

**CHOICE BASED CREDIT SYSTEM  
EVALUATION SCHEME  
AND  
COURSE CURRICULUM  
FOR  
B.TECH.  
COMPUTER SCIENCE AND ENGINEERING  
(SEMESTER WISE)  
SCHEME OF EXAMINATION**



**DEPARTMENT OF COMPUTER SCIENCE AND  
ENGINEERING  
FACULTY OF ENGINEERING AND TECHNOLOGY  
GURUKULA KANGRI (Deemed to be University),  
HARIDWAR**

**ACADEMIC SESSION 2023-24**

## Faculty of Engineering & Technology

In the year 2000 Faculty of Engineering & Technology was established with an aim of imparting technical education in the spiritual surroundings of the Gurukula System. Keeping in mind the importance of technocrats with strong moral character, superior knowledge, and devotion to the Nation, FET was established with a motto of “Building Technocrats with Ethics”. FET is known in India and abroad for students with virtuous moral character and Technical abilities. Currently, it is providing B. Tech. in Computer Science & Engineering, Electronics & Communication Engineering, Electrical Engineering, and Mechanical Engineering. FET is one of the richest faculty of Gurukula Kangri (Deemed to be University), with a huge number of books in the library, well-equipped laboratories, latest software, and computers.

### **Vision of F.E.T.**

To provide affordable & quality education to engineering aspirants and nurture them to be highly skilled & innovative technocrats with ethics and nation building spirit.

### **Mission of F.E.T.**

#### **M1: (ETHICS & VALUES)**

To educate and nurture engineering aspirants with values, updated engineering curriculum & latest technology to make them globally trusted and accepted.

#### **M2: (RESEARCH)**

Provide conducive environment for teaching, learning & research that can lead to patents, publications and make country proud.

#### **M3: (AFFORDABILITY)**

Provide cost effective education so that every section of society can be benefitted.

#### **M4: (SKILLED)**

Design industry oriented curriculum that can make engineering graduates ready to work for Indian Industries as well as MNCs.

## Department of Computer Science & Engineering

The Computer Science and Engineering department, established in 2000, has grown exponentially since its inception. Initially offering 30 seats, it has since expanded to accommodate 215 students, reflecting the unwavering faith in its quality education. The department proudly offers B.Tech and Ph.D. programs and is a pioneer in introducing cutting-edge courses like Cloud Computing, Machine Learning, and Blockchain. With a faculty composed of experienced professionals, the department has produced alumni thriving in prominent IT firms and PSUs. MoU with companies like IBM provide students skill oriented courses. Its visionary approach has left an indelible mark on the field, making it a hub of innovation and excellence.

### Vision And Mission

#### Vision of the department

To be a frontier in the field of Computer Science by imparting the knowledge in legible, lucid and perspicuous way and preparing the human resource of high moral and ethical values that can cater to contemporary societal needs.

#### Mission of the department

- **[M1]: (Contemporary excellence)**  
Provide sound technical foundation in Computer Engineering through comprehensive curriculum with rich skills set and practical experience.
- **[M2]: (Holistic Learning)**  
To enable students to become valuable and creative contributors in the society. To continue their education in different facet of technology to grow them professionally along with the spirit of moral values.
- **[M3]: (Social Responsibility & Sustainable Development)**  
To contribute to National Development by meeting the needs of the society and industry, empowering weaker and underprivileged sections, and to build economy through research and frugal innovation, anchored in the principle of achieving more with less.
- **[M4]: (Ethics & Values)**  
To uphold the highest ethical standards, inculcate values; create willingness and capacity to work with one's hands, and a spirit of devotion to serve humanity.

#### Program Educational Objectives (Under Graduate Program)

- **PEO1:** To provide a cogent foundation in Basic Sciences, analytical skills and engineering fundamentals required to succeed in engineering field.
- **PEO2:** To provide knowledge of various domains catering to the contemporary requirements of the industry.
- **PEO3:** To train students with good scientific and practical engineering application skills to comprehend, analyze, design and create feasible solutions for the societal vows.
- **PEO4:** Inculcate analytical reasoning and critical thinking through effective teaching learning and hands on training to develop innovative spirit and pursue higher education for nation building.
- **PEO5:** To encourage students to develop lifelong learning skills, to have self-motivation and high moral and ethical values for a successful professional career.

### Program Specific Outcomes (Under Graduate Program)

- **PSO1:** Graduates of Computer Science & Engineering will achieve the adequate understanding of the contents to analyze, design and implement sustainable solution in their domain.
- **PSO2:** Able to use problem-solving skills to develop efficient algorithmic solutions.

## B. Tech. (Computer Science and Engineering)

### Programme Framework

- Minimum Credits requirements for completion of B. Tech. program is 173.
- The curriculum is designed to meet the prevailing and ongoing industrial requirements
- The curriculum includes Project based Education.
- The curriculum is flexible and offers Choice Based Credit System (CBCS).
- The curriculum inherits the Value based Education and offers Interdisciplinary/Multidisciplinary Courses.
- The Curriculum offers Digital Pedagogy & Flipped Learning with adequate motivation for Entrepreneurship/ Startups
- The curriculum aims at the Holistic Development of the students.

Students can attend MOOC courses from SWAYAM / NPTEL / IBM / Organizations having MoU with Gurukula Kangri (Deemed to be University), Haridwar the student shall share the result after the examination. The credit transfer will be done according to the prevailing norms of Gurukula Kangri (Deemed to be University), Haridwar.

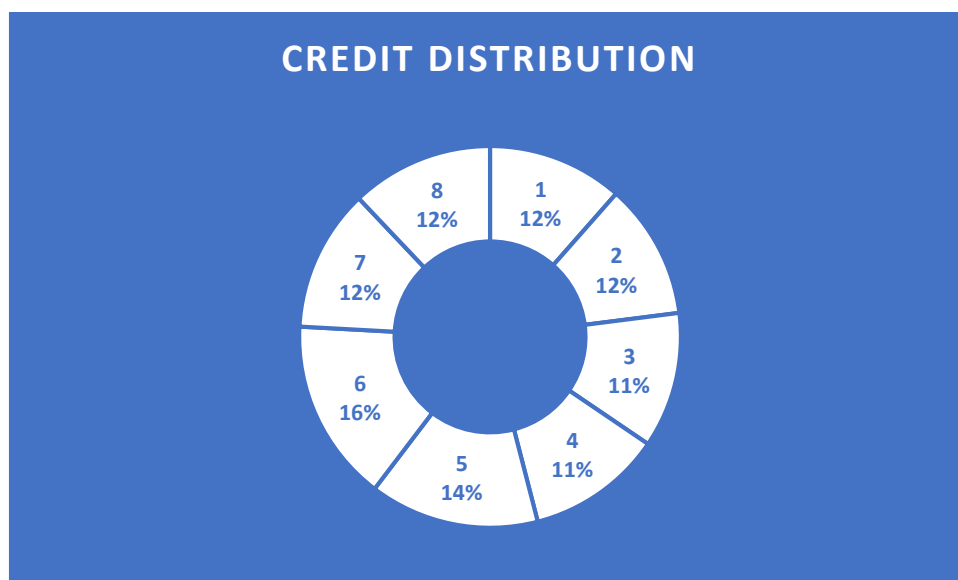
### Minor in CSE for Other Branches

- The other branches students can opt for Minor Degree in Computer Science and Engineering across any specialization offered by the department from 5th Semester onwards by obtaining 20 credits from Computer Science and Engineering (18 credits in course work and 02 credits in projects) from the respective specializations.
- Students who have registered for B. Tech. Minor in Computer Science and Engineering can opt to study any courses completing 20 Credits listed below, subject to condition that these courses are not in his Major Programme.
- Students enrolled for Minor in CSE cannot take more than 2 subjects in one semester.
- Students should not have any repeat in the previous semesters.
- Minor Course certificate will only be issued once student complete 20 credits from the above courses in stipulated time, and having cleared his Major Programme.
- Students can attend MOOC Courses from SWAYAM / NPTEL / Organizations having MoU with Gurukula Kangri (Deemed to be University), Haridwar. The student shall share the result after the examination. The credit transfer will be done according to the prevailing norms of Gurukula Kangri (Deemed to be University), Haridwar.

S. No.	Course Code	Course Title	Credits
1	BCE-C305, BCE-C355	Data Structure I with LAB	3+1
2	BCE-C407	Operating System	3
3	BCE-C408, BCE-C455	Database Management System with LAB	3+1
4	BCE-C406 , BCE-C456	Object Oriented Programming using Java with Lab	3+1
5	BCE-C511	Computer Network	3
6	BCE-C513	Design & Analysis of Algorithm	3
7	BCE-C601	Theory of Computation	3
8	BCE-C711	Compiler Design	3
9	ON-MOOC2	MOOCS 1 (NPTEL)	3
10	ON-MOOC3	MOOCS 2 (NPTEL)	3
11	BCE-P960	Project (Compulsory)	2

**Self-paced skill and ability enhancement courses:**

To educate students globally faculty members of the Gurukula Kangri (Deemed to be University), Haridwar are encouraged to develop self-paced courses individually or in collaboration with renowned mentors/contributors/experts/companies. The students enrolled for the course shall be given certificate from the Gurukula Kangri (Deemed to be University), Haridwar after successful completion of the course.

**Credit Distribution**

(Effective from the academic session 2023-24)  
**GURUKULA KANGRI (Deemed to be University), HARIDWAR**  
**Faculty of Engineering & Technology**  
**Computer Science & Engineering**  
**B. Tech. First Year**  
**Syllabus in accordance with AICTE Model Curriculum**

**B.Tech. I Year**  
**Semester - I**

DSC/ SEC/ AECC	Subject	Periods			Evaluation Scheme				Total Marks	Credits
					Continuous Internal Assessment		CIA Total	ESE		
		L	T	P	CT	TA				
THEORY										
BAC-C102/ BAC-C202	Engineering Chemistry	3	1	0	20	10	30	70	100	4
BEM-C102	Engineering Mathematics– I	3	1	0	20	10	30	70	100	4
BCE-C102/ BCE-C202	Programming for Problem Solving	3	1	0	20	10	30	70	100	4
BME-C103	Basic Mechanical Engineering	3	0	0	20	10	30	70	100	3
BEN-A103	Environmental Studies	2	0	0	20	10	30	70	100	0
	Induction Program	Only for first 3 weeks								
PRACTICAL										
BAC-C151/ BAC-C251	Engineering Chemistry Lab	0	0	2	10	5	15	35	50	1
BCE-C151 BCE-C251	Programming for Problem Solving Lab	0	0	2	10	5	15	35	50	1
BME-C153/ BME-C253	Engineering Graphics and Design Lab	0	0	2	10	5	15	35	50	1
BEG-A151/ BEG-A251	Technical Communication	0	0	2	10	5	15	35	50	1
	TOTAL	14	4	8	140	70	210	490	700	19

**Coding:**

BCE	: Computers	BET	: Electronics	BEM	: Mathematics
BEE	: Electricals	BHU	: Humanities	BME	: Mechanical
BAC	: Chemistry	BAP	: Physics	BEN	: Environment
C	: Discipline Specific Course	A	: Ability Enhancement Compulsory Course	S	: Skill Enhancement Course
P	: Program Elective Course	O	: Open Elective	ESE	: End Semester Examination

L- LECTURE;                      T- TUTORIAL;                      P- PRACTICAL;                      CT-CUMULATIVE  
 TEST;    TA- TEACHER ASSESSMENT;                      ESE-ENDSEMESTER EXAMINATION

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**Computer Science & Engineering**  
**B. Tech. First Year**  
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**B. Tech. I Year**  
**Semester - II**

Subject code	Subject	Periods			Evaluation Scheme				Total marks	Credit
					Continuous Internal Assessment		CIA Total	ESE		
		L	T	P	CT	TA				
THEORY										
BAP-C202	Engineering Physics	3	1	0	20	10	30	70	100	4
BEM-C202	Engineering Mathematics–II	3	1	0	20	10	30	70	100	4
BEE-C202	Basic Electrical Engineering	3	1	0	20	10	30	70	100	4
BET-C202	Electronic Devices	3	1	0	20	10	30	70	100	4
BHU-S202	Vedic Science & Engineering	3	1	0	20	10	30	70	100	0
	Summer Training and Internship	A training or internship is to be pursued after II sem, and the credits will be given in III sem after submitting the training certificate followed by presentation								
PRACTICAL										
BAP-C251	Engineering Physics Lab	0	0	2	10	5	15	35	50	1
BEE-C251	Basic Electrical Engineering Lab	0	0	2	10	5	15	35	50	1
BET-C251	Electronic Devices Lab	0	0	2	10	5	15	35	50	1
BME-C152/ BME-C252	Workshop Practice	0	0	2	10	5	15	35	50	1
BSP-S251	Physical Training & Yoga	0	0	2	0	0	50	0	50	0
	TOTAL	15	5	10	140	70	260	490	750	20

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**Faculty of Engineering & Technology**  
**Computer Science & Engineering**  
**B. Tech. Second Year**  
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**B.Tech. II Year**  
**Semester - III**

DSC/ SEC/ AECC	Subject	Periods			Evaluation Scheme				Total Marks	Credits
					Continuous Internal Assessment		CIA Total	ESE		
		L	T	P	CT	TA				
THEORY										
BEM-C302	Engineering Mathematics– III	3	1	0	20	10	30	70	100	4
BET-C306	Digital System Design	3	0	0	20	10	30	70	100	3
BCE-C307	Python Programming	3	0	0	20	10	30	70	100	3
BCE-C305/ BCE-C405	Data Structure-I	3	0	0	20	10	30	70	100	3
BCE-C306	Computer Architecture & Organization	3	0	0	20	10	30	70	100	3
PRACTICAL										
BCE-C355	Digital System Design Lab	0	0	2	10	5	15	35	50	1
BCE-C354	Python Programming lab	0	0	2	10	5	15	35	50	1
BCE-C355/ BCE-C454	Data Structure-I Lab	0	0	2	10	5	15	35	50	1
BCE-S350	Presentation	0	0	2	10	5	15	35	50	1
	TOTAL	15	1	8	140	70	210	490	700	20

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BCE-C 101 → Semester  
 BCE-C 101 → 0, 5 & 6 stands for Theory, Practical & Seminar / Project respectively  
 BCE-C 101 → Paper Code

L- LECTURE;                      T- TUTORIAL;                      P- PRACTICAL;                      CT-CUMULATIVE  
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**Computer Science & Engineering**  
**B. Tech. Second Year**  
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**B.Tech. II Year**  
**Semester - IV**

Semester - IV										
Subject code	Subject	Periods			Evaluation Scheme			Total marks	Credit	
					Continuous Internal Assessment	CIA Total	ESE			
		L	T	P						CT
THEORY										
BEM-C403	Discrete Mathematics	3	1	0	20	10	30	70	100	4
BCE-C408	Database Management System	3	0	0	20	10	30	70	100	3
BCE-C406	Object Oriented Programming using Java	3	0	0	20	10	30	70	100	3
BCE-C407	Operating System	3	0	0	20	10	30	70	100	3
BET-C411	Microprocessor and Interfacing	3	0	0	20	10	30	70	100	3
BKT-A403	Bhartiya Gyan Parampara (IKT)	2	0	0	20	10	30	70	100	0
	Summer training and Internship	To be pursued during summer vacations, certificate of completion to be submitted in the department								
PRACTICAL										
BCE-C455	DBMS Lab	0	0	2	10	5	15	35	50	1
BCE-C456	Object Oriented Programming using Java Lab	0	0	2	10	5	15	35	50	1
BET-C461	Microprocessor and Interfacing Lab	0	0	2	10	5	15	35	50	1
BCE-A460	MOOC (Soft Skills)	0	0	2	10	5	15	35	50	1
	TOTAL	17	1	8	160	80	240	560	800	20

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 TEST;    TA- TEACHER ASSESSMENT;                      ESE-ENDSEMESTER EXAMINATION

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**Faculty of Engineering & Technology**  
**Computer Science & Engineering**  
**B. Tech. Third Year**  
**Syllabus in accordance with AICTE Model Curriculum**

**B.Tech. III Year**  
**Semester - V**

DSC/SEC/DSE/AEC	SUBJECT	PERIODS			EVALUATION SCHEME				Subject Total	Credits	
					SESSIONAL EVALUATION			EXAM ESE			
		L	T	P	CT	TA	Total				
THEORY											
BCE-C511	Computer Network	3	1	0	20	10	30	70	100	4	
BCE-C512	Advance Data Structure	3	1	0	20	10	30	70	100	4	
BCE-C513	Design & Analysis of Algorithm	3	1	0	20	10	30	70	100	4	
BCE-C514	Cloud Computing	3	1	0	20	10	30	70	100	4	
BCE-M001	Universal Human Values	3	0	0	20	10	30	70	100	0	
BCE-P5XX	Program Elective - I	3	0	0	20	10	30	70	100	3	
BCE-O5XX	Open Elective - I	3	0	0	20	10	30	70	100	3	
BCE-S516	Fundamentals of Investment	1	0	0	0	0	0	0	0	0	
PRACTICAL											
BCE-C561	Advance Data Structure Lab	0	0	2	10	5	15	35	50	1	
BCE-C562	Cloud Computing Lab	0	0	2	10	5	15	35	50	1	
BCE-S570	Summer Training and Internship Program-II Presentation*	0	0	2	10	5	15	35	50	1	
		TOTAL CREDITS									
TOTAL		18	0	6	140	70	225	525	750	25	

\*For the Summer Training and Internship program done in summer break after IV semester examination, A certificate of completion to be submitted along with the presentation in the department. In case a student is unable to do an internship in some company, he may do any one extra online skill enhancement course.

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**Program Elective - I**

BCE-P515	Object Oriented Programming Using CPP
BCE-P516	Computer Graphics
BCE-P517	Machine Learning – I
BCE-P518	Software Engineering
BCE-P519	Data Analytics -1
BCE-P520	Complexity Theory

**Open Elective Subject List -1**

BCE-O530	Advance Operating System
BCE-O531	Functional Programming Principles with Scala
BET-O532	Signals and Systems
BCE-O533	Business Economics and Financial Analysis
BCE-O534	Introduction to AI
BCE-O535	Linux and Shell Programming

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**Syllabus in accordance with AICTE Model Curriculum**

**B.Tech. III Year**  
**Semester - VI**

DSC/SEC/DSE/AEC	SUBJECT	PERIODS			EVALUATION SCHEME			Subject Total	Credits	
					SESSIONAL EVALUATION		EXAM ESE			
		L	T	P	CT	TA				Total
THEORY										
BCE-C611	Distributed Systems	3	1	0	20	10	30	70	100	4
BCE-C612	Formal Languages and Automata Theory	3	1	0	20	10	30	70	100	4
BET-C613	Embedded Systems	3	1	0	20	10	30	70	100	4
BCE-M002	Intellectual Property Rights	3	0	0	20	10	30	70	100	3
BCE-P6XX	Program Elective – II	3	0	0	20	10	30	70	100	3
BCE-O6XX	Open Elective-II	3	0	0	20	10	30	70	100	3
PRACTICAL										
BCE-C661	Distributed Systems Lab	0	0	2	10	5	15	35	50	1
BET-C662	Embedded Systems Lab	0	0	2	10	5	15	35	50	1
BCE-P663	Project	0	0	2	10	5	15	35	50	1
ON-MOOC1	MOOC- I	-	-	-	-	-	-	-	-	3
		TOTAL CREDITS								
TOTAL		15	1	8	140	70	210	490	700	27

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List of MOOC courses shall be decided by the departmental committee in each semester depending upon the list from SWAYAM/NPTEL/ Organization having MoU with Gurukula kangri (Deemed to be University), Haridwar recognized online platforms. Students have to study from Online Platform, doubt sessions shall be held by Internal teachers. Examination and evaluation shall be conducted by SWAYAM / NPTEL and the credits obtained shall be transferred.

**Program Elective Subject List- II**

BCE-P614	Machine Learning – 2
BCE-P615	Advance Database Management System
BCE-P616	Software Project Management
BET-P617	Digital Signal Processing
BCE-P618	High Performance Computer Architecture
BCE-P619	Full Stack Web Development
BCE-P620	Data Analytics -2
BCE-P621	Cyber Forensics
BCE-P622	Augmented Reality and Virtual Reality

**Open Elective –II**

BCE-O630	Applied AI
BET-O631	Digital Image Processing
BCE-O632	Industrial Economics and Business Administration
BCE-O633	Introduction to Data Science and Design Thinking
BCE-O634	Data Mining
BCE-O635	Natural Language Processing
BCE-O636	E-commerce & Social Media Analysis
BCE-O637	Java Programming and Introduction to Python**
BCE-O657	Java Programming and Introduction to Python Lab**

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**Faculty of Engineering & Technology**  
**Computer Science & Engineering**  
**B. Tech. Fourth Year**  
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**B. Tech. Fourth Year**  
**SEMESTER-VII**

DSC/SEC/D SE/AEC	SUBJECT	PERIODS			EVALUATION SCHEME				Subject Total	Credits
					SESSIONAL EVALUATION			EXAM ESE		
		L	T	P	CT	TA	Total			
THEORY										
BCE-C711	Compiler Design	3	1	0	20	10	30	70	100	4
BCE-C712	Linux System Administration	3	1	0	20	10	30	70	100	4
BCE-P7XX	Program Elective -III	3	0	0	20	10	30	70	100	3
BCE-O7XX	Open Elective –III /	3	0	0	20	10	30	70	100	3
PRACTICAL										
BCE-C762	Linux System Administration Lab	0	0	2	10	5	15	35	50	1
BCE-P770	Project with research paper	0	0	8	20	10	30	70	100	6
		TOTAL CREDITS								
TOTAL		12	2	12	120	60	180	490	600	21

**Program Elective Subject List - III**

BCE-P713	Wireless Networks
BCE-P714	Information and Network Security
BCE-P716	Human Computer Interaction
BCE-P717	Block Chain
BCE-P718	Deep Learning
BCE-P719	Fuzzy logic and Neural Networks
BCE-P720	Real Time Operating System
BET-P721	Internet of Things

**Open Elective –III**

BCE-O731	Optimization Techniques in Computing
BCE-O732	Parallel and Distributed System
BCE-O733	Ad-hoc and Sensor Networks
BET-O734	Biomedical Signal Processing
BCE-O735	Ecommerce
BCE-O736	Human Resource and Organization Behavior
BCE-O737	Soft Computing
BCE-O738	Storage Management
BCE-O739	Quantum Computing
BCE-O740	Computer Vision
BCE-O741	AI in Healthcare
BCE-O742	Neural Networks and Deep Learning



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**Computer Science & Engineering**  
**B. Tech. Fourth Year**  
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**B. Tech. Fourth Year**  
**SEMESTER-VIII**

DSC/SEC/DSE /AEC	SUBJECT	PERIODS			EVALUATION SCHEME			Subject Total	Cred its	
					SESSIONAL EVALUATION		EXAM ESE			
		L	T	P	CT	TA				TOTAL
PRACTICAL										
BCE-P863	Major Project with Research paper/ Internship ( Projects Inside FET or Internship outside in any company or startup )	0	0	16	0	100	100	300	400	20
BCE-S862	Seminar	0	0	2			15	35	50	1
		TOTAL CREDITS								
TOTAL		12	4	16	60	130	190	510	700	21