Curriculum for Micro Credit Course on
CONDITION MONITORING OF MARINE MACHINERY USING ARTIFICIAL INTELLIGENCE

	Name of Subject	L	T	P	C	Hrs
A	**Condition Monitoring of Marine Machinery Using Artificial Intelligence**	5	10	0	1	15
	Total	**5**	**10**	**0**	**1**	**15**

Note: **L = Lectures**
T = Tutorials
P = Practicals
C = Credits

Total Credits for the course = 1

Unit 1	**Condition Monitoring of Marine Machinery Using Artificial Intelligence**	L	T	P	C	Hrs
		5	10	0	1	3

<u>Objectives</u>:

1. To acquaint the basics of using open source programming language-Python
2. To understand, analyze and be able to detect bad data from a set of given data using graphical methods
3. To understand the basic forecasting models that relies on mathematical principles for the forecasting.
4. To understand and develop a system that monitors the condition of a given machine for anomalies
5. To develop and implement a condition monitoring system that can detect abnormalities in a given machine.

<u>Section 1</u> Introduction to Artificial Intelligence and Applications

Explain the History of AI, the objectives of AI, the sub fields of AI, show the uses and application of AI

<u>Section 2</u> Condition Based Monitoring and scheduled monitoring

Explain what are sensors, Explain and demonstrate the various sensors used in marine machinery and what is data collection, Demonstrate the use of condition monitoring with special emphasis on marine industry, use of sensors to check the health of a machine, condition monitoring, introduction to digital twin

<u>Section 3</u> Forecasting

Define forecasting, Demonstrate the various classes of forecasting, Explain auto regression, Explain simple moving average (SMA), Demonstrate how regression and MA can be used for forecasting, Data forecasting using Auto Regression, Data forecasting using ARIMA Models,

<u>Section 4</u> Bad Data Detection

Define bad data, Bad data detection, Different methods used to detect bad data, The different types of graphs, Detecting bad data from graphs

<u>Section 5</u> Introduction to Python using Spyder-Anaconda package and practical case study

Use of Spyder(Anaconda) package(Open Source), Syntax pertaining to Loops, Conditional statements, functions and file handling, Demonstrate opening and reading the contents of a file, Demonstrate opening and writing/appending data to a file, Demonstrate how to plot graphs Case Study, Develop a condition monitoring system for monitoring the health of a marine machine