SARALA BIRLA UNIVERSITY RANCHI

Established under the Sarala Birla University Act 2017 Govt. of Jharkhand as per Section 2(f) of UGC Act. 1956

CURRICULUM
FOR

B.Tech

in
Electronics & Communication Engineering

(Based on AICTE- CBCS)

Effective from 2018-19

Definition of Credit

1 Hr. Lecture (L) Per Week	1 Credit
1 Hr. Tutorial (T) Per Week	1 Credit
1 Hr. Practical (P) Per Week	0.5 Credit
2 Hr. Practical (P) Per Week	1 Credit

Course Code Definitions

Course code	Definitions
BSC	Basic Science Course
ESC	Engineering Science Course
HSMC	Humanities and Social Sciences including Management Course
MC	Mandatory Course
PCC-ECE	Professional Core Course
PEC-ECE	Professional Electives Course
OEC	Open Electives Course
ECE-P1	Project Stage-I
ECE-P2	Project Stage-II
ECE-P3	Project Stage-III

Structure of Electronics & Communication Engineering (B.Tech)

(Breakup of Credits)

Sl. No.	Category	Breakup of Credits
1	Humanities and Social Sciences including Management course	14
2	Basic Science course	23
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	20
4	Professional core course	48
5	Professional Elective courses relevant to chosen specialization/branch	24
6	Open subjects – Electives from other technical and /or emerging subjects	13
7	Project work, seminar and internship in industry orelsewhere	16
8	Mandatory Course [Environmental Science, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	4
Total:		**162**

CREDITS DISTRIBUTION (SEMESTER-WISE AND COURSE-WISE)

Semester	HSMC	BSC	ESC	PCC	PEC	OEC	PROJECT	MC	Total Credit Semester-wise
1st	0	9.5	8	0	0	0	0	0	17.5
2nd	3	9.5	8	0	0	0	0	0	20.5
3rd	3	4	0	15	0	0	0	0	22
4th	0	0	4	12	0	0	0	4	20
5th	2	0	0	14	0	3	0	0	19
6th	4	0	0	7	3	3	2	0	19
7th	2	0	0	0	7	7	5	0	21
8th	0	0	0	0	14	0	9	0	23
Total Credit Course-wise	14	23	20	48	24	13	16	4	162
Total Credit									162

HUMANITIES & SOCIAL SCIENCES INCLUDING MANAGEMENT COURSE

Sl. No.	Course Code	Course Title	Hours per week			Credits	Preferred Semester
			L	T	P		
1	HSMC-101	English	3	0	0	3	II
2	HSMC-102	Technical Communication	2	0	0	2	III
3	HSMC-103	Technical Communication Lab	0	0	2	1	III
4	HSMC-104	Organisational Behaviour	2	0	0	2	VI
5	HSMC-105	French Through Communicative Approach-I	2	0	0	2	V
6	HSMC-106	French Through Communicative Approach-II	2	0	0	2	VI
7	HSMC-107	Professional Practice, Law & Ethics	2	0	0	2	VII
				Total Credits:		14	

BASIC SCIENCE COURSES

Sl. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			L	T	P		
1	BSC-101	Physics	3	1	0	4	I
2	BSC-102	Physics Lab	0	0	3	1.5	I
3	BSC-103	Chemistry	3	1	0	4	II
4	BSC-104	Chemistry Lab	0	0	3	1.5	II
5	BSC-105	Mathematics-I	3	1	0	4	I
6	BSC-106	Mathematics-II	3	1	0	4	II
7	BSC-107	Mathematics-III	3	1	0	4	III
				Total Credits:		**23**	

ENGINEERING SCIENCE COURSES

Sl. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			L	T	P		
1	ESC-099	Basic Electrical Engineering	3	1	0	4	I
2	ESC-100	Basic Electrical Engineering Lab	0	0	2	1	I
3	ESC-103	Engineering Graphics & Design	1	0	4	3	I
4	ESC-104	Programming for Problem Solving	3	0	0	3	II
5	ESC-105	Programming for Problem Solving Lab	0	0	4	2	II
6	ESC-106	Workshop/ Manufacturing Practices	1	0	4	3	II
7	ESC-107	Engineering Mechanics	3	1	0	4	IV

Total Credits: **20**

Professional Core Courses (Sem III & IV)

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ECE-201	Electronic Devices	3:0:0	3	III/IV
2	PCC-ECE-202	Electronic Devices Lab	0:0:2	1	III/IV
3	PCC-ECE-203	Digital Electronics	3:0:0	3	III/IV
4	PCC-ECE-204	Digital Electronics Lab	0:0:2	1	III/IV
5	PCC-ECE-205	Signal & System	3:0:0	3	III/IV
6	PCC-ECE-206	Electrical Circuit Analysis	3:0:0	3	III/IV
7	PCC-ECE-207	Electrical Circuit Analysis Lab	0:0:2	1	III/IV
8	PCC-ECE-208	Analog & Digital Communication	3:0:0	3	III/IV
9	PCC-ECE-209	Analog & Digital Communication Lab	0:0:2	1	III/IV
10	PCC-ECE-210	Analog Circuits	3:0:0	3	III/IV
11	PCC-ECE-211	Analog Circuits Lab	0:0:2	1	III/IV
12	PCC-ECE-212	Microprocessors & Microcontroller	3:0:0	3	III/IV
13	PCC-ECE-213	Microprocessors & Microcontroller Lab	0:0:2	1	III/IV

Total Credits: 27

Professional Core Courses (Sem V & VI)
Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ECE-301	Electromagnetic Waves	3:0:0	3	V/VI
2	PCC-ECE-302	Computer Architecture	3:0:0	3	V/VI
3	PCC-ECE-303	Digital System Design	3:0:0	3	V/VI
4	PCC-ECE-304	Digital System Design Lab	0:0:2	1	V/VI
5	PCC-ECE-305	Digital Signal Processing	3:0:0	3	V/VI
6	PCC-ECE-306	Digital Signal Processing Lab	0:0:2	1	V/VI
7	PCC-ECE-307	Control System	3:0:0	3	V/VI
8	PCC-ECE-308	Computer Networks	3:0:0	3	V/VI
9	PCC-ECE-309	Computer Network Lab	0:0:2	1	V/VI

Total Credits: 21

Professional Elective Courses (Sem V & VI)

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs./ Week L: T: P	Credits	Preferred Semester
1	PEC-ECE-301	Information Theory & Coding	3:0:0	3	V/VI
2	PEC-ECE-302	Introduction to MEMS	3:0:0	3	V/VI
3	PEC-ECE-303	CMOS Design	3:0:0	3	V/VI
4	PEC-ECE-304	Nano Electronics	3:0:0	3	V/VI

Professional Elective Courses (Sem VII & VIII)

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs./ Week L: T: P	Credits	Preferred Semester
1	PEC-ECE-401	Microwave Theory & Techniques	3:0:0	3	VII/VIII
2	PEC-ECE-402	Microwave Theory & Techniques Lab	0:0:2	1	VII/VIII
3	PEC-ECE-403	Adaptive Signal Processing	3:0:0	3	VII/VIII
4	PEC-ECE-404	Satellite Communication	3:0:0	3	VII/VIII
5	PEC-ECE-405	Fiber Optic Communications	3:0:0	3	VII/VIII
6	PEC-ECE-406	Fiber Optic Communications Lab	0:0:2	1	VII/VIII
7	PEC-ECE-407	Antenna & Propagation	3:0:0	3	VII/VIII
8	PEC-ECE-408	Antenna Measurement Lab	0:0:2	1	VII/VIII
9	PEC-ECE-409	Mobile Communication & Networks	3:0:0	3	VII/VIII
10	PEC-ECE-410	Mixed Signal Design	3:0:0	3	VII/VIII
11	PEC-ECE-411	Wireless Sensor Networks	3:0:0	3	VII/VIII
12	PEC-ECE-412	High Speed Electronics	3:0:0	3	VII/VIII
13	PEC-ECE-413	Wavelets	3:0:0	3	VII/VIII
14	PEC-ECE-414	Embedded Systems	3:0:0	3	VII/VIII
15	PEC-ECE-415	Error Correcting Codes	3:0:0	3	VII/VIII
16	PEC-ECE-416	HDL based Digital Design with programmable logic	3:0:0	3	VII/VIII

17	PEC-ECE-417	HDL based Digital Design with programmable logic Lab	3:0:0	3	VII/VIII
18	PEC-ECE-418	Linear Integrated Circuit	3:0:0	3	VII/VIII
19	PEC-ECE-419	Linear Integrated Circuit Lab	3:0:0	3	VII/VIII
20	PEC-ECE-420	Information Security	3:0:0	3	VII/VIII

Open Elective Course

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs./ Week L: T: P	Credits
1	OEC-CSE-303	Artificial Intelligence	3:0:0	3
2	OEC-CSE-305	Machine Learning	3:0:0	3
3	OEC-CSE-410	Digital Image Processing	3:0:0	3
4	OEC-CSE-411	Digital Image Processing Lab	0:0:2	1
5	OEC-ME-408	Wind & Solar Energy Systems	3:0:0	3

Project Work

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	ECE-P1	Project Stage-I (Mini Project/ Industrial Training)	0:0:4	2	VI
2	ECE-P2	Project Stage-II (Minor Project)	0:0:10	5	VII
3	ECE-P3	Project Stage-III (Major Project Work & Dissertation)	0:0:18	9	VIII
Total Credit:				**16**	

Mandatory Courses

Sl. No.	Course Code	Course Title	Hours per week			Credits	Preferred Semester
			L	T	P		
1	MC-101	Induction Program	0	0	0	0	I
2	MC-102	Environmental Science	2	0	0	2	IV
3	MC-103	Values & Ethics	2	0	0	2	IV
					Total Credits:	**4**	

COURSE STRUCTURE

SEMESTER-I (First Year)

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours L	Hours T	Hours P	Credit	Marks IA	Marks ESE	Marks Total
Theory										
1	Basic Science Course	BSC-101	Physics	3	1	0	4	30	70	100
2	Basic Science Course	BSC-105	Mathematics-I	3	1	0	4	30	70	100
3	Engineering Science Course	ESC-099	Basic Electrical Engineering	3	1	0	4	30	70	100
						Total(A)	**12**	**90**	**210**	**300**
Practical/Drawing/Design										
1	Engineering Science Course	ESC-103	Engineering Graphics & Design	1	0	4	3	30	20	50
2	Basic Science Course	BSC-102	Physics Lab	0	0	3	1.5	30	20	50
3	Engineering Science Course	ESC-100	Basic Electrical Engineering Lab	0	0	2	1	30	20	50
						Total(B)	**5.5**	**90**	**60**	**150**
			Grand Total (A+B)				**17.5**	**180**	**270**	**450**

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

COURSE STRUCTURE

SEMESTER-II (First Year)

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
Theory										
1	Basic Science Course	BSC-103	Chemistry	3	1	0	4	30	70	100
2	Basic Science Course	BSC-106	Mathematics-II	3	1	0	4	30	70	100
3	Engineering Science Course	ESC-104	Programming for Problem Solving	3	0	0	3	30	70	100
4	Humanities and Social Sciences including Management Course	HSMC-101	English	3	0	0	3	30	70	100
			Total(A)				14	120	280	400
Practical/Drawing/Design										
1	Engineering Science Course	ESC-106	Workshop/ Manufacturing Practices	1	0	4	3	30	20	50
2	Basic Science Course	BSC-104	Chemistry Lab	0	0	3	1.5	30	20	50
3	Engineering Science Course	ESC-105	Programming for Problem Solving Lab	0	0	4	2	30	20	50
			Total(B)				6.5	90	60	150
		Grand Total (A+B)					20.5	210	340	550

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

COURSE STRUCTURE

SEMESTER-III (Second Year)
Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
Theory										
1	Basic Science Course	BSC-107	Mathematics-III	3	1	0	4	30	70	100
2	Professional Core Course	PCC-ECE-203	Digital Electronics	3	0	0	3	30	70	100
3	Humanities and Social Sciences including Management Course	HSMC-102	Technical Communication	2	0	0	2	30	70	100
4	Professional Core Course	PCC-ECE-201	Electronic Devices	3	0	0	3	30	70	100
5	Professional Core Course	PCC-ECE-205	Signal & System	3	0	0	3	30	70	100
6	Professional Core Course	PCC-ECE-206	Electrical Circuit Analysis	3	0	0	3	30	70	100
			Total(A)				**18**	**180**	**420**	**600**
Practical/Drawing/Design										
1	Professional Core Course	PCC-ECE-204	Digital Electronics Lab	0	0	2	1	30	20	50
2	Professional Core Course	PCC-ECE-202	Electronics Devices Lab	0	0	2	1	30	20	50
3	Humanities and Social Sciences including Management Course	HSMC-103	Technical Communication Lab	0	0	2	1	30	20	50
4	Professional Core Course	PCC-ECE-207	Electrical Circuit Analysis Lab	0	0	2	1	30	20	50
			Total(B)				**4**	**120**	**80**	**200**
Grand Total (A+B)							**22**	**300**	**500**	**800**

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

COURSE STRUCTURE

SEMESTER-IV (Second Year)

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
Theory										
1	Mandatory Course	MC-102	Environmental Science	2	0	0	2	30	70	100
2	Professional Core Course	PCC-ECE-210	Analog Circuits	3	0	0	3	30	70	100
3	Engineering Science Course	ESC-107	Engineering Mechanics	3	1	0	4	30	70	100
4	Professional Core Course	PCC-ECE-208	Analog & Digital Communication	3	0	0	3	30	70	100
5	Professional Core Course	PCC-ECE-212	Microprocessors & Microcontroller	3	0	0	3	30	70	100
6	Mandatory Courses	MC-103	Values & Ethics	2	0	0	2	30	70	100
			Total(A)				**17**	**180**	**420**	**600**
Practical/Drawing/Design										
1	Professional Core Course	PCC-ECE-211	Analog Circuits Lab	0	0	2	1	30	20	50
2	Professional Core Course	PCC-ECE-209	Analog & Digital Communication Lab	0	0	2	1	30	20	50
3	Professional Core Course	PCC-ECE-213	Microprocessors & Microcontroller Lab	0	0	2	1	30	20	50
			Total(B)				**3**	**90**	**60**	**150**
			Grand Total (A+B)				**20**	**270**	**480**	**750**

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

COURSE STRUCTURE

SEMESTER-V (Third Year)
Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
Theory										
1	Professional Core Course	PCC-ECE-301	Electromagnetic Waves	3	0	0	3	30	70	100
2	Professional Core Course	PCC-ECE-302	Computer Architecture	3	0	0	3	30	70	100
3	Professional Core Course	PCC-ECE-303	Digital System Design	3	0	0	3	30	70	100
4	Professional Core Course	PCC-ECE-305	Digital Signal Processing	3	0	0	3	30	70	100
5	Open Elective Course	OEC-CSE-303	Artificial Intelligence	3	0	0	3	30	70	100
6	Humanities and Social Sciences including Management Course	HSMC-105	French Through Communicative Approach-I	2	0	0	2	30	70	100
			Total(A)				**17**	**180**	**420**	**600**
Practical/Drawing/Design										
1	Professional Core Course	PCC-ECE-304	Digital System Design Lab	0	0	2	1	30	20	50
2	Professional Core Course	PCC-ECE-306	Digital Signal Processing Lab	0	0	2	1	30	20	50
			Total(B)				**2**	**60**	**40**	**100**
Grand Total (A+B)							**19**	**240**	**460**	**700**

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

COURSE STRUCTURE

SEMESTER-VI (Third Year)
Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours L	Hours T	Hours P	Credit	Marks IA	Marks ESE	Marks Total
Theory										
1	Professional Core Course	PCC-ECE-307	Control System	3	0	0	3	30	70	100
2	Professional Core Course	PCC-ECE-308	Computer Network	3	0	0	3	30	70	100
3	Professional Elective Course	PEC-ECE-303	CMOS Design	3	0	0	3	30	70	100
4	Open Elective Course	OEC-CSE-305	Machine Learning	3	0	0	3	30	70	100
5	Humanities and Social Sciences including Management Course	HSMC-104	Organisational Behaviour	2	0	0	2	30	70	100
6	Humanities and Social Sciences including Management Course	HSMC-106	French Through Communicative Approach-II	2	0	0	2	30	70	100
						Total(A)	16	180	420	600
Practical/Drawing/Design										
1	Professional Core Course	PCC-ECE-309	Computer Network Lab	0	0	2	1	30	20	50
2	Project Work	ECE-P1	Project Stage-I (Mini Project/ Industrial Training)	0	0	4	2	75	25	100
						Total(B)	3	105	45	150
			Grand Total (A+B)				19	285	465	750

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

COURSE STRUCTURE

SEMESTER-VII (Fourth Year)
Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
Theory										
1	Professional Elective Course	PEC-ECE-401	Microwave Engineering	3	0	0	3	30	70	100
2	Professional Elective Course	PEC-ECE-414	Embedded Systems	3	0	0	3	30	70	100
3	Open Elective Course	OEC-ME-408	Wind & Solar Energy Systems	3	0	0	3	30	70	100
4	Humanities & Social Sciences including Management Course	HSMC-107	Professional Practice, Law & Ethics	2	0	0	2	30	70	100
5	Open Elective Course	OEC-CSE-411	Digital Image Processing	3	0	0	3	30	70	100
			Total(A)				14	150	350	500
Practical/Drawing/Design										
1	Professional Elective Course	PEC-ECE-402	Microwave & Antenna Measurement Lab	0	0	2	1	30	20	50
2	Open Elective Course	OEC-CSE-412	Digital Image Processing Lab	0	0	2	1	30	20	50
3	Project Work	ECE-P2	Project Stage-II (Minor Project)	0	0	10	5	75	25	200
			Total(B)				7	135	65	300
		Grand Total (A+B)					21	285	415	800

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

COURSE STRUCTURE

SEMESTER-VIII (Fourth Year)

Branch: Electronics & Communication Engineering (B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
Theory										
1	Professional Elective Course	PEC-ECE-405	Fiber Optics Communication	3	0	0	3	30	70	100
2	Professional Elective Course	PEC-ECE-420	Information Security	3	0	0	3	30	70	100
3	Professional Elective Course	PEC-ECE-416	HDL based Digital Design with Programmable Logic	3	0	0	3	30	70	100
4	Professional Elective Course	PEC-ECE-407	Antenna & Propagation	3	0	0	3	30	70	100
			Total(A)	12			12	120	280	400
Practical/Drawing/Design										
1	Professional Elective Course	PEC-ECE-408	Antenna Measurement Lab	0	0	2	1	30	20	50
2	Professional Elective Course	PEC-ECE-406	Fiber Optic Communications Lab	0	0	2	1	30	20	50
3	Professional Elective Course	PEC-ECE-417	HDL based Digital Design with Programmable Logic Lab	0	0	2	1	30	20	50
4	Project Work	ECE-P3	Project Stage-III (Major Project Work & Dissertation)	0	0	18	9	300	100	400
			Total(B)				12	390	160	550
Grand Total (A+B)							24	510	440	950

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination