



**ST. XAVIER'S COLLEGE – MUMBAI**  
**(Est. 1869)**

**(An Autonomous College affiliated with the University of Mumbai)**


**Syllabus for Undergraduate Programme as per**  
**National Education Policy (NEP-2020)**

**Programme: B.Sc**

**Information Technology**

**The academic year 2023–2024**



  
PRINCIPAL  
ST. XAVIER'S COLLEGE  
AUTONOMOUS  
MUMBAI - 400 001.

**APPROVED SYLLABUS**

**Preamble:**

The foundational principles of the National Education Policy 2020 (NEP 2020) released by MHRD are:

- Multidisciplinary and holistic education (student-centred), encompassing courses from multiple disciplines across the sciences, social sciences, arts, humanities, and commerce for a multidisciplinary world, with emphasis on outcome-based learning.
- 50-50 formulation, where 50% of the credits must be from the core discipline and the rest 50% from other disciplines. Also, 50% of the course must be conceptual and theory based and the rest 50% must be the application of the concepts into practice through student engagement in activities/apprenticeship and internship. Pedagogic methods must be problem-centred/ based and project-based learning and activities.
- Integration of technology into teaching-learning-evaluation resources, blended teaching-learning (face-to-face, online collaborative learning, hands-on and practicum and flipped learning), strengthening research pedagogy of the discipline.
- Integrating skilling and employability with curriculum and teaching-learning across disciplinary, inter-disciplinary, and multi-disciplinary studies.
- Multiple entry and exit options for students within an academic programme of study with credit transfer and accumulation of credits in the Academic Bank of Credits (ABC).
- Equality is the Goal, and Equity is a process to achieve equality and inclusion to promote students' sense of belonging.

**The framework of the choice-based credit system**

**Major Subject:** A single subject course of study pursued by a student as a mandatory requirement of the programme of study. Indian knowledge system (IKS) to be included in the core courses.

**Elective Course:** An elective course could be a project designed to acquire skills to supplement the major study.

**Minor Subject:** A second subject of study pursued by a student as an additional requirement of the programme of study.

**OE:** Open Elective - An elective course chosen generally from an unrelated discipline/subject, to seek multidisciplinary exposure.

**AEC:** Ability Enhancement Course - Mandatory Courses on content related to Language, and Literature (i) Compulsory – English communication (ii) Elective – any Indian language other than English.

**IKS:** Indian Knowledge System (Generic) – Mandatory course - an overview of the contribution of India towards multidisciplinary research and development.

**VSC:** Vocational Skill Course – Courses aimed at imparting practical skills, hands-on training, and soft skills to increase the employability of students. Specific or supporting the major subject is to be chosen from a basket/pool offered by the college.

**SEC:** Skill Enhancement Course – Courses aimed at imparting practical skills, hands-on training, and soft skills to increase students' employability. It could be chosen from a basket/pool offered by the college or a MOOC on Swayam or NPTEL platforms.



**On-Job Training (OJT)/Internship/Field Project (FP)/Community Engagement Programme (CEP) Research Project (RP):** Application of knowledge/concepts in solving or analyzing a real-life problem. All these are related to the major subject.

**CC:** Co-curricular Course – For the holistic development of students through Cultural activities such as performing art, visual art, NCC, NSS, Yoga, etc.

**VEC:** Value Education Course – Compulsory courses on (i) The Constitution of India and (ii) Environmental Education.

FYUGP Credit Structure from 2023-24 (Self financed)												
Level	Sem	Major (Sub-1)	Elective	Minor (Sub-2)	OE	VSC		IKS Generic		OJT, FP, RP, CEP	Cum Cr/Sem	Degree/Cum Cr
						SEC	AEC, VEC	CC				
4.5 (2023-24)	Sem 1	4	0	4	4	4	6	0	22	44 UG certificate		
	Sem 2	4	0	4	4	4	4	2	22			
	Cum Cr	8	0	8	8	8	10	2	44			
Major subject-specific IKS of 2 credits must be done as 2 units (could be 1 unit + 1 unit) from Sem 3 to Sem 6												
Exit option with a UG Certificate in Major with an additional 4 credits core NSQF course/internship OR continue with Major & Minor												
5 (2024-25)	Sem 3	8	0	4	2	2	2	4	22	88 UG Diploma		
	Sem 4	8	0	4	2	2	2	4	22			
	Cum Cr	24	0	16	12	12	14	10	88			
Exit option with a UG Diploma in Major & Minor with an additional 4 credits core NSQF course/internship OR continue with Major & Minor												
5.5 (2025-26)	Sem 5	12	4	2	0	2	0	2	22	132 UG Degree		
	Sem 6	12	4	2	0	0	0	4	22			
	Cum Cr	48	8	20	12	14	14	16	132			
6 (2026-27)	Sem 7	12	4	4	0	0	0	2	22	176 UG Honours		
	Sem 8	12	4	0	0	0	0	6	22			
	Cum Cr	72	16	20	12	14	14	24	176			
Exit option with a Three-Year Bachelor Degree with Major and Minor OR continue with Major & Minor												
6 (2026-27)	Sem 7	10	4	4	0	0	0	4	22	176 UG Honours with Research		
	Sem 8	10	4	0	0	0	0	8	22			
	Cum Cr	68	16	20	12	14	14	28	176			
Four-Year UG Honours with Research Degree with Major and Minor												

**Programme Outcomes aligned to the Vision and Mission of St. Xavier's College (Autonomous), Mumbai (Bachelor's degree programme)**

The students who complete three years of an undergraduate programme will be able to manifest skills and competencies in the following areas:

- 1. Disciplinary knowledge and Core competencies/skills:**  
Demonstrate (i) a lucid understanding of the fundamentals of the subject-related curriculum and (ii) basic and global skills in the academic field of study.
- 2. Critical and Creative thinking:**  
(i) Critically reflect on acquired knowledge and skills in areas of core competencies (ii) Explore new possibilities and be resourceful by generating relevant and practical ideas
- 3. Problem-solving and Analytical reasoning:**  
Demonstrate skills in identifying and investigating a problem. Collect relevant qualitative and quantitative data and analyze the results meaningfully.
- 4. Research-related skills:**  
(i) Apply comprehensive research-based knowledge and skills required for identifying issues, interpreting results, and synthesis of valid information. (ii) Communicate results of studies undertaken in an academic field effectively and accurately.
- 5. Social Application of research and development:**  
Employ core competencies and skills to develop solutions for the improvement of social and environmental conditions.
- 6. Industry-related skills:**  
Employ skills that are relevant to the industry and commit to strong work ethics and professionalism.
- 7. Ethical and Moral Integrity:**  
Practice values such as honesty, transparency, and accountability and commit to interpersonal and social ethics.
- 8. Empathy and Social Intelligence:**  
Cultivate and demonstrate affective, interpersonal, social, and spiritual intelligence.
- 9. Collaboration, Teamwork, and Multidisciplinary competence:**  
Apply knowledge and skills as an individual, team member or leader to manage ventures in monodisciplinary and interdisciplinary settings.
- 10. Leadership and Management:**  
Demonstrate effective strategic planning, and efficient organizational and transformational leadership skills to manage a mission embarked upon.
- 11. Social Concern:**  
Demonstrate (i) empathy and care for the marginalized and disadvantaged, (ii) respect, compassion, and concern for others.
- 12. Social responsibility and inclusion:**  
(i) Strive for social justice, harmony, and solidarity (ii) Value cultural pluralism and diversity.
- 13. Environmental Wellbeing**  
Investigate and design strategies to care for and enhance the well-being of the environment.
- 14. Self-motivation and Lifelong learning:**  
Develop a passion for ongoing personal and professional growth.



**Abbreviations:**

- OE: Open Electives
- AEC: Ability Enhancement Course
- VSC: Vocational Skill Course
- SEC: Skill Enhancement Course

**List of Courses offered from Semesters 1-8 in BSc Honours Information Technology**

Level	Semester	Major (Sub-1) Course titles	Minor (Sub-2) Course titles	OE Course title/s	VSC Course title/s	SEC
4.5 100-199	Sem 1	Applied Mathematics	Basics of Python Programming	Web Designing	The Art of Programming	Introduction to Python Programming
	Sem 2	Descriptive Statistics	Database Management Systems	UI & UX Design	C++ Programming	Advanced Python Programming
5 200-299	Sem 3					
	Sem 4					
5.5 300-399	Sem 5					
	Sem 6					
6 400-499	Sem 7					
	Sem 8					
	Total					

**Composition of the Board of Studies in Department of Information Technology 2023 – 2024**

<b>Representation</b>	<b>Name</b>	<b>Affiliation</b>
<b>Chairperson: Head of the Department</b>	Roy Thomas	St. Xavier's College
<b>Department faculty members</b>	Subhash Kumar	St. Xavier's College
	Lydia Fernandes	St. Xavier's College
	Aaron Johns	St. Xavier's College
	Dr. Jojan Mathai	St. Xavier's College
<b>VC nominee</b>	Dr. Jyotsna D	Mumbai University
<b>Industry Expert</b>	Mr. Joyson Dsouza	Dream 11
<b>Subject Experts from other Universities</b>	Dr. Seema Shah	NMIMS
	Dr. Paritosh Pandya	IIT Mumbai
<b>Experts from outside the college (co-opted)</b>	Dr. Hiren Dand	MCC College
<b>Other members of staff of the same faculty</b>	Dr. Annapurna S	St. Xavier's College
<b>Postgraduate meritorious alumnus</b>	Miss. Urmi Narsule	TCS

**Four-Year Undergraduate Programme in Information Technology**

Year of Implementation	Semester	Course Code	BOS Date	Academic Council Date
2023-2024	1	USITY4501MJ1 USITY4501MN1 USITY4501VS1 USITY4501OE1 USITY4501SE1	18/03/2023 29/06/2023	21/04/2023
2023-2024	2	USITY4502MJ1 USITY4502MN1 USITY4502VS1 USITY4502SE1 USITY4502OE1	30/09/2023	06/10/2023

**Programme: B.Sc. Information Technology**

**Programme Specific Outcomes (PSOs) for B.Sc. Information Technology**

Sr. No.	On completing B.Sc. Information Technology, the student will be able to:
PSO 1	Gain an understanding in various areas of information technology for higher studies and research.
PSO 2	Acquire analytical and problem-solving skills, in order to solve real world problems.
PSO 3	Communicate technical concepts and designs to all kinds of audience
PSO 4	Work as part of a team with constant collaboration and communication in order to build projects.
PSO 5	Create or apply modern tools and techniques to analyse concepts being applied to the system and/or data which is available.
PSO 6	Read programming language documentation and create/modify new/existing systems to generate useful products.
PSO 7	Develop competent technical writing skills for information technology-related concepts.
PSO 8	Develop database programming skill
PSO 8	Acquire the skill of developing predicting model and clustering model.
PSO 10	Acquire the skill of data visualization.
PSO 11	Acquire the skills to design and develop web applications and e-commerce solutions, incorporating user-centered design principles.
PSO12	Develop the skill of programming