



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
 (AUTONOMOUS INSTITUTION - UGC, GOVT. OF INDIA)
 (Affiliated to JNTUH; Approved by AICTE - Accredited by NBA & NAAC - 'A' Grade, ISO 9001:2008 Certified)
 Maisammaguda, Dhulapally, Secunderabad - 500100.

R₂₂ REGULATION

BACHELOR OF TECHNOLOGY **DATA SCIENCE(CSE)** COURSE STRUCTURE AND SYLLABUS

Version: R22-V2-DS-22.07.2023



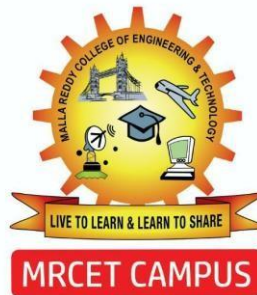
Department of Computer Science & Engineering
(DATA SCIENCE)



**MALLA REDDY COLLEGE
 OF ENGINEERING & TECHNOLOGY**
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EAMCET/PGEET/ICET CODE: MLRD



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)



BACHELOR OF TECHNOLOGY

CSE (DATA SCIENCE)

COURSE STRUCTURE & SYLLABUS (R22)

(Batches admitted from the academic year 2022 - 2023)



Department of

COMPUTER SCIENCE & ENGINEERING

(EMERGING TECHNOLOGIES)

Updated Version: R22/V-2/22.07.2023

M R C E T CAMPUS

(Autonomous Institution – UGC, Govt. of India)

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – _A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.

Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

Note: The regulations here under are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- Autonomous Institution /College|- means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- Academic Autonomy -||means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- Commission - means University Grants Commission.
- AICTE - means All India Council for Technical Education.
- University - The Jawaharlal Nehru Technological University, Hyderabad.
- College – means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- Program - means:
 - Bachelor of Technology (B.Tech) degree program
 - UG Degree Program: B.Tech
- Branch means specialization in a program like B.Tech degree program in Computer Science and Engineering, B.Tech degree program in Electronics & Communication Engineering etc.
- Course or Subject means a theory or practical subject, identified by its course–number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

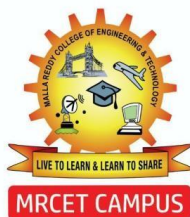
Malla Reddy College of Engineering & Technology (MRCET CAMPUS) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

“A thought beyond the horizons of success committed for educational excellence”

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Vision of the Department

“To be at the forefront of Emerging Technologies and to evolve as a Centre of Excellence in Research, Learning and Consultancy to foster the students into globally competent professionals useful to the Society.”



Mission of the Department

The department of CSE (Emerging Technologies) is committed to:



- To offer highest Professional and Academic Standards in terms of Personal growth and satisfaction.
- Make the society as the hub of emerging technologies and thereby capture opportunities in new age technologies.
- To create a benchmark in the areas of Research, Education and Public Outreach.
- To provide students a platform where independent learning and scientific study are encouraged with emphasis on latest engineering techniques

QUALITY POLICY

- To pursue continual improvement of teaching learning process of Undergraduate and Post Graduate programs in Engineering & Management vigorously.
- To provide state of art infrastructure and expertise to impart the quality education and research environment to students for a complete learning experiences.
- Developing students with a disciplined and integrated personality
- To offer quality relevant and cost effective programmes to produce engineers as per requirements of the industry need.

For more information: www.mrcet.ac.in

BACHELOR OF TECHNOLOGY (B.Tech)

DATA SCIENCE

COURSE STRUCTURE & SYLLABUS (R22)

(Batches admitted from the academic year 2022 - 2023)

COURSE STRUCTURE



MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

B TECH – CSE (DATA SCIENCE) - R22 - COURSE STRUCTURE

I Year B. Tech - CSE (Data Science) – I Semester

S.No	Subject Code	SUBJECT (S)	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0001	English	2	0	0	2	40	60
2	R22A0023	Mathematics – I	3	1	0	4	40	60
3	R22A0201	Principles of Electrical and Electronics Engineering	3	0	0	3	40	60
4	R22A0301	Computer Aided Engineering Graphics	2	0	3	4	40	60
5	R22A0501	Programming for Problem Solving	3	0	0	3	40	60
6	R22A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R22A0281	Principles of Electrical and Electronics Engineering Lab	-	0	3	1.5	40	60
8	R22A0581	Programming for Problem Solving Lab	-	0	3	1.5	40	60
9	R22A0004	Environmental Science	2	0	0	0	40	60
		Total	15	1	11	20	360	540

I Year B. Tech - CSE (Data Science) – II Semester

S.No	Subject Code	SUBJECT(S)	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0002	Professional English	2	0	0	2	40	60
2	R22A0024	Mathematics – II	3	1	0	4	40	60
3	R22A0021	Applied Physics	3	1	0	4	40	60
4	R22A0022	Engineering Chemistry	3	0	0	3	40	60
5	R22A0502	Problem Solving using Python Programming	3	0	0	3	40	60
6	R22A0082	Applied Physics/Engineering Chemistry Lab	-	0	3	1.5	40	60
7	R22A0582	Problem Solving using Python Programming Lab	-	0	3	1.5	40	60
8	R22A0083	Engineering and Computing Hardware Workshop	-	0	2	1	40	60
9	R22A0003	Human Values and Professional Ethics	2	0	0	0	40	60
		Total	16	2	8	20	360	540



II Year B. Tech - CSE (Data Science) – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0503	Data Structures	3	0	0	3	40	60
2	R22A6701	Data Science and It's Applications	3	1	0	4	40	60
3	R22A0508	Computer Organization	3	0	0	3	40	60
4	R22A0509	Operating Systems	3	0	0	3	40	60
5	R22A0027	Statistical Inference and Stochastic Process	3	1	0	4	40	60
6	R22A6781	R Programming Lab	0	0	2	1	40	60
7	R22A0583	Data Structures Lab	0	0	2	1	40	60
8	R22A0587	Operating Systems Lab	0	0	2	1	40	60
9	*R22A0061	Public Policy and Governance	2	0	0	0	100	-
Total			17	2	6	20	420	480

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

II Year B. Tech - CSE (Data Science) – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0507	Object Oriented Programming through Java	3	0	0	3	40	60
2	R22A0028	Discrete Mathematics	3	0	0	3	40	60
3	R22A0504	Database Management Systems	3	0	0	3	40	60
4	R22A0506	Design and Analysis of Algorithms	3	1	0	4	40	60
5	R22A0505	Software Engineering	3	0	0	3	40	60
6	R22A0584	Database Management Systems Lab	0	0	2	1	40	60
7	R22A0586	Object Oriented Programming through Java Lab	0	0	2	1	40	60
8	R22A6791	Industry Oriented Project	0	0	4	2	40	60
9	R22A0005	Foreign Language: French	2	0	0	0	40	60
Total			17	1	8	20	360	540

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree



III Year B. Tech - CSE (Data Science) – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A6609	Data Warehousing and Business Intelligence	3	0	0	3	40	60
2	R22A6601	Artificial Intelligence	3	0	0	3	40	60
3	R22A1201	Automata and Compiler Design	3	1	0	4	40	60
4		Open Elective-I	3	0	0	3	40	60
5	R22A0568 R22A0512 R22A0566 R22A6615	Professional Elective-I 1. Computer Graphics 2. Computer Networks 3. Web Programming 4. Human Computer Interaction	3	0	0	3	40	60
6	R22A6782	Data Wrangling and Data Visualization Lab	0	0	2	1	40	60
7	R22A6683	Artificial Intelligence Lab	0	0	2	1	40	60
8	R22A6792	Application Development – I	0	0	4	2	40	60
		Total	15	1	8	20	320	480

III Year B. Tech - CSE (Data Science) – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A6703	Data Analytics	3	0	0	3	40	60
2	R22A6602	Machine Learning	3	0	0	3	40	60
3	R22A6604	Knowledge Representation and Reasoning	3	1	0	4	40	60
4		Open Elective –II	3	0	0	3	40	60
5	R22A6201 R22A0514 R22A6704 R22A1206	Professional Elective-II 1. Cyber Security Essentials 2. Distributed Systems 3. Exploratory Data Analysis 4. Mobile Application Development	3	0	0	3	40	60
6	R22A6783	Data Analytics Lab	0	0	2	1	40	60
7	R22A6681	Machine Learning Lab	0	0	2	1	40	60
8	R22A6793	Application Development –II	0	0	4	2	40	60
		Total	15	1	8	20	320	480



IV Year B. Tech - CSE (Data Science) – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0513	Full Stack Development	3	0	0	3	40	60
2	R22A0520	Cloud Computing	3	0	0	3	40	60
3	R22A6605	Deep Learning	3	1	0	4	40	60
4	R22A6621	Professional Elective-III: 1. Generative AI 2. Database Security 3. Computer Vision 4. Ethical Hacking	3	0	0	3	40	60
	R22A6214							
	R22A6613							
	R22A6203							
5	R22A0524	Professional Elective-IV: 1. Blockchain Technology 2. Predictive Analytics 3. Natural Language Processing 4. DevOps	3	0	0	3	40	60
	R22A6608							
	R22A6603							
	R22A0523							
6	R22A0589	Full Stack Development Lab	0	0	2	1	40	60
7	R22A6794	Mini Project Development	0	0	6	3	40	60
Total			15	1	8	20	280	420

IV Year B. Tech - CSE (Data Science) – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0334	Innovation, Start-Up & Entrepreneurship	4	0	0	4	40	60
2	R22A6622	Professional Elective-V: 1. Prompt Engineering 2. Edge Computing 3. Expert Systems 4. Social Network Analysis	3	0	0	3	40	60
	R22A0530							
	R22A6614							
	R22A6610							
3	R22A6618	Professional Elective-VI: 1. Cognitive Computing 2. Augmented Reality and Virtual Reality 3. Reinforcement Learning 4. Text Analytics	3	0	0	3	40	60
	R22A0517							
	R22A6617							
	R22A6607							
4	R22A6795	Major Project Development	0	0	20	10	80	120
Total			10	0	20	20	200	300



List of Open Electives:

OPEN ELECTIVE – I		
S.No	Subject Code	SUBJECT NAME
1	R22A1251	WEB DEVELOPMENT
2	R22A2151	INTELLECTUAL PROPERTY RIGHTS
3	R22A0551	JAVA PROGRAMMING
4	R22A0351	ROBOTICS AUTOMATION PROCESS
5	R22A0451	ELECTRONICS FOR HEALTH CARE
6	R22A0251	RENEWABLE ENERGY SOURCES
7	R22A6751	PRINCIPLES OF DATA SCIENCE
8	R22A6752	BUSINESS ANALYTICS

OPEN ELECTIVE – II		
S.No	Subject Code	SUBJECT NAME
1	R22A0553	DATABASE SYSTEMS
2	R22A6753	BIG DATA ARCHITECTURE
3	R22A0352	DESIGN THINKING
4	R22A0552	PRINCIPLES OF CLOUD COMPUTING
5	R22A6951	IOT & IT'S APPLICATIONS
6	R22A2152	NANO MATERIALS
7	R22A0252	ELECTRICAL AND HYBRID VEHICLES
8	R22A6251	CYBER GOVERNANCE

