

Critical Path

Machine Learning in Cloud Computing

AIGC-5003- Winter 2023

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The Critical Path is the course schedule. It is an important document that lays out weekly **and/or** module objectives that you are responsible for to ensure academic success. Download and/or print out a copy of the Critical Path and refer to it regularly.

Module Breakdown

Module	Topics, Readings, and Activities	Due Dates	Weight
1	<p>Module 1:</p> <p>Fundamental of AWS cloud (1)</p> <p>Topics:</p> <ul style="list-style-type: none">• What is VPC• What is EC2• What is Lambda• What is Cloud9• What is S3 <p>Readings:</p> <ul style="list-style-type: none">• Lecture Notes <p>Activities:</p> <p>Run and practice the solutions and codes in class</p>	<p>Wed. Jan 11</p> <p>Thu. Jan 12</p> <p>Wed. Jan 18</p> <p>Thu. Jan 19</p>	

Module	Topics, Readings, and Activities	Due Dates	Weight
	Assignment 1: <ul style="list-style-type: none"> Create a new instance in a public subnet and Install boto3 on it Query S3 bucket and running instances programmatically from inside of that instance 		5%
2	Module 2: Fundamental of AWS cloud (2) Topics: <ul style="list-style-type: none"> What is IAM Containers and ECR ML Pipeline SageMaker Architecture Readings: <ul style="list-style-type: none"> Lecture Notes Activities: Run and practice the solutions and codes in class Assignment 2: See the lecture note. Select assignment option 1 or option 2	Wed. Jan 25 Thu. Jan 26 Wed. Feb 01 Thu. Feb 02	5%
3	Module 3:		

Module	Topics, Readings, and Activities	Due Dates	Weight
	<p>Introduction to AI services in AWS</p> <p>Topics:</p> <ul style="list-style-type: none"> • Amazon Transcribe • Amazon Translate • Amazon Comprehend • Polly • Lex • Rekognition • Textract <p>Readings:</p> <ul style="list-style-type: none"> • Lecture Notes <p>Activities:</p> <p>Run and practice the solutions and codes in class</p> <p>Assignment 3:</p>	<p>Wed. Feb 08</p> <p>Thu. Feb 09</p> <p>Wed. Feb 15</p>	5%
4	<p>Module 4:</p> <p>Using Amazon SageMaker</p> <p>Topics:</p> <ul style="list-style-type: none"> • High level Introduction to Amazon SageMaker features • Creating the first Jupyter Notebook in Amazon SageMaker • Using SageMaker Marketplace • Labeling data with SageMaker GroundTruth <p>Readings:</p>	<p>Thu. Feb 16</p> <p>Wed. Feb 22</p> <p>Thu. Feb 23</p>	

Module	Topics, Readings, and Activities	Due Dates	Weight
	<ul style="list-style-type: none"> Class Notes and Blackboard Notes <p>Activities:</p> <p>Run and practice the solutions and codes in class</p> <p>Assignment 4:</p> <p>Creating a labling job by SageMaker GroudTruth (See the instructions in the lecture note)</p>		5%
	Reading Week (Feb 27-March 03)		
5	<p>Module 5:</p> <p>Feature Engineering in Amazon SageMaker</p> <p>Topics:</p> <ul style="list-style-type: none"> Using SageMaker notebook instance to analyze and visualize the data Using SageMaker notebook instance to clean and feature engineer Save cleaned data locally and push them to S3 Introduction to SageMaker Data Wrangler <p>Readings:</p> <ul style="list-style-type: none"> Class Notes and Blackboard Notes <p>Activities:</p> <p>Run and practice the solutions and codes in class</p>	<p>Wed. Mar. 08</p> <p>Thu. Mar. 09</p>	

Module	Topics, Readings, and Activities	Due Dates	Weight
	Assignment 5: Feature Engineering in the Jupyter Instance Using Data Wrangler to do feature engineering		5%
	Mid Term Grade Due	March 10	
6	Module 6: Training jobs in Amazon SageMaker Topics: <ul style="list-style-type: none"> Using Sklearn in Amazon SageMaker Jupyter instance and train a model Training job in the AWS Management Console using XGBoost built-in algorithm Training through SageMaker Training API using Linear Learner built-in Algorithm Using SageMaker Built-in Frameworks to train a model Readings: <ul style="list-style-type: none"> Class Notes and Blackboard Notes Activities: Run and practice the solutions and codes in class Assignment 6: Creating a new training job in SageMaker	Wed. Mar. 15 Thu. Mar. 16	5%
7	Module 7 and 8:	Wed. Mar. 22	

Module	Topics, Readings, and Activities	Due Dates	Weight
	<p>Inferencing in Amazon SageMaker</p> <p>Topics:</p> <ul style="list-style-type: none"> • What is inferencing in SageMaker • Different types of Inferencing • Deploying a model and use it to inference <p>Readings:</p> <ul style="list-style-type: none"> • Class Notes and Blackboard Notes <p>Activities:</p> <p>Run and practice the solutions and codes in class</p> <p>Assignment 7:</p> <p>There are 3 questions at the end of Realtime inferencing notebook. Each group should answer one of those.</p>	Thu. Mar. 23	5%
8	<p>Module 7 and 8:</p> <p>Hyperparameter optimization</p> <p>Topics:</p> <ul style="list-style-type: none"> • Searching among the hyperparameters by random search and Bayesian search • Using Amazon SageMaker to do hyper-parameter tuning • Selecting the best model and deploy it <p>Readings:</p> <ul style="list-style-type: none"> • Class Notes and Blackboard Notes 	<p>Wed. Mar. 22</p> <p>Thu. Mar. 23</p>	

Module	Topics, Readings, and Activities	Due Dates	Weight
	Activities: Run and practice the solutions and codes in class Assignment 8: Compare Grid, Random and Bayesian searches		5%
9	Module 9: Project Topics: <ul style="list-style-type: none"> Using Amazon SageMaker to run a full ML pipeline Readings: <ul style="list-style-type: none"> Lecture notes Project : Run an ML pipeline in Amazon SageMaker and deliver a project end to end	Wed. Mar. 29 Thu. Mar. 30	20%
10	Module 10 and 11: SageMaker Studio JumpStart Topics: <ul style="list-style-type: none"> What is SageMaker Studio JumpStart Deploying a solution in Amazon SageMaker by Studio JumpStart Readings: <ul style="list-style-type: none"> Lecture Notes 	Wed. Apr. 05 Thu. Apr. 06	

Module	Topics, Readings, and Activities	Due Dates	Weight
	Activities: Run and practice the solutions and codes in class Assignment 9: Implementing one of the SageMaker JumpStart solutions		5%
11	Module 11 and 10: SageMaker Canvas Topics: <ul style="list-style-type: none"> What is SageMaker Canvas Using SageMaker Canvas to train a model and deploy in SageMaker Readings: <ul style="list-style-type: none"> Lecture Notes Activities: Run and practice the solutions and codes in class Assignmeny 10: Using SageMaker canvas to implement a no-code ML model	Wed. Apr. 05 Thu. Apr. 06	5%
12	Module 12: SageMaker Studio AutoPilot Topics: <ul style="list-style-type: none"> What is AutoML How to use SageMaker Studio Autopilot 	Wed. Apr. 12 Thu. Apr. 13	

Module	Topics, Readings, and Activities	Due Dates	Weight
	Readings: <ul style="list-style-type: none"> Lecture Notes Activities: Run and practice the solutions and codes in class Assignment 11: Using SageMaker Studio Autopilot in production		5%
13	Final Project Exam	Wed. Apr. 19 Thu. Mar. 20	25%

Summary of Graded Course Components

Summary	Weight
Total Assignments : 11	55%
Project : 1	20%
Final Exam	25%

Summary	Weight
Total	100%
Books/References:AWS SageMaker Documentation	