Certification Examination Regulations and Course Discription

This Certification Examination Regulations of the Steinbeis+Academy
applies to the following course on the basis of the valid Framework for the Implementation of
Certificate Courses (RZLG) in the current version.

Course title	Artificial Intelligence				

Fields of competences	Management	Personality Development	Education Management	Healthcare	Technology
					X

Place(s) of implementation	Bengaluru (India)				

Graduation	Diploma of Advanced Studies (DAS)	Certificate of Advanced Studies (CAS)	Diploma of Basic Studies (DBS)	Certificate of Basic Studies (CBS)	
				X	

Qualification aim	Students and professionals who are familiar with AI or its implications will learn how to develop applications in machine learning and artificial intelligence. With the qualification they are able to work as data analyst, business analyst or AI engineer.

RZLG-Supplementary admission requirement	Newbies who are not familiar with AI or its implications.

Teaching method	Classroom	Classroom/ Online	Online
		X	

Language	English			

Workload in hours	Total	Seminar time	Self-study time	Transfer time
	45	20	5	20

Type of performance records (LNW)	Examination (K)	Presentation/ oral examination (P)	Case (C)	Transfer papaer (TA)	Project study paper (PSA)
	X				

Contents

Modules	Key topics	Seminar time/h
Intro To Neural Network & Deep Learning	Introduction; Deep Learning Importance [Strength & Limitation]; SP	MLP; Feed Forward & Backward Propagation; Neural Network Overview; Neural Network Representation; Activation Function; Loss Function; Importance of Non-linear Activation Function; Gradient Descent for Neural Network	2
Parameter & Hyperparameter	Practical Aspect: Train, Test & Validation Set; Vanishing & Exploding Gradient; Dropout; Regularization; **Optimization:** Bias Correction; RMS Prop; Adam, Ada, AdaBoost; Learning Rate; Tuning; Softmax	3
Data Processing	Environment: Scikit Learn**;** NLTK**;** Spacy & Gensim**;** OpenCV**;** Tensorflow**;** Keras**; Text Processing:** Representation; Data Cleaning; Data Preprocessing; Similarity**; Image Processing:** Image Transformation; Filters; Noise Removal; Correlation & Convolution; Edge Detection; Non Maximum Suppression & Hysteresis; Fourier Domain; Video Processing; **Feature Extraction**: Image Feature; Descriptors; **Object Detection;** Detection & Classification	5
CNN	Computer Vision; Padding; Convolution; Pooling; Why Convolution; **Deep Convolution Mode:** Case Studies; Classic Networks; Inception; Open Source Implementation; Transfer Learning; Detection Algorithm; Object Localization; Landmark Detection; Object Detection; Bounding Box Prediction; Yolo	5
RNN	Why Sequence Model; RNN Model; Back propagation through time; Different Type of RNNs; GRU; LSTM; Bi directional LSTM; Deep RNN; Word Embedding; Debiasing; Negative Sampling	5

Assignments-I	Introduction to Machine Learning; Business Case evaluation; Data requirements and collection; Evaluation metrics**; Machine Learning**; Profit of 50_startups data prediction; Extra marital affair prediction; Fraud data analytics; Fabric sales analysis; Classification of animals data; Crime data analysis using clustering method and airlines data to obtain optimum number of clusters; **Python Programming;** Resource Information Analysis; Text Cleaning of Customer reviews using NLP; Image Manipulation (Loading, Rotation etc.); **Mathematics Foundation**; Sampling & Sampling Statistics; Hypothesis Testing; Calculus Problems; Linear Algebra Problems; Probability Problems; **Intro to Neural Network & Deep Learning;** Parameter & Hyperparameter; Risk Evaluation; Prediction of claim amount; Motor temp prediction; User Behavioral Pattern; (2 ANN assignments+ 2 Parameter and hyperparameters);	7
Assignments-II	Data Processing; User review data load and familiarity with data and environment; E commerce Product Similarity; Sentiment classification of movie reviews; Emotion Mining of user reviews; Vehicle edge detection; Cleaning of hand-written digits data; Image data Augmentation; Facial feature detection; Image data wrangling for classification; Video Analysis of a short film; Speech data Analysis w.r.t emotion; CNN; Ecommerce product image classification; Disease prediction based on images; (2 CNN algorithms); Vehicle identification(Object Detection); Animal Classification(Object Classification); Spatial Image classification (Image segmentation); Face detection; Face recognition (Attendance using facial recognition); RNN; Next word prediction (Vanilla RNN); Twitter data analysis using Named Entity Recognition(NER); Retail data - Word2vec; NER and Forecasting of Oil price prediction; Auto text composer (NER language model); Auto text composer (NER language model); Q and A Chatbot; Real life voice Recognition	7
Projects	1.Chatbot project: Build end to end chatbot right from data storage schema to final output for a domain; **2.Emotion Analytics**: Identifying and analyzing the full spectrum of human emotions including mood, attitude and emotional personality.	6