



# COLLEGE OF ENGINEERING BHUBANESWAR

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

[AFFILIATED TO BPUT, ODISHA]

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

## DEPARTMENT OF AUTOMOBILE ENGINEERING

Name of the course : Add-on course on Fuels and Combustion  
Course code :  
Branch : Automobile  
Semester : 5<sup>th</sup>  
Duration : 40 hours

### Learning Objective:

- ❖ To provide student with an opportunity to develop technical competency in automobile engineering.
- ❖ To provide students an understanding of the combustion system in vehicles.
- ❖ To have an understanding about supercharging and Turbo charging.
- ❖ To provide students a general idea about trouble shooting.

### Course Outcome:

After completion of course the students will be able to:

CO1: Understand the fundamentals and importance of engines, engine components, fuel parameters and advancement in technology.

CO2: Examine the aspects of maintenance and testing.

CO3: Understanding about the advanced techniques and tools used.

CO4: Explain the effects of exhaust emission on human health and various pollution norms.

## SYLLABUS

### MODULE 1:

(14 hours)

#### IC Engines Combustion Performance Parameters:

Fuels and suitability of fuels for use in S.I. Engines, Rating of S.I. Engines fuels, Carburetors and carburetion, Performance characteristics, Direct Injection Stratified Charge engines (DISC),

Homogeneous charge CI engines (HCCI), Supercharging and Turbo charging, Digital simulation for performance prediction.

### MODULE 2:

(14 hours)

Fuel system, Fuel tank, Fuel pump, Fuel injection, Exhaust, Catalytic converter, Engine cooling systems, Muffler/Silencers, Advanced techniques and tools used, Maintenance documentation,

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Trouble shooting and service procedures, Tools and equipment for repair and Overhaul, Testing equipments.

**MODULE 3:**

**(12 hours)**

Fundamentals of thermochemistry, Combustion air calculation, Calculation of calorific value of fuels, Adiabatic flame temperature calculation, Mechanism and kinetics of combustion, Flame properties, Combustion burners, Combustion furnaces, Internal combustion engines, Cracking, Thermal cracking, Visbreaking, Catalytic cracking, Hydrotreatment, dewaxing, deasphalting.

**Text Book:**

1. Modern Petroleum Technology, Vol 1, Upstream, Ed. by Richard A. Dave, IP, 6th ed., John Wiley & Sons. Ltd.
2. Modern Petroleum Technology, Vol 2, Downstream, Ed. by Alan G. Lucas, IP, 6th ed., John Wiley & Sons. Ltd.
3. Combustion, Irvin Glassman, 2nd ed., Academic Press.

**Reference Text Book:**

1. Modern Petroleum Refining Processes, B.K. Bhaskar Rao, 4th ed., Oxford & IBH Publishing Co. Pvt. Ltd.
2. Report on the project "Coal Combustion Study", sponsored by Tata Iron and Steel Company Ltd., Jamshedpur.
3. Fuels Combustion and Furnaces, John Griswold, Mc-Graw Hill Book Company Inc

**Online resources:**

1. <https://archive.nptel.ac.in/courses/103/105/103105110/>
2. <https://www.classcentral.com/course/youtube-fundamentals-of-combustion-i-92342>

**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. J Hussain & S. Soumya Ranjan Baliarsingh

Approved by:



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# COLLEGE OF ENGINEERING BHUBANESWAR

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

## NOTICE

Department of Automobile Engineering  
Add On Course 2018-2019

Ref No: COEB/AE/2018/20

Date: 04.06.2018

It is hereby informed to all the students that the Department of Automobile Engineering is going to start the following Add-on courses for Academic year 2018-2019. All the students are instructed to enroll their names for the following courses on or before **23.06.2018**. The classes will be commenced from **17.07.2018** with timing from 5.30pm to 7.30pm. You can contact the following course co-ordinators for enrolment and any queries.

SI No.	Name of Add-on Course	Sem	Duration in hours	Name of the course co-ordinators
1	Structural System Fundamentals	3 <sup>rd</sup>	40	Dr. J. Hussain
2	Fuels and Combustion	5 <sup>th</sup>	40	Dr. Krishna
3	Modern Fuels and Alternatives to IC Engines	7 <sup>th</sup>	40	Prof. Pusparanjan Swain

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Principal

College of Engineering Bhubaneswar

Vice Chairman

Executive Director

Principal

All Notice Board.

A.O(Admin)

All HODs

Hostel, Security

PSW

HOD

Automobile Engineering Department

A. Bhuje

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# COLLEGE OF ENGINEERING BHUBANESWAR (COEB)

DEPARTMENT OF AUTOMOBILE ENGINEERING  
ADD ON/CERTIFICATE COURSE  
STUDENT ENROLLMENT SHEET

Programme: B Tech in AUTOMOBILE ENGINEERING		Academic Year : 2018-19	
Semester: 5 <sup>th</sup>	Course Code (if any):	Course Duration: 40 hours	
Name of the Course: Fuels and Combustion			
I do hereby undertake to participate in the above mentioned add on course.			
Sl No.	Reg. No.	Name of the Students	Signature
1	1601219001	AJAYA KUMAR GAMANGO	Ajaya Kumar Gamango
2	1601219002	JYOTI KRUSHNA RAUTA	Jyoti Krushna Rauta
3	1601219003	KAUSTUVA JENA	Kaustuva Jena
4	1601219004	SURESH SABAR	Suresh Sabar
5	1601219005	SUSHIL KUMAR PRUSTY	S. K. Prusty
6	1601219006	SYED ZEESHAN ALAM	S. Z. Alam
7	1601219007	MAHESH CHARAN PATEL	Mahesh Ch. Patel
8	1601219175	ABHIMANYU SAHOO	Abhimanyu Sahoo
9	1601219176	BISWARANJAN MALLICK	B. Mallick
10	1601219177	HARICHANDAN GHOSH	H. Ghosh
11	1601219178	MD SAHEEN ALAM	Md Saheen Alam
12	1601219179	PRATEEK PANDA	Prateek Panda
13	1601219180	SATSANKLPA TRIPATHY	S.K. Tripathy
14	1601219181	SEKHAR MOHANTY	Sekhar Mohanty
15	1601219182	SIDDHARTH SAHOO	Siddharth Sahoo
16	1601219183	SATYANARAYAN DAS	Satyanarayan Das



  
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DEPARTMENT OF AUTOMOBILE ENGINEERING  
ADD ON/CERTIFICATE COURSE  
STUDENT ATTENDANCE SHEET

(1)

Programme: B Tech In AUTOMOBILE ENGINEERING

Semester: 5<sup>th</sup>

Academic Year : 2018-19

Course Code (if any):

Sheet No:

Name of the Course: Fuels and Combustion						
Sl No.	Reg. No.	Name of the Students	Date	Date	Date	Date
1	1601219001	AJAYA KUMAR GAMANCO	17/9/18 Ajaya Kumar Gamanco	18/9/18 Ajaya Kumar Gamanco	19/9/18 Ajaya Kumar Gamanco	20/9/18 Ajaya Kumar Gamanco
2	1601219002	JYOTI KRUSHNA RAUTA	17/9/18 Jyoti Krishna Rauta	18/9/18 Jyoti Krishna Rauta	19/9/18 Jyoti Krishna Rauta	20/9/18 Jyoti Krishna Rauta
3	1601219003	KAUSTUVA JENA	ABS	Kaustava Jena	Kaustava Jena	ABS
4	1601219004	SURESH SABAR	Suresh Sabar	Kaustava Jena	Kaustava Jena	Kaustava Jena
5	1601219005	SUSHIL KUMAR PRUSTY	S. K. Prusty	ABS	Suresh Sabar	Suresh Sabar
6	1601219006	SYED ZEESHAN ALAM	S. Z. Alam	S. K. Prusty	S. K. Prusty	S. K. Prusty
7	1601219007	MAHESH CHARAN PATEL	Mahesh Ch. Patel	S. Z. Alam	S. Z. Alam	S. Z. Alam
8	1601219175	ABHIMANYU SAHOO	Abhimanyu saho	Mahesh ch. Patel	Mahesh ch. Patel	Mahesh Ch. Patel
9	1601219176	BISWARANJAN MALLICK	B. Mallik	Abhimanyu saho	ABS	Abhimanyu saho
10	1601219177	HARICHANDAN GHOSH	H. Ghosh	B. Mallik	B. Mallik	B. Mallik
11	1601219178	MD SAHEEN ALAM	MD Saheen Alam	H. Ghosh	H. Ghosh	H. Ghosh
12	1601219179	PRATEEK PANDA	Prateek Panda	MD Saheen Alam	MD Saheen Alam	MD Saheen Alam
13	1601219180	SATSANKLPA TRIPATHY	Prateek Panda	Prateek Panda	Prateek Panda	Prateek Panda
14	1601219181	SEKHAR MOHANTY	S.K. Tripathy	S.K. Tripathy	S.K. Tripathy	S.K. Tripathy
15	1601219182	SIDDHARTH SAHOO	S. Sahoo	Sehkar Mohanty	Sehkar Mohanty	S.K. Tripathy
16	1601219183	SATYANARAYAN DAS	S. Das	S. Sahoo	ABS	S. Sahoo

*[Signature]*

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DEPARTMENT OF AUTOMOBILE ENGINEERING  
ADD ON/CERTIFICATE COURSE  
STUDENT ATTENDANCE SHEET

(2)

Programme: B Tech in AUTOMOBILE ENGINEERING

Semester: 5<sup>th</sup>

Academic Year : 2018-19

Name of the Course: Fuels and Combustion

Course Code (if any):

Sheet No:

Sl No.	Reg. No.	Name of the Students	Date	Date	Date	Date
1	1601219001	AJAYA KUMAR GAMANGO	28/7/18 Ajaykumar Gamango	29/7/18 Ajaykumar Gamango	25/7/18 Ajaykumar Gamango	26/7/18 Ajaykumar Gamango
2	1601219002	JYOTI KRUSHNA RAUTA	Jyoti Krishna Raut Kaushtava Jena	Jyoti Krishna Raut AB	Jyoti Krishna Raut Kaushtava Jena	AB
3	1601219003	KAUSTUVA JENA	Kaushtava Jena	AB	Kaushtava Jena	AB
4	1601219004	SURESH SABAR	Suresh Sabar	Suresh Sabar	Suresh Sabar	Suresh Sabar
5	1601219005	SUSHIL KUMAR PRUSTY	S.K. Prusty	S.K. Prusty	S.K. Prusty	S.K. Prusty
6	1601219006	SYED ZEESHAN ALAM	S.Z. Alam	S.Z. Alam	S.Z. Alam	S.Z. Alam
7	1601219007	MAHESH CHARAN PATEL	Mahesh Ch. Patel	Mahesh Ch. Patel	Mahesh Ch. Patel	Mahesh Ch. Patel
8	1601219175	ABHIMANYU SAHOO	Abhimanyu saho	Abhimanyu saho	Abhimanyu saho	Abhimanyu saho
9	1601219176	BISWARANJAN MALLICK	B. Mallik	B. Mallik	B. Mallik	B. Mallik
10	1601219177	HARICHANDAN GHOSH	H. Ghosh	H. Ghosh	H. Ghosh	H. Ghosh
11	1601219178	MD SAHEEN ALAM	AB	MD saheen Alam	MD saheen Alam	MD saheen Alam
12	1601219179	PRATEEK PANDA	Prateek Panda	Prateek Panda	Prateek Panda	Prateek Panda
13	1601219180	SATSANKIPA TRIPATHY	S.K. Tripathy	S.K. Tripathy	S.K. Tripathy	S.K. Tripathy
14	1601219181	SEKHAR MOHANTY	Sekhar Mohanty	Sekhar Mohanty	Sekhar Mohanty	Sekhar Mohanty
15	1601219182	SIDDHARTH SAHOO	S. Sahoo	S. Sahoo	S. Sahoo	S. Sahoo
16	1601219183	SATYANARAYAN DAS	AB	S. Das	S. Das	S. Das

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*(Signature)*





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DEPARTMENT OF AUTOMOBILE ENGINEERING  
ADD ON/CERTIFICATE COURSE  
STUDENT ATTENDANCE SHEET

3

Programme: B Tech in AUTOMOBILE ENGINEERING

Semester: 5<sup>th</sup>

Academic Year : 2018-19

Name of the Course: Fuels and Combustion

Course Code (if any):

Sheet No:

Sl No.	Reg. No.	Name of the Students	Date	Date	Date	Date
1	1601219001	AJAYA KUMAR GAMANGO	27/9/18	28/9/18	31/9/18	3/10/18
2	1601219002	JYOTI KRUSHNA RAUTA	27/9/18	28/9/18	31/9/18	3/10/18
3	1601219003	KAUSTUYA JENA	27/9/18	28/9/18	31/9/18	3/10/18
4	1601219004	SURESH SABAR	27/9/18	28/9/18	31/9/18	3/10/18
5	1601219005	SUSHIL KUMAR PRUSTY	27/9/18	28/9/18	31/9/18	3/10/18
6	1601219006	SYED ZESHAN ALAM	27/9/18	28/9/18	31/9/18	3/10/18
7	1601219007	MAHESH CHARAN PATEL	27/9/18	28/9/18	31/9/18	3/10/18
8	1601219175	ABHIMANYU SAHOO	27/9/18	28/9/18	31/9/18	3/10/18
9	1601219176	BISWARANJAN MALLICK	27/9/18	28/9/18	31/9/18	3/10/18
10	1601219177	HARICHANDAN GHOSH	27/9/18	28/9/18	31/9/18	3/10/18
11	1601219178	MD SAHEEN ALAM	27/9/18	28/9/18	31/9/18	3/10/18
12	1601219179	PRATEEK PANDA	27/9/18	28/9/18	31/9/18	3/10/18
13	1601219180	SATSANKLPA TRIPATHY	27/9/18	28/9/18	31/9/18	3/10/18
14	1601219181	SEKHAR MOHANTY	27/9/18	28/9/18	31/9/18	3/10/18
15	1601219182	SIDDHARTH SAHOO	27/9/18	28/9/18	31/9/18	3/10/18
16	1601219183	SATYANARAYAN DAS	27/9/18	28/9/18	31/9/18	3/10/18

*[Signature]*

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DEPARTMENT OF AUTOMOBILE ENGINEERING  
ADD ON/CERTIFICATE COURSE  
STUDENT ATTENDANCE SHEET

(4)

Programme: B Tech in AUTOMOBILE ENGINEERING

Semester: 5<sup>th</sup>

Academic Year : 2018-19

Name of the Course: Fuels and Combustion

Course Code (if any):

Sheet No:

Sl No.	Reg. No.	Name of the Students	Date	Date	Date	Date
1	1601219001	AJAYA KUMAR GAMANGO	6/8/18 Ajaya Kumar Gango	7/8/18 Ajaya Kumar Gango	8/8/18 Ajaya Kumar Gango	9/8/18 Ajaya Kumar Gango
2	1601219002	JYOTI KRUSHNA RAUTA	Jyoti Krishna Raut Kaushtura Jena	ABIS Kaushtura Jena	Jyoti Krishna Raut Kaushtura Jena	Jyoti Krishna Raut Kaushtura Jena
3	1601219003	KAUSTUVA JENA	Kaushtura Jena	Kaushtura Jena	Kaushtura Jena	Kaushtura Jena
4	1601219004	SURESH SABAR	Suresh Sabar ABIS	Suresh Sabar S. K. Prusty	Suresh Sabar S. K. Prusty	Suresh Sabar S. K. Prusty
5	1601219005	SUSHIL KUMAR PRUSTY	S. Z. Alam S. Z. Alam	S. Z. Alam S. Z. Alam	S. Z. Alam S. Z. Alam	S. Z. Alam S. Z. Alam
6	1601219006	SYED ZESHAN ALAM	S. Z. Alam	S. Z. Alam	S. Z. Alam	S. Z. Alam
7	1601219007	MAHESH CHARAN PATEL	Mahesh Ch. Patel Abhimanyu Sahoo	Mahesh Ch. Patel ABIS	Mahesh Ch. Patel Abhimanyu Sahoo	Mahesh Ch. Patel Abhimanyu Sahoo
8	1601219175	ABHIMANYU SAHOO	Abhimanyu Sahoo	Abhimanyu Sahoo	Abhimanyu Sahoo	Abhimanyu Sahoo
9	1601219176	BISWARANJAN MALLICK	B. Mallik H. Ghosh	B. Mallik H. Ghosh	B. Mallik ABIS	B. Mallik H. Ghosh
10	1601219177	HARICHANDAN GHOSH	H. Ghosh	H. Ghosh	H. Ghosh	H. Ghosh
11	1601219178	MD SAHEEN ALAM	MD Saheen Alam	MD Saheen Alam	MD Saheen Alam	MD Saheen Alam
12	1601219179	PRATEEK PANDA	Prateek Panda ABIS	Prateek Panda S. K. Prusty	Prateek Panda S. K. Prusty	Prateek Panda S. K. Prusty
13	1601219180	SATSANKI PA TRIPATHY	Satsanki Pa S. K. Prusty	Satsanki Pa S. K. Prusty	Satsanki Pa S. K. Prusty	Satsanki Pa S. K. Prusty
14	1601219181	SEKHAR MOHANTY	Sekhar Mohanty	Sekhar Mohanty	Sekhar Mohanty	Sekhar Mohanty
15	1601219182	SIDDHARTH SAHOO	S. Sahoo S. Das	S. Sahoo S. Das	S. Sahoo S. Das	S. Sahoo S. Das
16	1601219183	SATYANARAYAN DAS	S. Das	S. Das	S. Das	S. Das

*(Signature)*

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DEPARTMENT OF AUTOMOBILE ENGINEERING  
ADD ON/CERTIFICATE COURSE  
STUDENT ATTENDANCE SHEET

5

Programme: B Tech in AUTOMOBILE ENGINEERING

Semester: 5<sup>th</sup>

Academic Year : 2018-19

Name of the Course: Fuels and Combustion

Course Code (if any):

Sheet No:

Sl No.	Reg. No.	Name of the Students	Date	Date	Date	Date
1	1601219001	AJAYA KUMAR GAMANGO	13/08/18 ABS	13/08/18 Ajaya Kumar Gamang	20/08/18 Ajaya Kumar Gamang	21/08/18 Ajaya Kumar Gamang
2	1601219002	JYOTI KRUSHNA RAUTA	Jyoti Krushna Raut Kaushtura Jena	Jyoti Krushna Raut Kaushtura Jena	Jyoti Krushna Raut Kaushtura Jena	ABS
3	1601219003	KAUSTUVA JENA	Surekha Sabar	ABS	Surekha Sabar	Kaushtura Jena
4	1601219004	SURESH SABAR	S. K. Prusty	S. K. Prusty	S. K. Prusty	Surekha Sabar
5	1601219005	SUSHIL KUMAR PRUSTY	S. Z. Alam	S. Z. Alam	S. Z. Alam	S. Z. Alam
6	1601219006	SYED ZESHAN ALAM	Mahesh Ch. Patil Abhimanyu Sahoo	Mahesh Ch. Patil Abhimanyu Sahoo	Mahesh Ch. Patil Abhimanyu Sahoo	Mahesh Ch. Patil Abhimanyu Sahoo
7	1601219007	MAHESH CHARAN PATEL	B. Mallik	B. Mallik	B. Mallik	B. Mallik
8	1601219175	ABHIMANYU SAHOO	H. Ghosh	H. Ghosh	H. Ghosh	H. Ghosh
9	1601219176	BISWARANJAN MALLICK	Md Saheb Alam	Md Saheb Alam	Md Saheb Alam	Md Saheb Alam
10	1601219177	HARICHANDAN GHOSH	Prateek Panda S. K. Prusty	Prateek Panda S. K. Prusty	Prateek Panda S. K. Prusty	Prateek Panda S. K. Prusty
11	1601219178	MD SAHEEN ALAM	Sekhar Mohanty S. Sahoo	Sekhar Mohanty S. Sahoo	Sekhar Mohanty S. Sahoo	Sekhar Mohanty S. Sahoo
12	1601219179	PRATEEK PANDA	S. Das	ABS	S. Das	S. Das
13	1601219180	SATSANKI PA TRIPATHY				
14	1601219181	SEKHAR MOHANTY				
15	1601219182	SIDDHARTH SAHOO				
16	1601219183	SATYANARAYAN DAS				

*[Signature]*  
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PLOT NO-1(A), CNI COMPLEX, PATIA, BHUBANESWAR, KHORDHA, ODISHA-751024



# Certificate of Completion

This is to certify that Mr./Ms. JYOTIKRUSHNA RAUTA, student of the Department  
of Automobile Engg. semester Fifth bearing registration number 1601219002  
has successfully completed the ADD-ON Course titled Fuels and Combustion  
conducted at College of Engineering Bhubaneswar in the academic year 2018-19.

**TRUE COPY**

[Signature]  
Course-Coordinator

[Signature]  
Principal

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



# Certificate of Completion


This is to certify that Mr./Ms. KAUSTUVA JENA, student of the Department


of Automobile Engg. semester Fifth bearing registration number 1601219003


has successfully completed the ADD-ON Course titled Fuels and Combustion

conducted at College of Engineering Bhubaneswar in the academic year 2018-19.

**TRUE COPY**

  
Course-Coordinator

  
Principal

  
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# Certificate of Completion

This is to certify that Mr./Ms. SURESH SABAR, student of the Department

of Automobile Engg. semester Fifth bearing registration number 1601219004

has successfully completed the ADD-ON Course titled Fuels and Combustion

conducted at College of Engineering Bhubaneswar in the academic year 2018-19.

**TRUE COPY**

Course-Coordinator

Principal

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# Certificate of Completion


This is to certify that Mr./Ms. SUSHIL KUMAR PRUSTY, student of the Department


of Automobile Engg. semester Fifth bearing registration number 1601219005


has successfully completed the ADD-ON Course titled Fuels and Combustion

conducted at College of Engineering Bhubaneswar in the academic year 2018-19.

**TRUE COPY**

  
 Course-Coordinator

  
 Principal

  
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# *Certificate of Completion*

This is to certify that Mr./Ms. MAHESH CHARAN PATEL, student of the Department

of Automobile Engg. semester Fifth bearing registration number 1601219007

has successfully completed the ADD-ON Course titled Fuels and Combustion

conducted at College of Engineering Bhubaneswar in the academic year 2018-19.

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Course-Coordinator

Principal

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