



## ATC Innovation Center

2972 Webb Bridge Rd, Alpharetta, GA 30009  
[www.bbds.ma](http://www.bbds.ma) // [register@bbds.ma](mailto:register@bbds.ma) // 315-975-1661

### Learning Natural Language with Python | Desired Topics & Broad Goals

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#### Objective

Welcome to the Natural Language Processing course designed to be your complete online resource for learning how to use Natural Language Processing with the Python programming language.

The purpose of this course is to equip a learner with Natural Language Processing to become a world class practitioner of NLP with Python. This course starts with basis topics to establish NLP foundations, then advanced topics, such as sentiment analysis of text with the NLTK library and creating semantic word vectors with the Word2Vec algorithm.

#### Goal

- Learn to work with Text Files with Python
- Utilize Regular Expressions for pattern searching in text.
- Learn NLP pipeline (Stop-words, Whitespace, punctuation & number removal, Stemming, Lemmatization)
- Use Part of Speech Tagging to automatically process raw text files.
- Understand Named Entity Recognition, POS and NER
- Use SciKitLearn for Text Classification
- Use Latent Dirichlet Allocation for Topic Modelling
- Use the Word2Vec algorithm.
- Use NLTK for Sentiment Analysis
- Learn NLP with different libraries such as NLTK, Spacy, TextBlob, Gensim, Pattern, and Stanford CoreNLP

#### Target Audience

- Students who are Python programming language
- Students who want to learn more about Applied Machine Learning
- Professionals who are interested in applying Machine Learning and NLP to practical problems.
- Aspiring data scientists and ML engineers interested in NLP.
- Developers looking to implement NLP solutions.
- Data scientist, Machine Learning Engineer, and Python Developers
- Anyone willing to start a career in Data Science, Natural Language Processing, and NLP application such as Sentiment Analysis

- Ph.D. in AI (NLP)
- MS in Machine Learning | MS in Data Science | MS in IT | MBA
- 3 post-graduate degrees in Machine Learning and AI
- 23+ years of IT experience (Service Delivery Management)
- 11+ Years of experience in Data Science & related technologies
- Founder of Big Bang Data Science Solutions
- Founder of InnovatiCS Labs

Module	Topic Name
<b>Week 1</b>	<b>Introduction to Data Science</b>
	Data Explosion
	Why Data Science?
	What is Data Science?
	Type of Analytics
	Data Science Portfolio
	Data Science Process
	Career in Data Science
<b>Week 2</b>	<b>Python Crash course</b>
	Introduction to Jupyter Notebook
	Python Data Structure
	String   Int  Boolean
	List   Set   Tuple   Dictionaries
<b>Week 3</b>	<b>Tokenization</b>
	What is Natural Language Processing?
	History of Natural Language Processing
	NLP Applications
	NLP Levels
	NLP Components
	NLU
	NLG
	NLU vs NLG
	NLP Pipeline and Tasks
	NLP Toolkits and Libraries
	NLP Challenges
<b>Week 4</b>	<b>Essentials of Natural Language Processing</b>
	Basic Text Analysis
	Tokenization
	POS Tagging
	Stop Word Removal
	Text Normalization
	Spelling Correction
	Stemming
	Lemmatization
	Named Entity Recognition (NER)
	Word Sense Disambiguation
	Sentence Boundary Detection
<b>Week 5</b>	<b>NLP Feature Extractions</b>
	Data Structures
	NLP Pre Processing
	The Bag of Words
	Frequency Vector (Count of Vectorization)
	One-Hot Encoding
	Term Frequency – Inverse Term Frequency

	Distributed Representation
	Word Embedding
<b>Week 6</b>	<b>NLP with TextBlob</b>
	Introduction to Textblob
	Installation of TextBlob
	Language Detection
	POS
	Word Inflection
	Sentiment Analysis
<b>Week 7</b>	<b>NLP with spaCy</b>
	The spaCy Library
	Introduction to spaCy Library
	Objects of spaCy Library
	The Statistical Modeling
	Processing Pipelines
<b>Week 8</b>	<b>Text Classification</b>
	Introduction to Machine Learning
	What is Text Classification?
<b>Week 9</b>	<b>Text Summarization</b>
	What is Text Summarization?
	Text Summarization Categories
	Stages of Text Summarization
<b>Week 10</b>	<b>Topic Modeling</b>
	What is Topic Modeling?
	Topic Modeling Use cases
	Topic Modeling Libraries
	Latent Semantic Analysis (LSA)
	Latent Dirichlet Allocation (LDA)
	Hierarchical Dirichlet Process (HDP)
<b>Week 11</b>	<b>Sentiment Analysis</b>
	What is Sentiment Analysis?
	Types of Sentiment Analysis
	Benefits of Sentiment Analysis
	Examples of Sentiment Analysis
	Challenges of Sentiment Analysis
<b>Week 12</b>	<b>Chatbots /ChatGPT</b>
	What is a Chatbot?
	Types of Chatbot
	Importance of Chatbots
	Rasa Application
<b>Week 13-15</b>	<b>Capstone Project</b>