# AWS Machine Learning Tutorial: Table of Contents

## Chapter 1: Introduction to AWS and Machine Learning

1. Overview of AWS Machine Learning Services
2. Setting Up Your AWS Environment
3. Basic AWS Concepts for Machine Learning

## Chapter 2: Python Fundamentals and AWS Integration

1. Python Basics
   * Variables and Data Types
   * Control Structures (if statements, loops)
   * Functions
   * Data Structures (lists, tuples, dictionaries, sets)
2. Python for Data Science and Machine Learning
   * Introduction to NumPy
   * Introduction to Pandas
   * Introduction to Scikit-learn
3. AWS Integration with Python
   * Setting Up AWS SDK for Python (Boto3)
   * Configuring AWS Credentials
   * Basic AWS Operations with Python

## Chapter 3: Core AWS AI Services

1. Amazon SageMaker
   * Setting up a SageMaker Notebook Instance
   * Training and Deploying Models
   * SageMaker Built-in Algorithms
2. Amazon Comprehend
   * Natural Language Processing Tasks
   * Sentiment Analysis Example
3. Amazon Rekognition
   * Image and Video Analysis
   * Object and Face Detection Example
4. Amazon Forecast
   * Time Series Forecasting
   * Creating a Forecast Example
5. Amazon Personalize
   * Building Recommendation Systems
   * Creating a Personalization Model
6. Amazon Polly
   * Text-to-Speech Conversion
   * Generating Speech from Text Example
7. Amazon Transcribe
   * Speech-to-Text Conversion
   * Transcribing Audio Example
8. Amazon Translate
   * Language Translation
   * Translating Text Example

## Chapter 4: Advanced AWS AI/ML Services

1. Amazon SageMaker Advanced Features
   * SageMaker Autopilot
   * SageMaker Model Monitor
2. Amazon Augmented AI (A2I)
   * Setting Up Human Review Workflows
3. Amazon Textract
   * Document Text and Data Extraction
4. Amazon Kendra
   * Intelligent Search Service

## Chapter 5: Integration and Workflows

1. End-to-End ML Workflow: Customer Churn Prediction
   * Data Preparation with AWS Glue DataBrew
   * Feature Management with SageMaker Feature Store
   * Model Training with SageMaker
   * Model Deployment and Monitoring
   * Making Predictions
2. End-to-End Sentiment Analysis Pipeline
   * Data Collection and Storage
   * Sentiment Analysis with Amazon Comprehend
   * Visualization with Amazon QuickSight
3. AWS Step Functions for ML Workflows
4. Integrating AWS Services
   * Combining Multiple Services in a Single Pipeline
   * Best Practices for Service Integration

## Chapter 6: Best Practices and Advanced Topics

1. ML Ops on AWS
   * Continuous Integration and Deployment for ML
   * Version Control for ML Models
2. Optimizing ML Workflows
   * Cost Optimization Strategies
   * Performance Tuning
3. Security in ML Pipelines
   * Encrypting Data at Rest and in Transit
   * Managing IAM Roles and Permissions
4. Scaling ML Workloads
   * Using SageMaker Multi-Model Endpoints
   * Distributed Training on SageMaker

## Chapter 7: Case Studies and Real-World Scenarios

1. Customer Churn Prediction
   * End-to-End Implementation
   * Model Evaluation and Interpretation
2. Sentiment Analysis for Customer Reviews
   * Real-time Sentiment Analysis Pipeline
   * Visualization and Reporting
3. Industrial IoT: Predictive Maintenance for Oil Pumps
   * IoT Data Ingestion and Processing
   * Anomaly Detection with Machine Learning
   * Real-time Monitoring and Alerting