

COURSE STRUCTURE AND DETAILED SYLLABUS

R18

**Computer Science
And Engineering**

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the students admitted into Academic Year 2018-19)
(I – IV Years Syllabus)



RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES
Basar, Nirmal, Telangana - 504107

COURSE STRUCTURE (R18) FOR B.TECH.(REGULAR)
**Applicable for the students of B.Tech. (Regular) from the Academic
Year 2018-19 and onwards**

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

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(Lab)/week	1 credit

B. Structure of Undergraduate Engineering program:

S. No.		Credit Breakup for CSE students
1	Humanities and Social Sciences including Management courses	12
2	Basic Science Courses	26
3	Engineering Science Courses like drawing, basics of electrical/ mechanical/ computer etc	27.5
4	Professional Core Courses	51.5
5	Professional Elective Courses relevant to chosen specialization/branch	15
6	Open subjects – Electives from other technical and /or emerging subjects	12
7	Project work, seminar and internship in industry or elsewhere	15
8	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)
	Total	159

C. Credit distribution in the First year:

	Lecture	Tutorial	Laboratory/ Practical	Total Credits
Chemistry-I	3	1	3	5.5
Physics – I	3	1	3	5.5
Mathematics-I	4	0	0	4
Mathematics-II	4	0	0	4
Programming for Problem solving	3	0	4	5
English	2	0	2	3
Engineering Graphics	0	0	6	3
Engineering Workshop	2	0	2	3
Basic Electrical Engineering	3	1	2	5

D. Course code and Definition:

Course Category	Definitions
BSC	Basic Science Courses
ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management Courses
PCC-CS	Professional core courses
PEC-CS	Professional Elective Courses
OEC-CS	Open Elective Courses
LC	Laboratory Courses
MC	Mandatory Courses
SI	Summer Industry Internship
PROJ-CS	Project

HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT COURSES

Sl. No.	Code No.	Course Title	House per week				Total Credits	Semester
			L	T	P	Total		
1	HS1102	Communication Skills – I	2	0	0	2	0	1
2	HS1201	English	2	0	0	2	2	2
3	HS1801	English Lab	0	0	2	2	1	2
4	HS1202	Communication Skills – II	2	0	0	2	0	2
5	BM0001	Managerial Economics	3	0	0	3	3	4
6	HS3101	Soft Skills	2	0	0	2	0	5
7	BM0002	Humanities-II(Principles of Marketing)	3	0	0	3	3	5
8	BM0004	Personality Development	2	0	0	2	0	6
9	BM0003	Operational Research	3	0	0	3	3	
Total:			19	0	2	21	12	

BASIC SCIENCE COURSES [BSC]

Sl. No.	Code No.	Course Title	Hours per week				Total Credits	Semester
			L	T	P	Total		
1	CY1101	Chemistry-I	3	1	0	4	4	1
2	CY1701	Chemistry-I Lab	0	0	3	3	1.5	1
3	MA1101	Mathematics-I	4	0	0	4	4	1
4	PH1201	Physics-I	3	1	0	4	4	2
5	PH1801	Physics-I Lab	0	0	3	3	1.5	2
6	MA1201	Mathematics-II	3	1	0	4	4	2
7	MA2102	Probability & Statistics	4	0	0	4	4	3
8	BSC701	Bioinformatics	3	0	0	3	3	7
Total:			20	3	6	29	26	

ENGINEERING SCIENCE COURSE [ESC]

Sl. No.	Code No.	Course Title	Hours per week				Total Credits	Semester
			L	T	P	Total		
1	CS1101	Programming for Problem Solving	3	0	0	3	3	1
2	CS1701	Programming for Problem Solving Lab	0	0	4	4	2	1
3	ME1102	Engineering Workshop	2	0	2	4	3	1
4	EE1202	Basic Electrical Engineering	3	1	0	4	4	2
5	EE1802	Basic Electrical Engineering Lab	0	0	2	2	1	2
6	CE1801	Engineering Graphics	0	0	6	6	3	2
7	EC2105	Analog Electronic Circuits	4	0	0	4	3	3
8	EC2703	Analog Electronic Circuits Lab	0	0	3	3	1.5	3
9	EC2101	Digital Electronic Circuits	3	0	0	3	3	3
10	EC2701	Digital Electronic Circuits Lab	0	0	2	2	1	3
11	EC3106	Signals and Systems	3	0	0	3	3	5
Total:			18	1	19	38	27.5	

PROFESSIONAL CORE COURSES [PCC]

Sl. No.	Code No.	Course Title	Hours per week				Total Credits	Semester
			L	T	P	Total		
1	CS2702	IT Workshop	0	0	3	3	1.5	2
2	CS2101	Data Structure & Algorithms	3	0	0	3	3	3
3	CS2701	Data Structure & Algorithms Lab	0	0	4	4	2	3
4	CS2201	Computer Organization and Architecture	3	0	0	3	3	4
5	CS2801	Computer Organization and Architecture Lab	0	0	4	4	2	4
6	CS2202	Database Management Systems	3	0	0	3	3	4
7	CS2802	Database Management Systems Lab	0	0	4	4	2	4
8	CS2203	Design and Analysis of Algorithms	3	0	0	3	3	4
9	CS2803	Design and Analysis of Algorithms Lab	0	0	4	4	2	4
10	CS2102	Discrete Mathematics	3	1	0	4	4	4

11	CS3101	Operating Systems	3	0	0	3	3	5
12	CS3701	Operating Systems Lab	0	0	4	4	2	5
13	CS3102	Object Oriented Programming	3	0	0	3	3	5
14	CS3702	Object Oriented Programming Lab	0	0	4	4	2	5
15	CS3103	Formal Languages & Automata Theory	3	0	0	3	3	5
16	CS3201	Compiler Design	3	0	0	3	3	6
17	CS3801	Compiler Design Lab	0	0	4	4	2	6
18	CS3202	Computer Networks	3	0	0	3	3	6
19	CS3802	Computer Networks Lab	0	0	4	4	2	6
20	CS2204	Data Analytics						
Total:			30	1	35	66	48.5	

PROFESSIONAL ELECTIVE COURSES [PEC]

SI. No.	Code No.	Course Title	Hours per week				Total Credits	Semester
			L	T	P	Total		
1	PEC	Elective – I	3	0	0	3	3	5
2	PEC	Elective – II	3	0	0	3	3	6
3	PEC	Elective – III	3	0	0	3	3	6
4	PEC	Elective – IV	3	0	0	3	3	7
5	PEC	Elective – V	3	0	0	3	3	7
6	PEC	Elective – VI	3	0	0	3	3	8
Total:			18	0	0	18	18	

OPEN ELECTIVE COURSES [OEC]

Sl. No.	Code No.	Course Title	Hours per week				Total Credits	Semester
			L	T	P	Total		
1	OEC	Open Elective – I	3	0	0	3	3	6
2	OEC	Open Elective – II	3	0	0	3	3	7
3	OEC	Open Elective – III	3	0	0	3	3	8
4	OEC	Open Elective- IV	3	0	0	3	3	8
Total:			12	0	0	12	12	

MANDATORY COURSES (MC)

Sl. No.	Code No.	Course Title	Hours per week				Total Credits	Semester
			L	T	P	Total		
1	BM0005	Indian Constitution	3	0	0	3	0	1
2	HS2101	Essence of Indian Traditional Knowledge	2	0	0	2	0	3
3	MC_	Environmental Sciences	3	0	0	3	0	4
Total:			8	0	0	8	0	

Branch / Course: Computer Science and Engineering
Total credits (4 years course): 160

I. Induction Program

Induction program(mandatory)	3 weeks duration
Induction program for students to be offered right at the start of the First year.	<ul style="list-style-type: none"> • Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

II. Semester-wise structure of curriculum

[L= Lecture, T = Tutorials, P = Practical & C = Credits]

Engineering I - Semester I [First Year-First Semester] Curriculum

Branch/Course: Computer Science Engineering

SI. No	Course Type	Course Code	Course Title	Hours per week				Total Credits
				L	T	P	Total	
1	ESC	CS1101	Programming for Problem Solving	3	0	0	3	3
2	ESC	ME1102	Engineering Workshop	2	0	2	4	3
3	BSC	CY1101	Chemistry-I	4	0	0	4	4
4	BSC	MA1101	Mathematics-I	4	0	0	4	4
5	HSMC	HS1102	Communication Skills-I	2	0	0	2	0
6	MC	BM0005	Indian Constitution	3	0	0	3	0
7	ESC	CS1701	Programming for Problem Solving Lab	0	0	4	4	2
8	BSC	CY1701	Chemistry-I Lab	0	0	3	3	1.5
Total:				18	0	9	27	17.5

Engineering I - Semester II [First Year-Second Semester] Curriculum

Branch/Course: Computer Science Engineering

SI. No.	Course Type	Course Code	Course Title	Hours per week				Credits
				L	T	P	Total	
1	ESC	EE1202	Basic Electrical Engineering	4	0	0	4	4
2	ESC	CE1801	Engineering Graphics	0	0	6	6	3
3	BSC	PH1201	Physics-I	4	0	0	4	4
4	BSC	MA1201	Mathematics-II	4	0	0	4	4
5	HSMC	HS1201	English	2	0	0	2	2
6	HSMC	HS1202	Communication Skills-II	2	0	0	2	0
7	ESC	EE1802	Basic Electrical Engineering Lab	0	0	2	2	1
8	BSC	PH1801	Physics-I Lab	0	0	3	3	1.5
9	HSMC	HS1801	English Language Lab	0	0	2	2	1
Total:				16	0	16	32	20.5

Engineering II - Semester I [Second Year-First Semester] Curriculum
Branch/Course: Computer Science Engineering

Sl. No.	Course Type	Course Code	Course Title	Hours per week				Credits
				L	T	P	Total	
1	PCC	CS2101	Data structure & Algorithms	3	0	0	3	3
2	PCC	CS2102	Discrete Mathematics	4	0	0	4	4
3	ESC	EC2105	Analog Electronic Circuits	4	0	0	4	3
4	ESC	EC2101	Digital Electronic Circuits	3	0	0	3	3
5	BSC	MA2102	Probability and Statistics	4	0	0	4	4
6	MC	HS2101	Essence of Indian Traditional Knowledge	2	0	0	2	0
7	PCC	CS2701	Data structure & Algorithms Lab	0	0	4	4	2
8	PCC	CS2702	IT Workshop	0	0	3	3	1.5
9	ESC	EC2703	Analog Electronics Circuits Lab	0	0	3	3	1.5
10	ESC	EC2701	Digital Electronic Circuits Lab	0	0	2	2	1
Total:				20	0	9	29	23

Engineering II - Semester II [Second Year-Second Semester] Curriculum
Branch/Course: Computer Science Engineering

Sl. No.	Course Type	Course Code	Course Title	Hours per week				Credits
				L	T	P	Total	
1	PCC	CS2201	Computer Organization & Architecture	3	0	0	3	3
2	PCC	CS2202	Database Management Systems	3	0	0	3	3
3	PCC	CS2203	Design & Analysis of Algorithms	3	0	0	3	3
4	PCC	CS2204	Data Analytics	3	0	0	3	3
5	HSMC	BM0001	Managerial Economics	3	0	0	3	3
6	MC		Environmental Sciences	3	0	0	3	0
7	PCC	CS2801	Computer Organization & Architecture Lab	0	0	4	4	2
8	PCC	CS2802	Database Management Systems Lab	0	0	4	4	2
9	PCC	CS2803	Design & Analysis of Algorithms Lab	0	0	4	4	2
Total				18	0	12	30	21

Engineering III - Semester I [Third Year-First Semester] Curriculum
Branch/Course: Computer Science Engineering

Sl. No.	Course Type	Course Code	Course Title	Hours per week				Credits
				L	T	P	Total	
1	PCC	CS3101	Operating Systems	3	0	0	3	3
2	PCC	CS3102	Object Oriented Programming	3	0	0	3	3
3	PCC	CS3103	Formal Language & Automata Theory	3	0	0	3	3
4	PEC	CS_	Elective-I	3	0	0	3	3
5	ESC	EC3106	Signals & Systems	3	0	0	3	3
6	HSMC	BM0002	Humanities – II (Principles of Marketing)	3	0	0	3	3
7	HSMC	HS3101	Soft Skills	2	0	0	2	0
8	PCC	CS3701	Operating Systems Lab	0	0	4	4	2
9	PCC	CS3702	Object Oriented Programming Lab	0	0	4	4	2
Total:				20	0	8	28	22

Engineering III - Semester II [Third Year-Second Semester] Curriculum
Branch/Course: Computer Science Engineering

Sl. No.	Course Type	Course Code	Course Title	Hours per week				Credits
				L	T	P	Total	
1	PCC	CS3201	Compiler Design	3	0	0	3	3
2	PCC	CS3202	Computer Networks	3	0	0	3	3
3	PEC	CS_	Elective-II	3	0	0	3	3
4	PEC	CS_	Elective-III	3	0	0	3	3
5	PCC	CS3801	Compiler Design Lab	0	0	4	4	2
6	PCC	CS3802	Computer Networks Lab	0	0	4	4	2
7	PROJ	PROJCS60	Project-I(SE&WT)	0	0	6	6	3
8	PEC	CS_	Elective-IV	3	0	0	3	3
9	HSMC	BM0004	Personality Development	2	0	0	2	0
Total:				17	0	14	31	22

Engineering IV - Semester I [Fourth Year-First Semester] Curriculum
Branch/Course: Computer Science Engineering

Sl. No.	Course Type	Course Code	Course Title	Hours per week				Credits
				L	T	P	Total	
1	PEC	CS_	Elective-V	3	0	0	3	3
2	PEC	CS_	Elective-VI	3	0	0	3	3
3	OEC	OEC_	Open Elective- I	3	0	0	3	3
4	BSC	BSC701	Bioinformatics	3	0	0	3	3
5	PROJ	CSP02	Project-II	0	0	12	12	6
Total:				12	0	12	24	18

Engineering IV - Semester II [Fourth Year-Second Semester] Curriculum
Branch/Course: Computer Science Engineering

Sl. No.	Course Type	Course Code	Course Title	Hours per week				Credits
				L	T	P	Total	
1	OEC		Open Elective-II	3	0	0	3	3
2	OEC	OEC_	Open Elective-III	3	0	0	3	3
3	OEC	OEC_	Open Elective-IV	3	0	0	3	3
4	PROJ	CSP03	Project-III	0	0	12	12	6
Total:				9	0	12	21	15

PROFESSIONAL ELECTIVE COURSES

Electives will be introduced in 4 threads besides the Open Elective. There are 6 slots for Electives and 4 slots for Open Electives. The department may permit students to take 50% of these (electives + open electives) from other disciplines, based on the choices of the students and consent of course advisors.

A. **Theory** B. **Systems** C. **Data Science** D. **Applications** E. **Open Electives**

The students will have options of selecting the electives from the different threads depending on the specialization they wish to acquire. **There should be at least two electives from the open elective choices; the rest two can be taken from the other threads, if intended.**

Theory and Algorithms	Systems	Data Science and Machine Intelligence	Applications	Open Electives
Code: PEC-CS-T<number>	Code: PEC-CS-S<number>	Code: PEC-CS-D <number>	Code: PEC-CS-A<number>	OEC-CS<number>
Theory of Computation	Advanced Computer Architecture	Artificial Intelligence	Image Processing	Soft Skills and Interpersonal Communication
Graph Theory	Software Engineering	Data Analytics	Cryptography and Network Security	Economic Policies in India
Advanced Algorithms	Distributed Systems	Machine Learning	Introduction to Block Chain Technology	Human Resource Development and Organizational Behavior
Parallel and Distributed Algorithms	Embedded Systems	Data Mining	Cloud Computing	Cyber Law and Ethics
Computational Complexity	Advanced Operating Systems	Soft Computing	Digital Signal Processing	
Computational Geometry	Low Power Circuits & Systems	Speech and Natural Language Processing	Electronic Design Automation	Comparative Study
Queuing Theory and Modeling	Fault Tolerant Computing		Computer Graphics	Indian Music System
Computational Number Theory	Real Time Systems	Information Retrieval	VLSI System Design	History of Science
Quantum Computing	Ad-Hoc & Sensor Networks	Neural Networks & Deep Learning	Optimization Techniques	Introduction to Art & Aesthetics
Information Theory & Coding	Signals & Networks	Multi-agent Intelligent Systems	Web & Internet Technology	
	Internet of Things			

Total Number of Credits Semester –wise report:

SEMESTER	CREDITS
E1S1	17.5
E1S2	20.5
E2S1	23
E2S2	21
E3S1	22
E3S2	22
E4S1	18
E4S2	15
TOTAL: 159	