

Course code	Course Name	L-T-P-Credits	Year of Introduction
IC309	MACHINES AND DRIVES	3-0-0-3	2016
<b>Prerequisite : Nil</b>			
<b>Course Objectives</b> <ul style="list-style-type: none"> <li>To understand the basic types and working of Transformers</li> <li>To earn a basic knowledge of electrical machines</li> <li>To learn the basics of power electronics and drives.</li> </ul>			
<b>Syllabus</b> Transformers- synchronous machines- Induction motors- Power Semi conductor devices-AC Drives-Induction Motor drives-Special Electrical Machines.			
<b>Expected Outcome</b> After the completion of the course, students should be able to <ul style="list-style-type: none"> <li>Comprehend systems with electrical machines and drives.</li> <li>Effectively utilize electrical machines and drives in industry for various purposes.</li> </ul>			
<b>Text Books:</b> <ol style="list-style-type: none"> <li>M G Say, The performance and design of AC Machines, CBS Publishers and distributors</li> <li>P.S Bhimbra, Electrical Machines, Khanna publications</li> </ol>			
<b>References:</b> <ol style="list-style-type: none"> <li>Dubey G K, Fundamentals of Electric Drives, Narosa</li> <li>E G Janardanan, Special Electrical Machines, Printice Hall of India</li> <li>Edward Hughes , Electrical Technology, , ELBS</li> <li>J.B.Gupta, Electrical Machines (AC &amp; DC Machines), JBA Publishers</li> <li>M.N.Bandyopadhyay, Electrical machines , Printice Hall India</li> <li>Vedamsubrahmanian, Electrical Drives, McGrawHill</li> </ol>			
<b>Course Plan</b>			
Module	Contents	Hours	Sem. Exam Marks
I	Role of electrical machines and drives in the realm of Instrumentation and Control Transformers –principle of operation- EMF equation- vector diagram –types-equivalent circuit-regulation-losses –efficiency- All day efficiency- autotransformer – Current Transformers, Potential Transformers	7	15%
II	Alternators–emf equation-types of excitation- vector diagram- regulation emf and mmf methods-parallel operation concepts.	7	15%
<b>FIRST INTERNAL EXAM</b>			

<b>III</b>	Induction motors-principle of working-advantages-- types of induction motors -slip-equivalent circuit- -losses and efficiency-speed control-braking Single phase induction motors- principle of operation-types	7	<b>15%</b>
<b>IV</b>	Power semiconductor devices: Power diode and Power MOSFET's-(construction and working only).Thyristors and IGBT's-construction, working and characteristics-Chopper-step up-step down-quadrant chopper	7	<b>15%</b>
<b>SECOND INTERNAL EXAM</b>			
<b>V</b>	AC Drives-Induction motor speed control-stator voltage and frequency control- VSI fed induction motor drive	7	<b>20%</b>
<b>VI</b>	Special electrical machines- stepper motors- synchros- ac servomotors- tacho-generators	7	<b>20%</b>
<b>END SEMESTER EXAM</b>			

**QUESTION PAPER PATTERN:**

Maximum Marks: 100

Exam Duration: 3 Hours

**Part A**

Answer any two out of three questions uniformly covering Modules 1 and 2. Each question carries 15 marks and can have not more than four sub divisions. (15 x 2 = 30 marks)

**Part B**

Answer any two out of three questions uniformly covering Modules 3 and 4. Each question carries 15 marks and can have not more than four sub divisions. (15 x 2 = 30 marks)

**Part C**

Answer any two out of three questions uniformly covering Modules 5 and 6. Each question carries 20 marks and can have not more than four sub divisions. (20 x 2 = 40 marks)