



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL
(A constituent unit of MAHE, Manipal)

COURSE PLAN

| | | | | | |
|---------------------------|---|-------------------------------------|---|---|---|
| Department | : | CSE | | | |
| Course Name & code | : | Advanced Machine Learning & CSE5012 | | | |
| Semester & branch | : | Second Semester & CSE/CSIS | | | |
| Name of the faculty | : | Dr. N V Subba Reddy4 | | | |
| No of contact hours/week: | | L | T | P | C |
| | | 4 | 0 | 0 | 4 |

Course Outcomes (COs)

| At the end of this course, the student should be able to: | | No. of Contact Hours | Marks |
|---|--|----------------------|-------|
| CO1: | Understand the statistical learning model | 14 | 35 |
| CO2: | Understand clustering Learning models | 10 | 23 |
| CO3: | Design DT and ANN | 11 | 25 |
| CO4: | Understand conditionally independent Learning models | 10 | 22 |
| CO5: | Design ensemble learning models | 3 | 5 |
| Total | | 48 | 100 |

Assessment Plan

| Components | Assignments | Sessional Tests | End Semester/ Make-up Examination |
|-----------------------|---|---|--|
| Duration | 20 to 30 minutes | 60 minutes | 180 minutes |
| Weightage | 20 % (4 X 5 marks) | 30 % (2 X 15 Marks) | 50 % (1 X 50 Marks) |
| Typology of Questions | Understanding; Applying; Analyzing; Evaluating; Creating | Remembering; Understanding; Applying | Understanding; Applying; Analyzing; Evaluating; Creating |
| Pattern | Answer one randomly selected question from the problem sheet (Students can refer their class notes) | MCQ (10 marks): 10 questions of 0.5 marks each Short Answers (10 marks): questions of 2 or 3 marks | Answer all 5 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks |
| Schedule | As notified by Associate Director (Academics) at the start of each semester | Calendared activity | Calendared activity |
| Topics Covered | Assignment 1 (L 1-L8 & T _{y1-y2}) (CO1) | Test 1 (L 1-L14 & T _{b1-b2}) (CO1) | Comprehensive examination covering full syllabus. Students are expected to answer all questions (CO1-5) |
| | Assignment 2 (L 9-L14 & T _{y3-y4}) (CO2) | | |
| | Assignment 3 (L 15-L23 & T _{y5-y6}) (CO2-3) | Test 2 (L 15-L27 & T _{b3-b4}) (CO2-4) | |
| | Assignment 4 (L 24-L33 & T _{y7-y8}) (CO3-4) | | |

Lesson Plan

| L. No. | Topics | Course Outcome Addressed |
|--------|--|--------------------------|
| L0 | Introduction | CO1 |
| L01 | Well-posed and ill-posed problems Learning general model | CO1 |
| L02 | Concept learning, find s algorithm | CO1 |
| L03 | Candidate elimination algorithm | CO1 |
| L03 | Feature extraction | CO1 |
| L04 | Feature selection | CO1 |
| L05 | Distance measures | CO1 |
| L06 | NN and KNN | CO1 |
| L07 | MKNN and FKNN | CO1 |

| | | |
|------------|---|------|
| L08 | Discriminate functions | CO1 |
| L09 | Branch and bound and cube bound | CO1 |
| L10 | Minimal distance Classifiers | CO1 |
| L11 | Minimal Distance Clasiifiers | CO1 |
| L12 | Dicision boundaries and regions | CO1 |
| L13 | Problems on Minimal Distance classifiers | CO1 |
| L14 | Prblems on classifiers | CO1 |
| L15 | Problems on Classifiers | CO1 |
| L16 | Introduction to Clustering and types | CO2 |
| L17 | Hierachical | CO2 |
| L18 | Agglomerative | CO2 |
| L19 | Divisive and partition clustering | CO2 |
| L20 | Incremental | CO2 |
| L21 | Incremental learning | CO2 |
| L22 | Incremental models | CO2 |
| L23 | Genetic Algorithm | CO2 |
| L24 | Hypothesis search | CO2 |
| L25 | Case study | CO2 |
| L26 | DT | CO3 |
| L27 | Entropy Information gain | CO3 |
| L28 | ID3 | CO3 |
| L29 | Random forest | CO3 |
| L30 | ANN | CO4 |
| L31 | Activation functions and learning functions | CO4 |
| L32 | Singal Layer and Limitation | CO4 |
| L33 | MLP | CO4 |
| L34 | BPN | CO\$ |
| L35 | SOM | CO4 |
| L36 | RBF | CO4 |

| | | |
|------------|---|-----|
| L37 | Conditional Independence | CO4 |
| L38 | Parameter estimation | CO4 |
| L39 | Minimum error-rate classification, Minimum error rate | CO4 |
| L40 | Maximum likelihood | CO4 |
| L41 | Naïve Bayes | CO4 |
| L42 | Bayesian belief networks. | CO4 |
| L43 | Introduction to ensemble models | CO5 |
| L44 | AdaBoost for Classification | CO5 |
| L45 | Bagging | CO5 |
| L46 | Multi expert system and performance | CO5 |
| L48 | Problems on ensemble | CO5 |
| L49 | Click or tap here to enter text. | |
| | | |
| | | |
| | | |
| | | |

References:

- Machine Learning – Tom M. Mitchell, - MGH, 2013.
- Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001.
- Ethem Alpaydin, “Introduction to Machine Learning”, Prentice Hall of India, 2005
- Stephen Marsland, “Machine Learning –An Algorithmic Perspective”, CRC Press, 2009
- Click or tap here to enter text.
- Click or tap here to enter text.
- Click or tap here to enter text.

Submitted by: DR. N V SUBBA REDDY

(Signature of the faculty)

Date: 15-01-2020

Approved by: DR. ASHALATHA NAYAK

(Signature of HOD)

Date: 15-01-2020

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

| FACULTY | SECTION | FACULTY | SECTION |
|---------|---------|---------|---------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
