B.TECH COURSE IN COMPUTER SCIENCE AND ENGINEERING

(FOR THE STUDENTS ADMITTED IN 2020-21)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES
ANDHRA PRADESH

CONTENTS

		Web Technologies Lab
		Compiler Design
		Computer Networks
		Software Engineering
		Mathematical Foundations for Data Science
		Operating Systems
		Computer Networks Lab
		Software Engineering Lab
		Operating System Lab
		Artificial Intelligence
		Cryptography and Network Security
		Machine Learning
	(vi)	**Professional Elective Courses**
		Elective group-1
		Data Mining
		Mobile Application Development
		Distributed Computing
		Advanced Computer Architecture
		Elective group-2
		Object Oriented Analysis and Design
		Distributed Systems
		Real time Operating System
		Embedded Systems
		Digital Image Processing
		Elective Group-3
		Information Retrieval
		Software Testing
		Mobile Computing
		Data Compression
		Computer Graphics
		Elective Group-4
		Data Science
		Unix Shell Programming
		VLSI
		Soft Computing
		File Structures
		Elective Group-5
		Optimization Techniques
		Design Patterns
		Cloud Computing
		Block Chain Technology
		Internet of Things
		Information Security
		Computer Vision
		Open Elective Courses
		Big Data Analytics
		Biometric security

		Cyber security
		Human Computer interaction
		Robotics
		Computer Forensic
		Open Elective Courses for Other discipline
		OOPs through Java
		Database Management Systems
		Computer Graphics
		Distributed Computing
		Digital Image Processing
		List of additional Open Electives
		Soft Skills and Interpersonal Communication
		Economic Policies in India
		Indian Music System
		Intellectual Property Rights (IPR)
	(vii)	**Seminars/Mini Projects/Projects**
		Mini Project – 1
		Summer Internship
		Project-I
		Project-II & Dissertation

Chapter-1

General, Course structure, Theme and semester-wise credit distribution

A. Definition of Credit:

1 Hour Lecture (L) per week	1 credit
1 Hour Tutorial (T) per week	1 credit
3 Hours Practical (Lab)/week	1.5 credits

B. Total number of credits: 160

C. Minimum number of contact hours/weeks per semester: 15 weeks of teaching

1. For 1 credit course: 15 contact hours per semester
2. For 2 credit course: 30 contact hours per semester
3. For 3 credit course: 45 contact hours per semester
4. For 4 credit course: 60 contact hours per semester

D. Course code and definition, Abbreviations

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
EC	Core Courses
ECEL	Program Electives
ECP1	Project Stage-I
ECP2	Project Stage-II
ECMP1	Mini Project Stage-I
ECMP2	Mini Project Stage-II
ECSI	Summer Internship
BS	Basic Science
ES	General Engineering Courses
HS	Humanities and Social Sciences including Management Science
OE	Open Electives
MC	Mandatory Courses
PCC	Program Core Course
PEC	Program Elective Course
OEC	Open Elective Course
BSC	Basic Science Course
HSC	Humanities and Social Sciences including Management Science Course
PROJ	Mini project/Project

E. Structure of Program

S.No	Category	Credits
1	Basic Science Courses	17.5
2	Engineering Science Courses	18

3	Humanities and Social Sciences including Management courses	13.5
4	Program core courses	68
5	Program Elective courses	15
6	Open Elective courses	12
7	Project work, Miniproject work, Summer internships project	18
8	Mandatory courses - 03 [Indian Constitution, Environmental Studies, Career Development Course]	(non-credit)
	Total	**162**

F. Semester-wise Credits Distribution

Year & Semester	BSC	HSC	ESC	PCC	PEC	OEC	PROJ	TOTAL
E1S1	4	2.5	13.5	0	0	0	0	20
E1S2	9.5	3	0	10	0	0	0	22.5
E2S1	4	0	4.5	13	0	0	0	21.5
E2S2	0	3	0	16.5	0	0	0	19.5
E3S1	0	1.5	0	16.5	3	0	0	21
E3S2	0	1.5	0	8	6	3	3	21.5
Summer Internship							3	3
E4S1	0	0	0	4	3	3	6	16
E4S2	0	2	0	0	3	6	6	17
Total	**17.5**	**13.5**	**18**	**68**	**15**	**12**	**18**	**162**

Total number of Mandatory Courses (MC): 03 (Indian Constitution, Environmental Science, Career Development Course)

Notations:

E1-S1: Engineering first year first semester
E1-S2: Engineering first year second semester
E2-S1: Engineering second year first semester
E2-S2: Engineering second year first semester
E3-S1: Engineering third year first semester
E3-S2: Engineering third year second semester
E4-S1: Engineering fourth year first semester
E4-S2: Engineering fourth year second semester
SUM INTERN: Summer Internship program

CHAPTER – 2
SEMESTER-WISE STRUCTURE OF CURRICULUM
Mandatory Induction Program

3 Weeks Duration
• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent people • Visit to local areas • Familiarization of Dept./Branch Innovations

ENGINEERING FIRST YEAR: SEMESTER-1							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	BSC	20MA1102	Calculus & Linear Algebra	3	1	0	4
2	ESC	20EE1109	Basic Electrical and Electronics Engg.	3	1	0	4
3	ESC	20CS1101	Problem Solving and Programming Through C	3	1	0	4
4	ESC	20ME1114	Engineering Graphics & Computer Drafting	1	0	3	2.5
5	HSC	20EG1181	English-Language communication Skills Lab-I	~~0~~ 1	0	3	2.5
6	ESC	20EE1189	Basic Electrical and Electronics Engg. Lab	0	0	3	1.5
7	ESC	20CS1181	Problem Solving and Programming Through C Lab	0	0	3	1.5
8	MC	20HS1101	Indian Constitution	2	0	0	0
Total				**13**	**3**	**12**	**20**

ENGINEERING FIRST YEAR:SEMESTER-2							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			Credits
				L	**T**	**P**	
1	BSC	20MA1202	Discrete Mathematics	3	1	0	4
2	BSC	20PY1201	Engineering Physics	3	1	0	4

3	HSC	20BM1201	Managerial Economics and Finance Analysis	3	0	0	3
4	PCC	20CS1201	Object Oriented Programming through Java	3	1	0	4
5	PCC	20CS1202	Data Structures	3	0	0	3
6	BSC	20PY1281	Engineering Physics Lab	0	0	3	1.5
7	PCC	20CS1281	Object Oriented Programming through Java Lab	0	0	3	1.5
8	PCC	20CS1282	Data Structures Lab	0	0	3	1.5
9	HSC	20BE1201	Environmental Science	2	0	0	0
Total				**17**	**3**	**9**	**22.5**

ENGINEERING SECOND YEAR: SEMESTER-1							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	BSC	20MA2102	Probability and Statistics	3	1	0	4
2	ESC	20EC2110	Digital Logic Design	3	0	0	3
3	PCC	20CS2101	Design & Analysis of Algorithms	3	1	0	4
4	PCC	20CS2102	Database Management Systems	3	0	0	3
5	PCC	20CS2103	Formal Languages & Automata Theory	3	0	0	3
6	PCC	20CS2181	Design & Analysis of Algorithms Lab	0	0	3	1.5
7	ESC	20EC2180	Digital Logic Design Lab	0	0	3	1.5
8	PCC	20CS2182	Database Management Systems Lab	0	0	3	1.5
Total				**15**	**2**	**9**	**21.5**

ENGINEERING SECOND YEAR:SEMESTER-2							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	HSC	20BM2202	Introduction to Operation Research	3	0	0	3
2	PCC	20CS2201	Computer Organization & Architecture	3	0	0	3
3	PCC	20CS2202	Data Science with Python	3	0	0	3
4	PCC	20CS2203	Web Technologies	3	0	0	3
5	PCC	20CS2204	Compiler Design	3	0	0	3
6	PCC	20CS2281	Computer Organization & Architecture Lab	0	0	3	1.5
7	PCC	20CS2282	Data Science with Python Lab	0	0	3	1.5
8	PCC	20CS2283	Web Technologies Lab	0	0	3	1.5
Total				**15**	**0**	**9**	**19.5**

ENGINEERING THIRD YEAR:SEMESTER-1							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	PCC	20CS3101	Operating System	3	0	0	3
2	PCC	20CS3102	Computer Networks	3	0	0	3
3	PCC	20CS3103	Software Engineering	3	0	0	3
4	PCC	20CS3104	Mathematical Foundations for Data Science	3	0	0	3
5	PEC	20CS31XX	Elective – I	3	0	0	3
6	PCC	20CS3181	Operating System Lab	0	0	3	1.5
7	PCC	20CS3182	Computer Networks Lab	0	0	3	1.5
8	PCC	20CS3183	Software Engineering Lab	0	0	3	1.5
9	HSC	20EG3182	English-Language communication Skills Lab- II	0	0	3	1.5
Total				**15**	0	12	21

ENGINEERING THIRD YEAR:SEMESTER-2							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	PCC	20CS3201	Cryptography and Networks Security	3	1	0	4
2	PCC	20CS3202	Artificial Intelligence	3	1	0	4
3	PEC	20CS32XX	Elective – II	3	0	2	3
4	PEC	20CS32XX	Elective – III	3	0	2	3
5	OEC	20XX32XX	Open Elective-I	3	0	0	3
6	HSC	EG3283	English-Language communication Skills Lab-I -III	0	0	3	1.5

7	PR	20CS3291	Mini Project	0	0	6	3
8	MC	20CS3203	Career Development Course	2	0	0	0
9		20CS3292	Summer Internship	0	0	6	3
Total				**16**	**0**	**15**	**21.5**
10	20CS3292		Summer Internship	0	0	6	3

ENGINEERING FOURTH YEAR:SEMESTER-1							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	PCC	20CS4101	Machine Learning	3	1	0	4
2	PEC	20CS41XX	Elective-IV	3	0	0	3
3	OEC	20XX41XX	Open Elective – II	3	0	0	3
4	PR	20CS4193	Project-I	0	0	12	6
Total				**9**	**1**	**12**	**16**

ENGINEERING FOURTH YEAR:SEMESTER-2							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	PEC	20CS42XX	Elective-V	3	0	0	3
2	OEC	20XX42XX	Open Elective-III	3	0	0	3
3	OEC	20CS42XX	Open Elective-IV	3	0	0	3
4	PR	20CS4294	Project-II	0	0	12	6
5	HSC	20CS4299	Community Service	0	0	4	2
Total				**9**	**0**	**16**	**17**

LIST OF PROFESSIONAL ELECTIVE COURSES

PROGRAM ELECTIVE COURSES							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	PEC	20CS3121	Data Mining	3	0	0	3
2	PEC	20CS3122	Mobile Application Development	3	0	0	3
3	PEC	20CS3123	Distributed Computing	3	0	0	3
4	PEC	20CS3124	Advanced Computer Architecture	3	0	0	3
5	PEC	20CS3221	Object Oriented Analysis & Design (OOAD)	3	0	**0**	3
6	PEC	20CS3123	Distributed Computing	3	0	0	3
7	PEC	20CS3223	Real Time Operating System	3	0	0	3
7	PEC	20CS3223	Embedded Systems	3	0	0	3
8	PEC	20CS3225	Digital Image Processing	3	0	0	3
9	PEC	20CS3231	Information Retrieval	3	0	0	3

10	PEC	20CS3232	Software Testing	3	0	0	3
11	PEC	20CS3233	Mobile Computing	3	0	0	3
12	PEC	20CS3234	Data Compression	3	0	0	3
13	PEC	20CS3235	Computer Graphics	3	0	0	3
14	PEC	20CS4141	Data Science	3	0	0	3
15	PEC	20CS4142	Unix and Shell Programming	3	0	0	3
16	PEC	20CS4143	VLSI	3	0	0	3
17	PEC	20CS4144	Soft Computing	3	0	0	3
18	PEC	20CS4145	File Structure	3	0	0	3
19	PEC	20CS4251	Optimization Technique	3	0	0	3
20	PEC	20CS4252	Design Patterns	3	0	0	3
21	PEC	20CS4253	Cloud Computing	3	0	0	3
22	PEC	20CS4254	Block Chain Technology	3	0	0	3
23	PEC	20CS4255	Internet Of Things	3	0	0	3
24	PEC	20CS4257	Computer Vision	3	0	0	3

LIST OF OPEN ELECTIVE COURSES OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

OPEN ELECTIVE COURSES FOR ALL BRANCHES							
Sl. No.	**Course Type**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	
1	OEC	20CS4261	Big Data Analytics	3	0	0	3
2	OEC	20CS4262	Biometric Security	3	0	0	3
3	OEC	20CS4263	Human Computer Interaction	3	0	0	3
4	OEC	20CS4264	Cyber Security	3	0	0	3
5	OEC	20CS4265	Robotics	3	0	0	3
6	OEC	20CS4266	Computer Forensics	3	0	0	3
OPEN ELECTIVE COURSES FOR ALL BRANCHES except CSE							
7	OEC	20CSXX71	Object Oriented Programming through Java	3	0	0	3
8	OEC	20CSXX72	Database Management System	3	0	0	3
9	OEC	20CSXX73	Computer Graphics	3	0	0	3
10	OEC	20CSXX74	Distributed Computing	3	0	0	3
11	OEC	20CSXX75	Digital Image Processing	3	0	0	3

LIST OF COURSES OFFERED TO OTHER ENGINEERING BRANCHES BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSES for other Engg. Branches							
Sl. No.	Course Type	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	ESC	20CSXX09 (ECE)	Object Oriented programming	2	0	0	2
2	ESC	20CSXX89 (ECE)	Object Oriented programming lab	0	0	3	1.5
3	ESC	20CSXX10 (ECE)	Computer Organization and Architecture	3	1	0	4
4	ESC	20CSXX08 (all branches except CSE)	Programming & Data Structures	3	0	0	3
5	ESC	20CSXX88 (all branches except CSE)	Programming & Data Structures lab	0	0	3	1.5
6	ESC	20CSXX11 (ECE)	Computer Networks	3	0	0	3
7	ESC	20CSXX07 (CHE)	Object Oriented programming through JAVA	3	0	0	3
8	ESC	20CSXX87 (CHE)	Object Oriented programming through JAVA lab	0	0	3	1.5

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ENGINEERING FIRST YEAR: SEMESTER-I

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Course code	Course Name	Course Category	L-T-P	Credits
20MA1102	**Calculus and Linear Algebra (CSE)**	**BSC**	**3-1-0**	**4**

Course Learning Objectives: The objective of this course is to

1. Discuss the Solutions of first order differential equations
2. Understand Continuity and differentiability of multi-variable functions and its applications to discuss maximum and minimum
4.Discuss the linear transformation and its Eigen values and Eigen vectors.
5. Discuss numerical methods to find the roots of polynomial and transcendental equations Interpolating and Fitting the curves for data points.
6. Evaluate integrals by using numerical methods and solving IVP

Unit – I **(10 Contact hours)**

Differential equations of first order and first degree: