<table>
<tr><td>1.</td><td>Name of Course</td><td colspan="6">Artificial intelligence</td></tr>
<tr><td>2.</td><td>Course Code</td><td colspan="6">CCPS3593</td></tr>
<tr><td>3.</td><td>Name(s) of academic staff</td><td colspan="6"></td></tr>
<tr><td>4.</td><td>Rationale for the inclusion of the course/module in the programme</td><td colspan="6">Major
Artificial Intelligence is the study of how to make computers do things that humans can, This module looks at problems falling under this classification.This module develops methodologies and technological applications of artificial intelligence, and will develop the student’s ability to apply these to the design and implementation of intelligent systems..</td></tr>
<tr><td>5.</td><td>Semester and Year offered</td><td colspan="6">1 / 3</td></tr>
<tr><td rowspan="3">6.</td><td>Total Student Learning Time (SLT)</td><td colspan="4">Face to Face</td><td colspan="2">Total Guided and Independent Learning</td></tr>
<tr><td rowspan="2">L = Lecture
T = Tutorial
P = Practical
O= Others</td><td>L</td><td>T</td><td>P</td><td>O</td><td colspan="2" rowspan="2">Independent = 84
Total =126</td></tr>
<tr><td>28</td><td></td><td>28</td><td></td></tr>
<tr><td>7.</td><td>Credit Value</td><td colspan="6">3</td></tr>
<tr><td>8.</td><td>Prerequisite (if any)</td><td colspan="6">CCPS2553 Data Structure & Algorithm</td></tr>
<tr><td>9.</td><td colspan="7">Objectives:
The aims of this module are to
to develop the student’s abilities to critically analyze and explain the foundations, methodologies and applications of artificial intelligence;
Give an overview of key underlying ideas, such as knowledge representation, rule
Demonstrate the need for different approaches for different problems
Provide a foundation for further study of specific areas of AI.</td></tr>
<tr><td>10.</td><td colspan="7">Learning outcomes:
Upon the successful completion of this module a student should be able to:
Explain the underlying principles, and evaluate the advantages and limitations, of the AI approach to problem solving.
Write programs in PROLOG programming language.
Write programs in LISP programming language.
Explain, evaluate, and apply various knowledge representation formalisms in diverse application domains.
Investigate and comment critically current research areas in AI and evaluate potential applications of AI technology.
Incorporate of AI-techniques in their practical assignments.</td></tr>
<tr><td>11.</td><td colspan="7">Transferable Skills:
Develop researching, computing and reasoning skills.
Develop a foundation for further study of specific areas of artificial intelligence.
Critically analyze and discuss the fundamental precepts of artificial intelligence, their associated methodologies and technological applications. with specialists and non-specialists.</td></tr>
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12. **Teaching-learning and assessment strategy**

A variety of teaching and learning strategies are used throughout the course, including:

- Classroom lessons. Lectures and Power Point presentations
- Laboratory sessions: Practice exercises
- brainstorming;
- student-Lecturer discussion
- collaborative and co-operative learning;
- Independent study.

Assessment strategies include the following:

- Ongoing quizzes
- Midterm tests
- Performance Assessment (project, Assigned exercises)
- Lecturer Observation

13. **Synopsis:**

This module provides a general introduction to artificial intelligence, its techniques. The module will focus on the common underlying ideas, such as knowledge representation, rule based systems, search, and learning.

14. **Mode of Delivery:**

- Classroom lessons. Lectures and Power Point presentations.
- Laboratory sessions: Practice exercises.

15. **Assessment Methods and Types:**

The assessment for this course will be based on the following:

Coursework **50%**

- Quizzes and Assignments 15%
- Project 15%
- Mid-Semester Exam 20%

Final Examination **50%**

100%

16. **Mapping of the course/module to the Programme Aims**

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
3	1	1	1	2	2	0	2	0	3	3	0

17. **Mapping of the course/module to the Programme Learning Outcomes**

LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12
4	4	1	3	1	0	3	2	2	1	0	0

18. **Content outline of the course/module and the SLT per topic**

	Details	SLT			
		L	P	Indep.	Total

Topic 1	**General introduction to AI** Philosophy, Logic/Mathematics, Computation, declarative programming and artificial intelligence. Anatomy of an AI system. History of AI, Introduction to intelligent agents. Parallel and Distributed AI, Expert Systems, Fuzzy Logic, Neural Networks, Evolutionary Computation, Vision, Robotics, Expert Systems, Speech Processing, Planning, Machine Learning, Natural Language Processing	4	2	12	18
Topic 2	**Intelligent Agents** Concept,Rational Agents, Intelligent Agents, Simple Reflex Agents, Reflex Agents with an Internal State, Goal Based Agents, Utility Based Agents, Machine Learning, The Agent Environments Components of an AI Agent	2	2	6	10
Topic 3	**PROLOG programming** Programming with logic: The PROLOG programming language. Recursive programs and recursive data types, especially lists. Controlling search, arithmetic, input/output and negation as failure. **LISP programming** Syntax, List Structure, Control Structures, Input-Output, Functions, and Higher-Order Functions Property Lists, Hash Tables, Arrays, Structures, and Classes	8	10	24	42
Topic 4	**Problem Solving and search** State space representations, production systems, formal logic, goal reduction. The Importance of Search in AI ,Search Strategies, Properties of Search Algorithms, Search Trees, Types of Uninformed Search Algorithm, Avoiding Repeated States, Comparing the Uninformed Search Algorithms, Informed and heuristic search, optimal path, goal-reduction search, means-ends analysis, search with adversaries.	4	4	12	20
Topic 5	**Knowledge Representation and Semantic Networks** What is Knowledge? What is a Knowledge Representation?, Requirements of a Knowledge Representation, Practical Aspects of Good Representations, Knowledge Representation in Natural Language, Databases as a Knowledge Representation, First Order Logic as a Representation, Frame Based Systems and Semantic Networks, Components of a Semantic Network, AND/OR Trees, IS-A and IS-PART Hierarchies, Intersection Search, Tangled Hierarchies and Inferential Distance, The Relation between Semantic Networks and Frames, Components of Frame Based Systems.	6	6	24	36
Topic 6	**Machine Learning** What is Machine Learning? The Need for Learning, Learning in Neural and Evolutionary Systems, Problems Facing Expert Systems, Learning in Rule Based Systems, Rule Induction and Rule Refinement, Concept Learning and Version Spaces Learning Decision Trees	2	2	6	10
Topic 7	**Discussion topics** Genetic algorithms; natural language processing; expert systems; intelligent tutoring systems; constraint satisfaction; knowledge mining	2	2	6	10
	Total hours	28	28	90	140

Laboratory	Laboratory Details Exercises based on topics covered in each lecture. Weekly programming exercises on PROLOG and LISP must include the following • Introduction to PROLOG programming • Basic statements, data objects, and different types of queries. • Prolog database, Recursive data structures and programming techniques. • Procedural Programming: • Backtracking. Controlling backtracking with the "cut". • Negation as failure: "fail" predicate, "cut"-"fail" combination,"not" predicate. • PROLOG: Input-Output and Built-in Predicates • characters, sentences, and files. Built-in predicates for testing the type of terms, • constructing and decomposing terms, etc. Various kinds of equality. • Introduction to LISP • LISP: Syntax, List Structure, Control Structures, Input-Output, • Functions, and Higher-Order Functions Property Lists, Hash Tables, Arrays, • Structures, and Classes Lab assignment should include • Game Playing • Searching Techniques • Knowledge Representation • Natural Language Processing • Speech Processing
19.	**Main references supporting the course:** **1.** Stuart Russell, Peter Norvig**, Artificial Intelligence,** 3rd Edition, Prentice Hall; 2009 **2.** George F. Luger, **Artificial Intelligence: Structures and Strategies for Complex Problem Solving,** 6th Edition Addison Wesley, 2008
	Additional references supporting the course: 1. N. P. Padhy**, Artificial Intelligence and Intelligent Systems,** Oxford University Press, 2005 **2.** Bratko, I., **"Prolog programming for Artificial Intelligence",** 3rd Edition, Addison-Wesley, 2000**.**
20.	**Other additional information** All materials will be available to the students online.