**Model Curriculum Scheme for Bachelor of Technology (B.Tech.) in Computer Science and Engineering (CSE) Program**

**(Credit-Based Scheme of Studies/Examination from 2019-20 Onwards in Phased Manner)**



**Kurukshetra University, Kurukshetra (K.U.K) – 136119, Haryana, INDIA**

**(Established by the state Legislature Act XII of 1956; ‘A+’ Grade, NAAC Accredited)**

**A. Definition of Credit:**

|  |  |
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| 1 Hour Lecture (L) per week | 1 credit |
| 1Hour Tutorial (T) per week | 1 credit |
| 1 Hour Practical (P) per week | 0.5 credit |
| 2 Hours Practical (Lab) per week | 1 credit |

**B. Range of Credits:**

A total credit of 160 is required for a student to be eligible to get Under Graduate degree in Computer Science and Engineering. A student will be eligible to get Under Graduate degree **(B.Tech.) with Honours**, if he/she completes an additional 20 credits. These could be acquired through University Exam or through MOOCs (i.e. Swayam portal of Government of India) examination approved by the Competent Authority, Government of India.

**C.** **Abbreviations Used for Various Course Codes:**

BS: Basic Science Courses

ES: Engineering Science Courses

HM: Humanities and Social Sciences including Management Courses

PC: Professional Core Courses

MC: Mandatory Courses

PE: Professional Elective Courses/Program Elective Courses

OE: Open Elective Courses

PROJ: Project

CS: Computer Science & Engineering

OE-CS: Open Elective Courses-Computer Science & Engineering

A: Applications

D: Data Science and Machine Intelligence

S: Systems

T: Theory and Algorithms

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| **Bachelor of Technology (Computer Science & Engineering)** | | | | | | | | | | |
| **Credit-Based Scheme of Studies/Examination** | | | | | | | | | | |
| **Semester III (w.e.f. session 2019-2020 )** | | | | | | | | | | |
| **S. No.** | **Course Code** | **Subject** | **L:T:P** | **Hours/Week** | **Credits** | **Examination Schedule (Marks)** | | | | **Duration of Exam (Hrs)** |
|
| **Major Test** | **Minor Test** | **Practical** | **Total** |
| 1 | ES-205A | Principles of Programming Languages | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 2 | PC-CS-201A | Data Structure & Algorithms | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 3 | ES-207A | Digital Electronics | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 4 | PC-CS-203A | Object Oriented Programming | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 5 | BS-205A | Mathematics-III | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 6 | HM-902A | Business Intelligence and Entrepreneurship | 2:0:0 | 2 | 2 | 75 | 25 | 0 | 100 | 3 |
| 7 | PC-CS-205LA | Data Structure & Algorithms Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| 8 | ES-209LA | Digital Electronics Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| 9 | PC-CS-205 LA | Object Oriented Programming Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| **Total** | | |  | **29** | **23** | **450** | **270** | **180** | **900** |  |
| 10 | SIM-201A\* | Seminar on Summer Internship | 2:0:0 | 2 | 0 | 0 | 50 | 0 | 50 |  |

**\*Note:** SIM-201A\* is a mandatory credit-less course in which the students will be evaluated for the Summer Internship (training) undergone after 2nd semester and students will be required to get passing marks to qualify.

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| **Bachelor of Technology (Computer Science & Engineering)** | | | | | | | | | | |
| **Credit-Based Scheme of Studies/Examination** | | | | | | | | | | |
| **Semester IV (w.e.f. session 2019-2020 )** | | | | | | | | | | |
| **S. No.** | **Course Code** | **Subject** | **L:T:P** | **Hours/Week** | **Credits** | **Examination Schedule (Marks)** | | | | **Duration of Exam (Hrs)** |
|
| **Major Test** | **Minor Test** | **Practical** | **Total** |
| 1 | PC-CS-202A | Discrete Mathematics | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 2 | PC-CS- 204A | Internet Technology and Management | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 3 | PC-CS-206A | Operating Systems | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 4 | PC-CS-208A | Design & Analysis of Algorithms | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 5 | HM-901A | Organizational Behaviour | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 6 | PC-CS- 210LA | Internet Technology and Management Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| 7 | PC-CS-212LA | Operating Systems Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| 8 | PC-CS-214LA | Design & Analysis of Algorithms Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| **Total** | | |  | **27** | **21** | **375** | **245** | **180** | **800** |  |
| 9 | MC-901A | Environmental Sciences | 3:0:0 | 3 | 0 |  | 100 | 0 | 100 | 3 |

**Note: Students be encouraged to go to 6-8 weeks summer internships mandatory during the summer break after the completion of fourth semester exams.**

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| **Bachelor of Technology (Computer Science & Engineering)** | | | | | | | | | | |
| **Credit-Based Scheme of Studies/Examination** | | | | | | | | | | |
| **Semester V (w.e.f. session 2020-2021 )** | | | | | | | | | | |
| **S. No.** | **Course Code** | **Subject** | **L:T:P** | **Hours/Week** | **Credits** | **Examination Schedule (Marks)** | | | | **Duration of Exam (Hrs)** |
|
| **Major Test** | **Minor Test** | **Practical** | **Total** |
| 1 | ES-301A | Signals & Systems | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 2 | PC-CS-301A | Database Management Systems | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 3 | PC-CS-303A | Formal Language & Automata Theory | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 4 | PC-CS-305A | Essential of Information Technology | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 5 | PC-CS-307A | Computer Organization & Architecture | 2:0:0 | 2 | 2 | 75 | 25 | 0 | 100 | 3 |
| 6 | PE | Elective-I | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 7 | PC-CS-309LA | Database Management Systems Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| 8 | PC-CS-311LA | Essential of Information Technology Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| **Total** | | |  | **25** | **21** | **450** | **230** | **120** | **800** |  |
| 9 | MC-904A | Energy Resources & Management | 3:0:0 | 3 | 0 | 0 | 100 | 0 | 100 | 3 |
| 10 | SIM-301A\* | Seminar on Summer Internship | 2:0:0 | 2 | 0 | 0 | 50 | 0 | 50 |  |

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| **PEC Elective-I** |
| Digital Data Communication: PE-CS-T301A |
| Parallel and Distributed Computing: PE-CS-T303A |
| Information Theory and Coding: PE-CS-T305A |
| Advanced Algorithms: PE-CS-T307A |

**\*Note:** SIM-301A\* is a mandatory credit-less course in which the students will be evaluated for the Summer Internship undergone after 4th semester and students will be required to get passing marks to qualify.

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| **Bachelor of Technology (Computer Science & Engineering)** | | | | | | | | | | |
| **Credit-Based Scheme of Studies/Examination** | | | | | | | | | | |
| **Semester VI (w.e.f. session 2020-2021 )** | | | | | | | | | | |
| **S. No.** | **Course Code** | **Subject** | **L:T:P** | **Hours/Week** | **Credits** | **Examination Schedule (Marks)** | | | | **Duration of Exam (Hrs)** |
|
| **Major Test** | **Minor Test** | **Practical** | **Total** |
| 1 | PC-CS-302A | Complier Design | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 2 | PC-CS-304A | Computer Networks | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 3 | \* | Elective-II | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 4 | \*\* | Elective-III | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 5 | \*\*\* | Open Elective-I | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 6 | PROJ –CS-302A | Project-1 | 0:0:6 | 6 | 3 | 0 | 40 | 60 | 100 | 3 |
| 7 | PC-CS-306LA | Complier Design Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| 8 | PC-CS-308LA | Computer Networks Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
| **Total** | | |  | **29** | **22** | **375** | **245** | **180** | **800** |  |

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| **\* Elective-II** | **\*\* Elective-III** |
| Advanced Computer Architecture: PE-CS-S302A | Simulation & Modeling: PE-CS-S310A |
| Distributed Systems: PE-CS-S304A | Mobile Computing: PE-CS-S312A |
| Fault Tolerant Computing: PE-CS-S306A | Unix & Linux Programming: PE-CS-S314A |
| Ad-Hoc and Sensor Networks: PE-CS-S308A | Real Time Systems: PE-CS-S316A |
| **\*\*\* Elective-I** |
| Soft Skills and Interpersonal Communication: OE-CS-302A |
| Management Information System: OE-CS-304A |
| Enterprise Resource Planning: OE-CS-306A |

**Note: Students be encouraged to go to 6-8 weeks summer internships mandatory during the summer break after the completion of sixth semester exams.**

**The course of both PE & OE will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.**

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| **Bachelor of Technology (Computer Science & Engineering)** | | | | | | | | | | |
| **Credit-Based Scheme of Studies/Examination** | | | | | | | | | | |
| **Semester VII (w.e.f. session 2021-2022 )** | | | | | | | | | | |
| **S. No.** | **Course Code** | **Subject** | **L:T:P** | **Hours/Week** | **Credits** | **Examination Schedule (Marks)** | | | | **Duration of Exam (Hrs)** |
|
| **Major Test** | **Minor Test** | **Practical** | **Total** |
| 1 | PE | Elective-IV | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 2 | PE | Elective-V | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 3 | OE | Open Elective-II | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 4 | PROJ-CS-401A | Project-II | 0:0:12 | 12 | 6 | 0 | 40 | 60 | 100 | 3 |
| 5 | PE-417LA | Elective-IV Lab | 0:0:2 | 2 | 1 | 0 | 40 | 60 | 100 | 3 |
| 6 | PE-419LA | Elective-V Lab | 0:0:2 | 2 | 1 | 0 | 40 | 60 | 100 | 3 |
| **Total** | | |  | **21** | **17** | **225** | **115** | **60** | **400** |  |
| 7 | SIM-401A\* | Seminar on Summer Internship | 2:0:0 | 2 | 0 | 0 | 50 | 0 | 50 |  |

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| **PEC Elective-IV** | **PEC Elective-V** |
| Data Mining: PE-CS-D401A | Soft Computing: PE-CS-D409A |
| Speech and Natural Language Processing: PE-CS-D403A | Neural Networks and Deep Learning:  PE-CS-D411A |
| Information Retrieval: PE-CS-D405A | Object Oriented Software Engineering: PE-CS-D413A |
| Software Verification and  Validation and Testing: PE-CS-D407A | Expert Systems: PE-CS-D415A |
| **OEC Elective-II** |
| Cyber Law and Ethics: OE-CS-401A |
| Bioinformatics: OE-CS-403A |
| Fiber Optic Communications: OE-CS-405A |
| Industrial Electrical Systems: OE-CS-407A |

**The course of both PE & OE will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.**

**\*Note:** SIM-401A\* is a mandatory credit-less course in which the students will be evaluated for Summer Internship undergone after 6th semester and students will be required to get passing marks to qualify.

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| **Bachelor of Technology (Computer Science & Engineering)** | | | | | | | | | | |
| **Credit-Based Scheme of Studies/Examination** | | | | | | | | | | |
| **Semester VIII (w.e.f. session 2021-2022 )** | | | | | | | | | | |
| **S. No.** | **Course Code** | **Subject** | **L:T:P** | **Hours/Week** | **Credits** | **Examination Schedule (Marks)** | | | | **Duration of Exam (Hrs)** |
|
| **Major Test** | **Minor Test** | **Practical** | **Total** |
| 1 | PE | Elective-VI | 3:0:0 | 3 | 3 | 75 | 25 | 0 | 100 | 3 |
| 2 | OE | Open Elective-III | 2:0:0 | 2 | 2 | 75 | 25 | 0 | 100 | 3 |
| 3 | OE | Open Elective-IV | 2:0:0 | 2 | 2 | 75 | 25 | 0 | 100 | 3 |
| 4 | PROJ-CS-402A | Project-III | 0:0:12 | 12 | 6 | 0 | 40 | 60 | 100 | 3 |
| 5 | PE410-LA | Elective-VI Lab | 0:0:4 | 4 | 2 | 0 | 40 | 60 | 100 | 3 |
|  |  | **Total** |  | **23** | **15** | **225** | **155** | **120** | **500** |  |

**The course of both PE & OE will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.**

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| **PE Elective-VI** |
| Cloud Computing: PE-CS-A402A |
| Computer Graphics: PE-CS-A404A |
| Web and Internet Technology: PE-CS-A406A |
| Mobile Apps Development: PE-CS-A408A |
| **OE Elective-III** | **OE Elective-IV** |
| Cyber Security: OE-CS-402A | Software Quality Models: OE-CS-410A |
| Satellite Communication: OE-CS-404A | Automation in Manufacturing: OE-CS-412A |
| Social Networks: OE-CS-406A | IPR, Bioethics and Biosafety: OE-CS-414A |
| Agile Software Engineering: OE-CS-408A | Microprocessor & Interfacing: OE-CS-416A |

**Additional Courses for B.Tech. (Honours Degree)**

**Branch/Course: B.Tech. - Computer Science Engineering**

A student will be eligible to get Under Graduate degree ‘**B.Tech. with Honours’**, if he/she completes an additional 20 credits. These could be acquired through University Exam or through MOOCs examination.

The professional electives courses may be selected excluding these. In addition to the following list, the student can also opt some more courses offered under MOOCs at Swayam portal of Government of India from time to time.

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| **Bachelor of Technology (Computer Science & Engineering)** | | | | | | | | | | |
| **Credit-Based Scheme of Studies/Examination** | | | | | | | | | | |
| **Additional Courses for B.Tech. (Honours Degree)** | | | | | | | | | | |
| **S. No.** | **Course Code** | **Subject** | **L:T:P** | **Hours/Week** | **Credits** | **Examination Schedule (Marks)** | | | | **Duration of Exam (Hrs)** |
|
| **Major Test** | **Minor Test** | **Practical** | **Total** |
| 1 | PE-CS-T509A | Graph Theory | 3:0:0 | 3 | 3 | 100 | -- | 0 | 100 | 3 |
| 2 | PE-CS-S611A | Software Engineering | 3:0:0 | 3 | 3 | 100 | -- | 0 | 100 | 3 |
| 3 | PE-CS-S612A | Embedded Systems | 3:0:0 | 3 | 3 | 100 | -- | 0 | 100 | 3 |
| 4 | PE-CS-D709A | Artificial Intelligence | 3:0:0 | 3 | 3 | 100 | -- | 0 | 100 | 3 |
| 5 | PE-CS-A805A | Cryptography & Network Security | 3:0:0 | 3 | 3 | 100 | -- | 0 | 100 | 3 |
| 6 | PE-CS-S613A | Internet-of-Things | 3:0:0 | 3 | 3 | 100 | -- | 0 | 100 | 3 |
| 7 | PE-CS-D710A | Data Analytics | 3:0:0 | 3 | 3 | 100 | -- | 0 | 100 | 3 |
| 8 | PE-CS-D711A | Machine Learning | 3:0:0 | 3 | 3 | 100 | -- | 0 | 100 | 3 |
| 9 | PE-CS-S611LA | Software Engineering  Lab | 0:0:4 | 4 | 2 | 0 | -- | 100 | 100 | 3 |
| 10 | PE-CS-S612LA | Embedded Systems Lab | 0:0:4 | 4 | 2 | 0 | -- | 100 | 100 | 3 |
| 11 | PE-CS-D710LA | Data Analytics Lab | 0:0:4 | 4 | 2 | 0 | -- | 100 | 100 | 3 |
| 12 | PE-CS-D711LA | Machine Learning Lab | 0:0:4 | 4 | 2 | 0 | -- | 100 | 100 | 3 |