**COLLEGE OF ENGINEERING BHUBANESWAR (COEB)**

Plot No.1 (A), CNI Complex, Patia, Bhubaneswar – 751024, Odisha, India.

[AFFILIATED TO BPUT, ODISHA]

www.coeb.ac.in

# DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

**ADD-ON COURSE :** Machine Learning Algorithms for Communication

**[Programme: B.Tech, ETC]**

**Course Objectives:**

To impart knowledge to student about recent trends in telecommunication. It provides a brief introduction to the new solutions for communication engineering using machine learning techniques.

## SYLLABUS

**Total Lecture Hours : 30**

[10 Hours]

**MODULE-I:**

Overview of machine-learning algorithms , their application in wireless communication, supervised learning, unsupervised learning and reinforcement learning (RL), machine learning in wireless channel modeling, (i) propagation scenario classification, (ii) machine-learning-based multipath component (MPC) clustering, (iii) automatic MPC tracking and (iv) deep-learning-based channel modeling.

[10 Hours]

**MODULE-II**

New types of channel estimators based on machine learning, pilot-aided channel estimators, channel estimators based on deep learning and one blind estimator , challenges and open problems for channel estimation aided by machine-learning theories

[10 Hours]

**MODULE-III**

Deep learning is incorporated for indoor localization based on channel state information (CSI) with commodity 5GHz Wi-Fi, deep-learning-based algorithm is to leverage bimodal CSI data, the open Jackson queuing network models, vehicular distribution, Model validation, effective in the analysis of system-level performance and dimensioning for vehicular networks.

**Course Outcomes:** After completion of the course, the students will be able to

CO1: Explain the basic principles of machine learning and artificial intelligence.
CO2: Explain the different algorithms involved in machine learning
CO3: use the algorithms for application in communication engineering.
CO4: use deep learning technique for application in communication engineering.

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**Evaluation Process:**

1. Attendance for the course is 75%, which is mandatory.
2. Minimum qualifying marks percentage for the course is 50.
3. Certificate will be issued after successful completion of course and assessment processes.
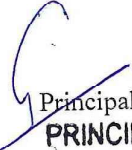
**Learning resources:**

**Suggested Books:**

1. Machine Learning And Wireless Communications by Ruisi He, ZIghuo Ding.
2. Machine Learning, Deep Learning and Computational Intelligence for Wireless Communication by E S Gopi
3. machine learning and deep learning techniques in wireless and mob by K. Suganthi, R. Karthik, G. Rajesh, Peter Ho Chiung Ching
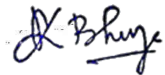4. 5G Wireless Communication System Using Machine Learning by Dr. S. K. Agrawal

**Other Sources:**
**e-Learning Resources:**

1. https://www.youtube.com/watch?v=r4sgKrRL2Ys&list=PL1xHD4vteKYVpaIiy295pg6_SY5qznc77

**Design and Developed by:** Prof. Subrat Kumar Mohanty and Prof. Arpit Sourav Mohapatra

Principal
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H.O.D, ETC Engg.
H.O.D
Dept. of ETC Engg.
COEB, Bhubaneswar

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## COLLEGE OF ENGINEERING BHUBANESWAR

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## NOTICE

## ADD-ON/CERTIFICATE COURSE

Date: 05/08/2019

Ref No: COEB/ETC/2019/09

It is for the information of all the students of 3rd/5th/7th semester that the classes for the Add-On/Certificate Courses will commence as per the time table given below.. The registration process for the course will start from **06/08/2019**. The interested students to enroll themselves for the course are advised to contact the concerned Course Coordinators for the details.

| Semester | Course Title | Course Coordinator | Date of Commencement |
|---|---|---|---|
| 3rd | PCB Design | Prof. Arpit Sourav Mohapatra | 16/08/2019 |
| 5th | Advances and challenges in telecommunication | Prof. Loknath Sarangi | 16/08/2019 |
| 7th | Machine Learning Algorithms for Communication | Prof. Sandip Kumar Mishra | 16/08/2019 |

The class timing will be from **5.30 pm to 7.30 pm**.

Head of the Department

H.O.D
Dept. of ETC Engg.
COEB, Bhubaneswar

Copy to:
1. Office of the Chairman/ Vice-Chairman for kind information.
2. Office of the Executive Director for kind Information.
3. Office of the Registrar for kind Information.
3. Office of the Principal for kind information.
4. Departmental Notice Board.
5. Guard File

Head of the Department

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# COLLEGE OF ENGINEERING BHUBANESWAR (COEB)

## ADD-ON COURSE

## STUDENT ENROLLMENT SHEET

| | |
|---|---|
| **Name of the Department:** Electronics and Telecommunication Engineering | |
| **Course Title:** Machine Learning Algorithms for Communication | |
| **Semester:** 7th | **Academic Year:** 2019-20 |

### Student's Declaration/Undertaking

1. I do hereby undertake to participate in the above mentioned add on course.

2. I do hereby, promise to abide by the admissible rules and regulations, connecting discipline, attendance, etc. of the department, and also to follow the code of Conduct prescribed for the students of the institute, as in force from time to time.

| SL. NO. | Reg. No./ Enrollment No. | NAME OF THE STUDENT | Signature of the student |
|---------|--------------------------|---------------------|--------------------------|
| 1 | 1601219052 | A ASHOK PATRA | A.A. Patra |
| 2 | 1601219053 | AASHISH KUMAR | Aashish Kumar |
| 3 | 1601219054 | AISHWARYA BEHERA | A. Behera |
| 4 | 1601219055 | ANKITA KUMARI | Ankita Kumari |
| 5 | 1601219056 | DIVYANSHI LAKRA | Dibyansi Lakra |
| 6 | 1601219057 | PRITIJINTA DAS | P. Das |
| 7 | 1601219058 | RISHIRAJ BIDYABHUSON | Rishiraj Bidyabhuson |
| 8 | 1601219059 | SAMBIT KUMAR MANGARAJ | Sambit Kumar Mangaraj |
| 9 | 1601219060 | SHILPA KUMARI | Shilpa Kum |
| 10 | 1601219061 | SNEHA PRIYANKA TIRKEY | Sneha Priyanka Tirkey |
| 11 | 1601219124 | RAVINDRA KUMAR | Ravindra Kuman |
| 12 | 1601219125 | SK MEHBOOB ALI | SK. Mehboob Ali |
| 13 | 1601219126 | TRIPTI JHA | Tripti |
| 14 | 1601219149 | ARIJIT MAHANANDIA | Arijit Mahanandia |
| 15 | 1601219150 | MEGHA SHARMA | Megha Sharma |
| 16 | 1601219160 | VISHAL KUMAR | Vishal |
| 17 | 1601219161 | NISHA KUMARI | Nisha Kumari |
| 18 | 1601219162 | SHUBHAM ROY | Subham Roy |
| 19 | 1601219163 | SUMEET BHOI | Sumeet Bhoi |
| 20 | 1601219164 | VIJENDRA BOIPAI | V. Boipai |
| 21 | 1601219174 | ROSHAN RAJ | Roshan Roy |
| 22 | 1601219332 | BIRESH RANJAN PATRA | Biresh Ranjan Patra |
| 23 | 1601219333 | SMARANIKA MALLICK | Smaranika Mallick |

S.K. Mishra

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## DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

ADD ON COURSE_____

### STUDENT ATTENDANCE SHEET

**Programme: B.Tech in ETC**          **Semester: 7th   Academic Year :2019-20**
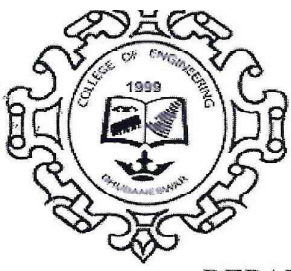
**Name of the course: Machine Learning Algorithms for Communication**
**Course Code (if any):**

**Duration :** 30 hours

Date & Signature of the Student

| SL. NO. | Reg. No./ Enrollment No. | NAME OF THE STUDENT | Date: 16/8/19 | Date: 19/8/19 | Date: 20/8/19 | Date: 21/8/19 |
|---------|--------------------------|---------------------|---------------|---------------|---------------|---------------|
| 1 | 1601219052 | A ASHOK PATRA | A.Ashok Patra | A.Ashok Patra | A.Ashok Patra | A.Ashok Patra |
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| 17 | 1601219161 | NISHA KUMARI | Nisha kumari | Nisha kumari | Nisha kumari | Nisha kumari |
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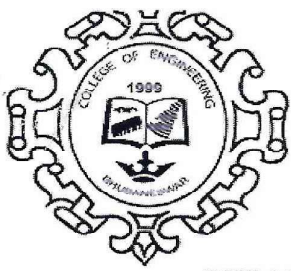
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## DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING
ADD ON COURSE_____

## STUDENT ATTENDANCE SHEET

| 22 | 1601219332 | BIRESH RANJAN PATRA | B. Ranjan Patra | B. Ranjen Patra | B. Ranjan Patra | B. Ranjan Patra |
| 23 | 1601219333 | SMARANIKA MALLICK | S. Mallick | | S. Mallick | S. Mallick |
| **ignature of the Course Coordinator** | | | S. K. Mishra | S. K. Mishra | S. K. Mishra | S. K. Mishra |

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## DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

ADD ON COURSE_____

### STUDENT ATTENDANCE SHEET

**Programme: B.Tech in ETC**
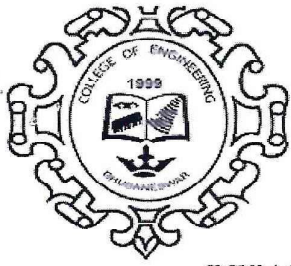
**Semester: 7th   Academic Year :2019-20**

**Name of the course: Machine Learning Algorithms for Communication**
**Course Code (if any):**

**Duration :** 80 hours

**Date & Signature of the Student**

| SL. NO. | Reg. No./ Enrollment No. | NAME OF THE STUDENT | Date: 22/8/19 | Date: 26/8/19 | Date: 27/8/19 | Date: 28/8/19 |
|---|---|---|---|---|---|---|
| 1 | 1601219052 | A ASHOK PATRA | A Ashok Patra | A Ashok Patra | A Ashok Patra | A Ashok Patra |
| 2 | 1601219053 | AASHISH KUMAR | A Kum | A Kum | A Kum | A Kum |
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| 15 | 1601219150 | MEGHA SHARMA | Megha Sharma | Megha sharma | Megha sharma | Megha Sharma |
| 16 | 1601219160 | VISHAL KUMAR | Vishal | Vishal | Vishal | Vishal |
| 17 | 1601219161 | NISHA KUMARI | Nisha kumari | Nisha kumari | Nisha kumari | Nisha kumari |
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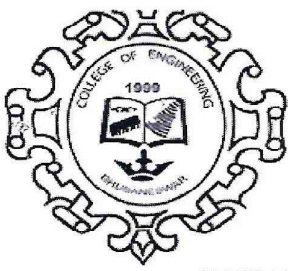
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## DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

ADD ON COURSE_____

STUDENT ATTENDANCE SHEET

| 22 | 1601219332 | BIRESH RANJAN PATRA | B.Ranjan Patra | B. Ranjan Patra | B. Ranjan Patra | B. Ranjan Patra |
| 23 | 1601219333 | SMARANIKA MALLICK | S. Mallick | S. Mallick | S. Mallick | |
| Signature of the Course Coordinator | | | S.K. Mishra | S.K. Mishra | S.K. Mishra | S.K. Mishra |

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## STUDENT ATTENDANCE SHEET

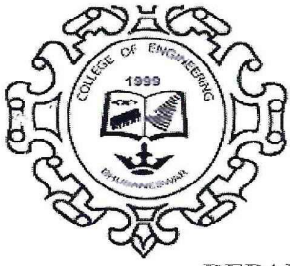**Programme: B.Tech in ETC**          **Semester: 7th   Academic Year :2019-20**

Name of the course: Machine Learning Algorithms for Communication
Course Code (if any):

**Duration :** 30 hours

| SL. NO. | Reg. No./ Enrollment No. | NAME OF THE STUDENT | Date:29/8/19 | Date:30/8/19 | Date:4/9/19 | Date:5/9/19 |
|---|---|---|---|---|---|---|
| 1 | 1601219052 | A ASHOK PATRA | A. Ashok Patra | A. Ashok Patra | A. Ashok Patra | A. Ashok Patra |
| 2 | 1601219053 | AASHISH KUMAR | A. Kum | A. Kum | A. Kum | A. Kum |
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| 4 | 1601219055 | ANKITA KUMARI | Anikita kumari | Ankita kumari | Ankita kumari | Ankita kumari |
| 5 | 1601219056 | DIVYANSHI LAKRA | Divyanshi lana | | | Divyansi Lakra |
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| 9 | 1601219060 | SHILPA KUMARI | Shilpi kumari | Shilpi kumari | Shilpi kumari | Shilpi kumari |
| 10 | 1601219061 | SNEHA PRIYANKA TIRKEY | Sneha Priyanka Tirkey | Sneha Priyanka Tirkey | Sneha Priyanka Tirkey | Sneha Priyanka Tirkey |
| 11 | 1601219124 | RAVINDRA KUMAR | Ravindra Kumar | Ravindra Kumar | Ravindra Kumar | Ravindra Kumar |
| 12 | 1601219125 | SK MEHBOOB ALI | SK Ali | SK Ali | SK Ali | SK Ali |
| 13 | 1601219126 | TRIPTI JHA | Tripti | Tripti | Tripti | Tripti |
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| 15 | 1601219150 | MEGHA SHARMA | Megha Sharma | Megha sharma | Megha Sharma | Megha Sharma |
| 16 | 1601219160 | VISHAL KUMAR | Vishal | Vishal | Vishal | Vishal |
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**DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING**

ADD ON COURSE_____

## STUDENT ATTENDANCE SHEET

| 22 | 1601219332 | BIRESH RANJAN PATRA | B. Ranjan Patra | B. Ranjan Patra | B. Ranjan Patra | B. Ranjan Patra |
| 23 | 1601219333 | SMARANIKA MALLICK | S. Mallick | S. Mallick | | S. Mallick |
| Signature of the Course Coordinator | | | S. K. Mishra | S. K. Mishra | S. K. Mishra | S. K. Mishra |

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## DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING
ADD ON COURSE_____

### STUDENT ATTENDANCE SHEET

Programme: B.Tech in ETC                    Semester: 7th    Academic Year :2019-20

Name of the course: Machine Learning Algorithms for Communication
Course Code (if any):

Duration : 30 hours

Date & Signature of the Student

| SL. NO. | Reg. No./ Enrollment No. | NAME OF THE STUDENT | Date: 6/9/19 | Date: 10/9/19 | Date: 11/9/19 | Date: |
|---|---|---|---|---|---|---|
| 1 | 1601219052 | A ASHOK PATRA | A. Ashok Patra | A. Ashok Patra | A. Ashok Patra | |
| 2 | 1601219053 | AASHISH KUMAR | | A. Kum | A. Kum | |
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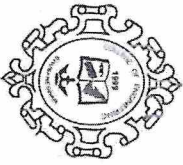Patia, Bhubaneswar–751024, Odisha, India.

[AFFILIATED TO BPUT, ODISHA]

## DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING
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### STUDENT ATTENDANCE SHEET

| 22 | 1601219332 | BIRESH RANJAN PATRA | B. Ranjan Patra | B. Ranjan Patra | B. Ranjan Patra | |
| 23 | 1601219333 | SMARANIKA MALLICK | | S. Mallick | S. Mallick | |
| Signature of the Course Coordinator | | | S. K. Mishra | S. K. Mishra | S. K. Mishra | |

PRINCIPAL
College of Engineering Bhubaneswar

# COLLEGE OF ENGINEERING BHUBANESWAR

PLOT NO-1(A), CNI COMPLEX, PATIA, BHUBANESWAR, KHORDHA, ODISHA-751024

## Certificate of Completion

This is to certify that Mr./Ms. ___SHUBHAM ROY___

of ___Electronics & Telecommunication Engg.___ semester ___Seventh___ , student of the Department

bearing registration number ___1601219162___

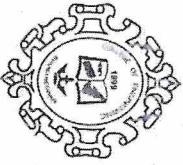has successfully completed the ADD-ON Course titled ___Machine Learning Algorithms for Communication___

conducted at College of Engineering Bhubaneswar in the academic year ___2019-20___

**TRUE COPY**

_____
Course-Coordinator

_____
Principal

PRINCIPAL
College of Engineering Bhubaneswar

# COLLEGE OF ENGINEERING BHUBANESWAR

PLOT NO-1(A), CNI COMPLEX, PATIA, BHUBANESWAR, KHORDHA, ODISHA-751024

## Certificate of Completion

This is to certify that Mr./Ms. ___SUMEET BHOI___

of ___Electronics & Telecommunication Engg.___ semester ___Seventh___ bearing registration number ___160121963___ , student of the Department

has successfully completed the ADD-ON Course titled ___Machine Learning Algorithms for Communication___
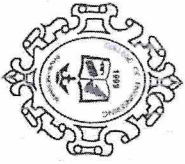
conducted at College of Engineering Bhubaneswar in the academic year ___2019-20___

**TRUE COPY**

Course-Coordinator

Principal

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College of Engineering Bhubaneswar

# COLLEGE OF ENGINEERING BHUBANESWAR

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## Certificate of Completion

This is to certify that Mr./Ms. ___VIJENDRA BOIPAI___

of ___Electronics & Telecommunication Engg.___ semester ___Seventh___ bearing registration number ___160219164___, student of the Department

has successfully completed the ADD-ON Course titled ___Machine Learning Algorithms for Communication___

conducted at College of Engineering Bhubaneswar in the academic year ___2019-20___
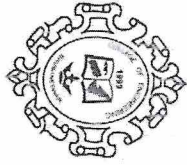
Course-Coordinator

Principal

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# COLLEGE OF ENGINEERING BHUBANESWAR

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## Certificate of Completion

This is to certify that Mr./Ms. _____ROSHAN RAJ_____

of _Electronics & Telecommunication Engg._ semester _Seventh_ bearing registration number _160121917A_, student of the Department

has successfully completed the ADD-ON Course titled _____Machine Learning Algorithms for Communication_____

conducted at College of Engineering Bhubaneswar in the academic year _2019-20_ .

Course-Coordinator

Principal

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College of Engineering Bhubaneswar

# COLLEGE OF ENGINEERING BHUBANESWAR

PLOT NO-1(A), CNI COMPLEX, PATIA, BHUBANESWAR, KHORDHA, ODISHA-751024

## Certificate of Completion

This is to certify that Mr./Ms. _____ BIRESH RANJAN PATRA _____

of _Electronics & Telecommunication Engg._ student of the Department

semester _Seventh_ bearing registration number _____ 160121933 _____

has successfully completed the ADD-ON Course titled

_____ Machine Learning Algorithms for Communication _____

conducted at College of Engineering Bhubaneswar in the academic year _____ 2019-20 _____

**TRUE COPY**

Course-Coordinator

Principal

PRINCIPAL
College of Engineering Bhubaneswar