

**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**  
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)  
**Department of Mechanical Engineering**

**Summary of Board of studies (ME) meeting held on 24/05/2022**

**Detail of program/courses where syllabus revision was carried out**

<b>Course/ Subject name</b>	<b>Course Code</b>	<b>Year/Date of introduction</b>	<b>Year/Date of revision</b>	<b>Percentage of content added or replaced</b>	<b>Agenda item No.</b>	<b>Page no.</b>
Industrial Engineering	120511	2017	24/05/2022	10% Added	Item ME9	21-22
Thermal Engineering	120514	2015	24/05/2022	10% replaced	Item ME9	26-27
Maintenance Engineering	900215	2020	24/05/2022	10 % Removed, 10 % Replaced	Item ME5	28-29



**Dr. M. K. Gaur**

**HMED**

6818  
08/08/22

Date 25  
30/8/2022

**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**  
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)  
Department of Mechanical Engineering

**BOARD OF STUDIES (BOS) PROCEEDING**  
**DEPARTMENT OF MECHANICAL ENGINEERING**  
**(MEETING DATED 24<sup>th</sup> May 2022)**

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**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**  
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**MINUTES OF MEETING OF BOARD OF STUDIES (BoS)**

An online meeting of following members (external and internal) was held on 24<sup>th</sup> May, 2022 at 11:00 AM through online mode (Google Meet Link [meet.google.com/hnq-owxs-xrb](https://meet.google.com/hnq-owxs-xrb))

Following members were present:

(1)	Dr. M.K. Gaur	Head of the Department and Chairman of the Committee
(2)	Prof. A.K. Agrawal	Professor, IIT BHU, AC Nominee
(3)	Dr. Prashant Kumar Jain	Professor, IITDM, Jabalpur, RGPV Nominee
(4)	Dr. K. K. Jain	Professor, NITTTR, Bhopal, AC Nominee
(5)	Dr. Pratesh Jayaswal	Member
(6)	Dr. Manish Ku. Sagar	Member
(7)	Dr. C. S. Malvi	Member
(8)	Mr. R. P. Kori	Member
(9)	Mr. Vedansh Chaturvedi	Member
(10)	Dr. Jyoti Vimal	Member
(11)	Mr. Sharad Agrawal	Member
(12)	Mr. Vaibhav Shivhare	Member
(13)	Dr. Amit Aherwar	Member
(14)	Mr. Bhupendra K Pandey	Member
(15)	Dr. Nitin Upadhyay	Member
(16)	Dr. Surendra Ku. Chourasiya	Member
(17)	Dr. Harbhajan Ahirwar	Member
(18)	Dr. Gavendra Norkey	Member
(19)	Dr. Dinesh Kumar Rathore	Member
(20)	Dr. Ashish Agrawal	Member
(21)	Soumya Shrivastava	Student, III-year Mechanical
(22)	Shubham Chhipa	Student, III-year Mechanical
(23)	Somya Kanthariya	Student, III-year Automobile

Following members were absent:

(1)	Prof. P. M. V. Subbarao	Professor, IIT, Delhi
(2)	Dr. Pavan Kumar Kankar	Associate Professor, IIT, Indore, AC Nominee
(3)	Mr. Rajesh Dixit	Zonal Head, Yuken India Ltd. New Delhi
(4)	Er. Rajiv Singh Bais	Chief Manager R&D, Siemens Ltd. Gurgaon. Industry Expert

Mechanical Engineering

BoS Meeting\_24/05/2022

# MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Agenda of the BoS Meeting  
(Approved by Academic Development Cell of the Institute - BoS Meeting Scheduled during 23-28, May 2022)

Course/ Subject name	Course Code	Course where revision was carried out			Agenda item No.	Page no.	Link of relevant documents/minutes
		Year/Date of introduction	Year/Date of revision	Percentage of content added or replaced			
Industrial Engineering	190511/120511	09/04/2019	24/05/2022	10% Added	Item ME9	3-4	<a href="https://drive.google.com/file/d/1B4jLqiZRNuY4AsTX47TeUR9BSVTeVtJa/viiew?usp=sharing">https://drive.google.com/file/d/1B4jLqiZRNuY4AsTX47TeUR9BSVTeVtJa/viiew?usp=sharing</a>
Design of M/c Elements	190514	09/04/2019	24/05/2022	8% Removed	Item ME9	5-7	
Thermal Engineering	120514	09/04/2019	24/05/2022	10% replaced	Item ME9	8-9	
Maintenance Engineering	900215	30/05/2020	24/05/2022	10 % Removed, 10 % Replaced	Item ME5	10-11	

Course/ Subject name	Course Code	Course focusing on employability/entrepreneurship/skill development			Agenda item No.	Page no.	Link of relevant documents/minutes
		Activities/content which have a bearing on increasing skill and employability					
Foundation of Computational Fluid Dynamics	120751	Students will be exposed to basics of CFD		Item ME4	3-4	<a href="https://drive.google.com/file/d/1pUjOhSMke7uAAjSxiDzujAS6Pr4yHsu/view?usp=sharing">https://drive.google.com/file/d/1pUjOhSMke7uAAjSxiDzujAS6Pr4yHsu/view?usp=sharing</a>	
Advanced Machining Processes	120753	Aims at bringing the students up-to-date with the latest technological		Item ME4	5		
Farm Machinery	190751	Design of horticultural machines and equipment		Item ME4	6		
Reliability and Vibration Lab	120701	Various vibration monitoring tools		Item ME6	7		
Automotive maintenance lab	190701	Maintenance strategy and schedule of different vehicles		Item ME6	8		

New Course Added					
Course/Subject name	Course Code	Activities/content which have a bearing on increasing skill and employability	Agenda item No.	Page no.	Link of relevant documents/minutes
Applied Thermodynamics for Engineers	M120703	Application of laws of thermodynamics in solving engineering problems	Item ME7	2	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>
Data Science	-	develop the ability to build and assess data-based models	Item ME8	3-4	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>

Feedback on curriculum received from stakeholders: Analysis & ATR				
Stakeholder	Student	Faculty	Alumni	Employer
No. of responses	264	23	14	66
Link of analysis	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>
ATR Link	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>
Link showing Excel sheet of google form details of stakeholders	<a href="https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing">https://drive.google.com/file/d/1VQ5J9TCyX856P8hzkz00UwVPWM_SHC7k/view?usp=sharing</a>	<a href="https://docs.google.com/spreadsheets/d/1HzJ8mpE59fzuA1g1sswEwTwJPOSNI_tu8/edit?usp=sharing&amp;ouid=108885958461624947473&amp;rtfpof=true&amp;sd=true">https://docs.google.com/spreadsheets/d/1HzJ8mpE59fzuA1g1sswEwTwJPOSNI_tu8/edit?usp=sharing&amp;ouid=108885958461624947473&amp;rtfpof=true&amp;sd=true</a>	<a href="https://docs.google.com/spreadsheets/d/1ekac19lew1fw-44Yeh813yFXAyCSnTy/edit?usp=sharing&amp;ouid=108885958461624947473&amp;rtfpof=true&amp;sd=true">https://docs.google.com/spreadsheets/d/1ekac19lew1fw-44Yeh813yFXAyCSnTy/edit?usp=sharing&amp;ouid=108885958461624947473&amp;rtfpof=true&amp;sd=true</a>	<a href="https://docs.google.com/spreadsheets/d/1ekac19lew1fw-44Yeh813yFXAyCSnTy/edit?usp=sharing&amp;ouid=108885958461624947473&amp;rtfpof=true&amp;sd=true">https://docs.google.com/spreadsheets/d/1ekac19lew1fw-44Yeh813yFXAyCSnTy/edit?usp=sharing&amp;ouid=108885958461624947473&amp;rtfpof=true&amp;sd=true</a>

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**BoS Agenda Items**

**Item ME1**  
 To confirm the minutes of previous BoS meeting held in the month of December 2021  
**The minutes of the last BoS held on 22<sup>nd</sup> December 2021 were confirmed. The BoS Minutes were presented & approved in Academic Council Meeting held on 28 December, 2021.**

**Item ME2**  
 To prepare and finalize the scheme structure of B.Tech. VII Semester with the provision of Two Departmental Electives (DEs) and Two Open Category (OC) Course (in which one Departmental Elective is to be offered in online mode with credit transfer) for the batch admitted in 2019-20.

S.No.	Subject Code	Category	Subject Name & Title
1.	DE	DE	Departmental Elective-3 (DE-3)
2.	DE*	DE	Departmental Elective -4 (DE-4)
3.	OC	OC	Open Category-2(OC-2)
4.	OC	OC	Open Category -3(OC-3)
5.	100008	MC	Intellectual Property Rights (IPR) (MC)
6.	190701/120701	DLC	Automotive Maintenance (DLC-6)
7.	190702/120702	DLC	Reliability and Vibration Lab (DLC-6)
8.	190703/120703	DLC	Summer Internship Project-III (04 weeks) (Evaluation)(DLC-7) Creative Problem Solving (Evaluation) (DLC-8)

3. Item ME2.docx

**Item ME3**  
 To prepare and finalize the syllabus of courses to be offered (for batch admitted in 2019-20) under Departmental Elective (DE) Course (in traditional mode) for B. Tech. VII Semester along with their COs.

Mechanical Engineering			Automobile Engineering		
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	120711	Refrigeration and Air-Conditioning	1	190711	Vehicle Dynamics
2	120713	Metrology, Measurement and Control	2	190713	Hybrid Electric Vehicles
3	120714	Total Quality Management			

4. Item ME3.docx

**Item ME4**  
 To propose the list of courses which the students can opt from SWAYAM/NPTEL/MOOC based Platforms, to be offered in online mode under Departmental Elective (DE) Course, with credit transfer in the B. Tech. VII Semester under the flexible curriculum (Batch admitted in 2019-20).

Mechanical Engineering			Automobile Engineering		
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	120751	Foundation of Computational Fluid Dynamics	1	190751	Farm Machinery
2	120752	Introduction to Composites	2	190753	Introduction to Mechanical Vibration
3	120753	Advanced Machining Processes			

5. Item ME4.docx

Mechanical Engineering

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To prepare and finalize the syllabus of courses to be offered (for batch admitted in 2019-20) under the **Open Category (OC) Courses** (in traditional mode) for B. Tech. **VII semester** students of other departments along with their COs.

**Item ME5**

Open Category (OC-2)			Open Category (OC-3)		
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	900203	Industrial Automation	1	900214	Engineering Materials for Industrial Applications
2	900204	Solar Energy	2	900215	Maintenance Engineering

6. Item ME5.docx

To prepare and finalize the Experiment list/ Lab manual for Departmental Laboratory Course (DLC) to be offered in B. Tech. VII semester (for batches admitted in 2019-20).

**Item ME6**

Automotive Maintenance (190701)	Reliability and Vibration Lab (120701)
<ol style="list-style-type: none"> <li>1. Study and layout of an automobile repair, service and maintenance shop.</li> <li>2. Study and preparation of different statements/records required for the repair and maintenance works.</li> <li>3. Cylinder reboring – checking the cylinder bore, Setting the tool and reboring.</li> <li>4. Valve grinding, valve lapping - Setting the valve angle, grinding and lapping and checking for valve leakage</li> <li>5. Calibration of fuel injection pump</li> <li>6. Minor and major tune up of gasoline and diesel engines.</li> <li>7. Study and checking of wheel alignment - testing of camber, caster.</li> <li>8. Brake adjustment and Brake bleeding.</li> <li>9. Battery testing and maintenance</li> </ol>	<ol style="list-style-type: none"> <li>1. Determination of Critical Speed in Whirling of Shafts.</li> <li>2. Determination of Natural Frequency in Longitudinal Vibrating System.</li> <li>3. Determination of Natural Frequency in Torsional Vibration System.</li> <li>4. To verify the relation of compound pendulum &amp; to determine the radius of gyration</li> <li>5. To study the undamped free vibration of spring mass system.</li> <li>6. To study the forced vibration of simply supported beam for different damping.</li> <li>7. Undamped torsional vibrations of single and double rotor system.</li> <li>8. To study the damped torsional vibration of single rotor system and to determine the damping coefficient.</li> <li>9. To study the forced damped vibration of spring mass system.</li> <li>10. Study the machine fault diagnostic system based on vibration analysis.</li> </ol>

7. Item ME6.docx

**Item ME7**

To propose the list of "Additional Courses" which can be opted for getting an  
 (i) **Honours (for students of the host department)**  
 (ii) **Minor Specialization (for students of other departments)**  
 [These will be offered through SWAYAM/NPTEL/MOOC based Platforms for the B.Tech. VII semester students (for the batch admitted in 2019-20)] and for B.Tech. V semester (for the batch admitted in 2020-21)]

Honor's		Minor Specialization	
V	VII	V	VII
(for the batch admitted in 2020-21)	(for the batch Admitted in 2019-20)	(for the batch admitted in 2020-21)	(for the Batch admitted in 2019-20)

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Mechanical Engineering

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1. Principle of Hydraulic Machines and System Design (12 Weeks) 2. System design for sustainability (12 Weeks) 3. Manufacturing Systems Technology Part I & II (12 Weeks)	1. Fundamentals of Artificial Intelligence (12 Weeks) 2. Rapid Manufacturing (12 Weeks) 3. Heat Exchangers: Fundamentals and Design Analysis (12 Weeks)	1. Basics of Materials Engineering (12 Weeks) 2. Fluid Mechanics (12 Weeks)	1. Engineering Metrology (12 Weeks) 2. Applied Thermodynamics for Engineers (12 Weeks)
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8. *Item ME7.docx*

To prepare and recommend the *scheme structure of B.Tech. V Semester under the flexible curriculum (Batch admitted in 2020-21).*

Item ME8

S.No.	Automobile Engineering			Mechanical Engineering		
	Subject Code	Category	Subject Name & Title	Subject Code	Category	Subject Name & Title
1.	190511	DC	Industrial Engineering (DC-10)	120511	DC	Industrial Engineering (DC-10)
2.	190513	DC	Heat and Mass Transfer (DC-11)	120513	DC	Heat and Mass Transfer (DC-11)
3.	190514	DC	Design of Machine Elements (DC-12)	120514	DC	Thermal Engineering (DC-12)
4.	190515	DC	Automotive Chassis (DC-13)	120515	DC	Machine Design (DC-13)
5.			Data Science			Data Science
6.	190516	DLC	Minor Project-I	120516	DLC	Minor Project-I
7.	190517	DLC	Self-learning/Presentation*	120517	DLC	Self-learning/Presentation*
8.	200xxx	CLC	Novel Engaging Course	20xxx	CLC	Novel Engaging Course
9.	190518	DLC	Summer Internship Project-II (Institute Level Evaluation)	120518	DLC	Summer Internship Project-II (Institute Level Evaluation)

9. *Item ME8.docx*

To prepare and recommend the syllabi for all *Departmental Core (DC) Courses* of B. Tech. V Semester (for batch admitted in 2020-21) under the flexible curriculum along with their COs.

Item ME9

Automobile Engineering			Mechanical Engineering		
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	190511	Industrial Engineering	1	120511	Industrial Engineering
2	190513	Heat and Mass Transfer	2	120513	Heat and Mass Transfer
3	190514	Design of Machine Elements	3	120514	Thermal Engineering
4	190515	Automotive Chassis	4	120515	Machine Design

10. *Item ME9.docx*

To prepare and recommend the Experiment list/ Lab manual for all the Laboratory Courses to be offered in B. Tech. V semester (for batch admitted in 2020-21).

Item ME10

S.No.	Name of Subject	Code
1	Heat and Mass Transfer	190513/120513
2	Design of Machine Elements	190514
3	Automotive Chassis	190515
5	Machine Design	120515

11. *Item ME10.docx*

Item ME11

To prepare and recommend the suggestive list of projects which can be assigned under the 'Skill based mini-project' category in various laboratory component-based courses to be offered in B.Tech. V Semester (for the batch admitted in 2020-21).



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Automobile Engineering			Mechanical Engineering		
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	190513	Heat and Mass Transfer	1	120513	Heat and Mass Transfer
2	190515	Automotive Chassis	2	120515	Machine Design

12. Item ME11.docx

To propose the list of courses from SWAYAM/NPTEL/MOOC Platforms to be offered (for batch admitted in 2020-21) in online mode under *Self-Learning/ Presentation*, in the B.Tech. V Semester.

S.No.	Name of Subject	Code	Week
1.	Foundations of Cognitive Robotics	120517/190517(i)	4
2.	Polymer Assisted Abrasive Finishing Processes	120517/190517(ii)	4
3.	Welding of Advanced High Strength Steels for Automotive Applications	120517/190517(iii)	4

13. Item ME12.docx

**Item ME13** To prepare and recommend the *Scheme & Syllabi (along with the Course Outcomes) of B.Tech. III semester of the newly started B. Tech. programmes in the emerging areas (AI & ML, AI & DS, CSD) (started from 2021-22 Session) [Applicable for the concerned departments]*

**Item ME14** To prepare and recommend the list of experiments and skill based mini projects of *B.Tech. III semester of the newly started B. Tech. programmes in the emerging areas (AI & ML, AI & DS, CSD) (started from 2021-22 Session) [Applicable for the concerned departments]*

To review, prepare, finalize and recommend the *Scheme & Syllabi (along with the Course Outcomes) of III semester B. Tech. programmes (batch admitted 2021-22 Session)*

S.No.	Automobile Engineering			Mechanical Engineering		
	Subject Code	Category	Subject Name & Title	Subject Code	Category	Subject Name & Title
1.	100025	BSC	Engineering Mathematics-II (BSC-3)	100025	BSC	Engineering Mathematics-II (BSC-3)
2.	190319	DC	Manufacturing Process (DC-2)	120311	DC	Manufacturing Process (DC-2)
3.	<del>190312</del> 190317	DC	Mechanics of Materials (DC-3)	<del>120312</del> 120319	DC	Mechanics of Materials (DC-3)
4.	190313	DC	Automotive Engines (DC-4)	120313	DC	Theory of Machines -I (DC-4)
5.	190314	DC	Fluid Mechanics & Hydraulic Machines (DC-5)	120314	DC	Fluid Mechanics and Hydraulic Machines (DC-5)
6.	190315	DLC	Software lab (DLC-1)	120315	DLC	Software Lab (DLC-1)
7.	190316	DLC	Self-learning/ Presentation*	120316	DLC	Self-learning/ Presentation*
8.	200XXX	CLC	Novel Engaging Course	200XXX	CLC	Novel Engaging Course
9.	190318	DLC	Summer Internship Project-I (Institute Level Evaluation)	120318	DLC	Summer Internship Project-I (Institute Level Evaluation)

14. Item ME15.docx

**Item ME16** To review, prepare, finalize and recommend the list of experiments/ Lab manual and skill based mini projects for various laboratory courses to be offered in III Semester (for the batch admitted in 2021-22).

Automobile Engineering	Mechanical Engineering
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Mechanical Engineering

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*(Handwritten signatures and initials)*

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	S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name																								
	1	190313	Automotive chassis	1	120313	Theory of Machine-I																								
	2	190314	Fluid Mechanics and Hydraulic Machines	2	120314	Fluid Mechanics and Hydraulic Machines																								
<i>15. Item ME16.docx</i>																														
To propose the list of courses from SWAYAM/NPTEL/MOOC Platforms to be offered (for batches admitted in 2021-22) in online mode under <i>Self-Learning/ Presentation</i> , in the III Semester.																														
Item ME17	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>S.No.</th> <th>Name of Subject</th> <th>Code</th> <th>Week</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Manufacturing Processes – Casting and Joining</td> <td>120316/190316(i)</td> <td>4</td> </tr> <tr> <td>2</td> <td>Laws of Thermodynamics</td> <td>120316/190316 (ii)</td> <td>4</td> </tr> <tr> <td>3</td> <td>Principles of Vibration Control</td> <td>120316/190316 (iii)</td> <td>4</td> </tr> </tbody> </table>						S.No.	Name of Subject	Code	Week	1	Manufacturing Processes – Casting and Joining	120316/190316(i)	4	2	Laws of Thermodynamics	120316/190316 (ii)	4	3	Principles of Vibration Control	120316/190316 (iii)	4								
S.No.	Name of Subject	Code	Week																											
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2	Laws of Thermodynamics	120316/190316 (ii)	4																											
3	Principles of Vibration Control	120316/190316 (iii)	4																											
<i>16. Item ME17.docx</i>																														
Item ME18	To review the <i>Scheme &amp; Syllabi, list of experiments and skill based mini projects of First semester of the B. Tech. programmes (for the batch 2022-23).</i>																													
<i>17. Item ME18.docx</i>																														
To review the CO attainments, to identify gaps and to suggest corrective measures for the improvement in the CO attainment levels for (i) 1 year November 2021 – February 2022 Semester (ii) July-December 2021 Session for II-to-IV-year students																														
Item ME19	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">Mechanical Engineering</th> </tr> <tr> <th>Total Number of courses</th> <th>Total Number of COs</th> <th>Number of COs not Attained</th> <th>Percentage of COs not Attained</th> </tr> </thead> <tbody> <tr> <td>41</td> <td>246</td> <td>18</td> <td>7.32%</td> </tr> <tr> <th colspan="4">Automobile Engineering</th> </tr> <tr> <th>Total Number of courses</th> <th>Total Number of COs</th> <th>Number of COs not Attained</th> <th>Percentage of COs not Attained</th> </tr> <tr> <td>41</td> <td>246</td> <td>31</td> <td>12.60%</td> </tr> </tbody> </table>						Mechanical Engineering				Total Number of courses	Total Number of COs	Number of COs not Attained	Percentage of COs not Attained	41	246	18	7.32%	Automobile Engineering				Total Number of courses	Total Number of COs	Number of COs not Attained	Percentage of COs not Attained	41	246	31	12.60%
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<i>18. Item ME19.xlsx</i>																														
<i>18. Item ME19 (a).xlsx</i>																														
Item ME20	To review PO attainment of 2017-2021 batch, CO-PO mapping matrix with attainments and gap analysis																													
Item ME21	To review curricula feedback from various stakeholders, its analysis and impact <b>{Stakeholder feedback analysis must also contain an Action Taken Report (ATR) and the details/data of the stakeholders who have responded through GOOGLE form (such as Name, organization, mail id, phone no., if available) must also be shared along with the feedback of the alumni/employer}</b> <i>19. Item ME21.docx</i>																													
Item ME22	To review the Course Outcomes (COs) feedback of various courses, its analysis, and ATR <i>Compiled in Item no.19</i>																													
Item ME23	Any other matter																													

Apart from the above points, the following points were discussed/Suggested in meeting;

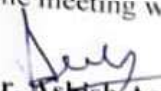

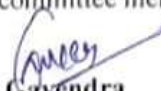



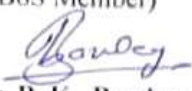
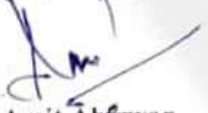



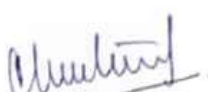



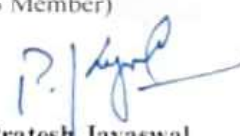

- In Industrial Engineering (V Sem) syllabus is revised and some portion is added to unit I, also Course outcomes (COs) revised.
- Thermal Engineering (V Sem) syllabus is too lengthy to cover in scheduled time duration. Therefore, the course has been split and revised for 2020-21 admitted batch, it has been discussed that the gas dynamics portion must be added in the course. Also, some introductory part of refrigeration is added in Engineering thermodynamics IV sem for 2021 admitted batch.

Mechanical Engineering

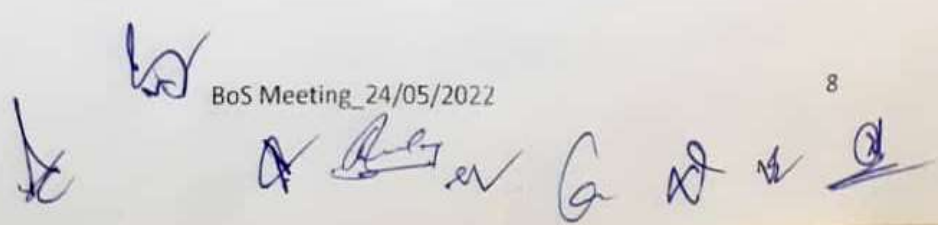
BoS Meeting\_24/05/2022

3. Belt and chain drive portion is removed from Design of Machine elements (V sem),
4. As maintenance Engineering is open category subjects without lab. Therefore, MATLAB portion may be removed from the syllabus.
5. To meet the current requirement Data Science is added in V sem Mechanical and automobile Engineering.

The meeting was ended with vote of thanks to the chairperson and committee members.

 <b>Dr. Ashish Agrawal</b> (BoS Member)	 <b>Dr. Dinesh Kumar Rathore</b> (BoS Member)	 <b>Dr. Gavendra Norkey</b> (BoS Member)	 <b>Dr. Harbhajan Ahirwar</b> (BoS Member)
 <b>Dr. Nitin Upadhyay</b> (BoS Member)	 <b>Dr. Surendra Ku. Chourasiya</b> (BoS Member)	 <b>Mr. B. K. Pandey</b> (BoS Member)	 <b>Dr. Amit Ahirwar</b> (BoS Member)
 <b>Mr. V. Shivhare</b> (BoS Member)	 <b>Mr. Sharad Agrawal</b> (BoS Member)	 <b>Dr. Jyoti Vimal</b> (BoS Member)	 <b>Mr. V. Chaturvedi</b> (BoS Member)
 <b>Mr. R. P. Kori</b> (BoS Member)	 <b>Dr. C. S. Malvi</b> (BoS Member)	 <b>Dr. M. K. Sagar</b> (BoS Member)	 <b>Dr. Pratesh Jayaswal</b> (BoS Member)
<i>online present</i> <b>Prof. Prashant K. Jain</b> ( RGPV Nominee)	<i>on-line Present</i> <b>Dr. K. K. Jain</b> (AC Nominee)	<i>on-line Present</i> <b>Prof. A.K. Agrawal</b> (AC Nominee)	 <b>Dr. M. K. Gaur</b> (BoS Chairman)

**DEAN (ACADEMICS)**  
**M.I.T.S**  
**GWALIOR**



# Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering

## V Semester

*For batches admitted in Session 2019-20*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact hours per week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem Exam.	Quiz/ Assignment	End Sem.	Lab work & Sessional					
1.	120501	DC	Industrial Engineering (DC-8)	70	20	10	-	-	100	3	-	-	3
2.	120502	DC	Metal Cutting and Machine Tools (DC-9)	70	20	10	-	-	100	3	1	-	4
3.	120503	DC	Heat and Mass Transfer (DC-10)	70	20	10	30	20	150	2	1	2	4
4.	120504	DC	Thermal Engineering (DC-11)	70	20	10	30	20	150	2	1	2	4
5.	120505	DC	Machine Design (DC-12)	70	20	10	30	20	150	2	1	2	4
6.	120506**	DLC	Minor Project-I (DLC-3)	-	-	-	30	20	50	-	-	2	1
7.	120507	DLC	Summer Internship Project-II (Evaluation) (DLC-4)	-	-	-	25	-	25	-	-	6	3
8.	120508#	SEMINAR/ SELF STUDY	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)	-	-	-	-	25	25	-	-	2	1
<b>Total</b>				<b>350</b>	<b>100</b>	<b>50</b>	<b>145</b>	<b>105</b>	<b>750</b>	<b>12</b>	<b>4</b>	<b>16</b>	<b>24</b>
<b>Department level activity/workshop/awareness programme to be conducted; certificate of compliance to be submitted by HoD to the Exam Controller through Dean Academics</b>													
Additional Courses for obtaining Honours or minor Specialization by desirous students			Permitted to opt for maximum two additional courses for the award of (i) Honours in parent discipline or (ii) Minor Specialization in engineering discipline other than the parent discipline										

\*\* The minor project-I may be evaluated by an internal committee for awarding Sessional marks.

# Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

01 Theory Period=1 Credit; 02 Practical Periods =1 Credit

## Scheme of Examination: Bachelor of Technology (B.Tech.) Automobile Engineering B.Tech. V Semester (Automobile Engineering)

*For batches admitted in Session 2019-20*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem Exam.	Quiz/Assignment	End Sem.	Lab work & Sessional					
1.	190501	DC	Industrial Engineering(DC-8)	70	20	10	-	-	100	3	-	-	3
2.	190502	DC	Metal Cutting and Machine Tool (DC-9)	70	20	10	-	-	100	3	1	-	4
3.	190503	DC	Heat and Mass Transfer(DC-10)	70	20	10	30	20	150	2	1	2	4
4.	190504	DC	Design of Machine Elements (DC-11)	70	20	10	30	20	150	2	1	2	4
5.	190505	DC	Automotive Chassis (DC-12)	70	20	10	30	20	150	2	1	2	4
6.	190506**	DLC	Minor Project-I (DLC-3)	-	-	-	30	20	50	-	-	2	1
7.	190507	DLC	Summer Internship Project-II (Evaluation) (DLC-4)	-	-	-	25	-	25	-	-	6	3
8.	190508 <sup>#</sup>	SEMINAR/ SELF STUDY	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)	-	-	-	-	25	25	-	-	2	1
<b>Total</b>				<b>350</b>	<b>100</b>	<b>50</b>	<b>145</b>	<b>105</b>	<b>750</b>	<b>12</b>	<b>4</b>	<b>16</b>	<b>24</b>
<b>Department level activity/workshop/awareness programme to be conducted; certificate of compliance to be submitted by HoD to the Exam Controller through Dean Academics</b>													
<b>Additional Courses for obtaining Honours or minor Specialization by desirous students</b>			<b>Permitted to opt for maximum two additional courses for the award of (i) Honours in parent discipline or (ii) Minor Specialization in engineering discipline other than the parent discipline</b>										

\*\* The minor project-I may be evaluated by an internal committee for awarding Sessional marks.

# Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation

**GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)**

**01Theory Period=1 Credit; 02 Practical Periods =1 Credit**

**Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering  
B.Tech. V Semester (Mechanical Engineering)**

*For batches admitted in Session 2020-21*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Online, Offline, Blended)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project							
1.	120519	MC	Data Science	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	MCQ
2.	120511	DC	Industrial Engineering (DC-10)	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
3.	120513	DC	Heat and Mass Transfer (DC-11)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
4.	120514	DC	Thermal Engineering (DC-12)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
5.	120515	DC	Machine Design (DC-13)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	AO
6.	120516	DLC	Minor Project-I**	-	-	-	-	60	40	-	100	-	-	4	2	Offline (2/0)	SO
7.	120517	Seminar/ Self-Study	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC) #	-	-	-	-	-	40	-	40	-	-	2	1	Online +Mentoring	SO
8.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	120518	DLC	Summer Internship Project-II (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>410</b>	<b>160</b>	<b>80</b>	<b>1150</b>	<b>12</b>	<b>3</b>	<b>20</b>	<b>25</b>	-	-
10.	1000006	MAC	Disaster Management	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ
11.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ
Additional Course for Honours or minor Specialization				Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization													

<sup>§</sup>proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

<sup>§§</sup>MCQ: Multiple Choice Question    <sup>§§</sup>AO: Assignment + Oral    <sup>§§</sup>PP: Pen Paper    <sup>§§</sup>SO: Submission + Oral

\*\* The Minor Project-I may be evaluated by an internal committee for awarding sessional marks.

# Compulsory registration for one online course using SWAYAM/NPTEL/MOOC, evaluation through attendance, assignments and presentation

Note: Students of 2020-21 admitted batch needs to appear and complete an additional MAC course of 30 Hrs. duration on Project Management & Financing. / Other modules related to futuristic technologies (Drones/ Robotics etc.)

**Scheme of Examination: Bachelor of Technology (B.Tech.) Automobile Engineering  
B.Tech. V Semester (Automobile Engineering)**

*For batches admitted in Session 2020-21*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Online, Offline, Blended)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project							
1.	190519	MC	Data Science	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	MCQ
2.	190511	DC	Industrial Engineering (DC-10)	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
3.	190513	DC	Heat and Mass Transfer (DC-11)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
4.	190514	DC	Design of Machine Elements (DC-12)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	AO
5.	190515	DC	Automotive Chassis (DC-13)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
6.	190516	DLC	Minor Project-I**	-	-	-	-	60	40	-	100	-	-	4	2	Offline (2/0)	SO
7.	190517	Seminar/ Self-Study	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC) #	-	-	-	-	-	40	-	40	-	-	2	1	Online +Mentoring	SO
8.	200xxx	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	190518	DLC	Summer Internship Project-II (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>410</b>	<b>160</b>	<b>80</b>	<b>1150</b>	<b>12</b>	<b>3</b>	<b>20</b>	<b>25</b>	-	-
10.	1000006	MAC	Disaster Management	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ
11.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ
Additional Course for Honours or minor Specialization				Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization													

<sup>s</sup>proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

<sup>ss</sup>MCQ: Multiple Choice Question    <sup>ss</sup>AO: Assignment + Oral    <sup>ss</sup>PP: Pen Paper    <sup>ss</sup>SO: Submission + Oral

\*\* The Minor Project-I may be evaluated by an internal committee for awarding sessional marks.

# Compulsory registration for one online course using SWAYAM/NPTEL/MOOC, evaluation through attendance, assignments and presentation

Note: Students of 2020-21 admitted batch needs to appear and complete an additional MAC course of 30 Hrs. duration on Project Management & Financing. / Other modules related to futuristic technologies (Drones/ Robotics etc.)

**Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering  
B.Tech. III Semester (Mechanical Engineering)**

*For batches admitted in Session 2020-21*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam .
				Theory Slot				Practical Slot				L	T	P			
				End Sem.		Mid Sem. Exam.	Quiz/ Assignment	End Sem	Lab Work & Sessional	Skill Based Mini Project							
				End Term Evaluation	\$Proficiency in subject /course												
1.	100025	BSC	Engineering Mathematics-II (BSC-3)	50	10	20	20	-	-	-	100	2	1	-	3	Offline (3/0)	PP
2.	120311	DC	Manufacturing Process (DC-2)	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
3.	120312	DC	Mechanics of Materials (DC-3)	50	10	20	20	60	20	20	200	2	-	2	3	Offline (3/0)	PP
4.	120313	DC	Theory of Machines –I (DC-4)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	AO
5.	120314	DC	Fluid Mechanics and Hydraulic Machines (DC-5)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
6.	120315	DLC	Software Lab (DLC-1)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
7.	120316	DLC	Self-learning/ Presentation <sup>#</sup>	-	-	-	-	-	40	-	40	-	-	2	1	Online +Mentoring	SO
8.	200XXX	CLC	Novel Engaging Course	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	120318	DLC	Summer Internship Project–I (Institute Level Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>350</b>	<b>120</b>	<b>80</b>	<b>1050</b>	<b>10</b>	<b>4</b>	<b>16</b>	<b>22</b>		
10	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

<sup>§</sup>Proficiency in course/subject – includes the weightage towards ability/ skill/ competence /knowledge level /expertise attained /attendance etc. in that particular course/subject

<sup>#</sup>Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation



**Scheme of Examination: Bachelor of Technology (B.Tech.) Automobile Engineering  
B.Tech. III Semester (Automobile Engineering)**

*For batches admitted in Session 2020-21*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Sem.		Mid Sem. Exam.	Quiz/ Assignment	End Sem	Lab Work & Sessional	Skill Based Mini Project							
				End Term Evaluation	Proficiency in subject /course												
1.	100025	BSC	Engineering Mathematics-II (BSC-3)	50	10	20	20	-	-	-	100	2	1	-	3	Offline (3/0)	PP
2.	190311	DC	Automotive Materials (DC-2)	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
3.	190312	DC	Mechanics of Materials (DC-3)	50	10	20	20	60	20	20	200	2	-	2	3	Offline (3/0)	PP
4.	190313	DC	Automotive Engines (DC-4)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
5.	190314	DC	Fluid Mechanics & Hydraulic Machines (DC-5)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
6.	190315	DLC	Software lab (DLC-1)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
7.	190316	DLC	Self-learning/ Presentation <sup>#</sup>	-	-	-	-	-	40	-	40	-	-	2	1	Online +Mentoring	SO
8.	200XX X	CLC	Novel Engaging Course	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	190318	DLC	Summer Internship Project-I (Institute Level Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>350</b>	<b>120</b>	<b>80</b>	<b>1050</b>	<b>10</b>	<b>4</b>	<b>16</b>	<b>22</b>		
10	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

<sup>§</sup>Proficiency in course/subject – includes the weightage towards ability/ skill/ competence /knowledge level /expertise attained /attendance etc. in that particular course/subject

<sup>#</sup>compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation

**Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering  
B.Tech. III Semester (Mechanical Engineering)**

*For batches admitted in Session 2021-22*

2S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Online, Offline, Blended)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam	Proficiency in subject /course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	100025	BSC	Engineering Mathematics-II (BSC-3)	50	10	20	20	-	-	-	100	2	1	-	3	Offline (3/0)	PP
2.	120311	DC	Manufacturing Process (DC-2)	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
3.	120319	DC	Mechanics of Materials (DC-3)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
4.	120313	DC	Theory of Machines –I (DC-4)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	AO
5.	120314	DC	Fluid Mechanics and Hydraulic Machines (DC-5)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
6.	120315	DLC	Software lab (DLC-1)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
7.	120316	DLC	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	40	-	40	-	-	2	1	Online +Mentoring	SO
8.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	120318	DLC	Summer Internship Project–I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>350</b>	<b>120</b>	<b>80</b>	<b>1050</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>23</b>	-	-
10.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

\$ proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

\$\$ MCQ: Multiple Choice Question    \$\$ AO: Assignment + Oral    \$\$ PP: Pen Paper    \$\$ SO: Submission + Oral

**Scheme of Examination: Bachelor of Technology (B.Tech.) Automobile Engineering  
B.Tech. III Semester (Automobile Engineering)**

*For batches admitted in Session 2021-22*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Online, Offline, Blended)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam	\$Proficiency in subject /course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	100025	BSC	Engineering Mathematics-II (BSC-3)	50	10	20	20	-	-	-	100	2	1	-	3	Offline (3/0)	PP
2.	190319	DC	Manufacturing Process (DC-2)	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
3.	190317	DC	Mechanics of Materials (DC-3)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
4.	190313	DC	Automotive Engines (DC-4)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
5.	190314	DC	Fluid Mechanics & Hydraulic Machines (DC-5)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
6.	190315	DLC	Software lab (DLC-1)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
7.	190316	DLC	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	40	-	40	-	-	2	1	Online +Mentoring	SO
8.	200XX X	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	190318	DLC	Summer Internship Project-I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>350</b>	<b>120</b>	<b>80</b>	<b>1050</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>23</b>	-	-
10.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

\$ proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

\$\$MCQ: Multiple Choice Question    \$\$AO: Assignment + Oral    \$\$\$PP: Pen Paper    \$\$SO: Submission + Oral

**Course where revision was carried out**

**BoS\_ 24/05/2022**

<b>Details of Courses</b>			
<b>S.No.</b>	<b>Subject Code</b>	<b>Subject Name</b>	<b>Semester</b>
2	190511/120511	Industrial Engineering	V
3	190514	Design of Machine Elements	V
4	120514	Thermal Engineering	V
5	900215	Maintenance Engineering	VII

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**For batch admitted in Academic Session 2020-21**

**Industrial Engineering**

Category	Title	Code	Credits: 3			Theory Paper
Departmental Core-DC	Industrial Engineering	120511/190511	L	T	P	Max.Marks-50 Min.Marks- Duration-2hrs.
			2	1		

**Course Objectives:** Industrial engineering is concerned with the design, improvement, installation, and management of integrated systems of men, material, and machine. After completing this course, students will learn a set of skills that includes mathematical modeling, probability and statistics, computer science, human factors, interpersonal skills, project management, and an ability to manage and administer large technical engineering and research projects. Thus, industrial engineering may be thought of as applied problem-solving, from inception to implementation.

**Syllabus**

**UNIT-I**

**Production Systems and Productivity:** Production Management: design of production systems (product, job shop and batch). Definition and types of productivity, Measurement of productivity, factors affecting the productivity and productivity improvement programs.

**Production Planning and Control:** Aggregate production planning, Capacity planning: capacity measurement, long-term and short-term strategies, aggregate production planning, and graphical method to choose aggregate plan. (Added)

**UNIT-II**

**Forecasting techniques:** Need and type of forecasting, factors affecting forecasting, forecasting in decision making, time series analysis, demand patterns, qualitative methods- measures of forecast accuracy and error analysis in quantitative forecasting.

**UNIT-III**

**Inventory Control** – Objectives and functions, need and classifications- codification and standardization ABC analysis, deterministic inventory models, quantity discount; perpetual and periodic inventory control systems. Probabilistic inventory management, economic ordering quantity procurement cost, carrying charges, lead-time, reorder point.

**Unit-IV**

**Facility Locations and Plant Layout:** Facility location factors and evaluation of alternate locations; qualitative aspects, quantitative models for layout decisions, types of plant layout and their evaluation; computer aided layout design techniques; assembly line balancing, materials handling systems.

**Project management** - Project Scheduling, Network diagram, critical path method (CPM), Project Evaluation and review techniques (PERT), Time cost trade off.

**UNIT-V**

**Master Production Scheduling and MRP:** Functions, planning horizon and planning periods for master production schedule, types of master production schedule, Bill of Material, Independent Demand versus dependent demand, Functions of material requirements planning and manufacturing resource planning (MRP I

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and MRP II), inputs for MRP system, performance characteristics of MRP system, materials requirement planning explosion.

**Course outcomes:** After learning the course the students should be able to:

**CO1. Define and measure productivity.**

**CO2. Understand** Production planning and control required for industry to analyze the engineering problems.

**CO3. Apply** engineering design to produce solutions that meet specified needs of manufacturing industry

**CO4. Analyze** practice through various Management and Operation Tools for Improving Quality and Quantity.

**CO5. Evaluate** various kinds of problems or issues faced by service and manufacturing industries like Inventory control, sales forecasting economic consideration, optimum utilization of resources, productivity.

**CO6. Create** new mathematical models for efficient production planning and control.

#### **Text Books:**

1. Industrial Engineering and Production Management, Martand Telsang, S. Chand
2. Production and Operation Management by R. Panneerselvam, PHI, Latest Edition
3. Manufacturing planning and control for SCM by Vollmann; TMH, Latest Edition.
4. Purchasing & Materials Management by Dobler & Lee, PHI, Latest Edition

#### **Reference Books:**

1. Operations Management by Krajewski, L. J., Ritzman, L. P. and Malhotra, M. K., Prentice Hall, New Delhi; Latest Edition.
2. Production/Operations Management by Ebert, J and Adams, D.J., Prentice Hall of India, New Delhi; Latest Edition.
3. Production and Operations Management: manufacturing and services by Chase, R. B., Aquilano, N. J. and Jacob, F. R., TMH, New Delhi; Latest Edition .
4. Modern Production/Operations Management by Buffa and Sarin, Wiley India; Latest Edition.

#### **List of Open Source Software/learning website:**

1. Operation Management, IIT Roorkee, Dr. Inderdeep singh, <https://nptel.ac.in/courses/112107238>
2. Operation and Supply chain Management, IIT Madras, Prof. G. Srinivasan  
<https://nptel.ac.in/courses/110106045>



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**For batch admitted in Academic Session 2020-21**

**190514: Design of Machine Elements**

Category	Title	Code	Credit-4			Theory Paper
			L	T	P	
Departmental Core-DC	Design of Machine Elements	190514/ 190504	2	1	2	Max.Marks-50 Min.Marks-16 Duration-2 hrs.

Note: Use of PSG Design Data book is permitted in exam.

**Course Pre-Requisites:**

Engineering Mathematics-I  
Mechanics of Materials

**Course Objectives:**

To make the students to understand:

1. develop an ability to apply knowledge of mathematics, science and engineering.
2. develop an ability to design a system, component or process to meet desired needs within realistic constraints.
3. develop an ability to identify, formulate, and solve engineering problems.
4. develop an ability to use techniques, skills and modern engineering tools.

**Syllabus:**

**Unit I - Design Philosophy:** Principles of mechanical design; Factor of safety, Limits and fits; Standardization; Selection of materials, Theory of failures. (Removed: strength, rigidity, fracture, wear and material consideration; Stress concentration; Design for fatigue)

**Unit II- Design of Keys, Shafts and Couplings:** Definitions, classifications and applications design of rigid and pin bushed flexible couplings.

**Unit III- Design of Permanent and Temporary Joints:** Cotter and knuckle joints; screwed fastenings, bolted and riveted joints under direct and eccentric loads. Welded joints: Welded joints, strength of welded joints, eccentrically loaded welded joints, welded joints subjected to bending moments and torsion.

**Unit IV- Design of Mechanical Gears:** Design of spur, helical, bevel and worm gears. (Removed: , Belt and chain drives and Automotive Gear box assembly.)

**Unit V- Design of Bearings: Rolling contact bearing:** Types of rolling contact bearing, static and dynamic load capacities, Stribeck's equation, equivalent bearing load, load life relationship, bearing life, bearing life, load factor, selection of bearing from manufacturing catalogue. Sliding contact bearing: Bearing material and their properties, bearing types and their constructional details. Design consideration in hydrodynamic bearings. (Removed: Lubrication and mountings, dismounting and preloading of bearings, oil seals and packing.)

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### Course Outcomes:

After successful completion of this course students will able to:

- CO1: **Illustrate** the design Philosophy and Principles of mechanical design.
- CO2: **Identify** appropriate bearing for a given application.
- CO3: **Use** design data books in designing various mechanical components.
- CO4: **Select** appropriate drive for power transmission on the basis of load and speed.
- CO5: **Analyze** the stresses and strain induced in basic mechanical components.
- CO6: **Design** the machine elements against static as well as fatigue load.

### Text Books:

1. V.B. Bhandari, "Design of Machine Elements, Tata McGraw- Hill Education.
2. R.K. Jain, "Machine Design", Khanna Publishers, New Delhi, 1997.
3. R C Juvinall Fundamental of Machine Components Design, 4/e, Wiley.
4. P C Gope, Machine Design: Fundamental and Applications, 1/e PHI.
5. R L NORTON, Machine Design an Introduction, Pearson.
6. E J Hearn, Mechanics of Material, BH.

### References Books:

1. P.M. Heldt "High speed combustion Engine", Oxford-IBH Publishing Co., Calcutta, 1965.
2. A.Kolchin and V.Demidov, "Design of automotive engine", MIR Publisher, Moscow, 1984.
3. Sundararaja Murthy, T.V. "Machine Design", Khanaa publisher, New delhi.
4. "Design Data book", PSG College of technology, Coimbatore,2000.

### NPTEL Link for Design of Machine Elements

<http://nptel.ac.in/courses/112105124/>

### List of Experiments

1. Design and drawing of Single, double and triple riveted joint
2. Design and drawing of Single and double strap butt joint
3. Design and drawing of Welded joint
4. Design and drawing of Socket and Spigot cotter joint
5. Design and drawing of Gib and Cotter joint.
6. Design and drawing of Knuckle joint
7. Study of Theories of failure
8. Design and drawing of Solid and hollow shaft
9. Design and drawing of Rigid coupling
10. Design and drawing of Flexible coupling

### Laboratory Course Outcomes:

After successful completion of this course students will be able to:

- CO1: **List** out the various 2D and 3D CATIA commands
- CO2: **Describe** construction details to draft the different design of machine elements



- CO3: Demonstrate** the concept of machine elements based on different material
- CO4: Distinguish** various types of Temporary and Permanent joints.
- CO5: Select and choose** the right strategy to draft the machine elements
- CO6: Design** and create the machine elements under various loading condition

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**For batch admitted in Academic Session 2020-21**

**120514: Thermal Engineering**

Category	Title	Code	Credits -4			Theory Paper
			L	T	P	
Departmental Core-DC	Thermal Engineering	120514	L	T	P	Max.Marks-50 Min.Marks-16 Duration-2 hrs.
			2	1	2	

**Course Objectives:** To make the students understand:

1. the fundamental principles of IC engines and combustion phenomena
2. the basic principles of nozzles and diffusers
3. the application of basic thermodynamics and fluid mechanics in steam and gas turbine power plants

**Syllabus**

**UNIT I - Vapor Power Cycles:** Vapor Carnot cycle and its limitations, Rankine cycle and modified Rankine cycle, actual vapor power cycle, Reheat cycle, ideal regenerative cycle, actual regenerative cycle, Reheat – regenerative cycle, feedwater heaters, cogeneration of power and process heat, working fluids in vapor power cycle, binary vapor cycles, the efficiency of coupled cycles. Basics of condensers.

**UNIT II – IC Engine Basics and Combustion in IC Engines**

Basics of CI and SI Engines, Basics of two-stroke and four-stroke IC engines, Valve timing diagram, Performance parameters, Heat balance, Testing of the engine.

Stages of combustion in SI engine, Flame propagation, Rate of pressure rise, Abnormal combustion, Theory of detonation, Effect of engine operating variables on knock, Stages of combustion in CI engines, Delay period - Factors affecting delay period, Knock in CI engines - methods of controlling diesel knock, Combustion chambers for SI and CI engines.

**UNIT III – Gas Turbine**

Open cycle and closed cycle arrangements, applications, assumptions in ideal cycle analysis, simple gas turbine cycle, heat exchange cycle, intercooled cycle, various combinations of reheat, heat exchange and intercooling, comparison of various cycles, Combined Brayton and Rankine Cycle and GT-ST plants; Advantages of Combined Cycle. (Replaced)

**UNIT IV – Steam Turbines**

Classification of steam turbine, Impulse and reaction turbines, Staging, Stage and overall efficiency, Reheat factor, Utilization factor, Blading, Velocity diagram & work calculations, Impulse Reaction Turbines, Losses in steam turbines, Governing of turbines.

**Unit V Nozzles and Diffusers**

Introduction, SFEE and continuity equation for nozzles & diffusers, momentum equation for the steam nozzle, entropy change due to friction in the nozzle, nozzle efficiency, critical pressure, stagnation enthalpy & pressure, Relation between area, velocity & pressure in nozzle, the effect of friction on critical pressure ratio, supersaturated flow in nozzles, the effect of variation of back pressure.

**Course Outcomes:** After successful completion of this course students will be able to:

**CO1:** analyze the performance of steam power plant

**CO2: describe** the working principles of internal combustion engines and combustion phenomena

**CO3: analyze** the performance of gas turbine power plant

**CO4: describe** the working of various types of steam turbine

**CO5: solve** analytical problems of nozzles and diffusers

#### Text Books:

1. P K Nag, "Power Plant Engineering", Latest Edition, Tata McGraw Hill Publishing Company Limited,
2. Ganesan V, "Internal combustion engines", Latest Edition, Tata McGraw Hill Education Private Limited,
3. Ganesan V, "Gas Turbines", Latest edition, Latest Edition, Tata McGraw Hill Education Private Limited,
4. P. L. Ballaney, "Thermal Engineering", Latest Edition, Khanna Publishers

#### References Books:

1. John. B, Heywood, "Internal Combustion Engine Fundamentals", Latest edition, McGraw Hill Publishing Co., New York,
2. Sharma S. P, Chandramohan, "Fuels and Combustion", Latest edition, Tata McGraw Hill Publishing Co.
3. Mathur and Sharma, "A course on Internal combustion Engines", Latest edition, Dhanpat Rai & Co.
4. Rajput R. K, "A textbook of Thermal Engineering", Latest edition, Laxmi Publications
5. B.K. Venkanna, "Fundamentals of Turbomachinery", PHI Learning Private Limited

#### List of Experiments:

1. Introduction to Computational Fluid Dynamics and its methodology.
2. Perform CFD analysis on flow through pipe with varying Reynolds Number.
3. Performance test of two stroke diesel engine and four stroke diesel engines.
4. Study of compounding of Steam turbine.
5. Study of combined steam and gas turbine plant.

**Lab Course Outcomes:** After successful completion of this course students will be able to:

**CO1: Describe** the process involved and advantages in solving a fluid problem using computational fluid dynamics

**CO2: Solve** the Fluid flow problem using CFD technique.

**CO3: Estimate** energy distribution by conducting heat balance test on IC engines.

**CO4: Determine** performance parameters of impulse steam turbine

**CO5: Evaluate** the performance of steam turbine with compounding.



**For batch admitted in Academic Session 2019-20**

**900215: Maintenance Engineering**

Category	Title	Code	Credit-3			Theory Paper
			L	T	P	
Open Course- OC3	Maintenance Engineering	900215	L	T	P	Max.Marks-70 Min.Marks-22 Duration-3hrs.
			3	-	-	

**Course Outcomes:** Through this course, student should be able to

- Identify different maintenance categories
- Understand the principles, functions and practices adopted in industry for the successful management of maintenance activities
- Implement the maintenance function and different practices in industries for the successful management of maintenance activities.
- The Condition Monitoring & Non-Destructive Testing.
- The fault Identification, Computerized Maintenance Systems.
- The Maintenance strategies and overall configuration and Maintenance of Machines, structure and System.

**UNIT I**

Evolution of maintenance, objective of maintenance, maintenance policies and philosophies, maintenance concept, importance of maintenance, elements of good maintenance classification of maintenance programs, corrective preventive and predictive maintenance, comparison of maintenance programs, preventive maintenance-concept, functions, benefits and limitations, training and safety aspects in maintenance. (Replaced: FMECA, Fault Diagnostics and Prognostics, Machine Learning in CBM)

**UNIT II**

Condition monitoring, objectives and benefits of condition based monitoring, what to monitor, when to monitor, principles, condition based maintenance techniques: visual/manual monitoring, temperature monitoring, thermography, lubricant monitoring, debris and spectroscopy, performance monitoring, vibration monitoring, current monitoring, and corrosion monitoring, odour monitoring, noise and sound monitoring, Time Domain Analysis, Frequency Domain Analysis, Non Stationary Signal Analysis, Practical Examples of Vibration. (Replaced: Modulation and Beats, Orbit and Order Analysis, Computer aided data acquisition, Orbit and Order Analysis, Data Recording, Cepstrum Analysis, Hilbert Transform in Condition Monitoring.)

**UNIT III**

Tribology in Maintenance, Friction wear and lubrication, friction & wear mechanisms, prevention of wear, types of lubrication mechanisms, lubrication processes, lubricants and its types, general and special purpose, additives, testing of lubricants, degradation of lubricants, seal & packings, repair methods for basic machine elements: failure analysis, failures and their development. (MATLAB portion removed)

**Unit- IV:**

Accelerometers, Rotational Speed Measurements, Introduction to Faults in Rotating Machines, Unbalance Detection, Field Balancing, Misalignment, Gears, Pumps and Cavitation, IC Engines,

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machinery Diagnostic Chart, Basics of Instrumentation, Signal Conditioning and Filtering, Errors In Measurements, Dynamic Range And Frequency Response.

**Unit- V:** Non-Destructive Testing, Ultrasonics, Eddy Current and Acoustic Emission, Radiography, Dye Penetrant Tests, Tool Condition Monitoring, Experimental Modal Analysis, Introduction to Failure Analysis, Railway Locomotive Noise and Vibration Monitoring, Paper Mill Vibration Monitoring, Overview of CBM facilities at SKF Reliability Lab, Artificial Intelligence in Maintenance Engineering, Expert Systems for fault Diagnosis. IoT in Maintenance Engineering.

**Course Outcomes:** After successful completion of this course students will be able to:

1. **Describe** the fundamental concepts of maintenance engineering noise and vibration, measurement techniques of Condition Monitoring.
2. **Show** skills of fault diagnosis.
3. **Demonstrate** the need of instrumentation and signal processing for condition monitoring
4. **Examine** the condition of machine parts through Failure analysis of plant machineries
5. **Apply** correct usage of a method or procedure of maintenance.

**Text & Reference books:**

- A. R. Mohanty, Machinery Condition Monitoring: Principles and Practices, CRC Press, 2014
- Bikash Bhadury. "Total Productive Maintenance". Allied Publisher Ltd. New Delhi.
- BC langlay. "Plant Maintenance". Prentice-Hall International. New Jersey.
- P Gopalakrishnan and AK Banerji, "Maintenance and Spare Parts Management". Prentice-Hall of India (P) Ltd. New Delhi.
- Kelly, "Maintenance Planning & Control"
- Industrial Maintenance by HP Garg. S. Chand & Company Ltd., New Delhi.
- Srivastava S.K., "Industrial Maintenance Management", - S. Chand and Co., 1981
- Bhattacharya S.N., "Installation, Servicing and Maintenance", S. Chand and Co., 1995
- White E.N., "Maintenance Planning", I Documentation, Gower Press, 1979.
- Garg M.R., "Industrial Maintenance", S. Chand & Co., 1986.
- Higgins L.R., "Maintenance Engineering Hand book", McGraw Hill, 5th Edition, 1988.
- Armstrong, "Condition Monitoring", BSIRSA, 1988.
- Davies, "Handbook of Condition Monitoring", Chapman &Hall, 1996.



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