

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI
DEPARTMENT OF COMPUTER APPLICATIONS

COURSE PLAN – PART I			
Name of the programme and specialization	MCA		
Course Title	Computational Intelligence		
Course Code	CA723	No. of Credits	3
Course Code of Pre-requisite subject(s)	CA713		
Session	July 2023	Section (if, applicable)	B
Name of Faculty	Dr. R. Eswari	Department	Computer Applications
Email	eswari@nitt.edu	Telephone No.	0431-2503744
Name of PAC Chairperson	Dr. L. Sindhia		
E-mail	sindhia@nitt.edu	Telephone No.	
Course Type	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
Introduction: Applications, Agents, Types of Agents, Intelligent Agent, Agent Environment, Problem Solving by Searching Techniques, Uninformed Search, Informed Search, hill climbing, simulated annealing, genetic algorithm search, heuristic search, A* algorithm, Adversarial Search, AO* algorithm, Minimax and game trees, Alpha – Beta pruning.			
Knowledge Representation and Reasoning: Knowledge representation, Propositional Logic, Rules of inference, First order logic, Inference in First order logic, resolution, unification, deduction system, Forward chaining, Backward chaining, refutation, PROLOG, semantic networks, frame system, Ontologies, Planning: Partial order planning.			
Handling uncertainty: Bayes Theorem, Bayesian Belief Network, Inference in Bayesian Networks, Fuzzy rules, Fuzzy inference, Fuzzy logic controller.			
Evolutionary Algorithms: Genetic programming - Evolution strategies - Evolutionary neural network - Metaheuristics - Swarm Intelligence - Ant colony systems – case studies.			
Applications: Optimization, Control Systems, Expert Systems, Natural Language Processing and Decision making.			
COURSE OBJECTIVES			
<ul style="list-style-type: none">To know basic concepts of Computational Intelligence and Problem-solving through various searching techniques			

<ul style="list-style-type: none"> To study about building knowledge base, representation and reasoning and Bayesian networks To know about Bayesian network and fuzzy logic controller To study various evolutionary algorithms 	
Mapping of COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
<ul style="list-style-type: none"> Know how to build simple knowledge-based systems 	1,3
<ul style="list-style-type: none"> Apply knowledge representation and fuzzy logic to solve real-world problems 	1,2,3,4
<ul style="list-style-type: none"> Apply computational intelligence techniques to solve real-world problems 	1,2,3,4,5

COURSE PLAN – PART II

COURSE OVERVIEW			
<p>This course introduces the concept of artificial intelligence and deals the problem solving methods. It discusses the ways to represent knowledge and how to reason logically with that knowledge. It describes machine learning and computational intelligence techniques for solving the real world problems. Finally, the course discusses various applications of artificial intelligence.</p>			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1	Introduction to CI, AI vs CI, Applications of CI	PPT, Chalk & Board
2	2	Problem Solving by Searching Techniques – Uninformed Search	PPT, Chalk & Board
3	3	Informed search, hill climbing, simulated annealing, heuristic search, Best first search, A* algorithm	PPT, Chalk & Board
4	4	AO* algorithm, Minimax and game trees, refining minimax, Alpha – Beta pruning	PPT, Chalk & Board
5	5	Intelligent Agents: rational, reflex, model-based, goal-based, and utility-based agents, Knowledge Representation: Propositional calculus, First order predicate calculus	PPT, Chalk & Board

6	6	resolution, unification, natural deduction system, refutation, reasoning - forward and backward chaining, logic programming	PPT, Chalk & Board
7	7	semantic networks, frame system, Ontologies, Planning	PPT, Chalk & Board
8	8	Handling uncertainty: Bayes Theorem, Bayesian Belief Network, Inference in Bayesian Networks	PPT, Chalk & Board
9	9	Fuzzy rules, Fuzzy inference, Fuzzy logic controller.	PPT, Chalk & Board
10	10	Evolutionary Algorithms: Genetic programming - Evolution strategies - Evolutionary neural network	PPT, Chalk & Board
11	11	Metaheuristics - Swarm Intelligence - Ant colony systems – case studies	PPT, Chalk & Board
12	12	Applications of CI (Demo)	PPT
13	13	Applications of CI (Demo)	PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle test1	Week 7	1 Hr	15
2	Cycle test2	Week 11	1 Hr	15
3	Seminar and Assignment	Week 12	-	20
4	Compensation Assessment	Week 12	1 Hr	20
5	Final Assessment	At the end of course	3 hrs	50

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

- The students through the class representative may give their feedback at any time to the course faculty which will be duly addressed.
- The students may also give their feedback during Class Committee meeting.

COURSE POLICY (including compensation assessment to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

The students can get the availability of faculty member over phone and email. They can get their doubts clarified at any time with their faculty member with prior appointment.

COMPENSATION ASSESSMENT

One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- **At least 75% attendance in each course is mandatory.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

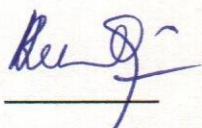

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

FOR APPROVAL

Course Faculty  CC-Chairperson  HOD 