

**R V R & J C COLLEGE OF ENGINEERING** (*Autonomous*),  
**CHOWDAVARAM, GUNTUR-19**  
**B.Tech., Computer Science & Engineering (Data Science)**  
 (w.e.f. the academic year 2021-2022)  
**Scheme (R20)**

**Semester I (First year)**

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD111	Mathematics – I	2	1	0	30	70	3	BS
2	CD112	Engineering Chemistry	2	1	0	30	70	3	BS
3	CD113	English for Communication Skills	3	0	0	30	70	3	HS
4	CD114	Fundamentals of Computer Science	3	0	0	30	70	3	PC
5	CD151	Engineering Chemistry Lab	0	0	3	30	70	1.5	BS
6	CD152	English Language Communication Skills Lab	0	0	3	30	70	1.5	HS
7	CD153	Engineering Graphics and Design Lab	1	0	4	30	70	3	ES
8	CD154	Fundamentals of Computer Science Lab	0	0	3	30	70	1.5	PC
9	CDMC1	Environmental Science	2	0	0	100	0	0	MC
10		Orientation Program	-	-	-	-	-	-	-
Total			13	2	13	340	560	19.5	

Category	Credits
Basic Science Course	7.5
Engineering Science Course	3.0
Humanities and Science Course	4.5
Professional Core Course	4.5
Total credits	19.5

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**Semester II (First year)**

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD121	Probability and Statistics	2	1	-	30	70	3	BS
2	CD122	Engineering Physics	3	-	-	30	70	3	BS
3	CD123	Digital Electronics	2	1	-	30	70	3	ES
4	CD124	Data Structures & Algorithms	2	1	-	30	70	3	PC
5	CD125	Python for Data Science	2	-	-	30	70	2	PC
6	CD161	Engineering Physics Lab	-	-	3	30	70	1.5	BS
7	CD162	Data Analytics Lab (R-Language)	-	-	3	30	70	1	ES
8	CD163	Data Structures & Algorithms Lab	-	-	3	30	70	1.5	PC
9	CD164	Python for Data Science Lab	-	-	2	30	70	1.5	PC
10	CDMC2	Constitution of India	2	-	-	100	-	-	MC
Total			13	3	11	370	630	19.5	

Category	Credits
Basic Science Course	7.5
Engineering Science Course	3.0
Professional Core Course	9.0
Total credits	19.5

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**Semester III (Second Year)**

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD211	Mathematics-II	2	1	-	30	70	3	BS
2	CD212	Discrete Mathematics	2	1	-	30	70	3	ES
3	CD213	Computer Organization	3	-	-	30	70	3	PC
4	CD214	Data Visualization	3	-	-	30	70	3	PC
5	CD215	Object Oriented Programming	2	1	-	30	70	3	PC
6	CD251	Business Communication & Value Science Lab	-	-	3	30	70	1.5	BS
7	CD252	Data Visualization Lab	-	-	3	30	70	1.5	PC
8	CD253	Object Oriented Programming Lab	-	-	3	30	70	1.5	PC
9	CDSL1	Skill Oriented Course-I	1	-	2	100	-	2	SC
10	CDMC3	Design Thinking & Product Innovation	2	-	-	100	-	-	MC
Total			15	3	11	440	560	21.5	

Category	Credits
Basic Science Course	4.5
Engineering Science Course	3.0
Professional Core Course	12.0
Skill Course	2.0
Total credits	21.5

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**Semester IV (Second Year)**

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD221	Foundations of Artificial Intelligence	3	-	-	30	70	3	PC
2	CD222	Database Management Systems	3	-	-	30	70	3	PC
3	CD223	Operating Systems	3	-	-	30	70	3	PC
4	CD224	Software Engineering	3	-	-	30	70	3	PC
5	CD225	Design and Analysis of Algorithms	3	-	-	30	70	3	PC
6	CD261	Database Management Systems Lab	-	-	3	30	70	1.5	PC
7	CD262	Operating Systems & Software Engineering Lab	-	-	3	30	70	1.5	PC
8	CD263	Design and Analysis of Algorithms Lab	-	-	3	30	70	1.5	PC
9	CDSL2	Skill Oriented Course-II	1	-	2	100	-	2	SC
10	CDMC4	Ethics & Human Values	2	-	-	100	-	-	MC
Total			16	2	11	440	560	21.5	

Category	Credits
Professional Core Course	19.5
Skill Course	2.0
Total credits	21.5

**Note:**

- *Internship of minimum 3 weeks is mandatory during summer vacation (will be evaluated in semester-V)*
- *Minor course registration is allowed in this semester (maximum two courses can be registered)*

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**Semester V (Third Year)**

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD311	Automata and Compiler Design	2	1	-	30	70	3	PC
2	CD312	Data Communications and Networking	3	-	-	30	70	3	PC
3	CD313	Machine Learning	2	1	-	30	70	3	PC
4	CD314	Professional Elective-I	3	-	-	30	70	3	PE
5	CD315	Open/Job Oriented Elective-I	3	-	-	30	70	3	OE
6	CD351	Machine Learning Lab	-	-	2	30	70	1.5	PC
7	CD352	Professional Elective-I lab	-	-	2	30	70	1.5	PC
8	CD354	Summer Internship	-	-	-	100	-	1.5	PR
9	CDSL3	Skill Oriented Course-III	1	-	2	100	-	2	SC
10	CDV	Smart Coding and Practicing							
Total			14	2	6	410	490	21.5	

Category	Credits
Skill Course	2.0
Professional Core Course	13.5
Professional Elective	3.0
Open Elective	3.0
Total credits	21.5

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**Semester VI (Third Year)**

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD321	Operations Research	2	1	-	30	70	3	PC
2	CD322	Cryptography and Network Security	2	1	-	30	70	3	PC
3	CD323	Deep Learning	3	-	-	30	70	3	PC
4	CD324	Professional Elective-II	3	-	-	30	70	3	PE
5	CD325	Open/Job Oriented Elective-II	3	-	-	30	70	3	OE
6	CD361	Deep Learning lab	-	-	3	30	70	1.5	PC
7	CD362	Professional Elective Lab-II	-	-	3	30	70	1.5	OE
8	CD363	Project-I	-	-	3	100	-	1.5	PR
9	CDSL4	Skill Oriented Course-IV	1	-	2	100	-	2	SC
Total			14	2	11	410	490	21.5	

Category	Credits
Professional Core Course	10.5
Professional Elective Course	3.0
Open/Job Oriented Elective Course	4.5
Project	1.5
Skill Course	2.0
Total credits	21.5

**Note:**

- Internship minimum 6 Weeks (mandatory) during summer vacation (to be evaluated during semester-VII)

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**Semester VII (Fourth Year)**

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD411	Humanities Elective	3	-	-	30	70	3	HS
2	CD412	Professional Elective-III	2	1	-	30	70	3	PE
3	CD413	Professional Elective-IV	2	1	-	30	70	3	PE
4	CD414	Professional Elective-V(MOOCs)	-	-	-	-	100	3	PE
5	CD415	Open/Job Oriented Course-III	3	-	-	30	70	3	OE
6	CD416	Open /Job Oriented Elective-IV(MOOCs)	-	-	-	0	100	3	OE
7	CD451	Internship/Certification	-	-	-	100	-	3	PR
8	CDSL5	Skill Oriented Course-V	2	-	-	100	-	2	SC
Total			12	2	3	350	550	23	

Category	Credits
Professional Elective Course	9
Humanities and Science Course	3
Open Elective Course	6
Skill Course	2
Project	3
Total credits	23

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**Semester VIII (Fourth Year)**

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD461	Project-II	-	-	12	30	70	12	PR
Total			<b>0</b>	<b>-</b>	<b>12</b>	<b>30</b>	<b>70</b>	<b>12</b>	

Category	Credits
Project	12
Total credits	12



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**Professional Elective Courses (PE)**

3-1
PE1
CDEL01-Data Engineering
<b>CDEL02-Distributed and Cloud Computing</b>
CDEL03-Software Testing Methodologies
CDEL04-Digital Image Processing

3-2
PE2
CDEL05-Software Architecture and Design Patterns
CDEL06-Web and Social Media Analytics
<b>CDEL07-Big Data Processing</b>
CDEL08-Computer Vision

4-1
PE3
<b>CDEL09-Soft Computing</b>
CDEL10-Predictive Analytics for Data Science
CDEL11-Semantic Web
CDEL12-Computer Forensics

4-1
PE4
CDEL13-IT Project Management System
CDEL14-Health and Business Analytics
<b>CDEL15-Time series analysis and Forecasting</b>
CDEL16-Block Chain Technologies

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**Open Elective (OE) / Job Oriented Courses (JOE)**

<b>OE1/JOE1</b>
MAD
Business Intelligence Tools
Web & Micro Services

<b>OE2/JOE2</b>
Edge and Fog Computing
NoSQL Databases
UI/UX

<b>OE3/JOE3</b>
Internet of Things
Cyber Security
Information Retrieval Systems

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**Skill Oriented Courses (SOC)**

Skill Oriented Course-I
<b>Web Development</b>
PHP and MySQL

Skill Oriented Course-II
<b>Scripting Languages</b>
High Performance Computing

Skill Oriented Course-III
<b>Soft Skills</b>
Operations Research

Skill Oriented Course-IV
<b>Natural Language Processing</b>
Animation & development

Skill Oriented Course-V
Automation Testing
<b>DevOps and MLOps</b>

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**MOOCS Professional Elective Courses (CD414)**

S.No	Course Name
1.	Introduction to Industry 4.0 and Industrial Internet of Things
2.	Introduction to internet of things
3.	Software Testing
4.	Social Networks
5.	Deep-learning – IIT Ropar
6.	Introduction to algorithms and analysis
7.	Deep learning for computer vision
8.	Advanced computer architecture
9.	Real-Time systems
10.	Data structures and algorithms with C++ / Python
11.	Algorithms for competitive programming
12.	Computer vision
13.	Natural language processing

**NPTEL Open Elective Courses (CD416)**

S.No	Discipline	Course Name
1.	Multidisciplinary	Introduction to Biomedical Imaging Systems
2.	Civil Engineering	Wastewater Treatment and Recycling
3.	Electrical and Electronics Engineering	Introduction to Wireless and Cellular Communications
4.	Electrical and Electronics Engineering	Stochastic Modelling and the Theory of Queues
5.	Electrical and Electronics Engineering	Fiber Optic Communication Technology
6.	Humanities and Social Sciences	Soft skills
7.	Humanities and Social Sciences	Patent Law for Engineers and Scientists
8.	Law	Right to information and Good Governance
9.	Management	Organizational Behaviour
10.	Management	Project management for managers
11.	Management	Sustainability through Green Manufacturing Systems: An Applied Approach
12.	Management	Corporate social responsibility
13.	Management	Ethics in engineering practice
14.	Mathematics	Computational commutative algebra
15.	Mathematics	Regression analysis
16.	Mathematics	Introduction to fuzzy set theory, arithmetic and logic
17.	Mathematics	Essential mathematics for machine learning
18.	Multidisciplinary	Introduction to Research

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**Science and Humanities Elective Courses (HE)**

HE
Financial & Human Resource Management
Digital Marketing
<b>Industrial Management &amp; Entrepreneurship</b>
Economics for Engineers