Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed-to-be University under section 3 of UGC Act 1956)

CIRCULAR

28.08.2017

The School of computing, Bharath Institute of Higher Education and Research is planned to conduct a certification value added course on **IBM AI Engineering** for the benefit of II, III and IV year students. This course is scheduled from 01.09.2017 for 30 hours which includes theory and practical. The timings are 9:30 AM to 12:30 PM from Friday (FN) and Saturday (FN&AN).

All Registered Students must attend all the classes without fail. The following faculty members are assigned to handle the course. S.NO	**Name of the Faculty**	**Designation**
1	Dr.C.Nalini	Professor
2	Mrs.C.Anuradha	Assistant Professor

Head of Department

HEAD OF DEPARTMENT
Department of Computer Sci... & Engg.
Bharath Institute of Higher Education & Research
(Declared as Deemed to be University U/S 3 of UGC Act, 1956)
Chennai-600 073. INDIA

To

Copy to CSE

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Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
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CERTIFICATE COURSE ON IBM AI ENGINEERING

Date of Introduction of the Course: 28.08.2017

The timings are 9:30 AM to 12:30 PM from Friday (AN) and Saturday (FN&AN).

Time Table & Lesson plan

CLASS	DATE	TOPIC
1,2	01-09-2017(FN)	**1.Introduction: Philosophy of AI, Production systems** Introduction to AI-Problem formulation, Problem Definition, Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics, Specialized production system.
3,4	02-09-2017 (FN) 02-09-2017(AN)	**2. Modeling a Problem as Search Problem, Uninformed Search** Problem solving methods, Problem graphs, Uninformed Search, Divide and Conquer, Greedy, Branch and Bound, Gradient Descent.
5,6	08-09-2017(FN)	**3. Heuristic Search, Domain Relaxations** Informed Search, Pure Heuristic Search, Best First Search, A* Search, AO* Search.
7,8	09-09-2017(FN) 09-09-2017(AN)	**4. Local Search, Genetic Algorithms** Local Search Algorithms and Optimization Problems, Hill-climbing search, Simulated annealing search, Local beam search, Genetic algorithms, Ant Colony Optimization, Tabu Search.
9,10	15-09-2017(FN)	**5. Adversarial Search** Adversarial Search, Game Types, Problem Formalization, Game Tree, Zero Sum Game.
11,12	16-09-2017(FN)	**6. Constraint Satisfaction** Searching with Partial Observations, Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search.
13,14	16-09-2017(AN)	**Game Playing** Game Playing, Optimal Decisions in Games, Min-Max Games, Alpha – Beta Pruning, Stochastic Games

15,16	22-09-2017(FN) 23-09-2017(FN)	**8. Knowledge Representation** Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic, Structured representation of knowledge.
17,18	23-09-2017(AN)	**9. Knowledge Inference** Inference Rules, Production based system, Frame based system, Backward chaining, Forward chaining, Rule value approach
19,20	29-09-2017(FN)	**10. Planning** Basic plan generation systems, Strips, Advanced plan generation systems, K strips, Strategic explanations, Why, Why not and how explanations.
21,22	30-09-2017(FN)	**11. Uncertainty in AI, Bayesian Networks** Fuzzy reasoning, Certainty factors, Bayesian Theory, Bayesian Network, Dempster – Shafer theory.
23,24	30-09-2017(FN)	**12. Markov Decision Processes** Markov Decision Processes, Dynamic programming, Linear programming, FMDP.
25,26	30-09-2017(AN) 06-10-2017(FN)	**13. Expert Systems** Expert systems – Architecture, Roles of expert systems, Knowledge Acquisition, Meta knowledge, Typical expert systems, Expert systems shells.
27,28	07-10-2017(FN)	**14. Reinforcement Learning** RL Framework, Tabular methods, Q-networks, Policy Optimization, Model based RL.
29,30	07-10-2017(AN)	**15. Introduction to Deep Learning** Introduction to Tensorflow, Deep Neural Network, Recurrent neural networks, Convolutional neural networks, Applications.

COURSE COORDINATOR

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CERTIFICATE COURSE ON IBM AI ENGINEERING

Date of Introduction of the Course: 28.08.2017

COURSE SYLLABUS

1. Introduction: Philosophy of AI, Production systems

Introduction to AI-Problem formulation, Problem Definition, Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics, Specialized production system.

2. Modeling a Problem as Search Problem, Uninformed Search

Problem solving methods, Problem graphs, Uninformed Search, Divide and Conquer, Greedy, Branch and Bound, Gradient Descent.

3. Heuristic Search, Domain Relaxations

Informed Search, Pure Heuristic Search, Best First Search, A* Search, AO* Search.

4. Local Search, Genetic Algorithms

Local Search Algorithms and Optimization Problems, Hill-climbing search, Simulated annealing search, Local beam search, Genetic algorithms, Ant Colony Optimization, Tabu Search.

5. Adversarial Search

Adversarial Search, Game Types, Problem Formalization, Game Tree, Zero Sum Game.

6. Constraint Satisfaction

Searching with Partial Observations, Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search.

7. Game Playing

Game Playing, Optimal Decisions in Games, Min-Max Games, Alpha – Beta Pruning, Stochastic Games

8. Knowledge Representation

Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic, Structured representation of knowledge.

9. Knowledge Inference

Inference Rules, Production based system, Frame based system, Backward chaining, Forward chaining, Rule value approach.

10. Planning

Basic plan generation systems, Strips, Advanced plan generation systems, K strips, Strategic explanations, Why, Why not and how explanations.

11. Uncertainty in AI, Bayesian Networks

Fuzzy reasoning, Certainty factors, Bayesian Theory, Bayesian Network, Dempster – Shafer theory.

12. Markov Decision Processes

Markov Decision Processes, Dynamic programming, Linear programming, FMDP.

13. Expert Systems

Expert systems – Architecture, Roles of expert systems, Knowledge Acquisition, Meta knowledge, Typical expert systems, Expert systems shells.

14. Reinforcement Learning

RL Framework, Tabular methods, Q-networks, Policy Optimization, Model based RL.

15. Introduction to Deep Learning

Introduction to Tensorflow, Deep Neural Network, Recurrent neural networks, Convolutional neural networks, Applications.

COURSE OBJECTIVES

In this course we plan to give students an overview of the field of Artificial Intelligence Engineering, and an in-depth study into its enabling technologies and main building blocks. Students will gain hands-on experience solving relevant problems through projects that will utilize existing public cloud tools. It is our objective that students will develop the skills needed to become a practitioner or carry out research projects in this domain.

Specifically, the course has the following objectives:

Students will learn

1) To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements. To have an appreciation for the engineering issues underlying the design of AI systems.

2) To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.

3) To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs.

4) To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning.

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CERTIFICATE COURSE ON IBM AI ENGINEERING

Date of Introduction of the Course: 28.08.2017

School of Computing

Registered Students Name List

S.NO	REG.NO	NAME OF THE STUDENT
1	U14CS007	ABHISHEK MANDURI
2	U14CS012	AMAR BASUMATARY
3	U14CS013	ANDREW JOSEPH.V
4	U14CS021	AREEF SYED
5	U14CS023	ASIF NAZIR WANI
6	U14CS024	ATUL ANAND
7	U14CS025	BACHU HARISH
8	U14CS026	BALA MURUGAN .P
9	U14CS029	BALAKRISHNAN.T
10	U14CS055	GOTTIPATI KARTHIK
11	U14CS702	S.KUMARAN
12	U14CS514	SATHISH RAJ
13	U14CS057	GOVIND KUMAR
14	U14CS058	HARI TEJA.G
15	U14CS059	HARISH.V
16	U14CS062	JERIPOTHULA SURESH GOUD
17	U14CS063	JOHN DALTON .H
18	U14CS064	K. LAKSHMIKANTH REDDY
19	U14CS067	KARTHICK.K

20	U14CS074	KESHAVAPRIYA .S
21	U14CS075	KEVIN ARNOLD THAKUR
22	U14CS080	KOVURI BALASUBHAKAR REDDY
23	U14CS082	KRISHNANDAN YADAV
24	U14CS086	LOKESHWARAN.A.
25	U14CS089	MADIYAL ANJAY
26	U14CS092	MANDELA SAIKIRAN
27	U14CS102	MOHAMMED AABID
28	U14CS104	MOLUGURI PRADEEP CHANDRA
29	U14CS109	N.UMA VENKATA MAHESHWARA SWAMY
30	U14CS222	M.GANESH RAJAN
31	U14CS503	ARJHUN KUMAR.K
32	U14CS508	INDHU GOPALAKRISHNAN
33	U14CS710	SHOPMINISTER
34	U14CS113	NALLAJARLA CHAKRADHAR
35	U14CS114	NANDALA SWETHA
36	U14CS115	NANDIPALLI MOUNICA
37	U14CS136	RAHUL GOUD.P
38	U14CS137	RAHUL HAWAIBAM
39	U14CS144	RAKESH KUMAR
40	U14CS147	RAMANATHAN.J
41	U14CS149	RANGAPUR VIKAS REDDY
42	U14CS151	RAVIPATI SUBBARAYUDU
43	U14CS153	RONU SHARMA

COURSE COORDINATOR

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CERTIFICATE OF PARTICIPATION

This certificate is presented to

RAKESH KUMAR

For actively participating in the value added course **"IBM AI Engineering"**
Conducted by School of Computing, BIHER from 01.09.2017 to 07.10.2017.

COURSE COORDINATORS

HEAD OF THE DEPARTMENT

DIRECTOR

COURSE FEEDBACK FORM

Academic Year		2017 - 2018					
Term		ODD SEM					
Course Number							
Course Title		IBM AI Engineering					
Number of Credits							
Type of Course	Regular		Elective		Add-on	✓	

I. Information on the Respondent: (Tick (√) Appropriately)

1. **Percentage of classes attended**

0-20		20-40		40-60		60-80	✓	80-100	

2. **Number of hours per week spent on the course (Other than lecture hours)**

0-2		2-4		4-6	✓	6-8		8-10	

3. **Preparation for the course by the student:**

(i)	Have done part of this course earlier	YES
(ii)	Has adequate prior exposure to the prerequisites	YES
(iii)	Had to pickup relevant additional topics through concurrent study	YES
(iv)	Have no exposure to the background material	YES

4. **The expectations for taking the course by the student are:**

(a)	Enhance by skill base in the area of specializations	YES
(b)	Get exposed to a relevant subject	YES
(c)	Curiosity	YES
(d)	Better Employment Opportunity	YES
(e)	Complete Course requirements	YES
(f)	To Improve CGPA	YES

About the Instructor: Information on the Respondent: (Tick (√) Appropriately)

		A	B	C	D	E
1.	Pace of the Teaching/lecture		✓			
2.	Comment of the Subject		✓			
3.	Clarity of expression			✓		
4.	Level of preparation		✓			
5.	Level of interaction	✓				
6.	Accessibility outside the class			✓		
7.	Others (please specify		✓			

A: Excellent		B: Very Good		C: Good		D: Satisfactory		E: Poor	

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COURSE FEEDBACK FORM

Academic Year		2019 - 2020					
Term		ODD SEM					
Course Number							
Course Title		IBM AI Engineering					
Number of Credits							
Type of Course	Regular		Elective		Add-on	✓	

I. Information on the Respondent: (Tick (√) Appropriately)

1. **Percentage of classes attended**

0-20		20-40		40-60		60-80	✓	80-100	

2. **Number of hours per week spent on the course (Other than lecture hours)**

0-2		2-4		4-6	✓	6-8		8-10	

3. **Preparation for the course by the student:**

(i)	Have done part of this course earlier	yes
(ii)	Has adequate prior exposure to the prerequisites	yes
(iii)	Had to pickup relevant additional topics through concurrent study	yes
(iv)	Have no exposure to the background material	yes

4. **The expectations for taking the course by the student are:**

(a)	Enhance by skill base in the area of specializations	yes
(b)	Get exposed to a relevant subject	yes
(c)	Curiosity	yes
(d)	Better Employment Opportunity	yes
(e)	Complete Course requirements	yes
(f)	To Improve CGPA	yes

About the Instructor: Information on the Respondent: (Tick (√) Appropriately)

		A	B	C	D	E
1.	Pace of the Teaching/lecture	✓				
2.	Comment of the Subject		✓			
3.	Clarity of expression		✓			
4.	Level of preparation		✓			
5.	Level of interaction			✓		
6.	Accessibility outside the class		✓			
7.	Others (please specify					

A: Excellent		B: Very Good		C: Good		D: Satisfactory		E: Poor	

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