

## B.Tech (Electronics and Computer Engineering) – 2023 Batch

### Program Educational Objectives (PEOs):

- **PEO I:** Graduates demonstrate their technical knowledge in the field of Electronics and Computer Engineering for real world applications.
- **PEO II:** Graduates exhibit competence as academicians, researchers and entrepreneurs by pursuing continuous professional development.
- **PEO III:** Graduates contribute to the development of the society with professional ethics.

### Program Specific Outcomes (PSOs):

- **PSO 1:** Impart solid foundation in mathematical, scientific and engineering fundamentals required to solve electronics and computer engineering problems.
- **PSO 2:** Specify, design, analyze and test the electronic systems.
- **PSO 3:** Understand and analyze various algorithms, data processing techniques for practical applications.
- **PSO 4:** Design, implement and test the various system architectures using software tools.

## COURSE COMPONENTS & CURRICULUM

**Total Credit for all B.Tech. Programs: 165**

PROGRAM STRUCTURE			
S.No	Category		Credits
1	Basic Science Courses	BSC	10
2	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc	ESC	22
3	Humanities and Social Sciences including Management Courses	HSMC	8
4	Professional core Courses	PCC	66
5	Professional Elective Courses relevant to chosen specialization/branch	PEC	24/30
6	Open Electives – Electives from other technical and /or emerging Courses	OEC	6
7	Project and Internship	P	18/12
8	Mandatory Courses	MC	0
9	Skill based Courses	SBC	6
10	Online Courses*		5
<b>Total Credits</b>			<b>160+5*</b>

\*Students shall earn 5 credits through online courses between 2<sup>nd</sup> and 7<sup>th</sup> semester both inclusive

## COURSE COMPONENTS

### Category 1: Basic Science Courses (BSC)

Sl. No	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	20MA1005	Mathematical Foundation of Computing	3	1	0	4
2	23MA1012	Vector Spaces and Laplace Transform	3	0	0	3
3	21MA2001	Probability Theory and Random Processes	3	0	0	3
<b>Total</b>						<b>10</b>

### Category 2: Engineering Science Courses (ESC)

Sl. No	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	21EC1001	Electronics for Everyday Life	3	0	0	3
2	21EC1002	Computer Aided Design Laboratory	0	0	2	1
3	23EC1001	Computational Thinking	2	0	0	2
4	23EC1002	Programming for Problem Solving with C	3	0	0	3
5	20EC1004	C Programming Laboratory	0	0	2	1
6	21EC1004	Python Programming	3	0	0	3
7	21EC1005	Python Programming Laboratory	0	0	2	1
8	21EC2001	Object Oriented programming in C++	3	0	0	3
9	21EC2002	Object Oriented programming in C++ Laboratory	0	0	2	1
12	21EC2026	Machine Learning Laboratory	0	0	2	1

13	21EC2027	LINUX Programming	3	0	0	3
			<b>Total</b>			<b>22</b>
<b>Skill Based Courses (SBC)</b>						
1	22EC1003	PCB Design using CAD Tools	0	0	2	1
2	20EC1005	Electronics for Intelligent Machines laboratory	0	0	2	1
3	19EC2001	Electronics for Intelligent Machines	2	0	0	2
4	23EC1003	Programming for System Design	2	0	0	2
			<b>Total</b>			<b>6</b>
<b>Category 3: Humanities &amp; Social Sciences Including Management Courses (HSMC)</b>						
Sl. No	Course Code	Course Title	Hours per week			Credits
			L	T	P	
		<b>Humanities, Social Sciences and Management Courses</b>				<b>5</b>
1	20MS2005	Soft Skills	1	0	0	1
2	19EN1001/ 19LN1001/ 17LN2007	English / German / Basic French	2	0	0	2
3	20MS2006	Professional Ethics	2	0	0	2
		<b>Entrepreneurship</b>				<b>3</b>
1	23MS2001	Concepts and Application in Entrepreneurship	3	0	0	3
			<b>Total</b>			<b>8</b>
<b>Category 4: Professional Core Courses (PCC)</b>						
Sl. No	Course Code	Course Title	Hours Per Week			Credits
			L	T	P	
1	21EC1006	Introduction to Computer Engineering	3	0	0	3
2	23EC2004	Software Engineering	3	0	0	3
3	21EC2003	Electronic Devices and Circuits	3	0	0	3
4	21EC2004	Electronic Devices and Circuits Laboratory	0	0	2	1
5	22EC2013	Digital System Design	2	1	0	3
6	22EC2014	Digital System Design Laboratory	0	0	2	1
7	18EC2017	Computer Networks	3	0	0	3
8	21EC2005	Operating Systems	3	0	0	3
9	21EC2006	Mathematics for Signal Analysis	2	1	0	3
10	21EC2007	Data Structures and Algorithms	3	0	0	3
11	21EC2008	Data Structures Laboratory	0	0	2	1
12	21EC2009	Fundamentals of JAVA Programming	2	1	0	3
13	21EC2010	Linear Integrated Circuits	3	0	0	3
14	21EC2011	Analog Electronics	3	0	0	3
15	22EC2018	Signal Processing and its Applications	2	1	0	3
16	22EC2019	Signal Processing Laboratory	0	0	2	1
17	21EC2014	Microprocessors and Microcontrollers	3	0	0	3
18	21EC2015	Web Technology	3	0	0	3
19	21EC2016	Internet of Things	3	0	0	3
20	21EC2017	Internet of Things Laboratory	0	0	2	1
21	23EC2005	Machine Learning	3	0	0	3
22	21EC2021	Multimedia Engineering	3	0	0	3
23	23EC2018	Data Analytics Laboratory	0	0	2	1
24	21EC2023	Cyber Security	3	0	0	3
25	23EC2001	Introduction to Data Analytics	3	0	0	3
26	23EC2006	Artificial Neural Networks and Deep Learning	3	0	0	3
		<b>Total</b>				<b>66</b>
<b>Category 6: Professional Elective Courses (PEC)</b>						

Sl. No	Course Code	Course Title	Hours Per Week			Credits
			L	T	P	
1	21EC2028	Data Analytics & Visualization	3	0	0	3
2	21EC2029	High Performance Computing	3	0	0	3
3	21EC2030	Theory of Computation and Compiler Design	3	0	0	3
4	21EC2031	Semantic Modelling and its Applications	3	0	0	3
5	23EC2002	Computer Vision	3	0	0	3
6	21EC2033	Embedded System Design	3	0	0	3
7	21EC2034	Cyber Physical Systems	3	0	0	3
8	21EC2035	Data Mining	3	0	0	3
9	21EC2036	Metaheuristic Algorithms	3	0	0	3
10	21EC2037	Human Computer Interface	3	0	0	3
11	21EC2038	Signal Processing Algorithms and its Architectures	3	0	0	3
12	21EC2039	Beyond CMOS Device Technologies	3	0	0	3
13	21EC2040	MEMS and Semiconductor Sensors	2	0	0	2
14	21EC2024	Cloud and Distributed Computing	3	0	0	3

**PROJECT AND INTERNSHIP**

Sl. No.	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	ITP2921	Industrial training -1	15 Days			1
2	ISP2921	Internship - 1	15 Days			1
3	ISP2911	Internship -2	30 Days			2
4	23EC2998/ 23EC2999	Project	-			8/14
<b>Total</b>					<b>12/18</b>	

**MANDATORY COURSES**

Sl. No.	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	18MS2014	Constitution of India	2	0	0	0
2	18CH2001	Environmental Studies	2	0	0	0
<b>Total</b>					<b>0</b>	

**ONLINE COURSES**

The students shall earn 5 credits through online courses between 2 <sup>nd</sup> and 7 <sup>th</sup> semester (both inclusive)					<b>5</b>
--	--	--	--	--	----------

**Professional Electives for Specialization in Data Science**

Course Code	Course Title	L	T	P	Credits
22EC2001	Introduction to Big Data	3	0	0	3
22EC2002	Social Media Analytics	3	0	0	3
22EC2003	Video Processing and Analytics	3	0	0	3
22EC2004	Data Visualization Techniques	3	0	0	3

**Professional Electives for Specialization in Artificial Intelligence**

Course Code	Course Title	L	T	P	Credits
22EC2005	Pattern Recognition Techniques	3	0	0	3
22EC2006	Deep Learning	3	0	0	3
22EC2007	Natural Language Processing	3	0	0	3
22EC2008	Introduction to Human Computer Interaction	3	0	0	3
22EC2009	Bio-inspired Optimization Techniques	3	0	0	3
22EC2027	Brain Computer Interface	3	0	0	3

**SEMESTER-WISE CURRICULUM  
SEMESTER 1**

Course Code	Course Title	Category	L	T	P	Credits
21EC1006	Introduction to Computer Engineering	PCC	3	0	0	3
21EC1001	Electronics for Everyday Life	ESC	3	0	0	3
23EC1001	Computational Thinking	ESC	2	0	0	2
20MA1005	Mathematical Foundations of Computing	BSC	3	1	0	4
19EN1001/ 19LN1001/ 17LN2007	English / German / Basic French	HSMC	2	0	0	2
23EC1002	Programming for Problem Solving with C	ESC	3	0	0	3
	Mandatory course – I	MC	3	0	0	0
<b>LABORATORY COURSES</b>						
21EC1002	Computer Aided Design Laboratory	ESC	0	0	2	1
20EC1004	C Programming Laboratory	ESC	0	0	2	1
	<b>Total Credits</b>					<b>19</b>

**SEMESTER 2**

Course Code	Course Title	Category	L	T	P	Credits
23MA1012	Vector Spaces and Laplace Transform	BSC	3	0	0	3
21EC1004	Python Programming	ESC	3	0	0	3
19EC2001	Electronics for Intelligent Machines	SBC	2	0	0	2
21EC2005	Operating Systems	PCC	3	0	0	3
20MS2005	Soft Skills	HSMC	1	0	0	1
	Mandatory Course-II	MC	3	0	0	0
23EC1003	Programming for System Design	SBC	2	0	0	2
ITP2921	Industrial training -1	P	0	0	2	1
23MS2001	Concepts and Application in Entrepreneurship	HSMC	3	0	0	3
<b>LABORATORY COURSES</b>						
21EC1005	Python Programming Laboratory	ESC	0	0	2	1
20EC1005	Electronics for Intelligent Machines Laboratory	SBC	0	0	2	1
22EC1003	PCB Design using CAD Tools	SBC	0	0	2	1
	<b>Total Credits</b>					<b>21*</b>

\*Mandatory MOOC for 1 Credit

**SEMESTER 3**

Course Code	Course Title	Category	L	T	P	Credits
21EC2001	Object Oriented programming in C++	ESC	3	0	0	3
21EC2003	Electronic Devices and Circuits	PCC	3	0	0	3
22EC2013	Digital System Design	PCC	2	1	0	3
21EC2006	Mathematics for Signal Analysis	PCC	2	1	0	3
20MS2006	Professional Ethics	HSMC	2	0	0	2
21EC2027	LINUX programming	ESC	3	0	0	3
<b>LABORATORY COURSES</b>						
21EC2004	Electronic Devices and Circuits Laboratory	PCC	0	0	2	1
22EC2014	Digital System Design Laboratory	PCC	0	0	2	1
21EC2002	Object Oriented programming in C++ Laboratory	ESC	0	0	2	1
	<b>Total Credits</b>					<b>20</b>

**SEMESTER 4**

Course Code	Course Title	Category	L	T	P	Credits
21EC2007	Data structures and Algorithms	PCC	3	0	0	3
21EC2009	Fundamentals of JAVA Programming	PCC	2	1	0	3
21EC2010	Linear Integrated Circuits	PCC	3	0	0	3
21EC2011	Analog Electronics	PCC	3	0	0	3

21EC2015	Web Technology	PCC	3	0	0	3
	Professional Elective - 1	PEC	3	0	0	3
ISP2921	Internship - 1	P	0	0	2	1
<b>LABORATORY COURSES</b>						
21EC2008	Data Structures Laboratory	PCC	0	0	2	1
	<b>Total Credits</b>					<b>20*</b>

\*Mandatory MOOC for 2 Credits

#### SEMESTER 5

Course Code	Course Title	Category	L	T	P	Credits
22EC2018	Signal Processing and its Applications	PCC	2	1	0	3
21MA2001	Probability Theory and Random Processes	BSC	3	0	0	3
21EC2014	Microprocessors and Microcontrollers	PCC	3	0	0	3
ISP2911	Internship -2	P	0	0	4	2
	Professional Elective – 2	PCC	3	0	0	3
	Professional Elective – 3	PEC	3	0	0	3
23EC2005	Machine Learning	PCC	3	0	0	3
<b>LABORATORY COURSES</b>						
22EC2019	Signal Processing Laboratory	PCC	0	0	2	1
21EC2026	Machine Learning Laboratory	PCC	0	0	2	1
	<b>Total Credits</b>					<b>22</b>

#### SEMESTER 6

Course Code	Course Title	Category	L	T	P	Credits
	Professional Elective – 4	PEC	3	0	0	3
23EC2004	Software Engineering	PCC	3	0	0	3
21EC2016	Internet of Things	PCC	3	0	0	3
	Professional Elective – 5	PEC	3	0	0	3
	Professional Elective – 6	PCC	3	0	0	3
23EC2006	Artificial Neural Networks and Deep Learning	PCC	3	0	0	3
	Open Elective -1	OEC	3	0	0	3
<b>LABORATORY COURSES</b>						
21EC2017	Internet of Things Laboratory	PCC	0	0	2	1
	<b>Total Credits</b>					<b>22*</b>

\*Mandatory MOOC for 2 Credits

#### SEMESTER 7

Course Code	Course Title	Category	L	T	P	Credits
	Professional Elective – 7	PEC	3	0	0	3
	Professional Elective -8	PEC	3	0	0	3
18EC2017	Computer Networks	PCC	3	0	0	3
21EC2023	Cyber Security	PCC	3	0	0	3
23EC2001	Introduction to Data Analytics	PCC	3	0	0	3
21EC2021	Multimedia Engineering	PCC	3	0	0	3
	Open Elective -2	OEC	3	0	0	3
<b>LABORATORY COURSES</b>						
23EC2018	Data Analytics Laboratory	PCC	0	0	2	1
	<b>Total Credits</b>					<b>22</b>

#### SEMESTER 8

Course Code	Course Title	Category	L	T	P	Credits
	<b>Half Semester Project</b>					
	Professional Elective -9	PEC	3	0	0	3
	Professional Elective -10	PEC	3	0	0	3

23EC2998	Project	P	0	0	16	8
	<b>Full Semester Project</b>					
23EC2999	Project	P	0	0	28	14
	<b>Total Credits</b>					<b>14</b>