



**COLLEGE OF ENGINEERING BHUBANESWAR (COEB)**

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

[AFFILIATED TO BPUT, ODISHA]

[www.coeb.ac.in](http://www.coeb.ac.in)

PRINCIPAL  
College of Engineering Bhubaneswar

**DEPARTMENT OF MECHANICAL ENGINEERING**

**ADD-ON COURSE : Advanced Welding Techniques**

[Programme: B.Tech, Mechanical Engg.]

Semester: 3<sup>rd</sup>

**Course Objectives:**

- ❖ To impart knowledge regarding various advanced welding practices in industries.
- ❖ To understand the various parameters and requirements for welding processes.
- ❖ To know the comparative merits and demerits of various welding processes.
- ❖ To understand the right kind of welding technique suitable for various joints.
- ❖ To learn about the joint designs adopted in different types of welding techniques.

**SYLLABUS**

**Total Lecture Hours: 40**

**MODULE 1:**

**(14 hours)**

Introduction to consolidation processes, Classification of welding processes, some common concerns, types of fusionwelds and types of joints, Design considerations, Heat effects, Weldability and join ability. Welding terms and definitions, welding positions, elements of and construction of welding symbols. Checks prior to weld joint preparation, joint preparation checks, preheating and inter-pass heating, post weld heating, heating processes, post heat treatments, insulation of heated joints.

**MODULE 2:**

**(14 hours)**

Solidification of weld metal: Principle of solidification of weld metal, modes of solidification, effect of welding parameters on weld structure, grain refinement principle of weld metal, method of weld metal refinement, inoculation, arc pulsation, external excitation.

Heat affected zone and weld metal: Transformations in HAZ of steel, factors affecting changes in microstructure and mechanical properties of HAZ, reactions in weld pool- gas metal reaction, slag metal reaction.

**MODULE 3:**

**(12 hours)**

Codes governing welding inspection: Structural welding code; ASME boiler and pressure vessel code, spot examination of welded joints, duties of the inspector, ASTM standards, API standards. Chemical, Metallurgical, and Mechanical testing of weldments: Comparison

of destructive and non-destructive tests, chemical tests, forms of corrosion, testing for corrosion resistance, metallographic tests.

**Text Book:**

1. Khanna O. P. – ‘A Text Book on Welding Technology’ – Dhanpat Rai and Sons, New Delhi – 2013
2. Parmar R. S. – ‘Welding Process and Technology’ – Khanna Publishers, Delhi – 1992
3. Dr. S.P. Tewari & S. A. Rizvi-Advanced welding Technology- S. K. Kataria, 4<sup>th</sup> Edition

**Reference Text Book:**

1. Welding technology, R. Bittle, TMH
2. American society for metals, metal hand book vol.6
3. Welding process technology-Houldcraft PT-cambridgeuniv.press


**Online resources:**

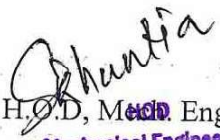
<https://archive.nptel.ac.in/courses/112/103/112103244/>

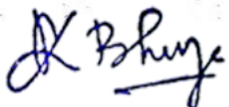
**Evaluation Criteria**

- Mandatory attendance of 75% for each student.
- Conduction of two internal assessments and students have to secure 50% marks in each assessment.
- Certificates will be awarded to each students fulfilling the above criteria.

Designed & developed by: Dr. Subhakanta Nayak & Dr. N. H. S. Ray

  
Principal  
PRINCIPAL  
College of Engineering Bhubaneswar

  
H.O.D, Mech. Engg.  
Mechanical Engineering  
College of Engineering Bhubaneswar

  
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# COLLEGE OF ENGINEERING BHUBANESWAR

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

## NOTICE

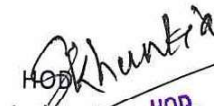
### Department of Mechanical Engineering Add On Course 2020-2021

Ref No: COEB/ME/2020/23

Date: 28.08.2020

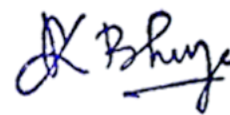
It is hereby informed to all the students that the Department of Mechanical Engineering is going to start the following Add-on courses for Academic year 2020-2021. All the students are instructed to enroll their names for the following courses on or before 10.09.2020. The classes will be commenced from 14/09/2020 in ON\_LINE MODE from 5.30pm to 7.30pm. You can contact the following course co-ordinators for enrolment and any queries.

Sl No.	Name of Add-on Course	Sem	Duration in hours	Name of the course co-ordinators
1	Advanced Welding Techniques	3 <sup>rd</sup>	40	Dr. Sujit Ku. Khuntia
2	Smart Manufacturing for Industry 4.0	5 <sup>th</sup>	40	Prof. Jagannath Mohapatra
3	Boiler Safety	7 <sup>th</sup>	40	Prof. Tapas Kumar Chand

  
HOD  
Mechanical Engineering Department  
College of Engineering Bhubaneswar

Copy to:

1. Vice Chairman
2. Executive Director
3. Principal
4. All Notice Board.
5. A.O(Admin)
6. All HODs
7. Hostel, Security

  
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College of Engineering Bhubaneswar



**COLLEGE OF ENGINEERING BHUBANESWAR (COEB)  
ADD-ON COURSE ENROLLMENT SHEET**

**ON-LINE MODE**

**Name of the Department: Department of Mechanical Engineering**

**Course Title: Advanced Welding Techniques**

**Semester : 3rd**

**Academic Year: 2020-21**

**Duration: 40 hours**

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, concerning 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.	Registration No.	Name of the Student	Remarks by the Course Coordinator
1	1901219145	AMBIKA PRASAD BARIK	Certified that the Enrollment Sheet is prepared by taking the consents of the students to enroll themselves in this Certificate Course (Add-On) to be conducted in Virtual Mode (ON-LINE) during the Pandemic COVID'19 through the link provided by the Department. They have also gone through the declaration/undertaking to be strictly abided by them during the course period.
2	1901219146	AMRIT KUMAR KAR	
3	1901219147	ARJEET MAJHEE	
4	1901219148	BIBEKANANDA JENA	
5	1901219149	BISHNU PRASAD MOHANTA	
6	1901219150	DEEPAN KUMAR BISWAL	
7	1901219151	KHAGESWAR MALIK	
8	1901219152	LIPU PRADHAN	
9	1901219153	PRABHU SANKAR SINGH	
10	1901219154	SHYAM SUNDAR BHOI	
11	1901219155	SUVAM ASHIRBAD	
12	1901219262	ABHIJIT SETHY	
13	1901219263	ABHISHEK BEHERA	
14	1901219264	ABHISHEK KASHYAP	
15	1901219265	ABINASH PAHADASINGH	
16	1901219266	ARSHAD MOHANTY	
17	1901219267	AYUSH PARIDA	
18	1901219268	BIDYABHUSAN KHATUA	
19	1901219269	BISHAL ROUT	
20	1901219270	CHANDAN KUMAR	
21	1901219271	DEBABRATA MISHRA	
22	1901219272	DEBASIS MOHANTY	
23	1901219273	DEBASISH SAHU	
24	1901219274	DIBYAJYOTI PALAI	
25	1901219275	FARHAN ALAM	
26	1901219276	GOBINDA PRASAD	
27	1901219277	HEMANTA KUMAR	
28	1901219278	KALIPRASAD SATAPATHY	
29	1901219279	MANOJ KUMAR KHADANGA	
30	1901219280	MANOJ KUMAR MALICK	
31	1901219281	MD. ZAID	
32	1901219282	PITABAS BEHERA	
33	1901219283	PRATYUSH KUMAR DHAL	
34	1901219284	PRIYA KUMARI SINGH	
35	1901219285	RAHUL KUMAR DIAN	
36	1901219286	RAJAT DIXIT	
37	1901219287	RAJIB KUMAR NANDI	
38	1901219288	RAJIB KUMAR RAY	
39	1901219289	RAKESH RANJAN ROUTARAY	
40	1901219290	SAUDAMINI BEHERA	

*S. Khuntia*  
**Course Coordinator**  
(Signature with Seal)



**COLLEGE OF ENGINEERING BHUBANESWAR (COEB)**



*A. Bhuje*  
**PRINCIPAL**  
College of Engineering Bhubaneswar



# ADD-ON COURSE ENROLLMENT SHEET

ON-LINE MODE

**Name of the Department:** Department of Mechanical Engineering

**Course Title:** Advanced Welding Techniques

**Semester :** 3rd

**Academic Year:** 2020-21


**Duration:**

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, concerning 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.	Registration No.	Name of the Student	Remarks by the Course Coordinator
41	1901219291	SAYED MOHAMMAD ABDULLAH	Certified that the Enrollment Sheet is prepared by taking the consents of the students to enroll themselves in this Certificate Course (Add-On) to be conducted in Virtual Mode (ON-LINE) during the Pandemic COVID'19 through the link provided by the Department. They have also gone through the declaration/undertaking to be strictly abided by them during the course period.
42	1901219292	SHIBASHANKAR BIRUA	
43	1901219293	SUBHAM KUMAR JENA	
44	1901219294	SUBHRANSU SINGH	
45	1901219295	SUBRAT KUMAR GOPAL	
46	1901219296	SURENDRA SAW	

  
Course Coordinator  
(Signature with Seal)



  
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COLLEGE OF ENGINEERING BHUBANESWAR (COEB)

DEPARTMENT OF MECHANICAL ENGINEERING

ADD ON/CERTIFICATE COURSE

STUDENT ATTENDANCE SHEET

ONLINE MODE

Academic Year: 2020-21

Programme: B Tech in MECHANICAL ENGINEERING

Duration: 40 hours

Name of the Course: Advanced Welding Techniques

Semester : 3rd Sem


Remarks of Course Coordinator (P-Present, A-Absent)


Remarks

Certified that this certified course is conducted in virtual mode (ON-LINE) because of the pandemic COVID-19.

The attendance is taken with the remarks P-Present and A-Absent for the students.

Sl.No.	Reg. No.	Name of the Students	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Remarks				
1	1901219145	AMBIKA PRASAD BARIK	15/9	A	16/9	P	18/9	P	22/9	P	23/9	A	24/9	P	25/9	P	28/9	A	29/9	P
2	1901219146	AMRIT KUMAR KAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
3	1901219147	ARJEET MAJHEE	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
4	1901219148	BIBEKANANDA JENA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
5	1901219149	BISHNU PRASAD MOHANTA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
6	1901219150	DEEPAK KUMAR BISWAL	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
7	1901219151	KHAGESWAR MALIK	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
8	1901219152	LIPU PRAHDAN	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
9	1901219153	PRABHU SANKAR SINGH	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
10	1901219154	SHYAM SUNDAR BHOI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
11	1901219155	SUVAM ASHIRBAD	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
12	1901219262	ABHJIT SETHY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
13	1901219263	ABHISHEK BEHERA	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
14	1901219264	ABHISHEK KASHYAP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
15	1901219265	ABINASH PAHADASINGH	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
16	1901219266	ARSHAD MOHANTY	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
17	1901219267	AYUSH PARIDA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	1901219268	BIDYABHUSAN KHATUA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
19	1901219269	BISHAL ROU	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
20	1901219270	CHANDAN KUMAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
21	1901219271	DEBABRATA MISHRA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
22	1901219272	DEBASIS MOHANTY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
23	1901219273	DEBASIS SAHU	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
24	1901219274	DIBYAJYOTI PALAI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
25	1901219275	FARHAN ALAM	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
26	1901219276	GOBINDA PRASAD	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
27	1901219277	HEMANTA KUMAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

  
 Course Coordinator  
 (Signature with Seal)  


  
 PRINCIPAL  
 College of Engineering Bhubaneswar



COLLEGE OF ENGINEERING BHUBANESWAR (COEB)

DEPARTMENT OF MECHANICAL ENGINEERING

ONLINE MODE

ADD ON/CERTIFICATE COURSE  
STUDENT ATTENDANCE SHEET

Academic Year: 2020-

Programme: B Tech in MECHANICAL ENGINEERING

Semester : 3rd Sem

Duration: 40 hours

Name of the Course: Advanced Welding Techniques

Remarks of Course Coordinator (P-Present, A-Absent)

Remarks

Sl No.	Reg. No.	Name of the Students	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
28	1901219278	KALIPRASAD SATAPATHY	P	P	P	A	A	P	P	P	P	P	P	P	P	P	A
29	1901219279	MANOJ KUMAR KHADANGA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
30	1901219280	MANOJ KUMAR MALICK	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P
31	1901219281	MD. ZAID	P	P	A	P	P	A	A	A	P	P	P	P	P	P	P
32	1901219282	PITABAS BEHERA	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P
33	1901219283	PRATYUSH KUMAR DHAL	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P
34	1901219284	PRIYA KUMARI SINGH	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
35	1901219285	RAHUL KUMAR DIAN	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P
36	1901219286	RAJAT DIXIT	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
37	1901219287	RAJIB KUMAR NANDI	A	P	P	A	P	P	P	P	P	P	P	P	P	P	P
38	1901219288	RAJIB KUMAR RAY	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P
39	1901219289	RAKESH RANJAN	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
40	1901219290	SAUDAMINI BEHERA	A	P	P	P	P	P	P	P	P	P	P	P	P	P	A
41	1901219291	SAYED MOHAMMAD	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
42	1901219292	SHIBASHANKAR BIRUA	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
43	1901219293	SUBHAM KUMAR JENA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
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45	1901219295	SUBRAT KUMAR GOPAL	P	P	P	P	P	A	P	P	P	P	P	P	P	P	A
46	1901219296	SURENDRA SAW	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P

Certified that this certified course is conducted in virtual mode (ON-LINE) because of the pandemic COVID-19.

The attendance is taken with the remarks P-Present and A-Absent for the students.

Signature of Course Coordinator (Signature with Seal)



Principal  
College of Engineering Bhubaneswar



COLLEGE OF ENGINEERING BHUBANESWAR (COEB)

DEPARTMENT OF MECHANICAL ENGINEERING

ADD ON/CERTIFICATE COURSE

STUDENT ATTENDANCE SHEET

Semester : 3rd Sem

Academic Year: 2020-21

ONLINE MODE

2

Programme: B Tech in MECHANICAL ENGINEERING

Duration: 40 DAYS

Name of the Course: Advanced Welding Techniques

Remarks of Course Coordinator (P-Present, A-Absent)

Remarks

Sl No.	Reg. No.	Name of the Students	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Remarks
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27	1901219277	HEMANTA KUMAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	



Signature of Course Coordinator  
 (Signature with Seal)

PRINCIPAL  
 College of Engineering Bhubaneswar

Signature of Principal





COLLEGE OF ENGINEERING BHUBANESWAR (COEB)

DEPARTMENT OF MECHANICAL ENGINEERING

ONLINE MODE

ADD ON/CERTIFICATE COURSE  
STUDENT ATTENDANCE SHEET

Academic Year: 2020-

Programme: B Tech In MECHANICAL ENGINEERING

Semester : 3rd Sem

Duration: 40 hours

Name of the Course: Advanced Welding Techniques

Remarks of Course Coordinator (P-Present, A-Absent)

Remarks

SI No.	Reg. No.	Name of the Students	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
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33	1901219283	PRAJYUSH KUMAR DHAL	P	P	P	P	P	P	P	P	P	P	P	P	P	P
34	1901219284	PRIYA KUMARI SINGH	P	A	P	P	P	P	P	P	P	P	P	P	P	P
35	1901219285	RAHUL KUMAR DIAN	P	P	P	P	P	P	P	P	P	P	P	P	P	P
36	1901219286	RAJAT DIXIT	P	P	P	P	P	P	P	P	P	P	P	P	P	P
37	1901219287	RAJIB KUMAR NANDI	P	P	P	P	P	P	P	P	P	P	P	P	P	P
38	1901219288	RAJIB KUMAR RAY	P	P	P	P	P	P	P	P	P	P	P	P	P	P
39	1901219289	RAKESH RANJAN	P	P	P	P	P	P	P	P	P	P	P	P	P	P
40	1901219290	SAUDAMINI BEHERA	P	P	P	P	P	P	P	P	P	P	P	P	P	P
41	1901219291	SAVED MOHAMMAD	P	P	P	P	P	P	P	P	P	P	P	P	P	P
42	1901219292	SHIBASHANKAR BIRUA	A	P	P	P	P	P	P	P	P	P	P	P	P	P
43	1901219293	SUBHAM KUMAR JENA	P	P	P	P	P	P	P	P	P	P	P	P	P	P
44	1901219294	SUBHRANSU SINGH	P	P	P	P	P	P	P	P	P	P	P	P	P	P
45	1901219295	SUBRAT KUMAR GOPAL	P	A	P	P	P	P	P	P	P	P	P	P	P	P
46	1901219296	SURENDRA SAW	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Certified that this certified course is conducted in virtual mode (ON-LINE) because of the pandemic COVID-19.

The attendance is taken with the remarks P-Present and A-Absent for the students.

*Signature*

Course Coordinator  
(Signature with Seal)



*Signature*

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. AMBIKA PRASAD BARIK, student of the Department  
of Mechanical Engg. semester Third bearing registration number 1901219145  
has successfully completed the ADD-ON Course titled Advanced Welding Techniques

conducted at College of Engineering Bhubaneswar in the academic year 2020-21

**TRUE COPY**

  
Course-Coordinator

  
Principal

  
PRINCIPAL  
College of Engineering Bhubaneswar



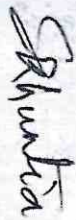
**COLLEGE OF ENGINEERING BHUBANESWAR**  
PLOT NO-1(A), CNI COMPLEX, PATIA, BHUBANESWAR, KHORDHA, ODISHA-751024

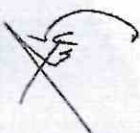



# Certificate of Completion

This is to certify that Mr./Ms. AMRIT KUMAR KAR, student of the Department  
of Mechanical Engg. semester Third bearing registration number 1901219146  
has successfully completed the ADD-ON Course titled Advanced Welding Techniques  
conducted at College of Engineering Bhubaneswar in the academic year 2020-21

**TRUE COPY**

  
Course-Coordinator

  
Principal

  
PRINCIPAL  
College of Engineering Bhubaneswar



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# Certificate of Completion

This is to certify that Mr./Ms. ARJEET MAJHEE student of the Department


of Mechanical Engg. semester Third bearing registration number 1901219147


has successfully completed the ADD-ON Course titled Advanced Welding Techniques

conducted at College of Engineering Bhubaneswar in the academic year 2020-21.

**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. BIBEKANANDA JENA, student of the Department

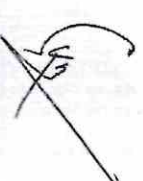
of Mechanical Engg. semester Third bearing registration number 1901219148


has successfully completed the ADD-ON Course titled Advanced Welding Techniques

conducted at College of Engineering Bhubaneswar in the academic year 2020-21

**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




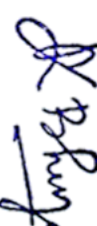
# Certificate of Completion

This is to certify that Mr./Ms. BISHNU PRASAD MOHANTA student of the Department  
 of Mechanical Engg. semester Third bearing registration number 1901219149  
 has successfully completed the ADD-ON Course titled Advanced Welding Techniques  
 conducted at College of Engineering Bhubaneswar in the academic year 2020-21

**TRUE COPY**

  
 Course-Coordinator

  
 Principal

  
 PRINCIPAL  
 College of Engineering Bhubaneswar