**University of Management and Technology**

**School of Engineering**

**Department of Electrical Engineering**

**Course Outline**

**Course code:** EE 460 **Course title:** Machine Learning for Signal Processing

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| --- | --- |
| Program | BSEE |
| Credit Hours | 3+1 |
| Duration | One semester |
| Prerequisites | None |
| Resource Person | T.B.A |
| Counseling Timing | T.B.A |
| Contact | T.B.A |

**Chairman/Director signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Learning Objective:**

On successful completion of this course you should be able to:

1. Illustrate machine learning techniques and identify their various applications.
2. Examine the strengths and weaknesses of various machine learning algorithms
3. Appreciate the theory and underlying mathematics behind fundamental machine learning algorithms.
4. Be able to formulate and develop machine learning algorithms to build intelligent applications.

**Learning Methodology:**

Interactive and participative.

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Quizzes and Assignments 20 %

Mid Term 30 %

Final exam 50 %

Total 100 %

**Recommended Text Books:**

Introduction to Machine Learning by Ethem Alpaydin (3rd Edition)

**Reference Books:**

Deep Learning by Ian Goodfellow

**Calendar of Course contents to be covered during semester**

**Course code**: EE 460  **Course title:** Machine Learning for Signal Processing

|  |  |  |
| --- | --- | --- |
| **Week** | **Course Contents** | **Reference** |
| 1 | Introduction to machine learning | Chapter 1 |
| 2 | Logistic regression | Chapter 2 |
| 3 | Decision trees | Chapter 9 |
| 4 | Support vector machines | Chapter 10 |
| 5 | Clustering | Chapter 7 |
| 6 | Expectation maximization | Chapter 7 |
| 7 | Gaussian mixture models | Handouts |
| 8 | Midterm Exam |  |
| 9 | Principal component analysis | Chapter 6 |
| 10 | Linear discriminant analysis | Chapter 6 |
| 11 | Independent component analysis | Chapter 6 |
|  12 | Deep Neural networks | Chapter 11 |
| 13 | Convolutional neural networks | Handouts |
| 14 | Recurrent neural networks | Handouts |
| 15 | Generative adversarial networks | Handouts |