

### ELECTRICAL DRIVES

<b>Course Code</b>	20EE4601B	<b>Year</b>	III	<b>Semester(s)</b>	II
<b>Course Category</b>	Professional Elective-II	<b>Branch</b>	EEE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Power Electronics, Electrical Machines-1, Electrical Machines-2
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

#### Course Outcomes

**Upon successful completion of the course, the student will be able to**

CO1	<b>Understand</b> the basic Power Converters to drives Classification of Electrical Drives, choice of electric drives and selection of drives ,braking and motoring operations of converters fed to drives.(L2)
CO2	<b>Apply</b> the basic knowledge to obtain the operation, multi-quadrant operation, speed torque characteristics ,applications of Rectifiers and Choppers fed to DC drives ,Various parts of Electric Drive,.(L3)
CO3	<b>Apply</b> the basic knowledge to obtain the operation, speed torque characteristics, applications for Inverters and AC to AC converters fed to AC drives, fundamental torque equation. (L3)
CO4	<b>Analyze</b> the concepts of Rectifiers and Choppers fed to DC drives.(L4)
CO5	<b>Analyze</b> the concepts of Inverters and AC to AC converters fed to AC drives, fundamental torque equation. (L4)
CO6	<b>Submit a report</b> in Fundamentals, Rectifiers, Choppers, Inverters and AC to AC converters of Electric Drives.

#### Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3					1	1						2	1
CO3	3					1	1						2	1
CO4		2											2	1
CO5		2											2	1
CO6						3	3		3	3		3	2	1

#### SYLLABUS

Unit No.	Contents	Mapped CO
I	<b>Fundamentals of Electric Drives</b> Introduction of Electric drives and various parts, Classification of Electrical Drives, choice of electric drives and selection of drives for various	CO1 CO2 CO3

	applications; fundamental torque equation, multi-quadrant operation of a motor driving hoist, Equivalent values of Drive Parameters.	CO5 CO6
II	<b>DC Drives-Rectifiers</b> Controlled rectifier fed dc drives, single phase half controlled rectifier control, single phase fully controlled rectifier control of dc separately excited motor, rectifier control of dc series motor. Three phase half controlled rectifier control, Three phase fully controlled rectifier control of dc separately excited motor, multi quadrant operation of separately excited motor fed from fully controlled rectifier.	CO1 CO2 CO4 CO6
III	<b>DC Drives- Choppers</b> Buck and Boost converter fed DC Drives, types of braking, Control of chopper fed dc separately excited, series motor and speed-torque characteristics. Converter ratings and closed loop control.	CO1 CO2 CO4 CO6
IV	<b>AC Drives</b> Stator voltage control, variable frequency control from voltage sources, VSI fed induction motor drives, rotor resistance control, slip power recovery schemes-static scherbius, static Kramer drive.	CO1 CO3 CO5 CO6
V	<b>Essential Applications of Electrical Drives</b> Solar powered Pump Drives, Battery Powered Electrical Vehicles, Drive requirements for machine tools, Brushless DC motor drive for Servo Applications. AC Traction using converter controlled dc Motors and DC Traction Using Chopper controlled dc Motors.(Block diagram only-no problems)	CO1 CO2 CO3 CO6

### Learning Resources

#### Text Books

1. G K Dubey ,Fundamentals of Electric Drives, Narosa Publications,2<sup>nd</sup> edition,2011
2. R.Krishnan, Electric Motor & Drives: Modeling, Analysis and Control, Prentice Hall of India, 2<sup>nd</sup> edition, 2001.

#### Reference Books

1. G.K. Dubey, Power Semiconductor Controlled Drives, Alpha Science International Ltd. 1<sup>st</sup> edition,2002.
2. Bimal K. Bose, Modern Power Electronics and AC Drives, Prentice-hall of India Pvt. Ltd,2<sup>nd</sup> edition, 2005.
3. P.S.Bhimbra, 'PowerElectronics', Khanna Publications, 5<sup>th</sup> edition, 2018.
4. Vedam Subramanyam, Electric Drives Concepts and Applications, Tata McGraw Hill Education Private Limited, 2<sup>nd</sup> edition, 2011

#### Web Links

1. <https://nptel.ac.in/courses/108104140>