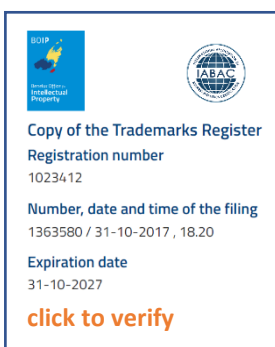




Certified Machine Learning Associate (CMLA) CODE: AI3020 Syllabus and Examination



The International Association for Data Science Certification (IABAC®) is a globally recognized professional association dedicated to growing and enhancing the field of applied Data Science and Business Analytics.

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1 INTRODUCTION

This document is intended to provide information on Certified Machine Learning Associate (CMLA – AI3020) certification for registered training providers to structure the course curriculum as per IABAC syllabus guidelines and for individuals, who are preparing for IABAC CMLA certification exam.

2 COURSE SYLLABUS

2.1 PYTHON FOR DATA SCIENCE

- Introduction to Data Science with Python
- Python Basics: Basic Syntax, Data Structures
- Data objects, Math, Comparison Operators, Condition Statements, loops, lists, tuples, dicts, functions
- Numpy Package
- Pandas Package
- Python Advanced: Data Munging with Pandas
- Python Advanced: Visualization with Matplotlib
- Exploratory Data Analysis: Data Cleaning, Data Wrangling
- Exploratory Data Analysis: Case Study

2.2 STATISTICS FOR DATA SCIENCE

- Introduction to Statistics
- Harnessing Data
- Exploratory Analysis
- Distributions
- Hypothesis & Computational Techniques
- Correlation & Regression

2.3 SQL FOR DATA SCIENCE

- Install SQL packages and Connecting to DB
- RDBMS (Relational Database Management) Basics
- Basics of SQL DB, Primary Key, Foreign Key
- SELECT SQL command, WHERE Condition
- Retrieving data with SELECT SQL command and WHERE Condition to Pandas DataFrame.
- SQL JOINS
- Left Join, Right Joins, multiple joins

2.4 MACHINE LEARNING

- Machine Learning Introduction
- What is ML? ML vs AI. ML Workflow, Statistical Modelling of ML. Application of ML
- Machine Learning Algorithms
- Popular ML Algorithms, Clustering, Classification and Regression, Supervised vs Unsupervised

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- Choice of ML
- Supervised Learning
- Simple and Multiple Linear regression, KNN, and more
- Linear Regression and Logistic Regression
- Theory of Linear Regression, hands on with use cases
- K-Nearest Neighbour (KNN)
- Decision Tree
- Naïve Bayes Classifier
- Unsupervised Learning: K-Means Clustering

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3 EXAMINATION

3.1 PRE-REQUISITE QUALIFICATIONS

1. No mandatory pre-requisite
2. Recommended essential knowledge in
 - a. Mathematics: Calculus, Statistics, Linear Algebra, Probability
 - b. Machine Learning and Python/R Programming
3. Training: Though formal training is not mandatory; it is recommended to attend IABAC® registered course through Registered Education Partners

3.2 MATERIAL PERMITTED

1. The examination is an 'open book'
2. Candidates can refer to any material

3.3 EXAM DURATION AND FORMAT

1. Exam format is through a Project Submission
2. The assessment duration is 8 hours.
3. The project is graded for three areas: Project Summary with recommendations, Machine Learning model performance and Exploratory Data Analysis

3.4 EXAM MODE

1. Project needs to be submitted at IABAC project submit page, as per exam guidelines
2. Any copied work, ideas, concepts or a piece of text needs to be marked with reference as per IABAC project plagiarism guidelines

3.5 PASS CRITERIA

1. The candidate needs to score assessment grade A+, A, B+, B, C+, C as a PASS Criteria
2. The candidate will be awarded grade F in case of failing to meet the pass criteria
3. The results will be declared after validation with the project guidelines

3.6 RESULTS TIMELINE

1. The preliminary results are usually released within **9 days** of the exam date
2. The official results are usually released within **15 days** from the exam date

3.7 CERTIFICATE ISSUANCE

- IABAC® e-certificate will be issued through the candidate's registered email
- The e-certificate is digital verifiable at <https://www.iabac.org/verify-certificate>
- The candidate has a license to share digital certificate validation in professional networking portals such as www.linkedin.com
- The candidate has a license to print physical copy (hardcopy) of the certificate

4 IABAC® KNOWLEDGE AREAS MAPPING

Knowledge Area	Syllabus Details	Bloom's Index
<p>KAG1-DSDA: Data Analytics group including Machine Learning, Statistical Methods, and Business Analytics</p>	<ul style="list-style-type: none"> ● Case Study on Statistical Analysis ● Curating the Data and performing, Discrete Mathematics, Probabilistic Reasoning ● Statistical Methods, including Descriptive Statistics, Exploratory Data Analysis (EDA) and Confirmatory Data Analysis (CDA) ● Case Study & Creating Machine Learning Model ● With detailed implementation of algorithms: Artificial Intelligence, Natural Language Processing ● Knowledge Representation and Reasoning ● Data Mining and knowledge discovery ● Text analysis, Data Mining, Text Analytics including Statistical, Linguistic, and Structural Techniques to analyse Structured and Unstructured data ● Creating Predictive Forecasting Models ● Decision Analysis and Decision Support Systems 	6
<p>KAG2-DSENG: Data Science Engineering group including Software and Infrastructure Engineering</p>	<ul style="list-style-type: none"> ● Set Up Infrastructure and Big Data Applications ● Computer Networks for high-performance computing and Big Data Infrastructure ● Cloud Enabled Applications development ● Modelling and Simulation ● Modelling and Simulation Theory and Techniques (general and domain oriented) ● Large Scale Modelling and Simulation Systems ● Set up Big Data (Data Science) Applications Design ● Programming Languages for Big Data Analytics: R, Python, others ● Models and Languages for complex interlinked Data Presentation and Visualisation 	5
<p>KAG3-DSDM: Data Management group including Data Curation, Preservation and Data Infrastructure</p>	<ul style="list-style-type: none"> ● Creating Database Models and Data Curation ● Data Modelling, Databases and Database Management Systems, Data Models and Query Languages, Database Administration ● Set up Data Management and Enterprise Data Infrastructure ● Data management, including Reference and Master Data, Data Warehousing and Business Intelligence, Data storage and Operations 	4

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	<ul style="list-style-type: none"> ● Data Archives/Storage Compliance and Certification Metadata, Linked data, Provenance ● Data Infrastructure, Data Management and Organisation Research Data Infrastructure, Open Science, Open Data, Open Access, Data Infrastructure Compliance and Certification, Ethical Principle and Data Privacy 	
KAG4-DSRM: Scientific and Research Methods group	<ul style="list-style-type: none"> ● Scientific/Research Methods ● Research Methodology, Paradigms and Research Cycle, Modelling and Experiment Planning ● Data Selection and Quality Evaluation ● Use Case Analysis: Research Infrastructures and Projects Research Data Management plan and Ethical Issues 	6
KAG5-DSBPM: Business Process Management group	<ul style="list-style-type: none"> ● Business Process Management ● Business Processes and Operations, Project Scope and Risk Management ● Business Analysis - Organisation and Management ● Business Analysis - Planning and Monitoring ● Requirements Analysis and Design Definition ● Requirements Life Cycle Management (from inception to retirement) Solution Evaluation and Improvements Recommendation ● Business analysis and Enterprise Organisation ● Agile Data Driven Methodologies, Processes and Enterprises ● Use Case Analysis: Business and Industry 	4
KAG6-DSDK: Data Science Domain Knowledge group includes domain specific knowledge	<ul style="list-style-type: none"> ● Applied Data Science use cases in Domains, HR, Retail, Fraud Analytics, Finance Trends, Health Care, Infrastructure Management 	2

5 BLOOM'S TAXONOMY REFERENCE

Bloom's Learning Index	Description
1	Remembering: Recall or retrieve previous learned information.
2	Understanding: Comprehending the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.
3	Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the workplace.
4	Analysing: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.
5	Evaluating: Make judgments about the value of ideas or materials.
6	Creating: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.

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