

**College of Computing Sciences & IT  
Teerthanker Mahaveer University**

**BCA (Bachelor of Computer Applications)  
Mobile Applications & Web Technologies (in collaboration with i-Nurture)**

**Programme Outcome**

<b>PO-1</b>	:	Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking 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.
<b>PO-2</b>	:	Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
<b>PO-3</b>	:	Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.
<b>PO-4</b>	:	Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
<b>PO-5</b>	:	Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
<b>PO-6</b>	:	Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.
<b>PO-7</b>	:	Self-directed and Life-long Learning: Acquire the ability to engage in independent and lifelong learning in the broadest context socio-techn

**Programme Specific Outcome**

<b>PSO-1</b>	:	Understanding the facts of basic computer technical knowledge to move for further domain specific courses
<b>PSO-2</b>	:	Applying the facts and rules for problem-solving skills and the knowledge of computer application to solve real world problems related with the Mobile applications and web technologies.
<b>PSO-3</b>	:	Analyzing the various Mobile/Web application reports and break down the information into components parts for complete analysis.
<b>PSO-4</b>	:	Analyzing the facts of non-technical skills necessary to enable their successful transition into corporate roles

**Course Outcomes**

<b>IMW107</b>	<b>CO-1</b>	Understanding the common features of human language.
	<b>CO-2</b>	Understanding the use of grammar to form the sentence.
	<b>CO-3</b>	Understanding the use of functional grammar to form the sentence.
	<b>CO-4</b>	Understanding the transformation of sentences.

	<b>CO-5</b>	Applying thoughts in efficient manner.
<b>IMW102</b>	<b>CO-1</b>	Understanding the concepts of matrix, set theory, function, some elementary functions with their graphs (Exponential, logarithmic, modulus), solving system of linear equations in two or three variables using inverse of a matrix.
	<b>CO-2</b>	Understanding the concept of derivative and its meaning, Integral as Antiderivative process, Indefinite Integrals, Rules of Integration, Integration by substitution, limits, continuity of a function.
	<b>CO-3</b>	Understanding properties of definite Integral, Cartesian Co-ordinate system ,Circle, equation of tangent, Straight line, Conic Sections:(Parabola & Ellipse),
	<b>CO-4</b>	Understanding the Maxima and Minima of Simple Functions, areas of simple closed curves.
	<b>CO-5</b>	Understanding the concepts of coordinate geometry.
<b>IMW103</b>	<b>CO-1</b>	Understanding basic concepts of Computer components.
	<b>CO-2</b>	Understanding the concept of memory hierarchy and the use of various input output device
	<b>CO-3</b>	Understanding the various computer languages, operating system functions and the application of number systems.
	<b>CO-4</b>	Understanding the concept of Microsoft Office and the overview of MS WORD, MS EXCEL and MS POWER POINT.
	<b>CO-5</b>	Understanding the basic concepts of Computer Networking and the applications of WWW, multimedia and the usage of electronic mail.
<b>IMW104</b>	<b>CO-1</b>	Understanding the use of basic concepts involved in Computer Programming.
	<b>CO-2</b>	Understanding the conceptual knowledge to design, implement, test, debug and document programs in C.
	<b>CO-3</b>	Understanding the concept of functions and functions with parameters passing option.
	<b>CO-4</b>	Understanding the use of programming through the use of pointers and arrays.
	<b>CO-5</b>	Applying algorithm using program involved in advance topics in like file handling functions and the concept of Standard C library
<b>IMW108</b>	<b>CO-1</b>	Understanding the basic concepts and functions of operating systems.
	<b>CO-2</b>	Understanding about process concept and its states.
	<b>CO-3</b>	Understanding the fragmentation and paging concepts in storage
	<b>CO-4</b>	Understanding the deadlock detection and prevention methods in operating
	<b>CO-5</b>	Understanding different access method used in Information management.
<b>TMU101</b>	<b>CO-1</b>	Understanding environmental problems arising due to constructional and developmental activities.
	<b>CO-2</b>	Understanding the natural resources and suitable methods for conservation of resources forsustainable development.
	<b>CO-3</b>	Understanding the importance of ecosystem and biodiversity and conserving it for maintaining ecological balance.

	<b>CO-4</b>	Understanding the types and adverse effects of various environmental pollutants and their abatement devices.
	<b>CO-5</b>	Understanding Greenhouse effect, various Environmental laws, movements, different disasters and their management.
<b>IMW151</b>	<b>CO-1</b>	Applying basic concepts involved in Computer Programming.
	<b>CO-2</b>	Applying programming skills to design, implement, test, debug and document programs in C.
	<b>CO-3</b>	Applying the use of functions and functions with parameters passing option.
	<b>CO-4</b>	Applying the pointers and array in programming.
	<b>CO-5</b>	Applying the algorithm using program involved in advance topics in C like file handling functions and the concept of Standard C library.
<b>TMUGA101</b>	<b>CO-1</b>	Solving complex problems using Criss cross method, base method and square techniques.
	<b>CO-2</b>	Applying the arithmetical concepts of Average, Mixture and Allegation.
	<b>CO-3</b>	Evaluating the different possibilities of various reasoning based problems in series, Blood relation, Ranking and Direction.
	<b>CO-4</b>	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation
<b>IMW206</b>	<b>CO-1</b>	Understanding the principle of effective communication
	<b>CO-2</b>	Understanding and Write various kinds of applications .
	<b>CO-3</b>	Understanding importance of e mail and memo
	<b>CO-4</b>	Understanding various types of official reports.
	<b>CO-5</b>	Understanding components of resume
<b>IMW204</b>	<b>CO-1</b>	Understanding the need and various types of Data Structures
	<b>CO-2</b>	Understanding the conceptual knowledge of various searching and sorting techniques.
	<b>CO-3</b>	Understanding the conceptual knowledge of various searching and sorting techniques.
	<b>CO-4</b>	Applying the use of various types of sorting methods on data.
	<b>CO-5</b>	Applying various algorithms of tree and graph data structures.
<b>IMW209</b>	<b>CO-1</b>	Understanding the use of basic concepts involved in Database management system.
	<b>CO-2</b>	Understanding the concepts of ER models, keys and modelling in DBMS
	<b>CO-3</b>	Applying SQL queries and DDL/DML commands in DBMS.
	<b>CO-4</b>	Analyzing the use of normalization, deadlock handling, serializable and recovery techniques in Database transactions.
	<b>CO-5</b>	Analyzing the concurrency control techniques involved in DBMS like validation based protocol and granularity.
<b>IMW255</b>	<b>CO-1</b>	Understanding the Java Programming environment
	<b>CO-2</b>	Applying objects in Object Oriented Programming
	<b>CO-3</b>	Applying various mathematical operations in Java.
	<b>CO-4</b>	Applying the concept of packages in Java.
	<b>CO-5</b>	Applying the database connections in Java using JDBC.
<b>IMW256</b>	<b>CO-1</b>	Applying the DDL and DML commands to manage Database.
	<b>CO-2</b>	Applying the use of cursors, PL/SQL queries and exception handling in DBMS.

	<b>CO-3</b>	Applying the JOIN, UNION and GROUPBY techniques in DBMS operations.
	<b>CO-4</b>	Applying the concept of conditional retrieval and query sorting in DBMS
	<b>CO-5</b>	Analyzing the use of SELECT, WHERE and ORDER BY clauses in DBMS
<b>TMUGA-201</b>	<b>CO-1</b>	Applying the arithmetical concepts in Ratio Proportion Variation.
	<b>CO-2</b>	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance.
	<b>CO-3</b>	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram.
	<b>CO-4</b>	Examining the optimized approach to solve logs and Surds.
<b>IMW307</b>	<b>CO-1</b>	Understanding the importance of value education in life and method of self-exploration.
	<b>CO-2</b>	Understanding „Natural Acceptance“ and Experiential Validation- as the mechanism for self-exploration.
	<b>CO-3</b>	Applying right understanding about relationship and physical facilities.
	<b>CO-4</b>	Analyzing harmony in myself, harmony in the family and society, harmony in the nature and existence.
	<b>CO-5</b>	Evaluating human conduct on ethical basis.
<b>IMW305</b>	<b>CO-1</b>	Understanding various accepted methodologies to design software
	<b>CO-2</b>	Understanding various Analysis, Design Concepts and Principles
	<b>CO-3</b>	Understanding the Taxonomy Of Software Testing
	<b>CO-4</b>	Understanding the basics of Software Project Management
	<b>CO-5</b>	Understanding various Function Point Models, COCOMO Model, Delphi Method, Scheduling
<b>IMW309</b>	<b>CO-1</b>	Understanding the concepts of internet and internet protocols such as FTP, SMTP, TCP/IP etc. and the architecture of Web System.
	<b>CO-2</b>	Understanding about HTML and different attributes of HTML. Designing simple HTML page
	<b>CO-3</b>	Understanding XML concepts , the differentiation between HTML and XML and the different attributes of XML
	<b>CO-4</b>	Understanding PHP and its basic syntax, variables, Loops, Arrays and Strings.
	<b>CO-5</b>	Understanding about HTTP requests, Files and Cookies.
<b>IMW310</b>	<b>CO-1</b>	Understanding the use of data types and conditional statements.
	<b>CO-2</b>	Understanding the use of dictionaries.
	<b>CO-3</b>	Designing a code and then test small python programs that meet the requirements.
	<b>CO-4</b>	Understanding the concept of object-oriented programming as used in Python: classes, subclasses, properties, inheritance, and overriding.
	<b>CO-5</b>	Understanding various concept of microservices.
<b>IMW306</b>	<b>CO-1</b>	Understanding the basic concepts and importance of information security.
	<b>CO-2</b>	Understanding the role and concept of user identity and access management.
	<b>CO-3</b>	Understanding the system and server security concepts.
	<b>CO-4</b>	Analyzing threats to information security, analyse their impact and propose suitable countermeasures.

	<b>CO-5</b>	Analyzing various aspects of securing systems, servers, Internet, user identity and management.
<b>IMW312</b>	<b>CO-1</b>	Understanding knowledge of grammar to address competitive exams.
	<b>CO-2</b>	Understanding the Use advance English language by using variety of words i.e. idioms and phrase in variety of sentences in functional context.
	<b>CO-3</b>	Understanding the proper usage of English grammar
	<b>CO-4</b>	Understanding the strategies of comprehension
	<b>CO-5</b>	Applying professional writing methodologies.
<b>IMW353</b>	<b>CO-1</b>	Applying web designing rules .
	<b>CO-2</b>	Applying HTML and different attributes of HTML for Designing simple HTML page.
	<b>CO-3</b>	Applying CSS and different attributes of CSS Designing simple CSS page
	<b>CO-4</b>	Creating a dynamic website using HTML.
	<b>CO-5</b>	Creating a dynamic website using HTML with CSS
<b>IMW354</b>	<b>CO-1</b>	Understanding the use of data types and conditional statements.
	<b>CO-2</b>	Understanding the use of dictionaries.
	<b>CO-3</b>	Applying a code and then test small python programs that meet the requirements.
	<b>CO-4</b>	Applying object-oriented programming as used in Python: classes, subclasses, properties, inheritance, and overriding.
	<b>CO-5</b>	Applying various concept of microservices.
<b>TMUGS-301</b>	<b>CO-1</b>	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings
	<b>CO-2</b>	Understanding and analyzing self and devising a strategy for self growth and development.
	<b>CO-3</b>	Adapting a positive mindset conducive for growth through optimism and constructive thinking
	<b>CO-4</b>	Utilizing time in the most effective manner and avoiding procrastination.
	<b>CO-5</b>	Making appropriate and responsible decisions through various
<b>TMUGA-302</b>	<b>CO-1</b>	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.
	<b>CO-2</b>	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability
	<b>CO-3</b>	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.
	<b>CO-4</b>	Correlating the various arithmetic concepts to check sufficiency of data
<b>IMW401</b>	<b>CO-1</b>	Understanding the value of Relational Databases
	<b>CO-2</b>	Understanding the features of NoSQL
	<b>CO-3</b>	Understanding various data models of NoSQL.
	<b>CO-4</b>	Understanding the concept of read and update consistency
	<b>CO-5</b>	Understanding the concept of Big Data and Hadoop.
<b>IMW406</b>	<b>CO-1</b>	Understanding Android programming including design, development and testing skills
	<b>CO-2</b>	Understanding the Android platform, Programming paradigms and Application Components
	<b>CO-3</b>	Understanding the user interface design principles and testing of the user

		interface
	<b>CO-4</b>	Applying the Background processing
	<b>CO-5</b>	Analyzing the Data Access and Storage
<b>IMW403</b>	<b>CO-1</b>	Understanding basic Server web architecture
	<b>CO-2</b>	Understanding the working of web protocols like Python, Ruby Rails as well as IP and web address
	<b>CO-3</b>	Understanding the CGI and GUI Programming.
	<b>CO-4</b>	Understanding the use of advance rails application
	<b>CO-5</b>	Applying the code using various languages .
<b>IMW408</b>	<b>CO-1</b>	Understanding the role of Entrepreneurs
	<b>CO-2</b>	Understanding the importance of Entrepreneurship in Economic Growth
	<b>CO-3</b>	Understanding Thematic Apperception Test.
	<b>CO-4</b>	Understanding Small Enterprises
	<b>CO-5</b>	Understanding various Sources of Finance
<b>IMW409</b>	<b>CO-1</b>	Understanding the usage of English grammar in day to day context.
	<b>CO-2</b>	Acquiring adequate knowledge of grammar and vocabulary to address competitive exams
	<b>CO-3</b>	Applying their listening to understand the basic content.
	<b>CO-4</b>	Understanding how to write and comprehensive skills in English.
	<b>CO-5</b>	Analyzing activities in situational context (like Impromptu).
<b>IMW402</b>	<b>CO-1</b>	Understanding the foundation in web technologies
	<b>CO-2</b>	Understanding popular web scripting languages
	<b>CO-3</b>	Understanding the JavaScript data types, variables, operators, expressions, statements, functions
	<b>CO-4</b>	Applying code for designing web pages using HTML.
	<b>CO-5</b>	Applying various concepts of AJAX and JSON
<b>IMW405</b>	<b>CO-1</b>	Understanding the fundamentals of Human Factors and Principles of Design
	<b>CO-2</b>	Understanding User Centred Design
	<b>CO-3</b>	Understanding the Wireframes and Wire Framing tools
	<b>CO-4</b>	Understand Material Design principles
	<b>CO-5</b>	Understanding quantitative and qualitative methods.
<b>IMW452</b>	<b>CO-1</b>	Creating Hello World Android Application
	<b>CO-2</b>	Creating an Android project from a basic app template.
	<b>CO-3</b>	Creating virtual devices and run their application on both emulator and device.
	<b>CO-4</b>	Creating interactive user interfaces in the Layout Editor, in XML and programmatically.
	<b>CO-5</b>	Implementing Text View, Edit Text, Button, Scroll View, Recycler View, Image View, Linear Layout, popup menus, toasts
<b>IMW451</b>	<b>CO-1</b>	Applying a python program to find the resolution of an image
	<b>CO-2</b>	Creating a simple rail application
	<b>CO-3</b>	Creating controllers and views – ruby on rails
	<b>CO-4</b>	Creating applications using rails scaffolding
	<b>CO-5</b>	Creating a python program to find the hash of file
<b>TMUGS-401</b>	<b>CO-1</b>	Communicating effectively in a variety of public and interpersonal settings.

	<b>CO-2</b>	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.
	<b>CO-3</b>	Analysing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.
	<b>CO-4</b>	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.
	<b>CO-5</b>	Handling difficult situations with grace, style, and professionalism.
<b>IMW508</b>	<b>CO-1</b>	Understanding Mobile web applications
	<b>CO-2</b>	Understanding SPA mobile web applications using AngularJS
	<b>CO-3</b>	Understanding the Hybrid Apps using Phonegap
	<b>CO-4</b>	Applying code to design UI Hybrid App using ionic
	<b>CO-5</b>	Analysing cordova environment.
<b>IMW505</b>	<b>CO-1</b>	Understanding the UI (User Interface) for Android Platform.
	<b>CO-2</b>	Understanding how to design web application for effective communication and Data Exchange.
	<b>CO-3</b>	Understanding network related application and their working in context of Android environment.
	<b>CO-4</b>	Understanding the features of Android platform.
	<b>CO-5</b>	Understanding how to commercialize Android application
<b>IMW503</b>	<b>CO-1</b>	Understanding the concept of web analytics, why web analytics
	<b>CO-2</b>	Understanding an account creation in Google Analytics
	<b>CO-3</b>	Understanding the concept of R & Rstudio
	<b>CO-4</b>	Applying Google Analytics with R programming.
	<b>CO-5</b>	Analyzing CRO services.
<b>IMW502</b>	<b>CO-1</b>	Understanding PHP Development Environment and code syntax.
	<b>CO-2</b>	Understanding different web related features.
	<b>CO-3</b>	Understanding advance concept OOPS, Database Handling and Ajax programming.
	<b>CO-4</b>	Applying Perl code including Control Statements, Arrays, Strings and I/O.
	<b>CO-5</b>	Applying advance programming concepts like Socket programming and CGI
<b>IMW509</b>	<b>CO-1</b>	Understanding enterprise software architecture on the web.
	<b>CO-2</b>	Understanding enterprise applications using the Java programming language
	<b>CO-3</b>	Understanding various advanced Java technologies used to build web applications for the enterprise and construct enterprise applications using advanced Java technologies
	<b>CO-4</b>	Applying the use of advanced Java libraries and frameworks in building a medium-size web application for the enterprise
	<b>CO-5</b>	Analyzing Enterprise mobility.
<b>IMW552</b>	<b>CO-1</b>	Creating a Notification using the Notification Builder.
	<b>CO-2</b>	Creating an HTTP connection to server & get the connection status
	<b>CO-3</b>	Creating a multithreaded application.
	<b>CO-4</b>	Creating a view with different moving shapes
	<b>CO-5</b>	Designing animated picture application.
<b>IMW554</b>	<b>CO-1</b>	Gaining industrial experience of developing

	<b>CO-2</b>	Understanding software or web based applications to solve real time problems of customers.
	<b>CO-3</b>	Understanding the program relevance in the industry.
	<b>CO-4</b>	Applying program skills in real projects.
	<b>CO-5</b>	Applying various problem solving methods .
<b>IMW553</b>	<b>CO-1</b>	Applying practical knowledge within the chosen area of technology for project development
	<b>CO-2</b>	Identifying , analyse, formulate and handle programming projects with a comprehensive and systematic approach
	<b>CO-3</b>	Contributing as an individual or in a team in development of technical projects
	<b>CO-4</b>	Developing effective communication skills for presentation of project related activities
	<b>CO-5</b>	Identifying programming projects with a comprehensive and systematic approach
<b>IMW554</b>	<b>CO-1</b>	Creating dynamic web application for Product management using Javascript
	<b>CO-2</b>	Creating SPA web application for the lab exercise 1 using AngularJS
	<b>CO-3</b>	Creating AngularJS App for capturing location with image and store locally in the phone using PhoneGap
	<b>CO-4</b>	Creating AngularJS App for moving object(ball) using Accelerometer and PhoneGap
	<b>CO-5</b>	Creating Ionic App for Playing Audio and Video based on file type(Music Player)
<b>IMW603</b>	<b>CO-1</b>	Understanding iOS, iOS Versions, iOS Layers
	<b>CO-2</b>	UnderstandingSwift, data types
	<b>CO-3</b>	Understanding the concepts of Cocoa Touch, MVC model, Advantages of MVC model
	<b>CO-4</b>	Understanding the concepts of image View and Page Controls
	<b>CO-5</b>	Understanding the SQL Lite concepts.
<b>IMW601</b>	<b>CO-1</b>	Understanding fundamental skills to maintain web server services required to host a website.
	<b>CO-2</b>	Applying markup languages for processing, identifying, and presenting of information in web pages.
	<b>CO-3</b>	Applying scripting languages and web services to transfer data and add interactive components to web pages.
	<b>CO-4</b>	Analyzing web media objects using editing software.
	<b>CO-5</b>	Analyzing formal concepts of layout and organization to design websites that effectively communicate using visual elements
<b>IMW602</b>	<b>CO-1</b>	Understanding test mobile applications to address specified business problems using high-level languages, technologies and appropriate methodologies.
	<b>CO-2</b>	Understanding mobile application for publishing for a given framework(s)following legal and ethical guidelines demonstrating an understanding of the publishing process.
	<b>CO-3</b>	Analyzing mobile application issues to determine the best solution.
	<b>CO-4</b>	Analyzing mobile testing procedure that is properly documented and tests



		the current prototype outside of the development environment.
	<b>CO-5</b>	Analyzing various android testing tools .
<b>IMW607</b>	<b>CO-1</b>	Understanding the fundamental design paradigms and technologies to mobile computing applications
	<b>CO-2</b>	Understanding consumer and enterprise mobile applications using representative mobile devices and platforms using modern development methodologies.
	<b>CO-3</b>	Understanding effective mobile interfaces using human computer interaction principles.
	<b>CO-4</b>	Understanding the role of mobile applications in software intensive systems.
	<b>CO-5</b>	Understanding the usability of representative mobile devices such as smart phones and tablets.
<b>IMW605</b>	<b>CO-1</b>	Understanding how to use HTML5 to create website and also its scope and Limitations
	<b>CO-2</b>	Understanding how to use CSS to improve the look of a website.
	<b>CO-3</b>	Understanding the use different HTML5 features.
	<b>CO-4</b>	Understanding how to handle Multimedia using HTML5 and API provided.
	<b>CO-5</b>	Understanding the use of Canvas for graphics in HTML5.
<b>IMW652</b>	<b>CO-1</b>	Creating a program to print student details using class & objects
	<b>CO-2</b>	Creating a program to instantiate Circle object using protocols
	<b>CO-3</b>	Creating a program to add a method for existing class using categories
	<b>CO-4</b>	Creating a program to display digital clock using threads
	<b>CO-5</b>	Creating a program to collect n names and print them using arrays
<b>IMW651</b>	<b>CO-1</b>	Applying practical knowledge within the chosen area of technology for project development
	<b>CO-2</b>	Identifying , analyse, formulate and handle programming projects with a comprehensive and systematic approach
	<b>CO-3</b>	Contributing as an individual or in a team in development of technical projects
	<b>CO-4</b>	Developing effective communication skills for presentation of project related activities
	<b>CO-5</b>	Identifying programming projects with a comprehensive and systematic approach