# Big Data Analytics & Artificial Intelligence with Python

## EM09HM33

**Programme**

PGE
PGE4 FI

**UE**

Big Data Analytics & Artificial Intelligence with Python

**Semestre**

B

**Discipline**

Quantitative methods / Statistics

**Volume horaire**

27 H

**Nombre de places**

40

**Ouvert aux visitants**

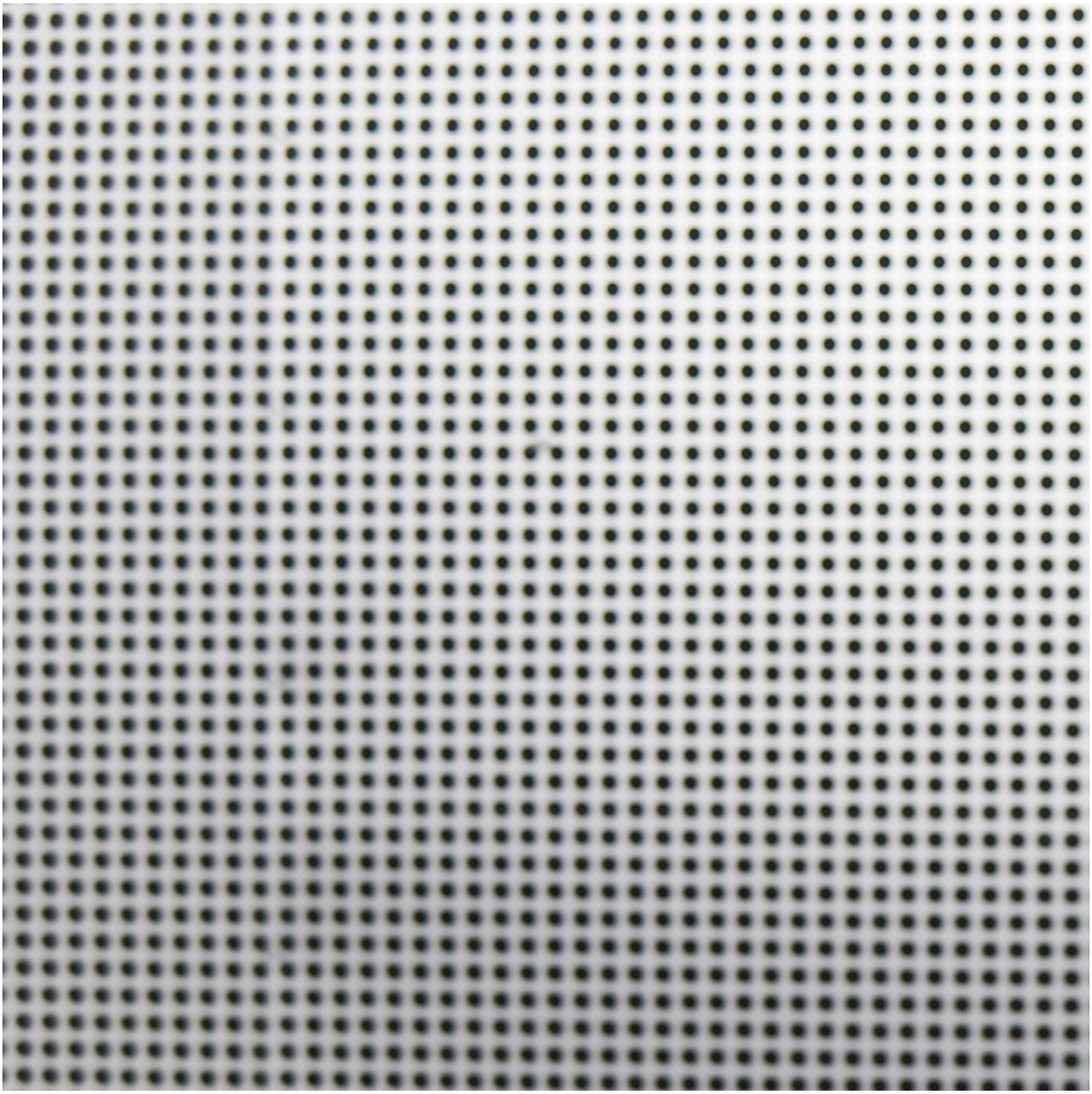
Oui

**Langue**

EN

**Responsable**

Samia CHEHBI GAMOURA



## Liste des intervenants

| Intervenant(s) | Email | Volume horaire CM |
|---|---|---|
| Samia CHEHBI GAMOURA | samia.gamoura@em-strasbourg.eu | 27 h |

## Contribution pédagogique du cours au programme

**Développer un management à impact grâce aux connaissances et aux outils les plus récents dans les domaines du management**
Developing a strategic and managerial vision in a complex, uncertain and changing environment
Evaluate sustainable managerial practices using managerial concepts and instruments as well as digital tools
Design solutions adapted to organizational problems by applying relevant methodologies
**Développer des compétences managériales de niveau avancé se traduisant par un leadership responsable**
Co-build a managerial and organizational culture through collaborations and team projects
Recommend decision making by taking a critical approach to driving change in organizations
Effectively argue his ideas orally and in writing with a professional posture
**Pratiquer un management à impact dans un environnement multiculturel et international, porté par un "European mindset"**
Communicate in a professional context in (foreign) languages, in writing and/or orally

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## Descriptif

The purpose of this course is to provide students with an overview of theoretical fundamentals and practical cases regarding the use of Big Data, Artificial Intelligence, Machine Learning, and Analytics in Business, Management, and organizations.
This course investigates the new Big Data and Analytics (Artificial Intelligence, Machine Learning, Business Intelligence, Business Object, etc.) in today's modern Management in business organizations. This course's set of knowledge will not be restricted to academic notions but covers a set of real-world challenging case studies, success, and fail stories in Data and AI use. The goal of this course is to offer hands-on applied experience in apprehending methodologies and solutions.
INTENDED OUTCOMES Upon successful completion of this course, students will be able to:
Understand the paradigm of Big Data and Analytics, and the related concepts such as Data sources, Artificial Intelligence, Internet of Things, Machine Learning, Business Intelligence, etc.,
Discover the approaches of analytics that are adapted by the organizations,
Research and use the concepts and trends underlying current and future methods of Big Data Analytics in Management of organizations,
Appraise management cases where managers are able to apply Big Data Analytics in order to facilitate decision making in Management,
Understand, control, plan, and evaluate a Big Data Project in Management with the use of Analytics.

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## Organisation pédagogique

### Face-to-face

- Lectures
- Tutorials

### In group

- Exercises
- Oral presentations
- Projects
- Case studies/texts

### Interaction

- Discussions/debates

### Others

Aucun élément de cette liste n'a été coché.

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## Objectifs pédagogiques

### Cognitive domain

A l'issue du cours, l'étudiant(e) devrait être capable de / d'...

- - (niv. 4) analyze the situation about data organization and processing in the organization
- - (niv. 4) audit the data pipeline in the organization
- - (niv. 4) examine the situation in the oprganization to detect the value to add by employing Big Data project embedding AI solution
- - (niv. 5) evaluate the maturity level of an organization for Big Data implementation
- - (niv. 6) organize and manipulate the business data collection and acquisition in data bases

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### Affective domain

A l'issue du cours, l'étudiant(e) devrait être capable de / d'...

- - (niv. 4) formulate a combination of data sources in an integrated Big Data System (example of MapReduce query)
- - (niv. 4) prepare a study of a situation to justify the need a Big Data system in an organization
- - (niv. 5) question the big data base to extract valuable information (example of BigQuery)
- - (niv. 5) exemplify an integrated system of Big Data for an organization
- - (niv. 5) revise the delivered work in groups on practical exercices and cases on AI

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## Objectifs de développement durable abordés

ODD n°4 - Quality education
ODD n°9 - Industry, innovation and infrastructure
ODD n°17 - Partnerships for the goals

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## Plan / Sommaire

Part 1: Big Data (BD)
1.1. Introduction to Data and Big Data Concepts
1.2. The Big Data Life Cycle
1.3. Data Processing Techniques (Hadoop, MapReduce)
1.4. Data Quality, Visualization, Compliance, and Preparation
1.5. Big Data Project Execution

Part 2: Big Data Analytics (BDA)
2.1. Overview of Big Data Analytics
2.2. Types of Analytics
2.2.1. Traditional Data Analytics
2.2.2. Advanced Analytics Approaches

Part 3: Artificial Intelligence (AI)
3.1. Introduction to Artificial Intelligence
3.2. AI for Business Analytics
3.3. Different Branches of AI
3.4. Machine Learning Techniques
3.4.1. Supervised Learning: Decision Trees in Warehousing
3.4.2. Unsupervised Learning: Association Rule Algorithms in Marketing
3.5. Generative AI

Part 4: Hands-on Practice with Google BigQuery & Python (or alternative tools)
4.1. Working with Tables and Datasets
4.2. Creating Queries and Extracting Data
4.3. Practical Examples of AI Coding and Programming

Part 5: Ethical and Social Considerations in Big Data and AI 5.1. Issues of Data Privacy and Security
5.2. Fairness and Bias in Algorithms
5.3. Trust, Accountability, and Transparency in AI
5.4. The Impact of AI on Jobs and the Workforce
5.5. Designing Ethical AI and Governance Principles

Part 6: The Future of Big Data and AI in Business
6.1. New and Emerging Trends in Big Data and AI
6.2. Automation and Autonomous Systems
6.3. Human-Centered Approaches to AI
6.4. Regulatory and Legal Challenges in AI and Big Data

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## Prérequis nécessaires

### Connaissances en / Notions clés à maîtriser

Requires a background in information systems, basics in Management, enterprise systems, and MS Office tools such as MS Excel.

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## Supports pédagogiques

### Mandatory tools for the course

- Computer
- Other : Videos (Youtube)

### Documents in all formats

- Case studies/texts
- Worksheets

### Moodle platform

- Upload of class documents
- Interface to submit coursework
- Assessments
- Coaching/mentoring

### Software

- Other : Python, BigQuery

### Additional electronic platforms

- Other : Python, BigQuery

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## Bibliographie recommandée

### Ouvrages principaux

Book: 'Data Analytics Made Accessible'. 2018. by Anil Maheshwari
Book: 'Too Big to Ignore: The Business Case for Big Data'. by award-winning
Book: 'Data Smart: Using Data Science to Transform Information into Insight', by J. W. Foreman'.

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### Littérature complémentaire

Paper: 'Almeida, F. (2018). Big Data: Concept, Potentialities and Vulnerabilities'. Emerging Science Journal, 2(1).
McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D. J., & Barton, D. (2012). Big data: the management revolution. Harvard business review, 90(10), 60-68.
Zikopoulos, P., & Eaton, C. (2011). Understanding big data: Analytics for enterprise class hadoop and streaming data. McGraw-Hill Osborne Media.
Kwon, O., Lee, N., & Shin, B. (2014). Data quality management, data usage experience and acquisition intention of big data analytics. International Journal of Information Management, 34(3), 387-394.

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### Travaux de recherche de l'EM : Veillez à mobiliser au moins une ressource

Peuvent être renseignés les manuels coordonnés, les traductions de manuel, les études de cas traduites etc...
1. Chehbi-Gamoura, S., et al. (2020). Insights from big Data Analytics in supply chain management: an all-inclusive literature review using the SCOR model. Production Planning & Control, 31(5), 355-382.

2. Chehbi-Gamoura, S., et al. (2020). Cross-management of risks in big data-driven industries by the use of fuzzy cognitive maps. Logistique & Management, 28(2), 155-166.

3. Chehbi-Gamoura, S., and Malhotra M. (2020). Master Data-Supply Chain Management, the Key Lever for Collaborative and Compliant Partnerships in Big Data Era: Marketing/Sales Case Study. Impacts and Challenges of Cloud Business Intelligence, New York, USA, IGI Global, 72-101.

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## Modalités d'évaluation

### Liste des modalités d'évaluation

**Evaluation intermédiaire / contrôle continu 1**Séance n° 4
Ecrite et orale (180 min) / en groupe / Anglais / pondération : 10 %
Précisions : 3 heures de travail en groupe pour préparer un sujet dans une liste fournie en lien avec le cours. Un plan obligatoire est imposé. Tous les étudiants de chaque groupe doivent présenter sous forme de pitch une présentation orale en 15min avec questions/réponses. Le support de la présentation est également fourni en complément. Tout le travail se fait en anglais.
Cette évaluation sert à mesurer ILO1.1-PGE, ILO1.2-PGE, ILO1.3-PGE, ILO2.1-PGE, ILO2.2-PGE, ILO4.1-PGE

**Evaluation intermédiaire / contrôle continu 2**Autre (date, contrôle surprise...) : at the end of some sessions (it depends on the progress in each session)
Ecrite (30 min) / individuelle / Anglais / pondération : 10 %
Précisions : Test automatisé via Moodle de validation des acquis de chaque séance. Le test est ouvert à la suite de chaque séance pendant une semaine. Les questions du test incite l'étudiant à replonger dans son cours de la séance pour pouvoir répondre. C'est un manière de combattre le décrochage chez les étudiants et de progresser en validant chaque étape.
Cette évaluation sert à mesurer ILO1.3-PGE

**Evaluation intermédiaire / contrôle continu 3**Autre (date, contrôle surprise...) : during tutorials
Ecrite (40 min) / en groupe / Anglais / pondération : 10 %
Précisions : during tutorials (exercises and practice)
Cette évaluation sert à mesurer ILO1.1-PGE, ILO1.2-PGE, ILO1.3-PGE, ILO2.2-PGE, ILO4.1-PGE

**Evaluation finale**Autre (date, contrôle surprise...) : after the last session
Ecrite (180 min) / individuelle / Anglais / pondération : 70 %
Précisions : Examen final écrit. Il contient des exercices pratiques et des problèmes à résoudre ainsi que des questions de compréhension sur tout le contenu du cours.
Cette évaluation sert à mesurer ILO1.2-PGE, ILO2.1-PGE, ILO2.2-PGE, ILO4.1-PGE, ILO1.2-PGE, ILO2.1-PGE, ILO2.2-PGE, ILO4.1-PGE, ILO1.2-PGE, ILO2.1-PGE, ILO2.2-PGE, ILO4.1-PGE, ILO1.2-PGE, ILO2.1-PGE, ILO2.2-PGE, ILO4.1-PGE, ILO1.2-PGE, ILO2.1-PGE, ILO2.2-PGE, ILO4.1-PGE, ILO1.2-PGE, ILO2.1-PGE, ILO2.2-PGE, ILO4.1-PGE