



USHA MITTAL INSTITUTE OF TECHNOLOGY
SNDT Women's University
Faculty: Technology (Undergraduate Course) -BTech

Revised
in 2025

USHA MITTAL INSTITUTE OF TECHNOLOGY
(umit.ac.in)

SNDT Women's University

(Sndt.digitaluniversity.ac)

Syllabus B. Tech.

ENC/ CST/ IT/ CE/ DS/ AI Syllabus



SNDT Women's University

1, Nathibai Thackersey Road Mumbai 400 020

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Semester-I (Group B)

- **Theory Courses**

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Category and Course Code	Course Title	Hours Per Week		Cr	D	TP	TW	P/V	Total
		L	P						
Basic Science course (BSC)	Engineering Chemistry	2	-	2	2	50	50	-	100
Basic Science course (BSC)	Mathematics –I	3	-	3	2	50	50	-	100
Engineering Science Courses (ESC)	Digital Electronics	3	-	3	2	50	50	-	100
Engineering Science Courses (ESC)	Engineering Graphics & Design	1	-	1	-	-	50	-	50
Engineering Science Courses	Programming in C.	2	-	2	2	50	50	-	100
Voc.Skill Course (VSEC)	Introduction to web programming	1	-	1	-	-	50	-	50
Humanities Social Science & Management (AEC)	Technical Communication I	2	-	2	-	-	50	-	50
	Introduction to web programming Lab		2	1	-	-	25	25	50
	Engg. Chemistry Lab		2	1	-	-	25	25	50
	Digital Electronics Lab		2	1	-	-	25	25	50
	Engineering Graphics & Design Lab	-	2	1	-	-	25	25	50
	Programming in C Lab.		2	1	-	-	25	25	50
Co-curricular Courses (CC)	NSS/NCC/Yoga/ IPDC/ Tourism			1	-	-	50	-	50
	Total			20					850

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Semester-II (Group B)

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Theory Courses (Category and Course Code)	Course Title	Hours Per Week		Cr	D	TP	TW	P/V	Total
		L	P						
Basic Science course (BSC)	Engineering Physics	2	-	2	2	50	50	-	100
Basic Science course (BSC)	Mathematics –II	3	-	3	2	50	50	-	100
Engineering Science Courses (ESC)	Basic Electronic Engineering	3	-	3	2	50	50	-	100
Engineering Science Courses (ESC)	Programming with problem solving.	2		2	2	50	50	-	100
Programme Core Course (PCC)	Introduction to AI.	2	-	2	2	50	50	-	100
Voc. Skill Course (VSEC)	Mobile Application Development	1	-	1	-	-	25	-	25
Humanities Social Science & Management (IKS)	IKS for Engineers	2	-	2		-	50	-	50
	Engg Physics Lab		2	1			25	25	50
	Basic Electronics Engineering Lab		2	1	-	-	25	25	50
	Mobile Application Development Lab		2	1	-	-	-	25	25
	Programming with Problem solving Lab		2	1			25	25	50
	Engineering Graphics & Design Lab- II		2	1			25	25	50
Co-curricular Courses (CC)	NSS/NCC/Yoga/ IPDC/ Tourism			1		-	50	-	50
	Total			21					850

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Credit Definition

1 Hr. Lecture (L) per week	1 credit
2 Hours Practical(Lab)/week	1 credit

Course code and Definition:

Course Code	Definitions
L	Lecture
P	Practical
D	Duration of Paper
TP	Term Paper
TW	Term Work
P/V	Practical/Viva
BSC	Basic Science Courses
ESC	Engineering Science Courses
PCC	Programme core courses
PEC	Programme Elective courses
MDM	Multidisciplinary Minor
OE	Open Elective
HSSM	Humanities and Social Sciences including Management courses
IKS	Indian Knowledge System
VEC	Value Education Course (VEC)

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VSEC	Vocational and Skill Enhancement Course
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SEM I

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Course code					
Category	Engineering Science Course				
Course title	Mathematics-I				
Scheme and Credits	L	T	P	Credits	Semester I
	3	-		3	
Pre-requisites (if any)	XI, XII std level mathematics				
Course Objectives	The learner will be able to 1. To introduce the idea of applying differential and integral calculus to improper integrals, and give basic introduction on Beta and Gamma functions. 2. To develop the tool of Fourier series for learning advanced Engineering Mathematics. 3. To familiarize the student with functions of several variables that is essential in most branches of engineering. To develop the essential tool of matrices and linear algebra in a comprehensive manner.				
Course Outcomes	The learner will be able to 1. apply the knowledge of differential and integral calculus to notions of improper integrals. 2. recognise Beta and Gamma functions and use them in solving practical problems. 3. use the tool of Fourier series for learning advanced Engineering problems. 4. deal with functions of several variables that are essential in most branches of Engineering. 5. use matrices as an essential tool to solve engineering problems..				

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Course code					
Category	Engineering Science Courses(ESC102)				
Course title	Engineering Graphics & Design (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester I
	1	-	2	2	
Pre-requisites (if any)					
Course Objectives	1. Understand the importance and applications of engineering drawings in various fields. 2. Develop skills in creating basic engineering drawings using standard conventions and symbols. 3. Acquire proficiency in reading and interpreting engineering drawings, including dimensioning and tolerancing. 4. Familiarize with computer-aided design (CAD) software and its role in modern engineering drawing practices. 5. Learn about different types of projections, views, and sectional views in engineering drawings. 6. Explore the principles of geometric dimensioning and tolerancing				
Course Outcomes	By the end of this course, students will have a solid foundation in engineering drawing principles, enabling them to create, read, and interpret technical drawings accurately and effectively, thereby enhancing their professional capabilities in various engineering disciplines.				

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Course code					
Category	Engineering Science Course				
Course title	Programming in C (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester I
	2	-	2	3	
Pre-requisites (if any)					
Course Objectives	1. To formulate simple algorithms for arithmetic and logical problems. 2. To translate the algorithms to programs (in C language). 3. To implement conditional branching, iteration. 4. To use arrays, functions to formulate algorithms and programs. 5. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.				
Course Outcomes	After completing this course, you will be able to: 1. Develop a C program 2. Control the sequence of the program and give logical outputs 3. Implement strings in your C program 4. Store different data types in the same memory 5. Manage I/O operations in your C program 6. Repeat the sequence of instructions and points for a memory location 7. Apply code reusability with functions and pointers 8. Understand the basics of file handling mechanisms 9. Explain the uses of pre-processors and various memory models				

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Course code					
Category	Vocational and Skill Enhancement Course (VSEC)				
Course title	Introduction to Web Programming				
Scheme and Credits	L	T	P	Credits	Semester I
	2	-	2	3	
Pre-requisites (if any)	-				
Course Objectives	The student will be able to 1. Define the principle of Web page design 2. Define the basics in web design 3. Visualize the basic concept of HTML. 4. Recognize the elements of HTML. 5. Introduce the basic concept of CSS. 6. Develop the concept of web publishing				
Course Outcomes	1. Understanding of development of web pages 2. Hosting of website 3. Connecting web pages with database				

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Course code					
Category	Ability Enhancement Course (AEC)				
Course title	Technical Communication I				
Scheme and Credits	L	T	P	Credits	Semester I
	2	-		2	
Pre-requisites (if any)					
Course Objectives	1. Construct grammatically correct sentences 2. Design effective letters 3. Write effective essays 4. Make formal presentations				
Course Outcomes	1. The learners will be able to acquire basic proficiency in English including reading, writing, listening and speaking skills.				

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Course code					
Category	Basic Science course (BSC101)				
Course title	Engineering Chemistry				
Scheme and Credits	L	T	P	Credits	Semester I (Group B)
	2	-	2	3	
Pre-requisites (if any)	10+2 level Chemistry				
Course Objectives	Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to understand the description of all chemical processes at molecular levels. The course will enable the student to: 1. learn the basics of electromagnetism. 2. Analyze microscopic chemistry in terms of atomic and molecular orbitals and energy level diagrams. 3. Differentiate the various electromagnetic radiations used for the study of molecular energy levels and their applications in various spectroscopic techniques. 4. Explain the thermodynamic concepts such as entropy, free energy, cell potentials and apply those to the real systems. 5. Understand the molecular forces existing in a bulk, macroscopic system.				

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Course Outcomes	The learners will be able to 1. Analyze atomic and molecular structure in terms of wavefunctions, charge densities and energy level diagrams. 2. Understand the nature of bonding existing in molecules and the electron distribution in molecular orbitals 3. Familiarize with the properties of the materials 4. Obtain quantitative information about energy levels through molecular spectroscopic methods such as electronic, vibrational, rotational and nuclear magnetic resonance (NMR) spectroscopy. 5. Rationalize bulk properties and processes using thermodynamic considerations. 6. Understand the energies existing in a bulk macroscopic system.
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Course code					
Category	Engineering Science Courses(ESC101)				
Course title	Digital Electronics (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester I (Group B)
	3	-	2	4	
Pre-requisites (if any)					
Course Objectives	The students will be able to 1. Acquire knowledge about basic components of digital circuit. 2. Understand working of different combinational and sequential circuits. 3. Learn the working of logic families				
Course Outcomes	At the end of this course students will demonstrate the ability to 1. Understand the working of logic gates 2. Design and analyze combinational logic circuits 3. Design & analyze synchronous sequential logic circuits. 4. Understand the working of logic families				

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SEM II

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Course code					
Category	Basic Science course (BSC101)				
Course title	Engineering Physics (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester II (Group B)
	2	-	2	3	
Pre-requisites (if any)	Fundamentals of science at 10+2 schooling levels				
Course Objectives	The learners will be able to 1. Learn the basic concept of electromagnetism such as electrostatics and magnetostatics. 2. Learn the concept of electric polarization and magnetic polarization for electric and magnetic fields. 3. Understand the different laws of electromagnetic wave theory based on Maxwell’s equations. 4. Learn the principle of Huygens wave theory and superpositions of waves for understanding the concept of interference and diffraction. 5. Acquire the concept of limit of resolution and its applications to vision. 6. Understand the concept of laser beam based on properties of ordinary light and laser light, 7. Learn the different types of lasers and various applications of Laser in different fields such as science and technology, medicinal field, defense, industry, and commercial products etc.				

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Course Outcomes	The learners will be able to 1. Understand and impart the knowledge about the concept of electromagnetic wave theory and its applications in various fields which will lead to innovation. 2. Understand the concept of bound charges and bound currents under the polarization phenomena of electric and magnetic fields. 3. acquire the knowledge of all four Maxwell's equations in the field of electromagnetic wave theory in vacuum and nonconducting medium. 4. Recognize, explain, and apply thorough knowledge of interference and diffraction phenomena under the field of wave optics. 5. Recognize and explain the difference between ordinary light (Incandescent) and laser light based on laser properties
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Course code					
Category	Basic Science course (BSC103)				
Course title	Mathematics –II (Theory)				
Scheme and Credits	L	T	P	Credits	Semester II
	3	-		3	
Pre-requisites (if any)	Sem I, XI and XII std level mathematics				
Course Objectives	The learner will be able to 1. To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage. 2. To introduce effective mathematical tools for the solutions of differential equations that model physical processes. 3. To introduce the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems				
Course Outcomes	Learner will be able to use 1. Mathematical tools needed in evaluating multiple integrals. 2. Effectively the mathematical tools for the solutions of differential equations that model physical processes. 3. The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing with engineering problems.				

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Course code					
Category	Engineering Science Courses(ESC101)				
Course title	Basic Electronic Engineering (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester II (Group B)
	3	-	2	4	
Pre-requisites (if any)					
Course Objectives	The students will be able to 1. Understand working of different electrical circuits 2. Analyze AC and DC circuits . 3. Understand the working of a diode and bipolar junction transistor				
Course Outcomes	To understand and analyze basic electric circuits 1. Apply knowledge of AC fundamentals to analyze AC circuits. 2. Apply the various simplification methods to analyze dc circuits. 3. Explain the working, characteristics, and applications of diodes and BJT.				

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Course code					
Category	Engineering Science Course				
Course title	Programming for Problem Solving (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester II
	3	-	2	4	
Pre-requisites (if any)	Basic Knowledge of C Language.				
Course Objectives	1. To formulate simple algorithms for arithmetic and logical problems. 2. To translate the algorithms to programs (in C language). 3. To test and execute the programs and correct syntax and logical errors. 4. To implement conditional branching, iteration and recursion. 5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach. 6. To use arrays, pointers and structures to formulate algorithms and programs. 7. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems. 8. To apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.				

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Course Outcomes	After completing this course, students will be able to: 1. Develop a C program 2. Control the sequence of the program and give logical outputs 3. Implement strings in your C program 4. Store different data types in the same memory 5. Manage I/O operations in your C program 6. Repeat the sequence of instructions and points for a memory location 7. Apply code reusability with functions and pointers 8. Understand the basics of file handling mechanisms 9. Explain the uses of pre-processors and various memory models
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Course code					
Category	Programme Core Course (PCC)				
Course title	Introduction to AI (Theory)				
Scheme and Credits	L	T	P	Credits	Semester II
	2	-	-	2	
Pre-requisites (if any)					
Course Objectives					

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Course code					
Category	Humanities Social Sciences and Management courses (IKS)				
Course title	Indian Knowledge Systems for Engineers				
Scheme and Credits	L	T	P	Credits	Semester II
	2	-		2	
Pre-requisites (if any)					
Course Objectives	Introduce Indian Knowledge systems 1. Explore Indian perspective to modern scientific thought . 2. Familiarize learners with major sequential development in Indian science, engineering and technology. 3. Understand and trace rational, verifiable and universal solutions from ancient Indian knowledge systems for the scientific, technological and holistic development of physical, mental and spiritual well being.				
Course Outcomes	Learners will be able to 1. Explain basics of Indian tradition and Indian traditional knowledge systems. 2. Describe basics of Indian traditional health care, technologies and its scientific perspectives. 3. Explain basics of Indian artistic, linguistic and philosophical traditions. 4. Co-relate Indian traditional knowledge with modern scientific perspective.				

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Category	Vocational and Skill Enhancement Course (VSEC)				
Course title	Mobile Application Development Lab				
Scheme and Credits	L	T	P	Credits	Semester II
	1	-	2	2	
Pre-requisites (if any)					
Course Objectives	The learners will be able to 1. To facilitate students to understand android SDK 2. To help students to gain a basic understanding of Android application development. 3. To inculcate working knowledge of Android Studio development tools.				
Course Outcomes	The learners will be able to 1. Demonstrate their understanding of the fundamentals of Android operating systems . 2. Demonstrate their skills of using Android software development tools. 3. Demonstrate their ability to develop software with reasonable complexity on mobile platforms. 4. Demonstrate their ability to deploy software to mobile devices. 5. Demonstrate their ability to debug programs running on mobile devices.				



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SNDT Women's University

Faculty : Technology (Undergraduate Course) -BTech

Subject : Syllabus for Electronics and Communication Engineering

**Pattern
2023**

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**Scheme for B. Tech. in
Electronics and Communication Engineering**



**SNDT Women's University
1, Nathibai Thackersey Road,
Mumbai 400 020**

(Applicable to students taking admission for academic year 2025-2026)

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Credit Definition

1 Hr. Lecture (L) per week	1 credit
2 Hours Practical(Lab) per week	1 credit

Range of credits –

- Credits of 168 for a student to be eligible to get an Undergraduate degree in Electronics and Communication Engineering (ENC).

Note:

Sem III

1. HSSM (VEC) Universal Human Values (HSSM) subject Theory Paper removed

Sem IV:

1. For Skill Course Subject Introduction to PCB based Antenna Design, theory paper (External) added.
2. Theory (external) paper for Advanced Technical Communication, Principles of Entrepreneurship and Environmental Science subjects are removed

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Semester III

Category	Subject Code	Course Title	Hours/Week			Cr	D	TP	TW	P/V	Total
			L	T	P						
PCC	30501101	Analog Electronics	3	-	-	3	2	50	50	-	100
PCC	30501201	Analog Electronics Lab	-	-	2	1	-	-	25	25	50
PCC	30501102	Signals and Systems	3	-	-	3	2	50	50	-	100
PCC	30501202	Signals and Systems Lab	-	-	2	1	-	-	25	25	50
HSSM (VEC)	30400102	Universal Human Values	2	-	-	2	-	-	50	-	50
HSSM	30400101	Accounts and Finance	2	-	-	2	2	50	50	-	100
MDM	30701101	Data Structures	2	-	-	2	2	50	50	-	100
MDM	30701201	Data Structures Lab	-	-	2	1	-	-	25	25	50
OE1	Refer Table 1	OE1	3	-	-	3	2	50	50	-	100
ELC	30901401	Technical Seminar (old Scheme)	2	-	2	2	-	-	25	25	50
		Total	17	-	8	20	-	-	-	-	750

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OE 1 – Table 1

Elective List

Sr. No	Subject Code	Subject Name
1	30801101	Applied Mathematics
2	30816101	Scientific Computing

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Semester IV

Category	Subject Code	Course Title	Hours/Week			Cr	D	TP	TW	P/V	Total
			L	T	P						
PCC	40501101	Electromagnetic Waves	3	-	-	3	2	50	50	-	100
PCC	40501201	Electromagnetic Waves Lab	-	-	2	1	-	-	25	25	50
PCC	40501102	Microcontroller	3	-	-	3	2	50	50	-	100
PCC	40501202	Microcontroller Lab (old)	-	-	2	1	-	-	25	25	50
MDM	40701101	Object Oriented Programming in C++	2	-	-	1	2	50	-	-	50
MDM	40701201	Object Oriented Programming in C++ Lab	-	-	2	1	-	-	25	25	50
OE2	Refer Table 2	Open Elective 2	2	-	-	2	2	50	50	-	100
Skill Courses	40301101	Introduction to PCB based Antenna Design	2	-	-	1	-	50	25	-	75
Skill Courses	40301201	Introduction to PCB based Antenna Design Lab	-	-	2	1	-	-	-	25	25
HSSM	40400102	Principles of Entrepreneurship	2	-	-	2	-	-	50	-	50
AEC	40400101	Advanced Technical Communication	2	-	-	2	-	-	50	-	50
VEC	40400103	Environmental Science	2	-	-	2	-	-	50	-	50
		Total	18	-	8	20	-	-	-	-	750

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OE 2 – Table 2

Elective List

Sr. No	Subject Code	Subject Name
1	40833101	Probability and Statistics
2	40842101	Design Thinking



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Semester III

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Category	Professional core courses (PCC)				
Course title	Analog Electronics				
Scheme and Credits	L	T	P	Credit	Semester III
	3	-	2	4	
Course Objective	1. Understand small signal analysis of various configurations of amplifier circuits. 2. Acquire knowledge about various classes of Power amplifiers, feedback topologies. 3. Acquire knowledge about functioning of OP-AMP and design OP-AMP based circuits. 4. Learn designing 555 timer based circuits.				
Course Outcomes	1. Analyse various configurations of amplifier circuits. 2. Understand the functioning of OP-AMP and design OP-AMP based circuits. 3. Design 555 timer based circuits.				

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Category	Professional core courses (PCC)				
Course title	Signals and system				
Scheme and Credits	L	T	P	Credit	Semester III
	3	-	2	4	
Course Objective	1. Understand the representations of continuous-time signals and discrete-time signals. 2. Classify and analyse signals and systems by performing various operations. 3. Representation of the system by mathematical model. 4. Analyse and predict the behaviour of linear systems. 5. Use different tools in the time-domain and frequency- domain.				
Course Outcomes	1. Represent continuous-time and discrete-time signals in time and frequency domain using different transforms. 2. Understand use of transforms in analysis of signals and systems in continuous and discrete time domain. 3. Evaluate the time and frequency response of Continuous and Discrete time systems using transforms. 4. Investigating properties of signals and systems. 5. Sampling and reconstruction of a signal.				

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Category	HSSM (VEC)				
Course title	Universal Human Values				
Scheme and Credits	L	T	P	Credit	Semester III
	2	-	-	2	
Course Objective	1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence. 2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence 3. Strengthening of self-reflection. 4. Development of commitment and courage to act.				
Course Outcomes	1. Become more aware of themselves, and their surroundings (family, society, nature) 2. More responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. 3. Better critical ability, sensitive to their commitment towards what they have understood (human values, human relationship and human society). 4. Able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.				

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Category	Humanities & Social Sciences including Management courses				
Course title	Accounts and Finance				
Scheme and Credits	L	T	P	Credit	Semester III
	2	-	-	2	
Course Objective	1. To enable the students to gain knowledge about Accountancy & Finance. 2. To improve the financial thinking skills of students. 3. To develop students' ability to identify and evaluate accounting problems and arrive at reasoned conclusions.				
Course Outcomes	1. Identify the main financial statements and their purposes. 2. Complete a Project/ Written Assignment that integrates career orientation and or professional development skills. 3. Develop the ability to use accounting information to solve a variety of business problems.				
Category	Multidisciplinary Minor Course (MDM)				
Course title	Data structures				
Scheme and Credits	L	T	P	Credit	Semester III
	2	-	2	3	
Pre-requisites (if any)	C Programming				
Course Objective	1. Allow to assess how the choice of data structures and algorithm design methods impacts the performance of programs. 2. To choose the appropriate data structure and algorithm design method for a specified application. 3. To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions. 4. To efficiently implement the different data structures and solutions for specific problems.				

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Course Outcomes	1. Understand basic data structures and operations , time and space trade-off, asymptotic notations. 2. Study linear data structures such as stacks and queues and understand their difference. 3. Study different trees, data structure, heap and graphs along with their basic operations. 4. Study different techniques for solving problems like sorting and searching. 5. Describe the hash function and concepts of collision and its resolution methods.			
Module No.	Sr.No.	Topic and Details	No. of Hours assigned	Weightage in %

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Category	OE1				
Course title	Applied Mathematics				
Scheme and Credits	L	T	P	Credit	Semester III
	3	-	-	3	
Course Objective	1. The course intends to familiarize the students with techniques in Laplace a. Transform, Fourier Transform, Fourier series and Linear algebra (Vector b. Spaces). 2. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced levels of mathematics and applications .				
Course Outcomes	1. Apply the Laplace Transform and its properties to evaluate the integrals. 2. Apply the Inverse Laplace Transform and integral transform calculus to solve the Ordinary differential equation by Laplace Transform. 3. Compute the Fourier series for learning advanced Engineering Mathematics. 4. Apply the concept of Fourier Transform and Inverse Fourier transform. 5. Use the Vector Spaces that are fundamental to application of analysis to Engineering problems.				

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Category	OE2				
Course title	Scientific Computing				
Scheme and Credits	L	T	P	Credit	Semester III
	3	-	-	3	
Course Objective	1. To know the assumptions for and rationale behind these algorithms, understand where they can be applied, and where they may fail. 2. To gain experience implementing algorithms and applying them to scientific problems.				
Course Outcomes	1. Write simple MATLAB/Octave program scripts. 2. Solve systems of linear equations 3. Find roots of mathematical functions. 4. Numerically solve simple differential equations. 5. Find optimum solutions to numerical problems.				



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Semester IV

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Category	PCC				
Course title	Electromagnetic Waves				
Scheme and Credits	L	T	P	Credit	Semester IV
	3	-	2	4	
Course Objective	1. Understand characteristics and wave propagation on high frequency transmission lines. 2. Carryout impedance transformation on TL. 3. Use sections of transmission line sections for realising circuit elements.				
Course Outcomes	1. Characterise uniform plane waves. 2. Calculate reflection and transmission of waves at the media interface. 3. Analyse wave propagation on metallic waveguides in modal form. 4. Understand principle of radiation and radiation characteristics of an antenna.				

Category	PCC				
Course title	Microcontroller				
Scheme and Credits	L	T	P	Credit	Semester IV
	3	-	2	4	
Course Objective	1. To Study Architecture of microprocessor 8085. 2. To understand Details of all the Peripherals. 3. To study the interfacing of the peripherals with 8085. 4. Understand the difference between microcontrollers and processors.				
Course Outcomes	1. To implement assembly language programming. 2. To interface design of peripherals like, I/O, A/D, D/A, timer etc. 3. To develop systems using different microcontrollers. 4. To understand RISC processors and design ARM microcontroller based systems.				

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Category	MDM				
Course title	Object Oriented Programming in C++				
Scheme and Credits	L	T	P	Credit	Semester IV
	1	-	1	2	
Course Objective	1. Standard tools and techniques for software development. 2. Use of object-oriented approach. 3. Use of a version control system, an automated build process. 4. Use of appropriate framework for automated unit and integration tests.				
Course Outcomes	1. Specify simple abstract data types and design implementations, using abstraction functions to document them. 2. Recognise features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity. 3. Name and apply some common object-oriented design patterns and give examples of their use. 4. Design applications with an event-driven graphical user interface.				

Category	OE2				
Course title	Probability and Statistics				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Course Objective	1. To familiarise the students with statistical techniques. 2. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.				
Course Outcomes	1. The ideas of probability and random variables and various discrete and continuous probability distributions and their properties. 2. The basic ideas of statistics include measures of central tendency, correlation and regression. 3. The statistical methods of studying data samples.				

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Category	OE2				
Course title	Design Thinking				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Course Objective	1. Acquire the knowledge of design thinking concepts and principles. 2. Learn the different phases of design thinking. 3. Apply various methods in design thinking to different problems.				
Course Outcomes	1. Define key concepts of design thinking. 2. Utilise design thinking in all stages of problem solving. 3. Apply a design thinking approach to real world problems.				

Category	Skill Courses				
Course title	Introduction to PCB based Antenna Design				
Scheme and Credits	L	T	P	Credit	Semester IV
	1	-	2	2	
Course Objective	1. Understand the basic concept of antennas and its parameters. 2. To teach teams of students how to design and fabricate PCB for prototyping as well as in the Industrial Production environment. 3. To innovate faster with electronics technology.				
Course Outcomes	1. To understand Radiation. 2. To apply a Radiation field from current element antennas. 3. To define and understand Radiation power. 4. To evaluate Radiation resistance of short dipole and half wave dipole antenna. 5. To learn Field and phase of point sources. 6. To understand Directivity and gain. 7. To evaluate Calculation of short and half wave antennas. 8. To Design PCB.				

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Category	HSSM (Management)				
Course title	Principles of Entrepreneurship				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Course Objective	1. The aim of this course is to have a comprehensive perspective of inclusive learning, ability to learn and implement the Fundamentals of Entrepreneurship.				
Course Outcomes	1. It enables students to learn the basics of Entrepreneurship and entrepreneurial development which will help them to provide vision for their own Start-up. 2. After completing this module, students will be prepared to launch and effectively manage a startup, taking into account legal, operational, and marketing considerations.				

Category	AEC				
Course title	Advanced Technical Communication				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Course Objective	1. To introduce the learners to the nuances of various genres of technical communication, both oral and written. 2. To guide students through self-study and assignments, in performing their communicative tasks in the real-life work environment. 3. To enable them to strengthen their oral and written communication skills so that they can achieve their professional goals more effectively.				

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Course Outcomes	1. Eliminate barriers and use verbal/non-verbal cues in social and workplace situations. 2. Employ listening strategies to comprehend wide-ranging vocabulary, grammatical structures, tone, and pronunciation. 3. Prepare effectively for speaking in social, academic, and business situations.
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Category	VEC				
Course title	Environmental Science				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Course Objective	1. The Ability Enhancement Course on Environmental Science aims to train students to cater to the need for ecological citizenship through development of a strong foundation on the critical linkages between ecology-society-economy. 2. The Learning Objectives of this course are as follows: Disciplinary knowledge enables students to develop a comprehensive understanding of various facets of life forms, ecological processes, and the impacts on them by humans during the Anthropocene era. 3. Critical thinking: Build capabilities to identify relevant environmental issues, analyse the various underlying causes, evaluate the practices and policies, and develop a framework to make informed decisions. 4. Moral and ethical awareness/reasoning Develop empathy for all life forms, appreciation for the various ecological linkages within the web of life, awareness and responsibility towards environmental protection and nature preservation.				



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Course Outcomes	1. Analyse natural processes and resources that sustain life and govern the economy. 2. Predict the consequences of human actions on the web of life, global economy, and quality of human life. 3. Think critically and develop appropriate strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development. 4. Demonstrate values and show compassionate attitudes towards complex environmental-economic-social challenges, and participate at national and international levels in solving current environmental problems and preventing the future ones. 5. Adopt sustainability as a practice in life, society, and industry.
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**SNDT Women's University
(Sndt.digitaluniversity.ac)**

**Scheme for B. Tech in
Electronics and Communication Engineering**



SNDT Women's University

1, Nathibai Thackersey Road,

Mumbai - 400 020

(Applicable to students taking admission in 2025-2026)



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Credit Definition

1 Hr. Lecture (L) per week	1 credit
2 Hours Practical (Lab)/week	1 credit

Range of credits –

- Credits of 168 for a student to be eligible to get an Undergraduate degree in Electronics and Communication Engineering (ENC).



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Semester V

Category	Subject Code	Course Title	Hours/Week			C	D	TP	TW	P/V	Total
			L	T	P						
PCC	50501101	Analog and Digital Communication	3	-	-	3	2	50	50	-	100
PCC	50501201	Analog and Digital Communication lab	-	-	2	1	-	-	25	25	50
PCC	50501102	Control Systems	2	-	-	2	2	50	50	-	100
PCC	50501103	Embedded System	3	-	-	3	2	50	50	-	100
PCC	50501203	Embedded System Lab	-	-	2	1	-	-	25	25	50
PEC1	Refer Table 1	Program Elective Course I	3	-	-	3	2	50	50	-	100
PEC1	Refer Table 1	Program Elective Course I Lab	-	-	2	1	-	-	25	25	50
MDM	50701101	Basics of Machine Learning	3	-	-	3	2	50	50	-	100
MDM	50701201	Basics of Machine learning Lab	-	-	2	1	-	-	25	25	50
OE3	Refer Table 2	Open Elective-III	2	-	-	2	2	50	50	-	100
OE3	Refer Table 2	Open Elective-III Lab	-	-	2	1	-	-	25	25	50
		Total	16	-	10	21	-	-	-	-	850

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Table 1: Program Elective Course - I

Sr. No	Subject Code	PEC1
1	51038101	Drone Technology
	51038201	Drone Technology Lab
2	51001101	Robotics
	51001201	Robotics Lab

Table 2: Open Elective - III

Sr. No	Subject Code	OE3
1	50801101	Image Processing
	50801201	Image Processing Lab
2	50842101	VLSI System Design
	50842201	VLSI System Design Lab



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Semester VI

Category	Subject Code	Course Title	Hours/Week			C	D	TP	TW	P/V	Total
			L	T	P						
PCC	60501101	Computer and Communication Networks	3	-	-	3	2	50	50	-	100
PCC	60501201	Computer and Communication Networks Lab	-	-	2	1	-	-	25	25	50
PCC	60501102	Digital Signal Processing	3	-	-	3	2	50	50	-	100
PCC	60501202	Digital Signal Processing Lab	-	-	2	1	-	-	25	25	50
PEC2	Refer Table 3	Program Elective Course II	3	-	-	3	2	50	50	-	100
PEC2	Refer Table 3	Program Elective Course II lab	-	-	2	1	-	-	25	25	50
PEC3	Refer Table 4	Program Elective Course III	3	-	-	3	2	50	50	-	100
PEC3	Refer Table 4	Program Elective Course III lab	-	-	2	1	-	-	25	25	50
MDM	60701101	Artificial Intelligence and Applications	3	-	-	3	2	50	50	-	100
MDM	60701201	Artificial Intelligence and Applications Lab	-	-	2	1	-	-	25	25	50
Skill Courses	60301101	DBMS and SQL Introduction	1	-	-	1	-	-	25	-	25
Skill Courses	60301201	DBMS and SQL Introduction Lab	-	-	2	1	-	-	-	25	25
CEP	60901301	Project 1	-	-	4	2	-	-	50	50	100
		Total	16	-	16	24	-	-	-	-	900

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Table 3: Program Elective Course - II

Sr. No.	Subject Code	PEC2
1	61001101	Speech and Audio Processing
	61001201	Speech and Audio Processing Lab
2	61001102	Nanotechnology
	61001202	Nanotechnology Lab
3	61001103	Cyber Security
	61000201	Cyber Security Lab

Table 4: Program Elective Course - III

Sr. No.	Subject Code	PEC3
1	61001103	Internet of Things and its applications
	61001203	Internet of Things and its applications Lab
2	61001104	Artificial Neural Networks
	61001204	Artificial Neural Networks Lab
3	61001105	Information Theory and coding
	61001205	Information Theory and coding Lab



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Category	PCC				
Course title	Analog and Digital Communication				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester V
	3	-	2	4	
Course Objective	1. To understand the fundamental concepts of analog and digital communication systems. 2. To analyze various modulation techniques used in analog and digital communication. 3. To study the performance of communication systems in the presence of noise. 4. To know the design principles of communication transmitters and receivers. 5. To apply the concepts of analog and digital communication in real-world scenarios.				



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Course Outcomes	1. Understand the fundamental principles and components of communication systems. 2. Analyze analog communication techniques and their performance in the presence of noise. 3. Explore digital communication methods and their effectiveness in different scenarios. 4. Apply communication system concepts to practical applications and real-world case studies.		
Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)
1	CO1	Understand the fundamental principles and components of communication systems.	Blooms Level 2
2	CO2	Analyze analog communication techniques and their performance in the presence of noise.	Blooms Level 4
3	CO3	Explore digital communication methods and their effectiveness in different scenarios.	Blooms Level 3
4	CO4	Apply communication system concepts to practical applications and real-world case studies.	Blooms Level 3



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Category	PCC				
Course title	Control Systems				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester V
	2	-	-	2	
Course Objective	1. To introduce the fundamental concepts of control systems and their applications in engineering. 2. To develop mathematical models of physical systems for analysis and design. 3. To familiarize students with time-domain and frequency-domain analysis and techniques 4. To enable understanding of stability criteria and methods of stability analysis. 5. To impart knowledge on the design of controllers and compensators for engineering applications.				
Course Outcomes	1. Apply modelling techniques to represent electrical and mechanical system. 2. Analyze system responses in time and frequency domain. 3. Determine the stability of linear time invariant systems using various stability criteria. 4. Design and tune controllers and compensators to meet desired performance specifications. 5. Utilize modern tools such as MATLAB for control system analysis and design.				
Sr. No.	Course Outcome	Course Outcomes (CO)			Knowledge Level (Blooms Level)



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1	CO1	Apply modelling techniques to represent electrical and mechanical system.	Blooms Level 2
2	CO2	Analyze system responses in time and frequency domain.	Blooms Level 3
3	CO3	Evaluate the stability of linear time invariant systems using various stability criteria.	Blooms Level 4
4	CO4	Create, design and tune controllers and compensators to meet desired performance specifications.	Blooms Level 5
5	CO5	Understand and utilize modern tools such as MATLAB for control system analysis and design.	Blooms Level 1



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Category	PCC				
Course title	Embedded Systems				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching / Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester V
	3	-	2	4	
Pre-requisites (if any)	Basic understanding of digital logic, computer organization, microcontroller and C programming				
Course Objective	1. Comprehend embedded system fundamentals, design principles, and diverse applications. (Understanding) 2. Gain expertise in technological aspects: interfacing, signal processing and communication protocols. 3. Develop proficiency in embedded software development, real-time programming, and RTOS principles. (Applying) 4. Learn RISC-V architecture, programming, and its key features. (Understanding, Applying) 5. Learn ARM architecture, compare RISC-V and ARM, and evaluate their application suitability. (Understanding, Analyzing, Evaluating)				
Course Outcomes	1. To explain core embedded system concepts, components, and applications. 2. Design and implement embedded system interfaces and communication protocols. 3. Develop embedded software using real-time programming and RTOS. 4. Analyze RISC-V architecture, programming, and memory organization. 5. Evaluate RISC-V vs. ARM, and select appropriate architectures for specific applications.				



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Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)
1	CO1	Explain core embedded system concepts, components, and applications.	Blooms Level 2
2	CO2	Design and implement embedded system interfaces and communication protocols.	Blooms Level 3
3	CO3	Develop embedded software using real-time programming and RTOS.	Blooms Level 3
4	CO4	Analyze RISC-V architecture, programming, and memory organization.	Blooms Level 4
5	CO5	Evaluate RISC-V vs. ARM, and select appropriate architectures for specific applications.	Blooms Level 5

Category	PEC1				
Course title	Drone Technology				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester V
	3	-	2	4	
Course Objective	1. To understand Drone Technology. 2. Analyze Basic Flight Principles. 3. To Master Drone Operation and Safety. 4. To Explore Data Collection and Analysis. 5. To Understand Legal and Regulatory Framework. 6. Apply Drones in Real-World Applications.				



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Course Outcomes	1. Know about a various type of drone technology, drone fabrication and programming. 2. Select appropriate sensors and actuators for Drones. 3. Develop a drone mechanism for specific applications. 4. Create the programs for various drones.		
Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)
1	CO1	Understand about a various type of drone technology, drone fabrication and programming.	Blooms Level2
3	CO3	Explore appropriate sensors and actuators for Drones	Blooms Level 3
4	CO4	Develop a drone mechanism for specific applications	Blooms Level 3

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5	CO5	Create the programs for various drones	Blooms Level 6
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Category	PEC1				
Course title	Robotics				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester V
	3	-	2	4	
Pre-requisites (if any)	Applied Mathematics, Control System				
Course Objective	1. To explore the fundamentals of robotics. 2. To acquaint learners with the kinematic modeling of robotic systems. 3. To introduce the principles of differential motion in robots. 4. To provide insights into trajectory generation and control of robotic manipulators. 5. To introduce vision systems and perception in robotics. 6. To develop understanding of task-level planning in robotic applications.				
Course Outcomes	1. Demonstrate an understanding of the essential principles of robotics. 2. Analyze and solve problems related to robotic kinematics. 3. Apply concepts of differential motion to robotic mechanisms. 4. Design and evaluate robotic trajectories and task execution strategies. 5. Explain the significance of sensing and vision technologies in robotic control. 6. Identify and discuss real-world applications of robotics across domains.				



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Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)
1	CO1	Demonstrate an understanding of the essential principles of robotics.	Blooms Level 2
2	CO2	Analyze and solve problems related to robotic kinematics.	Blooms Level 3
3	CO3	Apply concepts of differential motion to robotic mechanisms.	Blooms Level 4
4	CO4	Design and evaluate robotic trajectories and task execution strategies.	Blooms Level 3,6
5	CO5	Explain the significance of sensing and vision technologies in robotic control.	Blooms Level 2,5
6	CO6	Identify and discuss real-world applications of robotics across domains.	Blooms Level 1,2,5



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Category	MDM				
Course title	Basics of Machine Learning				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester V
	3	-	2	4	
Course Objective	1. Understand the fundamental concepts of machine learning. 2. Implement and apply various supervised learning algorithms. 3. Implement and apply various clustering algorithms. 4. Understand strengths, weaknesses, and appropriate use cases of different algorithms. 5. Apply dimensionality reduction techniques.				
Course Outcomes	1. Understand the core concepts of training, validation, and testing datasets and their importance in model evaluation. 2. Implement and train different supervised learning algorithms. 3. Evaluate the performance of supervised/ unsupervised learning models using appropriate metrics. 4. Implement and apply different clustering algorithms. 5. Understand concept of dimensionality reduction and its benefits in machine learning.				
Sr. No.	Course Outcome	Course Outcomes (CO)			Knowledge Level (Blooms Level)
1	CO1	Understand the core concepts of training, validation, and testing datasets and their importance in model evaluation.			Blooms Level 2, 3
2	CO2	Implement and train different supervised learning algorithms			Blooms Level 3,5



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3	CO3	Evaluate the performance of supervised/unsupervised learning models using appropriate metrics	Blooms Level 2, 5
4	CO4	Implement and apply different clustering algorithms	Blooms Level 3, 5
5	CO5	Understand concept of dimensionality reduction and its benefits in machine learning.	Blooms Level 2, 5



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Category	OE3				
Course title	Image Processing				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester V
	2	-	2	3	
Course Objective	1. To know and understand how computers can process digital images. 2. To know the basic operations (their basis, implementation and Consequences) in image processing. 3. To know the relation to image processing and other fields. 4. Give the students a useful skill base that would allow them to carry				
Course Outcomes	1. Understand images in the frequency domain using various transforms. 2. Analyze images in the frequency domain using various transforms. 3. Evaluate the techniques for image enhancement and image restoration and representation techniques. 4. To assess the feature extraction and object detection. 5. To perform Image Transformation and Geometric Operations.				
Sr. No.	Course Outcome	Course Outcomes (CO)			Knowledge Level (Blooms Level)
1	CO1	Understand images in the frequency domain using various transforms.			Blooms Level 2
2	CO2	Analyze images in the frequency domain using various transforms.			Blooms Level 4

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3	CO3	Evaluate the techniques for image enhancement and image restoration and representation techniques.	Blooms Level 5
4	CO4	To assess the feature extraction and object detection.	Blooms Level 5
5	CO5	To perform Image Transformation and Geometric Operations.	Blooms Level 1

Category	OE3				
Course title	VLSI System Design				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester V
	2	-	2	3	
Course Objective	1. To understand the Basic NMOS, CMOS & Bi CMOS circuits and their process technology. 2. To understand the Designing of stick diagrams and layouts for OS transistors. 3. To learn the concepts of modelling of Delay techniques and MOS layers. 4. To learn the concepts of Technology Scaling of MOS transistors. 5. To understand the concepts of testing of combinational and sequential circuits and also the scan of design techniques.				



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Course Outcomes	1. Knowledge on various IC fabrication technologies like NMOS, PMOS, CMOS and Bi-CMOS and their Electrical properties. 2. Draw the stick diagrams and layout diagrams of various logic circuits and analyze various design rules. 3. Design various combinational gate level logics. 4. Implement and design of building blocks of data path and array sub systems. 5. Design and implement different programmable logic devices.		
Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)
1	CO1	Understand the Knowledge on various I.C fabrication technologies like NMOS, PMOS, CMOS and Bi-CMOS and their Electrical properties	Blooms Level 2
2	CO2	Create the stick diagrams and layout diagrams of various logic circuits and analyze various design rules	Blooms Level 6
3	CO3	Analyze various combinational gate level logics	Blooms Level 4
4	CO4	Apply design of building blocks of data path and array sub systems	Blooms Level 3
5	CO5	Evaluate and implement different programmable logic devices	Blooms Level 5
6	CO6	Remember the concepts of Technology Scaling of MOS transistors.	Blooms Level 1



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Semester VI



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Category	PCC				
Course title	Computer and Communication Network				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	-	2	4	
Course Objective	1. Understand Network Fundamentals like topologies, protocols, OSI models. 2. Gain the knowledge of the basic computer network technology. 3. Understanding the concept of data transmission and types of transmission media. 4. Learn to design, set up, and manage networks, including routing and switching. 5. Simulation of different networks in Cisco Packet Tracer.				
Course Outcomes	1. Understanding the basic concepts, services and role of each layer of OSI and TCP/IP reference model networks devices and transmission media. 2. Apply channel allocation, framing, error and flow control techniques. 3. Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism. 4. Understand the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism. 5. Simulation of different networks in Cisco Packet Tracer. 6. Learn the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET.				
Sr. No.	Course Outcome	Course Outcomes (CO)		Knowledge Level (Blooms Level)	



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1	CO1	Understanding the basic concepts, services and role of each layer of OSI and TCP/IP reference model networks devices and transmission media.	Blooms Level 1, 2
2	CO2	Apply channel allocation, framing, error and flow control techniques	Blooms Level 3
3	CO3	Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism.	Blooms Level 2, 3
4	CO4	Understand the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism.	Blooms Level 2, 3
5	CO5	Simulation of different networks in Cisco Packet Tracer.	Blooms Level 6
6	CO6	Learn the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET	Blooms Level 2

Category	PCC
Course title	Digital Signal Processing
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation



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Scheme and Credits	L	T	P	Credit	Semester VI
	3	-	2	4	
Pre-requisites (if any)	Signals and Systems				
Course Objective	1. Analyze DT-LTI systems using different transforms. 2. Understand the properties of Discrete Fourier Transform. 3. Apply different algorithms of Fast Fourier Transform. 4. Design and implementation of different digital filters. 5. Understand the concept of Multirate signal processing and applications of DSP.				
Course Outcomes	1. Analyze of DT-LTI systems using DFT/FFT. 2. Apply properties of Discrete Fourier Transform on DT-LTI system. 3. Evaluate Fast Fourier Transform using different algorithms. 4. Design and realize different digital filters. 5. Understand the concept of Multirate signal processing and applications of DSP.				
Sr. No.	Course Outcome	Course Outcomes (CO)		Knowledge Level (Blooms Level)	
1	CO1	Analyze of DT-LTI systems using DFT/FFT.		Blooms Level 4	



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2	CO2	Apply properties of Discrete Fourier Transform on DT-LTI system.	Blooms Level 3
3	CO3	Evaluate Fast Fourier Transform using different algorithms.	Blooms Level 5
4	CO4	Design and realize different digital filters.	Blooms Level 6
5	CO5	Understand the concept of Multirate signal processing and applications of DSP.	Blooms Level 2

Category	PEC2				
Course title	Speech and Audio Processing				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	-	2	4	
Course Objective	1. Understand the speech signal. 2. Analyze the quality and properties of speech signal. 3. Enhance the speech and audio signals.				
Course Outcomes	1. Understand the fundamentals of speech signal. 2. Analyze the quality and properties of speech signals. 3. Create, modify and enhance the speech and audio signals. 4. Evaluate speech Coding and Compression. 5. Apply Speech Recognition and Synthesis. 6. Remember Noise Reduction and Speech Enhancement.				
Sr. No.	Course Outcome	Course Outcomes (CO)		Knowledge Level (Blooms Level)	



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1	CO1	Understand the fundamentals of speech signal.	Blooms Level 2
2	CO2	Analyze the quality and properties of speech signal.	Blooms Level 4
3	CO3	Create, modify and enhance the speech and audio signals.	Blooms Level 6
4	CO4	Evaluate speech Coding and Compression.	Blooms Level 5
5	CO5	Apply Speech Recognition and Synthesis	Blooms Level 3
6	CO6	Remember Noise Reduction and Speech Enhancement	Blooms Level 1



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Category	PEC2				
Course title	Cyber Security				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	-	2	4	
Course Objective	1. Understand the fundamentals of cybersecurity and its role in protecting digital assets. 2. Learn about common threats, vulnerabilities, and countermeasures. 3. Learn basic tools and techniques for securing systems, networks, and data. 4. Develop an understanding of cybersecurity frameworks, compliance, and best practices. 5. Understand legal and ethical aspects in cybersecurity				
Course Outcomes	1. Understand the fundamental concepts of cybersecurity, various types of attacks and basic security Policies. 2. Identify and analyze various tools and techniques used in cybercrimes and cyberattacks. 3. Apply cryptography algorithms, and network security principles to provide confidentiality, integrity, and authentication of information. 4. Evaluate risk management approaches and digital forensic methods used in detecting and responding to cyber incidents. 5. Interpret and apply cyber laws and ethical principles in addressing cybercrime and privacy risks.				
Sr. No.	Course Outcome	Course Outcomes (CO)		Knowledge Level (Blooms Level)	

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1	CO1	To analyze Cyber Security Threats	Blooms Level 2
2	CO2	To Implement Security Measures and best Practices.	Blooms Level 6
3	CO3	To competence in Network Security.	Blooms Level 4
4	CO4	To Conduct Ethical Hacking and Penetration Testing.	Blooms Level 3
5	CO5	To Know the Legal, Ethical and Compliance issues in Cyber Securities	Blooms Level 5

Category	PEC2				
Course title	Nano Technology				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	-	2	4	
Course Objective	1. To provide a comprehensive overview of synthesis and characterization of nanoparticles, nanocomposites and hierarchical materials with nanoscale features				



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Course Outcomes	1. Understand the fundamentals of Nanotechnology. 2. To know the nanoscale Characterization Techniques. 3. To understand the nano materials and their properties. 4. To apply nano technology in various fields. 5. To study nano fabrication Techniques and processes.		
Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)
1	CO1	Understand the fundamentals of Nanotechnology.	Blooms Level 1
2	CO2	To know the nanoscale Characterization Techniques.	Blooms Level 2
3	CO3	To understand the nano materials and their properties.	Blooms Level 3
4	CO4	To apply nano technology in various fields.	Blooms Level 4

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5	CO5	To study nano fabrication Techniques and processes	Blooms Level 5
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Category	PEC3				
Course title	Artificial Neural Networks				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	-	2	4	
Course Objective	1. Understand the basic principles and theoretical foundations of artificial neural networks. 2. Analyze various neural network architectures and their applications. 3. Learn different algorithms and techniques for training neural networks. 4. Apply neural network concepts to real-world problems in electronics and communication engineering. 5. Create new approaches or solutions using emerging trends in deep learning and neural networks.				
Course Outcomes	1. Describe the fundamental concepts and components of artificial neural networks and their biological inspirations. 2. Analyze and compare various neural network architectures, including feedforward, convolutional, and recurrent networks. 3. Implement and train neural networks using different learning algorithms and techniques. 4. Evaluate the performance of neural networks using appropriate metrics and validation methods. 5. Apply neural network models to solve practical problems in signal processing, image processing, and communication systems.				

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Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)	

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1	CO1	Describe the fundamental concepts and components of artificial neural networks and their biological inspirations.	Blooms Level 1
2	CO2	Analyze and compare various neural network architectures, including feedforward, convolutional, and recurrent networks.	Blooms Level 4
3	CO3	Implement and train neural networks using different learning algorithms and techniques.	Blooms Level 3
4	CO4	Evaluate the performance of neural networks using appropriate metrics and validation methods.	Blooms Level 5
5	CO5	Apply neural network models to solve practical problems in signal processing, image processing, and communication systems.	Blooms Level 3

Category	PEC3					
Course title	Internet of Things and its Applications					
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)					
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation					
Scheme and Credits	L	T	P	Credit	Semester VI	
	3	-	2	4		
Course Objective	1. Describe What IOT is and how it works today. 2. Recognize the factors that contributed to emergence in IOT. 3. Design the program IOT devices. 4. Use real IOT protocols for communication.					



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Course Outcomes	1. Understand IOT Architecture and Components. 2. To design and develop IOT System. 3. To analyze the data collection and cloud integration. 4. To understand the IOT Security and Privacy. 5. To study IOT communication Protocols.		
Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)
1	CO1	Understand IOT Architecture and Components.	Blooms Level 1
2	CO2	To design and develop IOT System.	Blooms Level 2
3	CO3	To analyze the data collection and cloud integration.	Blooms Level 3
4	CO4	To understand the IOT Security and Privacy.	Blooms Level 4
5	CO5	To study IOT communication Protocols	Blooms Level 5



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Category	PEC3				
Course title	Information Theory and Coding				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learnin g Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	-	2	4	
Course Objective	1. To learn the concept of information and entropy. 2. Study the Shannon’s theorem for coding. 3. Able to do the calculation of channel capacity. 4. Learn to apply coding techniques.				
Course Outcomes	1. Understand the concept of information and entropy. 2. Apply Shannon’s theorem for coding. 3. Analyze of channel capacity. 4. Evaluate coding techniques.				
Sr. No.	Course Outcome	Course Outcomes (CO)		Knowledge Level (Blooms Level)	
1	CO1	Understand the concept of information and entropy		Blooms Level 2	
2	CO2	Apply Shannon’s theorem for coding.		Blooms Level 3	
3	CO3	Analyze of channel capacity.		Blooms Level 4	
4	CO4	Evaluate coding techniques		Blooms Level 5	



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Category	Skill Courses				
Course title	DBMS and SQL Introduction				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester VI
	1	-	2	2	
Course Objective	1. To understand the different issues involved in the design and implementation of a database system. 2. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models. 3. To understand and use data manipulation language to query, update, and manage a database. 4. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.				



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Course Outcomes	1. For a given query write relational algebra expressions for that query and optimize the develop expressions. 2. For a given specification of the requirement design the databases using E R method and normalization. 3. For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2. 4. For a given query optimize its execution using Query optimization algorithms. 5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.		
Sr. No.	Course Outcome	Course Outcomes (CO)	Knowledge Level (Blooms Level)
1	CO1	To understand the different issues involved in the design and implementation of a database system.	Blooms Level 1
2	CO2	To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.	Blooms Level 2
3	CO3	To understand and use data manipulation language to query, update, and manage a database.	Blooms Level 3
4	CO4	To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing	Blooms Level 4
5	CO5	Determine the transaction atomicity, consistency, isolation, and durability.	Blooms Level 4



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Category	MDM				
Course title	Artificial Intelligence and Applications				
Teaching Scheme (Program Specific)	Examination Scheme (Formative / Summative)				
Modes of Teaching /Learning Weightage	Modes of Continuous Assessment / Evaluation				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	-	2	4	
Course Objective	1. Students will learn the basic concepts and techniques of Artificial Intelligence. 2. They should be able to develop AI algorithms for solving practical problems.				
Course Outcomes	1. Understand the basic concepts and techniques of Artificial Intelligence. 2. Apply AI algorithms for solving practical problems. 3. Describe human intelligence and AI. 4. Explain how an intelligent system works. 5. Apply basics of Fuzzy logic and neural networks. 6. Explain Expert System and implementation.				
Sr. No.	Course Outcome	Course Outcomes (CO)			Knowledge Level (Blooms Level)
1	CO1	Understand the basic concepts and techniques of Artificial Intelligence.			Blooms Level 2
2	CO2	Apply AI algorithms for solving practical problems.			Blooms Level 3

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3	CO3	Describe human intelligence and AI.	Blooms Level 1
4	CO4	Explain how an intelligent system works.	Blooms Level 4
5	CO5	Apply basics of Fuzzy logic and neural networks.	Blooms Level 3
6	CO6	Explain Expert System and implementation.	Blooms Level 4



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**Scheme for B. Tech. in
Electronics and Communication**



SNDT Women's University
1, Nathibai Thackersey Road,
Mumbai 400 020

(Applicable to students taking admission in and after 2023)

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Credit Definition

1 Hr. Lecture (L) per week	1 credit
2 Hours Practical(Lab) per week	1 credit

Range of credits –

- Credits of 168 for a student to be eligible to get an Undergraduate degree in Electronics and Communication (ENC).

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Semester VII

Theory/ Lab Courses

Category	Course Title	Hours/Week			Cr	D	TP	TW	P/V	Total
		L	T	P						
PCC	Mobile and Wireless Communication systems	3	-	-	3	2	50	50	-	100
	Mobile and Wireless Communication systems Lab	-	-	2	1	-	-	25	25	50
PCC	Advanced Cyber Security	3	-	-	3	2	50	50	-	100
	Advanced Cyber Security Lab	-	-	2	1	-	-	25	25	50
PEC-IV	Program Elective IV	3	-	-	3	2	50	50	-	100
	Program Elective IV Lab	-	-	2	1	-	-	25	25	50
PEC-V	Program Elective V	2	-	-	2	2	50	50	-	100
MDM	Fuzzy Logic	2	-	-	2	2	50	50	-	100
	Project II	-	-	8	8	-	-	100	200	300
	Total	13	-	14	24	-	-	-	-	950

Table 1: Program Elective Course - IV

Sr. No.	PEC IV
1	Advanced Drone Technology
2	Digital Voice and Picture Communication
3	Introduction to Quantum Computing

Table 2: Program Elective Course -V

Sr. No.	PEC V
1	Fiber Optic Communication
2	Blockchain Technology
3	Satellite Communication

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Semester VIII

Theory/ Lab Courses:

Category	Course Title	Hours/Week			Cr	D	TP	TW	P/V	Total
		L	T	P						
PEC-VI	Program Elective VI	2	-	-	2	2	50	50	-	100
MDM	Intellectual Property Rights	2	-	-	2	2	50	50	-	100
Experimental Learning Course	Research Methodology	4	-	-	4	2	50	50	-	100
Internship / OJT	Internship	-	-	-	10	-	-	100	200	300
	Total	-	-	-	18	-	-	-	-	600

Table 3: Program Elective Course -VI

Sr. No.	PEC VI
1	Agentic AI System
2	Microwave Engineering
3	Management for IT Professional



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in 2023**

SEM VII

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Category	Programme Core Course (PCC)				
Course title	Mobile and Wireless Communication Systems				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	2	4	
Prerequisite	The Students should have the prior knowledge of the following subjects: 1. Basic Principles of Communication Systems 2. Fundamentals of Digital Communication				
Course Objective	The objectives of this course are to: 1. To understand the basic concepts of wireless Cellular System and the design requirements. 2. To understand 3G, 4G and 5G mobile communication 3. To gain knowledge and awareness of the technologies for how to effectively share spectrum through multiple access techniques i.e. TDMA, CDMA, FDMA etc. 4. To understand various modulation schemes and multiple access techniques that are used in wireless communications.				
Course Outcome	On successful completion of course learner will be able to: 1. Explain cellular system concepts including cell structure, frequency reuse, system capacity. 2. Analyze and compare multiple access schemes and modulation techniques. 3. Describe the architecture, constraints, challenges, protocols, and applications of Wireless Sensor Networks and Mobile Ad Hoc Networks. 4. Evaluate wireless signal propagation mechanisms and channel characteristics. 5. Apply theoretical concepts of wireless communication to assess interference, fading, mobility, and routing issues.				

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Category	Programme Core Course				
Course title	Advanced Cyber Security				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	2	4	
Prerequisite	The Students should have the prior knowledge of the following subjects: 1. Cryptography 2. System Security				
Course Objective	The objectives of this course are to: 1. To provide in-depth knowledge of advanced cyber threats and attack methodologies. 2. To develop understanding of defensive, detective, and response-oriented security mechanisms. 3. To train students in SOC operations, incident response, and cyber forensics. 4. To apply cryptographic, network, cloud, mobile, and IoT security concepts in real world scenarios. 5. To understand legal, ethical, and compliance aspects of advanced cyber security.				
Course Outcome	On successful completion of course learner will be able to: 1. Analyze modern cyber threats, advanced attacks, and adversary techniques using cyber kill chain and MITRE ATT&CK framework. 2. Apply advanced network, system, and endpoint security controls for attack detection and prevention. 3. Implement cryptographic techniques and secure communication protocols for protecting data and systems. 4. Evaluate security challenges and protection mechanisms in cloud, mobile, and IoT environments. 5. Perform incident response, digital forensic investigation, and apply cyber laws and compliance requirements.				

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Category	Programme Elective Course IV (PEC-IV)				
Course title	Advanced Drone Technology				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	2	4	
Prerequisite	The Students should have the prior knowledge of the following subjects: 1. Control Systems 2. Drone Technology				
Course Objective	The objectives of this course are to: 1. To understand advanced UAV fundamentals and aerodynamics 2. To analyze and design drone systems 3. To develop hands-on skills in drone design and integration 4. To comprehend autonomous navigation and intelligent control techniques 5. To apply artificial intelligence techniques in UAV applications				
Course Outcome	On successful completion of course learner will be able to: 1. Analyze advanced UAV aerodynamics and flight stability parameters 2. Design and evaluate drone systems by applying embedded system architecture 3. Implement and test a quadcopter system through proper selection of subsystems 4. Apply autonomous navigation and control concepts using kinematic and dynamic models 5. Develop intelligent UAV applications by integrating AI-based computer vision and edge computing platforms				

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Category	Programme Elective Course IV (PEC-IV)				
Course title	Digital Voice and Picture Communication				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	2	4	
Prerequisite	The Students should have the prior knowledge of the following subjects: 1. Digital Signal Processing				
Course Objective	The objectives of this course are to: 1. To introduce fundamentals of digital speech and audio signal processing techniques. 2. To understand image and video coding principles and standards. 3. To analyze modern digital voice, video, and multimedia communication systems. 4. To familiarize students with VoIP, conferencing, and multiplexing techniques used in real-time communication.				
Course Outcome	On successful completion of course learner will be able to: 1. Explain speech production models and digital speech coding techniques. 2. Apply image and video compression techniques using transform-based methods. 3. Analyze video and audio coding standards used in multimedia communication. 4. Understand VoIP architecture, signaling protocols, and multimedia conferencing systems.				

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Category	Programme Elective Course IV (PEC-IV)				
Course title	Introduction to Quantum Computing				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	2	4	
Prerequisite	The Students should have the prior knowledge of the following subjects: 1. Engineering Mathematics 2. Data Structures and Algorithm 3. Python Programming				
Course Objective	The objectives of this course are to: 1. To understand the basics of quantum computing. 2. To understand mathematics required for quantum computing. 3. To understand the building blocks of quantum computing and design algorithms. 4. To understand quantum hardware principles and tools for quantum computing.				
Course Outcome	On successful completion of course learner will be able to: 1. Understand basic concepts of quantum computing. 2. Illustrate building blocks of quantum computing through architecture and programming models. 3. Appraise various mathematical models required for quantum computing. 4. Discuss various quantum hardware building principles. 5. Identify the various quantum algorithms. 6. Describe usage of tools for quantum computing				

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Category	Programme Elective Course V (PEC-V)				
Course title	Fibre Optic Communication				
Scheme and Credits	L	T	P	Credit	Semester VII
	2	-	-	2	
Prerequisite	The Students should have the prior knowledge of the following subjects: 1. Analog & Digital Communication 2. Electromagnetics / Wave Propagation 3. Basic Electronics				
Course Objective	The objectives of this course are to: 1. Explain the basics of signal propagation through optical fibers, fiber impairments, components and devices and system design. 2. Identify Classify the Optical sources and detectors and to discuss their principle. 3. Recognize the Optical sources and detectors and to discuss their principle.				
Course Outcome	On successful completion of course learner will be able to: 1. Recognize and classify the structures of Optical fiber and types. 2. Discuss the channel impairments like losses and dispersion. 3. Analyze various coupling losses. 4. Classify the Optical sources and detectors and to discuss their principle.				

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Category	Programme Elective Course V (PEC-V)				
Course title	Blockchain Technology				
Scheme and Credits	L	T	P	Credit	Semester VII
	2	-	-	2	
Prerequisite	Students should have the prior knowledge of the following subjects: 1. Fundamentals of Computer Networks 2. Basics of Data Structures 3. Discrete Mathematics concepts 4. Basic Programming knowledge (C / Java / Python) 5. Introductory understanding of Operating Systems				
Course Objective	The objectives of this course are to: 1. Understand fundamentals and basic architecture of blockchain systems 2. Study essential cryptographic concepts and consensus mechanisms 3. Learn fundamentals of smart contracts and blockchain platforms 4. Understand blockchain applications, security concerns, and regulatory aspects				
Course Outcome	On successful completion of course learner will be able to: 1. Explain basic blockchain concepts, components, and types 2. Describe cryptographic techniques and consensus mechanisms used in blockchain 3. Develop simple smart contracts and understand the DApp concepts 4. Identify blockchain applications and analyze security challenges				

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Category	Programme Elective Course V (PEC-V)				
Course title	Satellite Communication				
Scheme and Credits	L	T	P	Credit	Semester VII
	2	-	-	2	
Prerequisite	Students should have the prior knowledge of the following subjects: 1. Analog and Digital communication				
Course Objective	The objectives of this course are to: 1. To understand the basic principles of Satellite Communication systems, orbital mechanics, launching techniques. 2. To learn satellite link design and earth station technology. 3. To provide a better understanding of multiple access systems and GPS systems. 4. To explain the tools necessary for the calculation of basic parameters in a satellite communication system. 5. Understand different applications of Satellite Communication				
Course Outcome	On successful completion of course learner will be able to: 1. Explain basics of satellite communication, space segment and earth segment. 2. Understand different satellite orbits and orbital parameters. 3. Explain and analyze link budget of satellite signal for proper communication. 4. Understand various applications of satellite communications.				

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Category	Multidisciplinary Minor (MDM)				
Course title	Fuzzy Logic				
Scheme and Credits	L	T	P	Credit	Semester VII
	2	-	-	2	
Prerequisite	Students should have the prior knowledge of the following subjects: 1. Fundamentals of AI				
Course Objective	The objectives of this course are to: 1. To develop the fundamental concepts such as fuzzy sets, operations and fuzzy relations. 2. To learn about the fuzzification of scalar variables and the defuzzification of membership functions. 3. To learn three different inference methods to design fuzzy rule based systems. 4. To develop fuzzy decision making by introducing some concepts and also Bayesian decision methods 5. To learn different fuzzy classification methods.				
Course Outcome	On successful completion of course learner will be able to: 1. Understand the basic ideas of fuzzy sets, operations and properties of fuzzy sets and also about fuzzy relations. 2. Understand the basic features of membership functions, fuzzification process and defuzzification process. 3. Design a fuzzy rule based system. 4. Know about combining fuzzy set theory with probability to handle random and non-random uncertainty, and the decision making process. 5. Gain knowledge about fuzzy C-Means clustering.				



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SEM VIII

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Category	Programme Elective Course VI (PEC-VI)				
Course title	Agentic AI System				
Scheme and Credits	L	T	P	Credit	Semester VIII
	2	-	-	2	
Prerequisite	Students should have the prior knowledge of the following subjects: 1. Artificial Intelligence / Machine Learning 2. Programming & Data Structures 3. Multi-Agent Systems / Distributed Systems				
Course Objective	The objectives of this course are to: 1. Understand the foundations and evolution of Agentic AI systems 2. Learn agent architectures, reasoning, planning, and memory mechanisms 3. Design and implement autonomous and collaborative AI agents 4. Apply Agentic AI techniques to real-world intelligent automation problems				
Course Outcome	On successful completion of course learner will be able to: 1. Explain the principles, architectures, and capabilities of Agentic AI systems 2. Design autonomous agents with reasoning, memory, and tool usage 3. Develop multi-agent systems for collaborative problem solving 4. Evaluate, deploy, and manage responsible Agentic AI applications				

Category	Programme Elective Course VI (PEC-VI)				
Course title	Microwave Engineering				
Scheme and Credits	L	T	P	Credit	Semester VIII
	2	-	-	2	
Prerequisite	Students should have the prior knowledge of the following subjects: 1. Electromagnetic Theory 2. Analog & Digital Communication 3. Signals and Systems				
Course Objective	The objectives of this course are to: 1. An understanding of microwave waveguides, passive & active devices, tubes and network analysis. 2. An ability to design microwave matching networks. 3. An ability to perform microwave measurements. 4. An understanding of RADARs and its applications.				

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Course Outcome	On successful completion of course learner will be able to: 1. Explain different types of waveguides and their respective modes of propagation. 2. Analyze typical microwave networks using impedance, admittance, transmission and scattering matrix representations. 3. Design microwave matching networks using L section, single and double stub and quarter wave transformer. 4. Explain working of microwave passive circuits such as isolator, circulator, Directional couplers, attenuators etc. 5. Describe and explain working of microwave tubes and solid state devices. 6. Perform measurements on microwave devices and networks using power meter and VNA. 7. Explain the operation of RADAR systems and recite their applications.	

Category	Programme Elective Course VI (PEC-VI)				
Course title	Management for IT Professional				
Scheme and Credits	L	T	P	Credit	Semester VIII
	2	-	-	2	
Prerequisite	Students should have the prior knowledge of the following students: 1. Basic knowledge of Information Technology and computing systems 2. Understanding of software development or IT-enabled services 3. Familiarity with organizational structures and teamwork				
Course Objective	The objectives of this course are to: 1. Provide an understanding of fundamental management concepts relevant to IT organizations. 2. Familiarize students with business operations, managerial roles, and responsibilities in IT industries. 3. Develop knowledge of human resource management, financial management, and operations management in IT. 4. Introduce enterprise systems and management tools used in modern IT businesses.				
Course Outcome	On successful completion of course learner will be able to: 1. Explain basic business and management concepts applicable to IT organizations. 2. Describe managerial roles, functions, and responsibilities in IT project and organizational settings. 3. Apply principles of human resource management in IT environments. 4. Analyze financial and managerial economic aspects of IT business operations. 5. Utilize management tools and techniques for effective decision-making and organizational excellence.				

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Category	Multidisciplinary Minor (MDM)				
Course title	Intellectual Property Rights				
Scheme and Credits	L	T	P	Credit	Semester VIII
	2	-	-	2	
Prerequisite	-				
Course Objective	The objectives of this course are to: 1. Provide students with a fundamental understanding of Intellectual Property Rights (IPR) and their role in protecting intellectual creations. 2. Enable students to identify and distinguish between various IPR instruments such as patents, trademarks, copyrights, and industrial designs. 3. Create awareness of emerging challenges and contemporary issues in IPR 4. Equip students with basic knowledge of patent law				
Course Outcome	On successful completion of course learner will be able to: 1. Define and explain Intellectual Property Rights (IPR) 2. Identify and differentiate between various IPR instruments such as patents, trademarks, copyrights, industrial designs 3. Analyze the causes and impact of counterfeiting and piracy in global and Indian contexts. 4. Discuss emerging challenges in IPR 5. Apply the basics of patent law				

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Category	Experimental Learning Course				
Course title	Research Methodology				
Scheme and Credits	L	T	P	Credit	Semester VIII
	4	-	-	4	
Prerequisite	Students should have the prior knowledge of the following subjects: 1. Basic knowledge of research process				
Course Objective	The objectives of this course are to: 1. Understand the fundamentals of research methodology in engineering and technology. 2. Learn to design, conduct, and present research effectively. 3. Gain hands-on experience with open-source tools for writing, diagrams, and figures. 4. Develop critical thinking and ethical awareness in research practices				
Course Outcome	On successful completion of course learner will be able to: 1. Prepare a preliminary research design for projects in their subject matter areas 2. Accurately collect, analyze and report data 3. Present complex data or situations clearly 4. Review and analyze research findings				