ಮಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

MANGALORE UNIVERSITY

(Accredited by NAAC with 'A' Grade)

ಕ್ರಮಾಂಕ/ No. : MU/ACC/CR 40/2019-20/A2

ಕುಲಸಚಿವರ ಕಛೇರಿ
ಮಂಗಳಗಂಗೋತ್ರಿ – 574 199
Office of the Registrar
Mangalagangothri – 574 199
ದಿನಾಂಕ/Date:20.01.2021

NOTIFICATION

Sub: Syllabus of Career Oriented Programme in Artificial Intelligence and Machine learning

Ref: Academic Council approval vide agenda No.: ಎ.ಸಿ.ಸಿ.:ಶೈ.ಸಾ.ಸ.2:6 (2020–21) dtd 23.12.2020.

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The syllabus of Career Oriented programme in Artificial Intelligence and Machine learning which has been approved by the Academic Council at its meeting held on 23.12.2020 is hereby notified for implementation with effect from the academic year 2020-21.

Copy of the Syllabus shall be downloaded from the University Website (www.mangaloreuniversity.ac.in)

REGISTRAR

To,

1. The Principals of the College concerned.
2. The Chairman, Combined UG BOS in Computer Science & Computer Applications, Dept of PG Studies and Research in Computer Science, Mangalore University.
3. The Registrar (Evaluation), Mangalore University, Mangalagangothri.
4. The Superintendent (ACC), O/o the Registrar, Mangalore University.
5. The Asst. Registrar (ACC), O/o the Registrar, Mangalore University.
6. The Director, DUIMS, Mangalore University – with a request to publish in the website.
7. Guard File.

MANGALORE UNIVERSITY

CAREER ORIENTED PROGRAMME IN

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Preamble:

Intelligent machines have replaced human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. It is the branch of computer science that emphasizes on creating intelligent machines that work and react like humans. Artificial Intelligence spans a wide variety of topics in computer science research, including machine learning, deep learning, reinforcement learning, natural language processing, reasoning, perception etc.

Objectives:

- To have a basic proficiency in a traditional AI language including an ability to write simple
- To intermediate programs and an ability to understand code written in that language.
- To introduce the basic concepts and techniques of Machine Learning.
- To develop the skills in using recent machine learning software for solving practical problems.

Learning Outcomes:

- Analyze and design a real world problem for implementation and understand the dynamic behavior of a system.
- Use different machine learning techniques to design AI machine and enveloping applications for real world problems.
- Be able to apply knowledge of computing analyze a problem, and identify and define the computing requirements appropriate to its solution.

Methodology

- Tutorial and Group Discussion
- Practical Experience
- Course Presentation
- Projects and Assignments
- Industrial Visit
- Seminars and Workshops

SYLLABUS/ CURRICULUM: ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (AIML)

I YEAR (LEADING TO CERTIFICATE)

PAPER	Instruction (Hr)	Duration of Examination (Hr)	Marks for Final Exam	Marks for Internal Exam	Total Marks
CAIML Paper-I	03	03	100	50	150
Practical-I	03	03	100	50	150

Every student is expected to maintain a record book comprising minimum of five assignments from the syllabus or related areas each of 10 marks. (5*10=50). Every student should undergo a viva voce examination based on the record book and syllabus for a maximum of 50 marks.

50 Marks of internal can be allotted by the concerned teachers based on assignment presentations and class performance.

II YEAR (LEADING TO DIPLOMA)

PAPER	Instruction (Hr)	Duration of Examination (Hr)	Marks for Final Exam	Marks for Internal Exam	Total Marks
DAIML Paper-II	03	03	100	50	150
Practical-II	03	03	100	50	150

Every student is expected to maintain a record book comprising minimum of five assignments from the syllabus or related areas each of 10 marks. (5*10=50). Every student should undergo a viva voce examination based on the record book and syllabus for a maximum of 50 marks.

50 Marks of internal can be allotted by the concerned teachers based on assignment presentations and class performance.

III YEAR (LEADING TO ADVANCED DIPLOMA)

PAPER	Instruction (Hr)	Duration of Examination(Hr)	Marks for Final Exam	Marks for Internal Exam	Total Marks
ADAIML Paper-III	03	03	100	50	150
Practical-III	03	03	100	50	150
Project	03	Viva vice	100	-	100

Every student is expected to maintain a record book comprising minimum of five assignments from the syllabus or related areas each of 20 marks. (5*20=100).

50 Marks of internal can be allotted by the concerned teachers based on assignment presentations and class performance.

Every student is expected to take up a project work under a teacher guide relating to the areas of their study and submit a report containing a minimum of 50 pages which will have two valuations (1 internal and 1 external) for a maximum of 50 marks. A viva voce examination to be conducted based on their project report by the external examiner/examiners for a maximum of 50 marks.

1st YEAR

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING-CAIML

CHAPTER 1: Introduction to Artificial Intelligence

1.1 Categories of AI, Act like Human

1.2 Think like Human, Think Rationally, Act Rationally

1.3 Turing Test approach Applications of AI- Knowledge base and inference engine

1.4 Case study,

1.5 Introduction to AI Languages.

CHAPTER 2: AI Approaches

2.1 Introduction ,& Problem Solving

2.2 Searching Techniques, Types of Searching

2.3 Uniformed/Blind Search Strategies

2.4 Informed Searches

2.5 Game Solving

CHAPTER 3: Foundations of Machine Learning

3.1 Introduction machine learning

3.2 Applications of Machine leanring,

3.3 Types of machine learning

3.4 Theory of learning

3.5 theory of generalization

CHAPTER4: Supervised Learning-I & Linear Regression

4.1 Introduction

4.2 univariate linear regression

4.3 multivariate linear regressions

4.4 regularized regression

4.5 Logistic regression: classification

4.6 Artificial Neural Networks, Support Vector Machines.

Text Books:

1. C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 2006.
2. Elaine Rich and K.Knight , Artificial Intelligence , TMH 3nd edition, 2009
3. Ethem Alpaydin, Introduction to Machine Learning, Second Edition, 2004.
4. PY] How to Think Like a Computer Scientist: Learning with Python 2ed by Jerey Elkner, Allen B. Downey and Chris Meyers (Open Book Project) http://www.greenteapress.com/thinkpython/

References

1. T. M. Mitchell, "Machine Learning", McGraw Hill, 1997.

2. R. O. Duda, P. E. Hart and D. G. Stork Pattern Classification, Wiley Publications, 2001

3. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.

2nd YEAR

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING-DAIML

CHAPTER1: Knowledge Representation, Learning and Expert System

- **1.1** Introduction
- **1.2** Characteristics of Expert System
- **1.3** Need of an Expert system
- **1.4** Architecture of Expert System
- **1.5** Steps to developing expert system
- **1.6** Un-Supervised Learning, Reinforcement Learning.

CHAPTER2: Uncertain Knowledge and Reasoning

- 2.1 Quantifying Uncertainty
- 2.2 Basic Probability Notation
- 2.3 Independence, Bayes Rule and its use

Artificial Intelligence application

- 2.4 Autonomous vehicle
- 2.5 Social Media
- 2.6 chatbots, Medical, School.

CHAPTER3: Supervised Learning – II Classification

- 3.1 Introduction, Decision Trees
- 3.2 Linear Discriminant Analysis
- 3.3 K-nearest neighbor model, Bayesian Learning
- 3.4 Introduction to Hidden Markov Models and deep learning.

CHAPTER4: Unsupervised Learning

- 4.1 Clustering
- 4.2 Evaluation Measures and Combining Learners
- 4.3 Evaluation Measures
- 4.4 Combining Learners

Textbook

1. Ethem Alpaydin, Introduction to Machine Learning, Second Edition, 2004.
2. T. M. Mitchell, "Machine Learning", McGraw Hill, 1997.

References

1. P. Flach, "Machine Learning: The art and science of algorithms that make sense of data", Cambridge University Press, 2012.
2. K. P. Murphy, "Machine Learning: A probabilistic perspective", MIT Press, 2012.
3. M. Mohri, A. Rostamizadeh, and A. Talwalkar, "Foundations of Machine Learning", MIT Press, 2012.
4. S. Russel and P. Norvig, "Artificial Intelligence: A Modern Approach", Third Edition Prentice

3rd YEAR

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING-ADAIML

CHAPTER1: Uncertain Knowledge and Reasoning

1.1 Quantifying Uncertainty

1.2 Acting under Uncertainty

1.3 Basic Probability Notation

1.4 Inference Using Full join Distributions, Independence

1.5 Bayes Rule and its use,

1.6 The Wumpus World Revisited.

CHAPTER2: Communicating and Acting

2.1 Robotics Introduction

2.2 Software Architectures, Application Domains.

2.3 Introduction to Artificial Intelligence with JAVA

2.4 Introduction to Artificial Intelligence with Python

CHAPTER3 : Artificial Neural Networks

3.1 Neurons and biological motivation

3.2 Linear threshold units.

3.3 Perceptrons

3.4 Multilayer networks and backpropagation

3.5Hidden layers and constructing intermediate

3.6 Overfitting, learning network structure, recurrent networks.

CHAPTER4: Reinforcement Learning

4.1 Introduction

4.2 K-armed Bandit, Elements of reinforcement learning

4.3 Model Based Learning, Policy Iteration

4.4 Temporal Difference Learning, Exploration Strategies.

Text Books:

1. Ethem Alpaydin, Introduction to Machine Learning, Second Edition, 2004.
2. T. M. Mitchell, “Machine Learning”, McGraw Hill, 1997.
3. R. O. Duda, P. E. Hart and D. G. Stork Pattern Classification, Wiley Publications, 2001

Reference Books:

1. 1. Ethem Alpaydin, "Introduction to Machine Learning" 2nd Edition, The MIT Press, 2009.
2. 2. Tom M. Mitchell, "Machine Learning", First Edition by Tata McGraw-Hill Education, 2013.
3. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
4. 3. Christopher M. Bishop, "Pattern Recognition and Machine Learning" by Springer, 2007.
5. 4. Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective" by The MIT Press, 2012.