

DARBHANGA COLLEGE OF ENGINEERING

COURSE FILE  
OF  
AUTOMOTIVE MECHANICS



FACULTY NAME:

Mr. VISHNU SINGH

ASST. PROFESSOR

DEPARTMENT OF MECHANICAL ENGINEERING

<b>Institute / College Name</b>	Darbhanga College of Engineering, Darbhanga	
<b>Program Name</b>	B. Tech	
<b>Course Code</b>	02 1724	
<b>Course Name</b>	Automotive Mechanics	
<b>Lecture / Tutorial (per week)</b>	3/1	<b>Course Credits</b> 4
<b>Course Coordinator Name</b>	Mr. Vishnu Singh	

### **1. Scope and Objectives of the course**

Due to the wide range of applications of automobile in our live, teach the basic knowledge to the students studying Mechanical Engineering about the automobile terminology within the scope of the curriculum disclosure of issues such as history, basic concepts, working of various parts like engine, transmission, clutch, brakes, steering and the suspension systems operate.

Students will apply / improve their knowledge in basic sciences for excelling in various disciplines of Automobile Engineering with the emphasis on Design, Thermal and Manufacturing. Students will learn analytical approach to the engineering problem and performance analysis of automobile.

#### **Course Objectives**

1. Introduction to engineering analysis of the automobile and its sub-systems.
2. The students will be able to explain the working of various parts like engine, transmission, clutch, brakes, steering and the suspension systems operate
3. The students will be able to understand the environmental implications of automobile emissions.
4. To introduce students to the environmental and fuel economy challenges facing the internal combustion engine.
5. Familiarization with the automotive industry and its terminology.

## 2. Textbooks

TB1 Automobile Engineering by KM Gupta

TB2 Automotive Mechanics by Crouse

## 3. Reference Books

RB1. Automobile Engineering by Newton & Steeds

## Other reading and relevant websites

S. No.	Link of Journals, Magazines, Websites and Research Papers
1	<a href="https://www.springer.com/engineering/mechanical+engineering/journal/12239">https://www.springer.com/engineering/mechanical+engineering/journal/12239</a>
2	<a href="https://www.omicsonline.org/advances-in-automobile-engineering.php">https://www.omicsonline.org/advances-in-automobile-engineering.php</a>
3	<a href="http://www.scijour.com/page/journal-main-page.html?jourId=5">http://www.scijour.com/page/journal-main-page.html?jourId=5</a>
4	<a href="https://www.researchgate.net/journal/2229-8649_International_Journal_of_Automotive_and_Mechanical_Engineering">https://www.researchgate.net/journal/2229-8649_International_Journal_of_Automotive_and_Mechanical_Engineering</a>
5	<a href="https://www.elsevier.com/physical-sciences/fast-publication-in-mechanical-engineering">https://www.elsevier.com/physical-sciences/fast-publication-in-mechanical-engineering</a>
6	<a href="https://www.youtube.com/watch?v=qQW5e5hxNfg">https://www.youtube.com/watch?v=qQW5e5hxNfg</a>
7	<a href="https://www.youtube.com/watch?v=kChCljQXTTc">https://www.youtube.com/watch?v=kChCljQXTTc</a>
8	<a href="https://www.youtube.com/watch?v=qQkszLYPjm4">https://www.youtube.com/watch?v=qQkszLYPjm4</a>
9	<a href="https://www.youtube.com/watch?v=xCw6eXwxn2A">https://www.youtube.com/watch?v=xCw6eXwxn2A</a>
10	<a href="https://www.youtube.com/watch?v=fDdAlKdt79Q">https://www.youtube.com/watch?v=fDdAlKdt79Q</a>
11	<a href="https://www.youtube.com/watch?v=GVpbMqyrdeA">https://www.youtube.com/watch?v=GVpbMqyrdeA</a>
12	<a href="https://www.youtube.com/watch?v=TX65J12vYiY">https://www.youtube.com/watch?v=TX65J12vYiY</a>
13	<a href="https://www.youtube.com/watch?v=nFtbf4prm78">https://www.youtube.com/watch?v=nFtbf4prm78</a>
14	<a href="https://www.youtube.com/watch?v=QoruG4ma210">https://www.youtube.com/watch?v=QoruG4ma210</a>

#### 4. Course Plan

Lecture Number	Date of Lecture	Topics	Web Links for video Lecture	Books	Page numbers of Text Books
1-6		<b>Power unit</b>		TB1,RB1	1-39
		Description of power unit, Fuel supply system and engine lubrication.	<a href="https://www.youtube.com/watch?v=qQW5e5hxNfg">https://www.youtube.com/watch?v=qQW5e5hxNfg</a>		
7-11		<b>Transmission system</b>		TB1,RB1	40-78
		Transmission requirements, Fluid and automatic transmission system along with their performance requirements, tractive resistance.	<a href="https://www.youtube.com/watch?v=kChCljQXTTc">https://www.youtube.com/watch?v=kChCljQXTTc</a>		
12-15		<b>Steering systems</b>		TB1,RB1	79-152
		Different types of steering systems and performance requirements, Stability of vehicles on level road and curve path	<a href="https://www.youtube.com/watch?v=qQkszLYPjm4">https://www.youtube.com/watch?v=qQkszLYPjm4</a>		
16-20		<b>Braking systems</b>		TB1,RB1	153-207
		General braking requirements, weight transfer during braking, different types of brakes.	<a href="https://www.youtube.com/watch?v=xCw6eXwxn2A">https://www.youtube.com/watch?v=xCw6eXwxn2A</a>		
21-26		<b>Frames, Suspension systems and Tyre</b>		TB1,RB1	208-266
		General consideration of strength and stiffness of vehicle frame, various suspension systems, shock absorber and engine mounting, Tyre pavement interaction forces, Tyre wear & SAE terminology.	<a href="https://www.youtube.com/watch?v=fDdAlKdt79Q">https://www.youtube.com/watch?v=fDdAlKdt79Q</a>		
27-30		<b>Ignition systems</b>		TB1,RB1	266-312
		Various types of ignition systems with wiring diagram	<a href="https://www.youtube.com/watch?v=GVpbMqyrdeA">https://www.youtube.com/watch?v=GVpbMqyrdeA</a>		

31-34		<b>Testing of vehicles</b>		TB1,RB1	313-458
		Testing of vehicles and handling characteristics	<a href="https://www.youtube.com/watch?v=TX65J12vYiY">https://www.youtube.com/watch?v=TX65J12vYiY</a>		
35-38		<b>Vehicle maintenance</b>		TB1,RB1	459-494
		Preventive maintenance, Troubleshooting & tuning of power unit	<a href="https://www.youtube.com/watch?v=nFtb4prm78">https://www.youtube.com/watch?v=nFtb4prm78</a>		
39-42		<b>Vehicle Pollution</b>		TB1,RB1	495-527
		Pollution due to vehicles emission, Effect of design and operating condition on pollution.	<a href="https://www.youtube.com/watch?v=QoruG4ma210">https://www.youtube.com/watch?v=QoruG4ma210</a>		

### Evaluation Scheme

Component 1	Mid Semester Examination	20
Component 2	Assignment Evaluation	10
Component 3	End Term Examination **	70
	<b>Total</b>	100

\*\* The End term Comprehensive Examination will be held at the end of the semester. The mandatory requirement of 75% attendance in all theory classes is to be met for being eligible to appear in this component.

### SYLLABUS

Topics	No. of Lectures	Weightage
<b>Description of power unit:</b> Fuel supply system and engine lubrication.	6	14%
<b>Transmission requirements,</b> Fluid and automatic transmission system along with their performance requirements, tractive resistance.	5	12%
<b>Different types of steering systems</b> and performance requirements, Stability of vehicles on level road and curve path.	4	10%
<b>General braking requirements,</b> weight transfer during braking, different types of brakes.	5	12%

<b>General consideration of strength</b> and stiffness of vehicle frame, various suspension systems, shock absorber and engine mounting, Tyre pavement interaction forces, tyre wear & SAE terminology.	6	14%
Various types of <b>ignition systems</b> with wiring diagram	4	10%
<b>Testing</b> of vehicles and handling characteristics	4	10%
<b>Preventive maintenance</b> , troubleshooting & tuning of power unit	4	9%
<b>Pollution due to vehicles emission</b> , Effect of design and operating condition on pollution.	4	9%

**This Document is approved by:**

<b>Designation</b>	<b>Name</b>	<b>Signature</b>
Course Coordinator	Mr. Vishnu Singh	
H.O.D.	Dr. R K Singh	
Principal	Dr. A K Rai	
Date		

**Evaluation and Examination Blue Print:**

Internal assessment is done through quiz test, presentations, assignments and project work. Two sets of question paper are asked from each faculty and out of these two, without the knowledge of faculty, one question paper is chosen for concerned examination. Examination rules are uploaded on the student's portal. Evaluation is a very important process and the answer sheets of sessional tests, internal assessment assignments are returned back to the students.

The component of evaluations along with their weightage followed by the university is given below.

Sessional Test 1	10%
Sessional Test 2	10%
Sessional Test 3	10%
Assignments/ Quiz Tests/ Seminars	10%
End Term Examination	70%

(From amongst the three sessional tests best of two are considered)