



Thakur Educational Trust's (Regd.)

**THAKUR RAMNARAYAN
COLLEGE OF ARTS & COMMERCE**



NAAC Accredited & ISO 21001:2018 Certified

Thakur Ramnarayan Educational Campus, S.V. Road, Dahisar (East), Mumbai - 400 068
Tel: 022 2828 1200 | Fax: 022 2828 1300 | www.trcac.org.in

Outcome Based Education (OBE) Document

Programme: B.Sc. (I.T.)

Program Educational Objectives

PEO 1: To prepare students for career in Information Technology and its applications such as the design, development, implementation, testing and maintenance of computer software/hardware in professional career.

PEO 2: To develop the skill sets of students to be at par with the advancements in Information Technology domain.

PEO 3: To prepare the student for entry into a program of postgraduate study in Information Technology and related domain/ fields.

Program Outcomes

On successful completion, graduates of B.Sc. (I.T.) programme will be able to:

PO 1: Disciplinary Knowledge: Apply the knowledge of mathematics, computer science and Information Technology fundamentals to find of solutions of real time problems with different applications.

PO 2: Effective Communication Skills: Communicate effectively on complex activities with the end users and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 3: Critical thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, testing out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO 4: Problem Solving: Identify, formulate, research literature, and analyse various research and real time application scenarios reaching substantiated conclusions using first principles of mathematics, computer sciences, and information technology.

PO 5: Analytical Reasoning: Develop ability to analyse a problem, identify and define applications that resolves the end user requirement with respect to real time problems with appropriate consideration for the societal, and environmental considerations.

PO 6: Research Related Skills: Use research-based knowledge and research methods to investigate the problems that cannot be solved by straightforward application of knowledge, theories and techniques; that may not have a unique solution, which need to be defined (modelled) within appropriate mathematical framework/ scientific derivation/ global technological evolutions.

PO 7: Environment and Sustainability: Understand the impact of the scientific applications and solutions in societal and environmental contexts, and demonstrate the knowledge of green computing and need for sustainable development.

PO 8: Cooperation/ Teamwork: Function effectively as an individual, and as a member or team leader in diverse cross functional groups and in multidisciplinary settings.

PO 9: Information/Digital Literacy: Create, select, and apply appropriate techniques, resources, and modern tools including prediction and modelling to complex activities with an understanding of the limitations.

PO 10: Ethics: Apply ethical principles and commit to professional ethics & responsibilities and norms of the technological and sustainable development.

PO 11: Self-directed and Life-long Learning: Recognize the need for and have the preparation and ability to engage independent and lifelong learning in the broadest context of global technological evolution.

PO 12: Leadership Readiness/Qualities: Demonstrate knowledge and understanding of the Computer Science, Information Technology and management principles and apply these to one's own work, as a member and leader in a team, to manage research and application projects and in multidisciplinary environments.

Program Specific Outcomes

On successful completion, graduates of B.Sc. (I.T.) programme will be able to:

PSO 1: Demonstrate technical knowledge and illustrate the required skills for software development with the help of basic hardware components. Apply standard software engineering practices and strategies in the development using open-source programming environment.

PSO 2: Develop the skills of logical thinking, analytical thinking & acquire essential skills of both verbal as well as non-verbal communication.

PSO 3: Apply concepts of wired, wireless, embedded and IoT systems for demonstrating innovative solutions with consideration to real-time applications. Develop knowledge of basic concepts of computer network, security and software testing.

PSO 4: Acquaint with contemporary issues, latest trends in technological evolution and there by develop new ideas and design new solutions to existing problems.

T.Y.B.Sc. (I.T.) (Semester - V)

MJ - Artificial Intelligence and Application Development

Course Outcomes

After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Apply intelligent agent models, search algorithms, probabilistic reasoning, and fundamental machine learning techniques to solve structured AI problems.			✓			
CO2	Implement and evaluate supervised and basic deep learning models using appropriate performance metrics.					✓	
CO3	Design and construct end-to-end AI pipelines including data preprocessing, model training, validation, and inference integration within applications.						✓
CO4	Develop and deploy AI-based applications ensuring scalability, robustness, and adherence to ethical and responsible AI practices.						✓

T.Y.B.Sc. (I.T.) (Semester - V)

MJ - Artificial Intelligence Application Development and Jira (Practical)

Course Outcomes : After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Implement intelligent agent models and classical search algorithms to solve structured AI problems.			✓			
CO2	Construct probabilistic models and perform inference using Bayes' rule						✓
CO3	Develop and train machine learning models for classification and regression using real-world datasets.						✓
CO4	Evaluate and compare AI models using appropriate performance metrics such as accuracy, precision, recall, F1-score, and ROC curves.					✓	
CO5	Apply cross-validation and basic hyperparameter tuning techniques to improve model performance.			✓			
CO6	Design and deploy a basic AI application while analysing fairness, bias, and ethical considerations.						✓
CO7	Create and configure Jira projects.						✓
CO8	Manage issues and workflows effectively.			✓			
CO9	Implement Scrum and Kanban practices.			✓			
CO10	Use JQL, reports, and dashboards for project tracking.			✓			
CO11	Configure permissions, security, and automation rules			✓			

T.Y.B.Sc. (I.T.) (Semester - V)

MJ - Dot .Net Core and Progressive Web Application

Course Outcomes

After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Develop applications using C# and implement object-oriented programming concepts in the .NET environment.			✓			
CO2	Design and deploy dynamic web applications using ASP.NET Core, routing, middleware, and MVC architecture.					✓	
CO3	Build and consume restful APIs and integrate backend services with client-side applications.						✓
CO4	Create Progressive Web Applications with features such as service workers, web app manifest, and offline caching.						✓
CO5	Apply modern web development practices including responsive design, security mechanisms, and performance optimization in real-world applications.			✓			

T.Y.B.Sc. (I.T.) (Semester - V)

MJ - (Dot) .Net Core and Progressive Web Application (Practical)

Course Outcomes

After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Develop C# programs using basic programming constructs, arrays, strings, and pattern generation.			✓			
CO2	Apply Object-Oriented Programming concepts such as inheritance, polymorphism, interfaces, constructors, delegates, and exception handling.					✓	
CO3	Design and develop ASP.NET Web Forms and ASP.NET Core applications using server controls and validation techniques.						✓
CO4	Implement database connectivity using SQL Server and Entity Framework Core to perform CRUD operations.						✓
CO5	Develop Web APIs and Progressive Web Applications (PWA) with offline support, service workers, and manifest configuration.			✓			

T.Y.B.Sc. (I.T.) (Semester - V)

MAJOR (M1) ELECTIVES - Android Practical

Course Outcomes

After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Design and develop basic Android applications using Android Studio and implement Activity lifecycle methods.			✓			
CO2	Build responsive user interfaces using various Android layouts, UI controls, and resource files.			✓			
CO3	Implement fragments, intents, events, listeners, and adapters to enable effective user interaction and navigation.				✓		
CO4	Develop applications incorporating services, broadcast receivers, notifications, and background processing mechanisms.						✓
CO5	Create data-driven Android applications using SQLite database and JSON-based network communication.						✓
CO6	Apply advanced Android features including media APIs, threading, security mechanisms, and runtime permission handling in real-world applications.				✓		

T.Y.B.Sc. (I.T.) (Semester - V)

Minor - Industry & Service management IV (Production & Design thinking Management)

Course Outcomes

After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Categorize and design different Production Systems and Process Strategies based on volume and variety requirements.			✓			
CO2	Demonstrate proficiency in creating Service Blueprints to identify potential fail points and optimize customer touchpoints.				✓		
CO3	Apply Lean and Six Sigma basics to eliminate waste and reduce process variability in industrial workflows.			✓		✓	
CO4	Facilitate Design Thinking workshops using ideation techniques like SCAMPER and Empathy Mapping.						✓

T.Y.B.Sc. (I.T.) (Semester - V)

VSC - Internet of Things Practical

Course Outcomes

After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Ability to Interface and Control Digital & Analog Hardware Components.			✓			
CO2	Competence in Implementing Real-World IoT Communication and Automation.			✓			
CO3	Skills in Reading, Processing, and Displaying Sensor Data				✓		
CO4	Ability to Implement Identity & Security Mechanisms						✓
CO5	Capability to Design and Deploy an Integrated IoT-Based Smart System						✓
CO6	Ability to Integrate and Program Multiple Hardware Interfaces for Security and Automation				✓		
CO7	Proficiency in Designing Multi-Layer Authentication and Access Control Systems				✓		
CO8	Competence in IoT Communication and Web-Based Control of Embedded Devices					✓	
CO9	Skills in Implementing Intelligent Monitoring Systems Using Raspberry Pi						✓
CO10	Capability to Deploy, Test, and Evaluate Complete Embedded Solutions on Raspberry Pi						✓

T.Y.B.Sc. (I.T.) (Semester - V)

Indian Knowledge Systems in Information Technology

Course Outcomes

After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Explain the fundamental concepts of Indian Knowledge Systems, including Pramana, Pratyaksha, Anumana, Upamana, and Shabda as sources of knowledge.		✓				
CO2	Describe the relationship between Indian Knowledge Systems and modern Information Technology through knowledge representation, reasoning, and rule-based frameworks.		✓				
CO3	Apply concepts of the decimal number system, zero, binary representation, and combinatorics from ancient Indian mathematics to computational thinking.			✓			
CO4	Analyze Aryabhata's computational methods and algorithmic approaches in the context of modern algorithms and data processing techniques.				✓		
CO5	Apply Nyaya logic, Indian syllogism, and inference models to logical reasoning, problem-solving, and decision-making processes.			✓			
CO6	Analyze the relevance of Panini's Ashtadhyayi, Sanskrit grammar, and formal linguistic structures in compiler design, programming languages, and Natural Language Processing.				✓		
CO7	Examine the significance of ancient Indian cognitive models, knowledge representation systems, and classification methods in Artificial Intelligence and					✓	

	Machine Learning.						
CO8	Evaluate the contributions of traditional Indian computational concepts, cryptography, combinatorics, and strategic reasoning to modern computing systems.					✓	
CO9	Integrate Indian ethical, philosophical, and value-based principles into responsible AI, digital governance, and emerging technology applications.			✓			
CO10	Design innovative, multidisciplinary, and culturally rooted technology solutions by combining Indian Knowledge Systems with contemporary computing technologies.						✓

T.Y.B.Sc. (I.T.) (Semester - V)

Full Stack development MERN Practical

Course Outcomes

After completing this course, students will be able to:

CO	Course Outcomes	Revised Bloom's Taxonomy Learning Levels					
		R	U	A	N	E	C
CO1	Learners will be able to install required development tools and run basic JavaScript programs using Node.js.			✓			
CO2	Learners will be able to develop JavaScript programs using essential programming constructs and functions..			✓			
CO3	Learners will be able to create and execute basic React applications using functional components.			✓			
CO4	Learners will be able to design interactive React components using props, state and events.						✓
CO5	Learners will be able to develop multi-page React applications and display data retrieved from APIs.						✓
CO6	Learners will be able to perform CRUD operations through integrated frontend and backend applications.						✓
CO7	Learners will be able to create simple backend servers and APIs using Express and Node.js.						✓
CO8	Learners will be able to create databases and perform CRUD operations using MongoDB.			✓			
CO9	Learners will be able to connect React frontend with backend APIs and display dynamic data.						✓

CO10	Learners will be able to test and execute a complete MERN-based application ensuring proper data flow and validation.					✓	
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