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**Dawood University of Engineering & Technology, Karachi**

**Department of Artificial Intelligence**

**Course Report: Pre-Assessment**

**Course: Artificial Intelligence**

**5th Semester- 2022/F Batch**

**Engr. Mustafa Mohiuddin**

# **Guidelines for course assessment**

1. Assessment means primarily the assessment of course learning outcomes and program learning outcomes covered by the course. Other additional types of assessment can be used if useful (such as the online student survey or other assessment techniques).
2. Assessment is mandatory for all courses in each semester. Each faculty member teaching a course must produce a course assessment report (CAR) as part of the course portfolio.
3. If a course has several sections and each section is taught by a different instructor, assessment must be done for each section separately.
4. CAR must contain both direct assessment (opinion of the teacher using quizzes, exams, assignments, etc.) and indirect assessment (opinion of students through surveys).
5. Each faculty member must keep his data at the most detailed level (marks by student, by outcome, and by quiz/exam/assignment, etc.). Having the data at the detailed level will serve as evidence. It will also allow generating any aggregation we might need later.
6. Assessment is based on two different levels, first is average score of all students in a specific program outcome, and second is how well a student has performed in each course learning outcome.

1. The attainment of PLOs **must be judged primarily by using the average score of all students** in a specific outcome.
2. Levels of satisfaction in **ProgramLearningOutcomes** is defined through KPIs set as follows:
   1. For direct assessment:

* **Level 4: Unsatisfactory** is given to a student whose score in a specific outcome is 60% or lower,
* **Level 3: Developing** is given to a student whose score in a specific outcome is between 60% and 69%,
* **Level 2: Satisfactory** is given to a student whose score in a specific outcome is between 70% and 79%,
* **Level 1: Exemplary** is given to a student whose score in a specific outcome is equal or above 80%.
  1. For indirect assessment:
* **Unsatisfactory**:corresponds to **Disagree** + **Strongly Disagree** in a specific outcome.
* **Developing**: corresponds to **Neutral** in a specific outcome.
* **Satisfactory**: corresponds to **Agree** in a specific outcome.
* **Exemplary**: corresponds to “**Strongly Agree**” in a specific outcome.

1. The final judgment of the attainment of PLOs is based on the followings:

**Table 1:** Criteria for attainment of PLOs

|  |  |  |  |
| --- | --- | --- | --- |
| **Exceeds**  **Expectations**  **(EE)** | **Meets**  **Expectations**  **(ME)** | **Progressing**  **Towards Expectations**  **(PE)** | **Does Not Meet**  **Expectations**  **(DNME)** |
| **The average grade is**  **80% or more** | **The average**  **grade is between**  **70% - 79%** | **The average**  **grade is between**  **60% - 69%** | **The average**  **grade is less than 60%** |

**10**. When analyzing the results of the assessment of a course, we must necessarily pay attention to the following cases:

* Cases with DNME in a specific outcome.
* Cases with PE in a specific outcome.
* Cases with an important discrepancy (let's say > 15%) between direct and indirect assessment for a specific outcome; especially if the direct assessment (opinion of teacher) is much higher than the indirect assessment (opinion of students).
* Online Student Survey: if we have questions with Unsatisfactory or Developing, we should also comment them.

1. The analysis of the assessment results must be oriented towards:

* Identifying the issues and root causes behind the non-attainment of a specific outcome.
* Determining corrective actions to be taken in the following semester(s) to resolve those issues and root causes.

1. Level of satisfaction in CLOs for individual student are defined through the KPIs set as follows:

* **Unsatisfactory** is given to a student whose score in a specific outcome is 60% or lower,
* **Developing** is given to a student whose score in a specific outcome is between 60% and 70%,
* **Satisfactory** is given to a student whose score in a specific outcome is between 70% and 79%,
* **Exemplary** is given to a student whose score in a specific outcome is equal or above 80%.

1. At the end of each semester / beginning of following semester, an assessment meeting will be held at the department level in order to evaluate the **teaching achievements and issues** of the past semester based on course assessment reports done for each course taught. An **improvement plan** will result based on that assessment meeting. All faculty members should be involved and work to implement the improvement plan during the following semester(s).
2. Process of reviewing of CLOs shall be based on data collected by CLO assessment. A CLO shall be revisited in case an overall satisfactory level of that CLO goes below 60%. Recommendation (or mapping) shall be discussed by and reviewed by OBE Implementation team and shall be forwarded for further approval at BoS.

# **Course Summary**

**Table 2:** Course Summary

|  |  |
| --- | --- |
| **COURSE SUMMARY** | |
| **Course Code and Title** | Artificial Intelligence |
| **Semester** | 5th |
| **Instructor** | Engr. Mustafa Mohiuddin |
| **Course Format** | **3 (3+1)** – 3 hours lectures per week |
| **No. of Students** | 1 section, 50 students |
| **Average GPA** | **--/ 4** |

# **Course Contents**

Title of Course : Artificial Intelligence

Course Code : CS2107

Discipline : B.S. (Artificial Intelligence)

Semester : 5th Semester, Third Year

Effectiveness : Batch 21F and onwards

Course Type : Compulsory

Pre-Requisite : -

Marks : Theory: 100 Practical: 50

Credit Hours : 3 CH 01 CH

Teaching Scheme : 3 Hours / Week 03 Contact Hours / Week

Assessment : 20% Sessional, 30% Mid Semester Examination, 50% Final Semester

**Introduction:** Artificial Intelligence has emerged as one of the most significant and promising areas of computing. This course focuses on the foundation of AI and its basic techniques like symbolic manipulations, Pattern Matching, Knowledge Representation, Decision Making and appreciating the differences between Knowledge, Data and Code. AI programming language Python has been proposed for the practical work of this course.

**Objective:**

Artificial Intelligence (AI) is a constantly and actively growing and changing field. In this course, students will learn the basics of modern AI as well as some of the representative approaches of AI.

**Contents:**

An introduction to Artificial Intelligence and its applications towards Knowledge Based Systems; Introduction to Reasoning and Knowledge Representation, Problem Solving by Searching (Informed searching and uninformed searching, Heuristics, Local searching, Min max algorithms, Alpha beta pruning, Game playing); Case Studies; General Problem Solver, Eliza, Students, Macsyma; Learning from examples; ANN and Natural Language Processing; Recent trends in AI and applications of AI algorithms. Python programming language will be used to explore and illustrate various issues and techniques in Artificial Intelligence.

# **Course Learning Outcomes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Mapping of CLOs and PLOs** | | | |
| **S. No.** | **Course Learning outcomes** | **PLOs** | **Blooms Taxonomy** |
| CLO 1 | Explain the fundamental concepts and principles of Artificial Intelligence (AI) and its application areas | P-9 | C2 |
| CLO 2 | Apply appropriate AI algorithms and techniques to solve complex problems | P-10 | C3 |
| CLO 3 | Formulate real-world problems as state space problems, optimization problems or constraints satisfaction problems | P-3 | C6 |

**Recommended Books:**

1. Russell, S. and Norvig, P. “Artificial Intelligence. A Modern Approach”, 3rd ed, Prentice Hall, Inc., 2015.
2. Severance, C.R., 2016. “Python for everybody: Exploring data using Python 3.” CreateSpace Independent Publ Platform.
3. Miller, B.N., Ranum, D.L. and Anderson, J., 2019. “Python programming in context.” Jones & Bartlett Pub.
4. Joshi, P., 2017. “Artificial intelligence with python.” Packt Publishing Ltd.

# **Course Delivery (Topics Planned)**

1. *List the topics you planned at the beginning of the course.*

**Table 3:** Course Lecture Plan

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Week No.** | **Lecture No.** | **Date** | **Topics** | **Reference material** | **Assignment / Quiz** | **Related CLO** |
| Week 1 | 1 |  | Importance and purpose of artificial intelligence | Power point Presentation |  | **CLO 1** |
| 2 |  | Advantages of Artificial Intelligence  Disadvantages of Artificial Intelligence |
| 3 |  | Application of AI |
| Week 2 | 4 |  | Types of Artificial Intelligence | Power point Presentation | **(Quiz)** |
| 5 |  | History and future of artificial intelligence |
| 6 |  | Agent |
| Week 3 | 7 |  | PEAS Representation | Power point Presentation |  |
| 8 |  | Agent Environment in AI |
| 9 |  | Types of AI agents |
| Week 4 | 10 |  | Turning Test Approach | Power point Presentation |  |
| 11 |  | Informed Search |
| 12 |  | Uninformed Search |
| Week 5 | 13 |  | Best first search | Power point Presentation | Quiz 1 |
| 14 |  | Greedy Search |
| 15 |  | Quiz 1 |
| Week 6 | 16 |  | A\* | Power point Presentation |  | **CLO 2,** |
| 17 |  | AO\* search |
| 18 |  | Hill climbing |
| Week 7 | 19 |  | Simulated annealing | Power point Presentation |  |
| 20 |  | Steepest ascent hill climbing |
| 21 |  | Branch and bound |
| Week 8 | 22 |  | Crypt arithmetic problem | Power point Presentation | Assignment 1 |
| 23 |  | Crypt arithmetic problem |
| 24 |  | State space search |
| Week 9 | 25 |  | 8 tile puzzle | Power point Presentation |  | **CLO 3** |
| 26 |  | A\* in 8 tile puzzle problem |
| 27 |  | Water jug problem |
| Week 10 | 28 |  | 8 Queen problem | Power point Presentation |  |
| 29 |  | Missionaries and Cannibals problem |
| 30 |  | Tower of Hanoi |
| Week 11 | 31 |  | Expert Systems | Power point Presentation |  |
| 32 |  | Components of Expert Systems |
| 33 |  | Expert Systems Limitations |
| Week 12 | 34 |  | Applications of Expert System | Power point Presentation |  |
| 35 |  | Benefits of Expert Systems |
| 36 |  | Development of Expert Systems |
| Week 13 | 37 |  | Machine Learning | Power point Presentation |  |
| 38 |  | Traditional Programming |
| 39 |  | Machine Learning lifecycle |
| Week 14 | 40 |  | Supervised, | Power point Presentation |  | **CLO 4** |
| 41 |  | Unsupervised |
| 42 |  | Reinforcement |
| Week 15 | 43 |  | Quiz 2 | Power point Presentation | Quiz 2 |
| 44 |  | Regression |
| 45 |  | classification |
| Week 16 | 46 |  | Assignment 2 | Power point Presentation | Assignment 2 |
| 47 |  | Confusion Matrix |
| 48 |  | Paper Discussion |

1. *Assessment Plan*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment tools** | **CLO-1** | **CLO-2** | **CLO-3** | **Total** |
| **Quiz 1** |  |  |  |  |
| **Quiz2** |  |  |  |  |
| **Mid Exam** |  |  |  |  |
| **Final Exam** |  |  |  |  |
| **Total** |  |  |  |  |

1. *Marks Distribution against CLOs*

|  |  |  |  |
| --- | --- | --- | --- |
| **Marks Distribution** | | | |
| CLO-1 | CLO-2 | CLO-3 | **Total** |
|  |  |  | 100 |

1. *Marks Distribution against PLOs*

|  |  |  |  |
| --- | --- | --- | --- |
|  | PLO-9 | PLO-10 | PLO-3 |
| CLO 1 | 45 Marks |  |  |
| CLO 2 |  | 45 Marks |  |
| CLO 3 |  |  | 10 Marks |
| **Total** | **45** | **45** | **10** |

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