| 1 | Math Review | Matrix | - Vector, matrix, tensor  - Matrix multiplication |
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| 2 | Vector calculus | - Chain rule  - Vector calculus |
| 3 | Optimization | - Gradient descent  - Constrained Optimization and Lagrange Multipliers |
| 4 |  | Probability | - Probability  - Random variable  - Sum, product rules, Bayes theorem  - Mean, variance  - Gaussian distribution |
| 5 | Introduction | Introduction to Machine Learning | - What is Machine Learning  - Types of Machine Learning problems  - Application of Machine Learning |
| 6 | Regression and Classification algorithms | Maximum Likelihood Estimation (MLE) | - Maximum Likelihood Estimation  - Linear regression model  - Non-linear models in linear regression |
| 7 | Maximum A Posterior (MAP) | - Evaluation metric to regression task  - Underfitting/overfitting  - Maximum A Posterior  - L1/L2 regularization  - Ridge/Lasso/Elasticnet Regression |
| 8 | Logistic Regression | - Logistic Regression  - Decision Boundary  - Evaluation metric to the classification task |
| 9 | Naive Bayes | - Naive Bayes algorithm  - Text classification problem |
| 10 | Support Vector Machine | - SVM algorithm  - Kernel SVM  - Soft SVM |
| 11 |  | Decision Tree | - Decision Tree algorithm  - How to implement Decision Tree  - Handle overfitting in Decision Tree  - Parameter tuning |
| 12 | Ensemble algorithms | Random Forest | - Bagging vs boosting  - Decision Tree overfitting  - Random Forest algorithm |
| 13 | Adaboost | - Adaboost algorithm |
| 14 | Gradient Boosting | - Gradient Boosting algorithm |
| 15 | XGBoost & LightGBM | - Introduce XGBoost & LightGBM  - Tips for best practice |
| **Final Project** | | | |