



SIR PADAMPAT SINGHANIA UNIVERSITY

UDAIPUR

School of Engineering

**Department of Electronics & Communication Engineering**

**Vision**

The Department aims to harvest leaders, expert professionals, capable Researchers and entrepreneurial frontrunners for the magnanimity of the society. A student centric department with a student centric vision.

**Mission**

Department is steadfast.

**Learning by Doing:** To provide hands on training and develop a skilled work force.

**Continuous learning:** To stimulate invention through providing state-of-art facilities and dynamic industry institute interface.

**Aptitude:** To offer training on leading-edge technologies to improve the aptitude of the students. **Entrepreneurship:** To enable the students to develop their leadership and entrepreneurship skills with moral values.

**B. Tech. Degree Programme**

**Course Structure**

**(2021-2025)**

## Overview

Industrial Training incorporated in the syllabus to provide students an opportunity to work with an industry of their area of interest for a full semester in the final year. Basically, this will give students an exposure to work in industry environment with technology in practice.

- Self-learning components like seminars are part of the programme to develop communication and interpersonal skills of the students.
- Projects included in the curriculum helps students to experience hands-on practice and problem solving skills.
- Various Club and IEEE student chapter operated at the university level helps the students in all over development in terms of team work, technical projects, and opportunities to participate in competitions.
- Research based pedagogy techniques in the teaching-learning method encourages students for innovations and life-long learning.
- Seminars, workshops, and conferences held at the department and university level gives relevant subject knowledge exposure to the students.
- Value added courses like project endeavour helps students for overall development.

## Programme Educational Objectives (PEO's)

PEO1: **Employability:** Our Graduates shall be appropriately placed in associated industries/services with professional aptitude and knowledge of modern tools.

PEO2: **Higher Studies:** Our Graduates shall be skillful to follow higher studies/research in the field of engineering and management.

PEO3: **Entrepreneurship:** Our Graduates shall be equipped for a prosperous career by meeting ever increasing demands required by Electronics and communication career and empower them to become an entrepreneur.

PEO4: **Ethical:** Our Graduates foster professional and ethical attitudes with operational communication skills, team work and multidisciplinary approach related to engineering problems.

## Program Outcomes (PO's)

PO1: **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.

**PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

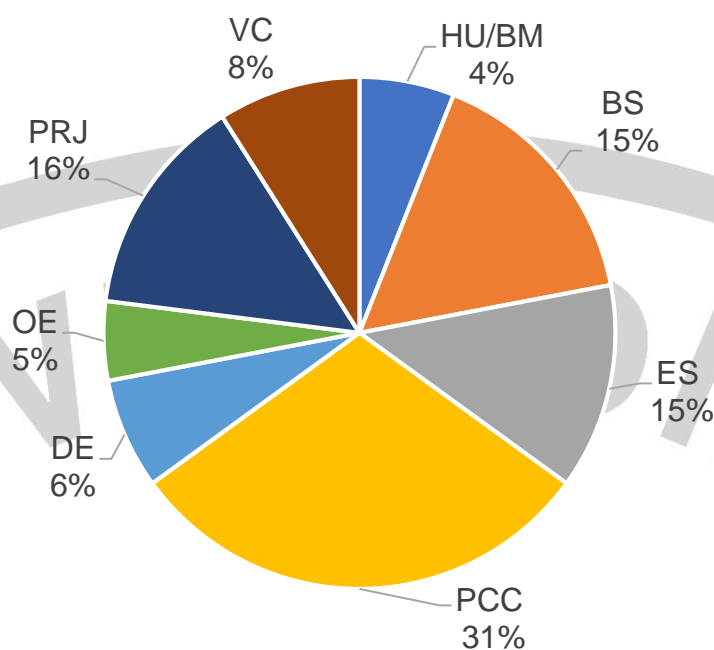
## **Program Specific Outcomes (PSO's)**

**PSO1: Product Development:** Use up-to-date tools to design subsystems for simple applications in Embedded Systems, VLSI and Internet of Things.

**PSO2: Problem Solving:** Apply engineering concepts to find solutions in the fields of Electronics & Communication.

## Credit Structure

Sr. No.	Category	Credits (%)
1	Humanities and Social Sciences including Management courses (HU/BM)	7 (4%)
2	Basic Science courses (BSC)	31 (15%)
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	29 (15%)
4	Professional core courses (PCC)	60 (31%)
5	Professional Elective courses relevant to chosen specialization/branch (PEC)	12 (6%)
6	Open subjects – Electives from other technical and /or emerging subjects (OE)	09 (5%)
7	Project work, seminar and internship in industry or elsewhere (Prj)	30 (16%)
8	Mandatory Courses [Environmental Sciences, Induction training, Anandam etc.] (MC)/Value addition courses (VC)	14 (8%)
Total Credits		192



## Distribution of Total Credits & Contact Hours in all Semesters

S. No.	Semester Number	Credits/Semester	Contact hours/week
1	I	22	25
2	II	28	31/32
3	III	25	24
4	IV	26	25/26
5	V	25	23/25
6	VI	28	25/27
7	VII	26	16/18
8	VIII	12	--
	<b>Total</b>	192	--

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## Course Structure: B. Tech. E&CE / E&CE(IoT) (2021-2025)

### Semester - I

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Hrs/Week
1	PH-XXXX	<b>BSC</b>	<b>(Options to choose any One)</b> PH-1003: Introduction to Electromagnetic Theory PH-1004: Introduction to Mechanics PH-1005: Oscillation, Waves and Optics PH-1006: Quantum Mechanics for Engineers PH-1007: Semiconductor Physics	3	0	1	0	4	5
2	CH-1004	<b>BSC</b>	Chemistry-I	3	0	1	0	4	5
3	MA-1004	<b>BSC</b>	Mathematics-I	3	1	0	0	4	4
2	ME-1201	<b>ESC</b>	Workshop Practice-I	0	0	1	0	1	2
3	CS-1201	<b>ESC</b>	C Programming	2	0	1	0	3	4
4	EC-1201	<b>ESC</b>	Introduction to IOT	0	0	1	0	1	2
5	HU-1011	<b>HU</b>	Professional and Business Communication	2	1	0	0	3	3
6	AM-2001	<b>VC</b>	Anandam – an exercise of trusteeship	-	-	-	2	2	-
<b>Total</b>								<b>22</b>	<b>25</b>

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## Semester - II

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Hrs/Week
1	BM-1114 BM-1115 BM-1116	BM	<b>(Options to choose any One)</b> 1) Business Ethics 2) Business Environment 3) Principles of Management	1	0	0	0	1	1
2	PH-XXXX CH-1005 MA-1005	BSC	<b>(Option to Choose any Two)</b> 1) Physics-II* 2) Chemistry-II 3) Advanced Mathematics	3 3 3	0 0 1	1 1 0	0 0 0	4 4 4	9/10
3	BT-0001	BSC	Biology for Engineers	1	0	0	0	1	1
4	ME-1203	ESC	Engineering Drawing	0	0	2	1	3	4
5	CS-1202 EC-1202 ME-1202 CE-1101	ESC	<b>Engineering Science course:</b> Workshop Practice-II <b>(Options to choose any Two)</b> 1) Computer Workshop 2) Electronics and Electrical Engineering Workshop 3) Mechanical Engineering Workshop 4) Civil Engineering Workshop	0 0	0 0	1 1	0 0	1 1	4
6	EC-1203	ESC	Basics of Electrical and Electronics Engineering (BEEE)	3	0	1	0	4	5
7	CS-1203 ES-1204 ES-1205	ESC	Computational Fundamentals <b>(Options to choose any one)</b> 1) Scilab Programming 2) Advanced Excel Computing 3) Introduction to Python Programming	0	0	1	1	2	2
8	HU-1012 HU-1013	HU	<b>(Options to choose any One)</b> 1) Oral and Written Communication Skills 2) Public Speaking	0	3	0	0	3	3
9	CH-1002	BSC	Environmental Studies	2	0	0	0	2	2
10	AM-2002	VC	Anandam – an exercise of trusteeship	-	-	-	2	2	-
<b>Total</b>								<b>28</b>	<b>31/32</b>

\*Options for Physics-II (Subject List same as Sem I, exclude the subject chosen in Sem. I)

## Semester - III

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Contact Hours
1	EC-2201	PCC	Electronic Devices & Circuits – I*	3	0	0	0	3	3
2	EC-2202	PCC	Electronic Devices & Circuits – I Lab	0	0	1	0	1	2
3	EC-2203	PCC	Digital Logic Design & Analysis*	3	0	0	0	3	3
4	EC-2204	PCC	Digital System Lab	0	0	1	0	1	2
5	EC-2206	PCC	Electronic Instrumentation & Measurements*	3	0	0	0	3	3
6	EC-2207	PCC	Electronic Instrumentation & Measurements Lab	0	0	1	0	1	2
7	EE-2260	ESC	Electrical Network Analysis & Synthesis*	3	0	0	0	3	3
8	EC-3201	PRJ	Mini-Project – 1**	-	-	-	2	2	-
9	CS-2204	ESC	OOPM(Java) Lab/OOPM(C++) Lab	0	0	1	1	2	2
10	MA-2011	BSC	Applied Mathematics – I	3	1	0	0	4	4
11	AM-2003	VC	Anandam – an exercise of trusteeship**	-	-	-	2	2	-
<b>Total</b>								<b>25</b>	<b>24</b>

(\*Indicates MOOC Course Option)

(\*\*Indicates workload of learner not faculty)

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## Semester - IV

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Contact Hours
1	EC-2208	PCC	Electronic Devices & Circuits – II*	3	0	0	0	3	3
2	EC-2209	PCC	Electronic Devices & Circuits – II Lab	0	0	1	0	1	2
3	EC-3202	PCC	Microprocessors & Applications*	3	0	0	0	3	3
4	EC-3203	PCC	Microprocessors & Applications Lab	0	0	1	0	1	2
5	EC-2210	PCC	Principles of Communication Engineering*	3	0	0	0	3	3
6	EC-2211	PCC	Principles of Communication Engineering Lab	0	0	1	0	1	2
7	EE-2261	ESC	Linear Control Systems*	3	0	0	0	3	3
8	EC-3204	PRJ	Mini-Project – 2**	-	-	-	2	2	-
9	MA-2015	BSC	Applied Mathematics – II	3	1	0	0	4	4
10	EC-XXXX	PEC	Department Level Optional Course – I	-	-	-	0	3	3/4
11	AM-2004	VC	Anandam – an exercise of trusteeship**	-	-	-	2	2	-
<b>Total</b>								<b>26</b>	<b>25/26</b>

(\*Indicates MOOC Course Option)

(\*\*Indicates workload of learner not faculty)

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## Semester – V

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Contact Hours
1	EC-3205/ IO-3201	PCC	Micro-controllers & Applications/ Sensors for Internet of Things	3	0	0	0	3	3
2	EC-3206/ IO-3202	PCC	Micro-controllers & Applications Lab/ Sensors for Internet of Things Lab	0	0	1	1	2	2
3	EC-2212	PCC	Digital Communication*	3	0	0	1	4	3
4	EC-2213	PCC	Digital Communication Lab	0	0	1	0	1	2
5	EC-3207	PCC	Design with Linear Integrated Circuits*	3	0	0	0	3	3
6	EC-3208	PCC	Design with Linear Integrated Circuits Lab	0	0	1	0	1	2
7	EC-XXXX	PEC	Department Level Optional Course – II*	-	-	-	0	3	3/4
8	EC-3209	PRJ	Mini-Project – 3**	-	-	-	2	2	-
9	CS-3291	ESC	Linux Programming Lab	0	0	1	0	1	2
10	XX-XXXX	OE	University Level Optional Course – I	-	-	-	0	3	3/4
11	AM-2005	VC	Anandam – an exercise of trusteeship**	-	-	-	2	2	-
<b>Total</b>								<b>25</b>	<b>23/25</b>

(\*Indicates MOOC Course Option)

(\*\*Indicates workload of learner not faculty)

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## Semester - VI

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Contact Hours
1	EC-3210	PCC	Embedded System & RTOS*	3	0	0	0	3	3
2	EC-3211	PCC	Embedded System & RTOS Lab	0	0	1	1	2	2
3	EC-3212	PCC	VLSI Design*	3	0	0	0	3	3
4	EC-3213	PCC	VLSI Design Lab	0	0	1	0	1	2
5	EC-2214	PCC	Signals & Systems*	3	1	0	0	4	4
6	EC-2215/ IO-3203	ESC	Computer Communication Network*/ Wireless Sensor Network*	3	0	0	0	3	3
7	EC-2216/ IO-3204	ESC	Computer Communication Network Lab/ Wireless Sensor Network Lab	0	0	1	0	1	2
8	EC-XXXX	PEC	Department Level Optional Course – III*	-	-	-	0	3	3/4
9	EC-4100	PRJ	Minor Project**	-	-	-	3	3	-
10	XX-XXXX	OE	University Level Optional Course – II*	3	0	0	0	3	3/4
11	AM-2006	VC	Anandam – an exercise of trusteeship**	-	-	-	2	2	-
<b>Total</b>								<b>28</b>	<b>25/27</b>

(\*Indicates MOOC Course Option)

(\*\*Indicates workload of learner not faculty)

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## Semester – VII

S. No.	Course Code	Categ -ory	Course Title	L	T	P	S	Credit (s)	Contact Hours
1	EC-3214/ IO-3205	PCC	Power Electronics*/ Internet of Things*	3	0	0	0	3	3
2	EC-3215/ IO-3206	PCC	Power Electronics Lab/ Internet of Things Lab	0	0	1	0	1	2
3	EC-3216	PCC	Digital Signal Processing*	3	0	0	0	3	3
4	EC-3217	PCC	Digital Signal Processing Lab	0	0	1	1	2	2
5	EC-XXXX	PEC	Department Level Optional Course – IV*	-	-	-	0	3	3/4
6	EC-4200	PRJ	Major Project**	-	-	-	6	6	-
7	EC-3300	PRJ	Summer Internship**	-	-	-	3	3	-
8	XX-XXXX	OE	University Level Optional Course – III*	-	-	-	0	3	3/4
10	AM-2007	VC	Anandam – an exercise of trusteeship**	-	-	-	2	2	-
<b>Total</b>								<b>26</b>	<b>16/18</b>

(\*Indicates MOOC Course Option)

(\*\*Indicates workload of learner not faculty)

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## Semester – VIII

S. No.	Course Code	Category	Course Title	L	T	P	S	Credit (s)	Contact Hours
1	EC-4300	PRJ	Thesis/Industrial Training**	-	-	-	12	12	-
Total Credits								12	-

(\*\*Indicates workload of learner not faculty)



### List of Department Level Optional Course(s) - I

S. No.	Course Code	Course Title	L	T	P	Credit
1	EC-2250	Advanced Digital Design	2	0	1	3
2	EC-2251	Biomedical Instrumentation	3	0	0	3
3	EC-2252	Engineering Electromagnetics	3	0	0	3
4	IO-2250	Data Base & Management System	2	0	1	3
5	IO-2251	Data Structures	2	0	1	3

### List of Department Level Optional Course(s) - II

S. No.	Course Code	Course Title	L	T	P	Credit
1	EC-2253	Microwave Engineering	2	0	1	3
2	EC-2254	Electronics Product Design	3	0	0	3
3	EC-2255	Computer Organization & Architecture	2	0	1	3
4	IO-2252	Wireless Communication	2	0	1	3
5	IO-2253	Artificial Intelligence	2	0	1	3

### List of Department Level Optional Course(s) - III

S. No.	Course Code	Course Title	L	T	P	Credit
1	EC-3250	Robotics	2	0	1	3
2	EC-3251	Integrated Circuit Technology	2	0	1	3
3	EC-3252	Instrumentation System Design	3	0	0	3
4	IO-3250	Neural Network & Fuzzy Logic	2	0	1	3
5	IO-3251	Advance Networking Technologies	2	0	1	3

### List of Department Level Optional Course(s) - IV

S. No.	Course Code	Course Title	L	T	P	Credit
1	EC-3253	Mechatronics	2	0	1	3
2	EC-3254	MEMS Technology	3	0	0	3
3	EC-3255	Digital Image Processing	2	0	1	3
4	IO-3253	Advanced IoT	2	0	1	3
5	IO-2254	Introduction to Cloud Computing	2	0	1	3

## List of University Level Optional Course(s) - I

S. No.	Course Code	Course Title	L	T	P	Credit
1	BT-1351	Bioprocess Engineering	3	0	0	3
2	CS-3001	Simulation & Modelling	3	0	0	3
3	CS-3002	Text Analytics	3	0	0	3
4	EC-2290	Battery Management Systems	3	0	0	3
5	EE-2290	Non-Conventional Energy Sources	3	0	0	3
6	EE-2291	Applications of Power Electronics In Renewable Energy	3	0	0	3
7	EE-2293	Advanced Electrical Machines	3	0	0	3
8	HU-3011	Fun with Drama	0	3	0	3
9	HU-3012	Indian Writings in English	0	3	0	3
10	HU-3013	Language through Literature and Films	0	3	0	3
11	MA-3001	Mathematical Statistics	3	0	0	3
12	ME-1205	Technology and Society	3	0	0	3
13	ME-1204	Economics for Engineers	3	0	0	3
14	PH-3204	Chaos in Engineering Systems	3	0	0	3



## List of University Level Optional Course(s) – II

S. No.	Course Code	Course Title	L	T	P	Credit
1	CS-3003	Management Information System	3	0	0	3
2	CS-3004	Cyber Security and Laws	3	0	0	3
3	EC-2291	Building IoT Applications	2	0	1	3
4	EE-2294	Energy Audit & Management	3	0	0	3
5	EE-2295	Distributed Generation & Microgrid	3	0	0	3
6	HU-3014	Intercultural Communication	0	3	0	3
7	HU-3015	Interview Skills	0	3	0	3
8	MA-3004	Modern Algebra	3	0	0	3
9	ME-3233	Solar Energy and Application	3	0	0	3
10	ME-3234	Project Management	3	0	0	3
11	PH-3201	Nanotechnology	3	0	0	3

### List of University Level Optional Course(s) – III

S. No.	Course Code	Course Title	L	T	P	Credit
1	BM-2203	Strategic Management	3	0	0	3
2	BM-2101	Basics of Financial Services	3	0	0	3
3	BM-2201	Business Planning & Entrepreneurial Management	3	0	0	3
4	BT-2351	Green Technology	3	0	0	3
5	CS-4001	Research Methodology	3	0	0	3
6	CS-4002	Digital Business Management	3	0	0	3
7	EC-2292	Robotics & Automation	2	0	1	3
8	EE-2296	Testing of Electrical Equipments	3	0	0	3
9	EE-2297	Control System Components	3	0	0	3
10	HU-3016	Interpersonal Communication	0	3	0	3
11	HU-3017	Soft Skills	0	3	0	3
12	HU-2011	Professional Mannerisms and Grooming	0	3	0	3
13	MA-3002	Optimization Techniques	3	0	0	3
14	MA-3003	Graph Theory	3	0	0	3
15	MA-3005	Special Functions	3	0	0	3
16	ME-4203	Flexible Manufacturing System	3	0	0	3
17	ME-3235	Operation Research	3	0	0	3
18	PH-3001	Quantum Computation and Information Processing	3	0	0	3
19	CH-2101	Medicinal Plants for Drug Discovery	3	0	0	3

### List of Value Added Course(s)

- Project Endeavour
- Field Visit
- NCC/NSS

