



CONTINUING EDUCATION CELL

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

G.E. Road, Raipur – 492010 (C.G.)

Ph- (0771)2253934

No./NITRR/CEC/2023/190

Date: 09/03/2023

NOTICE

Continuing Education Cell, NIT Raipur is going to offer a **certificate course** on “**Applied Data Analytics: A Practical Approach**”. The details are mentioned below.

Course Name	Tentative schedule	Details
“Applied Data Analytics: A Practical Approach” (Online mode)	22nd May to 21st June 2023 (01 hrs each day) Note: Participants can opt only one batch (Either Morning (9.00AM to 10.00AM) or Evening (5.30PM to 6.30PM))	ANNEXURE-A

Interested candidates/organizations can apply in the prescribed application form (**Annexure-B** along with the details of course fee. **The course Fee is given as follows:**

Course Fee	Students of NIT Raipur	Rs. 750 + 18% GST
	Outside Students (other than NIT Raipur)	Rs. 1000 + 18% GST
	Faculty/ Industry Personnel	Rs. 2500 + 18% GST

The payment can be done either in the form of a Demand Draft (DD) in favour of “Director, NIT, Raipur” payable at Raipur **or through online mode** (*account details in the last page of this document*). **For online payment**, the scanned copy of the application form along with the proof of payment should be sent to cec_assistant@nitrr.ac.in by the due date (**10th May 2023**). For payment made through DD, the hard copy of the application along with the DD should be **sent to the Chairman, Continuing Education CELL, NIT Raipur, Raipur, Pin:492010** by the due date (**10th May 2023**). After payment, participant is **required to fill following google form:**

<https://forms.gle/MMgYb4S5qPT3ChXP6>

For any clarification, please contact the course coordinators, **Dr. Govind Gupta** (Email: gpgupta.it@nitrr.ac.in/Mobile: 9891952480) and **Dr. Mridu Sahu**, (Email: mrisahu.it@nitrr.ac.in/ Mobile: 9826501139) Assistant Professor, Department of Information Technology, NIT Raipur, For course details kindly refer to **Annexure- A**. Conduction of the course is subjected to enrolment of minimum number of students.

Dr. Subhojit Ghosh
Chairman,
CEC NIT, Raipur

Email - "Dr. SubhojitGhosh"<sghosh.ele@nitrr.ac.in>, cec_assistant@nitrr.ac.in



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ANNEXURE-A

Course Name: “Applied Data Analytics: A Practical Approach”

Objectives of Training Programme: The main objective of the course is to help the participants in developing a solid understanding of the Data Science and Analytics techniques like data pre-processing, predictive analysis, fundamental of data statistics, machine learning techniques and data visualization etc., with help of emerging data analytics tools like Python/R. The mathematical foundation for analyzing the data will add more knowledge about the data and this will help for decision support systems. This certificate course will help to enhance the knowledge of the participants in the field Data Science and Analytics. This course focus on the delivery of the lectures with full practical approach, case studies and by hands-on practical sessions on diversified range of topics related to Data Science and Analytics.

Learning Outcomes (LO): Upon successful completion of this Training Programme, the participant will be able to:

- Perform analysis of data using Python/R tool
- Perform model fitting using mathematical background.
- Become familiar with the wide range of enabling technologies for data interpretation, data visualization.
- Become families with Data Summarization and Data Generalization techniques.
- Identify appropriate methods for data analysis in various domains
- Formulate and design data analytic solutions.
- Manage large-scale, complex data and obtain the interpretation.
- Recognize and evaluate the opportunities, needs, and limitations of data.
- Interpret data analytics and communicate the implications to stakeholders.
- Attain data scientist and data engineer positions in a fast-growing field
- Accelerate progress into related Research and Development in Data Science and Big Data



Course Content

Course Name: “Applied Data Analytics: A Practical Approach”

Module I: Introduction to the Data Science and Analytics, Engineering Applications of Data Science and Analytics, Machine Learning Learning Pipeline, **Introduction to R Programming:** History of R programming. R and Its Feature, R & R studio Installation. Data Types, Handling Data in R, Data types conversion, Importing Data, Reading and Writing Files like PDF, JPEG, CSV etc, Manipulating Data like Cbind, Rbind, Sorting, Aggregation, dplyr. Conditional Statement and Function like if --- else, for loop, while loop, Repeat loop, Apply(), sAppLy(), tApply().

Module II:

Introduction to Python Programming: Installation of Anaconda, Python Basic: Data types, operators, String operations, Input Function, Print Formatting, comments, Python Program Flow: Indentation, If statement and its related statement, while loop, for loop, range statement, break and continue , Assert, Example of looping Python Functions: defining a function, calling a function, Passing Arguments by Reference Values, Lambda functions and map; List, Multidimensional Lists, File, Exception handling Tuples, Sets, and Dictionaries in Python

Introduction to the science of statistics: Fundamental Elements of Statistics, Qualitative and Quantitative Data, Summaries. Types of Data Distribution {Continuous Distribution and Discrete Distribution}, F-test, T-Test for Simple Liner Regression, Analysis of Variance, Analysis of Covariance, F-Test and test for Multiple Regression.

Module III: Feature Engineering

Introduction to Feature Engineering: Feature Selection: Filter methods: Pearson correlation, Chi-Square, Information Gain, Case-Study using Python and filter-based feature selection techniques.

Wrapper Method for feature Selection: Forward selection, Backward elimination, Stepwise selection, Case-Study using Python and wrapper-based feature selection techniques, **Predictive Modeling:** Linear Regression, Multiple Regression analysis, Case-Study using Python and Linear regression technique.

Module IV: Supervised and Unsupervised Learning

Types of Machine Learning: Supervised and Unsupervised Learning, K-NN, Logistic regression, Case-Study using Python and K-NN, Decision Tree, Case-Study using Python and DT, Random Forest, Case-Study using Python and RF, SVM, Case-Study using Python and SVM

K-means, Fuzzy C-means, Case-Study using Python and Fuzzy C-means, Ensemble Learning Model: Bagging techniques, boosting technique, Voting-based techniques, Case-Study using Python and Voting-based technique.

Module IV: Data Visualization

ML Model Performance Metrics: Confusion Matrix, Accuracy, Precision, Recall, F1-Score, Positive Rate, False Positive Rate, Case Study using Python for all metrics; Data Visualization: using Matplotlib python library; Data Visualization: Tableau Installation and Basics, Tableau Architecture and Server Components, The role of Tableau in Business Intelligence, Case Study using Tableau



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Tentative Time-table of Certificate Course on “Applied Data Analytics: A Practical Approach”.

*[*NOTE: Time of online classes will be finalized after consulting the participants/sponsoring organization.]*

Day	Lecture Detail
Day 1	Introduction to the Data Science and Analytics, Engineering Applications of Data Science and Analytics
Day 2	Data Pre-processing and Analytics in R: introduction to R Programming, R & R studio Installation, Fundamentals of R.
Day 3	Handling Data in R, Data Types, Data types conversion, Importing Data, Reading and Writing Files like PDF, JPEG, CSV etc,
Day 4	Manipulating Data like Cbind, Rbind, Sorting, Aggregation, dplyr.
Day 5	Conditional Statement and Function like if --- else, for loop, while loop, Repeat loop, Apply (), sApply(), tApply().
Day 6	Introduction to Python Programming: Installation of Anaconda, Python Basic: Data types, operators, String operations, Input Function, Print Formatting, comments
Day 7	Python Program Flow: Indentation, If statement and its related statement, while loop, for loop, range statement, break and continue , Assert, Example of looping
Day 8	Python Functions: defining a function, calling a function, Passing Arguments by Reference Values, Lambda functions and map
Day 9	List, Multidimensional Lists, File, Exception handling
Day 10	Tuples, Sets, and Dictionaries in Python
Day 11	Introduction to the Science of statistics for data analytics: Fundamental Elements of Statistics Qualitative and Quantitative Data, Summaries, Types of Data Distribution {Continuous Distribution and Discrete Distribution}
Day 12	F-test, T-Test for Simple Liner Regression, Analysis of Variance, Analysis of Covariance, F Test and test for Multiple Regression.
Day 13	Introduction to Feature Engineering: Feature Selection: Filter methods: Pearson correlation, Chi-Square Case-Study using Python and filter-based feature selection techniques
Day 14	Filter methods: Information Gain, Case-Study using Python and filter-based feature selection techniques
Day 15	Wrapper Method for feature Selection: Forward selection, Backward elimination, Stepwise selection, Case-Study using Python and wrapper-based feature selection techniques



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Day 16	Predictive Modelling: Linear Regression, Multiple Regression analysis, Case-Study using Python and Linear regression technique
Day 17	Types of Machine Learning: Supervised and Unsupervised Learning Supervised learning algorithms: K-NN, Logistic regression, Case-Study using Python and K-NN
Day 18	Supervised learning algorithms: Decision Tree, Case-Study using Python and DT
Day 19	Supervised learning algorithms: Random Forest, Case-Study using Python and RF
Day 20	Supervised learning algorithms: SVM, Case-Study using Python and SVM
Day 21	Supervised learning algorithms: SVM, Case-Study using Python and SVM
Day 22	Unsupervised learning algorithms: K-means, Case-Study using Python and K-means
Day 23	Unsupervised learning algorithms: Fuzzy C-means, Case-Study using Python and Fuzzy C-means
Day 24	Ensemble Learning Model: Bagging techniques, Case-Study using Python and Random Forest
Day 25	Ensemble Learning Model: Boosting technique, Case-Study using Python and AdaBoost, XGBoost
Day 26	Ensemble Learning Model: Voting-based techniques, Case-Study using Python and Voting-based technique
Day 27	ML Model Performance Metrics: Confusion Matrix, Accuracy, Precision, Recall, F1-Score, Positive Rate, False Positive Rate, Case Study using Python for all metrics
Day 28	Data Visualization: using Matplotlib python library
Day 29	Data Visualization: Tableau Installation and Basics, Tableau Architecture and Server Components
Day 30	The role of Tableau in Business Intelligence, Case Study using Tableau



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ANNEXURE-B

APPLICATION FORM

Name of the Course Applied:

Name:

Father's/Husband's Name:

Date of Birth: Sex: Male Female

Occupation:

Qualification:

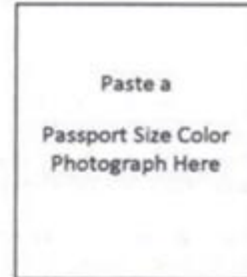
Address.....

.....

..... *E-mail ID:.....

Phone (with STD code): Residence: Mobile:

Aadhar Number :



Fee Details:

Amount: DD No.: Date:

Name of Bank.....

(Please write your name and course applied for in the back of the Demand Draft also.)

Date:

Signature of the Applicant

Note:

1. Time/Batch will be allotted as per the convenience of the applicant in general, however candidate may be asked to change the batch as per the requirement of the course.
2. The Fee Deposited for any course is non-refundable & non-transferable.
3. Information regarding the classes will be sent to through mail after registration.
4. If applicant is in Government service, they need to apply through proper channel.

For Office Use Only

Course and Time allotted:

Fee Details:

Place & Date:

Signature of CEC-Chairman



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ACCOUNT DETAILS FOR ONLINE PAYMENT

Bank Name:	State Bank of India
Account Number	38027633250
Account Holder Name	Director NIT Raipur
Branch Name and Address	NIT Branch, G. E. Road Raipur, Chhattisgarh 492010, India
IFSC Code	SBIN0002852
MICR Code	492002004
Swift Code	SBININBB646
PAN Card Number	AAAJN0643G
GSTIN Number	22AAAJN0643G1ZN