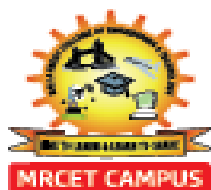




BACHELOR OF TECHNOLOGY
DATA SCIENCE(CSE)
COURSE STRUCTURE & SYLLABUS (R20)
(Batches admitted from the academic year 2020-2021)

**Department of
Computer Science & Engineering
(Emerging Technologies)**



**MALLA REDDY COLLEGE
OF ENGINEERING & TECHNOLOGY**
(AUTONOMOUS INSTITUTION - UGC, GOVT. OF INDIA)

Affiliated to JNTUH; Approved by AICTE, NBA-Tier 1 & NAAC with A-GRADE | ISO 9001:2015

EAMCET/ECET/PGEGET/ICET CODE: MLRD



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)



BACHELOR OF TECHNOLOGY

CSE (DATA SCIENCE)

COURSE STRUCTURE & SYLLABUS (R20)

(Batches admitted from the academic year 2020 - 2021)

Department of
COMPUTER SCIENCE & ENGINEERING
(EMERGING TECHNOLOGIES)

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: mrctet2004@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.

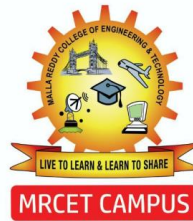
Malla Reddy College of Engineering & Technology (MRCET CAMPUS) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than 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

(Batches admitted from the academic year 2020 - 2021)



**M R C E T CAMPUS | AUTONOMOUS INSTITUTION - UGC, GOVT. OF INDIA
COURSE STRUCTURE BTECH- CSE (DATA SCIENCE)****I B. Tech CSE (DS) – I Semester (I Year I Semester)**

| S.N O | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|--------------|-----------------|---|-----------|----------|-----------|-----------|------------|------------|
| | | | | | | | INT | EXT |
| 1 | R20A0001 | English | 2 | 0 | 0 | 2 | 30 | 70 |
| 2 | R20A0021 | Mathematics – I | 3 | 1 | 0 | 4 | 30 | 70 |
| 3 | R20A0201 | Basic Electrical Engineering | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A0301 | Computer Aided Engineering Graphics | 2 | 0 | 2 | 3 | 30 | 70 |
| 5 | R20A0501 | Programming for Problem Solving | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A0081 | English Language Communication Skills Lab | - | 0 | 4 | 2 | 30 | 70 |
| 7 | R20A0281 | Basic Electrical Engineering Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0581 | Programming for Problem Solving Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 9 | R20A0003 * | Human Values and Professional Ethics | 2 | 0 | 0 | 0 | 100 | - |
| TOTAL | | | 15 | 1 | 12 | 20 | 340 | 560 |

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

I B. Tech CSE(DS) – II Semester (I Year II Semester)

| S.N O | SUBJECT CODE | SUBJECT | L | T | P | C | MAX MARKS | |
|--------------|-----------------|--|-----------|----------|-----------|-----------|--------------|------------|
| | | | | | | | INT | EXT |
| 1 | R20A0002 | Professional English | 2 | 0 | 0 | 2 | 30 | 70 |
| 2 | R20A0022 | Mathematics – II | 3 | 1 | 0 | 4 | 30 | 70 |
| 3 | R20A0011 | Applied Physics | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A0401 | Analog and Digital Electronics | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A0502 | Python Programming | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A0082 | Applied Physics Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 7 | R20A0582 | Python Programming Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0083 | Engineering and IT Workshop | - | 0 | 4 | 2 | 30 | 70 |
| 9 | R20A0064* | Financial Institutions, Markets and Services | 2 | - | - | 0 | 100 | - |
| TOTAL | | | 16 | 1 | 10 | 20 | 340 | 560 |

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

II B. Tech CSE(DS)- III Semester (II Year I Semester)

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|--------------|--------------|---|-----------|----------|----------|-----------|------------|------------|
| | | | | | | | INT | EXT |
| 1 | R20A0503 | Data Structures Using Python | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A0504 | Operating Systems | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A0506 | Computer Organization | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A6701 | Introduction to Data Science | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A0024 | Probability and Statistics | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A0061 | Managerial Economics and Financial Analysis | 3 | 0 | 0 | 3 | 30 | 70 |
| 7 | R20A0583 | Data Structures using Python Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0584 | Operating Systems Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 9 | R20A0004 | Foreign Language: French | 2 | - | - | 0 | 100 | - |
| TOTAL | | | 20 | - | 6 | 21 | 340 | 560 |

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

II B. Tech CSE (DS) – IV Semester (II Year II Semester)

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|--------------|--------------|--|-----------|----------|----------|-----------|------------|------------|
| | | | | | | | INT | EXT |
| 1 | R20A0505 | Design and Analysis of Algorithms | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A0508 | Object Oriented Programming through Java | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A0509 | Database Management Systems | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A6702 | Data Handling and Visualization | 2 | 0 | 2 | 3 | 30 | 70 |
| 5 | R20A0026 | Discrete Mathematics | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | | Open Elective-I | 3 | 0 | 0 | 3 | 30 | 70 |
| 7 | R20A0585 | Object Oriented Programming through Java Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0586 | Database Management Systems Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 9 | R20A0008* | Global Education & Professional Career | 2 | - | - | 0 | 100 | - |
| TOTAL | | | 20 | - | 6 | 21 | 340 | 560 |

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

III B. Tech CSE (DS) – V Semester (III Year I Semester)

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|------|----------------------------------|--|-----------|----------|----------|-----------|------------|------------|
| | | | | | | | INT | EXT |
| 1 | R20A0510 | Computer Networks | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A0513 | Artificial Intelligence | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A0028 | Statistical Foundations of Data Science | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A1202 R20A0511 R20A0562 | Professional Elective-I 1. Automata and Compiler Design 2. Software Engineering 3. Computer Graphics | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A6204 R20A1206 R20A0515 | Professional Elective-II 1. Database Security 2. Data Warehousing and Data Mining 3. Scripting Languages | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | | Open Elective-II | 3 | 0 | 0 | 3 | 30 | 70 |
| 7 | R20A6781 | Statistical Foundations of Data Science Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0588 | Artificial Intelligence Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 9 | R20A6791 | Application Development -I | 0 | 0 | | 2 | 30 | 70 |
| 10 | R20A0006* | Technical Communication & Soft Skills | 2 | - | - | 0 | 100 | - |
| | | TOTAL | 20 | - | 6 | 23 | 370 | 630 |

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

III B. Tech CSE (DS) – VI Semester (III Year II Semester)

| S.NO | Subject Code | SUBJECT | L | T | P | C | MAX. MARKS | |
|------|----------------------------------|---|-----------|----------|----------|-----------|------------|------------|
| | | | | | | | INT | EXT |
| 1 | R20A6704 | Data Science Tools and Techniques | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A0518 | Machine Learning | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A6609 R20A6705 R20A0520 | Professional Elective-III 1. Natural Language Processing 2. Web Analytics and Development 3. Big Data Analytics | 3 | - | 0 | 3 | 30 | 70 |
| 4 | R20A6202 R20A0523 R20A6606 | Professional Elective-IV 1. Cyber Security 2. Software Testing Methodologies 3. Human Computer Interaction | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | | Open Elective-III | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A6782 | Data Science Tools and Techniques Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 7 | R20A0590 | Machine Learning Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A6792 | Application Development -II | 0 | 0 | | 2 | 30 | 70 |
| 9 | R20A0007* | Constitution of India | 2 | - | - | 0 | 100 | - |
| | | TOTAL | 20 | - | 6 | 20 | 340 | 560 |

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

IV B. Tech CSE (DS) – VII Semester (IV Year I Semester)

| S.NO | Subject Code | SUBJECT | L | T | P | C | MAX. MARKS | |
|------|----------------------------------|--|-----------|----------|----------|-----------|------------|------------|
| | | | | | | | INT | EXT |
| 1 | R20A0516 | Full Stack Development | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A0522 | Blockchain Technology | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A6610 | Deep Learning | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A6215 R20A7305 R20A0517 | Professional Elective-V 1. Cyber Forensics 2. Computer Vision 3. Distributed Systems | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A0521 R20A6213 R20A7201 | Professional Elective-VI 1. Cloud Computing 2. Ethical Hacking 3. Text Analytics | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A6793 | Mini Project | - | - | | 3 | 30 | 70 |
| 7 | R20A0589 | Full Stack Development Lab | - | - | 3 | 1.5 | 30 | 70 |
| 8 | R20A6683 | Deep Learning Lab | - | - | 3 | 1.5 | 30 | 70 |
| | | TOTAL | 15 | - | 6 | 21 | 240 | 560 |

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

IV B. Tech CSE (DS) – VIII Semester (IV Year II Semester)

| S.N O | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|----------|-----------------|--|----------|----------|-----------|-----------|------------|------------|
| | | | | | | | INT | EXT |
| 1 | R20A0337 | Innovation, Start-up, & Entrepreneurship | 3 | 1 | - | 4 | 30 | 70 |
| 2 | R20A6794 | Major Project | - | - | 20 | 10 | 30 | 70 |
| | | TOTAL | 3 | 1 | 20 | 14 | 60 | 140 |

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

LIST OF ELECTIVES:

| OPEN ELECTIVE I | | |
|------------------------|---------------------|---------------------------------|
| S.NO | SUBJECT CODE | SUBJECT |
| 1 | R20A1251 | WEB DESIGNING TOOLS |
| 2 | R20A0551 | INTRODUCTION TO DBMS |
| 3 | R20A0351 | INTELLECTUAL PROPERTY RIGHTS |
| 4 | R20A0051 | ENTERPRISE RESOURCE PLANNING |
| 5 | R20A0451 | BASICS OF COMPUTER ORGANIZATION |

| OPEN ELECTIVE II | | |
|-------------------------|---------------------|--------------------------------|
| S.NO | SUBJECT CODE | SUBJECT |
| 1 | R20A1252 | MANAGEMENT INFORMATION SYSTEMS |
| 2 | R20A0552 | JAVA PROGRAMMING |
| 3 | R20A1253 | SOFTWARE PROJECT MANAGEMENT |
| 4 | R20A0452 | IOT & ITS APPLICATIONS |
| 5 | R20A0553 | OPERATING SYSTEM CONCEPTS |
| 6 | R20A0066 | PUBLIC POLICY AND GOVERNANCE |

| OPEN ELECTIVE III | | |
|--------------------------|---------------------|------------------------------|
| S.NO | SUBJECT CODE | SUBJECT |
| 1 | R20A0453 | ROBOTICS & AUTOMATION |
| 2 | R20A1254 | BIG DATA ARCHITECTURE |
| 3 | R20A6251 | INFORMATION SECURITY |
| 4 | R20A0555 | CLOUD COMPUTING FUNDAMENTALS |
| 5 | R20A0352 | DESIGN THINKING |
| 6 | R20A0065 | BUSINESS ANALYTICS |