

Winter FDP on Machine Learning Application in Signal Processing and Communication Engineering (03 – 08 January, 2022)

Jointly organized by: Electronics & ICT Academies at- IIT Guwahati, NIT Patna, MNIT Jaipur, IIITDM Jabalpur, IIT Roorkee and NIT Warangal.

Lecture	Topics	Tentative Speakers	Institute
Lecture 1	Introduction to Machine Learning in Signal Processing and Communication	Prof. Ratnajit Bhattacharjee	IIT Guwahati
Lecture 2	Bayesian Learning	Dr. Suresh Sundaram	IIT Guwahati
Lecture 3	Perception Learning	Dr. Suresh Sundaram	IIT Guwahati
Lecture 4	Statistical inference and Learning	Dr. Rhythm Grover	IIT Guwahati
Lecture 5	Support Vector Machine	Dr. Suresh Sundaram	IIT Guwahati
Lecture 6	Regression and Classification I	Dr. Mitul Kumar Ahirwal	MANIT Bhopal
Lecture 7	Regression and Classification II	Prof. RBV Subramanyam	NIT Warangal
Lecture 8	Feature Selection and Dimensionality Reduction	Dr. Debanga Raj Neog	IIT Guwahati
Lecture 9	Clustering	Dr. Irshad Ansari	IIITDM Jabalpur
Lecture 10	Reinforcement Learning	Dr. Arghyadip Roy	IIT Guwahati
Lecture 11	Machine Learning in Image Processing	Dr. Debanga Raj Neog	IIT Guwahati
Lecture 12	Noisy Channel Model and Application in Speech and Language Processing	Dr. Ashish Anand	IIT Guwahati
Lecture 13	Machine Learning in Speech Processing	Dr. G. Pradhan	NIT Patna
Lecture 14	Machine Learning in Gesture Recognition	Prof. M K Bhuyan	IIT Guwahati
Lecture 15	Machine Learning in Biomedical Signals I	Dr. Varun Bajaj	IIITDM Jabalpur
Lecture 16	Machine Learning in Biomedical Signals II	Dr. Amit Vishwakarma	IIITDM Jabalpur
Lecture 17	Machine Learning in Resource Allocation in Wireless Networks	Dr. Arghyadip Roy	IIT Guwahati
Lecture 18	Machine Learning in Energy-efficient Communication	Dr. Rakesh Kumar Jha	IIITDM Jabalpur
Lecture 19	Machine Learning in Seismic Signal Processing	Dr. Satyasai Jagannath Nanda	MNIT Jaipur
Lecture 20	Machine Learning for Cooperative Spectrum Sensing	Dr. Kuldeep Singh	MNIT Jaipur
Lecture 21	Machine Learning for Smart Health Care Systems	Dr. Amit Mahesh Joshi	MNIT Jaipur

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Detailed Schedule of the Programme

*Note: Inauguration on 03rd January, 2022 at 09.30 am to 10:00 am.

Closing Ceremony on 08th January at 05.00 pm to 05:30 pm

*Note: 1) Theory Lectures = 21 hrs

2) Hands – on /Quiz Test = 19 hrs

*Break Timing:- Lunch Break: 01:00 pm to 01:30 pm

Date/Time	10:00 am to 11:00 am		11:00 am to 12:00 noon	12:00 noon to 01:00 pm	01:30 pm to 02:30 pm	02:30 pm to 05:00 pm
03-01-2022 Monday	09:30 am to 10:00 am Inauguration	10:00 am to 11:00 am Lecture 1 Prof. Ratnajit Bhattacharjee (IIT Guwahati)	Lecture 2 Dr. Suresh Sundaram (IIT Guwahati)	Lecture 3 Dr. Suresh Sundaram (IIT Guwahati)	Lecture 4 Dr. Rhythm Grover (IIT Guwahati)	Hands-on 1
04-01-2022 Tuesday	Lecture 5 Dr. Suresh Sundaram (IIT Guwahati)		Lecture 6 Dr. Mitul Kumar Ahirwal (MANIT Bhopal)	Lecture 7 Prof. RBV Subramanyam (NIT Warangal)	Lecture 8 Dr. Debanga Raj Neog (IIT Guwahati)	Hands-on 1 (Continued)
05-01-2022 Wednesday	Lecture 9 Dr. Irshad Ansari (IITDM Jabalpur)		Lecture 10 Dr. Arghyadip Roy (IIT Guwahati)	Lecture 11 Dr. Debanga Raj Neog (IIT Guwahati)	Lecture 12 Dr. Ashish Anand (IIT Guwahati)	Hands-on 2
06-01-2022 Thursday	Lecture 13 Dr. G Pradhan (NIT Patna)		Lecture 14 Prof. M K Bhuyan (IIT Guwahati)	Lecture 15 Dr. Varun Bajaj (IITDM Jabalpur)	Hands-on 3	
07-01-2022 Friday	Lecture 16 Dr. Amit Vishwakarma (IITDM Jabalpur)		Lecture 17 Dr. Arghyadip Roy (IIT Guwahati)	Lecture 18 Dr. Rakesh Kumar Jha (IITDM Jabalpur)	Hands-on 4	
08-01-2022 Saturday	Lecture 19 Dr. S. J. Nanda (MNIT Jaipur)		Lecture 20 Dr. Kuldeep Singh (MNIT Jaipur)	Lecture 21 Dr. Amit Mahesh Joshi (MNIT Jaipur)	01:30 pm to 05:00 pm	05:00 pm to 05:30 pm
					Hands-on 5	Closing Ceremony

List of Practical's for "Machine Learning Application in Signal Processing and Communication Engineering" Course

Sr. No.	List of Experiments	Hands –on Sessions
1)	Supervised learning (Regression and classification)	Hands-on 1
2)	Unsupervised learning (Clustering and dimensionality reduction)	Hands-on 2
3)	Reinforcement learning (Q-learning and its applications)	Hands-on 3
4)	ML in signal processing-based applications	Hands-on 4
5)	ML in next-generation wireless communication	Hands-on 5

Note: 1) Labs will follow the theory.

2) Software requirements for the course: MATLAB/Octave