

Information of every subject	
1	Unit name: -Gas Turbine Theory
2	Code: ME-51043
3	Classification: Engineering subject
4	Credit value: 3
5	Semester/ Year Offered: 1/2
6	Pre-requisite:
7	Mode of delivery: Lecture, Practical, Tutorial, Viva
8	Practical 20%
	Tutorials 5%
	Viva 5%
	Mid-term/ final Examination 35% / 35%
9	Academic staff teaching unit:
10	<p>Course outcome of unit: In this course, students will be able</p> <p><b>Semester (I)</b></p> <ol style="list-style-type: none"> <li>1. Demonstrate the gas turbine power plant</li> <li>2. Illustrate the jet propulsion system</li> <li>3. Analyze the performance of the gas turbine engine</li> <li>4. Present the technical details of the compressors used in gas power systems.</li> </ol> <p><b>Semester (II)</b></p> <ol style="list-style-type: none"> <li>1. Analyze the state of performance of axial flow compressors.</li> <li>2. Understand the operation, types and performance of combustion system</li> <li>3. Know the turbine blade profile, pitch, chord and overall turbine performance.</li> <li>4. Analyze the performance of simple gas turbine.</li> </ol>
11	<p>Synopsis of unit: Gas turbine components arrangement, Gas turbine cycles, Aircraft propulsion, Principle of operation of centrifugal compressure</p>

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Topic:

**Semester (I)**

**1**

**Introduction**

- 1.1 0 -pen-cycle single-shaft and twin-shaft arrangements
- 1.2 Multi-spool arrangements
- 1.3 Closed cycles
- 1.4 Aircraft propulsion
- 1.5 Industrial applications
- 1.6 Marine and land transportation
- 1.7 Environmental issues
- 1.8 Some future possibilities
- 1.9 Gas turbine design procedure

**2**

**Shaft power cycles**

- 2.1 Ideal cycles
- 2.2 Methods of accounting for component losses
- 2.3 Design point performance calculations
- 2.4 Comparative performance of practical cycles
- 2.5 Combined cycles and cogeneration schemes
- 2.6 Closed-cycle gas turbines

**3**

**Gas turbine cycles for aircraft propulsion**

- 3.1 Criteria of performance
- 3.2 Intake and propelling nozzle efficiencies
- 3.3 Simple turbojet cycle
- 3.4 The turbofan engine
- 3.5 The turboprop engine
- 3.6 The turbo shaft engine
- 3.7 Auxiliary Power Units
- 3.8 Thrust augmentation
- 3.9 Miscellaneous topics

**4**

**Centrifugal compressors**

- 4.1 Principle of operation
- 4.2 Work done and pressure rise
- 4.3 The diffuser
- 4.4 Compressibility effects
- 4.5 Non-dimensional quantities for plotting compressor characteristics
- 4.6 Compressor characteristics
- 4.7 Computerized design procedures

14	Main references: Gas Turbine Theory, 6 <sup>th</sup> Edition, HHH Saravanamuttoo
15	Additional references: