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| **SIR ISSAC NEWTON COLLEGE OF ENGINEERING&TECHNOLOGY** **DEPARTMENT OF MECHANICAL ENGINEERING** **SUBJECT CODE/NAME: ME6502 HEAT AND MASS TRANSFER****UNIT-I BRANCH: MECHANICAL YEAR/SEM: III/V** |

**UNIT I CONDUCTION 9**

General Differential equation of Heat Conduction– Cartesian and Polar Coordinates – One

Dimensional Steady State Heat Conduction –– plane and Composite Systems – Conduction with Internal Heat Generation – Extended Surfaces – Unsteady Heat Conduction – Lumped Analysis – Semi Infinite and Infinite Solids –Use of Heisler’s charts.

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|  **Session****No** | **TOPICS TO BE COVERED**  | **NO. OF HOURS (as per Anna university)** |  **NO. OF HOURS (Needed)** | **BOOKS (Referred Page numbers)** |
| **1** | **2** |
| 01. | General Differential equation of Heat Conduction | 9 | 1 |  |  |
| 02. | Cartesian and Polar Coordinates Objectives and  | 1 |  |  |
| 03. | OneDimensional Steady State Heat Conduction | 1 |  |  |
| 04. |  plane and Composite Systems Conduction with Internal Heat Generation | 2 |  |  |
| 05. | Extended Surfaces Unsteady Heat Conduction | 2 |  |  |
| 06. | Lumped Analysis Semi Infinite and Infinite Solids | 1 |  |  |
| 07. | Use of Heisler’s charts..  | 2 |  |  |

**TEXT BOOKS:**

1. Frank P. Incropera and David P. Dewitt, "Fundamentals of Heat and Mass Transfer", John

Wiley & Sons, 1998.

2. Venkateshan. S.P., "Heat Transfer", Ane Books, New Delhi, 2004.

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**UNIT II CONVECTION 9**

Free and Forced Convection - Hydrodynamic and Thermal Boundary Layer. Free and Forced

Convection during external flow over Plates and Cylinders and Internal flow through tubes .

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|  **Session****No** | **TOPICS TO BE COVERED** | **NO. OF HOURS (as per Anna university)** |  **NO. OF HOURS (Needed)** | **BOOKS (Referred Page numbers)** |
| **1** | **2** |
| 01. | Free and Forced Convection | 9 | 1 |  |  |
| 02. | Hydrodynamic and Thermal Boundary Layer | 2 |  |  |
| 03. | Free and ForcedConvection during | 1 |  |  |
| 04. | external flow over Plates | 2 |  |  |
| 05. | Cylinders | 1 |  |  |
| 06. | Internal flow | 1 |  |  |
| 07. | through tubes | 2 |  |  |

**TEXT BOOKS:**

1. Frank P. Incropera and David P. Dewitt, "Fundamentals of Heat and Mass Transfer", John

Wiley & Sons, 1998.

2. Venkateshan. S.P., "Heat Transfer", Ane Books, New Delhi, 2004.

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**UNIT III PHASE CHANGE HEAT TRANSFER AND HEAT EXCHANGERS 9**

Nusselt’s theory of condensation - Regimes of Pool boiling and Flow boiling. Correlations in boiling and condensation. Heat Exchanger Types - Overall Heat Transfer Coefficient – Fouling Factors - Analysis – LMTD method - NTU method.

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|  **Session****No** | **TOPICS TO BE COVERED** | **NO. OF HOURS (as per Anna university)** |  **NO. OF HOURS (Needed)** | **BOOKS (Referred Page numbers)** |
| **1** | **2** |
| 01. | Nusselt’s theory of condensation | 9 | 1 |  |  |
| 02. | Regimes of Pool boiling and Flow boiling. | 2 |  |  |
| 03. | Correlations in boiling and condensation. | 1 |  |  |
| 04. | Heat Exchanger Types | 1 |  |  |
| 05. | Overall Heat Transfer Coefficient | 1 |  |  |
| 06. | Fouling Factors - Analysis | 2 |  |  |
| 07. | LMTD method - NTU method. | 3 |  |  |

**TEXT BOOKS:**

1. Frank P. Incropera and David P. Dewitt, "Fundamentals of Heat and Mass Transfer", John

Wiley & Sons, 1998.

2. Venkateshan. S.P., "Heat Transfer", Ane Books, New Delhi, 2004.

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**UNIT IV REPAIR METHODS FOR BASIC MACHINE ELEMENTS 10**

Repair methods for beds, slide ways, spindles, gears, lead screws and bearings – Failure analysis – Failures and their development – Logical fault location methods – Sequential fault location.

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|  **Session****No** | **TOPICS TO BE COVERED** | **NO. OF HOURS (as per Anna university)** |  **NO. OF HOURS (Needed)** | **BOOKS (Referred Page numbers)** |
| **1** | **2** |
| 01. | Repair methods for beds, slide ways | 10 | 1 |  |  |
| 02. | Repair methods for spindles, gears, lead screws and bearings  | 2 |  |  |
| 03. | Failure analysis | 1 |  |  |
| 04. | Failures and their development  | 2 |  |  |
| 05. | Logical fault location methods | 2 |  |  |
| 06. | Sequential fault location. | 2 |  |  |

**TEXT BOOKS:**

1. Dr.G.K.Vijayaragavan.”Maintenance Engineering”

2. Srivastata S.K.”Industrial Maintenance Management”

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**UNIT V REPAIR METHODS FOR MATERIAL HANDLING EQUIPMENT 8**

Repair methods for Material handling equipment - Equipment records –Job order systems -Use of computers in maintenance.

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|  **Session****No** | **TOPICS TO BE COVERED** | **NO. OF HOURS (as per Anna university)** |  **NO. OF HOURS (Needed)** | **BOOKS (Referred Page numbers)** |
| **1** | **2** |
| 01. | Repair methods for Material handling equipment | 8 | 2 |  |  |
| 02. | Equipment records | 2 |  |  |
| 03. | Job order systems | 2 |  |  |
| 04. | Use of computers in maintenance.  | 2 |  |  |

**TEXT BOOKS:**

1. Dr.G.K.Vijayaragavan.”Maintenance Engineering”

2. Srivastata S.K.”Industrial Maintenance Management”

**SUBJECT INCHARGE** **HOD** **PRINCIPAL**