# VIGNAN'S FOUNDATION FOR SCIENCE, TECHNOLOGY AND RESEARCH
## Department of Advanced Computer Science & Engineering

Date: 12.05.2025

The Department of ACSE is delighted to invite you to the Department Academic Advisory Committee (DAAC) meeting scheduled to review the B.Tech CSE – DS program curriculum. The meeting will be held on 17.05.2025, from 02:00 PM onwards. Venue: HoD ACSE Office Room, Sixth floor, N Block, VFSTR. We request all members to make it convenient to attend, your presence and valuable inputs are essential for the success of this meeting.

The members are:

1. Dr. Venkatesulu Dondeti, Professor and Head – Chairman
2. Dr. Nirupama Bhat M, Professor & IoT Co-ordinator – Member
3. Dr. D. Radha Rani, Associate Professor & CS Co-ordinator – Member
4. Dr. B. Jyostna Devi, Associate Professor & Content Training Head– Member
5. Dr. Sivadi Balakrishna, Associate Professor & DS Co-ordinator – Member
6. Mr. DS Bhupal Naik, Assistant Professor & CSBS Co-ordinator - Member
7. Dr. Arul Elango, Associate Professor – Member
8. Dr. Eva Patel, Associate Professor – Member

Agenda of the Department Academic Advisory Committee Meeting:

1. Review the proposed course structure for the R25 regulation for the B. Tech CSE Data Science program
2. Finalize the course structure for the remaining courses of the B. Tech CSE DS program
3. Analysis of the feedback collected from various stakeholders such as Alumni, Employers, Faculty, Parents and Students during the academic year 2024-25.
4. Discussion of results- FA, SA, grades
5. Discussion of attainments process, rubrics, CO/PO/PSO and SO values.
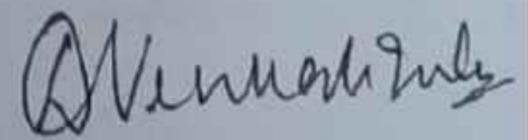
**Chairperson**

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## VIGNAN'S FOUNDATION FOR SCIENCE, TECHNOLOGY AND RESEARCH
### Department of Advanced Computer Science & Engineering

Date: 19.05.2025

## <u>Minutes of Department Academic Advisory Committee (DAAC) Meeting</u>

Department Academic Advisory Committee meeting of B.Tech., CSE-DS programme was conducted on 17.05.2025 in HoD ACSE Office Room, Sixth floor, N Block, VFSTR, from 02:00 PM onwards. Agenda of the Department Academic Advisory Committee Meeting:

1. Review the proposed course structure for the R25 regulation for the B. Tech CSE DS program
2. Finalize the course structure for the remaining courses of the B. Tech CSE DS program
3. Analysis of the Feedback collected from various stakeholders such as Alumni, Employers, Faculty, Parents and Students during the academic year 2024-25.
4. Discussion of results-FA, SA, grades
5. Discussion of the attainment process, rubrics, CO/PO/PSO and SO values.
6. Any other points with the permission of the Chairperson.

The following members were present

| SNO | Name and designation of the Member | Position | Signature |
|-----|-----------------------------------|----------|-----------|
| 1 | Dr. Venkatesulu Dondeti Professor and Additional Dean | Chairperson | |
| 2 | Dr. Nirupama Bhat M, Professor & Co-ordinator | Member | |
| 3 | Dr. D. Radha Rani, Associate Professor& Head | Member | |
| 4 | Dr. Sivadi Balakrishna, Associate Professor & DS Co-ordinator | Member and Convener | |
| 5 | Dr. DS Bhupal Naik, Assistant Professor & CSBS Co-ordinator | Member | |
| 6 | Dr. Arul Elango Associate Professor | Member | |
| 7 | Dr. Eva Patel Associate Professor | Member | |

person Dr. Venkatesulu Dondeti, Professor and Additional Dean, initiated the meeting and ...ented the result analysis of II & III year I Semester, followed by a discussion of changes in ... curriculum.

The following points were discussed in the Department Academic Advisory Committee meeting:

## 1. Result analysis of II year I semester (BTech CSE-DS)

| S.No. | Subject Name | Sec. | Strength | # Students Pass | Pass% | R | I | O | S | A | B | C | M | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DHV | A | 47 | 46 | 97.87 | 0 | 1 | 0 | 6 | 20 | 17 | 3 | 0 | 0 |
| 2 | DLCO | A | 47 | 46 | 97.87 | 0 | 1 | 0 | 4 | 21 | 16 | 5 | 0 | 0 |
| 3 | DBMS | A | 47 | 47 | 100 | 0 | 0 | 0 | 6 | 20 | 12 | 8 | 1 | 0 |
| 4 | MS | A | 47 | 47 | 100 | 0 | 0 | 0 | 1 | 20 | 20 | 6 | 0 | 0 |
| 5 | PSML | A | 47 | 47 | 100 | 0 | 0 | 0 | 9 | 31 | 6 | 1 | 0 | 0 |
| 6 | DS | A | 47 | 46 | 97.87 | 0 | 1 | 0 | 7 | 17 | 16 | 6 | 0 | 0 |
| 7 | DHV | B | 47 | 44 | 93.62 | 3 | 0 | 0 | 6 | 28 | 9 | 1 | 0 | 0 |
| 8 | DLCO | B | 47 | 45 | 95.74 | 1 | 1 | 0 | 7 | 25 | 11 | 2 | 0 | 0 |
| 9 | DBMS | B | 47 | 44 | 93.62 | 3 | 0 | 1 | 3 | 15 | 23 | 2 | 0 | 0 |
| 10 | MS | B | 47 | 45 | 95.74 | 2 | 0 | 0 | 5 | 35 | 5 | 0 | 0 | 0 |
| 11 | PSML | B | 47 | 45 | 95.74 | 2 | 0 | 0 | 5 | 35 | 5 | 0 | 0 | 0 |
| 12 | DS | B | 47 | 41 | 87.23 | 3 | 3 | 0 | 2 | 16 | 17 | 5 | 1 | 0 |

The analysis reveals a concerning trend of higher "R" grades in II year of sec-B, signaling a need for targeted intervention to support struggling students. Additionally, efforts should be directed towards uplifting "C" and "M" grade students across subjects to improve overall academic performance and ensure satisfactory outcomes.

## 3. Result analysis of III year I semester (BTech CSE-DS)

| S.No. | Subject Name | Sec. | Strength | # Students Pass | Pass% | R | I | O | S | A | B | C | M | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML | A | 55 | 54 | 98.18 | 1 | 0 | 2 | 8 | 28 | 11 | 5 | 0 | 0 |
| 2 | OS | A | 55 | 54 | 98.18 | 1 | 0 | 2 | 8 | 32 | 12 | 0 | 0 | 0 |
| 3 | WT | A | 55 | 53 | 96.36 | 1 | 1 | 1 | 8 | 25 | 17 | 2 | 0 | 0 |
| 4 | WSDT | A | 52 | 51 | 98.08 | 1 | 0 | 1 | 3 | 29 | 16 | 1 | 1 | 0 |

All subjects have pass percentages above 96%, reflecting good teaching and student engagement. Web Technologies (WT) had the lowest pass percentage and the only C grade

es among the four subjects. WSDT had the highest proportion of top grades (A/B), dicating it might be the strongest subject in terms of student outcomes. Consider additional tutorials or remediation for the two students who performed poorly in WT. Additionally, maintain teaching quality in WSDT to continue current strategies, as outcomes are excellent. Finally, analyze "R", "O", and "S" grades: ensure clarity on these categories, as they could indicate specific interventions needed.

4. Draft version of the curriculum is finalized based on the revised curriculum for the B.Tech Data Science. The outcomes of the meeting will be placed before the BoS for further discussion and recommendations.
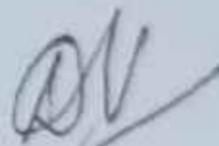
Chairperson

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# DEPARTMENT OF ADVANCED COMPUTER SCIENCE & ENGINEERING

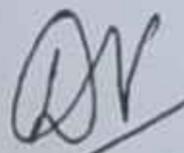Date: 09-06-2025

## Minutes of Board of Studies Meeting

The department of ACSE is conducted a Board of Studies (BoS) meeting to review the B. Tech CSE Data Science program curriculum on 22.05.2025 from 10:30 AM to 12:00PM in blended mode. (Physical meeting: ACSE Department, Room number 603, 6th floor, Nagarjuna Block, VFSTR and virtual meeting link:

https://us06web.zoom.us/j/87215338965?pwd=ZpH41V811A00PbwUnUWXb9fcq0xbtB.1

**Agenda of the BoS Meeting:**

1. Review the course structure and contents for the R25-C25 B.Tech CSE-Data Science curriculum.
2. Discussion on L-T-P structure change or any credit change courses.
3. SWAYAM-NPTEL courses identification and update.
4. Discuss the addition of the program electives, open electives, and the fulfillment of prerequisites for the department electives.
5. Formative and summative assessment results
6. Discussion on CO-PO-PSO
7. Fixing the CO-PO-PSO-PEO target values
8. Any other points based on the requirements with the permission of the Chair.

The following members were present either offline or online.

| S.No | Name of the Member | Designation and Affiliation | Role | Mode of Presence/ Signature |
|---|---|---|---|---|
| 1 | Dr. Venkatesulu Dondeti | Professor & Addl. Dean, Department of ACSE, VFSTR Deemed to be University Contact: 9840850744 Mail: dean_addl.acse@vignan.ac.in | Chair Person | |
| 2 | Prof. C. Raghavendra Rao | Retired Professor SCIS, University of Hyderabad, Hyderabad, Telangana, Mobile: +91 92474 65125 Email: crrcs@uohyd.ac.in | External member (Academia) | Online |
| 3 | Dr. Vinay Kumar N | AIML Delivery Lead, SC.AI, Standard Chartered Global Business Services, Bangalore-66. Mobile: 9632454934 Email: vinaykumar.natraj@gmail.com | Invited member (Research) | Online |
| 4 | Mr. Ramanamurthy Saripalli | Director of Vardaan Data Sciences Pvt. Ltd., Hyderabad. Mobile: +91 98859 70645 Mail: ramana.sv@vardaanglobal.com | Invited member (Industry) | Online |

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|---|---|---|---|---|
| 5 | Dr. Deevi Radha Rani | Associate Professor & Head, Department of ACSE, VFSTR Deemed to be University Contact: 91 9676354404 Mail: hod_acse@vignan.ac.in | Internal member | *(signature)* |
| 6 | Dr. Nirupama Bhat | Professor, Department of ACSE, VFSTR Deemed to be University Contact: 91 99088 23834 Mail: drmnb_acse@vignan.ac.in | Internal Member | *(signature)* |
| 7 | Dr. Britto Manoj | Assistant Professor, Department of ACSE, VFSTR Deemed to be University Contact: +91 9550367172 Mail: drbr_acse@vignan.ac.in | Internal member | Online |
| 8 | Dr. John Bob Gali | Assistant Professor, Department of CSE, Hyderabad Off-Campus Contact: 9475176321 Mail: jb_acse@vignan.ac.in | Internal Member | Online |
| 9 | Dr. Sivadi Balakrishna | Associate Professor, Department of ACSE, VFSTR Deemed to be University Contact: +91 9441540580 Mail: drsbk_acse@vignan.ac.in | Member Secretary | *(signature)* |

Chairperson Dr. Venkatesulu Dondeti, Professor and Additional Dean, Department of ACSE, VFSTR initiated the meeting by welcoming and introducing the external members, invitees to the internal members. Secretary Dr. Sivadi Balakrishna, Associate Professor, Department of ACSE, VFSTR presented the program curriculum along with course content to the board.

**The following points were discussed in the BoS meeting:**

1. Reviewed R25-C25 B.Tech CSE-Data Science curriculum
2. Discussed on revision of the Course contents
3. Discussed on L-T- P-C structure of various courses.
4. Discussed on SWAYAM-NPTEL course identification for the program, open electives, and honors.
5. Presented Formative and summative assessment results
6. Discussed on CO-PO-PSO
7. CO-PO-PSO-PEO target values finalization

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**The following resolutions are incorporated after the discussion:**

1. Dr. Sivadi Balakrishna, secretary, B. Tech CSE- Data Science program, initiated the meeting by welcoming and introducing the board members and presenting the program curriculum along with course content to the board. The External Board members expressed their opinion that the overall course structure of the program and the content of the courses are well-designed and sufficient for the program at under graduate level. They provided a few suggestions to improve the quality of the existing curriculum further.

2. Prof. Ramanamurthy enquired about the procedure for offering an Honors degree to students. The internal BOS members clarified the steps to be followed by students for choosing the Honors degree.

3. Prof. C.R. Rao suggested offering an industry-based internship program, either individually or in batches. The board members accepted the suggestion, and the changes were duly incorporated.

4. Prof. C.R. Rao enquired whether the prerequisite courses for each semester's offerings are being studied, as they are essential for understanding the course content. The board clarified that prerequisites are covered for each course, and to some extent, the R25 regulation provides flexibility to ensure this coverage.

5. During the discussion, the external BOS members Prof. Ramana Murthy and Prof. C.R. Rao suggested offering a Full-Stack Development course using Python instead of Java. The internal BOS members accepted the suggestion, as the course is intended for developing industry-based projects, and offering it through Python is considered more relevant and fulfills industry needs.

6. Prof. C.R. Rao enquired about who monitors the self-learning hours and felt happy offering them to the students. The internal BOS members clarified concerns about mentorship for self-learning hours.

7. The external BOS member Dr. Vinay enquired about Internship programs offered or not for Data Science students, as these programs are essential to filling the gap between industry and academia. The internal BOS members clarified that Internship programs are offered to data science students.

8. In the meeting, the external board members reviewed the program elective courses, Honors courses, and SWAYAM-NPTEL courses chosen by the Data Science students. They expressed their opinion that the overall curriculum and course content are well-designed and adequate for an undergraduate-level program.

9. At the end, there was a discussion on Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes (PSO), Formative Assessment results, Summative Assessment results, and the target values for CO-PO-PSO-PEO.

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Based on the suggestions given by the members, the Chairperson of BoS said that these fruitful suggestions would be considered in the curriculum and syllabi of the R25 Regulation.

There being no further points for discussion, the chairperson thanked all the external and internal invited members and announced that the meeting was adjourned.
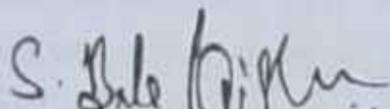
**Member Secretary**

**Chairperson**

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## DEPARTMENT OF ADVANCED COMPUTER SCIENCE & ENGINEERING

Date: 15-05-2025

The department of ACSE is conducting a Board of Studies (BoS) meeting to review the B. Tech CSE Data Science program curriculum on 22.05.2025 from 10:30 AM in blended mode. (Physical meeting: ACSE Department, room number 603, 6th floor, Nagarjuna Block, VFSTR and virtual meeting link:

https://us06web.zoom.us/j/87215338965?pwd=ZpH41V811A00PbwUnUWXb9fcq0xbtB.1

All the members of B. Tech- CSE Data Science Board of Studies are requested to make it convenient to attend the meeting.

| S.No | Name of the Member | Designation and Affiliation | Role |
|---|---|---|---|
| 1 | Dr. Venkatesulu Dondeti | Professor & Addl. Dean, Department of ACSE, VFSTR Deemed to be University Contact: 9840850744 Mail: dean_addl.acse@vignan.ac.in | Chair Person |
| 2 | Prof. C. Raghavendra Rao | Retired Professor SCIS, University of Hyderabad, Hyderabad, Telangana, Mobile: +91 92474 65125 Email: crrcs@uohyd.ac.in | External member (Academia) |
| 3 | Dr. Y Raghu Reddy | Associate Professor, IIIT Hyderabad Mobile: +91 9849371681 Email: raghu.reddy@iiit.ac.in | External member (Academia) |
| 4 | Dr. Vinay Kumar N | AIML Delivery Lead, SC.AI, Standard Chartered Global Business Services, Bangalore-66. Mobile: 9632454934 Email: vinaykumar.natraj@gmail.com | Invited member (Research) |
| 5 | Mr. Ramanamurthy Saripalli | Director of Vardaan Data Sciences Pvt. Ltd., Hyderabad. Mobile: +91 98859 70645 Mail: ramana.sv@vardaanglobal.com | Invited member (Industry) |
| 6 | Dr. Deevi Radha Rani | Associate Professor & Head, Department of ACSE, VFSTR Deemed to be University Contact: 91 9676354404 Mail: hod_acse@vignan.ac.in | Internal member |

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|---|---|---|---|
| 7 | Dr. Nirupama Bhat | Professor, Department of ACSE, VFSTR Deemed to be University Contact: 91 99088 23834 Mail: drmnb_acse@vignan.ac.in | Internal Member |
| 8 | Dr. Britto Manoj | Assistant Professor, Department of ACSE, VFSTR Deemed to be University Contact: +91 9550367172 Mail: drbr_acse@vignan.ac.in | Internal member |
| 9 | Dr. John Bob Gali | Assistant Professor, Department of CSE, Hyderabad Off-Campus Contact: 9475176321 Mail: jb_acse@vignan.ac.in | Internal Member |
| 10 | Dr. Jyotsna Devi Bodapati | Associate Professor, Department of ACSE, VFSTR Deemed to be University, Contact: +91 7358209553 Mail: bjd_acse@vignan.ac.in | Internal member (School nominee) |
| 11 | Dr. Jawed Ahmed Dar | Assistant Professor, Department of ACSE, VFSTR Deemed to be University. Contact: 7006157037 Mail: drjad_acse@vignan.ac.in | Internal Member (Nominee – Dean R&D) |
| 12 | Dr. Sivadi Balakrishna | Associate Professor, Department of ACSE, VFSTR Deemed to be University Contact: +91 9441540580 Mail: drsbk_acse@vignan.ac.in | Member Secretary |

**Agenda of the BoS Meeting:**

1. Review the course structure and contents for the R25-C25 B.Tech CSE-Data Science curriculum.
2. Discussion on L-T-P structure change or any credit change courses, if any
3. SWAYAM-NPTEL courses identification and update.
4. Discuss the addition of the program electives and the fulfillment of prerequisites for the program electives.
5. Any other points based on the requirements with the permission of the Chair.

**Chair Person**
**(Dr. Venkatesulu Dondeti)**

Vadlamudi, Andhra Pradesh, India
6gmx+jch, Vadlamudi, Andhra Pradesh, India
Lat 16.2338834° Long 80.548575°
22/05/2025 11:00 AM GMT +05:30

GPS Map Camera

# Course Structure: I Year

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## Induction Program

| Sl. No | Course Title | Course Category |
|--------|-------------|-----------------|
| 1 | Orientation Program (Induction Pr... | Binary Graded |
| | **Total** | |

## I Year Pre-seme...

| Sl. No. | Course Title | Course Category |
|---------|-------------|-----------------|
| 1 | Mathematics | Basic Engineering |
| 2 | English Communication | Humanities |
| 3 | Aptitude &Logical Reasoning | Binary Graded |
| 4 | IT Tools | Binary Graded |
| 5 | | Binary Graded |
| 6 | | Binary Graded |
| | **Total** | 6 |

Participants (6)

- vfstr acse (Host, me)
- CRRAO
- Ramanamurthy
- Dr. A.BRITTO MANOJ
- Dr. John Bob
- Vinay Kumar N

Invite    Mute all

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**Department of Advanced Computer Science and Engineering**

# B.TECH, CSE-DATASCIENCE PROGRAM,

## MAJOR REVISION - R25 & C25

### COURSE STRUCTURE – C25

**Induction program**

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Orientation program (Induction Program) | | | | | 1 | Binary graded |
| Total | | | | | 1 | |

**Pre - semester**

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Mathematics | | | | | 1 | Basic Sciences |
| English Communication | | | | | 1 | Humanities |
| Aptitude & Logical Reasoning | | | | | 1 | Humanities |
| IT Tools | | | | | 1 | Basic Engineering |
| | | | | | 1 | Binary graded |
| | | | | | 1 | Binary graded |
| Total | | | | | 6 | |

## ear I Semester

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Mathematics | | | | | 4 | Basic Sciences |
| Physics / Chemistry | | | | | 4 | Basic Sciences |
| Basic of Electrical & Electronics Engineering/ Engineering Graphics | | | | | 3 | Basic Engineering |
| Programming in C | | | | | 4 | Basic Engineering |
| English Proficiency & Communication Skills (PET) | | | | | 1 | Humanities |
| Environmental Studies / Management Studies | | | | | 3 | Basic Sciences / Humanities |
| | | | | | 1 | Binary graded |
| | | | | | 1 | Binary graded |
| | | | | | 1 | Binary graded |
| Total | | | | | 22 | |

## I Year II Semester

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Mathematics | | | | | 4 | Basic Sciences |
| Physics / Chemistry | | | | | 4 | Basic Sciences |
| Basic of Electrical & Electronics Engineering/Engineering Graphics | | | | | 3 | Basic Engineering |
| Problem Solving through Python | | | | | 3 | Basic Engineering |
| Technical English Communication | | | | | 2 | Humanities |
| Environmental Studies / Management Studies | | | | | 3 | Basic Sciences / Humanities |
| Cyber security | | | | | 1 | Basic Engineering |
| | | | | | 1 | Binary graded |
| | | | | | 1 | Binary graded |
| | | | | | 1 | Binary graded |
| | | | | | 1 | Binary graded |
| Total | | | | | 24 | |

## II Year I Semester

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Maths (P&S) | | | | | 4 | Basic Sciences |
| Dept. Specific – Physics / Domain Subject | | | | | 3 | Basic Sciences |
| Data Structures | 2 | 2 | 2 | 2 | 4 | Basic Engineering |
| Design Thinking and Engineering Orientation | | | | | 1 | Basic Engineering |
| Data Handling and Visualization | 2 | 2 | 2 | 2 | 4 | Professional Core-1 |
| Database Management Systems | 2 | 2 | 2 | 2 | 4 | Professional Core-2 |
| Digital Logic and Computer Organization | 2 | 2 | 2 | 2 | 4 | Professional Core-3 |
| Total | | | | | 24 | |

## II Year II Semester

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Dept. Specific – Maths (Advanced Statistical Methods) | 2 | 0 | 2 | | 3 | Basic Sciences |
| Industry – Interface (I²) Course | | | | | 1 | Dept. Elective-1 |
| NPTEL | | | | | 3 | Open Elective-1 |
| Artificial Intelligence | 2 | 2 | 2 | 2 | 4 | Professional Core-4 |
| Object Oriented Programming | 2 | 0 | 4 | 2 | 4 | Professional Core-5 |
| Algorithms Design and Analysis | 2 | 2 | 2 | 2 | 4 | Professional Core-6 |
| Operating Systems | 2 | 0 | 2 | 2 | 3 | Professional Core-7 |
| | | | | | 1 | Project |
| Total | | | | | 23 | |

## III Year I Semester

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Soft Skills Laboratory | | | | | 1 | Humanities |
| Quantitative Aptitude & Logical Reasoning | | | | | 1 | Humanities |
| | | | | | 3 | Dept. Elective-2 |
| Data Analytics | 2 | 0 | 2 | 2 | 3 | Professional Core-8 |
| Machine Learning | 3 | 0 | 2 | 3 | 4 | Professional Core-9 |
| Full Stack Development | 2 | 0 | 4 | 2 | 4 | Professional Core-10 |
| Computer Networks | 2 | 0 | 2 | 2 | 3 | Professional Core-11 |
| Mobile Application Development | 1 | 0 | 2 | 1 | 2 | Professional Core-- |
| **Sub-Total** | | | | | **21** | |
| Honours/Minors (Add-on) | | | | | **4** | Honours/Minors |
| **Total** | | | | | **25** | |

## III Year II Semester

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Professional Communication Skills | | | | | 1 | Humanities |
| | | | | | 4 | Dept. Elective-3 |
| | | | | | 4 | Dept. Elective-4 |
| | | | | | 3 | Open Elective-2 |
| Deep Learning | 3 | 0 | 2 | 3 | 4 | Professional Core-12 |
| Big Data Analytics | 2 | 0 | 2 | 2 | 3 | Professional Core-13 |
| | | | | | 1 | Project |
| **Sub-Total** | | | | | **20** | |
| Honours/Minors (Add-on) | | | | | **4** | Honours/Minors |
| **Total** | | | | | **24** | |

## IV Year I Semester

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Dept. Specific (Professional Ethics) | | | | | 2 | Humanities |
| | | | | | 4 | Dept. Elective-5 |
| | | | | | 4 | Dept. Elective-6 |
| Work-in-Lieu of Course – Research paper publications/patents/presentations/global certifications | | | | | 4* | Dept. Elective-7 |
| | | | | | 3 | Open Elective-3 |
| Sub-Total | | | | | 17 | |
| Honours/Minors (Add-on) | | | | | 4 | Honours/Minors |
| Total | | | | | 21 | |

## IV Year II Semester

| Course Title | L | T | P | SL | C | Course category |
|---|---|---|---|---|---|---|
| Project/Internship | | | | | 12 | Project/Internship |
| Sub-Total | | | | | 12 | |
| Honours/Minors (Add-on) | | | | | 4 | Honours/Minors |
| Total | | | | | 16 | |

# Program Electives

| Sl. No. | Course Code | Course Title | L | T | P | C |
|---|---|---|---|---|---|---|
| 1 | | Fundamentals of Image Processing | 2 | 0 | 2 | 3 |
| 2 | 22DS802 | Multi-modal Data Processing & Learning | 3 | 0 | 2 | 4 |
| 3 | 22DS804 | Security aspects of Data and Machine Learning Models | 3 | 0 | 2 | 4 |
| 4 | | Social, Web and Mobile Analytics | 3 | 0 | 2 | 4 |
| 5 | | Cloud Computing and Analytics | 3 | 0 | 2 | 4 |
| 6 | 22CS806 | Text Analytics and Natural Language Processing | 3 | 0 | 2 | 4 |
| 7 | 22DS304 | Computer Vision | 3 | 0 | 2 | 4 |
| 8 | | Graph Neural Networks | 3 | 0 | 2 | 4 |
| 9 | | Generative AI | 3 | 0 | 2 | 4 |
| 10 | | Cryptography and network security | 3 | 0 | 2 | 4 |
| 11 | | Data warehousing and data mining | 3 | 0 | 2 | 4 |
| 12 | | Federated Machine Learning | 3 | 0 | 2 | 4 |
| 13 | 22AM401 | Reinforcement Learning | 3 | 0 | 2 | 4 |
| 14 | | Soft computing | 3 | 0 | 2 | 4 |
| 15 | | Time series analysis and forecasting | 3 | 0 | 2 | 4 |
| 16 | | Business Analytics | 3 | 0 | 2 | 4 |
| 17 | | Speech Processing and Analytics | 3 | 0 | 2 | 4 |

## Honours for CSE - DS

| Sl. No | Course Code | Course Title | L | T | P | C |
|---|---|---|---|---|---|---|
| 1 | 22CS815 | Optimization Techniques | 3 | 2 | 0 | 4 |
| 2 | 22AM960 | Intelligent Application Development | 0 | 4 | 4 | 4 |
| 3 | 22AM963 | Web and Sequence Data Mining | 0 | 4 | 4 | 4 |
| 4 | 22DS951 | Multi-Variate Analysis | 0 | 4 | 4 | 4 |
| 5 | 22DS952 | Visual Analytics | 0 | 4 | 4 | 4 |
| 6 | 22DS953 | Data Clustering | 0 | 4 | 4 | 4 |
| 7 | 22DS954 | Kernel Methods for Pattern Analysis | 0 | 4 | 4 | 4 |
| 8 | 22CS909 | Capstone Project | - | 2 | 6 | 4 |

## List of SWAYAM/NPTEL Courses

| S.No | Course Id | Course Name |
|---|---|---|
| 1 | noc24_ge57 | Learning Analytics tools |
| 2 | noc24_cs132 | Responsible & Safe AI Systems |
| 3 | | Medical Image Analysis |
| 4 | | Algorithms in Computational Biology and Sequence Analysis |
| 5 | | Introduction to Large Language Models (LLMs) |