

Study & Evaluation Scheme

Of

Bachelor of Computer Application

(With Specialization in **Cloud Technology and Information Security**)

(In Collaboration with iNurture)

[Applicable w.e.f. Academic Session – 2020-21 till revised]

[As per CBCS guidelines given by UGC]



**COLLEGE OF COMPUTING SCIENCES & INFORMATION
TECHNOLOGY**

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

Syllabus Applicable w.e.f Academic Session 2020-21





TEERTHANKER MAHAVEER UNIVERSITY
(Established under Govt. of U.P. Act No. 30, 2008)
Delhi Road, Bagarpur, Moradabad (U.P.)

<u>Study & Evaluation Scheme</u>						
<u>SUMMARY</u>						
Institute Name		College of Computing Sciences & Information Technology				
Programme		BCA(CTIS)				
Duration		Three Years full time(Six Semesters)				
Medium		English				
Minimum Required Attendance		75%				
<u>Credits</u>						
Maximum Credits		136				
Minimum Credits Required for Degree		132				
<u>Assessment:</u>						
Evaluation			Internal	External	Total	
Theory			40	60	100	
Practical/ Dissertations/ Project Reports/ Viva-Voce			50	50	100	
Class Test-1	Class Test-2	Class Test-3	Assignment(s)	Attendance & Participation	Total	
Best two out of three						
10	10	10	10	10	40	
Duration of Examination			External	Internal		
			3 Hours	1.5 Hours		
<p>To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester end examination and teachers continuous evaluation.(i.e. both internal and external).A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have at least 45% marks in aggregate to clear the semester.</p> <p># Provision for delivery of 25% content through online mode.</p> <p># Policy regarding promoting the students from semester to semester & year to year. No specific condition to earn the credit for promoting the students from one semester to next semester.</p> <p># Maximum Duration: Maximum no of years required to complete the program: N+2 (N=No of years for program for BCA(CTIS) N=3)</p>						
<u>Question Paper Structure</u>						
1	The question paper shall consist of six questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question no. 2 to 6 (from Unit-I to V) shall have explanatory answers (approximately 350 to 400 words) along with having an internal choice within each unit.					
2	Question No. 1 shall contain 8 parts from all units of the syllabus with at least one question from each unit and students shall have to answer any five, each part will carry 2 marks.					
3	The remaining five questions shall have internal choice within each unit; each question will carry 10 marks.					

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IMPORTANT NOTES:	
1	<i>The purpose of examination should be to assess the Course Learning Outcomes (CLO) that will ultimately lead to of attainment of Programme Specific Outcomes (PSOs). A question paper must assess the following aspects of learning: Remember, Understand, Apply, Analyze, Evaluate & Create (reference to Bloom's Taxonomy).</i>
2	<i>Case Study is essential in every question paper (wherever it is being taught as a part of pedagogy) for evaluating higher-order learning. Not all the courses might have case teaching method used as pedagogy.</i>
3	<i>There shall be continuous evaluation of the student and there will be a provision of fortnight progress report.</i>

Program Structure-BCA(CTIS)

A.Introduction:

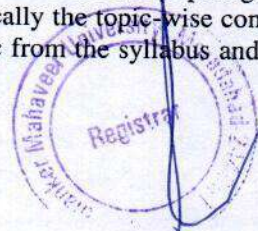
High-quality Technical education is essential for the digital age and using technology is a powerful way to enhance changing requirements of the corporate, business enterprises and society. BCA students should be equipped to work across timezones, languages, and cultures. Employability, innovation, technical connectedness is the central focus of BCA curriculum. The curriculum is designed as such that the students can gain an in-depth mastery of the academic disciplines and applied functional areas necessary to meet the requirements of industry.

The institute emphasizes on the following courses ***balanced with core and elective courses***: The curriculum of BCA program emphasizes an intensive, flexible technical education with 64 credits of core courses (all types), 13 credits of electives and 18 credits of field/internship projects. Total 136 credits are allotted for the BCA degree.

The programme structure and credits for BCA(CTIS) are finalized based on the stakeholders' requirements and general structure of the programme. Minimum number of classroom contact teaching credits for the BCA(CTIS) program will be 123 credits (one credit equals 10 hours); 6 credits for comprehensive viva-voce and fieldwork/internship will be of 12 credits. However, the minimum number of the credits for award of BCA(CTIS) degree will be 132 credits. Out of 123 credits of classroom contact teaching, 64 credits are to be allotted for core courses (CC), 4 credits are allotted to ability enhancement courses (AECC), 6 credits are allotted to skill enhancement courses (SEC), 12 credits are allotted to open/generic elective courses (GEC), 2 credits are allotted to compulsory specific course (CSC), and rest of 30 credits for discipline specific elective courses (DSEC).

The institute offers BCA with specialization in Cloud Technology & Information Security. Due to dynamism in industry environment and manifold expansion of corporate in the present scenario, various industries require candidates with strong multitasking abilities. There is a massive demand for candidates who can fit into diversified roles with adequate efficiency, and BCA degree with specialization solves this demand-supply gap.

Course handouts for students will be provided in every course. A course handout is a thorough teaching plan of a faculty taking up a course. It is a blueprint which will guide the students about the pedagogical tools being used at different stages of the syllabus coverage and more specifically the topic-wise complete plan of discourse, that is, how the faculty members treat each and every topic from the syllabus and what Syllabus Applicable w.e.f Academic Session 2020-21



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they want the student to do, as an extra effort, for creating an effective learning. It may be a case study, a role-play, a classroom exercise, an assignment- home or field, or anything else which is relevant and which can enhance their learning about that particular concept or topic. Due to limited availability of time, most relevant topics will have this kind of method in course handout.

BCA(CTIS) : Three-Year (6-Semester) CBCS Programme			
Basic Structure: Distribution of Courses			
S.No.	Type of Course	Credit Hours	Total Credits
1	Core Course (CC)	7 Courses of 3 credits (7 X 3) 12 Courses of 4 credits (12 X 4)	69
2	Ability-Enhancement Compulsory Course (AECC)	7 Courses of 3 credits (7 X 3) 1 Course of 1 credit (1 X 1)	22
3	Skill-Enhancement Elective Course (SEC)	1 Course of 4 credit (1 X 4) 1 Course of 10 credits (1 X 10)	14
4	Open/Generic Elective Course (GEC)	2 Courses of 3 Credit each (2 X 3)	6
5	Program/Discipline Specific Elective Course (DSEC)	3 Courses of 3 credits each (3 X 3) 1 Course of 4 credit (1 X 4)	13
6	Laboratory Course (LC)	6 Courses of 1 credit each (6 X 1) 3 Courses of 2 credit each (3 X 2)	12
7	Value Added Audit Course (VAC)	2 Courses of 0 Credit Hrs. each (Total Credit Hrs. 4X0)	0
Total Credits			136

Contact hours include work related to Lecture, Tutorial and Practical (LTP), where our institution will have flexibility to decide course wise requirements.

B. Choice Based Credit System (CBCS)

Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve his target number of credits as specified by the UGC and adopted by our University.

The following is the course module designed for the BCA(CTIS) program:

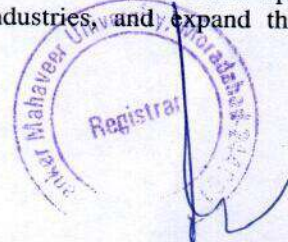
Core Course (CC): Core courses of BCA(CTIS) program will provide a holistic approach to technical education, giving students an overview of the field, a basis to build and specialize upon. These core courses are the strong foundation to establish technical knowledge and provide broad multi-disciplined knowledge can be studied further in depth during the elective phase.

The core courses will provide more practical-based knowledge, case-based lessons and collaborative learning models. It will train the students to analyze, decide, and lead rather than merely know-while creating a common student experience that can foster deep understanding, develop decision-making ability and contribute to the business and community at large.

A wide range of core courses provides groundwork in the basic technical disciplines: cloud technology, web technology, programming languages, information security, organizational behavior etc.

The integrated foundation is important for students because it will not only allow them to build upon existing skills, but they can also explore career options in a range of industries and expand their understanding of various business fields.

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We offer core courses in semester I, II, III, IV, V & VI during the BCA(CTIS) program.

Ability Enhancement Compulsory Course (AECC): As per the guidelines of Choice Based Credit System (CBCS) for all Universities, including the private Universities, the Ability Enhancement Compulsory Course (AECC) is a course designed to develop the ability of students in communication (especially English) and other related courses where they might find it difficult to communicate at a higher level in their prospective job at a later stage due to lack of practice and exposure in the language, etc. Students are motivated to learn the theories, fundamentals and tools of communication which can help them develop and sustain in the corporate environment and culture.

Skill Enhancement Course: This course will be helpful to students to provide value-based and/or skill-based knowledge. We offer two SECs- one each in V Semester & VI Semester.

Open/Generic Elective Course (GEC): Open/Generic Elective is an interdisciplinary additional subject that is compulsory in the fifth and sixth semester of a program. The score of Generic Elective is counted in your overall aggregate marks under Choice Based Credit System (CBCS). Each Generic Elective paper will be of 3 Credits. Each student has to take Open/Generic Electives from department other than the parent department. Core / Discipline Specific Electives will not be offered as Generic Electives.

Value Added Audit Course (VAC): A value added audit course is a non-credit course which is basically meant to enhance general ability of students in areas like soft skills, quantitative aptitude and reasoning ability - required for the overall development of a student and at the same time crucial for industry/corporate demands and requirements. The student possessing these skills will definitely develop acumen to perform well during the recruitment process of any premier organization and will have the desired confidence to face the interview. Moreover, these skills are also essential in day-to-day life of the corporate world. The aim is to nurture every student for making effective communication, developing aptitude and a general reasoning ability for a better performance, as desired in corporate world. There shall be one course each in Semester I & Semester II and will carry no credit, however, it will be compulsory for every student to pass these courses with minimum 45% marks to be eligible for the certificate. These marks will not be included in the calculation of CGPI. Students have to specifically be registered in the specific course of the respective semesters.

Program/Discipline Specific Elective Course (DSEC): The discipline specific elective course is chosen to make students specialist or having specialized knowledge of a specific domain like Cloud Technology, Information Security etc. It will be covered in three semesters (IV, V & VI) of second year and third year of the program relevant to chosen disciplines of core courses of the program. Each student will have to choose four discipline specific elective courses (DSECs); 1 in Semester IV and 1 in Semester V and 2 in semester VI.

C. Programme Specific Outcomes (PSOs)

The learning and abilities or skills that a student would have developed by the end of three-year BCA(CTIS):

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

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BCA(CTIS) Curriculum

BCA(CTIS) -Semester I

S. No.	Category	Course Code	Course	Periods			Credits	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	AECC-1	ICI106	English Communications-I	3	0	0	3	40	60	100
2	CC-1	ICI102	Fundamentals of Mathematics	3	1	0	4	40	60	100
3	CC-2	ICI103	Computer Fundamentals and Organization	3	0	0	3	40	60	100
4	CC-3	ICI104	Programming in C	3	1	0	4	40	60	100
5	CC-4	ICI107	Operating System	3	1	0	4	40	60	100
6	LC-1	ICI151	Programming in C (Lab)	0	0	2	1	50	50	100
7	AECC-2	TMU101	Environmental Studies	2	1	0	3	40	60	100
Total				17	4	2	22	290	410	700

Value Added Course*

S.N o.	Course Category	Course Code	Course Name	Periods			Credits	Evaluation		
				L	T	P		Internal	External	Total
1	VAC-I	TMUGA101	Foundation in Quantitative Aptitude	2	1	0	0	40	60	100

*Value Added Courses (VAC) is an audit course. The result of this course will not be added to overall result of the programme. However, it will be compulsory to pass the course with minimum 45% including both faculty continuous & end semester examination.



BCA(CTIS) -Semester II

S. No.	Category	Course Code	Course	Periods			Credits	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	AECC-3	ICI201	Computer Networks	3	1	0	4	40	60	100
2	CC-5	ICI206	OOPS with Java	3	0	0	3	40	60	100
3	CC-6	ICI203	Data Structure and Algorithms	3	0	2	4	40	60	100
4	CC-7	ICI207	Database Management System	3	1	0	4	40	60	100
5	CC-8	ICI205	English Communication-II	3	0	0	3	40	60	100
6	LC-2	ICI254	OOPS with Java (Lab)	0	0	2	1	50	50	100
7	LC-3	ICI255	Database Management System - (Lab)	0	0	2	1	50	50	100
Total				15	2	6	20	300	400	700

Value Added Course*

S. No.	Category code	Course Code	Course Name	Periods			Credi	Evaluation Scheme		
				L	T	P		Interna	External	Total
1	VAC-II	TMUGA201	Analytical Reasoning	2	1	0	0	40	60	100

**At the end of Semester-IV Industrial Training for at least 45 days is mandatory which is to be assessed and evaluated in Semester-V under subject code ICS553 (Industrial Training Seminar).



BCA(CTIS) -Semester III

S. No.	Category	Course Code	Course	Periods			Credits	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	AECC-4	ICI307	Human Values & Professional Ethics	2	1	0	3	40	60	100
2	CC-9	ICI302	Fundamental of Information Security	3	0	0	3	40	60	100
3	CC-10	ICI308	Principles of Virtualization	3	0	0	3	40	60	100
4	CC-11	ICI309	Python Programming	2	0	2	3	40	60	100
5	CC-12	ICI310	Introduction to Cloud Computing	3	1	0	4	40	60	100
6	AECC-5	ICI306	English Communications-III	3	0	0	3	40	60	100
7	LC-4	ICI353	Principles of Virtualization (Lab)	0	0	4	2	50	50	100
8	LC-5	ICI354	Information Security (Lab)	0	0	2	1	50	50	100
Total				16	2	8	22	340	460	800

Value Added Course*

S.N	Category code	Course Code	Course Name	Periods			Credits	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	VAC-III	TMUGA302	Modern Algebra and Data Management	2	1	0	0	40	60	100
2	VAC-IV	TMUGS301	Managing Self	2	1	0	0	50	50	100

*Value Added Courses (VAC) is an audit course. The result of this course will not be added to overall result of the programme. However, it will be compulsory to pass the course with minimum 45% including both faculty continuous & end semester examination.

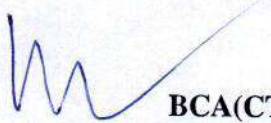


BCA(CTIS) -Semester IV

S. No.	Category	Course Code	Course	Periods			Credits	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CC-14	ICI408	Storage and Datacenter	3	1	0	4	40	60	100
2	CC-15	ICI409	Designing Enterprise Network	3	0	0	3	40	60	100
3	AECC-6	ICI410	English Communication-IV	3	0	0	3	40	60	100
4	CC-13	ICI404	Ethical Hacking	3	0	0	3	40	60	100
5	AECC-7	ICI411	Seminar	0	0	2	1	50	50	100
6	LC-6	ICI452	Ethical Hacking (Lab)	0	0	4	2	50	50	100
7	LC-7	ICI453	Storage and Datacenter (Lab)	0	0	4	2	50	50	100
8	DSE-1	ICI412	Discipline Specific Elective - I	3	1	0	4	40	60	100
		ICI413								
			Total	15	2	10	22	350	450	800

Value Added Course*

S.N	Category code	Course Code	Course Name	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	VAC-V	TMUGA402	Advance Algebra and Geometry	2	1	0	0	40	60	100
2	VAC-VI	TMUGS401	Managing Work and Others	2	1	0	0	50	50	100


 BCA(CTIS) -Semester V

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S. No.	Category	CourseCode	Course	Periods			Credits	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CC-16	ICI507	Cloud Migration	3	1	0	4	40	60	100
2	CC-17	ICI504	Computer Forensic Investigation	3	1	0	4	40	60	100
3	CC-18	ICI508	Cloud Security	3	1	0	4	40	60	100
4	AECC-7	ICI509	Entrepreneurship	2	1	0	3	40	60	100
5	LC-8	ICI551	Computer Forensic Investigation (Lab)	0	0	2	1	50	50	100
6	SEC-1	ICI552	Mini Project(Lab)	0	0	8	4	50	50	100
7	DSE-2	ICI510	Discipline Specific Elective - II	3	0	0	3	40	60	100
		ICI511		3	0	0	3	40	60	100
8	OE-1		Open Elective-I	3	0	0	3			100
Total				17	4	10	26	340	460	800

BCA(CTIS) -Semester VI

S. No.	Category	Course Code	Course	Periods			Credits	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CC-19	ICI607	Cloud Deployment	3	1	0	4	40	60	100
2	LC-9	ICI652	Cloud Deployment (Lab)	0	0	2	1	50	50	100
3	DSE-3	ICI606	Discipline Specific Elective-III	3	0	0	3	40	60	100
		ICI602		3	0	0	3	40	60	100
4	DSE-4	ICI608	Discipline Specific Elective-IV	3	0	0	3	40	60	100
		ICI609		3	0	0	3	40	60	100
5	OE-2		Open Elective -II	2	1	0	3			100
6	SEC-2	ICI651	Major Project	0	0	20	10	50	50	100
Total				11	2	22	24	260	340	600

 **ELECTIVE COURSES OFFERED**

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Generic Elective Courses (GEC)

S.No	Code	Course	L	T	P	Credit
Semester IV (Any one)						
Generic Elective Courses-I						
Group-A						
1	ICI412	Server Administration	3	1	0	4
2	ICI413	Linux Administration	3	1	0	4
Semester V (Any one)						
Generic Elective Courses-II						
Group-B						
3	ICI510	PowerShell Scripting	3	0	0	3
4	ICI511	Linux Shell Scripting	3	0	0	3
Semester VI (Any two)						
Generic Elective Courses-III						
Group-C						
5	ICI606	COBIT VALIT and RISK IT	3	0	0	3
6	ICI602	IT Infrastructure Library	3	0	0	3
Generic Elective Courses-IV						
Group-D						
7	ICI608	Infrastructure Solutions on Cloud	3	0	0	3
8	ICI609	Cloud Web Services	3	0	0	3

