



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

NEP
2023

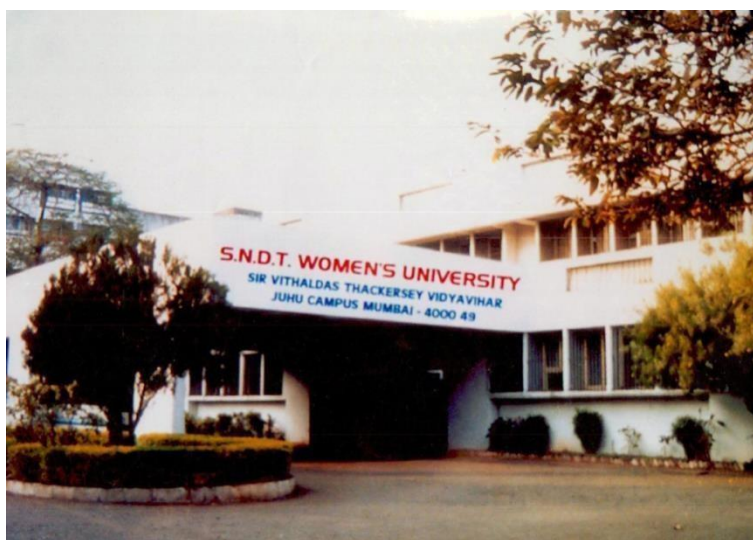
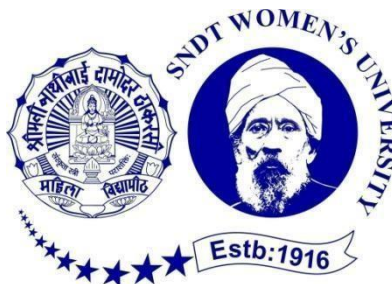
USHA MITTAL INSTITUTE OF TECHNOLOGY
(umit.ac.in)

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

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

Semester-I (Group A)

● Theory Courses

Category and Course Code	Course Title	Hours Per Week		Cr	D	TP	TW	P/V	Total
		L	P						
Basic Science course (BSC101)	Engineering Physics	2	-	2.0	2	50	50	-	100
Basic Science course (BSC102)	Mathematics –I	3	-	3.0	2	50	50	-	100
Engineering Science Courses(ESC101)	Basic Electronic Engineering	3	-	3.0	2	50	50	-	100
Engineering Science Courses(ESC102)	Engineering Graphics & Design	1	-	1.0	2	50	50	-	100
Engineering Science Courses	Biology For Engineers	2	-	2.0	2	50	-	-	50
Vocational and Skill Enhancement Course (VSEC)	Introduction to web programming	2	-	2.0	2	50	-	-	50
Ability Enhancement Course (AEC -01, AEC-02)	Technical Communication-I	2	-	2.0	2	50	-	-	50
	Introduction to web programming Lab		2	1.0			25	P/V	25
	Engg. Physics Lab		2	1.0		-	25	P/V	25
	Basic Electronics Engineering Lab		2	1.0		-	25	P/V	25
	Engineering Graphics & Design Lab	-	2	1.0		-	25	V	25
Co-curricular Courses (CC)	NSS/Yoga/ IPDC/Tourism			2.0		-	-	-	50
	Total			21					700

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

Semester-II(Group A)

● Theory Courses

Category and Course Code	Course Title	Hours Per Week		Cr	D	TP	TW	P/V	Total
		L	P						
Basic Science course (BSC101)	Engineering Chemistry	2	-	2.0	2	50	50	-	100
Basic Science course (BSC103)	Mathematics –II	3	-	3.0	2	50	50	-	100
Engineering Science Courses(ESC101)	Digital Electronics	3	-	3.0	2	50	50	-	100
Engineering Science Courses(ESC102)	Programming for Problem Solving	3		3.0	2	50	50	-	100
Programme Core Course(PCC	Programming Methodologies	2	-	2.0	2	50	-	-	50
Vocational and Skill Enhancement Course (VSEC)	Mobile App Development	1		1.0		-	25		25
Humanities and Social Sciences including Management courses (HSMC101)	Technical Communication-II	2	-	2.0	2	50	-	-	50
	Engg Chemistry Lab		2	1.0			25	P/V	25
	Digital Electronics Lab		2	1.0	-	-	25	P/V	25
Vocational and Skill Enhancement Course (VSEC)	Mobile App Development Lab		2	1.0	-	-	25	P/V	25
	Programming for Problem Solving Lab		2	1.0			25	P/V	25
	Engineering Graphics & Design Lab- II		2	1.0			25	V	25
Co-curricular Courses (CC)	NSS/NCC/Yoga/IP DC/ Tourism			2.0		-	-	-	50
	Total			23					700

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	---	---

SEM I

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

Course code					
Category	Basic Science course (BSC101)				
Course title	Engineering Physics (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester I (Group A)
	2	-	2	3	
Pre-requisites (if any)	Fundamentals of science at 10+2 schooling levels				
Course Objectives	The concepts developed in this course will aid in quantification of several concepts in chemistry and physics that have been introduced at the 10+2 levels in schools. 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 level or microscopic level, one has to understand the description of all chemical processes at molecular levels. All the phenomena of light could have been successfully explained by electromagnetic wave theory. The learners will be able to ● Learn the basic concept of electromagnetism such as electrostatics and magnetostatics. ● Learn the concept of electric polarization and magnetic polarization for electric and magnetic fields. ● Understand the different laws of electromagnetic wave theory based on Maxwell’s equations. ● Learn the principle of Huygen’s wave theory and superpositions of waves for understanding the concept of interference and diffraction. ● Acquire the concept of limit of resolution and its applications to vision. ● Understand the concept of laser beam based on properties of ordinary light and laser light, ● 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.				



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

**NEP
2023**

Course Outcomes	The learners will be able to • Understand and impart the knowledge about the concept of electromagnetic wave theory and its applications in various fields which will lead to innovation. • understand the concept of bound charges and bound currents under the polarization phenomena of electric and magnetic fields. • acquire the knowledge of all four Maxwell's equations in the field of electromagnetic wave theory in vacuum and nonconducting medium. • Recognize, explain, and apply thorough knowledge of interference and diffraction phenomena under the field of wave optics. • Recognize and explain the difference between ordinary light (Incandescent) and laser light based on laser properties
-----------------	---

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 ● To introduce the idea of applying differential and integral calculus to improper integrals, and give basic introduction on Beta and Gamma functions. ● To develop the tool of Fourier series for learning advanced Engineering Mathematics. ● 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 ● apply the knowledge of differential and integral calculus to notions of improper integrals. ● recognise Beta and Gamma functions and use them in solving practical problems. ● use the tool of Fourier series for learning advanced Engineering problems. ● deal with functions of several variables that are essential in most branches of Engineering. ● use matrices as an essential tool to solve engineering problems..				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---

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

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

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	• Understand the importance and applications of engineering drawings in various fields. • Develop skills in creating basic engineering drawings using standard conventions and symbols. • Acquire proficiency in reading and interpreting engineering drawings, including dimensioning and tolerancing. • Familiarize with computer-aided design (CAD) software and its role in modern engineering drawing practices. • Learn about different types of projections, views, and sectional views in engineering drawings. • 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.					

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

Course code					
Category	Engineering Science Courses				
Course title	Biology for Engineers (Theory)				
Scheme and Credits	L	T	P	Credit	Semester I
	2	-	-	2	
Pre-requisites (if any)	-				
Course Objective	Students will be introduced to the basics of biology such as cell structure and functions, inheritance & evolution, basic concepts of genetics, and an introduction to metabolism				
Course Outcomes	Describe how biological observations of 18th Century that lead to major discoveries. Convey that classification per se is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological				

Course code					
Category	Vocational and Skill Enhancement Course (VSEC)				
Course title	Introduction to Web Programming (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester I
	2	-	2	3	
Pre-requisites (if any)	1. Basic knowledge in HTML tags & skill of creating web pages should be known 2. Knowledge of basic Computer hardware & software is also necessary				
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	• Understanding of development of web pages • Hosting of website • Connecting web pages with database				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	---	---

Course code					
Category	Ability Enhancement Course (AEC-01)				
Course title	Technical Communication I (Theory)				
Scheme and Credits	L	T	P	Credits	Semester I
	2	-		2	
Pre-requisites (if any)					
Course Objectives	• Construct grammatically correct sentences • Design effective letters • Write effective essays • Make formal presentations				
Course Outcomes	1. The learners will be able to acquire basic proficiency in English including reading, writing, listening and speaking skills				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	---	---

SEM II

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

Course code					
Category	Basic Science course (BSC101)				
Course title	Engineering Chemistry (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester II (Group A)
	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: • Learn the basics of electromagnetism. • Analyze microscopic chemistry in terms of atomic and molecular orbitals and energy level diagrams. • Differentiate the various electromagnetic radiations used for the study of molecular energy levels and their applications in various spectroscopic techniques. • Explain the thermodynamic concepts such as entropy, free energy, cell potentials and apply those to the real systems. • Understand the molecular forces existing in a bulk, macroscopic system.				
Course Outcomes	The learners will be able to • .Analyze atomic and molecular structure in terms of wavefunctions, charge densities and energy level diagrams. • Understand the nature of bonding existing in molecules and the electron distribution in molecular orbitals • Familiarize with the properties of the materials • Obtain quantitative information about energy levels through molecular spectroscopic methods such as electronic, vibrational, rotational and nuclear magnetic resonance (NMR) spectroscopy. • Rationalize bulk properties and processes using thermodynamic considerations. • Understand the energies existing in a bulk macroscopic system.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

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 concepts developed in this course will aid in quantification of several concepts in chemistry and physics that have been introduced at the 10+2 levels in schools. 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 level or microscopic level, one has to understand the description of all chemical processes at molecular levels. All the phenomena of light could have been successfully explained by electromagnetic wave theory. The learners will be able to • Learn the basic concept of electromagnetism such as electrostatics and magnetostatics. • Learn the concept of electric polarization and magnetic polarization for electric and magnetic fields. • Understand the different laws of electromagnetic wave theory based on Maxwell’s equations. • Learn the principle of Huygen’s wave theory and superpositions of waves for understanding the concept of interference and diffraction. • Acquire the concept of limit of resolution and its applications to vision. • Understand the concept of laser beam based on properties of ordinary light and laser light, • 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.				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	---	---

Course Outcomes	The learners will be able to • Understand and impart the knowledge about the concept of electromagnetic wave theory and its applications in various fields which will lead to innovation. • understand the concept of bound charges and bound currents under the polarization phenomena of electric and magnetic fields. • acquire the knowledge of all four Maxwell's equations in the field of electromagnetic wave theory in vacuum and nonconducting medium. • Recognize, explain, and apply thorough knowledge of interference and diffraction phenomena under the field of wave optics. • Recognize and explain the difference between ordinary light (Incandescent) and laser light based on laser properties
------------------------	---

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

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 ● To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage. ● To introduce effective mathematical tools for the solutions of differential equations that model physical processes. ● 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 ● Mathematical tools needed in evaluating multiple integrals. ● Effectively the mathematical tools for the solutions of differential equations that model physical processes. ● The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing with engineering problems.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

Course code					
Category	Engineering Science Courses(ESC101)				
Course title	Digital Electronics (Theory and Lab)				
Scheme and Credits	L	T	P	Credits	Semester II (Group A)
	3	-	2	4	
Pre-requisites (if any)					
Course Objectives	The students will be able to ● Acquire knowledge about basic components of digital circuits ● Understand working of different combinational and sequential circuits ● Learn the working of logic families				
Course Outcomes	At the end of this course students will demonstrate the ability to ● Understand the working of logic gates ● Design and analyze combinational logic circuits ● Design & analyze synchronous sequential logic circuits ● Understand the working of logic families				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---

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

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---

Course code					
Category	Programme Core Course(PCC)				
Course title	Programming Methodology (Theory)				
Scheme and Credits	L	T	P	Credits	Semester II
	2	-		2	
Pre-requisites (if any)					
Course Objectives					
Course Outcomes	● To understand the different data types and that there exists a representation of each in the memory, as well as the limitation of the representations due to the limited number of bits; ● To develop a simple mental model of how a program is executed (CPU runs the code on data that is stored in memory, function call leads to the creation of call frames, which can explain recursion and variable scoping, etc). For interpreted language, understand the role of virtual machine/interpreter; ● To be able to understand at a high level the compilation process (from pre-processing to compiling to linking), where applicable				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---

Course code					
Category	Ability Enhancement Course (AEC-02)				
Course title	Technical Communication II (Theory)				
Scheme and Credits	L	T	P	Credits	Semester II
	2	-		2	
Pre-requisites (if any)					
Course Objectives	The learners will be able to ● Identify and select many types of writing frequently required in a variety of careers, ● Practice audience analysis and develop effective communication strategies for a variety of audiences, ● Determine your purposes/objectives and develop skill in composing and revising on the computer documents with formats and language appropriate for those purposes, ● Demonstrate in your writing the effective communication principles encouraged by professional writers, ● Achieve a greater awareness of the importance of selecting and integrating graphics with written communication, ● To differentiate among and to use facts, inferences and judgments.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---------------------

Course Outcomes	The learners will be able to 1. Participate actively in writing activities (individually and in collaboration) that model effective scientific and technical communication in the workplace. 2. Understand how to apply technical information and knowledge in practical documents for a variety of a.) professional audiences (including peers and colleagues or management) and b) public audiences. 3. Practice the unique qualities of professional writing style, including sentence conciseness, readability, clarity, accuracy, honesty, avoiding wordiness or ambiguity, previewing, using direct order organization, objectivity, unbiased analyzing, summarizing, coherence and transitional devices. 4. Recognize, explain, and use the rhetorical strategies and the formal elements of these specific genres of technical communication: technical abstracts, data-based research reports, instructional manuals, technical descriptions, web pages, wikis, and correspondence. 5. Collect, analyze, document, and report research clearly, concisely, logically, and ethically; understand the standards for legitimate interpretations of research data within scientific and technical communities. 6. Recognize and develop professional format features in print, Html, and multimedia modes, as well as use appropriate nonverbal cues and visual aids. 7. Revise and edit effectively in all assignments, including informal media (such as emails to the instructor). 8. Develop professional work habits, including those necessary for effective collaboration and cooperation
-----------------	---

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) -BTech	NEP 2023
---	--	---

Course code					
Category	Vocational and Skill Enhancement Course (VSEC)				
Course title	Mobile App 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 ● To facilitate students to understand android SDK ● To help students to gain a basic understanding of Android application development ● 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.				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	--	---

SNDT Women's University
(sndt.digitaluniversity.ac)

**Scheme for B. Tech. in
Information Technology**



SNDT Women's University
1, Nathibai Thackersey Road,
Mumbai 400 020
(Applicable to students taking admission in and after 2023)

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	--

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 Information Technology(IT).

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Semester III

Category	Course Title	Hours/Week			C	D	TP	TW	P/V	Total
		L	T	P						
PCC	Integrated Data Structures and Algorithm Analysis	3	-	-	3	2	50	50		100
PCC	Integrated Data Structures and Algorithm Analysis Lab	-	-	2	1			25	25	50
PCC	Object Oriented Programming	3	-		3	2	50	50		100
PCC	Object Oriented Programming Lab		-	2	1			25	25	50
MDM	Formal Language & Automata Theory	2	-	-	2	2	50	50		100
MDM	Open source Technology Lab			2	1			25	25	50
OE1	Open Elective -I	3	-	-	3	2	50	50		100
HSSM (EMC)	Accounts and Finance	2	-	-	2	2	50	50		100
HSSM (VEC)	Universal Human Values	2	-		2			50		50
Comm. Engg. Project(CEP)	Mini Project			4	2			25	25	50
	Total	15	-	10	20					750

Sr.No	OE1
1	Discrete Mathematics
2	Fundamentals of Bioinformatics

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Semester IV

	Course Title	Hours/Week			C	D	TP	TW	P/V	Total
		L	T	P						
PCC	Database Management Principles	3	-	-	3	2	50	50		100
PCC	Database Management Principles Lab	-	-	2	1			25	25	50
PCC	System Software	3	-	-	3	2	50	50		100
PCC	System Software Lab	-	-	2	1			25	25	50
MDM Course	Computer Architecture and Organization	2			2	2	50	50		100
OE2	Open Elective-II	2	-	-	2	2	50	50		100
Skill Courses	Full Stack Development	2	-		1	-	50	25		75
Skill Courses	Full Stack Development Lab		-	2	1	-			25	25
HSSM (AEC)	Advanced Technical Communication	2	-	-	2	-	-	50		50
HSSM(Management)	Principles of Entrepreneurship	2	-	-	2	-	-	50		50
HSSM (VEC)	Environmental Science	2		-	2	2	-	50		50
	Total	18	-	6	20					750

Sr.No	OE2
1	Foundations of Linear Algebra, Probability, and Statistics
2	UI/UX Design
3	Structural Bioinformatics

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	--

Course code					
Category	Programme Core Course				
Course title	Integrated Data Structures and Algorithm Analysis				
Scheme and Credits	L	T	P	Credit	Semester III
	3	0	1	4	
Pre-requisites (if any)					
Course Objective	The students will be able to 1. To understand different data structures 2. To provide mathematical approach for Analysis of Algorithms 3. To solve problems using various strategies 4. To analyse strategies for solving problems not solvable in polynomial time.				
Course Outcomes	At the end of this course students will demonstrate the ability to 1. Use appropriate data structures for different applications. 2. To apply the searching and sorting techniques. 3. Analyse the running time and space complexity of algorithms. 4. Describe, apply and analyse the complexity of divide and conquer strategy. 5. Describe, apply and analyse the complexity of greedy strategy. 6. Describe, apply and analyse the complexity of dynamic programming strategy. 7. Explain and apply backtracking, branch and bound techniques to deal with problems.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology					Proposed in 2023
Course code						
Category	Professional Core Courses					
Course title	Object Oriented Programming					
Scheme and Credits	L	T	P	Credit	Semester III	
	3	0	1	4		
Pre-requisites (if any)						
Course Objective	The students will be able to 1. The course will introduce standard tools and techniques for software development, using object oriented approach 2. Use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests. 3. Apply principles like inheritance and polymorphism to promote code reuse and flexibility. 4. Develop modular and maintainable programs using modern OOP languages such as Java, C++, or Python. 5. Utilize best practices in software design and problem-solving using the OOP paradigm.					
Course Outcomes	At the end of this course students will demonstrate the ability to 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.					

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	---

Category	MDM				
Course title	Formal Language and Automata Theory				
Scheme and Credits	L	T	P	Credit	Semester III
	2	-	-	2	
Pre-requisites (if any)	Discrete Mathematics, Basic Programming Concepts, Basic Understanding of Algorithms				
Course Objective	The students will be able to 1. Develop a formal notation for strings, languages and machines. 2. Design finite automata to accept a set of strings of a language. 3. Prove that a given language is regular and apply the closure properties of languages. 4. Design context free grammars to generate strings from a context free language and convert them into normal forms. 5. Prove equivalence of languages accepted by PushDown Automata and languages generated by context free grammars. 6. Identify the hierarchy of formal languages, grammars and machines. 7. Distinguish between computability and non-computability and Decidability and undecidability				
Course Outcomes	At the end of this course students will demonstrate the ability to 1. Write a formal notation for strings, languages and machines. 2. Design finite automata to accept a set of strings of a language. 3. For a given language determine whether the given language is regular or not. 4. Design context free grammars to generate strings of context free language 5. Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars. 6. Write the hierarchy of formal languages, grammars and machines 7. Distinguish between computability and non-computability and Decidability and undecidability				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	MDM				
Course title	Open Source Technology lab				
Scheme and Credits	L	T	P	Credit	Semester III
	-	-	2	1	
Pre-requisites (if any)	Operating System Fundamentals, Programming Knowledge, Web Technologies				
Course Objective	The students will be able to 1. Create machines with linux distributions, with different versions . learn a virtual machine or a cloud-based system, perform basic tasks like navigating directories, creating files, changing permissions, and using common commands like ls, cd, mkdir, and chmod. 2. Introduction to Git and GitHub/GitLab, Basic version control operations, Collaborative coding using Git., Students can create a simple repository, make commits, create branches, and collaborate with peers on a shared project. They can use platforms like GitHub or GitLab to practise version control. 3. Installation and configuration of a CMS on a local server (using tools like XAMPP) or a web host. Have them create and customize a simple website. 4. Connecting databases to web applications.				
Course Outcomes	At the end of this course students will demonstrate the ability to 1. To recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves 2. Writing scripts to scrape data from websites of their choice. 6. Open source tools for document preparation and graphic design 3. Explore and analyze existing open source projects, understanding their structure, contribution guidelines, and community practices. 4. Evaluate the impact of open source on innovation, industry, and software development practices.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Humanities & Social Sciences including Management courses				
Course title	Accounts and Finance				
Scheme and Credits	L	T	P	Credit	Semester III
	2	-	-	2	
Pre-requisites (if any)	Basic Mathematics, No Prior Accounting Knowledge Required				
Course Objective	The students will be able to 1. 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	At the end of this course students will demonstrate the ability to 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. The course will help understand and learn the				

Course code					
Category	HSSM (VEC)				
Course title	Universal Human Values				
Scheme and Credits	L	T	P	Credit	Semester III
	2	0	0	2	
Pre-requisites (if any)	Nil				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology		Proposed in 2023
Course Objective	The Student will be able to: 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	By the end of the course, students were able to : 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.		

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology					Proposed in 2023
Category	Open Elective I					
Course title	Fundamentals of Bioinformatics					
Scheme and Credits	L	T	P	Credit	Semester III	
	2	-	-	2		
Pre-requisites (if any)	nil					
Course Objective	The students will be able to 1. To enable the students to gain knowledge of the basic principles and concepts of biology, computer science and mathematics 2. To improve the ability to study structural and functional relationships, and molecular evolution. 3. To develop students expertise in the analysis of the human genome, identification of targets for drug discovery, development of new algorithms and analysis methods.					
Course Outcomes	At the end of course, the students will be able to: 1. Understand the intersection of life and information sciences, the core of shared concepts, 2. Develop the ability to to speak the language of structure-function relationships, information theory, gene expression, and database queries					



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

**Proposed
in 2023**

SEMESTER IV



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

**Proposed
in 2023**

Category	Programme Core Course(PCC)				
Course title	Database Management Principles				
Scheme and Credits	L	T	P	Credit	Semester IV
	3	-	1	4	
Pre-requisite s (if any)	Programming Knowledge, Data Structures & Algorithms, Mathematics & Logic				
Course Objective	The students will be able to: 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 modelling, 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)				
Course Outcomes	At the end of this course students will demonstrate the ability to: 1. For a given query write relational algebra expressions for that query and optimise the developed expressions 2. For a given specification of the requirement design the databases using E R method and normalisation. 3. For a given specification construct the SQL queries for Open source and Commercial DBMS 4. For a given query optimise its execution using Query Optimization algorithms				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology					Proposed in 2023
Category	Programme Core Course (PCC)					
Course title	Systems Software					
Scheme and Credits	L	T	P	Credit	Semester IV	
	3	-	1	4		
Pre-requisite s (if any)	Programming Fundamentals, COA					
Course Objective	The student will be able to: 1. Understand the evolution and components of system software including assemblers, macro processors, loaders, linkers, and compilers. 2. Analyze the design and functioning of system software tools such as two-pass assemblers, macro processors, and linking loaders. 3. Comprehend the front-end structure of a compiler, including lexical analysis, syntax analysis, and intermediate code generation. 4. Learn the role of system calls and how the operating system interacts with system software during program execution. 5. Gain knowledge of core operating system concepts such as process management, memory management, file systems, and storage handling. 6. Apply system-level knowledge to analyze and simulate various system software functionalities and OS mechanisms.					
Course Outcomes	At the end of the course, The student will be able to: 1. Explain the purpose and functionality of system software tools such as assemblers and macro processors. 2. Design and simulate the working of two-pass assemblers, macro expansion, and linking loaders. 3. Apply lexical and syntax analysis techniques to process source code and generate intermediate code. 4. Differentiate system programming from application programming and identify the role of OS in program execution. 5. Analyze and compare scheduling, memory management, and file system techniques in operating systems. 6. Demonstrate the interaction between system software components and OS-level features through examples or case studies.					

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology					Proposed in 2023
Category	Open Electives I					
Course title	Computer Organization & Architecture					
Scheme and Credits	L	T	P	Credit	Semester IV	
	2	-		2		
Pre-requisites (if any)	Digital Logic & Circuits, Basic Electronics, Binary math and logic					
Course Objective	The students will be able to 1. How Computer Systems work & the basic principles 2. Instruction Level Architecture and Instruction Execution 3. The current state of art in memory system design 4. How I/O devices are accessed and its principles. 5. To provide the knowledge on Instruction Level Parallelism 6. To impart the knowledge on micro programming 7. Concepts of advanced pipelining techniques.					
Course Outcomes	At the end of this course students will demonstrate the ability to 1. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication). 2. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process. 3. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU. 4. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology					

Category	MDM				
Course title	Discrete Mathematics				
Scheme and Credits	L	T	P	Credit	Semester IV
	2		-	2	

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology		Proposed in 2023
Pre-requisites (if any)	Basic mathematics		
Course Objective	The student will be able to 1. .Use mathematically correct terminology and notation. 2. Construct correct direct and indirect proofs. 3. Use division into cases in a proof. 4. Use counterexamples. 5. Apply logical reasoning to solve a variety of problems.		
Course Outcomes	At the end of the course the student will be able to: 1. For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference 2. For a given a mathematical problem, classify its algebraic structure 3. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra 4. Develop the given problem as graph networks and solve with techniques of graph theory.		

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	--	---

Category	Open Elective II				
Course title	Foundations of Linear Algebra, Probability, and Statistics				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Pre-requisites (if any)	Mathematics				
Course Objective	The student will be able to The objective of this course is to understand the fundamental concepts of vector spaces, matrices, and linear transformations and develop a strong foundation in probability,statistics theory and its applications.				
Course Outcomes	The students will learn: 1. Apply foundational principles of linear algebra to solve problems in various domains. 2. Utilise probability theory to model and analyse uncertainty and randomness in data. 3. Apply statistical methods to analyse data, make inferences, and draw conclusions. 4. Perform matrix operations and determine eigenvalues and eigenvectors. 5. Analyse and apply probability distributions and random variables to real-world problems.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	---

Course code					
Category	Open Elective II				
Course title	UI/UX Design				
Scheme and Credits	L	T	P	Credits	Semester IV
	2	-	-	2	
Pre-requisites (if any)	-				
Course Objective	The student will be able to 1. The aim of the UI/UX course is to provide students with the knowledge of user- centred design, user -centred methods in design, graphic design on screens, simulation and prototyping techniques, usability testing methods, interface technologies and user centred design in corporate perspective. 2. The course is organised around a practical project with iterative design of a graphical user interface to organise information about users into useful summaries with affinity diagrams, to convey user research findings with personas and scenarios and to learn the skill of sketching as a process for user experience design. 3. The students will be given exposure to wireframing and Prototyping software in the various UI/UX Design tools.				
Course Outcomes	At the end of this course students will demonstrate the ability to: 1. Understand iterative user-centred design of graphical user interfaces 2. Apply the user Interfaces to different devices and requirement 3. Create high quality professional documents and artefacts related to the design process.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Skill Course				
Course title	Full Stack Development				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	1	
Pre-requisites (if any)	HTML, CSS				
Course Objective	The student will be able to 1. Understand the fundamentals of JavaScript programming including syntax, data types, control structures, functions, and object manipulation. 2. Explore and apply core concepts of ReactJS for building responsive, component-based, and interactive user interfaces using JSX, state, props, and routing. 3. Develop backend applications using NodeJS and ExpressJS, including handling modules, events, and building RESTful APIs. 4. Understand NoSQL database concepts and effectively use MongoDB for performing CRUD operations and integrating it with server-side applications. 5. Demonstrate the ability to integrate frontend, backend, and database components to build full-stack web applications. 6. Apply modern development tools and frameworks such as Webpack, Redux, and unit testing to ensure maintainable and scalable applications.				
Course Outcomes	At the end of the course the student will be able to: 1. Common technologies related to full-stack, front-end and back-end application development . 2. To create responsive and interactive user interfaces. 3. To build server-side applications and APIs. 4. To develop full-stack applications that interact seamlessly.				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	--

Category	Humanities and Social Sciences Including Management courses (HSMC)				
Course title	Advanced Technical Communication				
Scheme and Credits	L	T	p	Credit	SEMESTER IV
	2	-	-	2	
Pre-requisites (if any)					
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				
Course Outcomes	Learners will be able to 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. 4. Use reading strategies for faster comprehension, summarization, and evaluation of texts. 5. Acquire effective writing skills for drafting academic, business, and technical documents.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Humanities & Social Sciences including Management courses				
Course title	Principles of Entrepreneurship				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Pre-requisites (if any)	-				
Course Objective	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	The students will be able to: 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	Humanities & Social Sciences including Management courses (VEC)				
Course title	Environmental Science				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Pre-requisi tes (if any)	Nil				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	--

Course Objectives	The students will be able to: 1. Enable 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. 2. Critical thinking Build capabilities to identify relevant environmental issues, analyse the various underlying causes,. 3. evaluate the practices and policies, and develop framework to make informed decisions. Moral and ethical awareness/reasoning 4. 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
Course Outcomes	After the course the students will be empowered and able to: 1. Analyse natural processes and resources that sustain life and govern economy. • Predict the consequences of human actions on the web of life, global economy, and quality of human life. 2. Think critically and develop appropriate strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development. 3. 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. 4. Adopt sustainability as a practice in life, society, and industry.

**USHA MITTAL INSTITUTE OF TECHNOLOGY****SNDT Women's University****Faculty: Technology (Undergraduate Course) - BTech****Subject: Syllabus for Information Technology****Proposed
in 2023**

Category	Open Elective II				
Course title	Structural Bioinformatics				
Scheme and Credits	L	T	P	Credit	Semester IV
	2	-	-	2	
Pre-requisites (if any)	-				
Course Objective	● To enable the students to gain knowledge of the basic principles and concepts of biology, computer science and mathematics ● To improve the ability to study structural and functional relationships, and molecular evolution. ● To develop students expertise in the analysis of the human genome, identification of targets for drug discovery, development of new algorithms and analysis methods.				
Course Outcomes	The students will be able to: ● Understand the intersection of life and information sciences, the core of shared concepts, ● Develop the ability to to speak the language of structure-function relationships, information theory, gene expression, and database queries				



SNDT Women's University
(sndt.digitaluniversity.ac)

**Scheme for B. Tech. in
Information Technology**



SNDT Women's University
1, Nathibai Thackersey Road,
Mumbai 400 020
(Applicable to students taking admission in and after 2023)

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	---	---

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 Information Technology (IT).

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	---	---

Semester V

Category	Course Title	Hours/Week			Cr	D	TP	TW	P/V	Total
		L	T	P						
PCC	Embedded, Microcontroller and IOT	3	-	-	3	2	50	50		100
PCC	Embedded, Microcontroller and IOT Lab		-	2	1			25	25	50
PCC	Fuzzy and Computational Intelligence	3	-	-	3	2	50	50		100
PCC	Fuzzy and Computational Intelligence Lab		-	2	1			25	25	50
PCC	IPR and Research Tools	2	-		2	2	50	50		100
PEC1	Programme Elective-I	3	-	-	3	2	50	50		100
PEC1	Programme Elective-I lab	-	-	2	1			25	25	50
MDM	Scalable Data Analytics for IT	3	-	-	3	2	50	50		100
MDM	Scalable Data Analytics for IT lab			2	1			25	25	50
OE3	Open Elective -III	2			2	2	50	50	-	100
OE3	Open Elective -III Lab			2	1			25	25	50
	Total	16	-	10	21					850

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	---	---

Electives:

Sr.No	PEC1	OE3
1	Cyber Security	Cloud Infrastructure and Network Essentials
2	Advanced Data Structures	Design Thinking
3	Human-Computer Interaction	Bioinformatics Algorithms

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	--	---

Semester VI

Category	Course Title	Hours/Week			Cr	D	TP	TW	P/V	Total
		L	T	P						
PCC	Blockchain Technology and Applications	3	-	-	3	2	50	50		100
PCC	Blockchain Technology and Applications Lab	-	-	2	1			25	25	50
PCC	Java Frameworks and Applications	3	-	-	3	2	50	50		100
PCC	Java Frameworks and Applications Lab		-	2	1			25	25	50
PEC2	Programme Electives-II	3	-	-	3	2	50	50		100
PEC2	Programme Electives-II Lab	-	-	2	1			25	25	50
PEC3	Programme Electives-III	3	-	-	3	2	50	50		100
PEC3	Programme Electives-III Lab	-	-	2	1			25	25	50
MDM	Digital Image and Video Processing	3	-	-	3	2	50	50		100
MDM	Digital Image and Video Processing Lab	-		2	1			25	25	50
Skill Courses	Geoinformatics and Digital Transformation	1	-	-	1			25		25
Skill Courses	Geoinformatics and Digital Transformation Lab	-	-	2	1				25	25
	Project I			4	2			50	50	100
	Total	16		16	24					900

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	---	---

Electives:

Sr.No	PEC2	PEC3
1	Drone Technology	Software Engineering
2	Distributed Systems	Business & Digital Skills for IT
3	Biomedical Image Analysis	Computational Genomics

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	---	---

Course code					
Category	Programme Core Course				
Course title	Embedded, Microcontroller and IOT				
Scheme and Credits	L	T	P	Credit	Semester V
	3	0	1	4	
Pre-requisites (if any)	Basic knowledge of Computer Organization and Fundamentals of Programming				
Course Objective	The students will be able to 1. Understand the fundamentals of embedded systems and their role in modern applications. 2. Learn the architecture and programming of microcontrollers, with a focus on practical applications. 3. Develop embedded software using Embedded C for real-world use cases. 4. Interface peripheral devices, sensors, actuators, and communication protocols in embedded systems. 5. Explore real-time systems and IoT applications, with an emphasis on practical implementation.				
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Understand embedded systems basics, including microcontroller architecture and applications. 2. Write and execute basic Embedded C programs for microcontrollers. 3. Interface sensors, actuators, and displays with microcontrollers. 4. Implement communication protocols such as UART, SPI, and I2C. 5. Work with basic real-time system concepts for task scheduling and embedded applications. 6. Understand low-power embedded system design for IoT applications.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology					Proposed in 2023
Course code						
Category	Programme Core Course					
Course title	Fuzzy and Computational Intelligence					
Scheme and Credits	L	T	P	Credit	Semester V	
	3	0	1	4		
Pre-requisites (if any)	Basic knowledge of Mathematics, Probability and Programming Concepts					
Course Objective	The students will be able to 1. Understand the fundamentals of fuzzy logic and computational intelligence techniques. 2. Learn about Artificial Neural Networks (ANN), Machine Learning (ML), and Deep Learning (DL). 3. Develop basic fuzzy inference systems and apply fuzzy logic in decision-making. 4. Implement ANN and ML algorithms to solve real-world problems. 5. Explore applications of computational intelligence in automation, robotics, and data analytics.					
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Explain fuzzy logic principles and its role in handling uncertainty. 2. Develop fuzzy rule-based systems for decision-making applications. 3. Understand and implement Artificial Neural Networks (ANN) for classification and prediction 4. Apply Machine Learning techniques to solve engineering problems. 5. Develop basic deep learning models for simple image and text processing tasks. 6. Understand real-world applications of computational intelligence.					

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology					Proposed in 2023
Course code						
Category	Programme Core Course					
Course title	IPR and Research Tools					
Scheme and Credits	L	T	P	Credit	Semester V	
	2	0	0	2		
Pre-requisites (if any)	Basic introduction to Intellectual Property Rights (IPR) and general awareness of academic and technical writing					
Course Objective	The students will be able to 1. Understand the fundamental concepts of Intellectual Property Rights (IPR) and their significance in innovation. In today's, digital and knowledge-driven economy, understanding Intellectual Property Rights (IPR) is critical for IT professionals. It enables students to protect innovations, navigate software patents and open-source licenses, and avoid legal pitfalls in technology development. 2. Learn about patents, copyrights, trademarks, and trade secrets and their role in the IT industry. 3. Develop skills in research documentation and writing tools such as LaTeX, Xfig, and GIMP. 4. Gain hands-on experience in scientific and technical documentation for academic and industrial research.					
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Understand the role of IPR in technology, innovation, and commercialization. 2. Differentiate between various types of intellectual property rights. 3. Apply basic patent search techniques and understand patent filing processes. 4. Use LaTeX for academic writing, citation management, and report preparation. 5. Create technical illustrations using Xfig and GIMP for research documentation. 6. Develop structured and well-formatted research reports using standard tools.					

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	---	---

Category	Program Elective Course I				
Course title	Cyber Security				
Scheme and Credits	L	T	P	Credit	Semester V
	3	-	1	4	
Course Objective	1. Understand the fundamentals of cybersecurity and its role in protecting digital assets. 2. Learn about common threats, vulnerabilities, and countermeasures. Learn basic tools and techniques for securing systems, networks, and data. 3. Develop an understanding of cybersecurity frameworks, compliance, and best practices. 4. 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.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology					Proposed in 2023
Course code						
Category	MDM					
Course title	Scalable Data Analytics for IT					
Scheme and Credits	L	T	P	Credit	Semester V	
	3	0	1	4		
Pre-requisites (if any)	Basic knowledge of Data Structures and Algorithms Introduction to Database Management Systems (DBMS)					
Course Objective	The students will be able to 1. Understand big data fundamentals and their applications in IT. 2. Learn about distributed computing frameworks for scalable data processing. 3. Develop skills in NoSQL databases, Hadoop, and Spark for handling large datasets. 4. Implement scalable machine learning algorithms for data analytics. 5. Explore cloud-based data analytics solutions for real-world applications.					
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Explain big data characteristics and challenges in IT. 2. Utilize Hadoop and MapReduce for processing large-scale data. 3. Work with NoSQL databases (MongoDB, Cassandra, HBase) for efficient data storage. 4. Implement data analytics using Apache Spark for real-time processing. 5. Apply scalable machine learning techniques for predictive analytics. 6. Explore cloud-based platforms (AWS, Google Cloud, Azure) for scalable data analytics.					

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology					Proposed in 2023
Course code						
Category	Open Elective					
Course title	Open Elective -III (Cloud Infrastructure and Network Essentials)					
Scheme and Credits	L	T	P	Credit	Semester V	
	2	0	1	3		
Pre-requisites (if any)	No prior knowledge of Computer Networks or Operating Systems is required; fundamentals will be covered.					
Course Objective	The students will be able to 1. Learn fundamental computing and networking concepts before progressing to cloud infrastructure. 2. Understand cloud computing fundamentals and its service models. 3. Develop skills in virtualization, containerization, and cloud deployment. 4. Explore cloud security mechanisms and best practices. 5. Implement scalable cloud-based networking solutions.					
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Understand computing and networking basics, including OS concepts, IP addressing, routing, and protocols. 2. Explain cloud computing architecture and service models (IaaS, PaaS, SaaS) 3. Deploy virtual machines and containers using cloud platforms 4. Implement basic cloud security measures to protect cloud infrastructure. 5. Work with AWS, Azure, or GCP for cloud-based networking solutions. 6. Explore real-world applications of cloud computing and networking.					

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology					Proposed in 2023
Course code						
Category	Open Elective					
Course title	Open Elective -III (Design Thinking)					
Scheme and Credits	L	T	P	Credit	Semester V	
	3	0	1	4		
Pre-requisites (if any)						
Course Objective	The students will be able to 1. Identify the key concepts, principles, and significance of Design Thinking. 2. Explain the Human-Centered Design (HCD) process and its role in problem-solving. 3. Apply empathy tools like observation, stakeholder mapping, and empathy maps to understand user needs. 4. Analyze problems using techniques such as Customer Journey Maps and Personas for effective problem framing.					
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Identify the key tenets, principles, and process of Design Thinking. 2. Describe the significance of Human-Centered Design (HCD) and its role in innovation. 3. Apply empathy-driven research techniques such as observation, stakeholder mapping, and empathy maps to understand user needs. 4. Analyze problem statements using Customer Journey Maps, Personas, and Function Modeling. 5. Generate innovative ideas using brainstorming methods, mind mapping, TRIZ principles, and the Double Diamond model. 6. Implement design innovation strategies and understand how to take ideas to market.					



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

**Proposed
in 2023**

Semester VI

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	--	---

Course code					
Category	Programme Core Course				
Course title	Blockchain Technology and Applications				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	0	1	4	
Pre-requisites (if any)	Basic understanding of Computer Science Fundamentals No prior knowledge of Blockchain is required; fundamentals will be covered.				
Course Objective	The students will be able to 1. Understand the fundamentals of blockchain technology and its applications. 2. Learn about distributed ledger systems and consensus mechanisms. 3. Develop skills in smart contract programming using Ethereum and Solidity. 4. Explore cryptographic techniques and their role in blockchain security. 5. Analyze real-world applications of blockchain in finance, supply chain, and governance.				
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Explain the architecture and components of blockchain systems. 2. Understand different consensus mechanisms (PoW, PoS, DPoS, PBFT). 3. Develop and deploy smart contracts using Solidity on Ethereum. 4. Implement cryptographic techniques (hashing, digital signatures, encryption) in blockchain applications. 5. Evaluate blockchain use cases in finance, healthcare, IoT, and supply chain. 6. Explore emerging trends and advancements in blockchain technology.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	--	---

Course code					
Category	Programme Core Course				
Course title	Java Frameworks and Applications				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	0	1	4	
Pre-requisites (if any)	Object-Oriented Programming (OOP) Principles, HTTP and JSP				
Course Objective	The students will be able to 1. Provide students with a strong foundation in Java programming, covering both basic and advanced concepts. 2. Develop problem-solving skills using object-oriented programming (OOP) principles and Java features. 3. Equip students with the ability to build robust desktop, web, and enterprise applications using Java frameworks like Spring Boot. 4. Foster practical coding proficiency through hands-on exercises, mini-projects, and real-world application development. 5. Prepare students for industry roles that require Java expertise, including software development, web development, and enterprise application development.				
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Understand Core Java Concepts 2. Apply Object-Oriented Programming (OOP) Principles 3. Implement Exception Handling and File I/O 4. Develop Multithreaded Applications 5. Perform Database Operations Using JDBC 6. Build Web Applications Using Servlets and JSP 7. Develop Enterprise Applications Using Spring Boot 8. Apply Design Patterns in Java 9. Demonstrate Testing and Deployment Skills 10. Build Real-World Projects				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	---	---

Category	Programme Elective II				
Course title	Introduction to Drone Technology				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	0	1	4	
Pre-requisites (if any)					
Course Objective	The students will be able to 1. Understand drone types and components 2. Learn how to fly a drone 3. Learn about drone applications 4. Learn about drone design and programming				
Course Outcomes	Upon successful completion of the course, students should be able to: 1. Know about a various type of drone technology, drone fabrication and programming. 2. Execute the suitable operating procedures for functioning a drone 3. Select appropriate sensors and actuators for Drones 4. Develop a drone mechanism for specific applications 5. Create the programs for various drones				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	--	---

Course code					
Category	Programme Elective-III				
Course title	Software Engineering				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	0	1	4	
Pre-requisites (if any)	Basic Programming Concepts and Object-Oriented Programming (OOPs),Database Management, Problem-Solving & Analytical Thinking				
Course Objective	The students will be able to 1. In this course, students will gain a broad understanding of the discipline of software engineering and its application to the development and management of software systems. 2. Knowledge of basic SW engineering methods and practices, and their appropriate application. 3. An understanding of the role of project management including planning, scheduling, risk management, etc. 4. An understanding of software requirements and the SRS document, architectural styles. 5. An understanding of implementation issues such as modularity and coding standards. An understanding of approaches to verification and validation including static analysis, reviews and testing.				
Course Outcomes	At the end of this course students will demonstrate the ability to 1. Understand the fundamentals of Software Engineering, including software development methodologies, SDLC phases, and best practices. 2. Analyze real-world problems and design efficient software solutions using structured and object-oriented approaches. 3. Apply software development models like Waterfall, Agile, Scrum, and DevOps to manage software projects effectively. 4. Develop well-structured software applications using programming languages and frameworks. 5. Perform software testing, including unit testing, integration testing, and system testing, to ensure software reliability and performance.				

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	---	---

Course code					
Category	MDM				
Course title	Digital Image and Video Processing				
Scheme and Credits	L	T	P	Credit	Semester VI
	3	0	1	4	
Pre-requisites (if any)	Linear Algebra, Calculus, Probability and Statistics, Signal Processing Fundamentals, Programming Skills				
Course Objective	The students will be able to 1. To understand the different issues involved in the design and implementation of Digital Image and video Processing 2. Apply spatial and frequency domain techniques for image enhancement, restoration, and compression. 3. Analyse and implement algorithms for image segmentation, feature extraction, and object recognition. 4. Understand motion estimation, video compression, and frame differencing techniques used in video processing.				
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Mathematically represent the various types of images and analyse them. 2. Process these images for the enhancement of certain properties or for optimized use of the resources. 3. Develop algorithms for image compression and coding 4. Interpret processed image and video data to extract meaningful insights for practical applications.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty: Technology (Undergraduate Course) - BTech Subject: Syllabus for Information Technology	Proposed in 2023
--	--	---

Course code					
Category	Skill Courses				
Course title	Geoinformatics and Digital Transformation				
Scheme and Credits	L	T	P	Credit	Semester VI
	1	0	1	2	
Pre-requisites (if any)	Basic understanding of Geography and Information Technology No prior knowledge of GIS or Digital Transformation is required; fundamentals will be covered.				
Course Objective	The students will be able to 1. Understand the fundamentals of Geoinformatics and Geographic Information Systems (GIS). 2. Learn about spatial data, remote sensing, and geospatial analysis. 3. Develop skills in geospatial technologies, GIS software, and data visualization. 4. Explore digital transformation strategies for industry applications. 5. Implement practical lab exercises using GIS tools and case studies. 6. Gain insights into India’s Geospatial Technology Policy, its importance, vision, and role in national development 7. Understand the demand for skilled manpower in geospatial technology and its significance as the need of the hour. 8. Explore AI-driven geospatial analytics, cloud-based GIS, and IoT integration in GIS applications.				
Course Outcomes	At the end of this course, students will demonstrate the ability to 1. Explain the concepts and components of Geoinformatics and GIS. 2. Utilize GIS tools for spatial data analysis and visualization. 3. Apply remote sensing techniques for geospatial data processing. 4. Understand digital transformation concepts and their impact on industries. 5. Implement practical geospatial analysis using industry-standard tools. 6. Analyse India’s Geospatial Technology Policy and its role in national growth. 7. Understand the role of geospatial intelligence in business intelligence and governance. 8. Explore current trends in Geoinformatics, Digital Transformation, and workforce requirements.				



SNDT Women's University
(sndt.digitaluniversity.ac)

**Scheme for B. Tech. in
Information Technology**



SNDT Women's University
1, Nathibai Thackersey Road,
Mumbai 400 020
(Applicable to students taking admission in and after 2023)

	<u>USHA MITTAL INSTITUTE OF TECHNOLOGY</u> SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	--	-----------------------------

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 Information Technology (IT).

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Semester VII

Category	Course Title	Hours/Week			Cr	D	TP	TW	P/V	Total
		L	T	P						
PCC	High Performance Computing	3	-	-	3	2	50	50	-	100
	High Performance Computing Lab	-	-	2	1	-	-	25	25	50
	Advanced Cyber Security	3	-	-	3	2	50	50	-	100
PCC	Advanced Cyber Security Lab	-	-	2	1	-	-	25	25	50
PEC-IV	Programme Elective IV	3	-	-	3	2	50	50	-	100
	Programme Elective IV Lab	-	-	2	1	-	-	25	25	50
PEC-V	Programme Elective V	2	-	-	2	2	50	50	-	100
MDM	Digital Marketing Technologies	2	-	-	2	-	50	50	-	100
	Project III	-	-	8	8	-	-	100	200	300
	Total	13	-	14	24	-	-	-	-	950

Elective List

Sr. No	Programme Elective IV	Programme Elective V
1	Mobile and Wireless Communication	Business Informatics with R
2	Computational Data Analytics	Deep Neural Network Design
3	Advanced Drone Technology	Expert Systems

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Semester VIII

Category	Course Title	Hours/Week			Cr	D	TP	TW	P/V	Total
		L	T	P						
PEC-VI	Programme Elective VI	2	-	-	2	2	50	50	-	100
MDM	Applied Prompt Engineering	2	-	-	2	-	50	50	-	100
Experimental Learning Course	Research Methodology	4	-	-	4	-	50	50	-	100
Internship/ OJT	Internship	-	-	-	10	-	-	100	100	200
	Total	8			18					500

Elective List

1	Agentic AI Systems
2	Software quality assurance and testing
3	Robotics Engineering

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Programme Core Course (PCC)				
Course title	High Performance Computing				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	1	4	
Pre-requisites (if any)					
Course Objective	The objectives of this course are to: 1. Introduce the fundamental concepts, evolution, and architecture of modern High Performance Computing systems with emphasis on GPU-accelerated and centralized computing models. 2. Develop an understanding of heterogeneous CPU–GPU execution and the role of accelerator-based software stacks in high-performance workloads. 3. Enable students to analyze performance bottlenecks and apply optimization strategies for efficient utilization of shared HPC resources. 4. Expose students to real-world application domains where HPC is an enabling infrastructure for large-scale scientific, engineering, and creative problem solving.				
Course Outcomes	On successful completion of course learner will be able to: CO1: Explain the architecture, execution model, and application scope of modern high performance computing systems, including centralized and GPU-accelerated environments. CO2: Apply GPU-accelerated computing concepts and HPC software stacks to execute and monitor computational workloads on centralized HPC infrastructure. CO3: Analyze and optimize HPC workloads by identifying performance bottlenecks related to computation, memory usage, data movement, and resource sharing. CO4: Evaluate the role of high-performance computing in real-world application domains such as remote sensing, climate modeling, computer graphics rendering, and large-scale AI systems.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Programme Core Course (PCC)				
Course title	Advanced Cyber Security				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	1	4	
Pre-requisites (if any)					
Course Objective	The objectives of this course are to: 1. To providein-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 cybersecurity.				
Course Outcomes	After completing this course, students will be able to: CO1: Analyze modern cyber threats, advanced attacks, and adversary techniques using cyber kill chain and MITRE ATT&CK framework. CO2: Apply advanced network, system, and endpoint security controls for attack detection and prevention. CO3: Implement cryptographic techniques and secure communication protocols for protecting data and systems. CO4: Evaluate security challenges and protection mechanisms in cloud, mobile, and IoT environments. CO5: Perform incident response, digital forensic investigation, and apply cyber laws and compliance requirements.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Programme Elective Course (PEC-IV)				
Course title	Mobile and Wireless Communication				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	1	4	
Pre-requisites (if any)	The Students should have the 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 gain knowledge and awareness of the technologies for how to effectively share spectrum through multiple access techniques i.e. TDMA, CDMA, FDMA etc. 3. To understand various modulation schemes and multiple access techniques that are used in wireless communications.				
Course Outcomes	On successful completion of course learner will be able to: CO1: Explain cellular system concepts including cell structure, frequency reuse, system capacity. CO2: Analyze and compare multiple access schemes and modulation techniques. CO3: Describe the architecture, constraints, challenges, protocols, and applications of Wireless Sensor Networks and Mobile Ad Hoc Networks. CO4: Evaluate wireless signal propagation mechanisms and channel characteristics. CO5: Apply theoretical concepts of wireless communication to assess interference, fading, mobility, and routing issues.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Programme Elective Course (PEC-V)				
Course title	Business Informatics with R				
Scheme and Credits	L	T	P	Credit	Semester VII
	2	-		2	
Pre-requisites (if any)					
Course Objective	The objectives of this course are to: 1. Introduce the principles of business informatics and their role in supporting data-driven decision-making in organizations. 2. Develop the ability to frame business problems as analytical questions using appropriate KPIs, constraints, and assumptions. 3. Build practical skills in data handling, exploratory analysis, and visualization using R for business contexts. 4. Enable students to communicate analytical insights effectively through reproducible reports and decision-oriented documentation.				
Course Outcomes	On successful completion of course learner will be able to: CO1: Explain the concepts of business informatics and analytical thinking, and translate business objectives into well-defined analytical questions. CO2: Apply R and Tidyverse tools to clean, transform, and explore business datasets for analytical readiness. CO3: Develop and interpret business-oriented visualizations using R to derive actionable insights for decision-making. CO4: Prepare reproducible analytical reports and executive summaries using R Markdown, clearly communicating insights, recommendations, and limitations.				

		USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology				Proposed in 2023
Category	Multidisciplinary Minor (MDM)					
Course title	Digital Marketing Technologies					
Scheme and Credits	L	T	P	Credit	Semester VII	
	2	-		2		
Pre-requisites (if any)						
Course Objective	The objectives of this course are to: 1. Provide a comprehensive understanding of the technology ecosystem underpinning modern digital marketing platforms, including CMS, analytics, automation, and SEO technologies. 2. Develop hands-on skills to configure, deploy, and manage CMS-based digital marketing environments using LAMP/LEMP or equivalent technology stacks. 3. Enable learners to apply web analytics, SEO engineering, and tracking mechanisms to measure user behavior and digital campaign performance. Introduce integration of key digital marketing technologies such as analytics platforms, tag management systems, email automation tools, and API-based services. 4. Equip students with data-driven approaches to design, evaluate, and optimize digital marketing funnels and web campaigns while ensuring regulatory compliance.					
Course Outcomes	After successful completion of this course, the student will be able to: CO1: Explain the architecture and functioning of the digital marketing technology ecosystem, including CMS platforms, analytics systems, automation tools, and tracking frameworks. CO2: Deploy and configure a CMS-based digital marketing environment using LAMP/LEMP stack with appropriate SEO, performance, and security configurations. CO3: Implement SEO engineering, tracking, and automation technologies to capture, monitor, and manage digital user interactions and campaign data. CO4: Analyze web analytics data and design data-driven dashboards and optimization strategies for digital marketing funnels while ensuring privacy and regulatory compliance.					

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Programme Elective Course (PEC-IV)				
Course title	Computational Data Analytics				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	1	4	
Pre-requisites (if any)					
Course Objective	The objectives of this course are to: 1. Gather sufficient relevant data, conduct data analytics using scientific methods, and make appropriate and powerful connections between quantitative analysis and real-world problems. 2. Use advanced techniques to conduct thorough and insightful analysis, and interpret the results correctly with detailed and useful information.				
Course Outcomes	At the end of the course, the learner will be able to: CO1: Use the R programming language to perform reproducible data analysis, including data import, sampling, simulation, and descriptive statistical analysis. CO2: Apply appropriate data visualization techniques and exploratory data analysis methods to interpret and communicate insights from datasets. CO3: Apply Bayesian inference and multiple regression techniques, including interaction effects and model selection, for advanced statistical modeling and decision-making.				



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

**Proposed
in 2023**

Category	Programme Elective Course (PEC-IV)				
Course title	Advanced Drone Technology				
Scheme and Credits	L	T	P	Credit	Semester VII
	3	-	1	4	
Pre-requisites (if any)	The Students should have the knowledge of the following subjects: Control Systems 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 Outcomes	On successful completion of course learner will be able to: CO1: Analyze advanced UAV aerodynamics and flight stability parameters Design and evaluate drone systems by applying embedded system architecture CO2: Implement and test a quadcopter system through proper selection of subsystems CO3: Apply autonomous navigation and control concepts using kinematic and dynamic models CO4: Develop intelligent UAV applications by integrating AI-based computer vision and edge computing platforms				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Programme Elective Course (PEC-V)				
Course title	Deep Neural Network Design				
Scheme and Credits	L	T	P	Credit	Semester VII
	2	-		2	
Pre-requisites (if any)	Machine Learning, Artificial Intelligence				
Course Objective	The objectives of this course are to: 1. To strengthen important Mathematical concepts required for deep learning and neural network. 2. To get a detailed insight of advanced algorithms of ML.				
Course Outcomes	At the end of this course students will be able to: CO1: To design and implement Artificial Neural networks. CO2: To decide when to use which type of ANN.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Programme Elective Course (PEC-V)				
Course title	Expert Systems				
Scheme and Credits	L	T	P	Credit	Semester VII
	2	-		2	
Pre-requisites (if any)	Artificial Intelligence				
Course Objective	The objectives of this course are to: 1. Understand the fundamentals, architecture, and working principles of expert systems 2. Learn knowledge representation and inference mechanisms used in expert systems 3. Design and develop rule-based expert systems for real-world domains 4. Analyze challenges, limitations, and future scope of expert systems in AI applications				
Course Outcomes	At the end of the course students will able to: CO1: Explain the concepts, architecture, and applications of expert systems CO2: Apply knowledge representation and inference techniques in expert systems CO3: Develop rule-based expert systems using suitable tools and methodologies CO4: Evaluate expert systems with respect to performance, limitations, and ethical considerations				



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

**Proposed
in 2023**

SEM VIII

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Program Elective Course (PEC-VI)				
Course title	Agentic AI Systems				
Scheme and Credits	L	T	P	Credit	Semester VIII
	2	-		2	
Pre-requisites (if any)					
Course Objective	The students will be able to 1. Understand the conceptual foundations of agentic AI systems 2. Design structured autonomous workflows using AI agents 3. Analyze agent architectures involving planning, memory, and tools 4. Evaluate safety, ethical, and reliability concerns in autonomous AI systems				
Course Outcomes	On successful completion of course learner will be able to: CO1: Explain the fundamental concepts, components, and characteristics of agentic AI systems, including autonomy, reasoning, and decision-making capabilities. CO2: Design structured autonomous workflows using AI agents by decomposing goals into tasks and integrating planning, memory, and tool usage. CO3: Analyze and compare different agent architectures (single-agent and multi-agent) with respect to reasoning strategies, memory management, and system reliability. CO4: Evaluate agentic AI systems from the perspectives of safety, ethics, auditability, and human-in-the-loop control in real-world application scenarios.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Multidisciplinary Minor (MDM)				
Course title	Applied Prompt Engineering				
Scheme and Credits	L	T	P	Credit	Semester VIII
	2	-		2	
Pre-requisites (if any)	Artificial Intelligence, Data Mining, Introduction to Machine Learning				
Course Objective	The objectives of this course are to: 1. Introduce the principles of prompt engineering and in-context learning as mechanisms for controlling the behaviour of large language models. 2. Develop the ability to design structured, reusable, and reliable prompts for complex reasoning and task execution. 3. Enable students to evaluate, refine, and document prompts for consistency, robustness, and professional usage. 4. Create awareness of safety, ethical, and responsible practices in prompt design, including privacy and human-in-the-loop control, as preparation for agentic AI systems.				
Course Outcomes	After successful completion of this course, students will be able to: CO1: Explain the foundations of prompt engineering, in-context learning, and the limitations of large language models with respect to reasoning, bias, and reliability. CO2: Design structured prompts using appropriate roles, constraints, examples, and output formats to control reasoning and task execution in LLMs. CO3: Evaluate and refine prompts through systematic testing, versioning, and failure analysis to ensure consistent and auditable outputs. CO4: Apply responsible prompt engineering practices by addressing safety, ethical considerations, data privacy, and human-in-the-loop workflows in professional and academic contexts.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Experimental Learning Course				
Course title	Research Methodology				
Scheme and Credits	L	T	P	Credit	Semester VIII
	4	-		4	
Pre-requisites (if any)	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 Outcomes	After successful completion of this course, students will be able to: CO1: Prepare a preliminary research design for projects in their subject matter areas CO2: Accurately collect, analyze and report data CO3: Present complex data or situations clearly CO4: Review and analyze research findings				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	-----------------------------

Category	Programme Elective Course (PEC-VI)				
Course title	Software Quality Assurance & Testing				
Scheme and Credits	L	T	P	Credit	Semester VIII
	2	-		2	
Pre-requisites (if any)	Students should have prior knowledge of: Fundamentals of Software Engineering Basic understanding of the Software Development Life Cycle (SDLC) Programming concepts in any high-level language Basics of data structures and algorithms Elementary knowledge of software documentation and project management				
Course Objective	The objectives of this course are to: 1. Introduce fundamental concepts of software quality, quality assurance, and quality control. 2. Provide an understanding of SQA activities, standards, metrics, and process improvement models. 3. Explain verification and validation techniques and their role in ensuring software quality. 4. Develop knowledge of software testing principles, life cycle, strategies, and defect management. 5. Enable students to design effective test cases using black-box and white-box testing techniques.				
Course Outcomes	On successful completion of course learner will be able to: CO1: Explain key concepts of software quality, QA, QC, quality attributes, and their impact on productivity and reliability. CO2: Apply Software Quality Assurance (SQA) practices, standards, metrics, and process improvement models within the SDLC. CO3: Differentiate between verification and validation and apply appropriate reviews, inspections, and static analysis techniques. CO4: Describe the software testing life cycle, bug life cycle, testing strategies, and testing models used across SDLC phases.				

	USHA MITTAL INSTITUTE OF TECHNOLOGY SNDT Women's University Faculty : Technology (Undergraduate Course) -BTech Subject : Syllabus for Information Technology	Proposed in 2023
--	---	---

Category	Programme Elective Course (PEC-VI)				
Course title	Robotics Engineering				
Scheme and Credits	L	T	P	Credit	Semester VIII
	2	-		2	
Pre-requisites (if any)					
Course Objective	The objectives of this course are to: 1. Understand the fundamentals of robotic systems and their mathematical modeling 2. Learn kinematics, sensing, and control of robotic manipulators and mobile robots 3. Apply Artificial Intelligence techniques for perception, planning, and decision-making in robotics 4. Design intelligent robotic systems for real-world applications				
Course Outcomes	At the end of this course students will demonstrate the ability to CO1: Explain the structure, components, and working principles of robotic systems CO2: Analyze robot kinematics, dynamics, and control mechanisms CO3: Apply AI techniques for robot perception, learning, and task planning CO4: Design intelligent robotic applications integrating sensing, control, and AI				



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

**Proposed
in 2023**