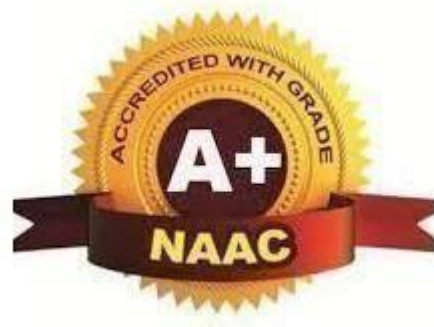




TULSIRAMJI GAIKWAD-PATIL
College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

An Autonomous Institute



Department
of
Computer Science and Engineering (Data Science)

B.Tech. Computer Science and Engineering
(Data Science)

Teaching Scheme

Considering

National Education
Policy 2020

From
Academic Year 2026-27

Vision of Institute

To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.

Mission of Institute

1. To strive for rearing standard and stature of the students by practicing high standards of professional ethics, transparency and accountability.
2. To provide facilities and services to meet the challenges of Industry and Society.
3. To facilitate socially responsive research, innovation and entrepreneurship.
4. To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.

Vision of the Department

“To emerge as a Centre of Excellence in Data Science, nurturing expertise in Analytics and Machine Learning for national development”

Mission of the Department

- To build a strong foundation in Data Science by fostering professionalism, integrity, and accountability.
- To create advanced learning ecosystems and resources that prepare students for industry and societal challenges in the digital era.
- To encourage impactful research, innovation, and entrepreneurial ventures with emphasis on Data Analytics and Artificial Intelligence.
- To promote the overall growth of students and faculty by integrating knowledge, values, and lifelong learning into practice.

Program Education Objectives (PEO)

- PEO 1: Demonstrate essential technical skills to identify, analyze and solve problems and design issues in Electronics and Communication Engineering.
- PEO 2: Apply field knowledge, research and professional practices to meet the requirements of industries.
- PEO 3: Imbibe lifelong learning practices and entrepreneurship skills in tune with emerging technologies.
- PEO 4: Inculcate professional ethics and managerial skills to satisfy real life problems for serving the needs of society and environment.

Program Outcomes (PO)

- PO1: Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
- PO2: Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
- PO3: Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/ components/ processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
- PO4: Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7). **PO7: Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for
i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

Program Specific Outcomes (PSO)

- PSO 1: Data Analytics Proficiency:** Apply statistical methods, data mining, and machine learning techniques to analyze and interpret complex data for meaningful insights.
- PSO 2: Solution Design & Development:** Design, develop, and implement data-driven solutions and predictive models to address real-world industry and societal challenges.
- PSO 3: Research, Innovation & Ethics:** Conduct socially responsive research, innovate in data-driven applications, and demonstrate professional ethics with lifelong learning orientation.



TULSIRAMJI GAIKWAD-PATIL COLLEGE OF ENGINEERING & TECHNOLOGY

Wardha Road, Nagpur - 441108
Accredited with NAAC A+ Grade & NBA Accredited (EE, ME, CE & ECE)
Approved by AICTE, New Delhi, Govt. of Maharashtra
(An Autonomous Institution Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur)



Department of Basic Sciences and Humanities

Scheme of Instruction for First Year of B. Tech. (UG) Programme Group-A Semester – I (AIML/CSE/DS/IT)

| SN | Sem | Type | BoS/ Dept | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | TOTAL | ESE Duration Hours |
|----------------------------------|-----|------|--------------|-----------|--|-----|---------------|----|----|-----|---------|-------------|----|-----|-------|--------------------------|
| | | | | | | | L | P | SL | Hrs | | CT/A | CA | ESE | | |
| FIRST SEMESTER (GROUP-A) | | | | | | | | | | | | | | | | |
| 1 | 1 | BSC | S&H | BSH41101 | Linear Algebra and Calculus | T | 4 | 0 | 2 | 6 | 4 | 30 | 10 | 60 | 100 | 3 |
| 2 | 1 | BSC | S&H | BSH41102 | Quantum, Optics & Computing | T | 3 | 0 | 2 | 5 | 3 | 30 | 10 | 60 | 100 | 3 |
| 3 | 1 | BSC | S&H | BSH41103 | Quantum, Optics & Computing -Lab | P | 0 | 2 | - | 2 | 1 | 25 | - | 25 | 50 | - |
| 4 | 1 | ESC | ECE | BEC41101 | Digital Circuits and Design | T | 3 | 0 | 2 | 5 | 3 | 30 | 10 | 60 | 100 | 3 |
| 5 | 1 | ESC | ECE | BEC41102 | Digital Circuits and Design -Lab | P | 0 | 2 | - | 2 | 1 | 25 | - | 25 | 50 | - |
| 6 | 1 | ESC | CSE | BCS41101 | Programming for Problem Solving | T | 2 | 0 | 2 | 4 | 2 | 15 | 5 | 30 | 50 | 1 |
| 7 | 1 | VSEC | CSE | BCS41102 | Programming for Problem Solving-Lab | P | 0 | 2 | - | 2 | 1 | 25 | - | 25 | 50 | - |
| 8 | 1 | VSEC | S&H | BSH41105 | Professional Etiquette | P | 0 | 2 | - | 2 | 1 | 25 | - | 25 | 50 | - |
| 9 | 1 | ESC | CSE | BCS41103 | Elements of AI -Lab | P | 0 | 2 | 2 | 4 | 1 | 25 | - | 25 | 50 | - |
| 10 | 1 | AEC | S&H | BSH41104 | Digital Wellness & Basic Communication Lab | P | 0 | 4 | - | 4 | 2 | 50 | - | 50 | 50 | - |
| 11 | 1 | CC | S&H | BSH41X01 | Liberal Learning Module-I | P | 0 | 4 | - | 4 | 2 | 50 | - | 50 | 50 | - |
| TOTAL FIRST SEM | | | | | | | 12 | 18 | 10 | 40 | 21 | 330 | 35 | 310 | 675 | 10 |
| SECOND SEMESTER (GROUP-A) | | | | | | | | | | | | | | | | |
| 1 | 2 | BSC | S&H | BSH41201 | Differential Equation and Statistics | T | 4 | 0 | 2 | 6 | 4 | 30 | 10 | 60 | 100 | 3 |
| 2 | 2 | BSC | S&H | BSH41202 | Advance Material | T | 3 | 0 | 2 | 5 | 3 | 30 | 10 | 60 | 100 | 3 |
| 3 | 2 | BSC | S&H | BSH41203 | Advance Material -Lab | P | 0 | 2 | - | 2 | 1 | 25 | - | 25 | 50 | - |
| 4 | 2 | ESC | IT | BIT41201 | Logic Development and Programming Design | T | 3 | 0 | 2 | 5 | 3 | 30 | 10 | 60 | 100 | 3 |
| 5 | 2 | ESC | IT | BIT41202 | Logic Development and Programming Design-Lab | P | 0 | 2 | - | 2 | 1 | 25 | - | 25 | 50 | - |
| 6 | 2 | IKS | S&H | BSH41204 | Indian Ancient Technology | T | 2 | 0 | 2 | 4 | 2 | 15 | 5 | 30 | 50 | 1 |
| 7 | 2 | ESC | ME | BME41201 | Idea & Innovation -Lab | P | 0 | 4 | - | 4 | 2 | 50 | - | 50 | 50 | - |
| 8 | 2 | VSEC | IT | BIT41203 | Web Designing-Lab | P | 0 | 2 | - | 2 | 1 | 25 | - | 25 | 50 | - |
| 9 | 2 | VSEC | S&H | BSH41205 | Social Internship | P | 0 | 2 | - | 2 | 1 | 25 | - | 25 | 50 | - |
| 10 | 2 | PCC | IT | BIT41204 | Python Programming-Lab | P | 0 | 4 | - | 4 | 2 | 25 | - | 25 | 50 | - |
| 11 | 2 | CC | S&H | BSH41Y01 | Liberal Learning Module-II | P | 0 | 4 | - | 4 | 2 | 50 | - | 50 | 50 | - |
| TOTAL SECOND SEM | | | | | | | 12 | 20 | 08 | 40 | 22 | 330 | 35 | 310 | 675 | 10 |

| Course Category | BSC/ ESC (Basic Science Course/ Engineering Science Course) | PCC (Programme Core courses) | Multidisciplinary courses | VSEC (Skill Course) | Social Science & Management | | Experiential Learning Courses | CC (Co-Curricular Courses) |
|-----------------|---|------------------------------|---------------------------|---------------------|---------------------------------|-------------------------------|-------------------------------|----------------------------|
| | | | | | AEC/Ability Enhancement Course) | IKS (Indian Knowledge System) | | |
| Credits SEM-I | 08 / 07 | -- | -- | 02 | 02 | -- | -- | 02 |
| Credits SEM-II | 08 / 06 | 02 | -- | 02 | -- | 02 | -- | 02 |
| Cumulative Sum | 16 / 13 | 02 | -- | 04 | 02 | 02 | -- | 04 |

PROGRESSIVE TOTAL CREDITS: 21 +22=43

| | | | | | | |
|-------------|----------------|----------------|-----------|-----------------|---------|-----------------------------------|
| | | | | July, 2025 | 4.00 | Applicable for AY 2025-26 Onwards |
| Chairperson | Dean Academics | Vice Principal | Principal | Date of Release | Version | |



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Department of Basic Sciences and Humanities

Scheme of Instruction for First Year of B. Tech. (UG) Programme Group-A (AIML/CSE/DSIT)

Liberal Learning Modules for SEM-I

| SN | Sem | Type | BoS/ Dept | Sub. Code | Subject | T/P | Contact Hours | | | Credit | Weightage | | |
|----|-----|------|--------------|-----------|---|-----|---------------|---|----|--------|------------------------|--------------|-----------------------|
| | | | | | | | L | P | Pr | | INT (1-Certificate) | ESE (MCQ) | External Practical |
| 1 | 1 | CC | S&H | BSH41X01 | Art of Theater | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 2 | 1 | CC | S&H | BSH41X02 | Fundamental of Music | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 3 | 1 | CC | S&H | BSH41X03 | CPD (Communication for Personality Development) | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 4 | 1 | CC | S&H | BSH41X04 | EBCD (Every Body Can Dance) | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 5 | 1 | CC | S&H | BSH41X05 | Yoga Practices & NSS | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 6 | 1 | CC | S&H | BSH41X06 | Interactive English (Level-1) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 7 | 1 | CC | S&H | BSH41X07 | Gateway to Competitive Exams (Level-1) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 8 | 1 | CC | S&H | BSH41X08 | Foreign Language -French (Level-1) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 9 | 1 | CC | S&H | BSH41X09 | Foreign Language-German (Level-1) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 10 | 1 | CC | S&H | BSH41X10 | Foreign Language-Japanese (Level-1) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |

Liberal Learning Modules for SEM-II

| SN | Sem | Type | BoS/ Dept | Sub. Code | Subject | T/P | Contact Hours | | | Credit | Weightage | | |
|----|-----|------|--------------|-----------|---|-----|---------------|---|----|--------|------------------------|--------------|-----------------------|
| | | | | | | | L | P | Pr | | INT (1-Certificate) | ESE (MCQ) | External Practical |
| 1 | 2 | CC | S&H | BSH42Y01 | Art & Craft | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 2 | 2 | CC | S&H | BSH42Y02 | Poster & Video Design | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 3 | 2 | CC | S&H | BSH42Y03 | IPD (Integrated of Personality Development) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 4 | 2 | CC | S&H | BSH42Y04 | Sports (Outdoor & Indoor) | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 5 | 2 | CC | S&H | BSH42Y05 | Indian Cuisine | P | 2 | 2 | 4 | 2 | 25 | - | 25 |
| 6 | 2 | CC | S&H | BSH42Y06 | Interactive English (Level-2) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 7 | 2 | CC | S&H | BSH42Y07 | Gateway to Competitive Exams (Level-2) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 8 | 2 | CC | S&H | BSH42Y08 | Foreign Language -French (Level-2) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 9 | 2 | CC | S&H | BSH42Y09 | Foreign Language-German (Level-2) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |
| 10 | 2 | CC | S&H | BSH42Y010 | Foreign Language-Japanese (Level-2) | P | 2 | 2 | 4 | 2 | 25 | 25 | - |

| | | | | | | |
|-------------|------|------|-----------|------------|---------|-----------------------------------|
| | | | | July, 2025 | 4.00 | Applicable for AY 2025-26 Onwards |
| Chairperson | Dean | Vice | Principal | Date of | Version | |



Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur)

SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per New NEP 2020)

Year – II/Semester- III



| Sr. No | Sem | Type | BoS/ Dept | Sub Code | Subject | T/ P | Contact Hours | | | Credits | % Weightage | | | ESE Duration | Total Marks |
|--------------|-----|------|-----------|----------|--|------|---------------|-----------|-----------|-----------|-------------|------------|------------|---------------|-------------|
| | | | | | | | L | P | Hrs | | CT/IA | CA | ESE | | |
| 1 | III | PCC | DS | BDS42301 | Data Structures and Algorithms | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 2 | | PCC | DS | BDS42302 | Data Structures and Algorithms Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 3 | | PCC | DS | BDS42303 | Database Management Systems | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 4 | | PCC | DS | BDS42304 | Database Management Systems Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 5 | | PCC | DS | BDS42305 | Basics of Data Analytics | T | 2 | - | 2 | 2 | 14 | 6 | 30 | 2 Hrs | 50 |
| 6 | | PCC | DS | BDS42306 | Basics of Data Analytics Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 7 | | MDM | S&H | BSH42304 | Numerical and Statistical Methods | T | 2 | - | 2 | 2 | 14 | 6 | 30 | 2 Hrs | 50 |
| 8 | | OE | DS | BDS42307 | OE-I: Object Oriented Programming with C++ | T | 4 | - | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 9 | | VEC | CE | BCE42309 | Sustainable Development Goals | T | 2 | - | 2 | 2 | 20 | - | 30 | 2 Hrs | 50 |
| 10 | | CEP | DS | BDS42309 | Field Project | P | - | 4 | 4 | 2 | - | 50 | 50 | - | 100 |
| 11 | | AEC | S&H | BSH424 | Liberal Learning Modules - 3 | P | - | 2 | 2 | 1 | 50 | - | - | 2 Hrs | 50 |
| Total | | | | | | | 16 | 12 | 28 | 22 | 188 | 167 | 395 | 23Hrs. | 750 |

| Course Category | BSC/ ESC (Basic Science Course/ Engineering Science Course.) | PCC/PEC (Programme Core courses) | VSEC (Skill Course) | Multidisciplinary Courses | | Humanities Social Science & Management | | | | Experiential Learning Courses | | | | CC (Co-Curricular Courses) |
|-----------------|--|----------------------------------|---------------------|-------------------------------|-------------------|--|------------------------------|-----------------------------|-------------------|-------------------------------|-----|---------|-----------------|----------------------------|
| | | | | MDM (Multidisciplinary minor) | OE(Open Elective) | AEC (Ability Enhancement Course) | IKS(Indian Knowledge System) | VEC(Value education Course) | Management Course | Research Methodology | CEP | Project | Internship /OJT | |
| Credits | - | 11 | - | 02 | 04 | 01 | - | 02 | - | - | 02 | - | - | - |
| Cumulative Sum | 16 / 13 | 13 | 04 | 02 | 04 | 03 | 02 | 02 | - | - | 02 | - | - | 04 |

PROGRESSIVE TOTAL CREDITS: 43+22=65

| | | | | | | |
|-------------|---------------------------------------|----------------------------|-----------|-----------------|---------|-----------------------------------|
| | | | | June, 2026 | 1.00 | Applicable for AY 2026-27 Onwards |
| Chairperson | Vice-Principal/ Director Academics | Director Administration | Principal | Date of Release | Version | |



Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per New NEP 2020)

Year – II/Semester- IV



| Sr. No | Sem | Type | BoS/ Dept | Sub Code | Subject | T/P | Contact Hours | | | Credits | % Weightage | | | ESE Duration | Total Marks |
|--------------|-----|------|-----------|----------|--------------------------------------|-----|---------------|-----------|-----------|-----------|-------------|------------|------------|---------------|-------------|
| | | | | | | | L | P | Hrs | | CT/IA | CA | ESE | | |
| 1 | IV | PCC | DS | BDS42401 | Fundamentals of Operating System | T | 2 | - | 2 | 2 | 14 | 6 | 30 | 2 Hrs | 50 |
| 2 | | PCC | DS | BDS42402 | Formal Languages and Automata Theory | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 3 | | PCC | DS | BDS42403 | Introduction to Data Science | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 4 | | PCC | DS | BDS42404 | Fundamentals of Operating System Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 5 | | PCC | DS | BDS42405 | Introduction to Data Science Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 6 | | PCC | DS | BDS42406 | Data Engineering Fundamentals | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 7 | | PCC | DS | BDS42407 | Data Engineering Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 8 | | MDM | S&H | BSH42402 | Sampling Methods & Estimation Theory | T | 2 | - | 2 | 2 | 14 | 6 | 30 | 2 Hrs | 50 |
| 9 | | OE | DS | BDS42408 | OE-II: Introduction to Data Science | T | 2 | - | 2 | 2 | 14 | 6 | 30 | 2 Hrs | 50 |
| 10 | | VSEC | DS | BDS42409 | DBA (SQL/JDBC) Lab | P | - | 4 | 4 | 2 | - | 50 | 50 | 2 Hrs | 100 |
| 11 | | AEC | S&H | BSH424 | Liberal Learning Modules - 4 | P | - | 2 | 2 | 1 | 50 | - | - | 2 Hrs | 50 |
| Total | | | | | | | 15 | 12 | 27 | 21 | 182 | 173 | 395 | 25 Hrs | 750 |

| Course Category | BSC/ ESC (Basic Science Course/ Engineering Science Course.) | PCC/PEC (Programme Core courses) | VSEC (Skill Course) | Multidisciplinary Courses | | Humanities Social Science & Management | | | | Experiential Learning Courses | | | | CC (Co-Curricular Courses) |
|-----------------|--|----------------------------------|---------------------|-------------------------------|-------------------|--|------------------------------|-----------------------------|-------------------|-------------------------------|-----|---------|-----------------|----------------------------|
| | | | | MDM (Multidisciplinary minor) | OE(Open Elective) | AEC (Ability Enhancement Course) | IKS(Indian Knowledge System) | VEC(Value education Course) | Management Course | Research Methodology | CEP | Project | Internship /OJT | |
| Credits | - | 14 | 02 | 02 | 02 | 01 | - | - | - | - | - | - | - | - |
| Cumulative Sum | 16 / 13 | 27 | 06 | 04 | 06 | 04 | 02 | 02 | - | - | 02 | - | - | 04 |

PROGRESSIVE TOTAL CREDITS: 65+21=86

| | | | | | | |
|-------------|---------------------------------------|-------------------------|-----------|-----------------|---------|-----------------------------------|
| | | | | June, 2026 | 1.00 | Applicable for AY 2025-26 Onwards |
| Chairperson | Vice-Principal/ Director Academics | Director Administration | Principal | Date of Release | Version | |



Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per New NEP 2020)

Year – III/ Semester- V



| Sr | Sem | Type | BoS/ Dept | Sub Code | Subject | T/ P | Contact Hours | | | Credits | % Weightage | | | ESE Duration | Total Marks |
|--------------|-----|------|--------------|-------------|--|---------|---------------|----------|-----------|-----------|-------------|------------|------------|-----------------|----------------|
| | | | | | | | L | P | Hrs | | CT/IA | CA | ESE | | |
| 1 | V | PCC | DS | BDS43501 | Design and Analysis of Algorithms | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 2 | | PCC | DS | BDS43502 | Design and Analysis of Algorithms Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 3 | | PCC | DS | BDS43503 | Data Mining and Data Warehouse | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 4 | | PCC | DS | BDS43505 | Cloud Computing & MLOps Fundamentals | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 5 | | PCC | DS | BDS43506 | Cloud & MLOps Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 6 | | PEC | DS | BDS43507-10 | Program Elective Course – I | T | 4 | - | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 7 | | MDM | ECE | BEC43510 | Digital System Design with HDL | T | 4 | - | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 8 | | OE | DS | BDS43511 | OE-III: Software Engineering & Quality Assurance | T | 2 | - | 2 | 2 | 14 | 6 | 30 | 2 Hrs | 50 |
| Total | | | | | | | 19 | 4 | 23 | 21 | 164 | 106 | 380 | 21 Hrs. | 650 |

| Course Category | BSC/ ESC (Basic Science Course/ Engineering Science Course.) | PCC/PEC (Programme Core courses) | VSEC (Skill Course) | Multidisciplinary Courses | | Humanities Social Science & Management | | | | Experiential Learning Courses | | | | CC (Co-Curricular Courses) |
|-----------------|--|----------------------------------|---------------------|-------------------------------|-------------------|--|------------------------------|-----------------------------|-------------------|-------------------------------|-----|---------|-----------------|----------------------------|
| | | | | MDM (Multidisciplinary minor) | OE(Open Elective) | AEC (Ability Enhancement Course) | IKS(Indian Knowledge System) | VEC(Value education Course) | Management Course | Research Methodology | CEP | Project | Internship /OJT | |
| Credits | - | 11/04 | - | 04 | 02 | - | - | - | - | - | - | - | - | - |
| Cumulative Sum | 16 / 13 | 38/04 | 06 | 08 | 08 | 04 | 02 | 02 | - | - | 02 | - | - | 04 |

PROGRESSIVE TOTAL CREDITS: 86+21=107

| | | | | | | |
|-------------|---------------------------------------|-------------------------|-----------|-----------------|---------|-----------------------------------|
| | | | | June, 2026 | 1.00 | Applicable for AY 2026-27 Onwards |
| Chairperson | Vice-Principal/ Director Academics | Director Administration | Principal | Date of Release | Version | |



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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per New NEP 2020)

Year – III/Semester- VI



| Sr | Sem | Type | BoS/ Dept | Sub Code | Subject | T/ P | Contact Hours | | | Credits | % Weightage | | | ESE Duration | Total Marks |
|--------------|-----|---------|-----------|-------------|---|------|---------------|-----------|-----------|-----------|-------------|------------|------------|---------------|-------------|
| | | | | | | | L | P | Hrs | | CT/IA | CA | ESE | | |
| 1 | VI | PCC | DS | BDS43603 | Data Visualization Technique | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 2 | | PCC | DS | BDS43604 | Data Visualization Technique Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 3 | | PCC | DS | BDS43605 | Generative AI & Large Language Models | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 4 | | PCC | DS | BDS43606 | Generative AI & Large Language Models Lab | P | - | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 50 |
| 5 | | PEC | DS | BDS43607-10 | Program Elective Course – II | T | 4 | - | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 6 | | PEC | DS | BDS43611-14 | Program Elective Course – III | T | 4 | - | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 7 | | MDM | ECE | BEC43611 | Internet of Things | T | 2 | - | 2 | 2 | 14 | 6 | 30 | 2 Hrs | 50 |
| 8 | | VSEC | DS | BDS43615 | Data Analysis using R / Power BI Lab | P | - | 4 | 4 | 2 | - | 50 | 50 | 2 Hrs | 100 |
| 9 | | Project | DS | BDS43616 | Mini Project | P | - | 2 | 2 | 1 | - | 25 | 25 | 2Hrs | 50 |
| Total | | | | | | | 16 | 10 | 26 | 21 | 134 | 171 | 395 | 22 Hrs | 700 |

| Course Category | BSC/ ESC (Basic Science Course/ Engineering Science Course.) | PCC/PEC (Programme Core courses) | VSEC (Skill Course) | Multidisciplinary Courses | | Humanities Social Science & Management | | | | Experiential Learning Courses | | | | CC (Co-Curricular Courses) |
|-----------------|--|----------------------------------|---------------------|-------------------------------|-------------------|--|------------------------------|-----------------------------|-------------------|-------------------------------|-----|---------|-----------------|----------------------------|
| | | | | MDM (Multidisciplinary minor) | OE(Open Elective) | AEC (Ability Enhancement Course) | IKS(Indian Knowledge System) | VEC(Value education Course) | Management Course | Research Methodology | CEP | Project | Internship /OJT | |
| Credits | - | 08/08 | 02 | 02 | - | - | - | 02 | - | - | - | 02 | - | - |
| Cumulative Sum | 16 / 13 | 46/12 | 08 | 10 | 08 | 04 | 02 | 04 | - | - | 02 | 02 | - | 04 |

PROGRESSIVE TOTAL CREDITS: 107+20=127

| | | | | | | |
|-------------|---------------------------------------|----------------------------|-----------|-----------------|---------|-----------------------------------|
| | | | | June, 2026 | 1.00 | Applicable for AY 2026-27 Onwards |
| Chairperson | Vice-Principal/ Director Academics | Director Administration | Principal | Date of Release | Version | |



Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur)

SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per New NEP 2020)

Year – IV/Semester- VII



| Sr | Sem | Type | BoS/ Dept | Sub Code | Subject | T/ P | Contact Hours | | | Credits | % Weightage | | | ESE Duration | Total Marks |
|--------------|-----|---------|--------------|-------------|---------------------------------|---------|---------------|----------|-----------|-----------|-------------|------------|------------|-----------------|----------------|
| | | | | | | | L | P | Hrs | | CT/IA | CA | ESE | | |
| 1 | VII | PCC | DS | BDS44801 | Big Data Analytics | T | 4 | 0 | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 2 | | PCC | DS | BDS44702 | Cyber Security for Data Science | T | 3 | - | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 3 | | PEC | DS | BDS44703-06 | Program Elective Course -IV | T | 4 | 0 | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 4 | | PEC | DS | BDS44707-10 | Program Elective Course-V | T | 4 | 0 | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 5 | | MDM | ECE | BEC44710 | Embedded Systems | T | 3 | 0 | 3 | 3 | 30 | 10 | 60 | 3 Hrs | 100 |
| 6 | | MDM | ECE | BEC44711 | Embedded Systems - Lab | P | 0 | 2 | 2 | 1 | - | 25 | 25 | 2 Hrs | 100 |
| 7 | | PROJECT | DS | BDS44711 | Project | P | 0 | 6 | 6 | 3 | - | 100 | 100 | 2 Hrs | 200 |
| Total | | | | | | | 18 | 8 | 26 | 22 | 150 | 175 | 425 | 19 Hrs. | 800 |

| Course Category | BSC/ ESC (Basic Science Course/ Engineering Science Course.) | PCC/PEC (Programme Core courses) | VSEC (Skill Course) | Multidisciplinary Courses | | Humanities Social Science & Management | | | | Experiential Learning Courses | | | | CC (Co- Curricular Courses) |
|-----------------|---|--|---------------------------|-------------------------------------|----------------------|--|------------------------------------|-----------------------------------|----------------------|----------------------------------|-----|---------|--------------------|-----------------------------------|
| | | | | MDM (Multidisciplinary minor) | OE(Open Elective) | AEC (Ability Enhancement Course) | IKS(Indian Knowledge System) | VEC(Value education Course) | Management Course | Research Methodology | CEP | Project | Internship /OJT | |
| Credits | - | 07/08 | - | 04 | - | - | - | - | - | - | - | 03 | - | - |
| Cumulative Sum | 16 / 13 | 53/20 | 08 | 14 | 08 | 04 | 02 | 04 | - | - | 02 | 05 | - | 04 |

PROGRESSIVE TOTAL CREDITS: 127 +22=149

| | | | | | | |
|-------------|---------------------------------------|----------------------------|-----------|-----------------|---------|--------------------------------------|
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Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur)

SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)

Year – IV/Semester- VIII



| Sr | Sem | Type | BoS/ Dept | Sub Code | Subject | T/P | Contact Hours | | | Credits | % Weightage | | | ESE Duration | Total Marks |
|--------------|------|------------------------------------|--------------|----------|-----------------------------|-----|---------------|-----------|-----------|-----------|-------------|-----------|------------|-----------------|----------------|
| | | | | | | | L | P | Hrs | | CT/IA | CA | ESE | | |
| 1 | VIII | PCC | DS | BDS44801 | Research Methodology | T | 4 | 0 | 4 | 4 | 30 | 10 | 60 | 3 Hrs | 100 |
| 2 | | Internship/ Industry Project | | BDS44802 | Internship/Industry Project | p | 0 | 24 | 24 | 12 | 0 | 75 | 75 | 24 Hrs | 150 |
| Total | | | | | | | 4 | 24 | 28 | 16 | 30 | 85 | 135 | 27 Hrs | 250 |

* Highlights courses through SWAYM NPTEL platform.

| Course Category | BSC/ ESC (Basic Science Course/ Engineering Science Course.) | PCC/PEC (Programme Core courses) | VSEC (Skill Course) | Multidisciplinary Courses | | Humanities Social Science & Management | | | | Experiential Learning Courses | | | | CC (Co- Curricular Courses) | |
|-----------------|---|--|---------------------------|-------------------------------------|----------------------|--|------------------------------------|-----------------------------------|----------------------|----------------------------------|-----|---------|--------------------|-----------------------------------|---|
| | | | | MDM (Multidisciplinary minor) | OE(Open Elective) | AEC (Ability Enhancement Course) | IKS(Indian Knowledge System) | VEC(Value education Course) | Management Course | Research Methodology | CEP | Project | Internship /OJT | | |
| Credits | - | 02 | - | - | - | - | - | - | - | - | 04 | - | - | 12 | - |
| Cumulative Sum | 16 / 13 | 55/20 | 08 | 14 | 08 | 04 | 02 | 04 | - | 04 | 02 | 05 | 12 | 04 | |

PROGRESSIVE TOTAL CREDITS: 149 +16 =165

| | | | | | | |
|-------------|---------------------------------------|----------------------------|-----------|-----------------|---------|--------------------------------------|
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Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)

Programme: B.Tech in Computer Science and Engineering (Data Science)

List of Program Electives offered by Computer Science and Engineering (Data Science) Department



| Domain wise Cluster | Program Elective - I | Program Elective -II | Program Elective - III | Program Elective - IV | Program Elective - V |
|---|--|--|---|---|---|
| Semesters | Semester V | Semester VI | Semester VI | Semester VII | Semester VIII |
| Domain-1 Network and Security | BDS43506 Cyber Law and Ethics | BDS43606 Cryptography | BDS43610 Computer Security | BDS44702 Cloud Security | BDS44803 Network Security Administration |
| Domain-2 AI ML | BDS43507 Artificial Intelligence | BDS43607 Machine Learning | BDS43611 Business Intelligence | BDS44703 Neural Network | BDS44804 Deep Learning in Data Analytics |
| Domain-3 IoT | BDS43508 TCP/IP | BDS43608 Mobile Computing | BDS43612 Ad-Hoc Sensor Networks | BDS44704 Internet of Things | BDS44805 Cloud Computing and IoT |
| Domain-4 Digital Healthcare | BDS43509 Introduction of Digital Healthcare | BDS43609 Medical Imaging Analysis with AI | BDS43613 Introduction to Internet of Medical Thing | BDS44705 Healthcare Data Management and Security | BDS44806 Mobile Health Applications |
| Domain-5 Data Engineering | BDS43510 Stream Processing | BDS43610 Data Lakehouse | BDS43614 Apache Spark | BDS44706 Real-time Analytics | BDS44807 Vector DBs & Embedding |

Program: B. Tech Computer Science and Engineering (Data Science)

List of Open Electives offered by Computer Science and Engineering (Data Science)

| Open Elective-I | Open Elective-II | Open Elective-III |
|---|---|---|
| Semester-III | Semester-IV | Semester-V |
| BDS42307 – Object Oriented Programming with C++ | BDS42407 – Introduction to Data Science | BDS43510 – Software Engineering and Quality Assurance |

| | | | | | | |
|-------------|---------------------------------------|----------------------------|-----------|-----------------|---------|---|
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Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)



Total Credits: B. Tech Computer Science and Engineering (Data Science)

List of **Liberal Learning Modules - 3** offered by Computer Science and Engineering (Data Science)

Year – II/Semester- III

| Sr | Sem | Type | BoS/ Dept | Sub Code | Subject | T/ P | Contact Hours | | | Credits | % Weightage | | | ESE Duration | Total Marks |
|----|-----|------|--------------|----------|--|---------|---------------|---|-----|---------|-------------|----|-----|-----------------|----------------|
| | | | | | | | L | P | Hrs | | CT/IA | CA | ESE | | |
| 1 | III | AEC | DS | BDS42310 | Creative Writing & Storytelling | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 2 | | AEC | DS | BDS42310 | Photography & Digital Editing | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 3 | | AEC | DS | BDS42310 | Public Speaking & Presentation Skills | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 4 | | AEC | DS | BDS42310 | Advanced Dance & Choreography | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 5 | | AEC | DS | BDS42310 | Physical Fitness & Wellness Training | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 6 | | AEC | DS | BDS42310 | Interactive English (Level-3) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 7 | | AEC | DS | BDS42310 | Competitive Exam Preparation (Level-3) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 8 | | AEC | DS | BDS42310 | Foreign Language – French (Level-3) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 9 | | AEC | DS | BDS42310 | Foreign Language – German (Level-3) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 10 | | AEC | DS | BDS42310 | Foreign Language – Japanese (Level-3) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |

| | | | | | | |
|-------------|---------------------------------------|----------------------------|-----------|-----------------|---------|---|
| | | | | June, 2026 | 1.00 | Applicable for AY 2025-26 Onwards |
| Chairperson | Vice-Principal/ Director Academics | Director Administration | Principal | Date of Release | Version | |



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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)



Total Credits: B. Tech Computer Science and Engineering (Data Science)

List of **Liberal Learning Modules - 4** offered by Computer Science and Engineering (Data Science)

Year – II/Semester- IV

| Sr | Sem | Type | BoS/Dept | Sub Code | Subject | T/P | Contact Hours | | | Credits | % Weightage | | | ESE Duration | Total Marks |
|----|-----|------|----------|----------|---|-----|---------------|---|-----|---------|-------------|----|-----|--------------|-------------|
| | | | | | | | L | P | Hrs | | CT/IA | CA | ESE | | |
| 1 | IV | AEC | DS | BDS42410 | Digital Marketing & Social Media Skills | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 2 | | AEC | DS | BDS42410 | Event Management & Leadership | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 3 | | AEC | DS | BDS42410 | Personality Grooming & Professional Etiquette | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 4 | | AEC | DS | BDS42410 | Theatre Acting & Stage Techniques | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 5 | | AEC | DS | BDS42410 | Professional Fitness & Lifestyle Management | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 6 | | AEC | DS | BDS42410 | Interactive English (Level-4) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 7 | | AEC | DS | BDS42410 | Competitive Exam Preparation (Level-4) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 8 | | AEC | DS | BDS42410 | Foreign Language – French (Level-4) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 9 | | AEC | DS | BDS42410 | Foreign Language – German (Level-4) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |
| 10 | | AEC | DS | BDS42410 | Foreign Language – Japanese (Level-4) | P | - | 4 | 4 | 2 | - | 25 | 25 | 2 Hrs | 50 |

| | | | | | | |
|-------------|---------------------------------------|----------------------------|-----------|-----------------|---------|---|
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Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)



Total Credits: B. Tech Computer Science and Engineering (Data Science)

| Sr. No. | Semester | Credits |
|----------------------|----------|------------|
| 1 | I | 21 |
| 2 | II | 22 |
| 3 | III | 22 |
| 4 | IV | 21 |
| 5 | V | 21 |
| 6 | VI | 21 |
| 7 | VII | 22 |
| 8 | VIII | 16 |
| Total Credits | | 166 |

| | | | | | | |
|-------------|---------------------------------------|----------------------------|-----------|-----------------|---------|---|
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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)



HONORS SPECIALIZATION IN DIGITAL FORENSICS AND INFORMATION SECURITY

| Sr. No | Sem | Course Code | Subject | Nature of Evaluation | Credits |
|--------------|------|-------------|--|----------------------|-----------|
| 1 | III | BDS32324 | Digital Forensics | ESE/NPTEL | 04 |
| 2 | IV | BDS32424 | Information Security and Cyber Forensics | ESE/NPTEL | 04 |
| 3 | V | BDS33525 | Introduction to Forensic Science and Cyber Law | ESE/NPTEL | 03 |
| 4 | VI | BDS33623 | Mobile Forensics | ESE/NPTEL | 03 |
| 5 | VII | BDS34723 | Web Application Security | ESE/NPTEL | 03 |
| 6 | VIII | BDS34822 | Malware Analysis & Forensics | ESE/NPTEL | 03 |
| Total | | | | | 20 |



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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)

MINORS SPECIALIZATION IN COMPUTER SCIENCE AND ENGINEERING – DATA SCIENCE



| Sr. No | Sem | Course Code | Subject | Nature of Evaluation | Credits |
|--------------|------|-------------|---|----------------------|-----------|
| 1 | III | BDS32321 | Python for Data Science | ESE/NPTEL | 01 |
| 2 | | BDS32322 | Programming, Data Structure and Algorithms in Python | ESE/NPTEL | 02 |
| 3 | | BDS32323 | Introduction to Data Analytics | ESE/NPTEL | 02 |
| 4 | IV | BDS32421 | Data Science for Engineers | ESE/NPTEL | 02 |
| 5 | | BDS32422 | Data Analytics with Python | ESE/NPTEL | 03 |
| 6 | | BDS32423 | Introduction to Machine Learning | ESE/NPTEL | 03 |
| 7 | V | BDS33521 | Reinforcement Learning | ESE/NPTEL | 03 |
| 8 | | BDS33522 | An Introduction to Artificial Intelligence | ESE/NPTEL | 03 |
| 9 | | BDS33523 | Computer Vision | ESE/NPTEL | 03 |
| 10 | | BDS33524 | Natural Language Processing | ESE/NPTEL | 03 |
| 11 | VI | BDS33621 | Learning Analytics Tools | ESE/NPTEL | 03 |
| 12 | | BDS33622 | Artificial Intelligence: Knowledge Representation and Reasoning | ESE/NPTEL | 03 |
| 13 | VII | BDS34721 | Practical Machine Learning with Tensorflow | ESE/NPTEL | 02 |
| 14 | | BDS34722 | Probability for Computer Science | ESE/NPTEL | 02 |
| 15 | VIII | BDS34821 | Linear Programming and its Applications to Computer Science | ESE/NPTEL | 02 |
| 16 | | BDS34822 | Learning Analytics Tools | ESE/NPTEL | 03 |
| Total | | | | | 20 |



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SCHEME OF INSTRUCTION & SYLLABI

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Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)

Exit Course



Award of UG Certificate (After First Year)

| Sr. No | Course Name | Mode of conduction | Credits |
|-----------|----------------------------------|---------------------------------------|---------|
| 01 | Database management System | Certification Online/Offline/NPTEL | 03* |
| 02 | Introduction to Data Science | Certification Online/Offline/NPTEL | 03* |
| 03 | Introduction to Data Science lab | Certification Online/Offline/NPTEL | 02* |
| OR | | | |
| 01 | Industry Internship | - | 08# |

Award of Diploma (After 2 Year)

| Sr. No | Course Name | Mode of conduction | Credits |
|-----------|----------------------------------|---------------------------------------|---------|
| 01 | Data Mining and Data Warehouse | Certification Online/Offline/NPTEL | 03* |
| 02 | Data Visualization Technique | Certification Online/Offline/NPTEL | 03* |
| 03 | Data Visualization Technique Lab | Certification Online/Offline/NPTEL | 02* |
| OR | | | |
| 01 | Industry Internship | - | 08# |



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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Computer Science and Engineering – Data Science

Scheme of Instructions: B. Tech. Computer Science and Engineering – Data Science (As Per NEP 2020)



Award of Vocational Degree (After 3 Year)

| Sr. No | Course Name | Mode of conduction | Credits |
|-----------|------------------------------------|---------------------------------------|---------|
| 01 | Data Analytics | Certification Online/Offline/NPTEL | 03* |
| 02 | Data Modeling and Optimization | Certification Online/Offline/NPTEL | 03* |
| 03 | Data Modeling and Optimization Lab | Certification Online/Offline/NPTEL | 02* |
| OR | | | |
| 01 | Industry Internship | - | 08# |

| | | | | | | |
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