MAGNA SKILLS DEVELOPMENT INSTITUTE

Capacity Building • Professional Training • Organisational Development

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Course Profile Document

ICT and Security Management

Machine Learning Algorithms in Python and R

Prepared as a professional course profile for delegate review, sponsorship approval and organisational training planning.

COURSE CODE	DELIVERY	DURATION	PREPARED FOR
MSD2828	**Online / Face-to-Face**	**Flexible**	**Organisation Approval**

Register for this Course

View Online Course Page

Course Overview

The Machine Learning Algorithms in Python and R course offered by Magna Skills provides participants with comprehensive training in machine learning techniques using two popular programming languages, Python and R. This course covers fundamental concepts, algorithms, and methodologies in machine learning, along with hands-on practical exercises to implement machine learning models using Python's scikit-learn library and R's caret package. Participants will learn how to preprocess data, build predictive models, evaluate model performance, and deploy machine learning solutions in real-world scenarios

Course Outcomes

1. **Understanding Machine Learning Fundamentals:** Gain a solid understanding of machine learning concepts, algorithms, and methodologies, including supervised learning, unsupervised learning, and semi-supervised learning.
2. **Data Preprocessing and Feature Engineering:** Learn techniques for data preprocessing, including data cleaning, normalization, feature scaling, and feature extraction, to prepare data for machine learning model training.
3. **Supervised Learning Algorithms:** Explore popular supervised learning algorithms, such as linear regression, logistic regression, decision trees, random forests, support vector machines (SVM), and k-nearest neighbors (KNN), and understand their applications and limitations.
4.

Unsupervised Learning Algorithms: Delve into unsupervised learning algorithms, including clustering algorithms (k-means, hierarchical clustering) and dimensionality reduction techniques (principal component analysis, t-distributed stochastic neighbor embedding), for data exploration and pattern discovery.

5. **Model Evaluation and Performance Metrics:** Learn how to evaluate the performance of machine learning models using appropriate metrics, such as accuracy, precision, recall, F1-score, ROC curve, and AUC-ROC, and select the best model for deployment based on evaluation results

Course Outline / Curriculum

Module 1: Introduction to Machine Learning

- Overview of machine learning concepts, types of machine learning, and applications
- Introduction to Python and R programming languages for machine learning

Module 2: Data Preprocessing

- Data cleaning, missing value imputation, and outlier detection
- Feature scaling, normalization, and transformation techniques

Module 3: Supervised Learning Algorithms

- Linear regression and logistic regression for regression and classification tasks
- Decision trees, random forests, and ensemble learning methods for classification and regression

Module 4: Support Vector Machines (SVM)

- Understanding SVM algorithm for binary and multi-class classification
- Kernel functions and hyperparameter tuning for SVM optimization

Module 5: K-Nearest Neighbors (KNN)

- Working principles of KNN algorithm for classification and regression
- Model selection and performance evaluation in KNN

Module 6: Unsupervised Learning Algorithms

- K-means clustering for data segmentation and pattern recognition
- Dimensionality reduction techniques (PCA, t-SNE) for data visualization and feature extraction

Module 7: Model Evaluation and Performance Metrics

- Cross-validation techniques for model evaluation and validation
- Performance metrics (accuracy, precision, recall, F1-score, ROC curve, AUC-ROC) for model assessment

Module 8: Model Deployment and Integration

- Exporting and saving trained machine learning models for deployment
- Integrating machine learning models into applications using Python and R libraries

Module 9: Advanced Topics in Machine Learning

- Introduction to advanced machine learning concepts (deep learning, reinforcement learning)
- Recent trends and developments in the field of machine learning

Module 10: Case Studies and Practical Applications

- Real-world machine learning projects and case studies in Python and R
- Hands-on exercises and projects to implement machine learning algorithms on datasets

The Machine Learning Algorithms in Python and R course equips participants with the knowledge and skills required to build, evaluate, and deploy machine learning models using Python and R programming languages. Through a combination of theoretical learning, hands-on exercises, case studies, and practical applications, participants will gain proficiency in machine learning techniques and be prepared to tackle real-world data science challenges.

Target Audience

The programme is aimed at senior and middle managers in government dealing with public sector transformation and digital governance. It is also aimed at digital government practitioners and researchers working in the non-profit environment. Industry practitioners involved in the implementation of digital governance will also benefit from participating in the course.

The course will thus be of interest to:

- professionals and senior managers in national, provincial and local government
- practitioners in e-education and e-health
- information and content managers
- business analysts
- IT and telecommunications managers, architects, planners
- business, marketing representatives

Key Course Benefits

Work-Ready Skills

Delegates leave with practical tools, templates and methods they can apply immediately at work.

Better Institutional Results

The programme supports stronger planning, reporting, compliance, accountability and service delivery.

Sponsor-Friendly

This document is designed to help supervisors, HR units and sponsors approve delegate participation quickly.

Professional Recognition

Delegates receive training documentation and a certificate of completion after successful participation.

Our Training Centres & Delivery Options

Magna Skills offers flexible delivery through face-to-face training centres across Africa and beyond, plus Online / E-Learning for delegates who prefer remote participation.

Southern Africa

Practical training destinations with strong travel access and delegate support.

- Pretoria, South Africa
- Vic Falls, Zimbabwe
- Livingstone, Zambia

East Africa

Popular regional centres for government, NGO and donor-funded project teams.

- Kigali, Rwanda
- Kampala, Uganda
- Nairobi,
- Zanzibar, Tanzania

West Africa & Islands

Strategic locations for regional networking and executive capacity building.

- Accra, Ghana
- Port Louis, Mauritius

International Executive Venue

Premium destination training for senior teams and international delegates.

- Dubai, United Arab Emirates

Online / E-Learning

Attend from anywhere through live online, blended or self-paced learning options.

- Online, E-Learning
- Remote Teams
- Flexib

Organisation-Based Training

Magna Skills can also arrange dedicated in-house training for ministries, NGOs and companies.

- Onsite
- Custom Dates
- Group Training

Ready to Nominate Delegates?

Use the links below to register, review the live course page or contact Magna Skills for organisation-based training support.

Register / Apply Online | **View Full Course Page**

About Magna Skills

Magna Skills Development Institute provides practical capacity building programmes for government departments, NGOs, public institutions, donor-funded projects and private sector professionals across Africa. Our training approach combines expert facilitation, real workplace case studies, practical tools, post-training support and professional documentation that helps organisations strengthen staff performance and service delivery.

Government Training | NGO Capacity Building | Corporate Workshops | Online Learning | Face-to-Face Training | Certifica

Approval & Authorisation Form

This section may be completed by the organisation, department, HR office, finance office or sponsor approving delegate participation. It can be attached to an internal memo, procurement request or training approval submission.

Organisation / Department	
Delegate Name(s)	
Approved Course	Machine Learning Algorithms in Python and R
Preferred Delivery Mode	☐ Online ☐ Face-to-Face ☐ Organisation-Based Training
Preferred Training Venue / Date	
Estimated Number of Delegates	
Budget / Vote Number	
Contact Person	
Email / Mobile	

Authorised Name _____ Signature / Stamp _____ Date _____