



Supervised Learning

1.0 Course Faculty Information

Prof. Dr. V. Saranya

Instructor

NSRIC Inc.,

London, Ontario, Canada

2.0 Course Information

Course Code and Title	NSRIC T0001: AI&ML
Month Year	July 2023
Class Days	Monday - Friday
Class Time	10:00 am – 11:00 am EST
Course Credit Hours	3
Class Location	NSRIC online platform
prerequisites and/or co-requisites	N/A
Level /A, E, H, I, K12, M, P, S, T, U, V, W	Foundational courses /I,P

Note: The below classification of courses is related any areas of knowledge:

A: Advanced level academic level courses; **E:** Executive courses; **H:** Higher-level courses (i.e., graduate courses); **I:** Intermediate courses (i.e., university preparatory courses – Grade XII+); **K12:** Foundational, and lower-level courses; **M:** Mid-level courses (i.e., undergraduate courses); **P:** Professional

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courses; **S**: Short/seminar courses; **T**: Training courses; **U**: Tutorial Courses;
V: Vocational training courses; and **W**: Workshop courses.

3.0 Professor Information

Name	Dr.V.Saranya
Title	NSRIC
Contact Information	saranyapulse@gmail.com
Office Location	NSRIC online platform
Office Hours	10: 30 am – 11:30 am EST (Saturdays) by email appointment

4.0 Target Audiences

- Diploma and vocational training student
- University undergraduate level student
- Any student who is interested in Artificial Engineering and Machine Learning
- Students who want to know Basics of Artificial Engineering and Machine Learning (Courses 1-9) offered by Dr. V. Saranya

5.0 Course Description

Supervised learning is a type of machine learning where an algorithm is trained on a labelled dataset, meaning that the input data is already classified or categorized. The goal of supervised learning is to learn a mapping function from the input variables to the output variables based on the labelled dataset. This mapping

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function can then be used to make predictions on new, unlabelled data. In supervised learning, the dataset is divided into two parts: a training set and a test set. The training set is used to train the algorithm, while the test set is used to evaluate the performance of the algorithm on unseen data. Supervised learning can be further classified into two categories: classification and regression. In classification, the goal is to predict a discrete output variable, such as whether an email is spam or not. In regression, the goal is to predict a continuous output variable, such as the price of a house based on its features. Some common supervised learning algorithms include linear regression, logistic regression, decision trees, random forests, support vector machines, and neural networks. They should also be able to apply their knowledge to solve real-world problems using machine learning techniques by Prof. Saranya .V at NSRIC Platform to understand this course content.

6.0 Course Learning Outcomes

Upon successful completion of this course, students will be able to:

CLO1: Understand the basics of supervised learning, including the difference between classification and regression tasks.

CLO2: Select appropriate supervised learning algorithms based on the characteristics of the dataset and the problem to be solved.

CLO3: Evaluate the performance of a supervised learning algorithm using metrics such as accuracy, precision, recall, and F1 score.

CLO4: Pre-process and prepare data for supervised learning algorithms, including

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techniques such as feature scaling, normalization, and handling missing data.

CLO5: Apply supervised learning to real-world problems such as image recognition, speech recognition, natural language processing, and predictive maintenance.

CLO6: Understand ethical considerations and potential biases when using supervised learning algorithms in decision-making processes.

7.0 How the course supports the attainment of the student outcomes

Student Learning Outcomes (1-6)					
1	2	3	4	5	6
Moderate	Moderate	Moderate	Low	Moderate	Moderate

8.0 Course Materials

Online course materials

- Online PowerPoint presentation slides in pdf form
- Audio/visual recording of lectures (Optional)
- Online tutorial and meeting with students upon request
- Assignments and quizzes in the MLS system in pdf form
- Reading materials if any in pdf form

Textbook and resources (If any)

- 1) Machine Learning For Dummies, 2nd Edition. John Paul Mueller, Luca

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Massaron. ISBN: 978-1-119-72401-8

- 2) Artificial Intelligence: A Modern Approach, 3rd Edition; Format, Cloth; ISBN-13: 9780136042594.

9.0 Academic Integrity

Students are encouraged to have a look at the NSRIC's statement of academic integrity at NSRIC website. It is noted that by signing this syllabus, you will acknowledge that you have understood that any detected plagiarism should be reported.

10. Assessment for Grade

This course contains assignment and quizzes for assessment. Student will receive a "Certificate of completion" after successful completion of the course.

Important Note:

- i) The below classified courses (i.e., academic courses) will only be evaluated based on the grade system shown in Table 2. A grade and certificate will be issued for the student(s) and participant(s).

A: Advanced level academic level courses; **H:** Higher-level courses (i.e., graduate courses); **I:** Intermediate courses (i.e., university preparatory courses – Grade XII+); **K12:** Foundational, and lower-level courses; **M:** Mid-level courses (i.e., undergraduate courses).

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- ii) The below classified courses will **not** be evaluated based on the grade system shown in Table 2. A certificate will be issued for the student(s) and participant(s).

E: Executive courses; **P:** Professional courses; **S:** Short/seminar courses; **T:** Training courses; **U:** Tutorial Courses; **V:** Vocational training courses; and **W:** Workshop courses.

Participation/Engagement/Performance

Your participation in every aspect of the course is important for the learning process. Your engagement in every discussion in the course, due delivery of all assignments, quizzes, and research projects will be fruitful. These efforts from your side will reflect your performance in the course delivery and your commitments. This performance is the reflection of your dream grade!!

Assignments

You will be given **1 assignment** during the course delivery. The due dates for assignments are specified in the course content and schedule section. The assignments will be given time to time to solve/answer during the term. Assignments will be posted through NSRIC online platform at least one week before they are due. Due dates are given in course schedule (tentative schedule). However, in case of any special circumstance, the date will be posted beforehand or announced in class.

Quizzes

A Maximum of 2 quizzes (maximum of **Two MCQ @ five** minute) will be taken based on class lectures and performance. The quiz will be taken in the beginning of the lecture through NSRIC online platform. If you miss the quiz without any valid

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official excuse, your will receive **zero** for the non-attended quiz. If any student fails to attend the quiz, he/she must submit a valid reason to the instructor. In such case, he/she should appear another quiz or may be averaged on the quizzes that he/she attended. It will depend on the situation and instructor.

11.0 Advice and additional requirements

I advise you to:

- Please contact me if you need any help.
- Students are expected to attend all scheduled online lecture classes.
- Students are expected to study from the course materials and/or textbooks which will help to easily read and understand.
- Students are encouraged to write their own notes during lectures/presentations (pdf PowerPoint presentations, and additional materials if any).
- Students are encouraged to attend online platform classes on time because late-attendee disrupts the flow of the class for both the instructor and the other students.

Additional information (During Online Course offering Period)

- The PowerPoint course materials, and video lectures will be available at the NSRIC Platform.
- There will be scheduled discussion/tutorial sessions on **every Monday** at the class scheduled time. All students must attend this session (Need student request).
- There will be an office hours for students on Monday from 10:30 am – 11:30 am, Toronto, Canada time. Students need to send an email

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request so that a zoom meeting can be arranged. In addition, any time student can set up an online appointment (i.e., phone, zoom, and/or other mode of communications) based on availability of the course instructor. However, student should send an email request for setting up this type of meeting.

12.0 Course Topics

1. Introduction to Artificial Intelligence (AI) and Machine Learning (ML)
2. Mathematics for Machine Learning
3. Supervised Learning
4. Unsupervised Learning
5. Deep Learning
6. Reinforcement Learning
7. Natural Language Processing (NLP)
8. AI Ethics and Bias
9. Case Studies and Real-World Applications

13.0 Course Contents and Schedule

Lec. No.	Module	Topics	Remarks
Supervised Learning			
1.	Introduction	Introduction to Supervised Learning	
2.	Supervised	Classification vs Regression in Machine	

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	Learning	Learning	
3.	Methods	Getting started with Classification	Quiz 1
4.	Methods	Basic Concept of Classification	
5.	Methods	Types of Regression Techniques in ML	Assignment
6.	Methods	Gradient Descent algorithm and its variants	
7.	Methods	Logistic Regression in Machine Learning	
8.	Methods	Introduction to Support Vector Machines (SVM)	
9.	Methods	Decision Tree	
10	Supervised Learning	Summery	Quiz 2

Prepared by Dr. V. Saranya, OE Division, NSRIC Inc., London, ON, Canada.

Course Descriptions

Supervised Learning is a type of machine learning in which an algorithm is trained on a labeled dataset. The algorithm learns to make predictions by analyzing the features of the input data and their corresponding labels. In supervised learning, the algorithm is provided with input-output pairs and it tries to learn a mapping function from input to output. The goal of supervised learning is to accurately predict the output for new, unseen input data. Common examples of supervised learning include classification tasks, where the goal is to predict a discrete label, and regression tasks, where the goal is to predict a continuous value.

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Captions: Supervised Learning, dataset, regression, algorithms, mapping functions .

Requirements/Instructions

Students are advised to register all AI & ML modules courses for becoming the master in the subject area.



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