

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



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	Chairman-cum-Managing Director, NIMDC, External Expert
(5) Dr. Pratesh Jayswal	Member (19) Prof. Shubham Shrivastava Member
(6) Dr. Chandra Shekhar Malvi	Member (20) Dr. Amrat kumar Dhamneya Member
(7) Dr. Manoj K Gaur	Member (21) 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
(12) Prof. Sharad Agrawal	Member (26) Dr. Ravi kant Ranjan Member
(13) Prof. Vaibhav Shivhare	Member (27) Prof. Vaibhav Gupta Member
(14) Dr. Amit Aherwar	Member (28) Prof. Narendra Singh Sikarwar Member
(15) Prof. Bhupendra K Pandey	Member (29) Prof. Manish sharma Member
(16) 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 <p style="text-align: center;">➤ 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.</p>

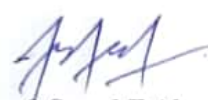
	gap in CO attainment and the corrective measures proposed by the experts and other BOS members are listed in the Annexure-IX.
Item 10:	To propose/ recommend the panel of examiners (UG & PG Level) for conducting practical examination ➤ The propose/ recommend list of the panel of examiners (UG & PG Level) 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.

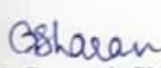
The meeting was ended with vote of thanks to the chairperson and committee members.

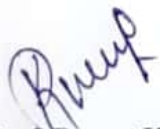

Prof. Neeraj Mishra
 (BoS Member)



Prof. Sayed F Ahmad
 (BoS Member)



Dr. N K Raghuvanshi
 (BoS Member)

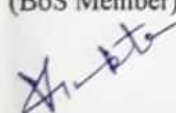

Dr. Amrat K Dhamneya
 (BoS Member)


Prof. Gyanesh Sharan
 (BoS Member)

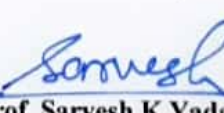

Prof. Puneet K Nema
 (BoS Member)

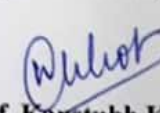

Prof. Manish Sharma
 (BoS Member)


Prof. Narendra S Sikarwar
 (BoS Member)

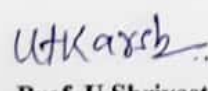

Prof. Vaibhav Gupta
 (BoS Member)


Dr. Ravi kant Ranjan
 (BoS Member)


Prof. Sarvesh K Yadav
 (BoS Member)

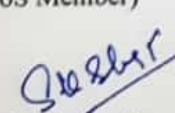

Prof. Kaustubh Khot
 (BoS Member)


Prof. Kapil
 (BoS Member)


Prof. U Shrivastava
 (BoS Member)

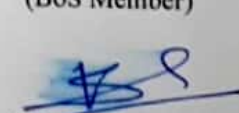

Prof. sumit K Singh
 (BoS Member)

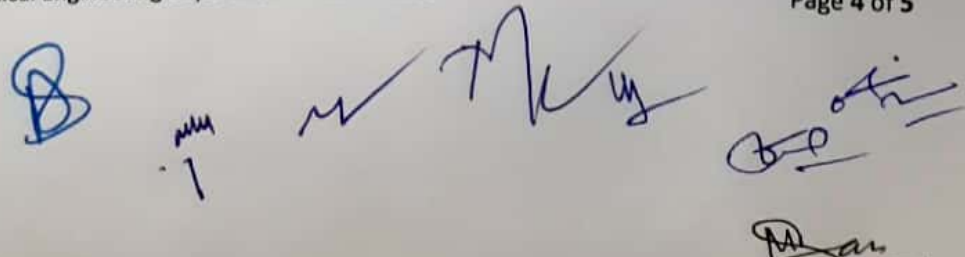

Dr. Dharmendra Jain
 (BoS Member)


Prof. S. Shrivastava
 (BoS Member)


Prof. B. K. Pandey
 (BoS Member)


Dr. Amit Ahirwar
 (BoS Member)


Prof. Vaibhav Shivhare
 (BoS Member)





Prof. Sharad Agrawal
(BoS Member)



Prof. D. K. Kasdekar
(BoS Member)



Dr. Jyoti Vimal
(BoS Member)



Prof. V. Chaturvedi
(BoS Member)



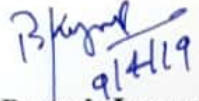
**Prof. Rajendra Prasad
Kori**
(BoS Member)



Dr. Manoj Kumar Gaur
(BoS Member)



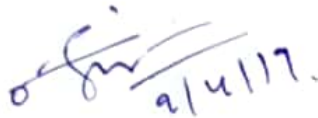
**Dr. Chandra Shekhar
Malvi**
(BoS Member)



Dr. Pratesh Jayaswal
(BoS Member)



Dr. Pushpendra Singh
(External Expert)



Dr. Qasim Murtaza
(External Expert)



Er.C.G.Porwal
(External Expert)



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			Theory Paper
Departmental Core-DC	Thermal Engineering	120504	L	T	P	Max.Marks-70 Min.Marks-22 Duration-3hrs.
			3	1	0	

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 , Ericsson ,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

P.L
Mukherjee

M - 3

- 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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