



Case Studies and Real-World Applications

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

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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 offered by Dr. V. Saranya

5.0 Course Description

This course on Case Studies and Real-World Applications in AI and ML provides an opportunity for students to apply their theoretical knowledge to real-world problems and scenarios. The course covers a variety of case studies and applications in AI and ML, including natural language processing, computer vision, recommender systems, and robotics. Through hands-on projects and case studies, students will

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gain experience in data analysis, feature engineering, model selection and evaluation, and deployment of AI and ML solutions. The course also focuses on the ethical and social implications of AI and ML in real-world applications. Students will explore the impact of AI on society, including issues related to privacy, bias, and accountability. They will also learn about best practices for ethical AI development and deployment, and how to evaluate the ethical implications of real-world AI and ML applications. Throughout the course, students will work in teams to develop and present their own AI and ML applications based on real-world case studies. They will learn how to design, develop, and evaluate their solutions, and how to communicate their results effectively to both technical and non-technical audiences. By the end of the course, students will have gained practical experience in applying AI and ML techniques to real-world problems and scenarios, and will have developed the skills necessary to evaluate the ethical and social implications of AI and ML in real-world applications. They will also have gained experience in working collaboratively and communicating technical ideas effectively to different audiences. 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: Apply AI and machine learning techniques to real-world problems and scenarios.

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CLO2: Select appropriate algorithms and models for a given problem and evaluate their effectiveness.

CLO3: Collect and preprocess data, and perform feature engineering to prepare it for analysis.

CLO4: Deploy AI and machine learning solutions in real-world settings, and evaluate their performance.

CLO5: Communicate technical ideas effectively to both technical and non-technical audiences.

CLO6: Work collaboratively in teams to develop and present AI and machine learning solutions.

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	High	High

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

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Textbook and resources (If any)

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

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preparatory courses – Grade XII+); **K12**: Foundational, and lower-level courses; **M**: Mid-level courses (i.e., undergraduate courses).

- 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

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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 official excuse, you 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.

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- 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 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

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13.0 Course Contents and Schedule

Lec. No.	Module	Topics	Remarks
Case Studies and Real-World Applications			
1.	Introduction	Introduction to real-world AI and ML applications	
2.	Concepts	Data collection, preprocessing, and feature engineering	
3.	Case study	Natural language processing for real-world applications	Quiz 1
4.	Case study	Computer vision for real-world applications	
5.	Case study	Recommender systems for real-world applications	Assignment
6.	Case study	Robotics for real-world applications	
7.	Case study	Evaluation and selection of AI and ML models	
8.	Case study	Deployment and integration of AI and ML solutions	
9.	Case study	Ethics and social implications of AI and ML	
10	Revision	Summery	Quiz 2

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

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Course Descriptions

Case Studies and Real-World Applications is a module in which students learn how artificial intelligence is being applied in various industries and domains. The module focuses on real-world case studies and examples to illustrate the practical applications of AI in fields such as healthcare, finance, transportation, and manufacturing. Students are exposed to examples of how AI is being used to improve efficiency, productivity, accuracy, and decision-making in various industries. They also learn about the challenges and limitations of AI applications in different contexts and how these can be addressed. Through this module, students gain an understanding of the practical implications and potential of AI in different industries and domains.

Captions: Case Studies and Real-World Applications, practical applications of AI in fields, efficiency, productivity, accuracy, and decision-making in various industries.

Requirements/Instructions

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

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