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| C:\Users\TEMP.WDC.013\Downloads\VIT logo.png  **Version 0120-7** | **Consolidated Academic Administration Plan for the Course**  ***Artificial Intelligence and Soft Computing ( Core)***  ***Sem. VI Program Computer Engineering 2023-2024 –Even Semester***  ***Faculty - Prof. \_ Prof Avinash Shrivas (Cluster Mentor) &***  ***Prof Avinash Shrivas*** |

**The academic resources available in VIT –**

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| **VMIS (ERP)** | **V-Refer and V-Live** | **VIT Library** | **VAC & MOOC Courses** |
| Institute & Department Vision and Mission | Former IA question papers and solutions (prepared by faculty) | Former IA question papers solutions - hardcopy | Value Added Courses (VAC) are conducted throughout the semester & in the semester break - Enrol for the VACs |
| Program Educational Objectives (PEO) | MU end semester examination question papers and solutions (prepared by faculty) | MU end semester exam question paper & solutions - by faculty, hardcopy |
| Program Specific Outcome (PSO) | Class notes and Digital Content for the subject (scanned / typed by faculty) | All text books, reference books, e -books mentioned in the syllabus & AAP | Online courses from NPTEL, Coursera etc. are pursued throughout the semester - Register for the course & get certified |
| Program Outcome (PO) | Comprehensive question bank, EQ, GQ, PPT, Class Test papers | Technical journals and magazines for reference |
| Departmental Knowledge Map | Academic Administration Plan & Beyond Syllabus Activity report | VIT library is member of IIT Bombay Library | Watch former lectures captured in LMS at VIT |

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| **1.a** | **Course Objectives (Write in detail – as per NBA guidelines)** |

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| Cognitive | What do you want students to know? | Architecture of Intelligent agents , searching Techniques, Knowledge representation techniques , drawing Inferences , planning and reasoning and recent trends in AI |
| Affective | What do you want students to think / care about? | To induce human like intelligence in artefact , what all components are needed. |
| Behavioural | What do you want students to be able to do? | Implement core concepts of AI such as searching technique, Knowledge representation, planning and ,learning to solve real life problem |

**Advice to Students:**

Attend every class!!! Missing even one class can have a substantial effect on your ability to understand the course. Be prepared to think and concentrate, in the class and outside. I will try to make the class very interactive. Participate in the class discussions. Ask questions when you don’t understand something. Keep up with the class readings. Start assignments and homework early. Meet me in office hour to discuss ideas, solutions or to check if what you understand is correct. The v-Refer Link for this course (**Creation of microsite (vit.edu.in or teams) e.g. https://cs50.harvard.edu/college/2021/spring/)**

**Collaboration Policy:**

We encourage discussion between students regarding the course material. However, no discussion of any sort is allowed with anyone on the assignment and homework for the class. If you find solution to some problems in a book or on the internet, you may use their idea for the solution; provided you acknowledge the source (name and page in the book or the website, if the idea is found on the internet). Even though you are allowed to use ideas from another source, you must write the solution in your own words. If you are unsure whether or not certain kinds of collaboration is possible please ask the teacher.

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| **1.b** | **Course Outcome (CO) Statements and Module-Wise Mapping (follow NBA guideline)** |

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| CO No. | Statements | Related Module/s |
| CO1 | Ability to develop a basic understanding about components of AI, categorization of Intelligent Systems and new trends. | 01 |
| CO2 | Ability to understand the concept of rational agent, PEAS properties, task environment and types of intelligent agent. | 02 |
| CO3 | Ability to choose an appropriate problem-solving method and searching technique. | 03 |
| CO4 | Ability to analyse the strength and weaknesses of AI approaches to knowledge– intensive problem solving and knowledge representation technique. | 04 |
| CO5 | Ability analyse different planning and learning techniques to solve complex and realistic AI problems. | 05 |
| CO6 | Ability to design and develop AI applications in real world scenarios. | 06 |

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| **1.c** | **Mapping of COs with POs (mark S: Strong, M: Moderate, W: Weak, Dash ‘–’: not mapped)**  **(List of POs is available in V-refer)** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 |
| CO 1 | **S** | **W** | **W** | **-** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| CO 2 | **S** | **S** | **S** | **-** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **-** |
| CO 3 | **M** | **S** | **M** | **-** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| CO 4 | **M** | **S** | **S** | **-** | **M** | **-** | **–** | **–** | **–** | **–** | **–** | **-** |
| CO 5 | **M** | **S** | **S** | **M** | **–** | **–** | **–** | **–** | **–** | **–** | **–** | **–** |
| CO6 | **W** | **M** | **S** | **M** | **M** | **W** | **W** | **W** | **W** | **W** | **W** | **M** |

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| **1.d** | **Mapping of COs with PSOs (mark S: Strong, M: Moderate, W: Weak, Dash ‘–’:not mapped)** |

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| --- | --- | --- | --- |
|  | PSO 1 | PSO 2 | PSO 3 |
| CO 1 | M | - | - |
| CO 2 | S | - | M |
| CO 3 | S | W | M |
| CO 4 | S | M | W |
| CO 5 | M | M | W |
| CO 6 | M | M | W |

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| **1.e** | **Teaching and Examination Scheme (As specified by the University) for the Course** |

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| Categories | Mathematics | Basic Science & General Engg. | Humanities & Soft Skill | Core Engg./ Technology - Design & Analysis | Multidisciplinary |
| Tick suitable category |  |  |  | **√** |  |

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| Subject Code | Subject Name | **Teaching Scheme** | | | Credits Assigned | | | |
| Theory | Practical | Tutorial | Theory | TW/Practical | Tutorial | Total |
| CSC604 | Artificial Intelligence | 03 | -- | -- | 03 | -- | -- | 03 |
| CSL604 | Artificial Intelligence | -- | 02 |  | - | 01 |  | 01 |

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| Subject Code | Subject Name | **Examination Scheme** | | | | | |
| Mid Sem. Exam Marks | End Sem. Exam Marks | ISA | Practical | Oral | Total |
| CSC604 | Artificial Intelligence | 30 | 50 | 20 | -- | -- | 100 |
| CSL604 | Artificial Intelligence | -- | -- | 25 | 25 | | 50 |

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| **1.f** | **Faculty-Wise Distribution of all Lecture-Practical-Tutorial Hours for the Course** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Divisions | Lecture (Hrs.) | Practical (Hrs.) | | | | Tutorial (Hrs.) | | | |
| Batch 1 | Batch 2 | Batch 3 | Batch 4 | Batch 1 | Batch 2 | Batch 3 | Batch 4 |
| **Team A** | 3  AHS | 2  AHS | 2  AHS | 2  AHS | 2  AHS |  |  |  |  |
| **Team B** | 3  AHS | 2  AHS | 2  AHS | 2  AHS | 2  KS |  |  |  |  |

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| **1.g** | **Office Hours (Faculty will be available in office in this duration for solving students’ query)** |

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| Division | Day | Time (at least 1 Hr. / Division) | Venue (Office Room No.) |
| A | Thursday | 3:45 pm to 4:30 pm | M209 Discussion Room |
| B | Monday | 3:45 pm to 4:30 pm | M209 Discussion Room |

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| **2.a** | **Syllabus: Module Wise Teaching Hours and % Weightage in University Question Paper** |

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| --- | --- | --- | --- |
| Module No. | Module Title and Brief Details | Teaching Hrs. for each module | % Weightage in University Question Papers |
| 1 | **Introduction to Artificial Intelligence** | 02 | 5% |
| Introduction, History of Artificial Intelligence, Intelligent Systems: Categorization of Intelligent System, Components of AI Program, Foundations of AI, Sub-areas of AI, Applications of AI, Current trends in AI. |
| 2 | **Intelligent Agents** | 06 | 15 % |
| Agents and Environments, The concept of rationality, The nature of environment, The structure of Agents, Types of Agents, Learning Agent. |
| **Solving problem by Searching:** Problem Solving Agent, Formulating Problems, Example Problems. |
| 3 | **Problem solving** | 10 | 20% |
| **Uninformed Search Methods**: Breadth First Search (BFS), Depth First Search (DFS), Depth Limited Search, Depth First Iterative Deepening (DFID), Informed Search Methods: Greedy best first Search, A\* Search, Memory bounded heuristic Search. |
| **Local Search Algorithms and Optimization Problems**: Hill climbing search Simulated annealing, Genetic algorithms. |
| **Adversarial Search:** Game Playing, Min-Max Search, Alpha Beta Pruning |
| 4 | **Knowledge and Reasoning** | 08 | 20% |
| Knowledge based Agents, Brief Overview of propositional logic, First Order Logic: Syntax and Semantic, Inference in FOL, Forward chaining, backward Chaining. |
| Knowledge Engineering in First-Order Logic, Unification, Resolution |
| Uncertain Knowledge and Reasoning: Uncertainty, Representing knowledge in an uncertain domain, The semantics of belief network, Simple Inference in belief network |
| 5 | **Planning and Learning** | 06 | 20% |
| The planning problem, Planning with state space search, Partial order planning, Hierarchical planning, Conditional Planning. |
| **Learning**: Forms of Learning, Theory of Learning, PAC learning. Introduction to statistical learning (Introduction only) Introduction to reinforcement learning: Learning from Rewards, Passive Reinforcement Learning, Active reinforcement Learning |
| 6 | **AI Applications** | 04 | 10% |
| **A.** Introduction to NLP- Language models, Grammars, Parsing **B.** Robotics - Robots, Robot hardware, Problems Robotics can solve  **C.** AI applications in Healthcare, Retail, Banking |
| **Total** | | **36** | **100%** |

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| **2.b** | **Prerequisite Courses** |

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| No. | Semester | Name of the Course | Topic/s |
| 1 | 02 | C programming | All |
| 2 | 03 | DS | Array, link list and Trees. |
| 3 | 04 | AOA | Greedy Algorithms |

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| **2.c** | **Relevance to Future Courses** |

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| No. | Semester | Name of the Course |
| 1 | VII | Machine Learning |
| 2 | VIII | Natural Language Processing |
| 3 | VII + VIII | Final Year Project |

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| **2.d** | **Identify real life scenarios / examples which use the knowledge of the subject** |

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| Real Life Scenario | Concept Used |
| Personal Assistant : Siri , Google Now and Cortana are intelligent personal assistants | Intelligent Agents |
| Video Games: Video game AI has been used for a very long time but the complexity and effectiveness of that AI has increased exponentially over the past several decades. | Searching |
| Smart Cars: But self-driving cars are moving closer and closer to reality; Google’s self-driving car project and Tesla’s “autopilot” feature are two examples. | Intelligent Agents, Searching , Knowledge and Reasoning, Learning |
| Automobile Controls & Automation Systems – Engine firing control, Dashboard, Navigation and lighting control , Climate control, GPS, EBD/ABS Systems, Electronic Suspensions, CAN bus systems. | Intelligent Agents, Searching, Knowledge and Reasoning, Planning and Learning. |
| Purchase Prediction: Large retailers like Target and Amazon stand to make a lot of money if they can anticipate your needs. | Knowledge and Reasoning, Inferences and Learning. |
| Character Recognition, Handwriting Recognition, Activity Recognition, etc. | Applications |

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| **3.** | **Past Results – Division-Wise** |

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| --- | --- | --- | --- | --- |
| Details | Target – May 2024 | May 2023 | May 2022 | May 2021 |
| Course Passing % – Average of 2 Divisions | 100 | 100 | NA | NA |
| Marks Obtained by Course Topper ( mark/100) | 90 | 91 | 88 | NA |

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|  | Division A | | Division B | | Division C | |
| Year | Initials of Teacher | % Result | Initials of Teacher | % Result | Initials of Teacher | % Result |
| May 2023 | AHS | 98% | AHS | 98% |  |  |
| May 2022 | NA |  | NA |  |  |  |
| May 2021 | NA |  | NA |  |  |  |

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| **4** | **All the Learning Resources – Books and E-Resources** |

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| **4.a** | **List of Text Books (T – Symbol for Text Books) to be Referred by Students** |

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| --- | --- | --- | --- | --- | --- |
| Sr. No | Text Book Titles | Author/s | Publisher | Edition | Module Nos. |
| 1 | Artificial Intelligence : A Modern Approach | Stuart J. Russell and Peter Norvig | Pearson Education. | Second Edition | ALL |
| 2 | Artificial Intelligence | Saroj Kaushik | Cengage Learning | First Edition | ALL |
| 3 | Artificial Intelligence | George F. Luger | Pearson Education. | Fourth Edition | ALL |
| 4 | Artificial Intelligence and Intelligent Systems | N.P. Padhy | Oxford University Press. |  | ALL |

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| **4.b** | **List of Reference Books (R – Symbol for Reference Books) to be Referred by Students** |

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| --- | --- | --- | --- | --- | --- |
| Sr. No | Reference Book Titles | Author/s | Publisher | Edition | Module Nos. |
| 1 | Artificial Intelligence | Elaine Rich and Kevin Knight | Tata McGraw-Hill Education | Third Edition | All |
| 2 | Artificial Intelligence | Patrick Winston | Pearson Education. | Third Edition | 04 |
| 3 | A first course in Artificial Intelligence | Deepak Khemani | McGraw-Hill Publication |  | All |
| 4 | Principles of Artificial Intelligence | Nils Nilsson | Narosa Publication |  | 01,02,03 |

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| **4.c** | **List of E - Books (E – Symbol for E-Books) to be Referred by Students** |

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| Sr. No | E- Book Titles | Author/s | Publisher | Edition | Module Nos. |
| 1 | Artificial Intelligence” (R) (P) | Elaine Rich and Kevin Knight |  |  | 01,02,03,04,05 |
| 2 | Artificial Intelligence Lecture Notes MIT | Prof. Leslie Kaelbling and Prof. Tomas Lozano-Perez | MIT |  | 01,02,03,04,05,06 |
| 3 | Artificial Intelligence | Abhesik Taneja |  |  | 01,02,03,,06 |
| 4 | Artificial Intelligence Lecture Notes | Gordon S. Novak Jr |  |  | 01,02,03,,06 |

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| **4.d** | **Reading latest / top rated research papers (at least 5 papers)** |

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| --- | --- | --- | --- | --- |
| Name of Paper | Authors with Background | Published in | | Problem Statement |
| Date | Journal |
| Artificial Intelligence in Medicine: Today and Tomorrow | Giovanni Briganti and Olivier Le Moine | 05/02/2020 | Artificial Intelligence in Medicine: Today and Tomorrow | Giovanni Briganti and Olivier Le Moine |
| NLP Methods for Extraction of Symptoms from  Unstructured Data for Use in Prognostic COVID-19  Analytic Models | Greg M. Silverman  gms@umn.edu  Himanshu S. Sahoo  sahoo009@umn.edu  Nicholas E. Ingraham  ingra107@umn.edu  Monica Lupei  lupei001@umn.edu  University of Minnesota, Minneapolis | Oct. 2021 | Journal of Artificial Intelligence Research | Statistical modeling of outcomes based on a patient’s presenting symptoms (symptoma-  tology) to assist high quality care and to allocate essential resources, which is especially  important during the COVID-19 pandemic. |
| Thinking Fast and Slow in AI | G. Booch, F. Fabiano, L. Horesh, K. Kate, et.al IBM/ University of Udine/ European University | 15 Dec 2020 | Association for the Advancement of Artificial Intelligence (www.aaai.org). | This paper proposes a research direction to advance AI which draws inspiration from cognitive theories of human decision making. The premise is that if we gain insights about the causes of some human capabilities that are still lacking in AI (for instance, adaptability, generalizability, common sense, and causal reasoning), we may obtain similar capabilities in an AI system by embedding these causal components |
| Cuckoo-search and Gacha Games Rewards: How Can Improve the Relationship Between Player and Game by Using a Metaheuristic Algorithm? | Lucas Castañeda,  Rony Cueva,  [Manuel Tupia](https://ieeexplore.ieee.org/author/37542808300)  Pontificia ,Universidad Católica del Perú, Lima, Perú | 23-26 June 2021 | IEEE Xplore | To find a balance between user satisfaction and the benefit of the company, for which two types of user were used, who cover the characteristics of time spent in the game and how much they have invested in this. |
| Artificial intelligence moving serious gaming: Presenting reusable game AI components | Wim Westera, Rui Prada Samuel Mascarenhas et al | July 2019 | Springer | Proposes a set of advanced game AI components that enable pedagogical affordances and that can be easily reused across a wide diversity of game engines and game platforms to develop high quality serious games at reduced costs and in shorter periods of time. |

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| **4.e** | **Based on research paper an identify the current Problem statement** |

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| Problem Statement | Used in | | | | | |
| Quiz | Assignment | Lab | Mini Project | Poster Presentation | Test |
| Identification of AI-Game components, to improve the performance and user experience. |  |  |  |  | **🗸** |  |

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| **4.f** | **Identify Companies / Industries which use the knowledge of the subject and thus may provide Internships and final Placements** |

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| Name of the Company | To be / Contacted for | | |
| Student Internship | Student Final Placement | Faculty Internship |
| Cere Labs | **√** |  | **√** |

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| **4.g** | **Identify suitable relevant TOP Guest Speakers from Industry (CS50 Lecture by Mark Zuckerberg - 7 December 2005 - YouTube)** |

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| Name of the Identified Guest Speaker | Designation | Name of the Company |
| Sameer Ratolikar | CISO | HDFC Bank |
| Sanjay Joshi | CEO | Krushak mitra agro Pvt Ltd |
| Devesh Rajadhyax | CEO | Cere Labs |

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| **4.h** | **Identify relevant Technical competitions to participate [Competitions -Paper Presentations, Projects, Hackathons, IVs etc..]** |

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| Name of the Relevant Technical Competition Identified to participate | Organized by | Date of the Event |
| Google Summer of Code 2024 (programming competition) | Google | Deadline February 22, 2024 |
| Open AI - Hackathon 2024 | Open AI | March 3rd 2024 |

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| **4.i** | **Identify faculty in TOP schools / Universities who are teaching same / similar subject and develop rapport e.g. Exchange Lecture Material (Assignments / Tests / Project etc..), Joint Paper Publication** |

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| --- | --- | --- | --- | --- | --- |
| University | Name of the Course | Name of Faculty | Type of Collaboration | | |
| Exchange of Lecture Material | Joint Publication/ Research | Other |
| Kitami Institute of Technology, Hokkaido Japan | AI and Robotics | Dr. Abhijeet R. |  | Initiating the discussion on Joint research | Expert Talk |

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| **4.j** | **Web Links and Names of Magazines, Journals, E-journals – [VIT is member of IIT Bombay Library]** |

Refer online journals subscribed in VIT library. You can also access IIT Bombay online library for journals from IITB campus.

|  |  |  |  |
| --- | --- | --- | --- |
| Sr. No. | Web-Links and Names of Journals and E-Journals Recommended to Students for this Course | Web-Links and Names of Magazines Recommended to Students for this Course | Module Nos. |
| 1 | [www.ceser.in/ceserp/index.php/ijai](http://www.ceser.in/ceserp/index.php/ijai) | AI Magazine  http://www.aaai.org/Magazine/magazine.php | 02,03 |
| 2 | www.sciedupress.com/journal/index.php/air |  | 03,02 |
| 3 | https://www.journals.elsevier.com/artificial-intelligence/ | https://www.inns.org | 03,04 |
| 4 | www.springer.com › Home › Computer Science › Artificial Intelligence |  | 03,04 |
| 5 | [www.jair.org](http://www.jair.org) |  | 05 |

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| **4.k** | **Module Best Available in - Tick ONE best resource [from *4.a* to *4.d* in this AAP] & give details** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Module No. | Category ( Please Tick Mark ) - √ | | | | | | Available In VIT Library? | | Details of the Resource  (i.e. Name, Chapter no.etc.) |
| Book | | | Maga-zine | Journals | |
| Text | Reference | E-Book | Regular | E-Journal | Y | N |
| 1 | √ |  |  |  |  |  | Y |  | T1,R1 |
| 2 | √ |  |  |  |  |  | Y |  | T1,R1 |
| 3 | √ |  |  |  |  |  | Y |  | T1,R1 |
| 4 | √ |  |  |  |  |  | Y |  | T1,R1 |
| 5 | √ |  |  |  |  |  | Y |  | T1,R1 |
| 6 |  | √ |  |  |  |  | Y |  | T1,R1 |

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| **4.l** | **Referred to any top-rated university in that subject for content** |

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| --- | --- | --- | --- | --- |
| University | Name of the Course | Name of Faculty | Date of Delivery of the Course | Remarks |
| University of Toronto | CSC384 - Intro to AI | Bahar Ameri and Sonya Allin | Summer 2021 | Covers 80% topics of this course |
| Massachusetts Institute of Technology | 60002:Introduction to Computational Thinking and Data Science | Prof. Eric Grimson  Prof. John Guttag | Fall 2016 | Give information about basics of Data Science |
| Stanford University | Artificial Intelligence: Principles and Techniques | Tatsunori Hashimoto | Spring 2021-22 | Cover Searching algorithm in details |
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| **4.m** | **Faculty received any certification related to their subject. List of Certifications Identified / Done** |

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| --- | --- | --- | --- | --- |
| Course | Certifying Agency | Certification | | Remarks |
| Done on | Proposed to be on |
| Introduction to Natural Language Processing | Great Learning | DEC 2022 |  |  |
| Introduction to AI | NPTL Swayam |  | April 2024 | Registered |

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| **4.n** | **Completed subject wise/cluster wise training with cluster mentor.**  **List of relevant Refresher Course Identified / Done** |

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| Course | Certifying Agency  (As suggested by DAB/Cluster Mentor/Industry/University other than MU) | Certification | | Remarks |
| Done on | Proposed to be on |
| Pedagogy | Teaching with Technology | 2020 |  | Use of different tools to improve the students engagement and participation. |
|  |  |  |  |
| PBL | Fundamentals of PBL (NPTEL) |  | March 2021 | Covers approaches used in design of PBL |
|  |  |  |  |
| Sub. Content Training | Python for Everybody |  | April 2021 | COURSERA and University of Michigan |
| “Post Pandemic Scenario Building using AI, ML and Optimization Techniques” |  | July 2020 | On line FDP |

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| **4.o** | **Best Practices Identified and adopted** |

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| No. | Item | Best Practices Identified | | |
| Univ. 1 MIT USA | Univ. 2 Stanford USA | Univ. 3 Texas USA |
| 1 | Microsite | https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/ | https://ai.stanford.edu/~latombe/cs121/2011/schedule.htm | <https://www.cs.utexas.edu/~mooney/cs343/>  Raymond J. Mooney |
| 2 | Video Lectures | Prof. Patrick Henry Winston | https://online.stanford.edu/artificial-intelligence/free-content?category=All&course=All |  |
| 3 | Assignments | https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/assignments/ | https://ai.stanford.edu/~latombe/cs121/2011/schedule.htm | https://www.cs.utexas.edu/~mooney/cs343/ |
| 4 | Mini Project |  |  | https://www.cs.utexas.edu/~mooney/cs343/proj1/ |
| 5 | Assessment Metric |  |  |  |
| 6 | Quizzes | https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/exams/ |  |  |
| 7 | Labs/ Practical (PBL) | https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/assignments/ |  |  |
| 8 | Tests | https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/exams/ |  | https://www.cs.utexas.edu/~mooney/cs343/ |
| 9 | Etc |  |  |  |
| 10 | Peer Assessment etc. |  |  |  |

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| **4.p** | **Web Links for Online Notes/YouTube/VIT Digital Content/VIT Lecture Capture/NPTEL Videos** |

Students can view lectures by VIT professors, captured through LMS ‘Lecture Capture’ in VIT campus for previous years.

|  |  |  |
| --- | --- | --- |
| No. | Websites / Links | Module Nos. |
| 1 | <https://www.coursera.org/courses?query=artificial%20intelligence> | 01,02,03 |
| 2 | https://nptel.ac.in/courses/106/105/106105078/ | ALL |
| 3 | <http://ocw.mit.edu> | 02,03 |
| 4 | https://thestempedia.com/blog/simple-ai-and-machine-learning-projects-for-students-and-beginners/ | 02,03 |
| 5 | https://nptel.ac.in/courses/106/105/106105079/ | ALL |
| 6 | <http://ai.stanford.edu/courses/> | 03,04 |
| 7 | <https://www.udacity.com/course/intro-to-artificial-intelligence--cs271> | 01,02,03 |
| 8 | <https://www.youtube.com/watch?v=gcK_5x2KsLA> | 04,05 |

|  |  |
| --- | --- |
| **4.q** | **Recommended MOOC Courses like Coursera / NPTEL / MIT-OCW / edX/VAC etc.** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sr. No. | MOOC Course Link | Course conducted by – Person / University / Institute / Industry | Course Duration | Certificate (Y / N) |
| 1 | <https://onlinecourses.nptel.ac.in/noc24_cs08/preview> | NPTL, Swayam | 12 Weeks | Y |

|  |  |
| --- | --- |
| **5** | **Consolidated Course Lesson Plan** |

|  |  |  |  |
| --- | --- | --- | --- |
|  | From (date/month/year) | From (date/month/year) | Total Number of Weeks |
| Semester Duration |  |  |  |

| Week | Lecture no. | Module No. | Lecture Topics / IA 1 and IA 2 / BSA planned to be covered | Actual date of Completion  (Hand written) | COs  Mapped | Recommended  Prior Viewing / Reading | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Lecture No. (on LMS) | Chapter No./ Books/ Web Site |
| 1 | 1 | 1 | Introduction, History of Artificial Intelligence, Intelligent Systems: Categorization of Intelligent System |  | CO1 |  | Chap 01  Book 01 Page 01-30 |
|  |  |  |  |  |  |  |
| 2 | 2 | 1 | Components of AI Program, Foundations of AI, Sub-areas of AI, Applications of AI, Current trends in AI. |  | CO1 |  | Chap 01  Book 01 Page 01-30 |
|  |  |  |  |  |  |  |
| 3 | 3 | 2 | Intelligent Agents: Agents and Environments, Rationality, Nature of Environment, Structure of Agent, types of Agent |  | CO2 |  | Chap 02  Book 01 Page 32-56 |
|  |  |  |  |  |  |  |
| 4 | 4 | 3 | Problem Solving Agent, Formulating Problems, Example Problems |  | CO3 |  | Chap 07  Book 01  Page 194-236 |
|  |  |  |  |  |  |  |
| 5 | 5 | 3 | Uninformed Search Methods: DFS, BFS, Depth Limited Search, Depth First Iterative Deepening (DFID), Uniform Cost Search |  | CO3 |  | Chap 07  Book 01  Page 194-236 |
|  |  |  |  |  |  |  |
| 6 | 6 | 3 | Informed Search Methods: Greedy best first Search, A\* Search, Memory bounded heuristic Search |  | CO3 |  | Chap 08  Book 01 Page 240-268 |
|  |  |  |  |  |  |  |
| 7 | 7 | 3 | Hill climbing search Simulated annealing, Genetic algorithms. |  | CO3 |  | Chap 08  Book 01 Page 240-268 |
|  |  |  |  |  |  |  |
| 8 | 8 | 3 | Game Playing, Min-Max Search, Alpha Beta Pruning |  | CO3 |  | Chap 08  Book 01 Page 270-275 |
|  |  |  |  |  |  |  |
| 9 | 9 | 4 | Knowledge, Reasoning: Knowledge based agents, First order logic: syntax and Semantic |  | CO4 |  | Chap 08  Book 01 Page 217-261 |
|  |  |  |  |  |  |  |
| 10 | 10 | 4 | Knowledge Engineering in FOL Inference in FOL |  | CO4 |  | Chap 08  Book 01 Page  265-294 |
|  |  |  |  |  |  |  |
| 11 | 11 | 4 | Uncertain Knowledge and Reasoning: Uncertainty, Representing knowledge in an uncertain domain, The semantics of belief network, Simple Inference in belief network |  | CO4 |  | Chap 08  Book 01 Page  265-294 |
|  |  |  |  |  |  |  |
| 12 | 12 | 5 | The planning problem, Planning with state space search, Partial order planning, Hierarchical planning, Conditional Planning. |  | CO5 |  | Chap 09  Book 01 Page  297-332 |
|  |  |  |  |  |  |  |
| 13 | 13 | 5 | Forms of Learning, Theory of Learning, PAC learning. Introduction to statistical learning |  | CO5 |  | Chap 10  Book 01 Page  237-340 |
|  |  |  |  |  |  |  |
| 14 | 14 | 5 | Introduction to reinforcement learning: Learning from Rewards, Passive Reinforcement Learning, Active reinforcement Learning |  | CO5 |  | Chap 10  Book 01 Page  241-347 |
|  |  |  |  |  |  |  |
| 15 | 15 | 6 | Introduction to NLP- Language models, Grammars, Parsing |  | CO6 |  | Chap 12  Book 01 Page  262-373 |
|  |  |  |  |  |  |  |
| 16 | 16 | 6 | Robots, Robot hardware, Problems Robotics can solve  AI applications in Healthcare, Retail, Banking |  | CO6 |  | ------ |
|  |  |  |  |  |  |  |

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| **6** | **Rubric for Grading and Marking of Term Work (inform students at the beginning of semester)** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Theory (ISA=20) | | | | | Practical (ISA=25 ) | | | | Total |
| Class Participation | | Class Test | Student Seminar | Assignments | Lab Participation | Lab work | Certification | PBL |
| 05 | | 05 | 05 | 05 | 05 | 10 | 05 | 05 | 45 |
| **7** | | **Assignments / Tutorials Details** | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Assignment/ Tutorial No. | Title of the Assignments / Tutorials | CO Map | Assignment/ Tutorials given to Students on | Week of Submission |
| 1 | Assignments 01 | CO1 | Week 1 | 2 |
| 2 | Assignments 02 | CO2 | Week 2 | 3 |
| 3 | Assignments 03 (Student Debate) | CO2 | Week 3 | 4 |
| 4 | Assignments 04 | CO3 | Week 4 | 5 |
| 5 | Assignments 05 (Pop Quiz) | CO3 | Week 5 | 6 |
| 6 | Assignments 06 (THT) | CO3 | Week 6 | 7 |
| 7 | Assignments 07 (Pop Quiz) | CO4 | Week 7 | 8 |
| 8 | Assignments 08 | CO4 | Week 8 | 9 |
| 9 | Assignments 09 (THT) | CO4 | Week 9 | 10 |
| 10 | Assignments 10 (Poster presentation) | All | Week 13 | 13 |
| 11 | Assignments 11 (Mini project) | All | Week 13 | 14 |

**Analysis of Assignment / Tutorial Questions and Related Resources**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Assignment / Tutorial No. | Week No. | Type\* (√) | | | Module No. | Based on # | | | Question Type (√) | |
| R | PQ | OBT | Text Book | Reference  Book | Other Learning Resource | MU EQ | Thought Provoking |
| 1 | 7 | √ |  |  | 1,2,3 | √ |  |  | √ |  |
| 2 | 14 | √ |  |  | 4,5,6 | √ |  |  | √ |  |
| 3 |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |  |

\* Tick (√) the Type of the Assignment: Regular (R); Pop Quiz (PQ) ; Open Book Test for TE/BE/ME (OBT)

# Write number for text book, reference book, other learning resource from this AAP – *from* *Points 4.a to 4.d*

|  |  |
| --- | --- |
| **8** | **Internal Assessment / Other Class Test / Open Book Test (OBT)/Take Home Test (THT) Details** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tests | Test Dates | Module No. | CO Map | MSE Question Paper Pattern | Policy |
| MSE (3) | --- | 1,2,3,4,5,6 | ALL | Q1 – 8 Sub Questions of 2 marks each, Attempt any 5 (**MCQs)**  Q2 & Q3 – Descriptive & will be of   * 3 Sub questions of 5 marks each & student will attempt any 2   Or   * 2 Sub questions of 10 marks each & student will attempt any 1 | MSE will be paper based examination. |
|  |  |  |  |
| Pop Quiz | Week 5 and 7 | 3, 4 | CO3, CO4 |  |  |
| Open Book Test |  |  |  |  |  |
| Take Home Test | Week 6 and 8 | 5 | CO3, CO4 |  |  |
| Class tests / prelims |  |  |  |  |  |
| Class tests / prelims |  |  |  |  |  |
| Any other test/exams |  |  |  |  |  |

**\* Failures of IA test (IA1+IA2) shall appear for IA test in the next semester. There is no provision for re-test in the same semester.**

|  |  |
| --- | --- |
| **9.a** | **Practical Activities – Regular Experiments** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Practical No. | Module No. | Title of the **Regular Experiments** | Topics to be highlighted | CO Map |
| 1 | 2 | Implementation of Tic-Tac-Toe game using approach 2 | AI Techniques | CO2 |
| 2 | 2 | Implementation of Tic-Tac-Toe game using approach 3 | AI Techniques | CO2 |
| 3 | 2 | Implementation of Water jug problem. Design a puzzle that can be solved by user | AI Techniques with Heuristic function | CO2 |
| 4 | 2 | Implementation of Water jug problem. Design an AI logic which will solve the problem of itself | AI Techniques with Heuristic function | CO2 |
| 5 | 2 | Implementation of 8 Puzzle problem. Design a puzzle that can be solved by user | AI Techniques with Heuristic function | CO2 |
| 6 | 2 | Implementation of 8 Puzzle problem. Design an AI logic which will solve the problem of itself | AI Techniques with Heuristic function | CO2 |
| 7 | 3 | Implementation of 8 Puzzle problem using Hill Climbing search. | Local Search | CO3 |
| 8 | 3 | Implementation of 8 Puzzle problem using Best First search. | Informed Search | CO3 |
| 9 | 3 | Implementation of Tic-Tac-Toe game using min-max search | Game Playing | CO3 |
| 10 | 3 | Implementation of Tic-Tac-Toe game using alpha-beta cutoff search | Game Playing | CO3 |

|  |  |
| --- | --- |
| **9.b** | **Practical Activities – Newly Added Experiments** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Practical No. | Module No. | Title of the **Newly Added Experiments** | Concepts to be highlighted | CO Map |
| 1 | 2 | Implementation of arithmetic solution to the Water jug problem | AI Techniques | CO2 |
| 2 |  |  |  |  |

|  |  |
| --- | --- |
| **9.c** | **Practical Activities – PBL Experiments** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Practical No. | Module No. | Title of the **PBL Experiments** | Concepts to be highlighted | CO Map |
| 1 | 4 | Implementation of BOTCLEAN, a cleaning bot whose to clean all the dirty cells | Knowledge Base | CO4 |
| 2 | 4 | Implementation of BOT SAVE PRINCESS, a bot whose job is to rescue the princess | Knowledge Base | CO4 |
|  |  |  |  |  |

|  |  |
| --- | --- |
| **10** | **Beyond Syllabus Activities for Gap Mitigation** |

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Type of the Activity | Activities | Details – no of attendees, guest, feedback, mark sheet, report |
| 1 | **Experiential learning/Interaction with Outside World** | 1- Guest Lectures by Industry Expert | Planned |
| 2- Workshops | NA |
| 3- Mini Project | Planned |
| 4- Industrial Visit | NA |
| 5- Any other activity | NA |
| 2 | **Collaborative & Group Activity** | 1- Poster Presentation | Planned |
| 2- Minute Papers | NA |
| 3- Students Seminars | NA |
| 4- Students Debates | Planned |
| 5- Panel Discussion / Mock GD | NA |
| 6- Mock Interview | NA |
| 7- Any other activity | NA |
| 3 | **Co-Curricular Activity** | 1- Informative videos (NPTEL/Youtube /TEDx/ MIT OW/edX) | NPTEL/ YouTube Videos |
| 2- Lecture Capture Usage | NA |
| 3-Any other activity | NA |
| 4 | **Tests & Assessments** | 1- Class Tests/ Weekly Tests | NA |
| 2- Pop Quiz | Planned |
| 3- Mobile App Based Quiz | NA |
| 4- Open Book | NA |
| 5- Take Home Test | Planned |
| 6-Any other activity | NA |

|  |  |
| --- | --- |
| **11.1** | **One-on-One Academic Mentoring Meetings done** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Name of Mentee | Date of One-On-One Meeting | | |
| Beginning of Sem. | After Mid Term Results | Before End Sem. |
| 1 | Nikhil Agrawal |  |  |  |
| 2 | Shashank Joshi |  |  |  |
| 3 | Parmeshwar Chauhan |  |  |  |
| 4 | Tanmay Bhanushali |  |  |  |
| 5 | Harsh Thakur |  |  |  |
| 6 | Gautam Mandal |  |  |  |
| 7 | Miral Gudhka |  |  |  |
| 8 | Anurag Chaudhari |  |  |  |
| 9 | Shiv Rakh |  |  |  |
| 10 | Susham Desai |  |  |  |
| 11 | Amritesh Jha |  |  |  |
| 12 | Yash Sarfare |  |  |  |
| 13 | Chaitanya Sarode |  |  |  |
| 14 | Vandan Raval |  |  |  |
| 15 | Ayush Danao |  |  |  |
| 16 | Pranav Khedekar |  |  |  |
| 17 | Sharyu Sonavane |  |  |  |
| 18 | Aditya Mali |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
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| --- | --- |
| **11.2** | **Identify Financial Concerns and refer appropriately** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Name of Mentee |  | | |
| Individual Goals Identified | Any Financial Concern which needs to be referred to | Any Emotional Concern to be referred to |
|  |  |  |  |  |

**\* Do not delete any activity. Give details for planned events. Write ‘NA’ for activity Not Planned.**

Consolidated Academic Administration PlanPrepared by (mention all theory teaching faculty names with signature)

Please write below your name and sign with date of the external cluster mentor meeting

|  |  |  |
| --- | --- | --- |
| Faculty 1 | Faculty 2 | Faculty 3 |

|  |  |  |  |
| --- | --- | --- | --- |
| External Industry Mentor | External Academic Mentor | VIT Cluster Mentor | Program HOD |