UNIVERSITY OF MUMBAI

Syllabus for

Honours/Minor Degree Program

In

Data Science

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2022-2023)

University of Mumbai Data Science (With effect from 2022-23)										
Year & Sem	Course Code & Course Title	Teaching Scheme Hrs / Week			Examination Scheme and Marks					Credit Scheme	
		Theory	Seminar / Tutorial	Practical	Internal Assessment	End Sem Exam	Term Work	Oral / Practical	Total	Credits	
TE Sem V	HDSC501: Mathematics for Data Science	04	--	--	20	80	--	--	100	04	
	Total	04	-	--	100	-	-	100	04		
Total Credits = 04											
TE Sem VI	HDSC601: Statistical Learning for Data Science	04	--	--	20	80	--	--	100	04	
	Total	04	-	-	100	-	-	100	04		
Total Credits = 04											
BE Sem VII	HDSC701: Data Science for Health and Social Care	04	--	--	20	80	--	--	100	04	
	HDSSBL701: Data Science for Health and Social Care: Lab	--	--	04	--	--	50	50	100	02	
	Total	04	-	04	100		50	50	200	06	
Total Credits = 06											
BE Sem VIII	HDSC801: Text, Web and Social Media Analytics	04	-	--	20	80	--	--	100	04	
	Total	04	-	-	100	-	-	100	04		
Total Credits = 04											
Total Credits for Semesters V,VI, VII &VIII = 04+04+06+04 = 18											

Data Science: Sem V							
Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
HDSC501	Mathematics for Data Science	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Exam Duration	Term Work	Practical and Oral	Total
		Internal Assessment			End Sem. Exam.				
		Test1	Test2	Avg.					
HDSC501	Mathematics for Data Science	20	20	20	80	03	--	--	100

Course Prerequisites:	
1	Applied Mathematics, Discrete Mathematics
Course Objectives:	
1	To build an intuitive understanding of Mathematics and relating it to Data Analytics.
2	To provide a strong foundation for probabilistic and statistical analysis mostly used in varied applications in Engineering.
3	To focus on exploring the data with the help of graphical representation and drawing conclusions.
4	To explore optimization and dimensionality reduction techniques.
Course Outcomes:	
After successful completion of the course, the student will be able to:	
1	Use linear algebra concepts to model, solve, and analyze real-world problems.
2	Apply probability distributions and sampling distributions to various business problems.
3	Select an appropriate graph representation for the given data analysis.
4	Apply exploratory data analysis to some real data sets and provide interpretations via relevant visualization
5	Analyze various optimization techniques for data analysis.
6	Describe Dimension Reduction Algorithms in analytics

Module		Topics	Hours.
1.0		**Linear Algebra**	**05**
	1.1	Vectors and Matrices, Solving Linear equations, The four Fundamental Subspaces, Eigenvalues and Eigen Vectors, The Singular Value Decomposition (SVD).	
2.0		**Probability and Statistics**	**09**
	2.1	Introduction, Random Variables and their probability Distribution, Random Sampling, Sample Characteristics and their Distributions, Chi-Square, t-, and F-Distributions: Exact Sampling Distributions, Sampling from a Bivariate Normal Distribution, The Central Limit Theorem.	
3.0		**Introduction to Graphs**	**10**

	3.1	Quantitative vs. Qualitative data, Types of Quantitative data: Continuous data, Discrete data, Types of Qualitative data: Categorical data, Binary data, Ordinary data, Plotting data using Bar graph, Pie chart, Histogram, Stem and Leaf plot, Dot plot, Scatter plot, Time-series graph, Exponential graph, Logarithmic graph, Trigonometric graph, Frequency distribution graph.	
4.0		**Exploratory Data Analysis**	**09**
	4.1	Need of exploratory data analysis, cleaning and preparing data, Feature engineering, Missing values, understand dataset through various plots and graphs, draw conclusions, deciding appropriate machine learning models.	
5.0		**Optimization Techniques**	**10**
	5.1	Types of optimization-Constrained and Unconstrained optimization, Methods of Optimization-Numerical Optimization, Bracketing Methods-Bisection Method, False Position Method, Newton's Method, Steepest Descent Method, Penalty Function Method.	
6.0		**Dimension Reduction Algorithms**	**05**
	6.1	Introduction to Dimension Reduction Algorithms, Linear Dimensionality Reduction: Principal component analysis, Factor Analysis, Linear discriminant analysis.	
	6.2	Non-Linear Dimensionality Reduction: Multidimensional Scaling, Isometric Feature Mapping. Minimal polynomial	
		Total	**48**

Text Books:

1 Linear Algebra for Everyone,
2 Gilbert Strang, Wellesley Cambridge Press.
3 An Introduction to Probability and Statistics, Vijay Rohatgi, Wiley Publication
4 An introduction to Optimization, Second Edition, Wiley-Edwin Chong, Stainslaw Zak.
5 Mathematics for Machine Learning, Marc Peter Deisenroth, A. Aldo Faisal, Cheng Soon Ong, Cambridge University Press.
6 Exploratory Data Analysis, John Tukey, Princeton University and Bell Laboratories.

References:

1 Introduction to Linear Algebra, Gilbert Strang.
2 Advanced Engineering Mathematics, Erwin Kreyszig
3 Mehryar Mohri, Afshin Rostamizadeh, and Ameet Talwalkar. Foundations of Machine Learning. MIT Press, 2018.
4 Shai Shalev-Shwartz and Shai Ben-David. Understanding Machine Learning: From Theory to Algorithms. Cambridge University Press, 2014
5 Last updated on Sep 9, 2018.
6 Mathematics and Programming for Machine Learning with R, William B. Claster, CRC Press,2020

Useful Links:

1 https://math.mit.edu/~gs/linearalgebra/
2 https://www.coursera.org/learn/probability-theory-statistics
3 https://nptel.ac.in/courses/111/105/111105090/
4 https://onlinecourses.nptel.ac.in/noc21_ma01/preview
5 https://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/video-lectures/

Assessment:

Internal Assessment: (20)

1 Assessment consists of two class tests of 20 marks each.

2   The first-class test is to be conducted when approx. 40% syllabus is completed and   second-class test when additional 40% syllabus is completed.
3   Duration of each test shall be one hour.

End Semester Theory Examination: (80)

1   Question paper will comprise of **total 06** questions, each carrying **20 marks**.
2   **Question No: 01** will be **compulsory** and based on the entire syllabus wherein 4 to 5 sub-questions will be asked.
3   Remaining questions will be mixed in nature and randomly selected from all the modules.
4   Weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.
5   **Total 04 questions** need to be solved.

Data Science: Sem VI							
Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
HDSC601	Statistical Learning for Data Science	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Exam Duration	Term Work	Practical and Oral	Total
		Internal Assessment			End Sem. Exam.				
		Test1	Test2	Avg.					
HDSC601	Statistical Learning for Data Science	20	20	20	80	03	--	--	100

	Course Prerequisites:
1	Engineering Mathematics, Probability and Statistics

Course Objectives:

1	To understand basic statistical foundations for roles of Data Scientist.
2	To develop problem-solving skills.
3	To infer about the population parameters using sample data and perform hypothesis testing.
4	To understand importance and techniques of predicting a relationship between data and determine the goodness of model fit.

Course Outcomes:

After successful completion of the course, the student will be able to:

1	Develop various visualizations of the data in hand.
2	Analyze a real-world problem and solve it with the knowledge gained from sampling and probability distributions.
3	Analyze large data sets and perform data analysis to extract meaningful insights.
4	Develop and test a hypothesis about the population parameters to draw meaningful conclusions.
5	Fit a regression model to data and use it for prediction.

Module No.		Topics	Hours.
1.0		**Introduction**	08
	1.1	**Data and Statistics**: Elements, Variables, and Observations, Scales of Measurement, Categorical and Quantitative Data, Cross-Sectional and Time Series Data, Descriptive Statistics, Statistical Inference, Descriptive Statistics: Tabular and Graphical Summarizing Categorical Data, Summarizing Quantitative Data, Cross Tabulations and Scatter Diagram.	
	1.2	**Descriptive Statistics: Numerical Measures**: Measures of Location, Measures of Variability, Measures of Distribution Shape, Relative Location, and Detecting Outliers, Box Plot, Measures of Association Between Two Variables	

2.0		Probability	08
	2.1	**Probability :** Experiments, Counting Rules, and Assigning Probabilities, Events and Their Probabilities, Complement of an Event, Addition Law Independent Events, Multiplication Law, Baye's theorem	
	2.2	**Discrete Probability Distributions** Random Variables, Discrete Probability Distributions, Expected Value and Variance, Binomial Probability Distribution, Poisson Probability Distribution	
	2.3	**Continuous Probability Distributions:** Uniform Probability Distribution, Normal Curve, Standard Normal Probability Distribution, Computing Probabilities for Any Normal Probability Distribution	
3.0		**Sampling and Sampling Distributions**	05
	3.1	Sampling from a Finite Population, Sampling from an Infinite Population, Other Sampling Methods, Stratified Random Sampling, Cluster Sampling, Systematic Sampling, Convenience Sampling, Judgment Sampling	
	3.2	Interval Estimation: Population Mean: Known, Population Mean: Unknown, Determining the Sample Size, Population Proportion	
4.0		**Hypothesis Tests**	05
	4.1	Developing Null and Alternative Hypotheses, Type I and Type II Errors, Population Mean: Known Population Mean: Unknown Inference About Means and Proportions with Two Populations-Inferences About Population Variances, Inferences About a Population Variance, Inferences About Two Population Variances	
	4.2	Tests of Goodness of Fit and Independence, Goodness of Fit Test: A Multinomial Population, Test of Independence	
5.0		**Regression**	08
	5.1	**Simple Linear Regression:** Simple Linear Regression Model, Regression Model and Regression Equation, Estimated Regression Equation, Least Squares Method, Coefficient of Determination, Correlation Coefficient, Model Assumptions, testing for Significance, Using the Estimated Regression Equation for Estimation and Prediction Residual Analysis: Validating Model Assumptions, Residual Analysis: Outliers and Influential Observations	
	5.2	**Multiple Regression:** Multiple Regression Model, Least Squares Method, Multiple Coefficient of Determination, Model Assumptions, Testing for Significance, Categorical Independent Variables, Residual Analysis	
6.0		**Time Series Analysis and Forecasting**	05
	6.1	Time Series Patterns, Forecast Accuracy, Moving Averages and Exponential Smoothing, Trend Projection, Seasonality and Trend and Time Series Decomposition	
	6.2	**Nonparametric Methods** Sign Test, Wilcoxon Signed-Rank Test, Mann-Whitney-Wilcoxon Test, Kruskal-Wallis Test, Rank Correlation	
		Total	48

Text Books:

1 https://static1.squarespace.com/static/5ff2adbe3fe4fe33db902812/t/6009dd9fa7bc363aa822d2c7/1611259312432/ISLR+Seventh+Printing.pdf
2 Data Science from Scratch, FIRST PRINCIPLES WITH PYTHON, O'Reilly, Joel Grus,
3 Data Science from Scratch (oreillystatic.com)
4 Practical Time Series Analysis, Prediction with statistics and Machine Learning, O'Reilly, Aileen Nielsen [DOWNLOAD] O'Reilly Practical Time Series Analysis PDF (lunaticai.com)
5 R for data science: Import, Tidy, Transform, Visualize, And Model Data, O'Reilly , Garrett Grolemund, Hadley Wickham
6 Python for Data Analysis, 2nd Edition, O'Reilly Media, Wes McKinney.
7 https://static1.squarespace.com/static/5ff2adbe3fe4fe33db902812/t/6009dd9fa7bc363aa822d2c7/1611259312432/ISLR+Seventh+Printing.pdf

References:

1 Data Science for Dummies Paperback, Wiley Publications, Lillian Pierson
2 Storytelling with Data: A Data Visualization, Guide for Business Professionals, Wiley Publications, Cole Nussbaumer Knaflic
3 Probability and Statistics for Engineering and the Sciences, Cengage Publications Jay L. Devore.

Assessment:

Internal Assessment: (20)

1 Assessment consists of two class tests of 20 marks each.
2 The first-class test is to be conducted when approx. 40% syllabus is completed and   second-class test when   additional 40% syllabus is completed.
3 Duration of each test shall be one hour.

End Semester Theory Examination: (80)

1 Question paper will comprise of **total 06** questions, each carrying **20 marks**.
2 **Question No: 01** will be **compulsory** and based on the entire syllabus wherein 4 to 5 sub-questions will be asked.
3 Remaining questions will be mixed in nature and randomly selected from all the modules.
4 Weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.
5 **Total 04 questions** need to be solved.

Data Science: Sem VII							
Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract ical	Tutorial	Theory	Practical	Tutorial	Total
HDSC701	Data Science for Health and Social Care	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme						
		Theory Marks			Exam Duration	Term Work	Practical and Oral	Total
		Internal Assessment		End Sem. Exam.				
		Test1	Test2	Avg.				
HDSC701	Data Science for Health and Social Care	20	20	20	80	03	--	--	100

Course Prerequisites:	
Artificial Intelligence, Machine Learning	
Course Objectives: The course aims	
1	To gain perspective of Data Science for Health and Social Care.
2	To understand different techniques of Biomedical Image Analysis.
3	To learn NLP techniques for processing Clinical text.
4	To understand the role of social media analytics for Healthcare data .
5	To learn advanced analytics techniques for Healthcare Data.
6	To investigate the current scope, potential, limitations, and implications of data science and its applications for healthcare.
Course Outcomes:	
After successful completion of the course, the student will be able to:	
1	Identify sources and structure of healthcare data.
2	Apply structured lifecycle approach for handling Healthcare data science projects.
3	Analyze the data, create models, and identify insights from Healthcare data.
4	Apply various data analysis and visualization techniques for Healthcare and social media data.
5	Apply various algorithms and develop models for Healthcare data science projects.
6	To Provide data science solutions for solving problems of Health and Social Care.

Module		Topics	Hours.
1.0		**Data Science for Healthcare**	05
	1.1	Introduction, Healthcare Data Sources and Data Analytics for Healthcare, Applications and Practical Systems for Healthcare.	
	1.2	Electronic Health Records(EHR), Components of EHR, Benefits of EHR, Barriers to Adopting EHR, Challenges of using EHR data, Phenotyping Algorithms	
2.0		**Biomedical Image Analysis**	06
	2.1	Biomedical Imaging Modalities, Object detection ,Image segmentation, Image Registration, Feature Extraction	
	2.2	Mining of Sensor data in Healthcare, Challenges in Healthcare Data Analysis	
	2.3	Biomedical Signal Analysis, Genomic Data Analysis for Personalized Medicine.	

3.0		**Data Science and Natural Language Processing for Clinical Text**	06
	3.1	NLP, Mining information from Clinical Text, Information Extraction, Rule Based Approaches, Pattern based algorithms, Machine Learning Algorithms.	
	3.2	Clinical Text Corpora and evaluation metrics, challenges in processing clinical reports, Clinical Applications.	
4.0		**Social Media Analytics for Healthcare**	06
	4.1	Social Media analysis for detection and tracking of Infectious Disease outbreaks.	
	4.2	Outbreak detection, Social Media Analysis for Public Health Research, Analysis of Social Media Use in Healthcare.	
5.0		**Advanced Data Analytics for Healthcare**	08
	5.1	Review of Clinical Prediction Models, Temporal Data Mining for Healthcare Data	
	5.2	Visual Analytics for Healthcare Data, Information Retrieval for Healthcare- Data Publishing Methods in Healthcare.	
6.0		**Data Science Practical Systems for Healthcare**	08
	6.1	Data Analytics for Pervasive Health, Fraud Detection in Healthcare	
	6.2	Data Analytics for Pharmaceutical discoveries, Clinical Decision Support Systems	
	6.3	Computer-Assisted Medical Image Analysis Systems- Mobile Imaging and Analytics for Biomedical Data.	
		Total	48

Textbooks:
1 Chandan K. Reddy and Charu C Aggarwal, "Healthcare data analytics", Taylor & Francis, 2015.
2 Hui Yang and Eva K. Lee, "Healthcare Analytics: From Data to Knowledge to Healthcare Improvement, Wiley, 2016.

References:

1 Madsen, L. B. (2015). Data-driven healthcare: how analytics and BI are transforming the industry. Wiley India Private Limited

2 Strome, T. L., & Liefer, A. (2013). Healthcare analytics for quality and performance improvement. Hoboken, NJ, USA: Wiley

3 McNeill, D., & Davenport, T. H. (2013). Analytics in Healthcare and the Life Sciences: Strategies, Implementation Methods, and Best Practices. Pearson Education.

4 Rachel Schutt and Cathy O'Neil, "Doing Data Science", O'Reilly Media

5 Joel Grus, Data Science from Scratch: First Principles with Python, O'Reilly Media

6 EMC Education Services,"Data Science and Big Data Analytics",Wiley

Assessment:
Internal Assessment: (20)
1 Assessment consists of two class tests of 20 marks each.
2 The first-class test is to be conducted when approx. 40% syllabus is completed and   second-class test when additional 40% syllabus is completed.
3 Duration of each test shall be one hour.
End Semester Theory Examination: (80)
1 Question paper will comprise of **total 06** questions, each carrying **20 marks**.
2 **Question No: 01** will be **compulsory** and based on the entire syllabus wherein 4 to 5 sub-questions will be asked.
3 Remaining questions will be mixed in nature and randomly selected from all the modules.

4 Weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.
5 **Total 04 questions** need to be solved.

Data Science: Sem VIII							
Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
HDSC801	Text, Web and Social Media Analytics	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Exam Duration	Term Work	Practical and Oral	Total
		Internal Assessment			End Sem. Exam.				
		Test1	Test2	Avg.					
HDSC801	Text, Web and Social Media Analytics	20	20	20	80	03	--	--	100

Course Prerequisites:	
Python, Data Mining	
Course Objectives: The course aims	
1	To have a strong foundation on text, web and social media analytics.
2	To understand the complexities of extracting the text from different data sources and analysing it.
3	To enable students to solve complex real-world problems using sentiment analysis and Recommendation systems.
Course Outcomes:	
After successful completion of the course, the student will be able to:	
1	Extract Information from the text and perform data pre-processing
2	Apply clustering and classification algorithms on textual data and perform prediction.
3	Apply various web mining techniques to perform mining, searching and spamming of web data.
4	Provide solutions to the emerging problems with social media using behaviour analytics and Recommendation systems.
5	Apply machine learning techniques to perform Sentiment Analysis on data from social media.

Module No.		Topics	Hours.
1.0		**Introduction**	06
	1.1	**Introduction to Text Mining:** Introduction, Algorithms for Text Mining, Future Directions	
	1.2	**Information Extraction from Text**: Named Entity Recognition, Relation Extraction, Unsupervised Information Extraction	
	1.3	**Text Representation:** tokenization, stemming, stop words, NER, N-gram modelling	
2.0		Clustering and Classification	10

	2.1	**Text Clustering**: Feature Selection and Transformation Methods, distance based Clustering Algorithms, Word and Phrase based Clustering, Probabilistic document Clustering	
	2.2	**Text Classification**: Feature Selection, Decision tree Classifiers, Rule-based Classifiers, Probabilistic based Classifiers, Proximity based Classifiers.	
	2.3	**Text Modelling:** Bayesian Networks, Hidden Markovian Models, Markov random Fields, Conditional Random Fields	
3.0		**Web-Mining:**	05
	3.1	**Introduction to Web-Mining:** Inverted indices and Compression, Latent Semantic Indexing, Web Search,	
	3.2	**Meta Search:** Using Similarity Scores, Rank Positons	
	3.3	**Web Spamming**: Content Spamming, Link Spamming, hiding Techniques, and Combating Spam	
4.0		**Web Usage Mining:**	**05**
	4.1	Data Collection and Pre-processing, Sources and types of Data, Data Modelling, Session and Visitor Analysis, Cluster Analysis and Visitor segmentation, Association and Correlation Analysis, Analysis of Sequential and Navigational Patterns, Classification and Prediction based on Web User Transactions.	
5.0		**Social Media Mining**:	**05**
	5.1	Introduction, Challenges, Types of social Network Graphs	
	5.2	Mining Social Media: Influence and Homophily, Behaviour Analytics, Recommendation in Social Media: Challenges, Classical recommendation Algorithms, Recommendation using Social Context, Evaluating recommendations.	
6.0		**Opinion Mining and Sentiment Analysis**:	**08**
	6.1	The problem of opinion mining,	
	6.2	**Document Sentiment Classification**: Supervised, Unsupervised	
	6.3	**Opinion Lexicon Expansion:** Dictionary based, Corpus based	
	6.4	**Opinion Spam Detection**: Supervised Learning, Abnormal Behaviours, Group Spam Detection.	
		Total	**48**

Textbooks:

1 Daniel Jurafsky and James H. Martin, "Speech and Language Processing," 3rd edition, 2020
2 Charu. C. Aggarwal, Cheng Xiang Zhai, Mining Text Data, Springer Science and Business Media, 2012.
3 BingLiu, "Web Data Mining-Exploring Hyperlinks, Contents, and Usage Data", Springer, Second Edition, 2011.

4   Reza Zafarani, Mohammad Ali Abbasiand Huan Liu, "Social Media Mining- An Introduction", Cambridge University Press, 2014

Assessment:

Internal Assessment: (20)
1   Assessment consists of two class tests of 20 marks each.
2   The first-class test is to be conducted when approx. 40% syllabus is completed and   second-class test when   additional 40% syllabus is completed.
3   Duration of each test shall be one hour.

End Semester Theory Examination: (80)
1   Question paper will comprise of **total 06** questions, each carrying **20 marks**.
2   **Question No: 01** will be **compulsory** and based on the entire syllabus wherein 4 to 5 sub-questions will be asked.
3   Remaining questions will be mixed in nature and randomly selected from all the modules.
4   Weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.
5   **Total 04 questions** need to be solved.

Data Science: Sem VII							
Course Code	**Course Name**	**Teaching Scheme (Contact Hours)**			**Credits Assigned**		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
HDSSBL701	**Data Science for Health and Social Care: Lab**	--	**04**	--	--	**02**	--	**02**

Course Code	Course Name	Examination Scheme							
		Theory Marks				**Exam Duration**	**Term Work**	**Oral**	**Total**
		Internal Assessment			**End Sem. Exam.**				
		Test1	Test2	Avg.					
HDSSBL701	**Data Science for Health and Social Care: Lab**						50	50	100

Course Prerequisites:
Python
Course Outcomes:
After successful completion of the course, the student will be able to:
1	Students will be able to, Identify sources of data, suggest methods for collecting, sharing and analyzing Healthcare data.
2	Students will be able to Clean, integrate and transform healthcare data.
3	Students will be able to apply various data analysis and visualization techniques on healthcare data.
4	Students will be able to apply various algorithms and develop models for healthcare data Analytics .
5	Students will be able to implement data science solutions for solving healthcare problems.

Suggested Experiments:	
Sr. No.	**Name of the Experiment**
	Introduction
1	Clean, Integrate and Transform Electronic Healthcare Records.
2	Apply various data analysis and visualization techniques on EHR.
3	Bio Medical Image Preprocessing, Segmentation.
4	Bio Medical Image Analytics.
5	Text Analytics for Clinical Text Data.
6	Diagnose disease risk from Patient data.
7	Social Media Analytics for outbreak prediction/ Drug review analytics.
8	Visual Analytics for Healthcare Data.

9	Implement an innovative Data Science application based on Healthcare Data.
10	Documentation and Presentation of Mini Project.

Useful Links:

1 http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=MachineLearning
2 http://www.cse.wustl.edu/~kilian/cse517a2010/
3 https://datarade.ai/data-categories/electronic-health-record-ehr-data
4 https://www.cms.gov/Medicare/E-Health/EHealthRecords
5 https://onlinecourses.nptel.ac.in/noc20_ee40

Term Work:

1 Term work should consist of 8 experiments and a Mini Project.
2 The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
3 Total 25 Marks (Experiments: 10-Marks, Mini Project-10 Marks, Attendance Theory & Practical: 05-marks)

Oral & Practical exam

1 Based on the entire syllabus of **AI ML for Healthcare**