The course details for the 'Artificial intelligence' course (Duration: 52 Hours) for corporate purposes.

A. Introducing Machine Learning and Artificial Intelligence: 73 Minutes

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| **Introducing Machine Learning and Artificial Intelligence** |  |
| The Machine Learning Landscape | 5 minutes |
| Different types of machine learning supervised learning, semi-supervised and reinforcement learning | 5 minutes |
| Batch and online learning | 5 minutes |
| Machine learning libraries. Keras, Tensor flow, Pytorch | 2 minutes |
| Machine learning tools Watson, Dialogflow, Luis, Azure cognitive service | 3 minutes |
| Tensor, Tensors | 3 minutes |
| The main challenge of ML | 2 minutes |
| Insufficient quality data, Overfitting and Undercutting Problem | 3 minutes |
| Poor Quality and Noisy Data | 3 minutes |
| Feature Selection and Feature Pollution | 5 minutes |
| Testing and Validation Concept | 5 minutes |
| Hyper Parameters and Tuning | 2 minutes |
| Basic Calculus | 30 minutes |

B. Hello World of Machine Learning: 62 Minutes

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| **Hello World of Machine Learning** |  |
| Classification Problem | 10 minutes |
| Training binary classification | 2 minutes |
| Performance measures | 5 minutes |
| Roc curve | 5 minutes |
| Confusion matrix | 15 minutes |
| Precision and recall , different types of use cases | 5 minutes |
| Error analysis | 5 minutes |
| Multilevel classification | 5 minutes |
| Multiclass classification | 5 minutes |
| One Vs rest architecture | 5 minutes |

C. Let's Clear The Fundamentals: 400 Minutes

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| **Let's Clear The Fundamentals** |  |
| Linear regression | 20 minutes |
| Polynomial regression | 10 minutes |
| Gradient descent | 40 minutes |
| Learning curves | 20 minutes |
| Ridge and lasso regression | 20 minutes |
| Elastic net and early stopping | 20 minutes |
| Logistics regression | 30 minutes |
| Softmax regression | 20 minutes |
| Support vector machine | 30 minutes |
| Linear support vector machine | 15 minutes |
| Nonlinear support vector machine | 15 minutes |
| SVM regression | 20 minutes |
| Dual problem | 10 minutes |
| Kernelized SVM | 10 minutes |
| Decision trees | 25 minutes |
| The cart training algorithm | 15 minutes |
| Computational complexity | 15 minutes |
| Ginni impurity | 15 minutes |
| Chad decision tree | 10 minutes |
| Ginni impurity or entropy | 10 minutes |
| Regularisation hypotheses | 15 minutes |
| Regression | 15 minutes |

D.Ensemble Learning: 80 Minutes

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| Ensemble Learning |  |
| Voting classifies | 10 minutes |
| Bagging and boosting | 20 minutes |
| Random patches | 15 minutes |
| Random forest | 25 minutes |
| Stacking | 10 minutes |

E.Dimensionally Reduction: 70 Minutes

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| Dimensionally Reduction |  |
| The curse of dimensions | 5 minutes |
| Main approaches of dimensions reductions | 15 minutes |
| PCA | 20 minutes |
| Karnal PCA | 15 minutes |
| LLE | 5 minutes |

F. Unsupervised Learning: 60 Minutes

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| Unsupervised Learning |  |
| K means | 20 minutes |
| Clustering | 20 minutes |
| Dbscan | 10 minutes |
| Gaussian mixtures | 10 minutes |

G.Neural Networks and Deep Learning: 270 Minutes

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| **Neural Networks and Deep Learning** |  |
| Introduction | 15 Minutes |
| Fine-Tuning Neural Network Hyperparameters | 15 Minutes |
| The Vanishing/Exploding Gradients Problems | 15 Minutes |
| Reusing Pretrained Layers | 15 Minutes |
| Faster Optimizers | 30 Minutes |
| Avoiding Overfitting Through Regularization | 15 Minutes |
| Customizing Models and Training Algorithms | 15 Minutes |
| TensorFlow Functions and Graphs | 15 Minutes |
| The Data API | 30 Minutes |
| The TFRecord Format | 30 Minutes |
| Preprocessing the Input Features | 30 Minutes |
| TF Transform | 30 Minutes |
| The TensorFlow Datasets (TFDS) Project | 15 Minutes |

H.Convolutional Neural Networks: 135 Minutes

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| **Convolutional Neural Networks** |  |
| Convolutional Layers | 15 Minutes |
| Pooling Layers | 15 Minutes |
| CNN Architectures | 30 Minutes |
| Implementing a ResNet-34 CNN Using Keras | 15 Minutes |
| Using Pretrained Models from Keras | 15 Minutes |
| Pretrained Models for Transfer Learning | 15 Minutes |
| Classification and Localization | 15 Minutes |
| Semantic Segmentation | 15 Minutes |

I.Natural Language Processing with RNNs and Attention: 120 Minutes

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| **Natural Language Processing with RNNs and Attention** |  |
| Sentiment Analysis | 30 Minutes |
| An Encoder–Decoder Network for Neural Machine Translation | 30 Minutes |
| Attention Mechanisms | 30 Minutes |

J.Training and Deploying TensorFlow Models at Scale: 60 Minutes

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| **Training and Deploying TensorFlow Models at Scale** |  |
| Serving a TensorFlow Model | 15 Minutes |
| Deploying a Model to a Mobile or Embedded Device | 15 Minutes |
| Using GPUs to Speed Up Computations | 15 Minutes |
| Training Models Across Multiple Devices | 15 Minutes |

K.Introduction to Generative Deep Learning: 65 Minutes

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| **Introduction to Generative Deep Learning** |  |
| What is Generative Modeling | 25 minutes |
| Probabilistic Generative Models | 25 minutes |
| The limitations of Generative Modeling | 15 minutes |

L.Variational Autoencoders : 130 Minutes

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| **Variational Autoencoders** |  |
| The art of exhibition | 5 minutes |
| The encoder and decoder architecture | 25 minutes |
| First Autoencoder building | 25 minutes |
| The variational art exhibition | 10 minutes |
| Building a variational autoencoder | 40 minutes |
| Using VAE's to generate new faces | 25 minutes |

M.GAN : 105 Minutes

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| **Generative Advertial Networks** |  |
| Introduction to Gan's | 10 minutes |
| First Gan Model | 30 minutes |
| Gan Challenges | 20 minutes |
| Wasserstein Gan | 40 minutes |
| WGAN CP | 5 minutes |

N.CycleGan : 110 Minutes

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| **CycleGan** |  |
| First CycleGan | 60 minutes |
| Resnet introduction | 10 minutes |
| Neural style transfer | 30 minutes |

O.When Gan can Write an article: 50 Minutes

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| **When Gan can Write an article** |  |
| Lstm, bidirectional lstm and word embedding | 5 minutes |
| Model architecture | 5 minutes |
| Coding part | 40 minutes |

P.MuseGan . : 90 Minutes

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| **MuseGan** |  |
| Attention in Keras | 15 minutes |
| Encoder and decoder architecture with attention | 15 minutes |
| First Muse Gan | 45 minutes |
| The Critic Framework | 15 minutes |

Q.Reinforcement Learning: 675 Minutes

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| **Reinforcement Learning** |  |
| Introduction to Reinforcement Learning | 60 minutes |
| Markov Decision Process | 60 minutes |
| Planning by Dynamic programming | 30 minutes |
| Model-free prediction and model-free control | 30 minutes |
| Value function approximation | 45 minutes |
| Policy Gradient Methods | 45 minutes |
| Integrating learning and planning | 45 minutes |
| Exploration and exploitation | 30 minutes |
| OpenAI Gym | 60 minutes |
| World Model Architecture | 75 minutes |
| MDN RNN architecture | 75 minutes |
| In Dream Training | 30 minutes |
| Building first AI bot to play FIFA | 90 minutes |

R.The Transformer : 140 Minutes

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| **The Transformer** |  |
| Introduction | 30 minutes |
| BERT | 45 minutes |
| GPT-2 | 45 minutes |
| ProGan | 10 minutes |
| Self Attention Gan | 10 minutes |

S.Industry Based Machine Learning Tools : 375 Minutes

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| **Industry Based Machine Learning Tools** |  |
| Microsoft Cognitive Services - umbrella of machine learning tools | 90 minutes |
| Google Dialogflow - build chatbot | 60 minutes |
| IBM Watson - NLP in different level | 75 minutes |
| Yolo - the real time video recognition | 75 minutes |
| Neo4j knowledge graph implementation | 75 minutes |

T.Deployment of machine learning models : 60 Minutes

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| **Deployment of machine learning models** |  |
| Google Cloud | 60 minutes |