



**NADIMPALLI SATYANARAYANA RAJU
INSTITUTE OF TECHNOLOGY
(AUTONOMOUS)**



Approved by AICTE, New Delhi & Affiliated to JNTUK, Kakinada & An ISO 9001, ISO 14001 & ISO 45001 Certified Institution
Recognized under 2(f) of the UGC Act 1956 & Accredited by NAAC with 'A' Grade (3-10/4-00)
SONTYAM, Pondurtn - Anandapuram Highway, Visakhapatnam - 531173, Ph: 9885024167, 8099464546, www.nsr.it.edu.in

Department of Civil Engineering

Few specific feedback received reflecting the needs of stakeholders at Local-, Regional-, National, International level
(The feedbacks are received through centralised online system using google form with timestamp and reflected in the Feedback Form by the Program Coordinator of Civil Engineering for documentation attested by the HoD). The received feedback (s) are further discussed in the internal pre-BoS meeting and escalated to the BoS for necessary approval.

| Geographical Location | Few samples feedback received | Integration into the curriculum | | Semester | POs/PSOs |
|-----------------------|-------------------------------|---------------------------------|--|----------|------------------------|
| | | Course Code | Course Name | | |
| Local | Computer Aided Tool Design | 20CE302 | Building Planning and Drawing | III | 01, 04, 05, 10, PSO# 1 |
| | | 20CESO2 | Computer Applications in Civil Engineering | VI | 01, 04, 05, 10, PSO# 1 |
| | Programming Skills | 20CS407 | Python Programming | IV | 01, 02, 04, 05 |
| | | 20ESX02 | Programming of Problem-solving using C | I | 01, 02, 04, 05 |
| | Communication | 20HSX01 | Communicative English | I | 10 |
| | | - | Summer Internship | V & VII | 10 |
| - | | Technical paper Writing | V | 10 | |
| Regional | State of Art Courses | 20CEHO8 | Building Information Modelling | VI | 01, 05, 10, PSO 2 |
| | Communication | 20HSX01 | Communicative English | I | 10 |

Commented [ds1]: Hai

Commented [ds2R1]: Though 'C' Programming is already there in the curriculum, stakeholders feel that Python Programming is very much essential for all. In that context, it is included in the curriculum and shown as proof. All other similar evidences are shown in trailing part of the proof.

[Signature]
24/11/23
**Head of the Department
Dept. of Civil Engineering
N.S. Raju Institute of Technology(A)
Sontyam, Visakhapatnam-531173.**

| | | | | | |
|--------------------------|--------------------------|--|--|-----------------------|-----------------------|
| | | - | Summer Internship | V & VII | 10 |
| | | - | Technical paper Writing | V | 10 |
| | Programming Skills | 20CS407 | Python Programming | IV | 01, 02, 04, 05, 10 |
| | | 20ESX02 | Programming of Problem-solving using C | I | 01, 02, 04, 05, 10 |
| National | Environmental Challenges | 20CE603 | Environmental Engineering | VI | 02, 03, 06, PSO2 |
| | | 20CE008 | Environmental Impact Assessment | VI | Professional Elective |
| | | 20CE014 | Solid Waste Management | VII | Professional Elective |
| | Smart Technologies | 20ECO01 | Architectures and Algorithms of IOT | V | Open Elective |
| | | 20CS002 | Designing of Internet of Things | VI | Open Elective |
| | | 20ECO03 | Privacy and Security in IOT | VII | Open Elective |
| | | 20CEH01 | Cognitive Management of IoT for Smart Cities | IV | Honors |
| Repairs & Rehabilitation | 20CE013 | Repairs and Rehabilitation of Structures | VII | Professional Elective | |
| International | Environmental Challenges | 20CE603 | Environmental Engineering | VI | 02, 03, 06, PSO2 |
| | | 20CE008 | Environmental Impact Assessment | VI | Professional Elective |


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| | | | | | |
|--|----------------------------------|---------|---|---------|-----------------------|
| | | 20CE014 | Solid Waste Management | VII | Professional Elective |
| | | 20CE018 | Hazardous Waste Management | VIII | Professional Elective |
| | Climate & Sustainability Changes | 20CEM02 | Climate Changes Mitigation and Adaption | V | Minors |
| | | 20CEM01 | Air Pollution, | IV | Minors |
| | | 20CEM03 | Sustainability and Pollution-Prevention and Practices | VI | Minors |
| | Smart Technologies | 20ECO01 | Architectures and Algorithms of IOT | V | Open Elective |
| | | 20CSO02 | Designing of Internet of Things | VI | Open Elective |
| | | 20ECO03 | Privacy and Security in IOT | VII | Open Elective |
| | | 20CEH01 | Cognitive Management of IoT for Smart Cities | IV | Honors |
| | Communication | 20HSX01 | Communicative English | I | 10 |
| | | - | Summer Internship | V & VII | 10 |
| | | - | Technical paper Writing | V | 10 |


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Short Term Skill Oriented Electives

included ←

| | | | | | | | |
|---|---------|---|---|---|----|-----|-----|
| 34 | 20CES01 | Python Programming | 0 | 0 | 4 | 2.0 | SC |
| 35 | 20CES02 | Computer Applications in Civil Engineering | 0 | 0 | 4 | 2.0 | SC |
| 36 | 20CES04 | Estimation and Costing | 0 | 0 | 4 | 2.0 | SC |
| Industry Connect Courses (Skill Oriented Courses) ¹⁰ | | | | | | | |
| 37 | 20ICC01 | Competitive Programming | 2 | 0 | 8 | 6.0 | ICC |
| 38 | 20ICC02 | Web Technologies – Transferring to Practice | 2 | 0 | 8 | 6.0 | ICC |
| 39 | 20ICC03 | Java and Spring boot | 2 | 0 | 8 | 6.0 | ICC |
| 40 | 20ICC04 | Robotics Process Automation | 2 | 0 | 8 | 6.0 | ICC |
| 41 | 20ICC05 | Information Security and Forensics | 2 | 0 | 8 | 6.0 | ICC |
| 42 | 20ICC06 | Battery System – Design Engineering | 2 | 0 | 8 | 6.0 | ICC |
| 43 | 20ICC07 | Blockchain Technology | 2 | 0 | 8 | 6.0 | ICC |
| 44 | 20ICC08 | Network Administration | 2 | 0 | 8 | 6.0 | ICC |
| 45 | 20ICC09 | Product Engineering | 2 | 0 | 14 | 9.0 | ICC |
| 46 | 20ICC10 | Machine Learning Engineer | 2 | 0 | 8 | 6.0 | ICC |
| 47 | 20ICC11 | Data Scientist | 2 | 0 | 8 | 6.0 | ICC |
| 48 | 20ICC12 | Industrial IoT | 2 | 0 | 8 | 6.0 | ICC |

¹⁰ The credits earned through Industry Connect Courses (Skill Oriented Course) can be tradeoff with any other 3-Credit course other than Professional Core

20CS407 Python Programming Lab

0 0 3 1.5

At the end of the course, students will be able to

| Code | Course Outcomes | Mapping with POs | |
|-----------|---|------------------|------|
| | | PO1 | PO12 |
| 20CS407.1 | Illustrate the use of basic concepts of Python Programming | 3 | 1 |
| 20CS407.2 | Demonstrate the use of control Structures and Data Structures in Python | 3 | 1 |
| 20CS407.3 | Build programs using functions for resolving simple problems | 3 | 1 |
| 20CS407.4 | Explain the usage of Object oriented concepts and files | 3 | 1 |
| 20CS407.5 | Apply mathematical libraries for analyzing data sets with GUI | 3 | 1 |

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective Pos

List of Experiments

1.
 - a. Write a program that asks the user for a weight in kilograms and converts it to pounds
 - b. Write a program to find total and average of 3 numbers
 - c. Write a program that uses a for loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89
2.
 - a. Write a program that should print out the user's name the specified number of times
 - b. Use for loop to print a triangle like the one below. Allow the user to specify how high the triangle should be


```

                    *
                    **
                    ***
                    ****
                    
```
 - c. Generate a random number between 1 and 10. Ask the user to guess the number and print a message based on whether they get it right or not
3.
 - a. Write a program that asks the user for two numbers and prints Close if the numbers are within .001 of each other and Not close otherwise
 - b. Write a program that asks the user to enter a word and prints out whether that word contains any vowels
 - c. Write a program that asks the user to enter two strings of the same length. If they are not, the program should print an appropriate message and exit
4.
 - a. Write a program that asks the user for a large integer and inserts commas into it according to the standard American convention for commas in large numbers
 - b. Write a program that asks the user for an algebraic expression and then inserts multiplication symbols where appropriate
5. Write a program that generates a list of 20 random numbers between 1 and 100. Print the list.
 - a. Print the average of the elements in the list.
 - b. Print the largest and smallest values in the list.
 - c. Print the second largest and second smallest entries in the list
 - d. Print how many even numbers are in the list
6.
 - a. Write a program that asks the user for an integer and creates a list that consists of the factors of that integer
 - b. Write a program that generates 100 random integers that are either 0 or 1. Then find the longest run of zeros, the largest number of zeros in a row
 - c. Write a program that removes any repeated items from a list so that each item appears at most once. For instance, the list [1,1,2,3,4,3,0,0] would become [1,2,3,4,0]
7.
 - a. Write a function called sum digits that is given an integer num and returns the sum of the digits of numbers
 - b. Write a function called first diff that is given two strings and returns the first location in which the strings differ. If the strings are identical, it should return -1
 - c. Write a function called number of factors that takes an integer and returns how many factors the number has
 - d. Write a function called is sorted that is given a list and returns True if the list is sorted and False otherwise
8.
 - a. Write a function called root that is given a number x and an integer n and returns x^{1/n}. In the function definition, set the default value of n to 2
 - b. Write a function called primes that is given a number n and returns a list of the first n primes. Let the default



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value of n be 100

- c. Write a function called merge that takes two already sorted lists of possibly different lengths, and merges them into a single sorted list: i. Do this using the sort method ii. Do this without using the sort method
9.
 - a. Write a program that reads a file consisting of email addresses, each on its own line. Your program should print out a string consisting of those email addresses separated by semicolons.
 - b. Write a program that reads a list of temperatures from a file called temps.txt, converts those temperatures to Fahrenheit, and writes the results to a file called ftemps.txt.
10. Write programs to demonstrate the usage of class
11. Write programs to demonstrate the usage of GUI
12. Write programs to demonstrate the usage Matplotlib library

References

1. Lab Manual for " Python Programming ", Department of Computer Science Engineering, NSRIT

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Chairman
Board of Studies (CE)

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(Additional evidences)
Highlighted

Civil Engineering

Credit requirement for the award of the degree under academic Regulation 2020 – 2021 for the candidates admitted from the academic year 2021 onwards

| | Four Years | Three Years |
|--|------------|-------------|
| B. Tech. (Regular Degree) | 160 | 121 |
| B. Tech. (Honors Degree) | 180 | 141 |
| B. Tech. (With Minor specialization other than Chosen Branch of Engg. & Tech.) | 180 | 141 |

Semester I

| No. | Code | Course | POs | Contact Hours | | | | |
|-----------|---------|---|--------------------|---------------|----------------|----|------|----|
| | | | | L | T ¹ | P | C | |
| 01 | 20HSX01 | Communicative English | 10 | 3 | 0 | 0 | 3.0 | HS |
| 02 | 20BSX11 | Linear Algebra and Differential Equations | 1, 12 ² | 3 | 1 | 0 | 3.0 | BS |
| 03 | 20BSX21 | Engineering Chemistry | 1 | 3 | 0 | 0 | 3.0 | BS |
| 04 | 20ESX01 | Engineering Drawing | 1, 5, 10 | 1 | 0 | 4 | 3.0 | ES |
| 05 | 20ESX02 | Programming for Problem Solving Using 'C' | 1 | 3 | 0 | 0 | 3.0 | ES |
| 06 | 20HSX02 | Communicative English Lab | 10 | 0 | 0 | 3 | 1.5 | HS |
| 07 | 20BSX22 | Engineering Chemistry Lab | 1, 4 | 0 | 0 | 3 | 1.5 | BS |
| 08 | 20ESX07 | Programming for Problem Solving Using 'C' Lab ^ | 1, 4 | 0 | 0 | 3 | 1.5 | ES |
| Sub-total | | | | 13 | 01 | 13 | 19.5 | |

Semester II

| | | | | | | | | |
|-----------|---------|--|------|----|----|----|------|----|
| 01 | 20BSX12 | Partial Differential Equations and Vector Calculus | 1 | 3 | 1 | 0 | 3.0 | BS |
| 02 | 20BSX31 | Engineering Physics | 1 | 3 | 0 | 0 | 3.0 | BS |
| 03 | 20ESX05 | Basic Electrical and Electronics Engineering | 1 | 3 | 1 | 0 | 3.0 | ES |
| 04 | 20ESX04 | Engineering Mechanics | 1 | 3 | 1 | 0 | 3.0 | ES |
| 05 | 20CE201 | Building Materials | 2, 5 | 3 | 0 | 0 | 3.0 | ES |
| 06 | 20BSX32 | Engineering Physics Lab | 1, 4 | 0 | 0 | 3 | 1.5 | BS |
| 07 | 20ESX08 | Basic Electrical and Electronics Engineering Lab | 1, 4 | 0 | 0 | 3 | 1.5 | ES |
| 08 | 20ESX06 | Engineering Workshop | 4 | 0 | 0 | 3 | 1.5 | ES |
| 09 | 20MCX01 | Environmental Science | 1 | 2 | 0 | 0 | - | |
| Sub-total | | | | 17 | 03 | 09 | 19.5 | |

Semester III

| | | | | | | | | |
|-----------|---------|---|--------------|----|----|----|------|----|
| 01 | 20BSX13 | Numerical Methods and Transforms | 1 | 3 | 1 | 0 | 3.0 | BS |
| 02 | 20CE302 | Building Planning and Drawing | 1, 10, PSO 1 | 3 | 0 | 0 | 3.0 | PC |
| 03 | 20CE303 | Surveying | 1 | 3 | 1 | 0 | 3.0 | PC |
| 04 | 20CE304 | Strength of Materials | 1, PSO #1 | 3 | 1 | 0 | 3.0 | PC |
| 05 | 20CE305 | Fluid Mechanics | 1, 3, PSO #2 | 3 | 1 | 0 | 3.0 | PC |
| 06 | 20CE306 | Surveying Lab | 5, 10 | 0 | 0 | 3 | 1.5 | PC |
| 07 | 20CE307 | Strength of Materials Lab | 1, 4 | 0 | 0 | 3 | 1.5 | PC |
| 08 | 20CE308 | Fluid Mechanics and Hydraulic Machinery Lab | 1, 4 | 0 | 0 | 3 | 1.5 | PC |
| 09 | 20CES01 | Short-term Skill Oriented Elective | 1, 5, 10 | 0 | 0 | 4 | 2.0 | SC |
| 10 | 20MCX02 | Constitution of India ³ | - | 2 | 0 | 0 | - | |
| Sub-total | | | | 18 | 04 | 11 | 21.5 | |

¹ Suggested tutorial hours will not carry any credits

² By default, all courses are mapped to PO 12 as they are weakly contributing

³ It is mandate for all students to pursue an online certification course for minimum duration of 30 hours covering the areas of Sustainability, Climate changes, Environmental Impact Assessment in line with Sustainable Development Goals (SDG)



Semester IV

| No. | Code | Course | POs | Contact Hours | | | | |
|-----------|---------|---|--------------------|---------------|----|----|------|----|
| | | | | L | T | P | C | |
| 01 | 20HSX03 | Managerial Economics and Financial Analysis | 11 | 3 | 0 | 0 | 3.0 | HS |
| 02 | 20CE402 | Hydraulics and Hydraulic Machinery | 1, 3, PSO #2 | 3 | 1 | 0 | 3.0 | ES |
| 03 | 20CE403 | Concrete Technology | 1, 2, 6, 8 | 3 | 0 | 0 | 3.0 | PC |
| 04 | 20CE404 | Soil Mechanics | 1, 2, 3, 6, PSO #1 | 3 | 0 | 0 | 3.0 | PC |
| 05 | 20CE405 | Construction Project Management | 11 | 3 | 0 | 0 | 3.0 | PC |
| 06 | 20CS407 | Python Programming Lab | 1 | 0 | 0 | 3 | 1.5 | ES |
| 07 | 20CE407 | Concrete Technology Lab | 1, 2, 4 | 0 | 0 | 3 | 1.5 | PC |
| 08 | 20CE408 | Soil Mechanics Lab | 1 | 0 | 0 | 3 | 1.5 | PC |
| 09 | 20CES02 | Short-term Skill Oriented Elective | 1, 5, 10 | 0 | 0 | 4 | 2.0 | SC |
| Sub-total | | | | 16 | 01 | 11 | 21.5 | |

Semester V

| | | | | | | | | |
|-----------|---------|---|---------------------|----|----|----|------|----|
| 01 | 20CE501 | Structural Analysis | 1, PSO 1 | 3 | 1 | 0 | 3.0 | PC |
| 02 | 20CE502 | Design of Reinforced Concrete Elements | 1, 3, 8, PSO #1 | 3 | 1 | 0 | 3.0 | PC |
| 03 | 20CE503 | Foundation Engineering | 1, 3, 6, PSO #1, 2 | 3 | 1 | 0 | 3.0 | PC |
| 04 | - | Professional Elective I | - | 3 | 0 | 0 | 3.0 | PE |
| 05 | - | Open Elective I | - | 3 | 0 | 0 | 3.0 | OE |
| 06 | 20CE506 | Drawing of Reinforced Concrete Structures | 1, 3, PSO #1 | 0 | 0 | 3 | 1.5 | PC |
| 07 | 20CE507 | Irrigation Design and Drawing | 5, 10, 6, PSO #1, 2 | 0 | 0 | 3 | 1.5 | PC |
| 08 | - | Technical Paper Writing ⁴ | 1, 4, 5, 10 | 0 | 0 | 4 | 2.0 | SC |
| 09 | 20MCX03 | Intellectual Property Rights and Patents ⁵ | - | 2 | 0 | 0 | - | MC |
| 10 | - | Summer Internship #1 ⁶ / CSP | 5, 8, 9, 10, PSO 1 | 0 | 0 | 0 | 1.5 | IN |
| Sub-total | | | | 17 | 03 | 08 | 21.5 | |


⁴ The students are expected to identify one research area in the recent trends, collect recent research articles, prepare a technical research review paper and publish in renowned annual conferences/ journals, preferably indexed in Scopus or UGC care

⁵ The students are expected to identify one research area in the recent trends, collect recent research articles, prepare a technical research review paper and publish in renowned annual conferences/ journals, preferably indexed in Scopus or UGC care

⁶ The work pertaining to summer Internship #1 and #2 shall be completed at the end of the semesters IV & VI respectively. The assessment shall be carried out during the semesters V and VII

It is mandate for all the students to undergo 4-6 weeks of industrial training and appear for assessment during Semester V with report. With regard to Community Service Project (CSP), based on the availability the students can opt CSP as an alternate option for summer internship #1 for a duration of 08 weeks

V


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| Semester VI | | | | | | | | |
|---------------|---------|---|--------------------|----|----|----|------|----|
| 01 | 20CE601 | Transportation Engineering | PSO 2 | 3 | 0 | 0 | 3.0 | PC |
| 02 | 20CE602 | Design of Steel Structures | 3, 10, PSO #1 | 3 | 1 | 0 | 3.0 | PC |
| 03 | 20CE603 | Environmental Engineering | 2, 3, 6, PSO #2 | 3 | 0 | 0 | 3.0 | PC |
| 04 | - | Professional Elective II | - | 3 | 0 | 0 | 3.0 | PE |
| 05 | - | Open Elective II | - | 3 | 0 | 0 | 3.0 | OE |
| 06 | 20CE606 | Detailing and Drawing of Steel Structures | 10, PSO 1 | 0 | 0 | 3 | 1.5 | PG |
| 07 | 20CE607 | Transportation Engineering Lab | 4, PSO 2 | 0 | 0 | 3 | 1.5 | PC |
| 08 | 20CE608 | Environmental Engineering Lab | 4, PSO 2 | 0 | 0 | 3 | 1.5 | PC |
| 09 | 20CES04 | Short-term Skill Oriented Elective | 1, 5, 10 | 0 | 0 | 4 | 2.0 | SC |
| 10 | 20MCX04 | Indian Traditional Knowledge ⁷ | - | 2 | 0 | 0 | - | IN |
| Sub-total | | | | 17 | 01 | 13 | 21.5 | |
| Semester VII | | | | | | | | |
| 01 | - | Professional Elective III | - | 3 | 0 | 0 | 3.0 | PE |
| 02 | - | Professional Elective IV | - | 3 | 0 | 0 | 3.0 | PE |
| 03 | - | Professional Elective V | 12 | 3 | 0 | 0 | 3.0 | PE |
| 04 | - | Open Elective III | - | 3 | 0 | 0 | 3.0 | OE |
| 05 | - | Open Elective IV | 12 | 3 | 0 | 0 | 3.0 | OE |
| 06 | 20HSX04 | Professional Ethics | 8 | 3 | 0 | 0 | 3.0 | HS |
| 07 | 20CES05 | Finishing School for Civil Engineering | 9, PSO 1 | 0 | 0 | 4 | 2.0 | SC |
| 08 | - | Summer Internship #2 ⁸ | 5, 8, 9, 10, PSO 1 | 0 | 0 | 0 | 3.0 | IN |
| Sub-total | | | | 18 | 0 | 04 | 23.0 | |
| Semester VIII | | | | | | | | |
| 01 | - | Full Semester Internship ⁹ | 5-10, PSO 1, PSO 2 | 0 | 0 | 0 | 06 | IN |
| 02 | - | Capstone Project | 5-10, PSO 1, PSO 2 | 0 | 0 | 0 | 06 | IN |
| Sub-total | | | | 0 | 0 | 0 | 12.0 | |
| Total Credits | | | | - | - | - | 160 | |

⁷ It is mandate for all the students to pursue an online certification course for minimum duration of 30 hours covering the application of ITK in Science Engineering & Technology

⁸ It is mandate for all the students to undergo 6-8 weeks of industrial training and appear for assessment during Semester VII with report and those opted FSI during Semester VII shall appear through online for reviews

⁹ Students opting for FSI in VII semester have to take up courses of VII semester in VIII semester. The students are expected to do a capstone project parallelly demonstrating their POs & PSOs and submit a separate report

VI



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List of Electives

Professional Elective #1

| | | | | | | | | |
|---|---------|---|---|---|---|---|-----|----|
| 1 | 20CE001 | Advanced Concrete Technology | - | 3 | 0 | 0 | 3.0 | PE |
| 2 | 20CE002 | Environmental Geotechnics | - | 3 | 0 | 0 | 3.0 | PE |
| 3 | 20CE003 | Transportation Planning and Management | - | 3 | 0 | 0 | 3.0 | PE |
| 4 | 20CE004 | Water Resources Systems Planning and Management | - | 3 | 0 | 0 | 3.0 | PE |
| 5 | 20CE005 | Construction Equipment Automation | - | 3 | 0 | 0 | 3.0 | PE |
| 6 | 20CE006 | Harbor Engineering | - | 3 | 0 | 0 | 3.0 | PE |

Professional Elective #2

| | | | | | | | | |
|----|---------|----------------------------------|---|---|---|---|-----|----|
| 7 | 20CE007 | Pre-Stressed Concrete | - | 3 | 0 | 0 | 3.0 | PE |
| 8 | 20CE008 | Environmental Impact Assessment | - | 3 | 0 | 0 | 3.0 | PE |
| 9 | 20CE009 | Pavement Analysis and Design | - | 3 | 0 | 0 | 3.0 | PE |
| 10 | 20CE010 | Urban Hydrology | - | 3 | 0 | 0 | 3.0 | PE |
| 11 | 20CE011 | Sustainable Construction Methods | - | 3 | 0 | 0 | 3.0 | PE |
| 12 | 20CE012 | Advanced Structural Analysis | - | 3 | 0 | 0 | 3.0 | PE |

Professional Elective #3

| | | | | | | | | |
|----|---------|---|---|---|---|---|-----|----|
| 13 | 20CE013 | Repair and Rehabilitation of Structures | - | 3 | 0 | 0 | 3.0 | PE |
| 14 | 20CE014 | Solid Waste Management | - | 3 | 0 | 0 | 3.0 | PE |
| 15 | 20CE015 | Traffic Engineering | - | 3 | 0 | 0 | 3.0 | PE |
| 16 | 20CE016 | Hydraulic Structures | - | 3 | 0 | 0 | 3.0 | PE |
| 17 | 20CE017 | Construction Cost Analysis | - | 3 | 0 | 0 | 3.0 | PE |
| 18 | 20CE018 | Coastal Zone Management | - | 3 | 0 | 0 | 3.0 | PE |

Professional Elective #4

| | | | | | | | | |
|----|---------|-------------------------------|---|---|---|---|-----|----|
| 19 | 20CE019 | Self-Healing Concrete | - | 3 | 0 | 0 | 3.0 | PE |
| 20 | 20CE020 | Solid Waste Management | - | 3 | 0 | 0 | 3.0 | PE |
| 21 | 20CE021 | Urban Transportation Planning | - | 3 | 0 | 0 | 3.0 | PE |
| 22 | 20CE022 | Hydro Power Engineering | - | 3 | 0 | 0 | 3.0 | PE |
| 23 | 20CE023 | Safety Engineering | - | 3 | 0 | 0 | 3.0 | PE |
| 24 | 20CE024 | Ocean Engineering | - | 3 | 0 | 0 | 3.0 | PE |

Professional Elective #5

The curriculum provides academic flexibility to choose any of the domain specific courses from MOOCs as approved by the respective Board of Studies and Academic Council. The students can take up this course on self-study mode. The course shall be of 45 – 60 hours duration (4-credits) and the assessment shall be as per the academic regulation 2020.

PE

Open Elective #1

| | | | | | | | | |
|----|---------|---|---|---|---|---|-----|----|
| 29 | 23CE001 | Urban Environmental Service | - | 3 | 0 | 0 | 3.0 | OE |
| 30 | 23CS001 | Data Structures and Algorithms | - | 3 | 0 | 0 | 3.0 | OE |
| 31 | 23AI001 | Machine Learning for Engineers | - | 3 | 0 | 0 | 3.0 | OE |
| 32 | 23DS001 | Introduction to Database Management Systems | - | 3 | 0 | 0 | 3.0 | OE |
| 33 | 23EC001 | Architectures and Algorithms of IoT | - | 3 | 0 | 0 | 3.0 | OE |
| 34 | 23EE001 | Introduction to Renewable Energy Sources | - | 3 | 0 | 0 | 3.0 | OE |
| 35 | 23ME001 | Nano Technology | - | 3 | 0 | 0 | 3.0 | OE |
| 36 | 23SH001 | Women and Society | - | 3 | 0 | 0 | 3.0 | OE |

Open Elective #2

| | | | | | | | | |
|----|---------|--|---|---|---|---|-----|----|
| 37 | 23CE002 | Ecology, Environment and Resource Management | - | 3 | 0 | 0 | 3.0 | OE |
| 38 | 23CS002 | Designing the Internet of Things | - | 3 | 0 | 0 | 3.0 | OE |
| 39 | 23AI002 | Fundamentals of Deep Learning | - | 3 | 0 | 0 | 3.0 | OE |
| 40 | 23DS002 | Introduction to Data Science | - | 3 | 0 | 0 | 3.0 | OE |
| 41 | 23EC002 | IoT for Smart Grids | - | 3 | 0 | 0 | 3.0 | OE |
| 42 | 23EE002 | Electrical Safety and Management | - | 3 | 0 | 0 | 3.0 | OE |
| 43 | 23ME002 | Fundamentals of Automobile Engineering | - | 3 | 0 | 0 | 3.0 | OE |
| 44 | 23SH002 | Constitution of India | - | 3 | 0 | 0 | 3.0 | OE |

Open Elective #3

| | | | | | | | | |
|----|---------|--|---|---|---|---|-----|----|
| 44 | 23CE003 | Disaster, Risk Mitigation and Management | - | 3 | 0 | 0 | 3.0 | OE |
| 45 | 23CS004 | Operating System | - | 3 | 0 | 0 | 3.0 | OE |
| 46 | 23AI003 | Intelligent Robots and Drone Technology | - | 3 | 0 | 0 | 3.0 | OE |
| 47 | 23DS003 | Introduction to Big Data | - | 3 | 0 | 0 | 3.0 | OE |
| 48 | 23EC003 | Privacy and Security in IoT | - | 3 | 0 | 0 | 3.0 | OE |
| 49 | 23EE003 | Low- Cost Automation | - | 3 | 0 | 0 | 3.0 | OE |
| 50 | 23ME003 | Industrial Automation | - | 3 | 0 | 0 | 3.0 | OE |




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51 23SHO03 Design Thinking 3 0 0 3.0 
Open Elective #4




The curriculum provides academic flexibility to choose any of the inter-disciplinary courses from MOOCs as approved by the respective Board of Studies and Academic Council. The students can take up this course on self-study mode. The course shall be of 45 – 60 hours duration and the assessment shall be as per the academic regulation 2023.

B. Tech. (Honors)




Category I

| | | | | | | | | |
|---|---------|--|---|---|---|---|-----|---|
| 1 | 20CEH01 | Cognitive Management of IoT for Smart Cities | - | 4 | 0 | 0 | 4.0 |  |
| 2 | 20CEH02 | Energy Efficient Buildings | - | 4 | 0 | 0 | 4.0 |  |
| 3 | 20CEH03 | Structural Health Monitoring | - | 4 | 0 | 0 | 4.0 |  |




Category II

| | | | | | | | | |
|---|---------|--|---|---|---|---|-----|---|
| 4 | 20CEH04 | Structural Failure Protection using AI | - | 4 | 0 | 0 | 4.0 |  |
| 5 | 20CEH05 | Architecture and Town Planning | - | 4 | 0 | 0 | 4.0 |  |
| 6 | 20CEH06 | Safety Analysis and Risk Management | - | 4 | 0 | 0 | 4.0 |  |

Category III












| | | | | | | | | |
|---|---------|-------------------------------------|---|---|---|---|-----|---|
| 7 | 20CEH07 | Intelligent Transportation Networks | - | 4 | 0 | 0 | 4.0 |  |
| 8 | 20CEH08 | Building Information Modelling | - | 4 | 0 | 0 | 4.0 |  |
| 9 | 20CEH09 | Traffic Engineering and Management | - | 4 | 0 | 0 | 4.0 |  |

Category IV












| | | | | | | | | |
|----|---------|--|---|---|---|---|-----|---|
| 10 | 20CEH10 | Structural Health Monitoring using IoT | - | 4 | 0 | 0 | 4.0 |  |
| 11 | 20CEH11 | GIS and Remote Sensing | - | 4 | 0 | 0 | 4.0 |  |
| 12 | 20CEH12 | Disaster Risk Mitigation | - | 4 | 0 | 0 | 4.0 |  |

B. Tech. (Minor with Specialization)












Category I

| | | | | | | | | |
|----|---------|----------------------------------|---|---|---|---|-----|---|
| 1 | 20CEM01 | Air Pollution | - | 3 | 0 | 0 | 3.0 |  |
| 2 | 20CSM01 | E-Commerce | - | 3 | 0 | 0 | 3.0 |  |
| 3 | 20MEM01 | Biomaterials | - | 3 | 0 | 0 | 3.0 |  |
| 4 | 20EEM01 | Basic Control Systems | - | 3 | 0 | 0 | 3.0 |  |
| 5 | 20ECM01 | Semiconductor Devices & Circuits | - | 3 | 0 | 0 | 3.0 |  |
| 6 | 20AIM01 | Fundamentals of Neural Networks | - | 3 | 0 | 0 | 3.0 |  |
| 7 | 20DSO03 | Introduction to R Programming | - | 3 | 0 | 0 | 3.0 |  |
| 8 | 20SHM01 | Psychology | - | 3 | 0 | 0 | 3.0 |  |
| 9 | 20SHM02 | Statistical Methods | - | 3 | 0 | 0 | 3.0 |  |
| 10 | 20MBM01 | General Management | - | 3 | 0 | 0 | 3.0 |  |
| 11 | 20MBM02 | Human Resource Planning | - | 3 | 0 | 0 | 3.0 |  |

Category II

| | | | | | | | | |
|----|---------|---|---|---|---|---|-----|---|
| 12 | 20CEM02 | Climate Change Mitigation and Adaptation | - | 3 | 0 | 0 | 3.0 |  |
| 13 | 20CSM02 | Knowledge Discovery and Databases | - | 3 | 0 | 0 | 3.0 |  |
| 14 | 20MEM02 | Micro Electromechanical Systems | - | 3 | 0 | 0 | 3.0 |  |
| 15 | 20EEM02 | Basics of Electrical Machines and Drives | - | 3 | 0 | 0 | 3.0 |  |
| 16 | 20ECM02 | Digital Electronics | - | 3 | 0 | 0 | 3.0 |  |
| 17 | 20AIM02 | Machine Learning with Python | - | 3 | 0 | 0 | 3.0 |  |
| 18 | 20DSM02 | Data Management and Analysis | - | 3 | 0 | 0 | 3.0 |  |
| 19 | 20SHM03 | English for Media | - | 3 | 0 | 0 | 3.0 |  |
| 20 | 20SHM04 | Statistical Inference | - | 3 | 0 | 0 | 3.0 |  |
| 21 | 20MBM03 | Organizational Behavior | - | 3 | 0 | 0 | 3.0 |  |
| 22 | 20MBM04 | Compensation Management & Employee Welfare Laws | - | 3 | 0 | 0 | 3.0 |  |

Category III

| | | | | | | | | |
|----|---------|---|---|---|---|---|-----|---|
| 23 | 20CEM03 | Sustainability and Pollution Prevention Practices | - | 3 | 0 | 0 | 3.0 |  |
| 24 | 20CSM03 | Database Security | - | 3 | 0 | 0 | 3.0 |  |
| 25 | 20MEM03 | Surface Engineering | - | 3 | 0 | 0 | 3.0 |  |
| 26 | 20EEM03 | Electrical Engineering Material Science | - | 3 | 0 | 0 | 3.0 |  |
| 27 | 20ECM03 | Analog Electronic Circuits | - | 3 | 0 | 0 | 3.0 |  |
| 28 | 20AIM03 | Interpretable Machine Learning | - | 3 | 0 | 0 | 3.0 |  |
| 29 | 20DSM03 | Data Governance | - | 3 | 0 | 0 | 3.0 |  |
| 30 | 20SHM05 | Journalism | - | 3 | 0 | 0 | 3.0 |  |
| 31 | 20SHM06 | Statistical Quality Control | - | 3 | 0 | 0 | 3.0 |  |
| 32 | 20MBM05 | Entrepreneurship and Business Venture Planning | - | 3 | 0 | 0 | 3.0 |  |
| 33 | 20MBM06 | Performance Management and Talent Management | - | 3 | 0 | 0 | 3.0 |  |



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