



**Punyashlok Ahilyadevi Holkar Solapur University
Solapur**

Ordinance for
Long Term Course on

Data Science

under the

Skill Development Center

in Association with

Department of Computer Science

and



DeveLearn Technologies Pvt. Ltd., Mumbai

Long Term Course on Data Science

1. About Solapur: SOLAPUR is one of the most popular districts in Southern Maharashtra, India. It is in the southern part of Maharashtra. The district consists of eleven Talukas. The headquarters of North Solapur and South Solapur Taluka is the Solapur city itself. The city is known for its famous religious shrines including Pandharpur, Akkalkot and the Bhagwant Mandir of Barshi. Sant Damaji of Mangalwedha is one of the important personalities of the district.

Solapur has its own history and, the city was addressed with a lot of titles including the Textile Capital, the Labour city, etc. At present, Solapur is popular for its handloom and cotton factories. The Handloom and power loom factory and the Solapur Cotton Industry is engaged in Production of Chadar, towel and other handloom products. Solapur is transport hub connecting Maharashtra, Karnataka and Andhra Pradesh. It is well connected by Road and Rail to the major districts. The national highways 9, 13 and 211 passes through Solapur city.

2. About Solapur University: Solapur University was established on 1st August 2004 and was inaugurated on 03-08-2004 by the then Governor of Maharashtra. The formation of the university at Solapur was a long cherished desire of the people of this region. Earlier, to the formation of University, Solapur had a P.G. Centre of Shivaji University, Kolhapur for over two decades. The center for P.G. studies had three postgraduate science departments and 7 postgraduate courses. With this sound background, Solapur University was established to cater to the needs of over 60,000 students community.

The university is poised for ambitious growth and is now a hub of various academic activities. Good numbers of Engineering, Agricultural, Architectural, Medical and Traditional institutions of national fame are located in and around the city. Solapur district is home of religious saints of various languages since the district is at a triple junction of linguistic states of Telangana, Karnataka, and Maharashtra. Therefore, Solapur is secular, multilingual and metropolitan to its core. This backdrop makes the University stand for transcendent principles, embodying a noble mission. It is a small team yet progressive and forward-looking. Perched on a plateau, the Solapur University is a citadel of higher learning. Recently the Solapur University has introduced the concept of the school system and has decided to bring its various departments under the umbrella of seven schools, viz. 1) School of Chemical Sciences 2) School of Computational Sciences 3) School of Earth Sciences 4) School of Physical Sciences 5) School of Social Sciences 6) School of Commerce and management 7) School of Languages 8) School of Technology. To cater to the need of the academic information,

the University has a full-fledged library housed in the premises measuring nearly 400 sq. meters.

In thirteen academic years, the University flaunts a delight of various distinctions. Student and staff have completed their academic commitment. It is a landmark to state that the university has successfully conducted its examinations and has declared results in record time. Student's welfare department has conducted successfully its council elections, youth festivals, and insurance scheme, etc. activities. Further, students have bagged medals at state and national youth festivals and sports events. The varsity has strong NSS and NCC units. Teachers and Students have great zeal in academic activities. They had participated in national and international seminars and presented research findings. Solapur University has formulated quality improvement guidelines for Ph.D. in the state of Maharashtra.

3. Skill Development Center: Solapur University has Skill Development Center, which runs 62 skill-based courses in its affiliated colleges and recently started 7 skill-based courses in its own campus. The main focus of the skill development center is to offer short term skill enhancement courses to different sectors of the society. The skill-based courses are mainly in various sectors including electrical, mechanical, IT, health care, handloom and textile, commerce, management, personality development, agriculture, tourism, yoga, and culture.

4. About DeveLearn Technologies Pvt. Ltd., Mumbai: DeveLearn Technologies Pvt. Ltd. is a dedicated training, teaching and educational research organization having expertise in the delivery of specialized training programs in Data Science. At one side of the country, there are lakhs of unemployed graduates. On the other side, there are companies who are struggling to find the right talent. It all boils down to one root cause - "Talent gap". Fortunately, this is exactly the problem DeveLearn is solving. We bridge the gap between industry and academia. We help students acquire the right skills and expose them to the myriad of career opportunities available in the world of data science.

Our NASSCOM certified institution is an IITian initiative to offer cutting-edge data science courses with world-class content created by our team of industry professionals. We have partnered with a plethora of institutions in Maharashtra including Mumbai University. We offer interactive face-to-face offline training programs to students. We also have a sophisticated e-learning portal to enable students to learn data science from anywhere, anytime. We offer highly updated content that clearly communicates to students what they need to understand. Our state of the art AI technology detects and fills learning gaps and our team of mentors top it with some human touch.

5. About the course:

The course covers a wide range of concepts used in data science including two programming languages: Python and R. The course also gives an overview of the popular data science frameworks including Hadoop. It also introduces students to various data science techniques including artificial intelligence, machine learning, deep learning, neural networking, natural language processing etc.

Why learn Data Science?

- Demand in the industry - Companies across the world are witnessing an exponential increase in the volumes of big data every day. According to NASSCOM, the Indian Big data analytics industry revenue is expected to grow eightfold from \$2 billion to hit \$16 billion by 2025. And this growth translates to a bigger demand for data analysts.
- Assured placement - Hadoop brings with it an array of opportunities to future-proof your career. Be it with SMBs or enterprises, decisions are becoming data-driven. Irrespective of the industry, almost all the businesses need data analysts. Learning Hadoop will reinforce the skill set of students as it comes with promising career opportunities.
- High starting salary - There has been a high demand for data analysts in India and, typically, an entry-level job comes with a salary package of 4.5-4 LPA. The scope of Indian data analysts is not just limited to India. According to McKinsey the United States alone faces a shortage of 140,000 -190,000 data analysts. The talent gap and high demand would enable professionals to eligible for lucrative jobs.
- Freelancing opportunities – Becoming a Data Science professional is not just about a full-time 9-5 career. There is a myriad of opportunities for freelancing and part-time jobs in this space. You can side-hustle with a data analyst job while pursuing your master degree. The course also gives you scope for starting your own business.

6. Course Objectives: The objectives of this short term course are:

- i. To help students learn the two most popular programming languages used in data science: R and Python
- ii. To introduce students to Hadoop framework and the various tools of the Hadoop ecosystem
- iii. To give the students insights to Artificial intelligence, machine learning, deep learning and neural networking.
- iv. To introduce students to the basic concepts of Natural Language Processing (NLP) and Sentiment Analysis.
- v. To prepare students to take up real life data science problems by practical sessions

7. Course Outcomes: The outcomes of this short term course are:

- i. Students would get deeper insights about the basics and the applications of Hadoop.
- ii. Students will be able to write basic data analysis coding using Python and R
- iii. Students will get a clear understanding artificial intelligence, machine learning, deep learning and neural networks.
- iv. It will ensure that students learn to efficiently understand NLP algorithms and derive meaningful insights from unstructured conversations.

8. Mode of teaching / Learning: Online courses along with practical lab sessions.

9. Course duration: 300 hrs/1 year

10. Ordinances and regulations

Eligibility: Admission to the course is open to any candidate who has passed HSC or equivalent.

Fee Structure: Rs.45,000/

Course Structure: This course has an online lecture, lab sessions, and offline lab sessions. The course structure is as follows:

Code	Title	Type	Distribution of marks			Hours/week	Credits
			Internal	Univ.	Total		
CS	Data Science	Theory and Practical	50	100	150	300 Hrs (Total)	40

Evaluation: The course evaluation has two components: Internal assessment for 50 marks containing assignment/Oral/viva/internal test, etc and the term end examination will online mode for 100 marks

Module Name	Objective	Theory/Practical	Duration
Module Number: 01			
R Programming	Explain the basic programming concepts in detail and introduce the basics of data analysis using R	Theory and practical	60 Hrs (4 credits)
Introduction to R			
Loops and functions			
Data Structures			
Working with Data			
Module Number: 01			
Python	Explain the basic programming concepts in detail and gives an overview of various Python packages used in data analysis.	Theory and practical	60 Hrs (4 credits)
Introduction to Python			
Basic concepts - lists, tuples, dictionaries, loops, functions, operators, etc			
Python packages - Numpy, Pandas, Matplotlib, Scikit Learn			

Module Number: 02			
SQL : MYSQL	SQL is an essential skill for managing and analyzing data which are crucial for fields like computer science, data science, business analysis and it helps for the connectivity that enables data exchange between system or devices.	Theory and practical	40 Hrs (4 credits)
Introduction to MYSQL - Installation, Data, database, DBMS, SQL, DML, DDL, DCL, TCL			
Functions, Joins, Subquery			
Working with Data			
Module Number: 03			
Statistics and probability	The module recalls the basic mathematical concepts involved in machine learning.	Theory	40 Hrs (4 credits)
Statistics			
Probability distribution			
Testing Hypothesis			
Matrices			
Linear algebra			
Module Number: 04			
Machine Learning and Deep Learning	The module aims to introduce students to the concepts of machine learning and teaches them how they can apply the concepts learned in earlier modules (about R and Python) to create machine learning algorithms	Theory and practical	60 Hrs (6 credits)
Introduction to machine learning			
Supervised and unsupervised machine learning			
Deep learning			
Machine learning techniques using Python and R			

Module Number: 05			
Artificial Intelligence and Neural networking	The module gives an overview of artificial intelligence and neural networking. It also helps the students understand the basic techniques.	Theory and Practical	40 Hrs (6 credits)
Introduction to AI Neural networking			
Basic concepts - Activation functions, Gradient Descent, Back propagation, pooling, Relu and Keras			
Soft Max and cross entropy			
Module Number: 07			
Natural Language processing	The chapter aims to introduce students to concepts of NLP and sentiment analysis that are widely used in automated chatbots. These concepts can help data scientists derive insights from user conversations.	Theory and Practical	20 Hrs (6 credits)
Introduction to NLP			
NLP intuition			
RNN			
Cleaning data for NLP using modelling			
Sentiment Analysis			
Module Number: 08			
Projects	The module focuses on putting all the concepts learnt thus far into practice by throwing real life challenges along with guidelines to solve them.	Practical	40 Hrs (6 credits)
Regression business problems			
Classification projects			
Clustering projects			
NLP projects			
Image classification projects (deep learning)			
		Total	300 Hrs