



# Graphic Era

Deemed to be University

Accredited by NAAC with Grade A

Approved by AICTE, Ministry of HRD, Govt. of India

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## BACHELOR OF TECHNOLOGY COMPUTER SCIENCE & ENGINEERING

### Course Components of Academic Programme B.Tech (Computer Science and Engineering)

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

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

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

#### **SEMESTER: I**

<b>COURSE MODULE</b> Physics Group		<b>TEACHING PERIODS</b>			<b>WEIGHTAGE :</b>			
					<b>EVALUATION</b>			
<b>COURSE</b>	<b>Credits</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CWA</b>	<b>MSE</b>	<b>ESE</b>	<b>Total</b>

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
	<b>Total</b>		<b>24</b>	<b>16</b>	<b>1</b>	<b>12</b>	<b>275</b>	<b>225</b>	<b>600</b>	<b>1100</b>

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
	<b>Total</b>		<b>25</b>	<b>17</b>	<b>1</b>	<b>12</b>	<b>250</b>	<b>250</b>	<b>600</b>	<b>1100</b>

## 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
<b>Total</b>			<b>24</b>	<b>16</b>	<b>1</b>	<b>12</b>	<b>275</b>	<b>225</b>	<b>600</b>	<b>1100</b>

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
<b>Total</b>			<b>25</b>	<b>17</b>	<b>1</b>	<b>12</b>	<b>250</b>	<b>250</b>	<b>600</b>	<b>1100</b>

### 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

	<b>Total</b>		<b>27</b>	<b>20</b>	<b>1</b>	<b>8</b>	<b>225</b>	<b>225</b>	<b>650</b>	<b>1100</b>
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**PROGRAM ELECTIVE-I**  
STATISTICS

**AUDIT COURSE: TOC301 PROBABILITY AND**

COURSE CODE	COURSE NAME
TCS-351	Fundamental of Cloud Computing and Bigdata
TCS-391	Fundamental of Cyber Security
TCS-331	Fundamental of IoT
TCS-320	Application Based Programming in Python (Through Swayam)

**SEMESTER: IV**

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	C WA	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	-	2	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
	<b>Total</b>		<b>31</b>	<b>23</b>	<b>2</b>	<b>8</b>	<b>250</b>	<b>250</b>	<b>700</b>	<b>1200</b>

**PROGRAM ELECTIVE-II**

**AUDIT COURSE: TOC 401: COMPETITIVE PROGRAMMING**

COURSE CODE	COURSE NAME
TCS-451	Virtualization and Cloud Computing
TCS-471	Statistical Data Analysis with R
TCS-431	Microcontroller and Its Interfacing
TCS-491	Introduction to Cryptography
TCS-421	Fundamental of Statistics and AI
TCS-433	Blockchain and its Applications (Through Swayam)

**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
<b>Total</b>			<b>27</b>	<b>20</b>	<b>1</b>	<b>8</b>	<b>225</b>	<b>225</b>	<b>650</b>	<b>1100</b>

**PROGRAM ELECTIVE-III**

**AUDIT COURSE: TOC 501: FOUNDATIONS OF DATA SCIENCE**

COURSE CODE	COURSE NAME
TCS-552	Cloud Based Application Development and Management
TCS-571	Bigdata Visualization
TCS-531	Communication models and protocols
TCS-591	Computer system security
TCS-509	Machine learning
TCS-521	User Interface Design (Through Swayam)

**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	
<b>Total</b>			<b>26</b>	<b>20</b>	<b>-</b>	<b>8</b>	<b>225</b>	<b>225</b>	<b>650</b>	<b>1100</b>	

**PROGRAM ELECTIVE-IV**

**AUDIT COURSE: TOC601: COMPETITIVE**

**PROGRAMMING**

COURSE CODE	COURSE NAME
TCS-691	Image processing and computer vision
TCS-651	Devops on cloud
TCS-671	Bigdata storage and processing
TCS-631	Network programming and wireless technologies (Through Swayam)
TCS-619	Network and system security

**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	Advanced 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
	<b>Total</b>		<b>19</b>	<b>15</b>	<b>-</b>	<b>-</b>	<b>125</b>	<b>125</b>	<b>550</b>	<b>800</b>

#### PROGRAM ELECTIVE-V

Course Code	Course Name
TCS-750	Cloud orchestration and Load Balancing
TCS-771	Natural Language Processing using Bigdata
TCS731	Digital Forensics
TCS-761	Cloud Infrastructure Services
TIT-721	Business Intelligence
TCS-756	Human computer interaction
TCS-722	Data warehousing and data mining
TCS-723	Distributed Systems
TCS- 799	Software Verification, Validation and Testing
TCS-732	Web Mining (Through Swayam)

#### OPEN ELECTIVE-I

COURSE CODE	COURSE NAME
TOE-714	Artificial Intelligence
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	
	<b>Total</b>		<b>16</b>	<b>8</b>	<b>-</b>	<b>-</b>	<b>75</b>	<b>75</b>	<b>550</b>	<b>700</b>	

#### Program Elective - VI

<b>Course Code</b>	<b>Course name</b>
TCS821	Soft Computing
TCS822	Mobile Applications Development
TCS823	Multimedia Systems and Data Compression
TCS824	Computer Graphics (Through Swayam)
TCS825	Computational Geometry (Through Swayam)
TCS826	Unix Systems Programming
TCS851	Storage Networks
TCS852	Pattern Recognition
TCS855	Agile Software Engineering
TCS857	Game Theory
TCS810	Virtual Reality

### **Open Elective-III**

<b>Course Code</b>	<b>Course Name</b>
TOE-811	Mobile Computing
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	