BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI

NEW COURSE STRUCTURE - To be effective for B.Tech. 2021-22, 2022-23 Based on CBCS system & OBE model

Recommended scheme of study

(EEE)

S. No	Semester of Study (Recommended)	Category of course	Course Code	Subjects	Mode of delivery & credits L-Lecture; T-Tutorial; P-Practical			Total Credits C- Credits
					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
THEORY								
I.1	**FIRST**	**FS**	MA 103	Mathematics – I	3	1	0	4
I.2			CH101	Chemistry	3	1	0	4
I.3		**GE**	EC101	Basic of Electronics and Communication Engineering	3	1	0	4
			ME101	Basic of Mechanical Engineering	3	1	0	4
I.4		**FS**	CE101	Environmental Science	2	0	0	2
		LABORATORIES						
I.6		**FS**	CH102	Chemistry Lab	0	0	3	1.5
I.7		**GE**	EC102	Electronics and Communication Lab	0	0	3	1.5
I.8			ME102	Engineering Graphics	0	0	4	2
		MC **Mandatory**	MC101/102/103 /104/109	Choice of: NCC/NSS/ PT & Games/ Creative Arts (CA)/ Entrepreneurship	0	0	2	1
				TOTAL (Theory + Labs)				**24**
THEORY								
II.1	**SECOND**	**FS**	MA107	Mathematics – II	3	1	0	4
			PH113	Physics	3	1	0	4
II.2			BE101	Biological Science for Engineers	2	0	0	2
II.3		**GE**	CS101	Programming for problem-Solving	3	1	0	4
II.4			EE101	Basic Electrical Engineering	3	1	0	4
		LABORATORIES						
II.6		**FS**	PH114	Physics Lab	0	0	3	1.5
II.7		**GE**	CS102	Programming for problem Solving	0	0	3	1.5
II.8			PE101	Workshop Practice	0	0	3	1.5
		HSS	MT132	Communication Skills-I	0	0	3	1.5
		MC	MC105/106/107 /108/110	NCC/NSS/ PT & Games/ Creative Arts (CA)/ Entrepreneurship	0	0	2	1
				TOTAL (Theory + Labs)				**25**
GRAND TOTAL FOR FIRST YEAR								**49**

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				THEORY				
III.2	**THIRD**							
		PC	EE201	Electrical Measurement and Instrumentation	3	0	0	3
		PC	EE253	Engineering Electromagnetics	3	1	0	4
		HSS	MT 131	UHV2: Understanding Harmony	3	0	0	3
		PC	EC203	Digital System Design	3	0	0	3
		PC	EE203	Electrical Energy Generation and Control	3	0	0	3
		PC	EE205	Circuit Theory	3	1	0	4
				LABORATORIES				
III.3		**GE**	EE102	Electrical Engineering Lab	0	0	3	1.5
III.4		**MC**	MC201/202/203 /204/209	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)/ Entrepreneurship	0	0	2	1
		PC	EC204	Digital System Design Laboratory	0	0	3	1.5
							TOTAL	**24**
	FOURTH			**THEORY**				
IV.1		**FS**	MA203	Numerical Methods	2	0	0	2
IV.3		**PC**	EE305	Digital Signal Processing	3	1	0	4
IV.4		**OE**	XX XXX	Open Elective – I / MOOC	3	0	0	3
		PC	EE251	DC Machines and Transformers	3	1	0	4
		PC	EE303	Introduction to Microprocessors and Microcontrollers	3	0	0	3
				LABORATORIES				
IV.6		**FS**	MA204	Numerical Methods lab	0	0	2	1
IV.7		**PC**	EE202	Electrical Measurement and Instrumentation Laboratory	0	0	3	1.5
		PC	EE306	Digital Signal Processing Laboratory	0	0	3	1.5
IV.8		**MC**	MC205/206/207 /208/210	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)/ Entrepreneurship	0	0	2	1
		PC	EE304	Microprocessors and Microcontrollers Laboratory	0	0	3	1.5

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					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
		PC	EE252	Electrical Machine Laboratory – I	0	0	3	1.5
							TOTAL	**24**
GRAND TOTAL FOR SECOND YEAR								**48**
V.1	**FIFTH**	**OE**	XX XXX	Open Elective - II / MOOC	3	0	0	3
		PC	EE301	AC Rotating Machines	3	0	0	3
		PC	EE353	Power Electronics	3	1	0	4
		PC	EE307	Electrical Power Transmission and Distribution	3	0	0	3
		PC	EE351	Control Theory	3	1	0	4
		PE	EE XXX	Programme Elective – I	3	0	0	3
		LABORATORIES						
		PC	EE302	Electrical Machine Laboratory - II	0	0	3	1.5
		PC	EE404	Power Electronics Laboratory	0	0	3	1.5
		PC	EE352	Control System Laboratory	0	0	2	1
TOTAL								**24**
	SIXTH			**THEORY**				
VI.1		**OE**	XX XXX	Open Elective - III / MOOC	3	0	0	3
		PC	EE401	Switchgear and Protection	3	0	0	3
		PC	EE355	Power System Analysis	3	1	0	4
		PE	EE XXX	Programme Elective – II	3	0	0	3
		PE	EE XXX	Programme Elective – III	3	0	0	3
VI.3		**HSS**	MT204	Constitution of India	2	0	0	0
		LABORATORIES						
		HSS	MT 133	Communication Skills-II	0	0	3	1.5
		PC	EE402	Power System Laboratory	0	0	2	1
		PE	XXXX	Program Elective-III Laboratory	0	0	3	1.5
		PROJ	MC300	Summer Training				2
							TOTAL	**22**
GRAND TOTAL FOR THIRD YEAR								**46**
VII.5	**SEVENTH**	**OE**	XX XXX	Open Elective – IV / MOOC	3	0	0	3
		PE	EE XXX	Programme Elective – IV	3	0	0	3
		PE	EE XXX	Programme Elective – V	3	0	0	3

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					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
		PROJ	EE400M	Minor project	--	--	--	3
		LABORATORIES						
		PE	XXXX	Program Elective V Laboratory	0	0	3	1.5
		PC	EE354	Electrical Workshop	0	0	3	1.5
TOTAL								**15**
VIII.1	**EIGHTH**	**PROJ**	EE 400	**Research project / Industry Internship**	--	--	--	**10**
GRAND TOTAL FOR FOURTH YEAR								**25**
				GRAND TOTAL				**168**

Program Electives

S. No	Semester of Study (Recommended)	Pre-requisites	Course Code	Subjects				
1	PE-I	Basics of Electronics & Communication Engineering	EE357	Electronic Devices and Analog Circuits	3	0	0	3
2		Electrical Measurement & Instrumentation	EE413	Sensors and Transducers	3	0	0	3
3		Basics of Electronics & Communication Engineering	EE417	Fundamentals of Communication System	3	0	0	3
4	PE-II	Mathematics	EE449	Artificial Intelligence for Electrical Engineering	3	0	0	3
5		Mathematics	EE447	Machine Learning	3	0	0	3
6		Basic Electrical Engineering	EE365	Introduction to Sustainable Energy	3	0	0	3
		Basic Electrical Engineering	EE463	Specifications & Estimation of Electrical Installations	3	0	0	3
		Physics, Chemistry, Material Science	EE381	Electrical Engineering Materials	3	0	0	3
		Control Theory	EE425	Robotics	3	0	0	3
7	PE-III	Mathematics	EE519	Computational Techniques in Electrical Engineering	3	0	0	3
8		Electrical Measurement & Instrumentation	EE415	Bioinstrumentation and concepts	3	0	0	3
		Electrical Machines	EE465	Electrical Machine Design	3	0	0	3

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					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
10	PE-IV	DC Machine and Transformers; AC Rotating Machines	EE419	Special Electrical Machines	3	0	0	3
11		Basics of Electrical Engineering; Electric Power Transmission and Distribution	EE443	Utilization of Electrical Power	3	0	0	3
13		Basics of Electrical Engineering; Basics of Electronics & Communication Engineering	EE573	Embedded Systems and Applications	3	0	0	3
14		Electric Power Transmission and Distribution; Power System Analysis	EE531	EHV AC Power Transmission	3	0	0	3
15		Basics of Electrical Engineering; Electrical Measurement & Instrumentation; Engineering Electromagnetics	EE593	High Voltage Engineering	3	0	0	3
16		Electric Power Transmission and Distribution; Power System Analysis; Power Electronics	EE535	HVDC and FACTS	3	0	0	3
		Electrical Machines, Switchgear, and Protection	EE461	Testing & Commissioning of Electrical Equipment	3	0	0	3
17		Electric Power Transmission and Distribution; Power System Analysis	EE539	Power System Dynamics	3	0	0	3
18		DC Machine and Transformers;	EE585	Hybrid Electric Vehicle	3	0	0	3

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					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
		AC Rotating Machines; Power Electronics						
19		Electric Power Transmission and Distribution; Power System Analysis; Power Electronics	EE605R1	Micro-Grid Operation and Control	3	0	0	3
20	PE-V	Power Electronics; Control Theory	EE437	Industrial Drives and Control	3	0	0	3
21		Control Theory	EE439	Applied Control Theory	3	0	0	3
22		Electric Power Transmission and Distribution; Power System Analysis	EE441	Computer-Aided Power System Analysis	3	0	0	3
23		Power Electronics	EE507	Advanced Power Electronics	3	0	0	3
Laboratory PE – III and V								
1.	PE-III		EE416	Bioinstrumentation Lab.	0	0	3	1.5
2.			EE520	Computational Techniques in Electrical Engineering	0	0	3	1.5
3.			EE366	Computer-Aided Electrical Machine design Lab.	0	0	3	1.5
4.	PE-V		EE438	Industrial Drive Lab.	0	0	3	1.5
5.			EE442	CAPSA Lab.	0	0	3	1.5
6.			EE508	Advanced Power Electronics Lab	0	0	3	1.5
7.			EE440	Applied Control Lab.	0	0	3	1.5

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					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C

Open Electives ***(Offered by EEE)***								
S. No	**Semester of Study (Recommended)**	**Pre-requisites**	Course Code	**Subjects**				
1	OE-I		EE203	Electric Energy Generation & Control	3	0	0	3
2			EE255	Signals and Systems	3	0	0	3
3			EE257	Solar Photovoltaics: Photons to Farms	3	0	0	3
4	OE-II		EE361R1	Linear Control Theory	3	0	0	3
5			EE363	Sensors: Fabrication and Applications	3	0	0	3
6			EE365	Introduction to Sustainable Energy	3	0	0	3
7	OE-III		EE457	Fundamentals of Power System	3	0	0	3
8			EE459	Introduction to Power Electronics	3	0	0	3
9			EE425	Robotics	3	0	0	3
10	OE-IV		EE453	Machine Electronics	3	0	0	3
11			EE519	Computational Techniques in Electrical Engineering	3	0	0	3

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					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C

Minor Course

(Offered by EEE)

S. No	Semester of Study (Recommended)	Pre-requisites	Course Code	Subjects	L	T	P	C
1	**FIFTH (Any two course, total of 8 credits)**	Mathematics, Basic Electrical Engineering	EE205	Circuit Theory (For all branches except ECE)	3	1	0	4
2		Mathematics	EE305	Digital Signal Processing (For all branches except ECE)	3	1	0	4
3			EE379	Sustainable Energy Sources (For all branches)	3	1	0	4
4		Mathematics, Basic Electrical Engineering	EE351	Control Theory (For all branches except ECE)	3	1	0	4
5	**SIXTH (Any two course, total of 8 credits)**	Basic Electrical Engineering	EE261	Principles of Electrical Machines (For all branches)	3	1	0	4
6		Basic Electrical Engineering Mathematics	EE353	Power Electronics (For all branches)	3	1	0	4
7		Basic Electrical Engineering Mathematics	EE421	Power System (For all branches)	3	1	0	4
8		Control Theory	EE475	Non-linear and Adaptive Control (For all branches)	3	1	0	4
9	**SEVENTH (Mandatory, 2 credits)**	Basic Electrical Engineering	EE452	Advanced Electrical Engineering Lab (For all branches)	0	0	4	2
	18 credits							

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					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C

In-depth Course								
S. No	**Semester of Study (Recommended)**	**Category of course**	Course Code	**Subjects**	**L**	**T**	**P**	**C**
1	**FIFTH**	Group-I (POWER SYSTEM)	EE377	Industrial Instrumentation	3	1	0	4
2	**SIXTH**		EE379	Sustainable Energy Sources	3	1	0	4
3	**SIXTH**		EE481	Advanced Power System Analysis and Control	3	1	0	4
4	**SEVENTH**		EE479	Smart Power System	3	1	0	4
5	**SEVENTH**		EE452	Advanced Electrical Engineering Laboratory	0	0	4	2
	FIFTH	Group-II (POWER ELECTRONICS)	EE377	Industrial Instrumentation	3	1	0	4
	SIXTH		EE379	Sustainable Energy Sources	3	1	0	4
6	**SIXTH**		EE477	Power Conversion Techniques	3	1	0	4
7	**SEVENTH**		EE557	Power Electronics Applications	3	1	0	4
	SEVENTH		EE452	Advanced Electrical Engineering Laboratory	0	0	4	2
	FIFTH	Group-III (CONTROL SYSTEM)	EE377	Industrial Instrumentation	3	1	0	4
	SIXTH		EE379	Sustainable Energy Sources	3	1	0	4
8	**SIXTH**		EE475	Non-linear and Adaptive Control	3	1	0	4
9	**SEVENTH**		EE375	Sensing Technology and Applications	3	1	0	4
	SEVENTH		EE452	Advanced Electrical Engineering Laboratory	0	0	4	2