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UNDER GRADUATE DEGREE  
COURSES IN

**COMPUTER SCIENCE  
&  
ENGINEERING**

(Engineering & Technology)

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[Syllabus – 2023 onwards]

**Department of Computer Science & Engineering  
Dibrugarh University Institute of Engineering and  
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Dibrugarh, Assam-786004  
India**

**All India Council for Technical Education  
Model curriculum for  
Undergraduate Degree Courses in Engineering & Technology**

**COMPUTER SCIENCE AND ENGINEERING**

**CONTENTS**

Sl. No.	Chapter	Title	Page No.
1	1	General, Course Structure, Theme & Semester wise Credit Distribution	
2	2	Detailed 4-YEAR Curriculum Contents	
	(i)	<b>Professional Core Courses</b>	
		CSE-301: Principles of Programming Language	
		CSE-302: Data Structure & Algorithms	
		CSE-313: Software tools	
		CSE-401: Discrete Mathematics	
		CSE-402: Computer Organization & Architecture	
		CSE-403: Object Oriented Programming	
		CSE-404: Database Management Systems	
		CSE-501: Design and Analysis of Algorithms	
		CSE-502: Computer Network	
		CSE-503: Formal Language & Automata Theory	
		CSE 504: Operating Systems	
		CSE-601: Compiler Design	
		CSE-602: Computer Network & Security	
	(ii)	<b>Professional Elective Courses</b>	
		Additional Courses for B. Tech (Hons.)	
	<b>Appendix-A</b>	<b>A Guide to Induction Program</b>	
		Common courses (Physics, Chemistry, Biology & Mathematics)	
	<b>In Volume II</b>	MC: Model Curriculum for Mandatory Non-credit courses	
3	<b>In Volume II</b>	HSMC: Model Curriculum for courses in Humanities and Social Sciences including Management	
	<b>In Volume II</b>	Virtual Laboratories for various disciplines	
4			
5	<b>In Volume II</b>		
6			

**All India Council for Technical Education  
Model curriculum for Undergraduate Degree Courses in  
Engineering & Technology**

**COMPUTER SCIENCE AND ENGINEERING**

**Chapter-1**

**General, Course structure &  
Theme &  
Semester-wise credit distribution**

**A. Definition of Credit:**

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

**B. Range of credits-**A student will be eligible to get Graduate degree in Engineering, if he/she completes 168 credits. A student will be eligible to get Under Graduate degree with Honours, if he/she completes an additional 20 credits. These could be acquired through MOOCs.

**C. Structure of Undergraduate Engineering program:**

Sl. No.	Category	Credit Break up for CSE Students
1	Humanities and Social Sciences including Management courses	15
2	Basic Science courses	22
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	21
4	Professional core courses	59
5	Professional Elective courses relevant to chosen specialization/branch	12
6	Open subjects –Electives from other technical and/or emerging subjects	9
7	Project work, seminar and internship in industry or else where	21
8	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution]	2
9	Skill based Course	12
10	Audit Course	(non-credit)
	<b>Total</b>	<b>173</b>

*\*Minor variation is allowed as per need of the respective disciplines.*

**D. Credit distribution in the First year of Undergraduate Engineering program:**

	<b>Lecture</b>	<b>Tutorial</b>	<b>Laboratory/Practical</b>	<b>Total credits</b>
Chemistry-I	3	0	2	4
Physics	3	1	2	5
Maths-1	3	0	0	3
Maths-2	3	1	0	4
Programming for Problem solving	2	0	4	4
English	2	0	2	3
Engineering Graphics & Design	1	0	4	3
Workshop/ Practical	1	0	4	3
Basic Electrical Engg.	2	0	2	3
*Maths-3	3	0	0	3

*\*These courses may be offered preferably in the later semesters*

**E. Course code and definition:**

<b>Course code</b>	<b>Definitions</b>
BS	Basic Science Courses
ES/ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management courses
CSE	Professional core courses
CSE-ELV	Professional Elective courses
CSE-O-ELV	Open Elective courses
MC	Mandatory courses
SBC	Skill Based Course
AU	Audit Course

**HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT COURSES**

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	HSMC101	English for Technical Writing	2	0	2	3	1
2	HSMC102	Design Thinking	0	0	2	1	1
3	HSMC201	Universal Human Values	2	1	0	3	2
4	HSMC401	Humanities-I	3	0	0	3	4
5	HSMC 402	Humanities-II	0	0	4	2	4
6	HSMC 501	Humanities-III	3	0	0	3	5
<b>Total Credits:</b>						<b>15</b>	

**BASIC SCIENCE COURSE [BSC]**

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	BS101	Physics-I	3	1	2	5	1
2	BS 102	Mathematics-I	3	0	0	3	1
3	BS 201	Chemistry-I	3	0	2	4	2
4	BS 202	Mathematics-II	3	1	0	4	2
5	BS 203	Biology for Engineers	3	0	0	3	2
5	BSC301	Mathematics-III(Transform Calculus)	3	0	0	3	3
<b>Total Credits:</b>						<b>22</b>	

**SKILL BASED COURSE [SBC]**

Sl. No.	Code No.	Course Title	Hours Per Week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	SBC 101	Data Analysis in Sci-Lab and Excel	1	0	4	3	1
2	SBC 102	MS-Office and MS Project Management	1	0	4	3	2
3	SBC 102	Data Analytics	1	0	2	3	3
4	SBC 401	Robotics	1	0	2	3	4
<b>Total Credits:</b>						<b>12</b>	

**ENGINEERING SCIENCE COURSE [ESC]**

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	ES101	Basic Electrical Engineering	2	0	2	3	1
2	ES102	Engineering Graphics & Design	1	0	4	3	1
3	ES201	Programming for Problem Solving	2	0	4	4	2
4	ES202	Workshop/Manufacturing Practices	1	0	4	3	2
5	ESC301	Digital Electronics	3	0	4	5	3
6	ESC302	Signals and Systems	3	0	0	3	5
<b>Total Credits:</b>						<b>21</b>	

**PROFESSIONAL CORE COURSES [PCC]**

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	CSE-301	Principles of Programming Language	3	0	0	3	3
2	CSE-302	Data Structure & Algorithms	3	0	4	5	3
3	CSE-313	Software tools	0	0	4	2	3
4	CSE-401	Discrete Mathematics	3	1	0	4	4
5	CSE-402	Computer Organization and Architecture	3	0	4	5	4
6	CSE-403	Object Oriented Programming	3	0	4	5	4
7	CSE-404	Database Management Systems	3	0	4	5	4
8	CSE-501	Design and Analysis of Algorithms	3	0	4	5	5
9	CSE-502	Computer Network	3	0	4	5	5
10	CSE-503	Formal Language & Automata Theory	3	0	4	5	5
11	CSE-504	Operating Systems	3	0	4	5	5
11	CSE-601	Compiler Design	3	0	4	5	6
12	CSE-602	Computer Network & Security	3	0	4	5	6
<b>Total Credits:</b>						<b>59</b>	

**PROFESSIONAL ELECTIVE [PEC]**

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	CSE-ELV-501	Elective- I	3	0	0	3	6
2	CSE-ELV-601	Elective - II	3	0	0	3	7
3	CSE-ELV-602	Elective - III	3	0	0	3	7
4	CSE-ELV-701	Elective - IV	3	0	0	3	8
<b>Total Credits</b>						<b>12</b>	

**OPEN ELECTIVE COURSES [OEC]**

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	CSE-O-ELV-601	Open Elective-I	3	0	0	3	7
2	CSE-O-ELV-701	Open-Elective-II	3	0	0	3	8
3	CSE-O-ELV-801	Open-Elective-III	3	0	0	3	8
<b>Total Credits:</b>						<b>9</b>	

**4 year Curriculum structure  
Undergraduate Degree in Engineering & Technology**

**Branch / course: Computer Science and Engineering  
Total credits (4 year course):168**

**I. Induction Program (Please refer Appendix-A for guidelines)**

<b>Induction program (mandatory)</b>	<b>3 weeks duration</b> (Please refer Appendix-A for guidelines & also details available in the curriculum of Mandatory courses)
Induction program for students to be offered right at the start of the first year.	<ul style="list-style-type: none"> <li>• Physical activity</li> <li>• Creative Arts</li> <li>• Universal Human Values</li> <li>• Literary</li> <li>• Proficiency Modules</li> <li>• Lectures by Eminent People</li> <li>• Visits to local Areas</li> <li>• Familiarization to Dept./Branch &amp; Innovations</li> </ul>



## II. Semester-wise structure of curriculum

**[L=Lecture, T=Tutorials, P=Practical's & C=Credits]**

### Semester I (First year) Curriculum Branch/Course: Computer Science Engineering

Sl. No.	Type of course	Course Code	Course Title	Hours per week			Credits
				Lecture	Tutorial	Practical	
1	Basic Science course	BS-101 (T)	Physics-I	3	1	0	4
2	Basic Science course	BS-101 (P)	Physics-I	0	0	2	1
3	Basic Science course	BS-102	Mathematics-I	3	0	0	3
4	Engineering Science Course	ES101 (T)	Basic Electrical Engineering	2	0	0	2
5	Engineering Science Course	ES101 (P)	Basic Electrical Engineering	0	0	2	1
6	Engineering Science Course	ES102	Engg. Graphics & Design	1	0	4	3
7	Humanities & Social Sciences including Management courses	HSMC 101 (T)	English for Technical Writing	2	0	0	2
8	Humanities & Social Sciences including Management courses	HSMC 101 (P)	English for Technical Writing	0	0	2	1
9	Humanities & Social Sciences including Management courses	HSMC 102	Design Thinking	0	0	2	1
10	Audit Course	AU 101	Basic Engineering Workshop	2	0	4	0
11	Skill Based Course (Any One)	SBC 101	Data Analysis in Sci-Lab and Excel	1	0	4	3
<b>Total credits</b>							<b>21</b>

**Semester II (First year) Curriculum**  
**Branch/Course: Computer Science Engineering**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				Lecture	Tutorial	Practical	
1	Basic Science course	BS 201 (T)	Chemistry-I	3	0	0	3
2	Basic Science course	BS 201 (P)	Chemistry-I	0	0	2	1
3	Basic Science course	BS 202	Mathematics-II	3	1	0	4
4	Engineering Science Course	ES 201 (T)	Programming for Problem Solving	2	0	0	2
5	Engineering Science Course	ES 201 (P)	Programming for Problem Solving	0	0	4	2
6	Basic Science course	BS 203	Biology for Engineers	3	0	0	3
7	Engineering Science Course	ES 202	Digital Fabrication/ Workshop/ Manufacturing Practices	1	0	4	3
8	Humanities & Social Sciences including Management courses	HSMC 201	Universal Human Values	2	1	0	3
9	Audit Course	AU-02	Sports and Yoga or NSS/NCC	2	0	2	0
10	Skill Based Course	SBC 201	MS-Office and MS Project Management	1	0	4	3
<b>Total credits</b>							<b>24</b>

**Semester III (Second year] Curriculum**  
**Branch/Course: Computer Science Engineering**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				Lecture	Tutorial	Practical	
1	Professional Core Courses	CSE301	Principles of Programming Language	3	0	0	3
2	Professional Core Courses	CSE-302 (T)	Data structure & Algorithms	3	0	0	3
3	Professional Core Courses	CSE-302 (P)	Data structure & Algorithms	0	0	4	2
4	Engg. Science Course	ESC301 (T)	Digital Electronics	3	0	0	3
5	Engg. Science Course	ESC301 (P)	Digital Electronics	0	0	4	2
6	Professional Core Courses	CSE-313	Software tools	0	0	4	2
7	Basic Science course	BSC301	Transform Calculus	3	0	0	3
8	Engineering Science Course	ESC 302	Signals & Systems	3	0	0	3
9	Skill Based Course	SBC 301	Data Analytics	1	0	2	3
10	Mandatory Course	MC 201	Indian Knowledge System	2	0	0	2
<b>Total credits</b>							<b>26</b>

**Semester IV (Second year] Curriculum**  
**Branch/Course: Computer Science Engineering**

Sl. No	Type of course	Code	Course Title	Hours per week			Credits
				Lecture	Tutorial	Practical	
1	Professional Core Courses	CSE-401	Discrete Mathematics	3	1	0	4
2	Professional Core Courses	CSE-402 (T)	Computer Organization & Architecture	3	0	0	3
3	Professional Core Courses	CSE-402 (P)	Computer Organization & Architecture	0	0	4	2
4	Professional Core Courses	CSE-403 (T)	Object Oriented Programming	3	0	0	3
5	Professional Core Courses	CSE-403 (P)	Object Oriented Programming Laboratory	0	0	4	2
5	Professional Core Courses	CSE 404 (T)	Database Management Systems	3	0	0	3
5	Professional Core Courses	CSE 404 (P)	Database Management Systems	0	0	4	2
6	Humanities & Social Sciences including Management courses	HSMC401 (T)	Humanities-I (Managerial Economics)	3	0	0	3
7	Humanities & Social Sciences including Management courses	HSMC402 (P)	Humanities-II (Technical English for Engineers)	0	0	4	2
8	Mandatory Course	MC 201	Environmental Science	0	0	0	0
9	Skill Based Course	SBC 401	Robotics	1	0	2	3
10	Project/seminar/ Internship, etc.	CSE - 415	Internship - I	0	0	3	3
<b>Total credits</b>							<b>30</b>

**Semester V (Third year] Curriculum**  
**Branch/Course: Computer Science Engineering**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				Lecture	Tutorial	Practical	
1	Professional Core Courses	CSE-501 (T)	Design & Analysis of Algorithms	3	0	0	3
2	Professional Core Courses	CSE-501 (P)	Design & Analysis of Algorithms	0	0	4	2
3	Professional Core Courses	CSE-502 (T)	Computer Network	3	0	0	3
4	Professional Core Courses	CSE-502 (P)	Computer Network	0	0	4	2
5	Professional Core Courses	CSE-503 (T)	Formal Language & Automata Theory	3	0	0	3
6	Professional Core Courses	CSE-503 (P)	Formal Language & Automata Theory	0	0	4	2
7	Humanities & Social Sciences including Management courses	HSMC-501	Humanities-III (Management & Accountancy)	3	0	0	3
8	Professional Core Courses	CSE-504 (T)	Operating Systems	3	0	0	3
9	Professional Core Courses	CSE-504 (P)	Operating Systems	0	0	4	2
10	Audit Course	AU 501	Professional Ethics	-	-	-	0
<b>Total credits</b>							<b>23</b>

**Semester VI (Third year] Curriculum**  
**Branch/Course: Computer Science Engineering**

Sl. No	Type of course	Code	Course Title	Hours per week			Credits
				Lecture	Tutorial	Practical	
1	Professional Core Courses	CSE-601 (T)	Compiler Design	3	0	0	3
2	Professional Core Courses	CSE-601 (P)	Compiler Design	0	0	4	2
3	Professional Core Courses	CSE-602 (T)	Computer Network & Security	3	0	0	3
4	Professional Core Courses	CSE-602 (P)	Computer Network & Security	0	0	4	2
5	Professional Elective courses	CSE-ELV-601	Elective-I	3	0	0	3
6	Project/seminar/ Internship, etc.	CSE - 613	Internship - II	0	0	4	4
			<b>Total credits</b>				<b>17</b>

**Semester VII (Fourth year] Curriculum  
Branch/Course: Computer Science Engineering**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				Lecture	Tutorial	Practical	
1	Professional Elective courses	CSE-ELV-701	Elective-II	3	0	0	3
2	Professional Elective courses	CSE-ELV-702	Elective-III	3	0	0	3
3	Open Elective courses	CSE-O-ELV-701	Open Elective-I	3	0	0	3
4	Project/seminar/Internship, etc.	CSE-711	Internship-III	0	0	4	4
5	Project	CSE-712	Project-I	0	0	8	4
			<b>Total credits</b>				<b>17</b>

**Semester VIII (Fourth year] Curriculum  
Branch/Course: Computer Science Engineering  
[Summer Industry Internship]**

Sl. No.	Type of course	Code	Course Title	Hours per week			Credits
				Lecture	Tutorial	Practical	
1	Professional Elective courses	CSE-ELV-801	Elective-IV	3	0	0	3
2	Open Elective courses	CSE-ELV-O-802	Open Elective-II	3	0	0	3
3	Open Elective courses	CSE-O-ELV-801	Open Elective-III	3	0	0	3
4	Project	CSE-811	Project-II	0	0	8	4
5	Project/seminar/Internship, etc.	CSE-812	Grand-VIVA	0	0	2	2
			<b>Total credits</b>				<b>15</b>

**List of Electives:****5<sup>th</sup> Semester:**

<b>CSE-ELV-501</b>	<b>Elective-I</b>	<b>3L:0T:0P</b>	<b>3Credits</b>
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- Computer Graphics.
- Machine learning
- Cloud Computing

**6<sup>th</sup> Semester:**

<b>CSE-ELV-601</b>	<b>Elective-II</b>	<b>3L:0T:0P</b>	<b>3Credits</b>
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- Image Processing
- Embedded System
- Natural language Processing.
- Data analytics
- Soft Computing

<b>CSE-O-ELV-601</b>	<b>Open Elective-I</b>	<b>3L:0T:0P</b>	<b>3Credits</b>
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- Graph Theory
- Information Theory and Coding
- Wireless Network

**7<sup>th</sup> Semester:**

<b>CSE-ELV-701&amp;702</b>	<b>Elective- III &amp; IV</b>	<b>3L:0T:0P</b>	<b>3Credits</b>
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- Practical Reinforcement learning
- Internet Of Things
- Neural Network and deep learning
- Peer to peer network
- Data Mining
- Real time cyber thread detection and mitigation.
- Advanced Computer Architecture
- Ad-Hoc And Sensor Network
- Computational Geometry
- Advanced Design and analysis of Algorithm

<b>CSE-O-ELV-701</b>	<b>Open Elective-II</b>	<b>3L:0T:0P</b>	<b>3Credits</b>
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- Programming in JAVA
- Biology for Engineers



**8<sup>th</sup> Semester:**

<b>CSE-ELV-801</b>	<b>Elective-V</b>	<b>3L:0T:0P</b>	<b>3Credits</b>
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- Artificial Intelligence
- Parallel and Distributed Algorithm
- Computational Complexity
- Real Time system.
- Web Technology
- Theory of Computation
- Distributed System

<b>CSE-O-ELV-801</b>	<b>Open Elective-III</b>	<b>3L:0T:0P</b>	<b>3Credits</b>
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- Cryptography and Network Security
- Mobile computing
- Application of Fuzzy logic
- Practical Applications of Block Chains
- Quantum Physics

<b>CSE-O-ELV-802</b>	<b>Open Elective-IV</b>	<b>3L:0T:0P</b>	<b>3Credits</b>
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- Software Engineering
- Cyber law and Ethics
- Big Data Management & Data Lakes
- Generative AI