618
Mail-id: arunapadma.b@gmail.com



6) RASMI RANJAN KHANSAMA

Head, Dept of Computer Science,
Govt. Degree College (A),
TUNI

Contact: 6371002597

Mail-id: rasmiranjankhansama@gmail.com

7) V SURYANARAYANA KUMAR

Head, Dept of Computer Science,
Aditya Degree College (A),
KAKINADA

Contact: 9347877650

Mail-id: vsnkumar@aditya.ac.in

8) S S A V S SAMBHA MURTHY

Lecturer in Computer Science
Dr. VS Krishna Government Degree & PG
College (A), Visakhapatnam
Mobile number: 9705075185
Mail id: sivakotimurthy45@gmail.com

9) P. RAMACHANDRA

Lecturer in Computer Science
Dr. VS Krishna Government Degree College (A),
Visakhapatnam
Mobile number: 8596958292
Mail id: polireddiram@gmail.com

10) B AJAY KUMAR

Lecturer in Computer Science,
S V V S D Degree College,
ANNAVARAM - Kakinada Dt
Contact: 9912841299



Mail-id: ajaybheem82@gmail.com

11) KADALI SURESH

Lecturer in Mathematics,
Govt. Degree College,
YELESWARAM - Kakinada Dt
Contact: 9700203074
Mail-id: suresh.maths86@gmail.com

12) Dr M SIVAIAH

Principal & Prof. In Mathematics,
Govt Degree College,
Nakkapalli - Anakapalli Dt
Contact: 7659002882
Mail-id: gdcnakkapalli@gmail.com

13) P MAHA LAKSHMI NAIDU,

Lecturer in Mathematics,
Govt Degree College,
K Perumallapuram - Kakinada Dt
Contact: 9491764463
Mail-id: naidupm73@gmail.com

14) V SREENIVASA RAO,

Lecturer in Mathematics,
Sri GCSR Degree College,
Rajam - Srikakulam Dt
Contact: 9849821082
Mail-id: vakasreenu7@gmail.com



SPACES
Degree College
AUTONOMOUS

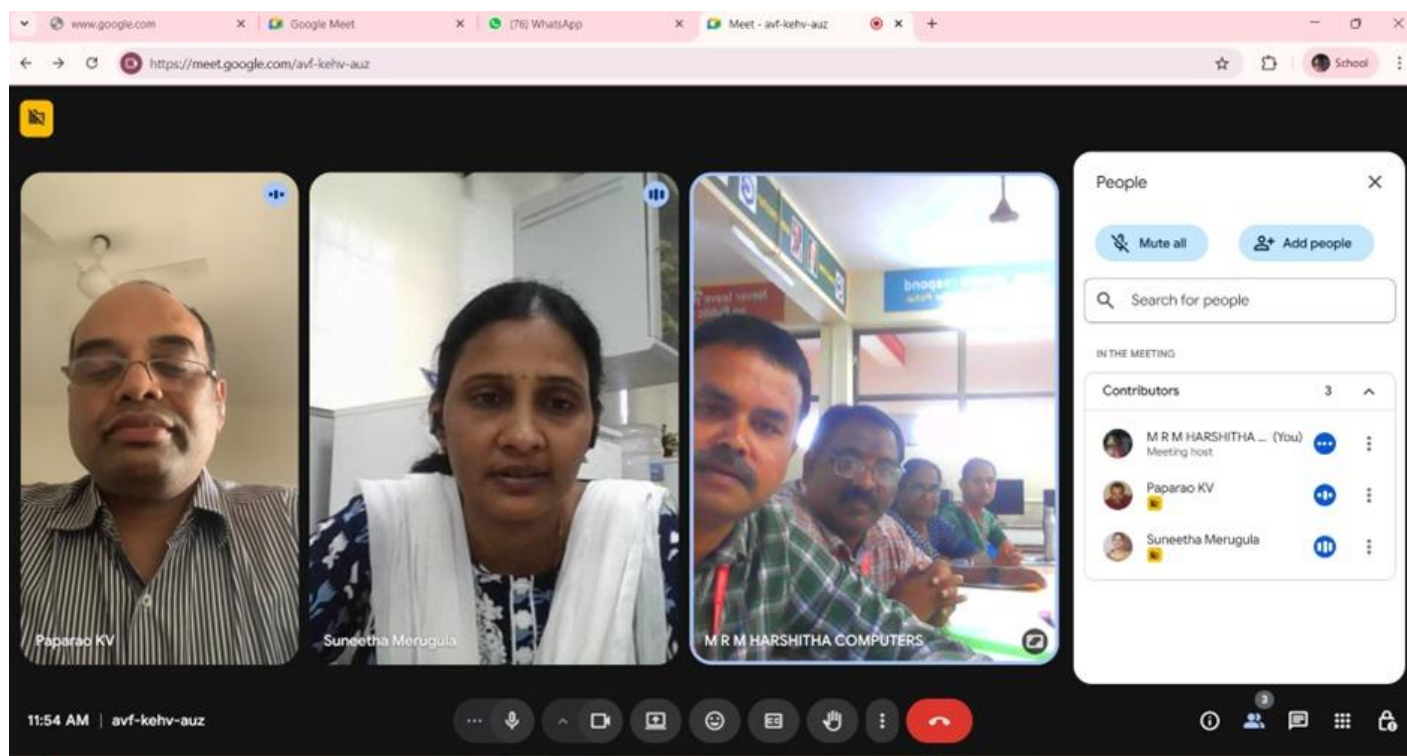
Accredited by NAAC with 'A' Grade
Permanently affiliated to Andhra University
Approved by AICTE, New Delhi
Under the management of Sri Prakash Educational Society, Tuni



SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA
DEPARTMENT OF COMPUTER SCIENCE
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>

Sri Prakash Academy of Computers, Electronics & Sciences

Sri Prakash Vidya Soudham, P.L.Puram, Payakaraopeta-531126, Anakapalli Dt., A.P.
☎ 92466 93833 ✉ sdc.principal@sriprakash.org 🌐 www.spacescollege.ac.in



SPACES

Degree College
AUTONOMOUS

Accredited by NAAC with 'A' Grade
Permanently affiliated to Andhra University
Approved by AICTE, New Delhi
Under the management of Sri Prakash Educational Society, Tuni



Sri Prakash Academy of Computers, Electronics & Sciences

Sri Prakash Vidya Soudham, P.L.Puram, Payakaraopeta-531126, Anakapalli Dt., A.P.
☎ 92466 93833 ✉ sdc.principal@sriprakash.org 🌐 www.spacescollege.ac.in