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 09/04/2019

Detail of program/ courses where syllabus revision was carried out

Course/ Subject Name	Code	Year/date of introduction	Year/date of revision	Percentage of content added or replaced	Item no.	Page. No.
Thermal Engineering	120504	2015	09/04/2019	20%	1	6-7

John -

Dr. M. K. Gaur

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MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR (A Govt. Aided UGC Autonomous & NAAC Accredited Institute, Affiliated to RGPV Bhopal) MECHANICAL ENGINEERING DEPARTMENT

Date: 09/04/2019

MINUTES OF MEETING OF BOARD OF STUDIES (BoS)

A meeting of following members (external and internal) was held on 09th April, 2019 at 10:30 AM in the HOD chamber, Mechanical Engineering Department.

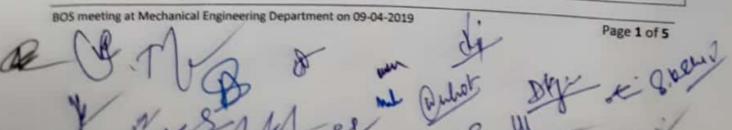
Following members were present:

(1)	Dr. Manish Kumar Sagar	Head of the Department and Chairman of the Committee					
(2)	Dr. Qasim Murtaza	Professor, DTU, New Delhi, External Expert					
(3)	Dr. Pushpendra Singh	Associate Professor, DTU, New Delhi, External Expert					
(4)	Er. C. G. Porwal			ging Director, NIMDC, External E	xpert		
(5)	Dr. Pratesh Jayswal	Member		Prof. Shubham Shrivastava	Member		
(6)	Dr. Chandra Shekhar Malvi	Member		Dr. Amrat kumar Dhamneya	Member		
(7)	Dr. Manoj K Gaur	Member		Dr. Naresh kumar Raghuwanshi	Member		
(8)	Prof. R. P. Kori	Member	(22)	Prof. Puneet kumar Nema	Member		
(9)	Prof. Vedansh Chaturvedi	Member	(23)	Prof. Kapil	Member		
(10)	Dr. Jyoti Vimal	Member	(24)	Prof. Kaustubh Khot	Member		
(11)	Prof. Dinesh K Kasdekar	Member	(25)	Prof. Sarvesh kumar yadav	Member		
	Prof. Sharad Agrawal	Member		Dr. Ravi kant Ranjan	Member		
(13)	Prof. Vaibhav Shivhare	Member	(27)	Prof. Vaibhay Gupta	Member		
(14)	Dr. Amit Aherwar	Member	(28)	Prof. Narendra Singh Sikarwar	Member		
(15)	Prof. Bhupendra K Pandey	Member	(29)	Prof. Manish sharma	Member		
	Dr. Dharmendra Jain	Member	(30)	Prof. Gyanesh Sharan	Member		
(17)	Prof. Utkarsh Srivastava	Member	(31)	Prof. Sayed Faiz Ahmed	Member		
(18)	Prof. Sumit Kumar Singh	Member	(32)	Prof. Neeraj Mishra	Member		

Before starting the meeting, Chairman welcomed the external expert members for attending the Board of Studies (BoS) meeting on 09th April, 2019 in the department of Mechanical Engineering to finalize the Scheme and syllabus of B.E / B.Tech (Mechanical Engineering and Automobile Engineering) and M.Tech (Production Engineering) students.

Following agendas were discussed and deliberated upon:

Item No.	Agenda Discussed
Item 1:	 To frame the syllabi for all Departmental Core (DC) courses to be offered in the V & VI Semester under the flexible curriculum ➢ All departmental core (DC) courses from V semester to VI semester under flexible curriculum, are framed. Experts gave valuable suggestions wherever required. DC of V and VI semester are attached in Annexure
	I.



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be offered in V & VI Semester under the flexible curriculum. > List of experiment list / Lab manuals for laboratory courses to be offer- in V & VI Semester under the flexible curriculum, semester wise prepared. Finalized experiment list / Lab manuals for laboratory cours are attached in the Annexure-II and is also incorporated in the fin Curriculum Scheme. Item 3: To prepare the syllabi of following Mandatory Courses (MC) of V & VI Semester to be offered under the flexible curriculum. • Indian Constitution & Traditional Knowledge • Disaster Management (Syllabi for mandatory courses will be framed & finalized at institute level and uniformly adopted by all the departments) > The syllabi of Indian Constitution & Traditional Knowledge and Disaster Management are framed (at Institute Level) as Mandatory Courses (MC) of V & VI Semester to be offered under the flexible curriculum. Finalized syllabuses of the above courses are attached in the Annexure-III. Item 4: To frame the COs for all Departmental Electives (DEs) and Open Category (OC) courses up to VI Semester, to be offered under the flexible curriculum > COs of all Departmental Electives (DEs) and Open Category (OC) courses up to VI Semester, to be offered under the flexible curriculum are framed. Experts gave valuable suggestions wherever required regarding formation of COs and Course objectives. COs of all these courses are attached in Annexure - IV. Item 5: To frame and propose the syllabi for all Departmental Electives (DEs) and Open Category (OC) courses up to VI Semester, to be offered under the flexible curriculum > The	Item 2:	To prepare and recommend the experiment list / Lab manuals for laboratory courses to
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 Category (OC) courses up to VI Semester, to be offered under the flexible curriculum The syllabi for all Departmental Electives (DEs) and Open Category (OC) courses up to VI Semester, to be offered under the flexible curriculum are framed. Expert from industry also suggested and added some contents which are required extensively in industries. The syllability of th	Item 5:	
The syllabi for all Departmental Electives (DEs) and Open Category (OC) courses up to VI Semester, to be offered under the flexible curriculum are framed. Expert from industry also suggested and added some contents which are required extensively in industries. The syllability of the syllability		Category (OC) courses up to VI Semester, to be offered under the flexible
framed. Expert from industry also suggested and added some contents which are required extensively in industries. The syllability		The syllabi for all Departmental Electives (DEs) and Open Cotoner (DES)
which are required extensively in industries. The syllability		courses up to VI Semester, to be offered under the flexible curricular
which are required extensively in industries. The sullable of		framed. Expert from industry also suggested and added some
Departmental Electives (DEs) and Open Category (OC)		which are required extensively in industries. The syllability
category (OC) courses up to VI		Departmental Electives (DEs) and Open Category (OC) courses up to VI
Semester are attached in Annexure - V.		Semester are attached in Annexure - V.
BOS meeting at Mechanical Engineering Department on 09-04-2019	BOS meet	ing at Mechanical Engineering Department on 09-04-2019
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Item 6:	To make the owner of the state
nem o:	To propose lists of "Additional Courses" which can be opted for getting an
	(i)'Honours' (by the students of parent department) (ii) Minor Specialization (by the
	students of other departments)
	(These courses will be completed through SWAYAM / NPTEL / MOOC based
	learning platforms during V & VI Semester.
	> List of "Additional Courses" which can be opted for getting an
	(i)'Honours' (by the students of parent department) (ii) Minor
	Specialization (by the students of other departments) are prepared by
	keeping in mind that 'Honours' courses will be helpful to explore the
	various fields in Mechanical Engineering and specialization in Minor are
	useful for other different branches of our Institute. Finalized list of all
-	"Additional Courses" are attached in Annexure-VI.
Item 7:	To propose the tentative list of courses which the students can opt from NPTEL
	platform for Seminar/Self Study Courses in III & V Semester
	> List of Seminar/Self Study Courses in III & V Semester are framed
	keeping in mind that the students can opt it from NPTEL platform.
	Finalized list for Seminar/Self Study Courses in III & V Semester are
	attached in Annexure-VII.
Item 8	e and a second s
	admitted batch
	> The Scheme of 2017-18 admitted batch is framed. The overall credit
	requirement is align to 170 credits. Finalized Scheme of 2017-18 admitted batch is attached in Annexure-VIII.
Item 9	
	corrective measures for improvement
C.	> In most of the Courses CO attainment was as per the target level which
1.1	was fixed to 65% for the July-December 2019 session. Gaps in CO
	attainment for the all courses in which the attainment level was low are
	identified and corrective measures for the respective courses have been
	proposed. Experts gave their suggestions for any further improvement of
	COs. Also calculation of CO attainment by using mathematical model as
	developed by the institute is explained to the experts. All reasons for the
BOS m	eeting at Mechanical Engineering Department on 09-04-2019 Page 3 of 5
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	gap in CO attainment and the corrective measures proposed by the experts and other BOS members are listed in the Annexure-IX.
Item 10:	To propose/ recommend the panel of examiners (UG & PG Level) for conducting practical examination
	The propose/ recommend list of the panel of examiners (UG & PG Level) for conducting practical examinations are prepared and attached in Annexure-X.
Item 11:	Equivalence of syllabus are discussed and attached in Annexure XI.

Apart from the above, following suggestions has been discussed and listed below;

- 1. For awarding minor specialization the subject must be combination of fundamentals and specific topics. Students must be guided by their mentor to fix the specific field for awarding the minor specialization.
- 2. Artificial Intelligence, Machine Learning, some thermal and design subjects must be kept in miscellaneous section.
- 3. Total Quality Management, Project management and other common courses must be kept in open courses.
- 4. In text and reference book section attached with the syllabus the year of edition must be omitted and only the Title Name, Author Name and Name of Publication shall be included.

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

Prof. Neeray Mishra (BoS Member)

ablasan **Prof. Gyanesh Sharan** (BoS Member)

Prof. Vaibhav Gupta (BoS Member)



Prof. Kapil (BoS Member)

Prof. S. Shrivastava (BoS Member)

Prof. Sayed F Ahmad (BoS Member)

Dr. NK Raghuvanshi (BoS Member)

Dr. Amrat K Dhamneya (BoS Member)

Prof. Narendra S Sikarwar (BoS Member)

Prof. Kaustubh Khot (BoS Member)

Dr. Dharmendra Jain

(BoS Member)

Prof. Vaibhav Shivhare (BoS Member)

BOS meeting at Mechanical Engineering Department on 09-04-2019

Dr. Amit Ahirwar (BoS Member)

Page 4 of 5

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Prof. Puneet K Nema

(BoS Member)

Dr. Ravi kant Ranjan

(BoS Member)

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Prof. U Shrivastava (BoS Member)

Prof. B. K. Pandey

(BoS Member)

Prof. **Manish Sharma** (Bos Member)

Prof. Sarvesh K Yadav (BoS Member)

of. sumit K Singh (BoS Member)

Prof. Sharad Agrawal (BoS Member)

Prof. Rajendra Prasad Kori (BoS Member)

Dr. Pushpendra Singh (External Expert)

Prof. D. K. Kasdekar

(BoS Member)

Dr. Manoj Kumar Gaur (BoS Member)

2/4/17.

Dr. Qasim Murtaza (External Expert)

Dr. Jyoti Vimal

(BoS Member)

Dr. Chandra Shekhar Malvi

(BoS Member)

Er.C.G.Porwal (External Expert)

Prof. V. Chaturvedi

(BoS Member)

Dr. Pratesh Jayaswal (BoS Member)

Dr. Manish Kumar Sagar (BoS Chairman)

Syllabus Revision on 09/04/2019 For batch admitted in Academic Session 2017

120504: Thermal Engineering

Category	Title	Code	Credit-4		t-4	Theory Paper	
Departmental Core-DC	Thermal Engineering	120504	L	Т	Р	Max.Marks-70 Min.Marks-22	
Cole-DC			3	1	0	Duration-3hrs.	

Course Objectives: To make the students to understand:

- 1. To familiarize students with basic concepts of units and dimensions, systems (open and closed systems and control volumes) and its boundaries, properties, state, process, cycle, quasi-static process etc.- required as foundation for development of principles and laws of thermodynamics.
- 2. To enable students to develop Intuitive problem solving technique.
- 3. To study Air-vapour cycles, and Nozzle, diffuser applications.
- 4. To understand the fuel combustion phenomenon and working of steam generators.

Syllabus

Unit I Air standard cycles: Carnot, Sterling, Ericssion, Otto, Diesel, Dual cycles and determination of their air standard efficiencies and their comparison. Brayton cycle, Atkinson cycle. PVT relationship, Mixture of ideal gases Properties of mixture of gases.

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, feed water heaters, working fluids in vapor power cycle, binary vapor cycles, efficiency of coupled cycles, process heat, efficiencies in power cycles.Introduction of condensers. (Merged in unit 1)

UNIT II - Engine Construction, Operation And Performance:

Basics of CI and SI Engines, Valve timing diagram, Firing order and its significance - relative merits and demerits of SI and CI engines. Two stroke engine construction and operation. Comparison of four-stroke and two-stroke engines. Performance parameters, Heat balance. Testing of engine. (Added)

Unit III Nozzles and diffuser :- Introduction, SFEE and continuity equation for nozzles, momentum equation for steam nozzle, entropy change due to friction in nozzle, nozzle efficiency, critical pressure, stagnation enthalpy & pressure, Relation between area, velocity & pressure in nozzle, effect of friction on critical pressure ratio, supersaturated flow in nozzles, effect of variation of back pressure.(Removed)

UNIT III - Combustion In SI And CI Engines:

Combustion process in IC engines.Stages of combustion, Flame propagation, velocity and area of flame front.Rate of pressure rise - Cycle to cycle variation – Abnormal combustion - Theories of detonation - Effect of engine operating variables on combustion.Combustion chambers for SI and CI engines, Importance of air motion - Swirl, squish and turbulence - Swirl ratio. Fuel air mixing



 Stages of combustion - Delay period - Factors affecting delay period, Knock in CI engines methods of controlling diesel knock.(Added)

Unit IV Fuels and Combustion of Fuel : Types of fuels, Combustion, Determination of minimum air required for combustion. Conversion of volumetric analysis to mass Analysis. Determination of air required when volumetric analysis fuel gases is known. Determination of Excess air Determination of Calorific value of fuels. Bomb calorimeter, Orsat apparatus Junkers gas calorimeter. (Removed)

UNIT IV – Turbines And Pumps

Classification, Pelton, Francis and Kaplan turbines, vector diagrams and work done Draft Tubes, governing or water turbines, Impulse staging, velocity and pressure compounding utilization factor, analysis for optimum U.F. Curtis stage, and Rateau stage, including qualitative analysis. Effect of blade and nozzle losses on Vane efficiency, Stage efficiency. Analysis for optimum efficiency vortex types of flow, flow with constant reaction. Application of dimensional analysis, similarity to turbines and pumps, Classification, advantage over reciprocation type, definition of manometric head gross head, static head, vector diagram and work done. Performance and Characteristics of turbines and pumps. (Added)

Unit V Steam generators:- Water tube boilers, high pressure boilers, combustion equipment for steam boilers, boiler mountings and accessories, Draught, chimney height and diameters, condition for maximum discharge through chimney, draught losses, artificial draught, steam jet draught, performance of steam generators, equivalent evaporation, factor of evaporation, boiler efficiency, heat losses in boilers. (Removed)

Unit V Refrigeration and Air Conditioning

- Reversed Brayton Cycle, Bell-Coleman Cycle.Air Cycles for Aircraft Refrigeration, Properties Requirement, & Applications of Refrigerants.CFC & HFC Refrigerants.Simple vapour Absorption Systems-Electrolux Refrigerator, Refrigerants, Ozone depleting refrigerants.
- Vapour Compression System: Simple Systems, Multi pressure systems. Compound Compression, Multi Evaporator Systems. Cascade Systems. Vapour absorption system,

Air Conditioning: Introduction to Psychometry and Air Conditioning. (Added)

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

- 1. **State** the basic concepts of thermal sciences and their application to in formulating the thermal engineering problems.
- 2. Examine the equivalent evaporation of steam generators.
- 3. In a position to check the feasibility of proposed processes and cycles.
- 4. **Analyze** basic power cycles and apply the laws of thermodynamics to various thermodynamic applications.
- 5. Explain fuel combustion and its application.
- 6. Describe and assess benefits of improvements to thermal systems.

Text & Reference Books:

- 1. Engineering thermodynamics by P.K. Nag
- 2. Thermal engineering by R.K. Rajput
- 3. Thermal engineering by P.L. Ballan

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