DARBHANGA COLLEGE OF ENGINEERING, DARBHANGA

COURSE FILE

OF

Artificial Intelligence

(05 1717)

Faculty Name:

Mr. Dhirendra Kumar
Assistant Professor

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

विज्ञान एवं प्रावैधिकी विभाग
Department of Science and Technology
Government of Bihar

CONTENTS

Department of Computer Science & Engineering

Vision

To bring forth cultured graduates meeting the expectation of national and multi-national industries exceling in the field of computing as well as in higher studies and research.

Mission

1. To provide strong theoretical knowledge of computer science with practical training which meet the industries expectations.
2. To train necessary skills to further higher studies and professional growth.
3. To inculcate ethical valued in graduates through various social-cultural activities.

Program Educational Objectives (PEOs)

- **PEO 1:** Students will be able to effectively communicate, understand the problems of industries, environment, society and endeavor to find the solutions with high ethical responsibilities.
- **PEO 2:** Students will be able to engage in life-long learning, pursue higher studies and contribute to the evolving research & development.
- **PEO 3:** Students will be able to demonstrate their professional skills and leadership roles across multi-disciplinary domains.

Program Specific Outcomes (PSOs)

- **PSO - 1:** Students should be able to develop and test sustainable cost effective software for automization in businees application and society.
- **PSO - 2:** Students should be able to use new technologies and tools for executing multi-disciplinary projects.

Program Outcomes (POs)

PO 1: Engineering Knowledge *: An ability to apply knowledge of computing and mathematics which is appropriate to computer science.*

PO 2: Problem analysis: *An ability to identify, formulate, and develop solutions to computational challenges.*

PO 3: Design/development of solutions: An ability to design, implement, and evaluate a computational system to meet the desired soluitions of problem with feasibility.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and methods including design of experiments, analysis and interpretation of data, and synthesis them to get the valid conclusions.

PO 5: Modern tool usage: An ability to use appropriate techniques, skills, and tools necessary for computing practice and makes human effort less.

PO 6: The engineer and society: An ability to analyze impacts of computing on individuals, organizations, and society.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions on society in environmental contexts, and provide a solution for sustainable development.

PO 8: Ethics: An understanding of professional, ethical, legal, security, and social issues and responsibilities for the computing profession.

PO 9: Individual and team work: An ability to function effectively on teams to accomplish shared idea, computing design, evaluation, or implementation goals.

PO 10: Communication: An ability to communicate and engage effectively with diverse stakeholders.

PO 11: Project management and finance: An ability to apply design and development principles in the construction of software systems of varying complexity.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Objectives

Course Objectives:

1. To study the programming language Prolog used to implement AI problems.
2. To build problem state space and intelligent agents for search and games.
3. To solve AI problems through programming with Python.
4. To design and develop programs for different search algorithms.

Course Outcomes:

CO1: Demonstrate different arithmetic operations using Python.

CO2: Capture and design the real world problems as AI problems.

CO3: Program exploration methods for a given AI problem.

CO4: Apply search algorithms for a new AI problem.

7. Syllabus

7A. 05 1717 Artificial Intelligence

L- T- P : 3-0-3 Credit : 5

1. Introduction : Why AI, Importance of AI. LISP, Prolog and other programming language for AI.

Lecture : 3

2. Search Strategies : Representation Scheme, Blind Search technique, Heuristic Search technique, Game search, Graph search (algorithm A and A*), Properties of A* algorithm, monotone – Specialized production systems –

AO * algorithm. Lecture : 15

3. Searching Game Trees : Minimax procedure, alpha-beta pruning – Introduction to predicate calculus –

Resolution refutation systems – Answer extraction. Lecture : 4

4. Knowledge Representation, Reasoning : Knowledge representation, Knowledge acquisition, Logical Representation scheme, procedural representation schema, network representation scheme, STRIPS robot problem solving system, Structured representations of knowledge (Semantic Nets, Frames, Scripts), KRR system, KR language, Domain modeling, Semantic net. Lecture : 8

5. Uncertainly : Non monotonic & monotonic reasoning, confidence factors, Bayes theorem, Dempster & Shafer's, Theory of evidence, Non-classical logic, Fuzzy reasoning. Lecture : 6

6. Natural Language Processing : An Introduction to Natural language Understanding, Perception, Learning.

Lecture : 4

7. Applications of Artificial Intelligence : Al in E-commerce, Al in Industry, Al in Medicine Lecture : 2

Text Books:

1. Introduction to Artificial Intelligence by Rajendra Akerkar, PHI

2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson Education.

3. Artificial Intelligence by Rich & Knight. Tata McGraw Hills.

4. Introduction to Artificial Intelligence & Expert system by Dan W. Patterson, PHI

Reference Book:

1. Artificial Intelligence. A Modern Approach by Stuart Russell. Peter Norving and Pearson Education.

2. Introduction to Expert System, Peter Jackson. Pearson Education.

3. Artificial Intelligence application programming by M. Tim Jones, Dreamtech Press

7B. GATE Syllabus

This subject is not listed in the GATE Paper.

8. Time Table

Sl. No.	Day	9:00 – 11:00	11:00 – 1:00	1:00 – 2:00	2:00 – 4:00
1.	Monday		AI (7th Sem)	LUNCH	
2.	Tuesday				
3.	Wednesday				
4.	Thursday				AI (7th Sem) Lab
5.	Friday				
6.	Saturday	AI (7th Sem) Lab	AI (7th Sem)		

9. Student List

Darbhanga College of Engineering, Darbhanga		
4th Semester Civil Engineering		
Subject Name:-		
S.N.	**Registration No.**	**Student Name**
1	17105111001	ADYA
2	17105111002	RAHUL KUMAR
3	17105111003	AMIT KUMAR
4	17105111004	GRISH KUMAR
5	17105111005	SHIVAM KUMAR JHA
6	17105111006	PRAGYA PRIYANSHU
7	17105111007	MANISH KUMAR
8	17105111009	NIRAJ KUMAR SAH
9	17105111010	VIJAY KUMAR
10	17105111011	GAUTAM KUMAR BHARTI
11	17105111012	BITTU KUMAR
12	17105111013	VIVEK KUMAR SHARMA
13	17105111014	VICKY KUMAR
14	17105111015	KRISHANANAND KUMAR
15	17105111016	ABHISHEK KUMAR SAHNI
16	17105111017	KAJAL RAJ
17	17105111018	BIRJU KUMAR
18	17105111019	AAKASH KUMAR SINGH
19	17105111020	DEVANAND KUMAR
20	17105111021	KUMAR ANIKET
21	17105111022	RAHUL KUMAR JHA
22	17105111023	SHAKEEL AHMAD ANSARI
23	17105111024	NIKITA KUMARI

24	17105111025	MONEEB ALI
25	17105111026	NIRAJ KUMAR
26	17105111027	PRINCE KUMAR
27	17105111028	MD ATIF RAZA
28	17105111029	AHIVAM KUMAR
29	17105111030	AMRIT KUMAR
30	17105111031	KAILASH KUMAR JHA
31	17105111032	AAKASH KUMAR
32	17105111033	TANU KUMARI
33	17105111034	SUMAN KUMAR CHOUDHARY
34	17105111035	JUHI
35	17105111036	NIHARIKA
36	17105111037	POOJA KUMARI
37	17105111038	ABHINAV GARG
38	17105111039	NIDHI
39	17105111040	SURAJ KUMAR
40	17105111041	RAVI KUMAR MAHTO
41	17105111042	MD AMIR
42	17105111043	DEEPAK SINGH
43	17105111044	ADITYA KUMAR GUPTA
44	17105111045	ASHISH KUMAR SINHA
45	17105111046	SATYA KUMARI
46	17105111047	NIDHI KUMARI
47	17105111048	KUMARI PALLAWI
48	17105111049	SUNNY KUMAR JAISWAL
49	17105111050	SAUMYA RAJ
50	17105111051	ANKITA KUMARI
51	17105111052	JUHI KUMARI

52	17105111053	SWETA RANI
53	17105111054	ARSHAD ALI
54	17105111055	SURYA KANT BHARTI
55	17105111056	PIYUSHI
56	17105111057	AKSHAT KUMAR
57	17105111058	RISHI RAJ ARYAN
58	17105111059	SUPRIYA KUMARI
59	17105111060	SONI KUMARI
60	17105111061	S M SHAHNAWAZ
61	17105111062	RAHUL KUMAR
62	17105111063	SHWETA SUMAN
63	18105111001	RASHMI GUPTA
64	18105111005	CHANDRA BHUSHAN KR. YADAV
65	18105111901	ARJUN KUMAR
66	18105111902	SAHINA KHATUN
67	18105111903	DEEP SHIKHA

10. Course Handout

Institute / College Name :	Darbhanga College Of Engineering		
Program Name	**B.Tech. COMPUTER SCIENCE AND ENGINEERING**		
Course Code/ Branch	051717 / **CS and Engineering** (7TH SEMESTER)		
Course Name	Artificial Intelligence		
Lecture / Tutorial (per week):	3/0	**Course Credits**	5
Course Coordinator Name	Mr. Dhirendra Kumar		

1. Scope and Objectives of the Course

Understand the broader context of Artificial Intelligence. Develop a basic understanding of the building blocks of AI such as intelligent agents, search, inference, logic, and learning. Learn core concepts in artificial intelligence, such as heuristic search, game playing, formal logic, knowledge representation, knowledge discovery, decision theory, machine learning, and natural language processing.

2. Textbooks

TB1: S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach," Prentice Hall

TB2: E. Rich, K. Knight and S. B. Nair, "Artificial Intelligence," TMH

TB3: D. W. Patterson, "Introduction to artificial intelligence and expert systems," Prentice Hall

TB4: D.Jurafsky and J. H. Martin,"Speech and Language Processing," Prentice Hall

3. Reference Books

RB1: 1. C. Bishop,"Pattern Recognition and Machine Learning," Springer

RB2: A. C.Staugaard, Jr., "Robotics and AI: An Introduction to Applied Machine Intelligence,"

Prentice Hall

RB3: I. Bratko, "Prolog Programming for Artificial Intelligence," Addison-Wesley

RB4: S. O. Haykin, "Neural Networks and Learning Machines," Prentice Hall

S.No.	**Link of Journals, Magazines, websites and Research Papers**
	https://www.aaai.org/
	https://www.aimagazine.com

	https://swayam.gov.in/
	https://www.youtube.com/ai

1. **Course Plan**

Lecture Number	Date of Lecture	Topics	Text Book / Reference Book / Other reading material	Page numbers of Text Book(s)
6		**Introduction to AI**	TB1	
-		Why AI, Importance of AI. LISP, Prolog and other programming language for AI.	RB3	
5		**Search Strategies**	TB1	
		Representation Scheme, Blind Search technique, Heuristic Search technique		
4		Game search	TB1	
		Game search, Graph search (algorithm A and A*),		
6		Properties	TB1	
		Properties of A* algorithm, monotone – Specialized production systems – AO * algorithm		
5		**Searching Game Trees**	TB1	
		Minimax procedure, alpha-beta pruning – Introduction to predicate calculus – Resolution refutation systems – Answer extraction.		

6		**Knowledge Representation**	TB2	
		Knowledge representation, Knowledge acquisition, Logical Representation scheme, procedural representation schema, network representation scheme, STRIPS robot problem solving system, Structured representations of knowledge (Semantic Nets, Frames, Scripts)		
4		**Reasoning**	RB4	
		KRR system, KR language, Domain modeling, Semantic net.		
8		**Uncertainly**	RB2	
		Non monotonic & monotonic reasoning, confidence factors, Bayes theorem, Dempster & Shafer's, Theory of evidence, Non-classical logic, Fuzzy reasoning.		
4		Natural Language Processing	TB2	
		An Introduction to Natural language Understanding, Perception, Learning.		
2		Applications of Artificial Intelligence	TB1, TB2	
		Al in E-commerce, Al in Industry, Al in Medicine		

1. **Evaluation Scheme:**

Component 1	Mid Semester Exam	20
Component 2	Assignment Evaluation	10
Component 3**	End Term Examination**	70
	Total	**100**

**** The End Term Comprehensive examination will be held at the end of semester. The mandatory requirement of 75% attendance in all theory classes is to be met for being eligible to appear in this component.

SYLLABUS

Topics	No of lectures
Introduction : Why AI, Importance of AI. LISP, Prolog and other programming language for AI.	3
2. Search Strategies : Representation Scheme, Blind Search technique, Heuristic Search technique, Game search, Graph search (algorithm A and A*), Properties of A* algorithm, monotone – Specialized production systems –AO * algorithm.	15
3. Searching Game Trees : Minimax procedure, alpha-beta pruning – Introduction to predicate calculus –Resolution refutation systems – Answer extraction.	4
4. Knowledge Representation, Reasoning : Knowledge representation, Knowledge acquisition, Logical Representation scheme, procedural representation schema, network representation scheme, STRIPS robot problem solving system, Structured representations of knowledge (Semantic Nets, Frames, Scripts), KRR system, KR language, Domain modeling, Semantic net.	8
5. Uncertainly : Non monotonic & monotonic reasoning, confidence factors, Bayes theorem, Dempster & Shafer's, Theory of evidence, Non-classical logic, Fuzzy reasoning.	6
6. Natural Language Processing : An Introduction to Natural language Understanding, Perception, Learning.	4

7. Applications of Artificial Intelligence : AI in E-commerce, AI in Industry, AI in Medicine	2

Evaluation and Examination Blue Print:

Internal assessment is done through quiz tests, presentations, assignments and project work. Evaluation is a very transparent process and the answer sheets of sessional tests, internal assessment assignments are returned back to the students.

The components of evaluations along with their weightage followed by the University is given below

Mid sem	20%
Assignments/Quiz Tests/Seminars	10%
End term examination	70%

12. Assignments

Assignment – 1

Darbhanga College of Engineering, Darbhanga

Department of CSE B.Tech [SEM VII (CSE)]

Assignment - 1

(Session: 2020-21)

Course Code–051717

ARTIFICIAL INTELLIGENCE

Information for You

1. This Examination paper contains **5-Questions**.
2. **All** are **compulsory**.

Advices to you

1. You should write your answers clearly in your own words.
2. Draw the figures whenever it is required.

Note: CO–Course Outcomes, BL–Bloom Level

S. No.	Questions	CO	BL
1.	What do you mean by AI? How do you interpret the real world problems as AI problems?	CO1	L1
2.	Evaluate the algorithm Generate-And-Test in a given search space.	CO5	L5
3.	Define heuristic function? What is the role of using it in AI problem?	CO4	L1
4.	Map the different problem characteristics to apply Heuristic Search.	CO2	L3
5.	What is the role of using State Space in AI searching Algorithm?	CO3	L2

Darbhanga College of Engineering, Darbhanga

Department of CSE B.Tech [SEM VII (CSE)]

Assignment - 2

(Session: 2020-21)

Course Code–051717

ARTIFICIAL INTELLIGENCE

Information for You

1. This Examination paper contains **5-Questions**.
2. **All** are **compulsory**.

Advices to you

1. You should write your answers clearly in your own words.
2. Draw the figures whenever it is required.

Note: CO–Course Outcomes, BL–Bloom Level

S. No.	Questions	CO	BL
1.	Write the A* algorithm. How it is different from Best First Search?	CO1	L1
2.	Create a situation where "h' Overestimates h." in a AI problem.	CO5	L5
3.	What is the role of h' function in A* algorithm?	CO4	L1
4.	In what type of situations AI techniques are helpful to solve them?	CO2	L3
5.	What is the difference between Generate-And-Test strategy and Best First Search ?	CO3	L2

13. Having No Tutorial !

14. Mid Question Papers

Darbhanga College of Engineering, Darbhanga

Department of Computer Science and Engineering

Branch: - CSE & EEE [7th Semester] Mid-Semester Examination, October, 2018

Course:- ARTIFICIAL INTELLIGENCE (051717)

Marks:- 20 **Time:- 2 Hour**

Information for You

1. This Examination paper contains **6-Questions**.
2. All questions are **compulsory**.

Advices to you

1. You should write your answers clearly in your own words.
2. Draw the figures whenever it is required.

1. Introduce the term AI. How do you interpret the real world problems as AI problems? What are the limitations of AI application? 5

2. Define the term State Space Search. Evaluate the techniques are used in Blind Search.

   Or, How do you apply the Breadth-first search algorithm in a given search space? 3

3. What is the difference between Generate-And-Test strategy and Hill Climbing?

   Or, Evaluate the algorithm Generate-And-Test in a given search space. 3

4. Write the Best-First Search algorithm. Give a problem, where we can apply this algorithm. 3

5. What is a heuristic function? What is the importance of using it in State Space search? 3

6. Draw any three situations, where AI techniques are using to reach a given goal.

   Or, Map the different problem characteristics to apply Heuristic Search. 3

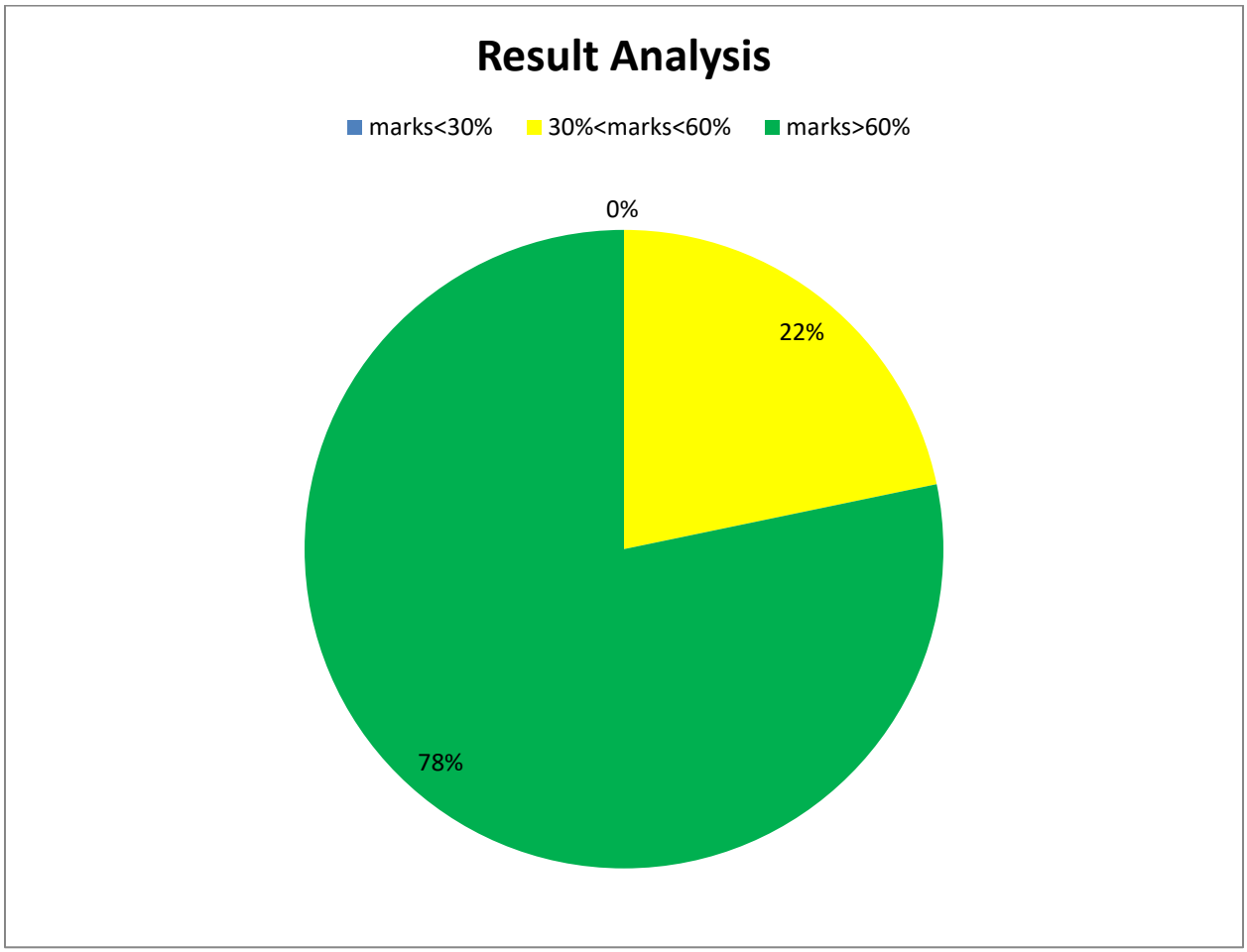
Darbhanga College of Engineering, Darbhanga

7th Semester CSE

Subject Name:- Artificial Intelligence

S.N.	Registration No.	Student Name	Attand. (5)	Assignment (5)	Mid Sem (20)	Total (30)	Percentage
1	17105111001	ADYA	5	5	9	19	63%
2	17105111002	RAHUL KUMAR	5	5	14	24	80%
3	17105111003	AMIT KUMAR	5	5	9	19	63%
4	17105111004	GRISH KUMAR	5	5	14	24	80%
5	17105111005	SHIVAM KUMAR JHA	5	5	8	18	60%
6	17105111006	PRAGYA PRIYANSHU	5	5	7	17	57%
7	17105111007	MANISH KUMAR	5	5	3	13	43%
8	17105111009	NIRAJ KUMAR SAH	5	5	18	28	93%
9	17105111010	VIJAY KUMAR	5	5	12	22	73%
10	17105111011	GAUTAM KUMAR BHARTI	5	5	10	20	67%
11	17105111012	BITTU KUMAR	5	4	10	19	63%
12	17105111013	VIVEK KUMAR SHARMA	5	5	12	22	73%
13	17105111014	VICKY KUMAR	5	5	10	20	67%
14	17105111015	KRISHANANAND KUMAR	5	5	14	24	80%
15	17105111016	ABHISHEK KUMAR SAHNI	5	5	8	18	60%
16	17105111017	KAJAL RAJ	5	5	8	18	60%
17	17105111018	BIRJU KUMAR	5	5	4	14	47%
18	17105111019	AAKASH KUMAR SINGH	5	5	7	17	57%
19	17105111020	DEVANAND KUMAR	5	5	10	20	67%
20	17105111021	KUMAR ANIKET	5	5	17	27	90%
21	17105111022	RAHUL KUMAR JHA	5	5	8	18	60%
22	17105111023	SHAKEEL AHMAD ANSARI	5	5	6	18	60%
23	17105111024	NIKITA KUMARI	5	5	6	16	53%
24	17105111025	MONEEB ALI	5	5	6	16	53%
25	17105111026	NIRAJ KUMAR	5	5	5	15	50%
26	17105111027	PRINCE KUMAR	5	5	7	17	57%
27	17105111028	MD ATIF RAZA	5	5	12	22	73%
28	17105111029	AHIVAM KUMAR	5	5	6	16	53%
29	17105111030	AMRIT KUMAR	5	5	17	27	90%
30	17105111031	KAILASH KUMAR JHA	5	5	9	19	63%
31	17105111032	AAKASH KUMAR	5	5	10	20	67%
32	17105111033	TANU KUMARI	5	5	8	18	60%
33	17105111034	SUMAN KUMAR CHOUDHARY	5	5	16	26	87%
34	17105111035	JUHI	5	5	9	19	63%
35	17105111036	NIHARIKA	5	5	10	20	67%
36	17105111037	POOJA KUMARI	5	5	15	25	83%
37	17105111038	ABHINAV GARG	5	5	11	21	70%
38	17105111039	NIDHI	5	4	14	23	77%
39	17105111040	SURAJ KUMAR	5	4	6	14	47%
40	17105111041	RAVI KUMAR MAHTO	5	5	8	18	60%
41	17105111042	MD AMIR	5	5	9	19	63%
42	17105111043	DEEPAK SINGH	5	4	10	19	63%
43	17105111044	ADITYA KUMAR GUPTA	5	5	9	19	63%
44	17105111045	ASHISH KUMAR SINHA	5	5	10	20	67%
45	17105111046	SATYA KUMARI	5	5	9	19	63%
46	17105111047	NIDHI KUMARI	5	5	10	20	67%
47	17105111048	KUMARI PALLAWI	5	5	14	24	80%
48	17105111049	SUNNY KUMAR JAISWAL	5	5	9	19	63%
49	17105111050	SAUMYA RAJ	5	5	17	27	90%
50	17105111051	ANKITA KUMARI	5	5	10	20	67%
51	17105111052	JUHI KUMARI	5	5	10	20	67%
52	17105111053	SWETA RANI	5	5	12	22	73%
53	17105111054	ARSHAD ALI	5	5	9	19	63%
54	17105111055	SURYA KANT BHARTI	5	5	7	17	57%
55	17105111056	PIYUSHI	5	5	14	24	80%
56	17105111057	AKSHAT KUMAR	5	5	14	24	80%
57	17105111058	RISHI RAJ ARYAN	5	5	6	16	53%
58	17105111059	SUPRIYA KUMARI	5	5	11	21	70%
59	17105111060	SONI KUMARI	5	5	11	21	70%
60	17105111061	S M SHAHNAWAZ	5	5	7	17	57%
61	17105111062	RAHUL KUMAR	5	5	15	25	83%
62	17105111063	SHWETA SUMAN	5	5	9	19	63%
63	18105111001	RASHMI GUPTA	5	5	18	28	93%
64	18105111005	CHANDRA BHUSHAN KR. YADAV	5	5	13	23	77%
65	18105111901	ARJUN KUMAR	5	5	16	26	87%
66	18105111902	SAHINA KHATUN	5	5	15	25	83%
67	18105111903	DEEP SHIKHA	5	5	14	24	80%

21. Result Analysis



22. Lab Course

Institute / School Name	Darbhanga College of Engineering, Darbhanga		
Program Name	B.Tech, CSE		
Course Code	05 1717 P		
Course Name	ARTIFICIAL INTELLIGENCE		
Labs (per week)	2	**Course Credits**	**2**
Course Coordinator Name	Mr. Dhirendra Kumar		

ARTIFICIAL INTELLIGENCE LAB

Course Objectives:

1. To study the programming language Prolog used to implement AI problems.
2. To build problem state space and intelligent agents for search and games.
3. To solve AI problems through programming with Python.
4. To design and develop programs for different search algorithms.

Course Outcomes:

CO1: Demonstrate different arithmetic operations using Python.

CO2: Capture and design the real world problems as AI problems.

CO3: Program exploration methods for a given AI problem.

CO4: Apply search algorithms for a new AI problem.

List of experiments which can be performed in this lab

Sr. No.	Experiment Name
1.	Study of PROLOG. Write a simple program showing a message using PROLOG
2.	Write a program to show how integer variable is used in prolog program

3.	Write a program to add two numbers.
4.	Write a program to show concept of list.
5.	Write a program to replace an integer from the list.
6.	Write a program to count number of elements in a list.
7.	Write a program to read address of a person using compound variable.
8.	Write a program to categorize animal characteristics.
9.	Write a program to demonstrate family relationship.
10.	Define and Solve any problem using depth first search.
11.	Write a program to solve 4-puzzle problem using best first search.
12.	Write a program to solve traveling salesman problem.
13.	Study of Robot (traversal) problem using Means End Analysis.

Instructions to the students:

Follow the Do's and Don'ts in the lab.

23. CO-PO mapping

Artificial Intelligence (Theory)

Mapping of COs and POs:

CO/PO /PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	3	2	2	-	-	-	-	-	-	2	-	3	-
CO2	2	3	3	2	-	-	-	-	-	-	-	-	3	-
CO3	2	3	3	3	-	-	-	-	-	-	-	-	3	2
CO4	2	2	3	3	-	-	-	-	-	-	2	-	2	-
CO5	2	2	2	3	-	-	2	-	-	-	-	2	-	-

Mapping of COs and PSOs:

CO/PSO	PSO1	PSO2
CO1	3	0
CO2	3	0
CO3	3	2
CO4	2	0
CO5	0	0

Correlation Level: 1- Slight (Low) 2- moderate (Medium) 3 – Substantial (High)

Note: The attainment level be 60% of the full marks for academic year 2014_18	60	%	
Our attainment Criteria	50.00	%	3
	40.00	%	2
	30.00	%	1

IDA (Indirect Assesment)		
IDA		
Course Exit Survey	Attainment	For
4	3	CO1
5	3	CO2
3	3	CO3
4	3	CO4
4	3	CO5

CO Attainment Target	
2	CO1
2	CO2
2	CO3
2	CO4
2	CO5

CO-PO Matrix														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3.0	3.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
CO 2	3.0	3.0	3.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
CO 3	3.0	3.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
CO 4	3.0	3.0	2.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0
CO 5	3.0	2.0	3.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Acadmic year 2014_18														
Surveys	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Program Exit Survey	2.58	2.3	2.41	2.21	2.24	2.15	2.33	2.53	2.42	0	2.36	2.46	2.25	2.35
Alumni Feedback	2	2	-	-	2	2	3	2	3	0	2	3	-	-
Parent Feedback	2.01	-	-	-	2.25	2.15	2.15	2.13	-	1	-	2.25	-	-
Guest Lecture / Expert Lecture/ workshop Resource person Feedback	2	-	-	2	2	-	1	1	-	1	-	2	-	-
Guest Lecture / Expert Lecture/ Workshop Student Feedback	2	-	2	3	2	-	3	-	-	-	-		2	-
External Examiner Feedback	2	-	2	2	-	-	-	1	-	2	-	-	-	-
In-plant training by industry person	3	-	-	-	-	-	-	3	3	1	-	2	-	-
Industrial Visit by industry person	-	-	-	-	-	-	3	-	3	-	3	-	-	
Employer Feedback	2	2	-	-	2	-	2	3	2	3	2	2	-	-
Co-curricular activities	-	-	-	-	2	3	2	3	2	3	2	3	-	-
Extra-curricular activities	-	-	-	-	-	2.07	2.01	2.16	2.25	2.05	-	2.05	-	-
Recruiters	2	-	1	2	-	2	1	2	1	-	2	-	-	
Attainment	2.176666667	2.1	1.8525	2.242	2.07	2.228333333	2.149	2.182	2.33375	1.864286	2.226667	2.345	2.125	2.35

Note: Program Exit Survey will be same for all the courses of a particular branch

Note: The data entered against each POs is fictional just to understand the actual scenario but soon it will be validated

24. CO Attainments

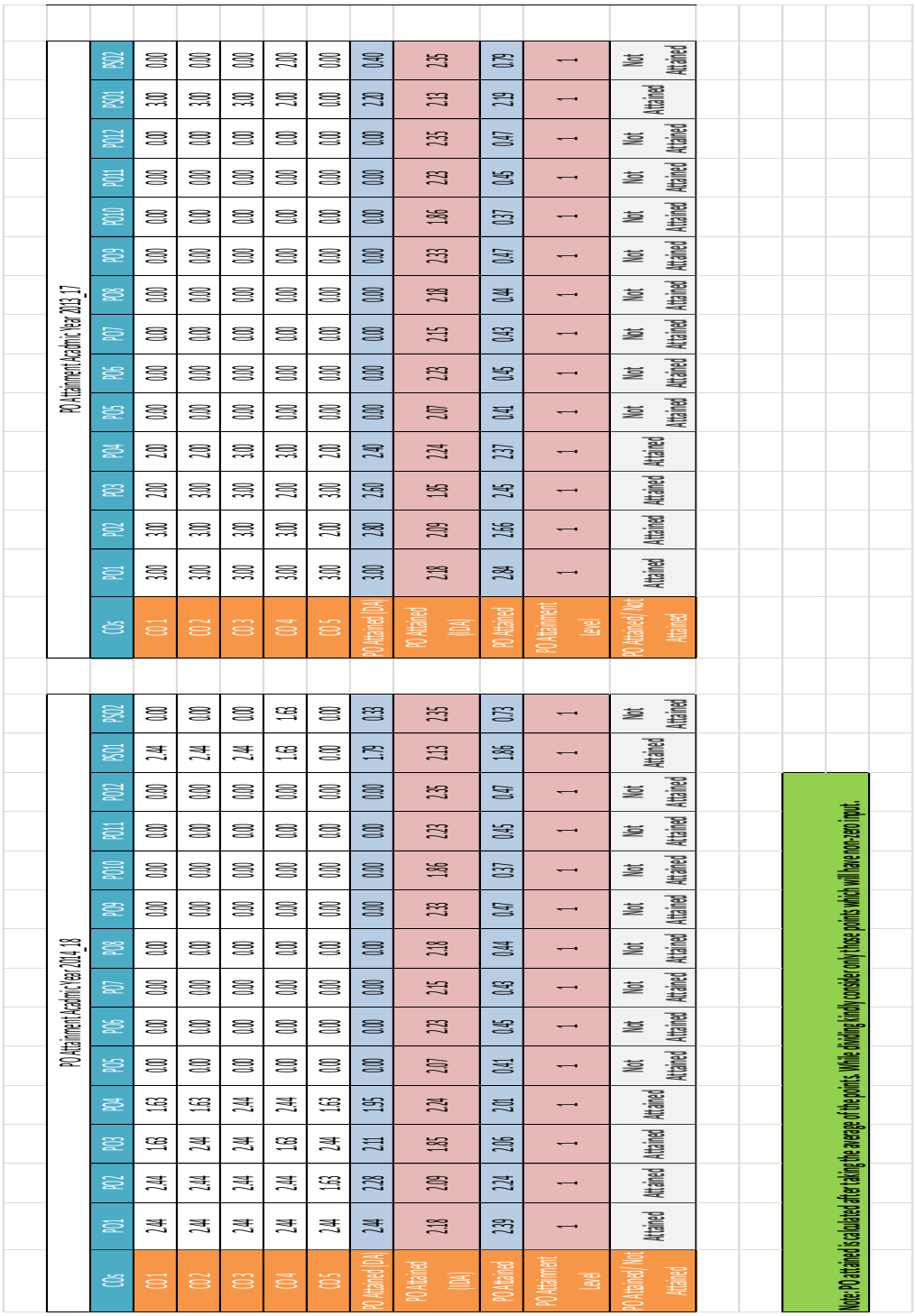
CO Attainment for acadmic year 2014_18					Acadmic year 2013_17					Acadmic year 2012_16					Acadmic year 2011_15				
	Total continous Assesment	Mid Sem	External			Total continous Assesment	Mid Sem	External			Total continous Assesment	Mid Sem	External			Total continous Assesment	Mid Sem	External	
Total Number of Students	45	45	45		Total Number of Students	48	48	48		Total Number of Students	46	46	46		Total Number of Students	51	51	51	
Avg of numbers	8	16	41		Avg of numbers	8	17	46		Avg of numbers	9	17	14		Avg of numbers	9	8	43	
No of Students getting more than Avg. Marks	11	14	24		No of Students getting more than Avg. Marks	13	44	28		No of Students getting more than Avg. Marks	20	32	46		No of Students getting more than Avg. Marks	17	25	24	
% of students	24.44	31.11	53.33		% of students	27.08	91.67	58.33		% of students	43.48	69.57	100.00		% of students	33.33	49.02	47.06	
Attainment level Achieved	0	1	3		Attainment level Achieved	3	3	3		Attainment level Achieved	2	3	3		Attainment level Achieved	1	2	2	
Attainment % of full marks	60	60	60		Attainment % of full marks	60	60	60		Attainment % of full marks	60	60	60		Attainment % of full marks	60	60	60	
Attainment marks	6	12	42		Attainment marks	6	12	42		Attainment marks	6	12	42		Attainment marks	6	12	42	
No of Students getting more than Attainment Marks	45	45	19		No of Students getting more than Attainment Marks	48	46	34		No of Students getting more than Attainment Marks	46	45	2		No of Students getting more than Attainment Marks	51	3	25	
% of students on attenment besis	100	100	42.2222		% of students on attenment besis	100	95.833	70.833		% of students on attenment besis	100	97.8261	4.34783		% of students on attenment besis	100	5.8824	49.02	
Attainment level Achieved	3	3	2		Attainment level Achieved	3	3	3		Attainment level Achieved	3	3	0		Attainment level Achieved	3	0	2	
CO Direct Assesment	2.3				CO Direct Assesment	3				CO Direct Assesment	2.9				CO Direct Assesment	1.8			
CO Direct Assesment	2.3				CO Direct Assesment	3				CO Direct Assesment	0.9				CO Direct Assesment	1.7			
	DA	IDA				DA	IDA				DA	IDA				DA	IDA		
CO1	2.3	3	2.44	Attained	CO1	3	3	3	Attained	CO1	2.9	3	2.92	Attained	CO1	1.8	3	2.04	Attained
CO2	2.3	3	2.44	Attained	CO2	3	3	3	Attained	CO2	2.9	3	2.92	Attained	CO2	1.8	3	2.04	Attained
CO3	2.3	3	2.44	Attained	CO3	3	3	3	Attained	CO3	2.9	3	2.92	Attained	CO3	1.8	3	2.04	Attained
CO4	2.3	3	2.44	Attained	CO4	3	3	3	Attained	CO4	2.9	3	2.92	Attained	CO4	1.8	3	2.04	Attained
CO5	2.3	3	2.44	Attained	CO5	3	3	3	Attained	CO5	2.9	3	2.92	Attained	CO5	1.8	3	2.04	Attained
	DA	IDA				DA	IDA				DA	IDA				DA	IDA		
CO1	2.3	3	2.44	Attained	CO1	3	3	3	Attained	CO1	0.9	3	1.32	Not Attained	CO1	1.7	3	1.96	Not Attained
CO2	2.3	3	2.44	Attained	CO2	3	3	3	Attained	CO2	0.9	3	1.32	Not Attained	CO2	1.7	3	1.96	Not Attained
CO3	2.3	3	2.44	Attained	CO3	3	3	3	Attained	CO3	0.9	3	1.32	Not Attained	CO3	1.7	3	1.96	Not Attained
CO4	2.3	3	2.44	Attained	CO4	3	3	3	Attained	CO4	0.9	3	1.32	Not Attained	CO4	1.7	3	1.96	Not Attained
CO5	2.3	3	2.44	Attained	CO5	3	3	3	Attained	CO5	0.9	3	1.32	Not Attained	CO5	1.7	3	1.96	Not Attained

Note: Here two attainment criterias are shown

1.Based on Average of marks

2. Based on 60% of full marks

25. PO Attainment



PO Attainment Academic Year 2014_18

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2.44	2.44	1.63	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44	0.00
CO 2	2.44	2.44	2.44	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44	0.00
CO 3	2.44	2.44	2.44	2.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44	0.00
CO 4	2.44	2.44	1.63	2.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.63	1.63
CO 5	2.44	1.63	2.44	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PO Attained (NA)	2.44	2.28	2.11	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	0.35
PO Attained (NA)	2.18	2.09	1.85	2.24	2.07	2.23	2.15	2.18	2.38	1.86	2.23	2.35	2.13	2.35
PO Attained	2.39	2.24	2.06	2.01	0.41	0.45	0.49	0.44	0.47	0.37	0.45	0.47	1.86	0.73
PO Attainment Level	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO Attained/ Not Attained	Attained	Attained	Attained	Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Attained	Not Attained

PO Attainment Academic Year 2013_17

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3.00	3.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
CO 2	3.00	3.00	3.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
CO 3	3.00	3.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
CO 4	3.00	3.00	2.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00
CO 5	3.00	2.00	3.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PO Attained (NA)	3.00	2.80	2.60	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20	0.40
PO Attained (NA)	2.18	2.09	1.85	2.24	2.07	2.23	2.15	2.18	2.33	1.86	2.23	2.35	2.13	2.35
PO Attained	2.84	2.66	2.45	2.37	0.41	0.45	0.43	0.44	0.47	0.37	0.45	0.47	2.19	0.79
PO Attainment Level	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO Attained/ Not Attained	Attained	Attained	Attained	Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Attained	Not Attained

Note: PO attained is calculated after taking the average of the points. While deriving it only consider only those points which will have non-zero input.

PO Attainment Academic Year 2012_16														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2.92	2.92	1.95	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92	0.00
CO 2	2.92	2.92	2.92	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92	0.00
CO 3	2.92	2.92	2.92	2.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92	0.00
CO 4	2.92	2.92	1.95	2.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95	1.95
CO 5	2.92	1.95	2.92	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PO Attained (DA)	2.92	2.73	2.53	2.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.14	0.39
PO Attained (IDA)	2.18	2.09	1.85	2.24	2.07	2.23	2.15	2.18	2.33	1.86	2.23	2.35	2.13	2.35
PO Attained	2.77	2.60	2.40	2.32	0.41	0.45	0.43	0.44	0.47	0.37	0.45	0.47	2.14	0.78
PO Attainment Level	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO Attained/ Not Attained	Attained	Attained	Attained	Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Attained	Not Attained

PO Attainment Academic Year 2015_19														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2.04	2.04	1.36	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04	0.00
CO 2	2.04	2.04	2.04	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04	0.00
CO 3	2.04	2.04	2.04	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04	0.00
CO 4	2.04	2.04	1.36	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	1.36
CO 5	2.04	1.36	2.04	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PO Attained (DA)	2.04	1.90	1.77	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.27
PO Attained (IDA)	2.18	2.09	1.85	2.24	2.07	2.23	2.15	2.18	2.33	1.86	2.23	2.35	2.13	2.35
PO Attained	2.07	1.94	1.78	1.75	0.41	0.45	0.43	0.44	0.47	0.37	0.45	0.47	1.62	0.69
PO Attainment Level	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO Attained/ Not Attained	Attained	Attained	Attained	Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Not Attained	Attained	Not Attained