



Graphic Era
Deemed to be University
Accredited by NAAC with Grade A
Approved by AICTE, Ministry of HRD, Govt. of India

BACHELOR OF TECHNOLOGY
COMPUTER ENGINEERING
(Specialization)

Course Components of Academic Programme

B.Tech (Computer Engineering)

Minimum Duration	:	8 Semesters (4 Years)
Maximum Duration	:	12 Semesters (6 Year)
Total Number of Credits	:	195 Credits

Course Components	Credits
1. Compulsory Courses	
I. Basic Science Courses (BSC)	16
II. Engineering Science Courses (ESC)	24
III. Core Courses (CC)	85
2. Elective Courses	
I. Programme Elective Courses (PEC)	22
II. Open Elective Courses (OEC)	9
3. Discipline-Centric Additional Courses	
I. Seminar(SM) /Project (PJ)/ Intern(IN)/ Comprehensive Viva-Voce (CM)	14
II. Humanities and Social Science Including Management (HSMC)	14
4 General Courses	
I. Healthy Living and Fitness (HF)	1
II. Environmental Science (EV)	2
III. General Proficiency (GP)	8

A. Requirement of Awards of Degree: - CGPA \geq 4.5 Clearance of total no. of credits as 195 and any other condition as per regulation and ordinances.

B. Audit Courses (AC) upto 4 credits may be done by a student as Extra Course(s) over and above the requirement for award of this degree.

B.Tech (Computer Engineering)

CURRICULUM STRUCTURE AND EVALUATION SCHEME W.E.F 2020-21

SEMESTER: I

COURSE MODULE	TEACHING PERIODS	WEIGHTAGE : EVALUATION
Physics Group		

COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
THU101	Professional Communication	HSMC	2	2	-	-	25	25	50	100
TPH101	Engineering Physics	BSC	3	3	-	-	25	25	50	100
TMA101	Engineering Mathematics-I	BSC	4	3	1	-	25	25	50	100
TEE101	Basic Electrical Engineering	ESC	3	3	-	-	25	25	50	100
TCS101	Fundamental of Computer & Introduction to Programming	ESC	3	3	-	-	25	25	50	100
THF101	Healthy Living & Fitness	HF	1	1	-	-	50	-	50	100
PPH151	Physics Lab	BSC	1	-	-	2	25	25	50	100
PEE151	Basic Electrical Engineering Lab.	ESC	1	-	-	2	25	25	50	100
PME151	Workshop and Manufacturing Practices	ESC	3	1	-	4	25	25	50	100
PCS151	Computer Lab-I	ESC	2	-	-	4	25	25	50	100
GP101	General Proficiency	GP	1	-	-	-	-	-	100	100
Total			24	16	1	12	275	225	600	1100

COURSE MODULE Chemistry Group				TEACHING PERIODS			WEIGHTAGE : EVALUATION			
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
THU101	Professional Communication	HSMC	2	2	-	-	25	25	50	100
TCH101	Engineering Chemistry	BSC	3	3	-	-	25	25	50	100
TMA101	Engineering Mathematics-I	BSC	4	3	1	-	25	25	50	100
TEC101	Basic Electronics Engineering	ESC	3	3	-	-	25	25	50	100
TEV101	Environmental Science	EV	2	2	-	-	25	25	50	100
TCS101	Fundamental of Computer & Introduction to Programming	ESC	3	3	-	-	25	25	50	100
PCH151	Chemistry Lab	BSC	1	-	-	2	25	25	50	100
PME153	Engg. Graphics and Design Lab.	ESC	3	1	-	4	25	25	50	100
PCS151	Computer Lab - I	ESC	2	-	-	4	25	25	50	100
PEC151	Basic Electronics Engineering Lab.	ESC	1	-	-	2	25	25	50	100
GP101	General Proficiency	GP	1	-	-	-	-	-	100	100
Total			25	17	1	12	250	250	600	1100

SEMESTER II

COURSE MODULE Physics Group				TEACHING PERIODS			WEIGHTAGE : EVALUATION			
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
THU201	Advanced Professional Communication	HSMC	2	2	-	-	25	25	50	100
TPH201	Engineering Physics	BSC	3	3	-	-	25	25	50	100
TMA201	Engineering Mathematics-II	BSC	4	3	1	-	25	25	50	100

TEE201	Basic Electrical Engineering	ESC	3	3	-	-	25	25	50	100
TCS201	Programming for Problem Solving	ESC	3	3	-	-	25	25	50	100
THF201	Healthy Living & Fitness	HF	1	1	-	-	50	-	50	100
PPH251	Physics Lab	BSC	1	-	-	2	25	25	50	100
PEE201	Basic Electrical Engineering Lab.	ESC	1	-	-	2	25	25	50	100
PME251	Workshop and Manufacturing Practices	ESC	3	1	-	4	25	25	50	100
PCS251	Computer Lab-II	ESC	2	-	-	4	25	25	50	100
GP201	General Proficiency	GP	1	-	-	-	-	-	100	100
Total			24	16	1	12	275	225	600	1100

COURSE MODULE Chemistry Group				TEACHING PERIODS			WEIGHTAGE : EVALUATION			
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
THU201	Advanced Professional Communication	HSMC	2	2	-	-	25	25	50	100
TCH201	Engineering Chemistry	BSC	3	3	-	-	25	25	50	100
TMA201	Engineering Mathematics-II	BSC	4	3	1	-	25	25	50	100
TEC201	Basic Electronics Engineering	ESC	3	3	-	-	25	25	50	100
TEV201	Environmental Science	EV	2	2	-	-	25	25	50	100
TCS201	Programming for Problem Solving	ESC	3	3	-	-	25	25	50	100
PCH251	Chemistry Lab	BSC	1	-	-	2	25	25	50	100
PME253	Engg. Graphics and Design Lab.	ESC	3	1	-	4	25	25	50	100
PCS251	Computer Lab - II	ESC	2	-	-	4	25	25	50	100
PEC251	Basic Electronics Engineering Lab.	ESC	1	-	-	2	25	25	50	100
GP201	General Proficiency	GP	1	-	-	-	-	-	100	100
Total			25	17	1	12	250	250	600	1100

SEMESTER: III

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE : EVALUATION			
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
TCS-301	Logic Design	CC	3	3	-	-	25	25	50	100
TCS-302	Data Structures with C	CC	3	3	-	-	25	25	50	100
TCS-307	Object Oriented Programming with C++	CC	3	3	-	-	25	25	50	100
	Program Elective-I	PEC	4	3	-	2	25	25	50	100
TMA-316	Discrete Structures and Combinatorics	CC	4	3	1	-	25	25	50	100
PCS-301	Logic Design Lab	CC	2	1	-	2	25	25	50	100
PCS-302	Data Structures Lab	CC	2	1	-	2	25	25	50	100
PCS-307	OOPS with C++ Lab	CC	2	1	-	2	25	25	50	100
XCS-301	Career Skills	HSMC	2	2	-	-	25	25	50	100

CSP-301	Mini Project	PJ	1	-	-	-	-	-	100	100
GP-301	General Proficiency	GP	1	-	-	-	-	-	100	100
	Total		27	20	1	8	225	225	650	1100

PROGRAM ELECTIVE I

AUDIT COURSE: TOC301 PROBABILITY AND STATISTICS

COURSE CODE	COURSE NAME
TCS-320	Application Based Programming in Python
TCS-321	Introduction to Embedded System
TCS-322	Introduction to Artificial Intelligence
TCS-391	Fundamental of Cyber Security
TCS-324	Information Security Foundations
TCS-333	Introduction to Open Source and Open Standards (Through Swayam)

SEMESTER: IV

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
TCS-408	Java Programming Language	CC	3	3	-	-	25	25	50	100
TCS-402	Finite Automata and Formal Languages	CC	4	3	1	-	25	25	50	100
TCS-403	Microprocessors	CC	3	3	-	-	25	25	50	100
TCS-404	Computer Organization	CC	4	3	1	-	25	25	50	100
TCS-409	Design and Analysis of Algorithms	CC	3	3	-	-	25	25	50	100
	Program Elective-II	PEC	4	3	1	-	25	25	50	100
PCS-408	Java Programming Lab	CC	2	1	-	2	25	25	50	100
PCS-403	Microprocessors Lab	CC	2	1	-	2	25	25	50	100
PCS-409	DAA Lab	CC	2	1	-	2	25	25	50	100
XCS-401	Career Skills	HSMC	2	2	-	-	25	25	50	100
CSP-401	Mini Project	PJ	1	-	-	-	-	-	100	100
GP- 401	General Proficiency	GP	1	-	-	-	-	-	100	100
	Total		31	23	3	6	250	250	700	1200

PROGRAM ELECTIVE II

AUDIT COURSE: TOC 401 COMPETITIVE

PROGRAMMING

COURSE CODE	COURSE NAME
TCS-467	LAMP Technologies
TCS-422	Artificial Intelligence for Robotics
TCS-423	Introduction to Machine Learning and Deep learning
TCS-424	Robotics Programming (Through Swayam)
TCS-425	Artificial Intelligence
TCS-426	Information Security Risk Management

TCS-427	Computer Crime Investigation and Forensics
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SEMESTER: V

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
TCS-501	System Software	CC	4	3	1	-	25	25	50	100
TCS-502	Operating Systems	CC	3	3	-	-	25	25	50	100
TCS-503	Data Base Management Systems	CC	3	3	-	-	25	25	50	100
TMA-502	Computer Based Numerical and Statistical techniques	CC	3	3	-	-	25	25	50	100
	Program Elective-III	PEC	4	3	-	2	25	25	50	100
PCS-506	Operating Systems Lab	CC	2	1	-	2	25	25	50	100
PCS-503	DBMS Lab	CC	2	1	-	2	25	25	50	100
PMA-502	CBNST Lab	CC	2	1	-	2	25	25	50	100
XCS-501	Career Skills	HSMC	2	2	-	-	25	25	50	100
CSP-501	Mini Project	PJ	1	-	-	-	-	-	100	100
GP-501	General Proficiency	GP	1	-	-	-	-	-	100	100
	Total		27	20	1	8	225	225	650	1100

PROGRAM ELECTIVE-III

AUDIT COURSE: TOC 501: FOUNDATIONS OF DATA SCIENCE

OR

TOC 502: FOUNDATIONS OF CLOUD COMPUTING

TECHNOLOGIES

Course Code	Course Name
TCS-521	User Interface Design
TCS-522	Communication Electronics
TCS-523	Bigdata and Machine Learning using Python
TCS-530	Sensing and Sensors
TCS-525	Planning Techniques for Robotics
TCS-526	Deep Neural networks and its applications (Through Swayam)
TCS-527	Applied Machine Learning
TCS-591	Computer System Security
TCS-529	Intrusion Detection and Prevention Systems

SEMESTER: VI

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
TCS-601	Compiler Design	CC	3	3	-	-	25	25	50	100
TCS-611	Software Engineering	CC	3	3	-	-	25	25	50	100
TCS-604	Computer Networks-I	CC	3	3	-	-	25	25	50	100
TCS 693	Full Stack Web Development	CC	3	3	-	-	25	25	50	100
	Program Elective-IV	PEC	4	3	-	2	25	25	50	100
PCS-601	Compiler Design Lab	CC	2	1	-	2	25	25	50	100

PCS611	Software Engineering Lab	CC	2	1	-	2	25	25	50	100
PCS 693	Web Development Lab	CC	2	1	-	2	25	25	50	100
XCS-601	Career Skills	HSMC	2	2	-	-	25	25	50	100
CSP-601	Mini Project	PJ	1	-	-	-	-	-	100	100
GP-601	General Proficiency	GP	1	-	-	-	-	-	100	100
	Total		26	20	-	8	225	225	650	1100

PROGRAM ELECTIVE-IV
PROGRAMMING

AUDIT COURSE: TOC601 COMPETITIVE

COURSE CODE	COURSE NAME
TCS-621	Interaction Programming & the Dynamic Web
TCS-622	Cloud Computing Technologies
TCS-623	Real Time Systems (Through Swayam)
TCS-620	Data Mining for Smart Structures and Systems
TCS-625	Cognitive Robotics
TCS-626	Computer Vision Basics
TCS-627	Information retrieval and Natural Language Processing
TCS-629	Artificial Intelligence
TCS-630	Cyber Threat Analysis
TCS-619	Network and System Security
TCS-633	Information Security Intelligence and Compliance Analytics Using Big Data (Through Swayam)

SEMESTER: VII

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Code	Title	Component								
TCS-703	Computer Networks-II	CC	3	3	-	-	25	25	50	100
TCS-704	Advance Computer Architecture	CC	3	3	-	-	25	25	50	100
	Open Elective-I	OEC	3	3	-	-	25	25	50	100
	Open Elective-II	OEC	3	3	-	-	25	25	50	100
	Program Elective-V	PEC	3	3	-	-	25	25	50	100
SCS-701	Seminar on Industrial Interaction	SM	1	-	-	-	-	-	100	100
CSP-701	Major Project- Phase 1	PJ	2	-	-	-	-	-	100	100
GP-701	General Proficiency	GP	1	-	-	-	-	-	100	100
	Total		19	15	-	-	125	125	550	800

PROGRAM ELECTIVE-V

Course Code	Course Name
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TIT-721	Business Intelligence
TCS-782	Advance Mobile Robot Development
TCS-783	Deep Learning Foundation
TCS-784	Kinematics and Dynamic Systems (Through Swayam)
TCS-785	Deep Learning for Computer Vision
TCS-786	Natural Language Processing with Deep Learning
TCS-787	Pattern and Anomaly Detection
TCS-751	Cloud Security
TCS-788	Information Security Audit and Monitoring
TCS-789	Cyber Crime and Cyber Laws
TCS-790	IoT and its security
TCS-761	Cloud Infrastructure Services
TCS-792	Security Engineering (Through Swayam)

OPEN ELECTIVE-I

COURSE CODE	COURSE NAME
TOE-701	Human Computer Interaction
TOE-702	Sensor Networks
TOE-703	Intellectual Property Rights for Engineers
TOE-704	Entrepreneurship and Small Business Management
TOE-705	Human Resource Planning and Development
TOE-706	Digital Signal Processing

OPEN ELECTIVE-II

COURSE CODE	COURSE NAME
TOE-707	Cryptography and Network Security
TOE-708	Strategic Management
TOE-709	Customer Relationship Management
TOE-710	Corporate Communication
TOE-711	Digital Image Processing
TOE-712	Non-conventional resources and Energy systems

SEMESTER: VIII

COURSE DETAILS			TEACHING PERIODS			WEIGHTAGE:EVALUATION				
COURSE			Credits	L	T	P	CWA	MSE	ESE	Total
Course	Title	Component								
	Open Elective-III	OEC	3	3	-	-	25	25	50	100
TDM-881	Disaster Management	HSMC	2	2	-	-	25	25	50	100
	Program Elective-VI	PEC	3	3	-	-	25	25	50	100
CSC-801	Comprehensive Viva-Voce	CM	2	-	-	-	-	-	100	100
SCS 801	Seminar	SM	1	-	-	-	-	-	100	100

CSP-801	Project Phase-II	PJ	4	-	-	-	-	-	100	100
GP-801	General Proficiency	GP	1	-	-	-	-	-	100	100
	Total		16	8	-	-	75	75	550	700

Program Elective -VI

Course Code	Course name
TCS822	Mobile Application Development
TCS857	Game Theory
TCS-830	Computer Vision
TCS-851	Storage Networks
TCS-831	Creating Intelligent Robots
TCS-832	Cognitive Analytics (Swayam)
TCS-833	Robotics and Intelligent Systems
TCS-834	Reinforcement Learning (Through Swayam)
TCS-835	Representation Learning
TCS-836	Deep Neural network based custom models and training
TCS-837	Mobile and Wireless Network Security
TCS-838	Enterprise Security Management
TCS-821	Soft Computing
TCS-839	E-Privacy: Privacy and Trust in the Electronic Society
TCS-840	Ethical Hacking & Incident Handling
TCS-841	Information Warfare

Open Elective-III

Course Code	Course Name
TOE-801	Advance Microprocessor System and Design
TOE-802	Project Management
TOE-803	Corporate Leadership
TOE-804	Counseling Skills for Managers
TOE-805	Wind and Solar Energy Systems
TOE-806	Mobile Adhoc Networks
TOE-807	Embedded Systems
TOE-808	Speech Processing
TOE-809	Smart Grid Technology
Any other course offered by other department with same credit scheme	