

Syllabus for B.Tech – Energy Engineering

Course Number & Title: EN 201: Electrical Machines and Power Electronics

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L-T-P-C: 3-1-0-8	
Offered in (Odd/ Even / Any): Semester III	
Pre-Requisite: Nil	
Preamble / Objectives (Optional): This course aims to provide basic foundation of electrical machines and power electronics for electrical energy conversion and control.	
<p>Course Content/ Syllabus: Magnetic circuits, mutually coupled circuits; Transformers: Principle of operation, equivalent circuit, phasor diagrams, testing, parallel operation and analysis of single phase, three phase transformers and auto transformers; principle of operation characteristics and control of DC, single phase and three phase induction machines and synchronous machines; Starting techniques of induction motors; Introduction to stepper motors, brushless DC machines, permanent magnetic machines, energy efficient machines.</p> <p>Characteristics and protection of power semiconductor devices; AC to DC converters: Single and three phase controlled rectifiers, dual converters and pulse width modulated rectifiers; DC to DC converters: operations of buck, boost, buck b boost, Cuk, fly back, and forward converters; DC to AC converters: single phase and three phase topologies, PWM techniques including (sine triangular space vector PWM); AC to AC conversion: AC voltage controllers, cyclo-converter; overview of various types of electrical drives.</p>	
Books (In case UG compulsory courses, please give it as “Text books” and “Reference books”. Otherwise give it as “References”.	
Texts: (Format: Authors, <i>Book Title in Italics font</i> , Volume/Series, Edition Number, Publisher, Year.)	
1.	P C Sen, <i>Principle of Electric Machines</i> , John Wiley & Sons, New Delhi, 3 rd Edition, 2013.
2.	A E Fitzgerald, Charles Kingsley, S D Umans, <i>Electric Machinery</i> , Tata McGraw Hill, New Delhi, 2017.
References: (Format: Authors, <i>Book Title in Italics font</i> , Volume/Series, Edition Number, Publisher, Year.)	
1	D P Kothari, I J Nagarath, <i>Electric Machines</i> , Tata McGraw-Hill, 2004.
2	B.K. Bose, <i>Power Electronics & A. C. Drives</i> , Prentice Hall, 1986.
3.	N Mohan, T M Undeland, W P Robbins, <i>Power Electronics: converter, Applications & design</i> , John Wiley & Sons, 2002.