

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

**BCA (Bachelor of Computer Applications)
Cloud Technology & Information Security (In collaboration with i-Nurture)**

Programme Outcome

PO-1	:	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 a
PO-2	:	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
PO-3	:	Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO-4	:	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.
PO-5	:	Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO-6	:	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

Programme Specific Outcome

PSO-1	:	Understanding the facts of basic computer technical knowledge to move for further domain specific courses
PSO-2	:	Applying the facts and rules for problem-solving skills and the knowledge of computer application to solve real world problems related cloud technology and Information security.
PSO-3	:	Analyzing the technical reports related with cyber crimes and break down the information into components parts for complete analysis.
PSO-4	:	Analyzing the facts of non-technical skills necessary to enable their successful transition into corporate roles

Course Outcomes

ICI106	CO-1	Understanding the common features of human language.
	CO-2	Understanding the use of grammar to form the sentence.
	CO-3	Understanding the use of functional grammar to form the sentence
	CO-4	Understanding the transformation of sentences.
	CO-5	Applying thoughts in efficient manner.
ICI102	CO-1	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.
	CO-2	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.
	CO-3	Understanding properties of definite Integral, Cartesian Co-ordinate system ,Circle, equation of tangent, Straight line, Conic Sections:(Parabola & Ellipse),
	CO-4	Applying the Maxima and Minima of Simple Functions, areas of simple closed curves.
	CO-5	Applying the concepts of coordinate geometry .
ICI103	CO-1	Understanding basic concepts of Computer components.
	CO-2	Understanding the concept of memory hierarchy and the use of various input output devices.
	CO-3	Understanding the various computer languages, operating system functions and the application of number systems.
	CO-4	Understanding the concept of Microsoft Office and the overview of MS WORD, MS EXCEL and MS POWER POINT.
	CO-5	Understanding the basic concepts of Computer Networking and the applications of WWW, multimedia and the usage of electronic mail.
ICI104	CO-1	Understanding the use of basic concepts involved in Computer Programming
	CO-2	Understanding the conceptual knowledge to design, implement, test, debug and document programs in C.
	CO-3	Understanding the concept of functions and functions with parameters passing option.
	CO-4	Understanding the use of programming through the use of pointers and arrays.
	CO-5	Applying the algorithm using program involved in advance topics in C like file handling functions and the concept of Standard C library.
ICI107	CO-1	Understanding the basic concepts and functions of operating systems
	CO-2	Understanding about process concept and its states.
	CO-3	Understanding the fragmentation and paging concepts in storage management.
	CO-4	Understanding the deadlock detection and prevention methods in operating system.
	CO-5	Applying different access method used in Information management.
TMU101	CO-1	Understanding environmental problems arising due to constructional and developmental activities.
	CO-2	Understanding the natural resources and suitable methods for conservation of resources for sustainable development.
	CO-3	Understanding the importance of ecosystem and biodiversity and conserving it for maintaining ecological balance.
	CO-4	Understanding the types and adverse effects of various environmental pollutants and their abatement devices.
	CO-5	Understanding Greenhouse effect, various Environmental laws, movements, different disasters and their management.

ICI151	CO-1	Implementing the use of basic concepts involved in Computer Programming.
	CO-2	Implementing the conceptual knowledge to design, implement, test, debug and document programs in C.
	CO-3	Implementing the use of functions and functions with parameters passing option.
	CO-4	Implementing the pointers and array in programming.
	CO-5	Implementing the algorithm using program involved in advance topics in C like file handling functions and the concept of Standard C library.
TMUGA101	CO-1	Solving complex problems using Criss cross method, base method and square techniques.
	CO-2	Applying the arithmetical concepts of Average, Mixture and Allegation
	CO-3	Evaluating the different possibilities of various reasoning based problems in series, Blood relation, Ranking and Direction
	CO-4	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation.
ICI205	CO-1	Understanding the principle of effective communication
	CO-2	Understanding and Write various kinds of applications .
	CO-3	Understanding importance of e mail and memo
	CO-4	Understanding various types of official reports.
	CO-5	Understanding components of resume
ICI201	CO-1	Understanding basic concepts of Computer Networking.
	CO-2	Understanding the concept of Computer Networking devices.
	CO-3	Understanding the various protocols used for networking .
	CO-4	Understanding the concept of WAN Technology in networking.
	CO-5	Applying the various troubleshooting methods used in networking.
ICI206	CO-1	Understanding the basic concepts of OOPS and Java Environment.
	CO-2	Understanding the use of class and object in Java Environment.
	CO-3	Understanding the concept of Packages in Object Oriented Programming.
	CO-4	Understanding the role of thread in Java programming.
	CO-5	Understanding the concept of JDBC for application development
ICI203	CO-1	Understanding the need and various types of Data Structures
	CO-2	Understanding the conceptual knowledge of various searching and sorting techniques.
	CO-3	Understanding the importance of stack and queue in data structures.
	CO-4	Applying the use of various types of sorting methods on data.
	CO-5	Analyzing the various algorithms of tree and graph data structures.
ICI207	CO-1	Understanding the use of basic concepts involved in Database management system
	CO-2	Understanding the concepts of ER models, keys and modelling in DBMS
	CO-3	Analyzing the use of SQL queries and DDL/DML commands in DBMS.
	CO-4	Understanding the use of normalization, deadlock handling, serializable and recovery techniques in Database transactions.
	CO-5	Understanding the concurrency control techniques involved in DBMS like validation based protocol and granularity.
ICI254	CO-1	Understanding the Java Programming environment
	CO-2	Applying programing concepts using the objects in Object Oriented

		Programming
	CO-3	Applying various mathematical operations in Java.
	CO-4	Applying the concept of packages in Java
	CO-5	Applying the database connections in Java using JDBC.
ICI255	CO-1	Applying the DDL and DML commands to manage Database.
	CO-2	Applying the use of cursors, PL/SQL queries and exception handling in DBMS.
	CO-3	Applying the JOIN, UNION and GROUPBY techniques in DBMS operations.
	CO-4	Applying the concept of conditional retrieval and query sorting in DBMS
	CO-5	Analyzing the use of SELCT, WHERE and ORDER BY clauses in DBMS
TMUGA-201	CO-1	Applying the arithmetical concepts in Ratio Proportion Variation.
	CO-2	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance.
	CO-3	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram.
	CO-4	Examining the optimized approach to solve logs and Surds.
ICI307	CO-1	Understanding the importance of value education in life and method of self-exploration.
	CO-2	Understanding ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration.
	CO-3	Applying right understanding about relationship and physical facilities.
	CO-4	Analyzing harmony in myself, harmony in the family and society, harmony in the nature and existence.
	CO-5	Evaluating human conduct on ethical basis.
ICI302	CO-1	Understanding the basic concepts and importance of information security.
	CO-2	Understanding the role and concept of user identity and access management.
	CO-3	Understanding the system and server security concepts.
	CO-4	Understanding threats to information security, analyse their impact and propose suitable countermeasures
	CO-5	Applying various aspects of securing systems, servers, Internet, user identity and management.
ICI308	CO-1	Understanding the concept of installing and configuring the SDDC using VMware products
	CO-2	Understanding how to implement Fault tolerance and High availability for the Virtual machines.
	CO-3	Understanding the security policy of Virtual environment.
	CO-4	Applying the resource optimization and monitoring concepts.
	CO-5	Analyzing the performance metrics of monitor key storage.
ICI309	CO-1	Understanding the use of data types and conditional statements.
	CO-2	Understanding the use of dictionaries.
	CO-3	Designing a code and then test small python programs that meet the requirements.
	CO-4	Applying the concept of object-oriented programming as used in Python: classes, subclasses, properties, inheritance, and overriding.

	CO-5	Analyzing the various concepts of micro services.
ICI310	CO-1	Understanding the fundamentals of cloud computing.
	CO-2	Analyzing the Cloud computing setup with its vulnerabilities and applications using different architectures.
	CO-3	Understanding the risks involved in migrating the existing infrastructure to cloud.
	CO-4	Understanding various cloud service providers and generate effective cloud infrastructure by optimizing the cost involved.
	CO-5	Understanding the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.
ICI306	CO-1	Understanding knowledge of grammar to address competitive exams
	CO-2	Understanding the Use advance English language by using variety of words i.e. idioms and phrase in variety of sentences in functional context.
	CO-3	Understanding the proper usage of English grammar.
	CO-4	Understanding the strategies of comprehension.
	CO-5	Understanding the professional writing methodologies.
ICI353	CO-1	Applying the installation and configuration methods of ESXi Server.
	CO-2	Applying vSphere Networking and security policies.
	CO-3	Applying the various configurations of vSan.
	CO-4	Applying the installation and configuration methods of NSX.
	CO-5	Applying the various encryption policies on VMware.
ICI354	CO-1	Applying the security policies and configuration of Firewall
	CO-2	Applying the security policies and configuration of Virtual Private Network
	CO-3	Applying the security policies and configuration of Router
	CO-4	Applying the configuration of HoneyPot and monitor the HoneyPot on the Network
	CO-5	Analyzing Asymmetric, Symmetric Crypto algorithm, Hash and Digital Signature using JCRYPT tool or any other equivalent tool.
TMUGS-301	CO-1	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings
	CO-2	Understanding and analyzing self and devising a strategy for self growth and development.
	CO-3	Adapting a positive mindset conducive for growth through optimism and constructive thinking.
	CO-4	Utilizing time in the most effective manner and avoiding procrastination.
	CO-5	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree.
TMUGA-302	CO-1	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.
	CO-2	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability.
	CO-3	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.
	CO-4	Correlating the various arithmetic concepts to check sufficiency of data
ICI404	CO-1	Understanding the importance of ethical hacking in achieving the
	CO-2	Understanding the processes of vulnerability assessment and ethical

		hacking from penetration testing.
	CO-3	Understanding the importance of appropriate countermeasures for managing vulnerabilities
	CO-4	Understanding the need for meticulous documentation in writing reports for consumption of both technical and management audiences.
	CO-5	Analysing the rationale for having an adequate legal framework for dealing with hacking and ethical hacking.
ICI408	CO-1	Understanding Storage devices and technologies.
	CO-2	Understanding the advantages and functionality of NAS and SAN.
	CO-3	Understanding knowledge on Backups and Disaster Recovery
	CO-4	Understanding Data Center Consolidation and its phases.
	CO-5	Understanding knowledge on design and analysis of Cluster Architecture.
ICI409	CO-1	Understanding the role of TCP/IP and OSI Layers
	CO-2	Understanding the concepts of IPv4 and Routing concepts.
	CO3	Applying the commands of Switch device in Networking.
	CO-4	Analyzing the working of IP Addressing and Subnetting.
	CO-5	Creating the LAN and Switch Configuration.
ICI410	CO-1	Understanding the usage of English grammar in day to day context.
	CO-2	Understanding adequate knowledge of grammar and vocabulary to address competitive exams
	CO-3	Applying their listening to understand the basic content.
	CO-4	Analyzing how to write and comprehensive skills in English.
	CO-5	Analyzing the activities in situational context (like Impromptu).
ICI411	CO-1	After completion of this course students will gain the knowledge of recent trends in domain.
ICI412	CO-1	Understanding the various services of Server 2012
	CO-2	Understanding the configuration of Active directory and manage the domains
	CO-3	Applying the administration and manage the AD domains in server 2012
	CO-4	Applying policies how to Maintain and manage the groups.
	CO-5	Applying patch management and monitoring server performance.
ICI413	CO-1	Understanding how to manage and administer systems and servers using Linux Operating System.
	CO-2	Understanding the operating system used for this unit is Red hat Enterprise Linux 6 (RHEL 6).
	CO-3	Understanding the local storage and file system.
	CO-4	Applying highly scalable MySQL or Oracle database in the cloud with multiple read-replica databases (for scalability of database)
	CO-5	Applying setup a load-balancer in the cloud.
ICI452	CO-1	Applying network scan to revile active hosts, open ports and services running
	CO-2	Applying privilege escalation attack on Client operating system and gain control of a Client operating system and write a short note on its mitigation strategy
	CO-3	Demonstrating ARP Poisoning and detect ARP Poisoning in switch based network
	CO-4	Applying man-in-the-middle attack and hijack an established session of a

		user. Write a report on the same with mitigation strategy
	CO-5	Applying a crack FTP credentials using dictionary attack and write a report of possible suggestion on hardening the login services
ICI453	CO-1	Creating Directly Attached Disks for Basic and Dynamic Disks
	CO-2	Creating and configuring the disk partitions and volumes for the disk in Windows/Linux System
	CO-3	Creating and Configuring the RAID 0, 1 and RAID5 in windows server 2012 R2
	CO-4	Configuring the Network Share using Windows Server 2012 R2
	CO-5	Configuring the File Server in Windows Server 2012 R2
TMUGS-401	CO-1	Communicating effectively in a variety of public and interpersonal settings.
	CO-2	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.
	CO-3	Analysing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.
	CO-4	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.
	CO-5	Handling difficult situations with grace, style, and professionalism.
TMUGA-402	CO-1	Recognizing the rules of Crypt-arithmetic and relate them to find out the solutions.
	CO-2	Illustrating the different concepts of Height and Distance and Functions
	CO-3	Employing the concept of higher level reasoning in Clocks, Calendars and Puzzle Problems.
	CO-4	Correlating the various arithmetic and reasoning concepts in checking sufficiency of data.
ICI507	CO-1	Understanding the migration strategy that can be used in a given scenario.
	CO-2	Understanding migrate services to the cloud.
	CO-3	Understanding the migrating services to AWS cloud using a cloud adoption framework.
	CO-4	Applying the steps involved in migrating Large scale services to the cloud
	CO-5	Applying various migrating strategies that can be used for a given case study scenario.

ICI504	CO-1	Understanding the importance of computer forensic in achieving the goals of information Security
	CO-2	Applying various method involved in recovering data stored in various devices
	CO-3	Analyzing the need for meticulous documentation in computer forensics
	CO-4	Analyzing different forensics techniques
	CO-5	Analyzing the rationale for having an adequate legal framework when dealing with Computer forensics
ICI508	CO-1	Understanding the benefits and Risks involved in Virtualization
	CO-2	Understanding the concept and service providers in Cloud Computing
	CO-3	Understanding the key privacy concern and control objective in cloud
	CO-4	Applying the security management and availability management in Cloud Security
	CO-5	Analyzing security principles in achieving trust and privacy in Cloud
ICI510	CO-1	Understanding the features of Windows Power Shell
	CO-2	Illustrating the Windows Power Shell commands.
	CO-3	Demonstrating the use of cmdlets for other server administration tasks.
	CO-4	Understanding the purpose of the Windows Power Shell pipeline
	CO-5	Understanding how to manipulate arrays and hash tables.
ICI511	CO-1	Understanding the Shell Scripting and basic commands
	CO-2	Understanding Process management and monitoring tools
	CO-3	Understanding how to use variables in a shell script to make program interactive
	CO-4	Understanding Arithmetic Operations in Shell Scripts
	CO-5	Applying loops and Functions to develop scripts
ICI509	CO-1	Understanding the role of Entrepreneurs
	CO-2	Understanding the importance of Entrepreneurship in Economic Growth
	CO-3	Understanding Thematic Apperception Test
	CO-4	Understanding Small Enterprises
	CO-5	Understanding various Sources of Finance
ICI551	CO-1	Applying System Forensics – System is switched ON
	CO-2	Applying System Forensics – System is switched OFF
	CO-3	Applying the recovery method.
	CO-4	Applying the Web application forensics
	CO-5	Analysing E- Mail Investigation & Analysis
ICI552	CO-1	Applying practical knowledge within the chosen area of technology for project development
	CO-2	Applying programming projects with a comprehensive and systematic approach
	CO-3	Contributing as an individual or in a team in development of technical projects
	CO-4	Developing effective communication skills for presentation of project related activities
	CO-5	Identifying programming projects with a comprehensive and systematic approach

ICI607	CO-1	Understanding the components of Open stack.
	CO-2	Understanding the Installation and configuration of the Open stack components
	CO-3	Understanding the resource creation in Open stack
	CO-4	Applying the steps to troubleshoot Open stack components
	CO-5	Applying steps for troubleshooting various logs.
ICI606	CO-1	Understanding how security is integrated with IT governance
	CO-2	Understanding the need for using standard frameworks in establishing a robust information security governance program
	CO-3	Understanding the role of Information security governance.
	CO-4	Applying COBIT 5 principles.
	CO-5	Analyzing the Risk factors.
ICI602	CO-1	Understanding the concepts of ITIL frameworks provide a homogenous IT environment and eases interactions with other global companies using similar preapproved tools.
	CO-2	Understanding Managing staff, providing services to customers and creating efficiencies for less money can be daunting tasks for any IT organization
	CO-3	Understanding service transition lifecycle stages.
	CO-4	Understanding service operation functions.
	CO-5	Understanding service level management.
ICI608	CO-1	Understanding the basics of cloud technology in Windows Azure services like computer service, network service, data service and App service. Programming with windows azure is also covered in depth.
	CO-2	Understanding the broad perceptive of cloud architecture and model.
	CO-3	Understanding different cloud programming model as per need.
	CO-4	Understanding some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.
	CO-5	Understanding Azure Database concepts
ICI609	CO-1	Understanding fundamental understanding of AWS cloud technologies
	CO-2	Understanding a Windows or Linux server in the cloud with its own private address
	CO-3	Understanding a CRM / Word Press / etc. website hosted in cloud
	CO-4	Understanding highly scalable MySQL or Oracle database in the cloud with multiple read-replica databases (for scalability of database)
	CO-5	Applying steps to setup a load-balancer in the cloud.
ICI652	CO-1	Applying openstack - mitaka in Enterprise linux (RHEL 7 based – Centos 7) and verifying the answer file
	CO-2	Applying the physical network and Configure the ovs –vctl in Enterprise linux
	CO-3	Applying how to managing users, projects, flavors, quota for users and projects using keystone service
	CO-4	Adding, importing and creating the images using glance service
	CO-5	Configuring the networking services with external and internal network using neutron
ICI651	CO-1	Applying practical knowledge within the chosen area of technology for

	project development
CO-2	Identifying , analyse, formulate and handle programming projects with a comprehensive and systematic approach
CO-3	Contributing as an individual or in a team in development of technical projects
CO-4	Developing effective communication skills for presentation of project related activities
CO-5	Identifying programming projects with a comprehensive and systematic approach