Graphic Era
Deemed to be University

Accredited 'A+' Grade by NAAC

CURRICULUM
for
UNDERGRADUATE DEGREE PROGRAM

BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE AND ENGINEERING
(Batch 2022-26) onwards

In accordance with NEP 2020

Dept. of Computer Science and Engineering
GRAPHIC ERA (DEEMED TO BE UNIVERSITY)
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CONTENTS

1. Preamble

The role of higher education is very important in securing the gainful employment and/or providing further access to higher education comparable to the best available in the world class institutions elsewhere. The improvement in the quality of higher education, therefore, deserves to be given highest priority to enable the young generation of students to acquire skill, training and knowledge in order to enhance their thinking, comprehension and application abilities and prepare them to compete, succeed and excel globally. Sustained initiatives are required to reform the present higher education system for improving and upgrading the academic resources and learning environments by raising the quality of teaching and standards of achievements in learning outcomes in undergraduate programs. The Graphic Era (Deemed to be University) upgraded its undergraduate programmes in Computer Science and Engineering in accordance with NEP, 2020 along with the Learning Outcomes-based Curriculum Framework (LOCF) which makes it student-centric, interactive and outcome-oriented with well-defined aims, objectives and goals to achieve. NEP, 2020 aims at making higher education multidisciplinary learning process. In other words, the curriculum will be flexible, it will allow students to take up creative subject-combinations.

2. Introduction

The Department of Computer Science & Engineering was established in the year 2001. Since then, the department has held a position of pride in Graphic Era (Deemed to be University). It has consistently fulfilled its role of producing Computer Engineers ready to meet the demands of the IT world. The department has always attracted the best of engineering aspirants from all over the country. It has a well-qualified and experienced team of faculty. The Department offers B.Tech., M.Tech., and Ph.D. courses in Computer Science and Engineering. The department has adequate facilities to support these teaching activities. Students of the department have access to sufficient high end computing facilities. The Department is also actively involved in various research activities. The facilities are adequate to cater to the needs of Research activities. The department has signed MoU with reputed Companies and University, for academic collaborative projects.

3. Nature of Bachelor's Degree Programme in Computer Science and Engineering

The curriculum of bachelor's degree in Computer Science and Engineering is divided into 4 stages with multiple exit-entry as per NEP 2020. The type of award, stage of exit and the mandatory credits to be achieved by the student at the time of exit is described in the table below.

S. No	Type of Award	Stage of Exit	Mandatory credits to be secured for the award
1.	Undergraduate Certificate in Computer Science	For those who exit after the first year (two semesters) of the undergraduate programme. (Programme duration: first year or two semesters of the undergraduate programme)	47
2.	Undergraduate Diploma in Computer Science	For those who exit after two years (four semesters) of the undergraduate programme (Programme duration: First two years or four semesters of the undergraduate programme)	99
3.	Bachelor of Science in Computer Science	For those who exit after three years (six semesters) of the undergraduate programme (Programme duration: First three years or six semesters of the undergraduate programme).	149
4.	Bachelor of Technology in Computer Science and Engineering	For those who exit after four years (eight semesters) of the undergraduate programme (Programme duration: First four years or eight semesters of the undergraduate programme).	191

4. Programme Educational Objectives

PEO1: To produce students employable towards building a successful career based on sound understanding of theoretical and applied aspects as well as methodology to solve multidisciplinary real-life problems.

PEO2: To produce professional graduates ready to work with a sense of responsibility, ethics and enabling them to work efficiently individually and also as a team.

PEO3: To impart the competency in students so that they are able to pursue higher studies and research in areas of engineering and other professionally related fields.

PEO4: To inculcate ability to adapt to the changing technology through continuous

5. Programme Outcomes (POs)

Engineering Graduates will be able to:

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

6. Programme Specific Outcomes (PSOs)

In addition to these twelve POs, three Programme Specific Outcomes (PSOs) are formulated

PSO1: Ability to analyze, design, implement, and test software systems based on requirement specifications and development methodologies of software systems.

PSO2: Apply computer science theory blended with engineering mathematics to solve computational tasks and model real world problems using appropriate programming language, data structure, and algorithms.

PSO3: Ability to explore technological advancements in various domains, evaluate its merits and identify research gaps to provide solution to new ideas and innovations.

7. Programme Structure

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hours Practical (P) per week	1 Credit

B. Code and Definition

Code	Definitions
L	Lecture
T	Tutorial
P	Practical
DC	Discipline Specific Core
DE	Discipline Specific Elective
GE	Generic Elective
AE	Ability Enhancement Course
SE	Skill Enhancement Course
IA	Internship/Apprenticeship/Project/Community Outreach
VA	Value Addition Course
B. Tech	Bachelor of Technology

Definitions

1. Courses of study – Courses of study indicates pursuance of study in a particular discipline. Every discipline shall offer various categories of courses of study, viz. Discipline Specific Core courses (DC), Discipline Specific Electives (DE), Generic Electives (GE), Ability Enhancement Course (AE), Skill Enhancement Course (SE), Value Addition Course (VA) and Internship/Apprenticeship/Project/Community Outreach (IA)

a) Discipline Specific Core (DC): Discipline Specific Core is a course of study, which should be pursued by a student as a mandatory requirement of his/her programme of study. DC shall be the core credit courses of that particular discipline which will be appropriately graded and arranged across the semesters of study, being undertaken by the student, with multiple exit options as per NEP 2020.

b) Discipline Specific Elective (DE): The Discipline Specific Electives (DE) shall be a pool of credit courses of that particular discipline (single discipline programme of study) or those disciplines (multidisciplinary programme of study), as the case may be, which a student chooses

to study from his/her particular discipline(s). There shall be a pool of DE from which a student may choose a course of study.

c) Generic Elective (GE): An elective course chosen generally from other discipline(s) with an intention to seek exposure is called a Generic Elective. GE shall consist of a pool of courses offered by various disciplines of study in groups of odd and even semesters, from which a student can choose.

d) Ability Enhancement Course (AE): AE courses are the courses based upon the content that leads to knowledge enhancement through various areas of study.

e) Skill Enhancement Course (SE): SE courses are skill-based courses in all disciplines and are aimed at providing hands-on-training, competencies, skills, etc. SE courses may be chosen from a pool of courses designed to provide skill-based instruction.

f) Value Addition Course (VA): VA courses are value-based courses which are meant to inculcate ethics, culture, Indian Knowledge systems, constitutional values, soft skills, sports education and such similar values to students which will help in all round development of students.

g) Internship/Apprenticeship/Project/Community Outreach (IA):

i. Internship /Apprenticeship: All students will also undergo internships / Apprenticeships in a firm, industry, or organization or Training in labs with faculty.
ii. Project: Students are required to take up research projects under the guidance of a faculty member. The students are expected to complete the Research Project in the eighth semester. The research outcomes of their project work may be published in peer-reviewed journals or may be presented in conferences /seminars or may be patented.
iii. Community Outreach: The curricular component of 'Community Outreach' seeks to expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems.

C. Course level coding scheme

Three-digit number used as suffix with the Course Code for identifying the level of the course. Digit at hundred's place signifies the semester in which course is offered. e.g.

101, 102 … etc. for first semester.

201, 202 …. Etc. for second semester.

301, 302 … for third semester.

D. Evaluation Scheme:

a. For Theory and Practical Courses:

The weightage of marks are as follows:

i. Continuous Internal Evaluation (CIE): 25% (25 Marks)
ii. Mid Semester Examinations (MSE): 25% (25 Marks)
iii. Semester End Examinations (SEE): 50% (50 Marks)

The student has to obtain at least 40% marks in SEE for theory courses and 50% of marks in SEE for practical courses.

b. For Internship/Apprenticeship/Project etc. Evaluation is based on work done, quality of report, performance in viva-voce, presentation etc.

E. SEMESTER WISE STRUCTURE:

- Every semester offers various categories of courses of study, viz. Discipline Specific Core courses (DC), Discipline Specific Electives (DE), Generic Electives (GE), Ability Enhancement Course (AE), Skill Enhancement Course (SE) and Value Addition Course (VA)
- There shall be choice from Semester III to Semester VIII to choose a subject from DE
- There shall be choice from Semester III to Semester VIII to choose a subject from GE

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	:	**191 Credits**

Course Components		**Credits**
1.	**Compulsory Courses**	
I.	Discipline Specific Core (CC)	120
2.	**Elective Courses**	
I.	Discipline Specific Elective (DE)	Min 8-Max16
II.	Generic Elective (GE)	Min 8-Max16
3.	**Ability Enhancement Course (AE)**	8
4	**Value Added Course (VA)**	10
5	**Skill Enhancement Course (SE)**	12
6	**Internship/Apprenticeship/ Project**	17

A. Requirement of Awards of Degree: - CGPA>= 4.5 Clearance of total no. of credits as 191 and any other condition as per regulation and ordinances.

B.Tech (Computer Science and Engineering)

CURRICULUM STRUCTURE AND EVALUATION SCHEME W.E.F 2022-23

SEMESTER: I

COURSE MODULE Physics/ Chemistry Group				TEACHING PERIODS			WEIGHTAGE : EVALUATION			
COURSE			Credits	L	T	P	CIE	MSE	SEE	Total
Code	Title	Component								
TMA101	Engineering Mathematics-I	DC	4	3	1	-	25	25	50	100
TCS101	Fundamental of Computer & Introduction to Programming	DC	3	3	-	-	25	25	50	100
TPH101/201	Engineering Physics	DC	3	3	-	-	25	25	50	100
TEE101/201	Basic Electrical Engineering	DC	2	2	-	-	25	25	50	100
TCE101/201	Basic Civil Engineering	DC	2	2	-	-	25	25	50	100
THU101	Professional Communication	AE	2	2	-	-	25	25	50	100
PCS151	Computer Lab- I	DC	2	-	-	4	25	25	50	100
PPH151/251	Physics Lab	DC	1	-	-	2	25	25	50	100
PEE151/251	Basic Electrical Engineering Lab.	DC	1	-	-	2	25	25	50	100
PME151/251	Workshop and Manufacturing Practices	SE	3	1	-	4	25	25	50	100
GP101	General Proficiency-I /NCC/Yoga/ Sports /Cultural	VA	1	-	-	2	-	-	100	100
THF101/201	Healthy Living & Fitness	VA	0	1	-	-	-	-	100	100
	Total		**24**	**17**	**1**	**14**	**250**	**250**	**700**	**1200**

SEMESTER: II

COURSE MODULE Chemistry/ Physics Group				TEACHING PERIODS			WEIGHTAGE : EVALUATION			
COURSE			Credits	L	T	P	CIE	MSE	SEE	Total
Code	Title	Component								
TMA201	Engineering Mathematics-II	DC	4	3	1	-	25	25	50	100
TCS201	Programming for Problem Solving	DC	3	3	-	-	25	25	50	100
TCH101/201	Engineering Chemistry	DC	3	3	-	-	25	25	50	100
TEC101/201	Basic Electronics Engineering	DC	3	3	-	-	25	25	50	100
THU201	Advanced Professional Communication	AE	2	2	-	-	25	25	50	100
PCS151/251	Computer Lab –II	DC	2	-	-	4	25	25	50	100
PCH151/251	Chemistry Lab	DC	1	-	-	2	25	25	50	100
PEC151/251	Basic Electronics Engineering Lab.	DC	1	-	-	2	25	25	50	100
PME153/253	Engg. Graphics and Design Lab.	SE	3	1	-	4	25	25	50	100
GP201	General Proficiency-II /NCC/Yoga/ Sports /Cultural	VA	1	-	-	2	-	-	100	100
TEV101/201	Environmental Science	VA	0	2	-	-	-	-	100	100
	Total		**23**	**17**	**1**	**14**	**225**	**225**	**650**	**1100**

SEMESTER: III

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE: EVALUATION			
COURSE			Credits	L	T	P	CIE	MSE	SEE	Total
Code	Title	Component								
TCS-308	Logic Design and Computer Organization	DC	3	3	-	-	25	25	50	100
TCS-302	Data Structures with C	DC	3	3	-	-	25	25	50	100
TCS-307	Object Oriented Programming with C++	DC	3	3	-	-	25	25	50	100
	Discipline Specific Elective-I Or Generic Elective-I	DE/GE	3	3	-	-	25	25	50	100
TMA-316	Discrete Structures and Combinatorics	DC	4	3	1	-	25	25	50	100
PCS-308	Logic Design and Computer Organization Lab	DC	2	-	1	2	25	25	50	100
PCS-302	Data Structures Lab	DC	2	-	1	2	25	25	50	100
PCS-307	OOPS with C++ Lab	DC	2	-	1	2	25	25	50	100
XCS-301	Career Skills	VA	2	2	-	-	25	25	50	100
CSP-301	Mini Project	AE	1	-	-	2	-	-	100	100
GP-301	General Proficiency	SE	1	-	-	-	-	-	100	100
	Total		**26**	**17**	**4**	**8**	**225**	**225**	**650**	**1100**

DISCIPLINE SPECIFIC ELECTIVE-I **AUDIT COURSE:** TOC301 PROBABILITY AND STATISTICS

COURSE CODE	COURSE NAME
TCS-351	Fundamental of Cloud Computing and Bigdata
TCS-392	Introduction to Cryptography
TCS-331	Fundamental of IoT
TCS-341	Python Programming for Computing
TCS-332	Fundamentals of Information Security and Block Chain
TCS-361	Joy of Computing using Python (Through Swayam)

NOTE:

1. Generic Elective can also be opted from Swayam Portal and students should produce Grade certificate on successful completion of the course but the content should not match with the courses offered under the curriculum.
2. General Proficiency shall be assessed based on the participation in NCC, NSS, Conferences (Research paper Publication (Journal/ Conference)), Organizing events, competitions (Inter University, State, National, International level) including Music, Debate, Sports, Hackathon and so on.

SEMESTER: IV

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	CIE	MSE	SEE	Total
Code	Title	Component								
TCS-408	Programming in Java	DC	3	3	-	-	25	25	50	100
TCS-402	Finite Automata and Formal Languages	DC	4	3	1	-	25	25	50	100
TCS-403	Microprocessors	DC	3	3	-	-	25	25	50	100
TCS-409	Design and Analysis of Algorithms	DC	3	3	-	-	25	25	50	100
	Discipline Specific Elective-II Or Generic Elective-II	DE/GE	3	3	-	-	25	25	50	100
PCS-408	Java Programming Lab	DC	2	-	1	2	25	25	50	100
PCS-403	Microprocessors Lab	DC	2	-	1	2	25	25	50	100
PCS-409	DAA Lab	DC	2	-	1	2	25	25	50	100
XCS-401	Career Skills	VA	2	2	-	-	25	25	50	100
CSP-401	Mini Project	AE	1	-	-	2	-	-	100	100
GP- 401	General Proficiency	SE	1	-	-	-	-	-	100	100
	Total		**26**	**17**	**4**	**8**	**225**	**225**	**650**	**1100**

DISCIPLINE SPECIFIC 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-492	Fundamental of Cyber Security
TCS-421	Fundamental of Statistics and AI
TCS-433	Blockchain and its Applications (Through Swayam)
TCS-461	Modern Algebra (Through Swayam)

NOTE:

1. Generic Elective can also be opted from Swayam Portal and students should produce Grade certificate on successful completion of the course but the content should not match with the courses offered under the curriculum.
2. General Proficiency shall be assessed based on the participation in NCC, NSS, Conferences (Research paper Publication (Journal/ Conference)), Organizing events, competitions (Inter University, State, National, International level) including Music, Debate, Sports, Hackathon and so on.

SEMESTER: V

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	CIE	MSE	SEE	Total
Code	Title	Component								
TCS-501	System Software	DC	3	3	-	-	25	25	50	100
TCS-502	Operating Systems	DC	3	3	-	-	25	25	50	100
TCS-503	Data Base Management Systems	DC	3	3	-	-	25	25	50	100
TMA-502	Computer Based Numerical and Statistical techniques	DC	3	3	-	-	25	25	50	100
	Discipline Specific Elective-III Or Generic Elective-III	DE/GE	3	3	-	-	25	25	50	100
PCS-506	Operating Systems Lab	DC	2	-	1	2	25	25	50	100
PCS-503	DBMS Lab	DC	2	-	1	2	25	25	50	100
PMA-502	CBNST Lab	DC	2	-	1	2	25	25	50	100
XCS-501	Career Skills	VA	2	2	-	-	25	25	50	100
CSP-501	Mini Project	AE	1	-	-	2	-	-	100	100
GP-501	General Proficiency	SE	1	-	-	-	-	-	100	100
	Total		**25**	**17**	**3**	**8**	**225**	**225**	**650**	**1100**

DISCIPLINE SPECIFIC 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)
TCS-561	Artificial Intelligence: Search Methods for Problem Solving (Through Swayam)

NOTE:

1. Generic Elective can also be opted from Swayam Portal and students should produce Grade certificate on successful completion of the course but the content should not match with the courses offered under the curriculum.
2. General Proficiency shall be assessed based on the participation in NCC, NSS, Conferences (Research paper Publication (Journal/ Conference)), Organizing events, competitions (Inter University, State, National, International level) including Music, Debate, Sports, Hackathon and so on.

SEMESTER: VI

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE										
Code	Title	Component	Credits	L	T	P	CIE	MSE	SEE	Total
TCS-601	Compiler Design	DC	3	3	-	-	25	25	50	100
TCS-611	Software Engineering	DC	3	3	-	-	25	25	50	100
TCS-604	Computer Networks-I	DC	3	3	-	-	25	25	50	100
TCS 693	Full Stack Web Development	DC	3	3	-	-	25	25	50	100
	Discipline Specific Elective-IV Or Generic Elective-IV	DE/GE	3	3	-	-	25	25	50	100
PCS-601	Compiler Design Lab	DC	2	-	1	2	25	25	50	100
PCS604	Computer Networks Lab	DC	2	-	1	2	25	25	50	100
PCS 693	Web Development Lab	DC	2	-	1	2	25	25	50	100
XCS-601	Career Skills	VA	2	2	-	-	25	25	50	100
CSP-601	Mini Project	AE	1	-	-	2	-	-	100	100
GP-601	General Proficiency	SE	1	-	-	-	-	-	100	100
	Total		**25**	**17**	3	**8**	**225**	**225**	**650**	**1100**

DISCIPLINE SPECIFIC 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-619	Network and system security
TCS-641	Virtual Reality
TCS-631	Network programming and wireless technologies (Through Swayam)
TCS-661	Computer Graphics (Through Swayam)

NOTE:

1. Generic Elective can also be opted from Swayam Portal and students should produce Grade certificate on successful completion of the course but the content should not match with the courses offered under the curriculum.
2. General Proficiency shall be assessed based on the participation in NCC, NSS, Conferences (Research paper Publication (Journal/ Conference)), Organizing events, competitions (Inter University, State, National, International level) including Music, Debate, Sports, Hackathon and so on.

SEMESTER: VII

COURSE MODULE				TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	CIE	MSE	SEE	Total
Code	Title	Component								
TCS-703	Computer Networks-II	DC	3	3	-	-	25	25	50	100
TCS-704	Advanced Computer Architecture	DC	3	3	-	-	25	25	50	100
TRM-701	Research Methodology and IPR	DC	3	3	-	-	25	25	50	100
	Discipline Specific Elective-V	DE	3	3	-	-	25	25	50	100
	Generic Elective-V	GE	3	3	-	-	25	25	50	100
SCS-701	Seminar on Industrial Interaction	IA	2	-	-	-	-	-	100	100
CSP-701	Major Project Phase I	IA	4	-	-	8	50	-	50	100
GP-701	General Proficiency	SE	1	-	-	-	-	-	100	100
	Total		**22**	**15**	**-**	**8**	**175**	**125**	**500**	**800**

DISCIPLINE SPECIFIC ELECTIVE-V

Course Code	Course Name
TCS-750	Cloud orchestration and Load Balancing
TCS-771	Natural Language Processing
TCS731	Computer 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-781	Deep Learning
TCS-734	Robotic Process Automation Design and Development
TCS-795	Cryptography and Network Security
TCS-706	Artificial Intelligence
TCS-732	Web Mining (Through Swayam)
TCS-741	Reinforcement Learning (Through Swayam)

NOTE:

1. Generic Elective can also be opted from Swayam Portal and students should produce Grade certificate on successful completion of the course but the content should not match with the courses offered under the curriculum.
2. General Proficiency shall be assessed based on the participation in NCC, NSS, Conferences (Research paper Publication (Journal/ Conference)), Organizing events, competitions (Inter University, State, National, International level) including Music, Debate, Sports, Hackathon and so on.

SEMESTER: VIII

	COURSE DETAILS			TEACHING PERIODS			WEIGHTAGE:EVALUATION			
COURSE			Credits	L	T	P	CIE	MSE	SEE	Total
Course	Title	Component								
	Discipline Specific Elective-VI	DE	**3**	**3**	**-**	**-**	25	25	50	100
TDM-881	Disaster Management	**DC**	2	2	-	-	25	25	50	100
	Generic Elective-VI	**GE**	**3**	**3**	**-**	**-**	**25**	**25**	**50**	**100**
CSC-801	Comprehensive Viva-Voce	**IA**	2	-	-	-	-	-	100	100
CSP-801	Major Project Phase II	**IA**	9	-	-	18	-	-	100	100
GP-801	General Proficiency	**SE**	1	-	-	-	-	-	100	100
	Total		**20**	**8**	**-**	**18**	**75**	**75**	**450**	**600**

DISCIPLINE SPECIFIC ELECTIVE - VI

Course Code	Course name
TCS-881	Advance Computer Vision
TCS-859	Service oriented cloud architecture
TCS-801	Mobile Computing
TCS821	Soft Computing
TCS822	Mobile Applications Development
TCS823	Multimedia Systems and Data Compression
TCS825	Computational Geometry (Through Swayam)
TCS826	Unix Systems Programming
TCS851	Storage Networks
TCS852	Pattern Recognition
TCS855	Agile Software Engineering
TCS857	Game Theory
TCS-841	Quantum Computing

NOTE:

1. Generic Elective can also be opted from Swayam Portal and students should produce Grade certificate on successful completion of the course but the content should not match with the courses offered under the curriculum.
2. General Proficiency shall be assessed based on the participation in NCC, NSS, Conferences (Research paper Publication (Journal/ Conference)), Organizing events, competitions (Inter University, State, National, International level) including Music, Debate, Sports, Hackathon and so on.

8. List of Potential Recruiters for Employing Graduates in Computer Science and Engineering

- Microsoft Corporation
- Google
- Adobe
- Amazon
- Walmart Global Technology
- Coforge
- TCS
- Infosys
- Capgemini
- HCL
- Informatica
- Teradata
- EY India
- 75Way Technologies
- Global Logic
- PWC
- Enquero Global
- HSBC
- Accenture
- Accolite
- Cognizant
- Vinculum
- Atlassian
- Airbus India
- Tally India
- Morgan Stanley
- Flipkart
- L&T Infotech
- Apps Associates
- Acuity Knowledge
- LTTS
- LTIMindtree
- IBM
- Zscaler
- Goldman Sachs
- Latent View
- Bonami Software
- Incture
- ANM
- Wissen Technologies
- DXC
- Contata
- Sopra Steria
- MAQ Software
- Intel
- Hexaware Technology
- Yamaha
- JSW
- Autopay
- Nineleaps
- American Express
- Salesforce
- Lowes India
- AbinBevGCC
- Siemens
- Deloitte

And many more