	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**Bachelor of Technology in Electrical and Electronics Engineering**	Year of Regulation	**2018-19**
Department	**Electrical Engineering**	Semester	**VIII**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EE420	**Application of Power Electronics**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives	To acquire the basic knowledge of power electronic circuits and its application to different important fields.	Course Outcomes	CO1	Able to know the uses and working of different power electronic circuits in power generation and transmission.
	To gather the knowledge how the power electronics circuits are effective in different fields.		CO2	Able to understand the circuit operation for power quality improvement and different active power filters
	To understand the operation of different power electronic circuits in different applications		CO3	Able to analyze the application of power electronic circuits in different renewable energy applications.
			CO4	Able to understand different electric vehicle application where power electronic circuits played an important rule.

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3	2	2	2	2	2	1	0	0	0	0	1	1	1	2
2	CO2	3	2	3	1	1	2	1	0	0	0	0	1	1	1	2
3	CO3	3	3	2	2	1	2	3	0	0	0	0	1	1	1	2
4	CO4	3	2	2	1	2	2	2	0	0	0	0	1	1	1	2

SYLLABUS

No.	Content	Hours	COs
I	**Power system Applications** Power Generation: hydroelectric power generation, Wind power generation, Power Transmission: Shunt compensator, Static Var Compensator, Thyristor switched capacitor, Thyristor switched reactor, Synchronous voltage source, STATCOM, FACTS, Power Quality: Static Frequency Converter (SFC), Rail Power Conditioner (RPC), High Voltage Direct Current (HVDC) and Energy Storage Systems (ESS), Active Power Filter: Shunt, Series, Hybrid	**16**	**CO1, CO2**
II	**Renewable energy applications** Solar Power Generation: dc to dc converter, Inverter: micro inverter, String inverter, Central inverter, Wind Power Generation: Soft-Starter for Fixed-Speed Wind Turbines, Variable-Speed Wind Turbines: Rotor Resistance Control, Doubly Fed Induction Generator	**10**	**CO3**
III	**Electric Vehicle Applications** Regenerative braking, dc to dc converter: isolated dc to dc converter, zero voltage switching, Cascaded buck boost capacitor in the middle, Cascaded buck boost inductor in the middle, Traction inverter: H-bridge inverter, tri-port converter, integrated synchronous buck converter, and Bidirectional z source nine switch inverter	**10**	**CO4**
	Total Hours	**36**	

Essential Readings

1. Mohan, Undeland, Robbins, Power Electronics: Converters Applications and Design, Wiley publisher, 3rd edition, 2007.
2. L. Umanand, “Power Electronics Essential and Applications”, Willey publisher, 1st edition, 2009.

Supplementary Readings

3. M. H Rashid, “Power Electronics Circuits, Devices, and Applications”, 1st edition, Pearson publishers, 2014.
4. P. S. Bimbhra, “Power Electronics”, Khanna Publishers, 1st edition, 2006.
5. J. P. Agrawal, “Power Electronic Systems: Theory and Design”, 1st edition, Pearson Publisher, 2000.
6. V. R. Moorthi, “Power Electronics Devices, Circuits and Applications”, Oxford University Press, 1st edition, 2005.