

BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK  
DEPARTMENT OF MECHANICAL ENGINEERING



LESSON PLAN

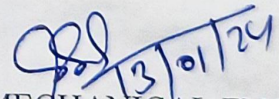
SUBJECT: THERMAL ENGINEERING -II

FACULTY: PRASANTA KUMAR PADHI

ACCADEMIC SESSION: 2023-24

SEMESTER: 4<sup>TH</sup>

SEC: A

  
H O D (MECHANICAL ENGG.)

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|                                               |                                                                                                                                                                          |                               |                                                                                                                                        |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Discipline:</b><br>Mechanical Engineering  | <b>Semester:</b> 4 <sup>TH</sup>                                                                                                                                         | <b>Section-A</b>              | <b>Name of the teaching faculty:</b><br>P.K.PADHI                                                                                      |
| <b>Subject:</b><br>THERMAL<br>ENGINEERING -II | <b>No. of Days/ per week class allotted:</b><br>04periods per week<br>(Mon-2 <sup>ND</sup> period, Tue-1 <sup>st</sup> period, Thu-1 <sup>st</sup> period, Sat-1 period) |                               | <b>Semester From Date:</b> 16-01-2024 <b>To Date:</b> 26-04-2024<br><b>No. of weeks:</b> 15 weeks                                      |
| <b>Week</b>                                   | <b>Class Day</b>                                                                                                                                                         | <b>No of period available</b> | <b>Theory Topics</b>                                                                                                                   |
| 1 <sup>ST</sup>                               | 16/01/2024                                                                                                                                                               | 1                             | Discussion of Syllabus and application of Thermodynamic                                                                                |
|                                               | 18/01/2024                                                                                                                                                               | 1                             | Introduction to thermal engineering-II<br>1.Performance of IC engine<br>1.1 Define mechanical efficiency ,indicated thermal efficiency |
| 2 <sup>ND</sup>                               | 25/01/2024                                                                                                                                                               | 1                             | 1.1 Define relative efficiency ,brake thermal efficiency, overall efficiency,                                                          |
| 3 <sup>RD</sup>                               | 29/01/2024                                                                                                                                                               | 1                             | 1.1 Define mean effective pressure and specific fuel consumption<br>1.2                                                                |
|                                               | 30/01/2024                                                                                                                                                               | 1                             | 1.2 Define air-fuel ratio and calorific value of fuel                                                                                  |
|                                               | 01/02/2024                                                                                                                                                               | 1                             | 1.3 work out problems to determine efficiencies and specific fuel consumption                                                          |
|                                               | 03/02/2024                                                                                                                                                               | 1                             | 2. Air compressor<br>2.1 Explain function of compressor and industrial uses of compressed air                                          |

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|-----------------|------------|---|--------------------------------------------------------------------------------------------------------------------------------------------|
| 4 <sup>TH</sup> | 05/02/2024 | 1 | 2.2 classify air compressor and principle of operation                                                                                     |
|                 | 06/02/2024 | 1 | 2.3 describe the parts of reciprocating air compressor                                                                                     |
|                 | 08/02/2024 | 1 | 2.3 describe the principle of reciprocating air compressor                                                                                 |
|                 | 10/02/2024 | 1 | 2.4 explain the terminology of reciprocating compressor such as bore, stroke, pressure ratio ,free air delivered and volumetric efficiency |
| 5 <sup>TH</sup> | 12/02/2024 | 1 | 2.5 derive the work done of single stage compressor without clearance                                                                      |
|                 | 13/02/2024 | 1 | 2.5 derive the work done of single stage compressor with clearance                                                                         |
|                 | 15/02/2024 | 1 | 2.5 derive the work done of two stage compressor with or without clearance                                                                 |
|                 | 17/02/2024 | 1 | 2.6 solve simple problems(without clearance only)                                                                                          |
| 6 <sup>TH</sup> | 19/02/2024 | 1 | Discussion of Syllabus and application of Thermodynamic                                                                                    |
|                 | 20/02/2024 | 1 | 3 Properties of steam 3.1 Difference between gas and vapour<br>3.2 formation of steam                                                      |
|                 | 22/02/2024 | 1 | 3.3 Representation on P-V,T-S H-S and T-H diagram                                                                                          |
|                 | 24/02/2024 | 1 | 3.3 Representation on P-V,T-S H-S and T-H diagram                                                                                          |
| 7 <sup>TH</sup> | 26/02/2024 | 1 | 3.4 definition and properties of steam                                                                                                     |
|                 | 27/02/2024 |   | 3.5 use of steam table for finding unknown properties                                                                                      |
|                 | 29/02/2024 | 1 | 3.5 use of mollier chart for finding unknown properties                                                                                    |
|                 | 02/03/2024 | 1 | Class test-1                                                                                                                               |

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| 8 <sup>TH</sup>  | 04/03/2024 | 1 | 3.6 non flow and flow process of vapour                                                         |
|                  | 07/03/2024 | 1 | 3.6 non flow and flow process of vapor                                                          |
|                  | 09/03/2024 | 1 | 3.7 P-V,T-S AND H-S diagram                                                                     |
| 9 <sup>TH</sup>  | 11/03/2024 | 1 | 4.2 Describe defects of cooling and their remedial measures                                     |
|                  | 12/03/2024 | 1 | 3.8 determine the changes in properties and solve simple numerical                              |
|                  | 14/03/2024 | 1 | 4 steam generator<br>4.1 classification and types of boiler                                     |
|                  | 16/03/2024 | 1 | 4.2 important terms for boiler                                                                  |
| 10 <sup>TH</sup> | 18/03/2024 | 1 | 4.3 comparison between fire tube and water tube boiler                                          |
|                  | 19/03/2024 | 1 | 4.4 description and working of common boilers<br>(Cochran,Lancashire,babcock and wilcox boiler) |
|                  | 21/03/2024 | 1 | 4.4 description and working of common boilers<br>(Cochran,Lancashire,babcock and wilcox boiler) |
|                  | 23/03/2024 | 1 | 4.4.description and working of common<br>boilers(Cochran,Lancashire,babcock and wilcox boiler)  |
| 11 <sup>TH</sup> | 28/03/2024 | 1 | 4.5 boiler draught (forced, induced and balanced)                                               |
|                  | 30/03/2024 | 1 | 4.6 boiler mounting and accessories                                                             |

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| 12 <sup>TH</sup> | 02/04/2024 | 1 | 5 steam power cycle<br>5.1 Carnot cycle with vapour                                             |
|                  | 04/04/2024 | 1 | 5.2 Derive work and efficiency of the cycle                                                     |
|                  | 06/04/2024 | 1 | 5.3 rankine cycle                                                                               |
| 13 <sup>TH</sup> | 08/04/2024 | 1 | 5.3.1 representation in P-V,T-S and H-S diagram                                                 |
|                  | 09/04/2024 | 1 | 5.3.1 representation in P-V,T-S and H-S diagram                                                 |
|                  | 12/04/2024 | 1 | 5.3.2 derive work and efficiency of the cycle                                                   |
|                  | 13/04/2024 | 1 | 5.3.3 effect of various end conditions in rankine cycle                                         |
| 14 <sup>TH</sup> | 15/04/2024 | 1 | 5.3.4 reheat and regeneration cycle                                                             |
|                  | 16/04/2024 | 1 | 5.4 solve simple numerical on carnotvapour cycle and rankine cycle                              |
|                  | 18/04/2024 | 1 | 6 Heat transfer<br>6.1 modes of heat transfer(conduction ,convection and radiation)             |
|                  | 20/04/2024 | 1 | 6.2 fourier law of heat conduction and thermal conductivity                                     |
|                  | 22/04/2024 | 1 | 6.3Newtons law of cooling                                                                       |
| 15 <sup>TH</sup> | 23/04/2024 | 1 | 6.4 Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement, no derivation |
|                  | 25/04/2024 | 1 | 6.5 Black body radiation, emissivity, absorptivity and transmissivity                           |
|                  | 27/4/2024  | 1 | Revision                                                                                        |
| 16 <sup>th</sup> | 29/4/2024  | 1 | Revision                                                                                        |
|                  | 30/4/2024  | 2 | Previous year Question discussion                                                               |
|                  | 01/05/2024 | 1 | Previous year Question discussion.                                                              |