THIRD-YEAR OF BACHELOR OF COMPUTER SCIENCE REVISED SYLLABUS ACCORDING TO CBCS

COURSE TITLE: ARTIFICIAL INTELLIGENCE

SEMESTER-V, W.E.F. 2021-2022

Recommended by the Board of Studies in Computer Science
And
Approved by the Academic Council

Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal. Sangameshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No: _____

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangameshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Department	:	Computer Science
Name of the Class	:	Third Year
Semester	:	Five
No. of Credits	:	03
Title of the Course	:	Artificial Intelligence
Course Code	:	USCST51
Name of the Vertical	:	Elective I
Eligibility for Admission	:	Any 12^{th} Pass seeking Admission to Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	UG
Pattern of Marks Distribution for TE and CIA	:	70:30
Status	:	CBCS
To be implemented from Academic Year	:	2021-2022
Ordinances /Regulations (if any)		

Syllabus for Third Year of Bachelor of Science in Computer Science

(With effect from the academic year 2021-2022)

SEMESTER-V **Paper No.– 1**

Course Title: Artificial Intelligence **No. of Credits - 03**

Type of Vertical: Elective I **COURSE CODE: USCST51**

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to…		
Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CO-01	Understand	After completion of this course, learner should get a clear understanding of AI and different search algorithms used for solving problems.
CO-02	Remember	The learner should also get acquainted with different learning algorithms and models used in machine learning.

Syllabus for Third Year of Bachelor of Science in Computer Science

(With effect from the academic year 2021-2022)

SEMESTER-V **Paper No.– 1**

Course Title: Artificial Intelligence **No. of Credits - 03**

Type of Vertical: Elective I **COURSE CODE: USCST51**

COURSE CONTENT			
Unit No.	**Content**	**Credits**	**No. of Lectures**
I	What Is AI: Foundations, History and State of the Art of AI. Intelligent Agents: Agents and Environments, Nature of Environments, Structure of Agents. Problem Solving by searching: Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions..	**01**	**15**
II	Learning from Examples: Forms of Learning, Supervised Learning, Learning Decision Trees, Evaluating and Choosing the Best Hypothesis, Theory of Learning, Regression and Classification with Linear Models, Artificial Neural Networks, Nonparametric Models, Support Vector Machines, Ensemble Learning, Practical Machine Learning	**01**	**15**
III	Learning probabilistic models: Statistical Learning, Learning with Complete Data, Learning with Hidden Variables: The EM Algorithm. Reinforcement learning: Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, Applications of Reinforcement Learning.	**01**	**15**

	Total	03	45

Required Previous Knowledge

Students should know basic concepts related to computer and computer handling

Access to the Course

The course is available for all the students admitted for Bachelor of Science (Computer Science).

Forms of Assessment

The assessment of the course will be of Diagnostic, Formative and Summative type. At the beginning of the course diagnostic assessment will be carried out. The formative assessment will be used for the Continuous Internal Evaluation whereas the summative assessment will be conducted at the end of the term. The weightage for formative and summative assessment will be 60:40. The detailed pattern is as given below.

Semester End Evaluation (60 Marks)
Question Paper Pattern
Time: 2 hours

Question No.	Unit/s	Question Pattern	Marks
Q.1	I ,II &III	MCQ/Fill in the blanks/One line sentence	10
Q.2	I	Descriptive Questions	20
Q.3	II	Descriptive Questions	20
Q4.	III	Descriptive Questions	20
	Total		**70**

Internal evaluation (30 Marks)

Sr. No.	Description	Marks
1	Classroom Tests	10
2	Project/ Viva/ Presentations/ Assignments	10
3	Attendance	10
	Total	**30**

Grading Scale

10 points grading scale will be used. The grading scale used is O to F. Grade O is the highest passing grade on the grading scale, and grade F is a fail. The Board of Examinations of the college reserves the right to change the grading scale.

Reference book:

- Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, 3rd Edition, Pearson, 2010.

Text book:

- Techmax publication book

Additional References:

- Artificial Intelligence: Foundations of Computational Agents, David L Poole,Alan K. Mackworth, 2nd Edition, Cambridge University Press ,2017
- Artificial Intelligence, Kevin Knight and Elaine Rich, 3rd Edition, 2017
- The Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani and Jerome Friedman, Springer, 2013

Course: USCSP58	Practical of USCST51 (Credits : 1, Lectures/Week: 3)
USCSP58	Practical shall be implemented in LISP or python 1. Implement Breadth first search algorithm for Romanian map problem. 2. Implement Iterative deep depth first search for Romanian map problem. 3. Implement A* search algorithm for Romanian map problem. 4. Implement recursive best-first search algorithm for Romanian map problem. 5. Implement decision tree learning algorithm for the restaurant waiting problem. 6. Implement feed forward back propagation neural network learning algorithm for the restaurant waiting problem. 7. Implement Adaboost ensemble learning algorithm for the restaurant waiting problem. 8. Implement Naive Bayes' learning algorithm for the restaurant waiting problem. 9. Implement passive reinforcement learning algorithm based on adaptive dynamic programming (ADP) for the 3 by 4 world problem 10. Implement passive reinforcement learning algorithm based on temporal differences (TD) for 3 by 4 world problem