**COURSE PLAN**

|  |  |
| --- | --- |
| Target | 50% (marks) |
| Level-1 | 40% (population) |
| Level-2 | 50% (population) |
| Level-3 | 60% (population) |

1. **Method of Evaluation**

|  |  |
| --- | --- |
| **UG** | **PG** |
| Quizzes/Tests, Assignments (30%) | Quizzes/Tests, Assignments, seminar (50%) |
| Mid Examination (20%) | End semester (50%) |
| End examination (50%) |  |

\*may be keep as per Program (UG/PG)

1. **Passing Criteria**

|  |  |  |
| --- | --- | --- |
| **Scale** | **PG** | **UG** |
| **Out of 10point scale** | SGPA – “6.00” in each semester  CGPA – “6.00”  Min. Individual Course Grade  –  “C”  Course Grade  Point –  “4.0” | SGPA – “5.0” in each semester  CGPA – “5.0”  Min. Individual Course Grade  –  “C”  Course Grade  Point –  “4.0” |

\*may be keep as per Program (UG/PG)

1. **Pedagogy**
2. **Class Test**
3. **Quiz**
4. **Assignments/ Tutorials**
5. **Digital Presentations/Video lectures**
6. **Concept diary (needs to be maintained by students-short and concise notes which include course concepts that he/she has understood.)**
7. **Topics introduced for the first time in the program through this course**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **References:**

|  |  |  |  |
| --- | --- | --- | --- |
| Text Books | Web resources | Journals | Reference books |
| Data Mining -Concept & Techniques  J Han, M Kamber, j Pei |  |  | Jiawei Han, M |

**Signature of HOD/Dean Signature of Faculty**

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**GUIDELINES TO STUDY THE SUBJECT**

**Instructions to Students:**

1. Go through the 'Syllabus' in the Black Board section of the web-site(https://learn.upes.ac.in) in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at Lecture Notes section.  These are our lecture notes. Make sure you use them during this course.
4. check your blackboard regularly
5. go through study material
6. check mails and announcements on blackboard
7. keep updated with the posts, assignments and examinations which shall be conducted on the blackboard
8. Be regular, so that you do not suffer in any way
9. C**ell Phones and other Electronic Communication Devices:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.
10. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
11. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail [pkainthura@ddn.upes.ac.in](mailto:pkainthura@ddn.upes.ac.in) Please use an appropriate subject line to indicate your message details.

There will no doubt be many more activities in the coming weeks. So, to keep up to date with all the latest developments, please keep visiting this website regularly.

**RELATED OUTCOMES**

1. **The expected outcomes of the Program are:**

|  |  |
| --- | --- |
| PO1 | **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. |
| PO2 | **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. |
| PO3 | **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| PO4 | **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. |
| PO5 | **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. |
| PO6 | **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| PO7 | **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| PO8 | **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |
| PO9 | **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| PO10 | **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| PO11 | **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| PO12 | **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

1. **The expected outcomes of the Specific Program are: (upto3)**

|  |  |
| --- | --- |
| PSO1 | Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques. |
| PSO2 | Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms. |
| PSO3 | To create & develop most efficient solutions by applying machine learning with analytical emphasis on industrial and research problems |

1. **The expected outcomes of the Course are: (minimum 3 and maximum 6)**

|  |  |
| --- | --- |
| CO 1 | Explain the basic concepts of data mining as KDD Process. |
| CO 2 | Demonstrate the steps involved in data pre-processing. |
| CO 3 | Practice the various data mining algorithms and development of models. |
| CO 4 | Examine developed models and their validation. |
|  |  |

1. **Co-Relationship Matrix**

Indicate the relationships by1- Slight (low) 2- Moderate (Medium) 3-Substantial (high)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Program**  **Outcomes**  **Course Outcomes** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO1110** | **PO111** | **PO112** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | 1 |  |  | 1 |  |  |  |  |  |  |  |  |  |  | 3 |
| CO2 | 1 |  |  | 2 |  |  |  |  |  |  |  |  |  |  | 3 |
| CO3 | 2 |  |  | 2 |  |  |  |  |  |  |  |  |  |  | 3 |
| CO4 | 2 |  |  | 2 |  |  |  |  |  |  |  |  |  |  | 3 |
| **Average** | 1.5 |  |  | 1.75 |  |  |  |  |  |  |  |  |  |  | 3 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. **Course outcomes assessment plan:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **components**  **Course Outcomes** | **Assignment** | **Test/Quiz** | **Mid Semester** | **End Semester** | **Any other** |
| **CO 1** | **□** | **□** | **□** | **□** | **□** |
| **CO 2** | **□** | **□** | **□** | **□** | **□** |
| **CO3** | **□** | **□** | **□** | **□** | **□** |
| **CO4** | **□** | **□** | **□** | **□** | **□** |

**OVERVIEW OF COURSE DELIVERY/BROAD PLAN OF COURSE COVERAGE**

**Course Activities:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Description** | **Planned** | | | **Actual** | | | **Remarks** |
| **From** | **To** | **No. of Ses** | **From** | **TO** | **No. of Ses** |
| **1.** | Data Mining Introduction |  |  |  |  |  | 3 |  |
| **2.** | Data Understanding |  |  |  |  |  | 5 |  |
| **3.** | Data preparation & Prediction Models |  |  |  |  |  | 7 |  |
| **4.** | Prediction models & Model Development |  |  |  |  |  | 5 |  |
| **5.** | Model evaluation and deployment |  |  |  |  |  | 4 |  |

Sessions: Total No. of Instructional periods available for the course

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**Date: Date:**

**SESSION PLAN**

**UNIT-I**

**Introduction to Data Mining**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Session Plan | | | | Actual Delivery | | | |
| Lect. | Date | Topics to be Covered | CO Mapped | Lect. | Date | Topics Covered | CO Achieved |
| 1 |  | Concept of data mining  Data Mining as the evolution of Information Technology  Other technologies with data mining | CO1 |  |  |  |  |
| 2 |  | KDD Process  Kinds of data and pattern that can be mined | CO1 |  |  |  |  |
| 3 |  | Application areas  Issues in data mining | CO1 |  |  |  |  |

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**SESSION PLAN**

**UNIT-II**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Session Plan | | | | Actual Delivery | | | |
| Lect. | Date | Topics to be Covered | CO Mapped | Lect. | Date | Topics Covered | CO Achieved |
| 4 |  | Data objects and attribute types  Distribution and summary statistics | CO2 |  |  |  |  |
| 5 |  | Data Visualization techniques  -Pixel oriented  -Icon based  -geometric projection | CO2 |  |  |  |  |
| 6 |  | Data dissimilarity and similarity concepts and methods- data matrix | CO2 |  |  |  |  |
| 7 |  | Proximity measures for Nomial attributes  Proximity measures for Binary attributes  Proximity measures of numeric attributes | CO2 |  |  |  |  |
| 8 |  | Proximity measures of ordinal attributes  Cosine similarity | CO2 |  |  |  |  |

**Signature of faculty**

**Date:**

**SESSION PLAN**

**UNIT-III**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Session Plan | | | | Actual Delivery | | | |
| Lect. | Date | Topics to be Covered | CO Mapped | Lect. | Date | Topics Covered | CO Achieved |
| 9 |  | Concepts of data Preprocessing-Data quality and processes | CO2/Assignment1 |  |  |  |  |
| 10 |  | Data cleaning methods  Data Integration methods | CO2 |  |  |  |  |
| 11 |  | Data Reduction- wavelet transforms, Principle component analysis | CO2 |  |  |  |  |
| 12 |  | Attribute subset selection  Data Transformation | CO3 |  |  |  |  |
| 13 |  | Prediction by machines concepts and techniques | CO3/Test1 |  |  |  |  |
| 14 |  | Classification methods-  Decision tree induction  Bayes Classification methods | CO3/Quiz1 |  |  |  |  |
| 15 |  | Support vector machines  Backpropogation classifications | CO3 |  |  |  |  |

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**Date**

**SESSION PLAN**

**UNIT-IV**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Session Plan | | | | Actual Delivery | | | |
| Lect. | Date | Topics to be Covered | CO Mapped | Lect. | Date | Topics Covered | CO Achieved |
| 16 |  | Techniques to improve classification accuracy  -Bagging  -Boosting  -Random forest | CO3 |  |  |  |  |
| 17 |  | Outlier analysis techniques  -Supervised methods  -Semi-supervised methods  -Unsupervised methods | CO3 |  |  |  |  |
| 18 |  | Concepts of cluster analysis  -partitioning methods | CO3 |  |  |  |  |
| 19 |  | Hierarchical methods  -Agglomerative  -Divisive | CO3/Assignment2 |  |  |  |  |
| 20 |  | Density based methods-  -DBSCAN  -OPTICS | CO4/Test2 |  |  |  |  |

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**Date:**

**SESSION PLAN**

**UNIT-V**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Session Plan | | | | Actual Delivery | | | |
| Lect. | Date | Topics to be Covered | CO Mapped | Lect. | Date | Topics Covered | CO Achieved |
| 21 |  | Model evaluation-  Bootstrap, Hold out, cross validation methods | CO4 |  |  |  |  |
| 22 |  | Metrics for evaluating classifier performance | CO4 |  |  |  |  |
| 23 |  | Comparing classifiers -  -Cost benefit Curves  -ROC curves | CO4 |  |  |  |  |
| 24 |  | Model Deployment | CO4/Quiz2 |  |  |  |  |
|  |  |  |  |  |  |  |  |

**Signature of faculty**

**Date:**

**PERIODIC MONITORING**

**Actual date of completion and remarks, if any**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Components** | | **From** | **To** | **From** | **To** | **From** | **To** |
| **Duration (Mention from and to dates)** | |  |  |  |  |  |  |
| **Percentage of Syllabus covered** | |  |  |  |  |  |  |
| **Lectures** | **Planned** |  |  |  |  |  |  |
| **Taken** |  |  |  |  |  |  |
| **Tutorials** | **Planned** |  |  |  |  |  |  |
| **Taken** |  |  |  |  |  |  |
| **Test/quizzes** | **Planned** |  |  |  |  |  |  |
| **Taken** |  |  |  |  |  |  |
| **CO's Addressed** |  |  |  |  |  |  |
| **CO's Achieved** |  |  |  |  |  |  |
| **Assignments** | **Planned** |  |  |  |  |  |  |
| **Taken** |  |  |  |  |  |  |
| **CO's Addressed** |  |  |  |  |  |  |
| **CO's Achieved** |  |  |  |  |  |  |
| **Signature of Faculty** | |  | |  | |  | |
| **Head of the Department** | |  | |  | |  | |
| **A.M.R.C** | |  | |  | |  | |

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**Date Date**

**PERIODIC MONITORING**

**Attainment of the Course (Learning) Outcomes:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Attainment level** | **Action plan** | **Remark**  **(AMC)** |
| **Assignment** | **CO1:** |  |  |
| **CO2:** |  |  |
| **CO3:** |  |  |
| **CO4:** |  |  |
| **CO5:** |  |  |
| **CO6:** |  |  |
| **CO7:** |  |  |
| **Quiz/test** | **CO1:** |  |  |
| **CO2:** |  |  |
| **CO3:** |  |  |
| **CO4:** |  |  |
| **CO5:** |  |  |
| **CO6:** |  |  |
| **CO7:** |  |  |
| **Mid Semester** | **CO1:** |  |  |
| **CO2:** |  |  |
| **CO3:** |  |  |
| **CO4:** |  |  |
| **CO5:** |  |  |
| **CO6:** |  |  |
| **CO7:** |  |  |
| **End Semester** | **CO1:** |  |  |
| **CO2:** |  |  |
| **CO3:** |  |  |
| **CO4:** |  |  |
| **CO5:** |  |  |
| **CO6:** |  |  |
| **CO7:** |  |  |
| **Any Other** | **CO1:** |  |  |
| **CO2:** |  |  |
| **CO3:** |  |  |
| **CO4:** |  |  |
| **CO5:** |  |  |
| **CO6:** |  |  |
| **CO7:** |  |  |

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**INDIRECT ASSESSMENT**

**Sample format for Indirect Assessment of Course outcomes:**

|  |
| --- |
| NAME: |
| ENROLLMENT NO: |
| SAP ID: |
| COURSE: |
| PROGRAM: |

Please rate the following aspects of course outcomes of --------------------.

Use the scale 1-3\*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| course Outcomes | Statement | 1 | 2 | 3 |
| CO1 |  |  |  |  |
| CO2 |  |  |  |  |
| CO3 |  |  |  |  |
| CO4 |  |  |  |  |
| CO5 |  |  |  |  |
| CO6 |  |  |  |  |

MODERATE

3

STRONG

2

WEAK

1

**\***

**INSTRUCTIONS FOR FACULTY**

**Instructions for faculty**

* Faculty should keep track of the students with low attendance and counsel them regularly.
* Course coordinator will arrange to communicate the short attendance (as per UPES policy) cases to the students and their parents monthly.
* Topics covered in each class should be recorded in the table of RECORD OF CLASS TEACHING (Suggested Format).
* Internal assessment marks should be communicated to the students twice in a semester.
* The file will be audited by respective AcademicMonitoring and Review Committee (AMRC) members for theory as well as for lab as per AMRC schedule.
* The faculty is required to maintain these files for a period of at least three years.
* This register should be handed over to the head of department, whenever the faculty member goes on long leave or leaves the Colleges/University.
* For labs, continuous evaluation format (break-up given in the guidelines for result preparation in the same file) should be followed.
* Department should monitor the actual execution of the components of continuous lab evaluation regularly.
* Instructor should maintain record of experiments conducted by the students in the lab weekly.
* Instructor should promote students for self-study and to make concept diary, due weightage in the internal should be given under faculty assessment for the same.
* Course outcome assessment: To assess the fulfilment of course outcomes two different approaches have been decided. Degree of fulfillment of course outcomes will be assessed in different ways through direct assessment and indirect assessment. In Direct Assessment, it is measured through quizzes, tests, assignment, Mid-term and/or End-term examinations. It is suggested that each examination is designed in such a way that it can address one or two outcomes (depending upon the course completion). Indirect assessment is done through the student survey which needs to be designed by the faculty (sample format is given below) and it shall be conducted towards the end of course completion. The evaluation of the achievement of the Course Outcomes shall be done by analyzing the inputs received through Direct and Indirect Assessments and then corrective actions suggested for further improvement.

**CHECKLIST**

**Check listCourse Outcomes Attainment(COA)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SI.No** | **Description** | **Date of Submission** | **Checked** | **Remarks** |
| 1 | Class Tests marks |  |  |  |
| 2 | Quiz marks |  |  |  |
| 3 | Assignment marks |  |  |  |
| 4 | Mid Semester Marks |  |  |  |
| 5 | End Semester Marks |  |  |  |
| 6 | Check in COA format |  |  |  |
| 7 | Whether respective CO of Class tests, Quiz’s, Assignments, Mid and End semester maximum marks entered or not |  |  |  |
| 8 | Ensure that all data got filled as per requirement |  |  |  |
| 9 | Copy of quiz paper with the model answer and two/three answer sheets |  |  |  |
| 10 | Copies of all test papers with two/three answer sheets |  |  |  |
| 11 | Copies of all assignments with two or three model assignments |  |  |  |
| 12 | Manual attendance sheet |  |  |  |
| 13 | Copy of faculty time table |  |  |  |
| 14 | Course Plan |  |  |  |
| 15 | Class Tests, Quiz and assignment marks as per COs |  |  |  |
| 16 | Copy of midterm examination paper and model solution |  |  |  |
| 17 | Copy of end term examination paper and model solution |  |  |  |
| 18 | List of minor/major project work given to the student |  |  |  |
| 19 | Detailed internal assessment sheet |  |  |  |
| 20 | Copy of final grade sheet (which was submitted to SRE) must be attached at the end of semester |  |  |  |
| 21 | Copy of quiz /test conducted for lab |  |  |  |
| 22 | Rubrics wise marks in Lab ( Day to day evaluation sheet) |  |  |  |
| 23 | Copy of course attainment sheet (both pages) |  |  |  |
| 24 | Indirect Attainment Sheet |  |  |  |

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**Date Date**

**Planning for Remedial Classes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No.** | **Name of Student** | **Roll No.** | **Sap ID** | **Mid Sem Marks** | **Remedial Classes Held** | | | | | | | **Class test on the basis of Remedial Classes** | **End Sem Marks** | **Improvement**  **(Y/N)** |
| **Date** |  |  |  |  |  |  |
| **Venue** |  |  |  |  |  |  |
| **Time** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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