ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY
(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
Rajampet, Annamayya District, A.P – 516126, INDIA

Department of Civil Enginnering

Academic Year:2024-2025

II BOARD OF STUDIES

MINUTES OF MEETINGS

Held on

11/06/2025 At Smart Class Room

Ref.No.:/AU/SoE/CE/BOS-02/2024-25/MOM-02 Date: 11/06/2025

DEPARTMENT OF CIVIL ENGINEERING

2nd BoS Minutes of Meeting

The 2nd Board of Studies was held by virtual mode in the Department of Civil Engineering on 11th June 2025 at 10:00 AM. Annamacharya University, Rajampet. with the following members of the board present.

Members Present:

Sl.No	Name	Affiliation	Role in BoS
1	Dr. T. Naresh Kumar	Associate Professor & Head, Dept. of Civil Engineering, Annamacharya University Rajampet. Email: tnk@aitsrajampet.ac.in	Chairman
2	Dr. N.R. Gowthami	Assistant Professor, Dept of Civil Engineering, Annamacharya University Rajampet. Email: nrg@aitsrajampet.ac.in	Senior Faculty – Member
3	Dr. D. Gouse Peera	Assistant Professor, Dept of Civil Engineering, Annamacharya University Rajampet. Email: dgp@aitsrajampet.ac.in	Course Coordinator – Member
4	Mr. S. Venkata Vara Prasad	Assistant Professor, Dept of Civil Engineering, Annamacharya University Rajampet. Email: svvp@aitsrajampet.ac.in	Course Coordinator-Member
5	Dr. G. Appa Rao	Professor, Dept. of Civil Engg., IIT, Madras. Email: garao@iitm.ac.in	Subject Expert – Member
6	Dr. A. Ramachandra Murthy	Senior Principal Scientist, CSIR- SERC, Chennai. Email: murthyarc@serc.res.in	Subject Expert – Member
7	Dr. M. Srimurali	Professor, Dept. of Civil Engineering, SV University, Tirupati Email :msrimurali@gmail.com	University Nominee-Member
8	Sri. S. Babu	Sr. Vice President (Tech.), NCC Limited, (formerly Nagarjuna Construction Company Ltd.), NCC House, Madhapur, Hyderabad. Email: sreerama.babu@gmail.com	Industry Representative – Member
9	Mr. G. Ravindra Kumar	Senior Engineer, Samarth Infra Engg. Techno crats Pvt. Ltd., Hyderabad. Email:ravindra@samarthinfrigg.com	Alumni Representative - Member

Members Absent: NIL

1.	2.	3.	4.	5. Attended Online
6. Attended Online	7. Attended Online	8. Attended Online	9. Attended Online	

Agenda of the Meeting:

Item No	Particulars
BoS/2025/CIVIL/2.1	Confirmation of the Minutes of the 1st Board of Studies Meeting.
BoS/2025/ CIVIL /2.2	To discuss and finalize the course structure and syllabus for II-B.Tech.- I & II Semester under the AU-24 Regulations.
BoS/2025/ CIVIL /2.3	To discuss and finalize the course structure and syllabus II-M.Tech. under the AU-24 Regulations.
BoS/2025/ CIVIL /2.5	To review and address any discrepancies observed in the first-year UG (B.Tech.-Civil Engg.) and PG (M.Tech-Structural Engg.) courses under the AU-24 Regulations.
BoS/2025/ CIVIL /2.6	To discuss and approve the Programme Educational Objectives (PBOs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs) of the Civil Engineering department.
BoS/2025/ CIVIL /2.7	Discussion on the inclusion of courses aligned with Sustainable Development Goals (SDGs), cross-cutting issues and Indian Knowledge System (IKS) in the curriculum of the Civil Engineering department.
BoS/2025/ CIVIL /2.8	To discuss and approve the syllabus for the Annamacharya University Research Admission Test (AURAT) – 2025 for the Civil Engineering department.
BoS/2025 CIVIL /2.9	To approve the list of examiners for second-year courses/subjects.
BoS/2025 CIVIL /2.10	To discuss the introduction of new programmes and/or proposals for increase in intake, if applicable.
BoS/2025 CIVIL /2.11	Discussion on feedback received regarding the curriculum
BoS/2025 CIVIL /2.12	Any other item with the permission of the Chair.

Minutes of the 2nd Board of Studies (BoS) Meeting - Civil Engineering Department

Date: 11-06-2025 **Time:** 10:00AM **Venue:** Online through MS Teams Platform

Link: MS Teams Link for joining Meeting: https://teams.microsoft.com/l/meetup-join/19%3aH2REF3MGMYiKJdfK9mDal8mIiRsrrPTmMwYYjT88AHc1%40thread.tacv2/1748405448623?context=%7b%22Tid%22%3a%223a92bd74-e970-4a6a-a57e-17cc9a6e9a0f%22%2c%22Oid%22%3a%22a8a180c2-a035-448a-9c73-54c9acb85316%22%2c%22MessageId%22%3a%220%22%7d

Meeting ID: 335 281 349 707 5

Passcode: Tu72f8KH

1.	2.	3.	4.	5. Attended Online
6. Attended Online	7. Attended Online	8. Attended Online	9. Attended Online	

Attendees:

[1.] Dr. T. Naresh Kumar, Head, Department of Civil Engineering (Chairman), Annamacharya University, Rajampet.
[2.] Dr. N.R. Gowthami, Senior Faculty, Department of Civil Engineering, Annamacharya University, Rajampet.
[3.] Dr. D. Gouse Peera, Course Coordinator, Department of Civil Engineering, Annamacharya University, Rajampet.
[4.] Mr. S. Venkata Vara Prasad, Course Coordinator, Department of Civil Engineering, Annamacharya University, Rajampet.
[5.] Dr. G. Appa Rao, Professor-Department of Civil Engg, IIT Madras (External Subject Expert).
[6.] Dr. A. Ramachandra Murthy, Senior Principal Scientist, CSIR-SERC, Chennai (External Subject Expert).
[7.] Dr. M. Sri Murali, Professor-CE, SV College of Engineering Tirupati (University Nominee)
[8.] Sri S. Babu, Vice President, NCC Ltd., Hyderabad (Industry Professional)
[9.] Mr. G. Ravindra Kumar, Senior Engineer, Smart Infra Engg. Techno Crats Pvt. Ltd., Hyderabad (Alumni Representative)

Absentees: Nil

1. Welcome and Introduction

Agenda Item No. BoS/2025/CIVIL/2.1: Confirmation of the Minutes of the 1st Board of Studies Meeting.

Dr. T. Naresh Kumar, Head of the Department of Civil Engineering and Chairman of the Board, extended a warm welcome to all members. He introduced the Internal Members Dr. N.R. Gowthami, Senior Faculty, Dr. D. Gouse Peera, Course Coordinator, Mr. S. Venkata Vara Prasad, Course Coordinator and external subject experts: Dr. G. Appa Rao, Dr. A. Ramachandra Murthy, Dr. M. Sri Murali, University Nominee, and industry professional Sri S. Babu and Alumni Representative Mr. G. Ravindra Kumar, thanking them for their presence at the 2nd BoS meeting.

A brief overview of the department's Vision, Mission, and Program Educational Objectives(PEOs) and Program Specific Outcomes(PSOs) was presented. The role of the Board of Studies in curriculum development, recommending textbooks, setting academic standards, and ensuring continuous monitoring and periodic revisions of the curriculum was highlighted.

The agenda for the meeting was then read aloud, and the floor was opened for discussion.

Outcome: The minutes of the 1st Board of Studies Meeting were **approved by all members.**

1.	2.	3.	4.	5. Attended Online
6. Attended Online	7. Attended Online	8. Attended Online	9. Attended Online	

2. Finalization of Course Structure and Syllabus for II-B.Tech. (I & II Semester) under AU-24 Regulations

Agenda Item No. BoS/2025/CIVIL/2.2: To discuss and finalize the Course Structure and Syllabus for II-B.Tech.-I & II Semester under the AU-24 Regulations.

The proposed course structure and syllabus for II-B.Tech. (I & II Semester) under the AU-24 Regulations (as enclosed in Annexure-I) were thoroughly discussed. Key suggestions and modifications were as follows:

- **Dr. G. Appa Rao suggested:**
  - Renaming "Lab" to "Laboratory" in the curriculum.
  - In Strength of Materials, Unit-III, simplify "derivation of bending equation (M/I=F/Y=E/R)" to simply "derivation."
  - Incorporating "Shear test of mild steel/wood" as Experiment-11 in the Strength of Materials lab.
  - Replacing "plane" with "plot" in Surveying lab, Experiment-10.
  - In Building Materials and Construction, Unit-3:
    - "Cracks" to be renamed as "failures in building."
    - "Smart building materials" to be renamed as "Materials for sustainability."
    - "Regional materials" to be renamed as "local materials."
- **Dr. A. Ramachandra Murthy suggested:**
  - Initially objected to replacing Probability and Statistics for continuity, but was later convinced to place it appropriately by balancing the workload as it is a common course for all branches.
  - In Strength of Materials, Unit-III, replace "I, T and Flanged sections" with "I, T and C-Sections."
  - For all courses, Indian authors should be mentioned in prescribed textbooks, and a standard format should be maintained for citing textbooks, online resources, manuals, and code books with their latest editions.
- **Dr. M. Sri Murali suggested:**
  - Splitting "Fluid Mechanics, Hydraulic and Hydraulics Machinery" into two separate subjects: Fluid Mechanics (I-Phase) and Hydraulic and Hydraulics Machinery (II-Phase).
  - In the combined "Fluid Mechanics, Hydraulic and Hydraulics Machinery" course, the current syllabus appears vast, with 70% coverage on Hydraulic and Hydraulics Machinery and only 30% on Fluid Mechanics. Equal weightage should be given to fundamental Fluid Mechanics.
  - In Concrete Technology, Unit 1, "mineral admixtures for sustainability" should be added.

1.	2.	3.	4.	5. Attended Online
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- In Concrete Technology, Unit 5, "special concrete" should be renamed as "special concrete for sustainability."
- In Concrete Technology Laboratory, Experiments 10, 11 & 14 should be mentioned as "Mechanical and Elastic Properties of Concrete."
- In Fluid Mechanics Laboratory, "calibration" (Experiments 2, 3, 6 & 7) should be replaced with "determination of coefficient of discharge."
- In Structural Analysis, Unit 3 title should be renamed as "Analysis of Structures by Slope-Deflection Method."
- In Structural Analysis, Unit 4 title should be renamed as "Analysis of Structures by Moment Distribution Method."

Outcome: The Course Structure and Syllabus for II-B.Tech.-I & II Semester under the AU-24 Regulations, incorporating the discussed modifications, were **approved by all members.**

3. Finalization of Course Structure and Syllabus for II-M.Tech. under AU-24 Regulations

Agenda Item No. BoS/2025/CIVIL/2.3: To discuss and finalize the course structure and syllabus II-M.Tech. under the AU-24 Regulations.

The syllabus for II-M.Tech. under the AU-24 Regulations (as enclosed in Annexure-II) was thoroughly discussed and reviewed.

Outcome: The Course Structure and Syllabus for II-M.Tech. under the AU-24 Regulations were **approved by all members.**

4. Review of Discrepancies in First-Year UG and PG Courses

Agenda Item No. BoS/2025/CIVIL/2.5: To review and address any discrepancies observed in the first-year UG (B.Tech.-Civil Engg.) and PG (M.Tech-Structural Engg.) courses under the AU-24 Regulations.

The first-year UG (B.Tech.-Civil Engg.) and PG (M.Tech-Structural Engg.) courses under the AU-24 Regulations (as enclosed in Annexure-III) were reviewed for any discrepancies.

Outcome: No discrepancies were observed, and the courses were **approved by all members.**

1.	2.	3.	4.	5. Attended Online
6. Attended Online	7. Attended Online	8. Attended Online	9. Attended Online	

5. Approval of Programme Educational Objectives (PEOs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs)

Agenda Item No. BoS/2025/CIVIL/2.6: To discuss and approve the Programme Educational Objectives (PEOs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs) of the Civil Engineering department.

Dr. T. Naresh Kumar, Chairman of the Board, presented the department's Vision, Mission, Programme Educational Objectives (PEOs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs) (as enclosed in Annexure-IV). These were defined to ensure outcome-based education and were thoroughly reviewed.

Outcome: The Programme Educational Objectives (PEOs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs) of the Civil Engineering department were **approved by all Board of Studies members.**

6. Inclusion of Courses Aligned with Sustainable Development Goals (SDGs), Cross-Cutting Issues, and Indian Knowledge System (IKS)

Agenda Item No. BoS/2025/CIVIL/2.7: Discussion on the inclusion of courses aligned with Sustainable Development Goals (SDGs), cross-cutting issues and Indian Knowledge System (IKS) in the curriculum of the Civil Engineering departments.

Dr. T. Naresh Kumar, Chairman of the Board, led the deliberation on integrating Sustainable Development Goals (SDGs), interdisciplinary issues, and elements of the Indian Knowledge System (IKS) into the curriculum for holistic and inclusive education (as enclosed in Annexure-V). Specific inclusions were:

- "Materials for sustainability" was incorporated into the Building Materials and Construction course.
- "Mineral admixtures for sustainability" and "special concrete for sustainability" were opted into the Concrete Technology syllabus.

Outcome: The integration of courses aligned with Sustainable Development Goals (SDGs), cross-cutting issues, and the Indian Knowledge System (IKS) in the curriculum was positively reviewed and **approved by all BoS members.**

1.	2.	3.	4.	5. Attended Online
6. Attended Online	7. Attended Online	8. Attended Online	9. Attended Online	

7. Approval of Syllabus for Annamacharya University Research Admission Test (AURAT) – 2025

Agenda Item No. BoS/2025/CIVIL/2.8: To discuss and approve the syllabus for the Annamacharya University Research Admission Test (AURAT) – 2025 for the Civil Engineering department.

Dr. T. Naresh Kumar, Chairman of the Board, proposed the syllabus for the Annamacharya University Research Admission Test (AURAT) – 2025 for the Civil Engineering department (as enclosed in Annexure-VI). Dr. G. Appa Rao and Dr. A. Ramachandra Murthy proposed a syllabus distribution of 60% for comprehensive Civil Engineering and 40% for Specialization.

Outcome: The proposed syllabus for AURAT – 2025 for the Civil Engineering department was reviewed and **approved by all BoS external members.**

8. Approval of List of Examiners for Second-Year Courses/Subjects

Agenda Item No. BoS/2025/CIVIL/2.9: To approve the list of examiners for second-year courses/subjects.

Dr. T. Naresh Kumar, Chairman of the Board, proposed the panel of examiners for second-year courses (as enclosed in Annexure-VII), emphasizing the need for qualified personnel for evaluation and academic assessment.

Outcome: The list of examiners for second-year courses/subjects was reviewed and **approved by all BoS external members.**

9. Discussion on Feedback Received Regarding the Curriculum

Agenda Item No. BoS/2025/CIVIL/2.11: Discussion on feedback received regarding the curriculum.

Dr. T. Naresh Kumar, Chairman of the Board, presented the feedback received from students, faculty, and stakeholders regarding the curriculum, aiming for continuous improvement and relevance.

Outcome: The feedback received regarding the curriculum was acknowledged and **accepted by all BoS external members.**

1.	2.	3.	4.	5. Attended Online
6. Attended Online	7. Attended Online	8. Attended Online	9. Attended Online	

10. Any Other Item with the Permission of the Chair

Agenda Item No. BoS/2025/CIVIL/2.12: Any other item with the permission of the Chair.

As all items on the agenda had been thoroughly discussed and resolved, the Chairman concluded that there were no further items to be addressed.

Conclusion

Dr. T. Naresh Kumar expressed his gratitude to all members for their active participation, valuable suggestions, and committed involvement in the discussions, particularly acknowledging the significant inputs from the subject and industry experts. The meeting concluded on a productive note.

1.	2.	3.	4.	5. Attended Online
6. Attended Online	7. Attended Online	8. Attended Online	9. Attended Online	

Attendance Sheet:

BoS Members:

Sl.No.	Name	Role in BoS	Signature with Date
1.	Dr. T. Naresh Kumar	Associate Professor& Head. Dept. of Civil Engineering Annamacharya University Rajampet. Email: tnk@aitsrajampet.ac.in	
2.	Dr. N.R. Gowthami	Assistant Professor, Dept of Civil Engineering Annamacharya University Rajampet. Email: nrg@aitsrajampet.ac.in	11/6/25
3.	Dr. D. Gouse Peera	Assistant Professor, Dept of Civil Engineering Annamacharya University Rajampet. Email: dgp@aitsrajampet.ac.in	11/6/25
4.	Mr. S. Venkata Vara Prasad	Assistant Professor, Dept of Civil Engineering Annamacharya University Rajampet. Email: svvp@aitsrajampet.ac.in	11/6/25
5.	Dr. G. Appa Rao	Professor, Dept. of Civil Engg., IIT, Madras. Email: garao@iitn.ac.in	Attended online
6.	Dr. A. Ramachandra Murthy	Senior Principal Scientist, CSIR- SERC, Chennai. Email: murthyarc@serc.res.in	Attended Online
7.	Dr. M. Srimurali	Professor, Dept. of Civil Engineering, SV University, Tirupati Email :msrimurali@gmail.com	Attended online
8.	Sri. S. Babu	Sr. Vice President (Tech.), NCC Limited, (formerly Nagarjuna Construction Company Ltd.), NCC House, Madhapur, Hyderabad. Email: sreerama.babu@gmail.com	Attended online
9.	Mr. G. Ravindra Kumar	Senior Engineer, Samarth Infra Engg. Techno crats Pvt. Ltd., Hyderabad. Email:ravindra@samarthinfrigg.com	Attended Online

CHAIRMAN, BOS
Annamacharya University, Rajampet

HEAD OF THE DEPARTMENT
CIVIL ENGINEERING
ANNAMACHARYA UNIVERSITY
RAJAMPET, ANNAMAYYA DIST, A.P.

1.	2.	3.	4.	5. Attended Online
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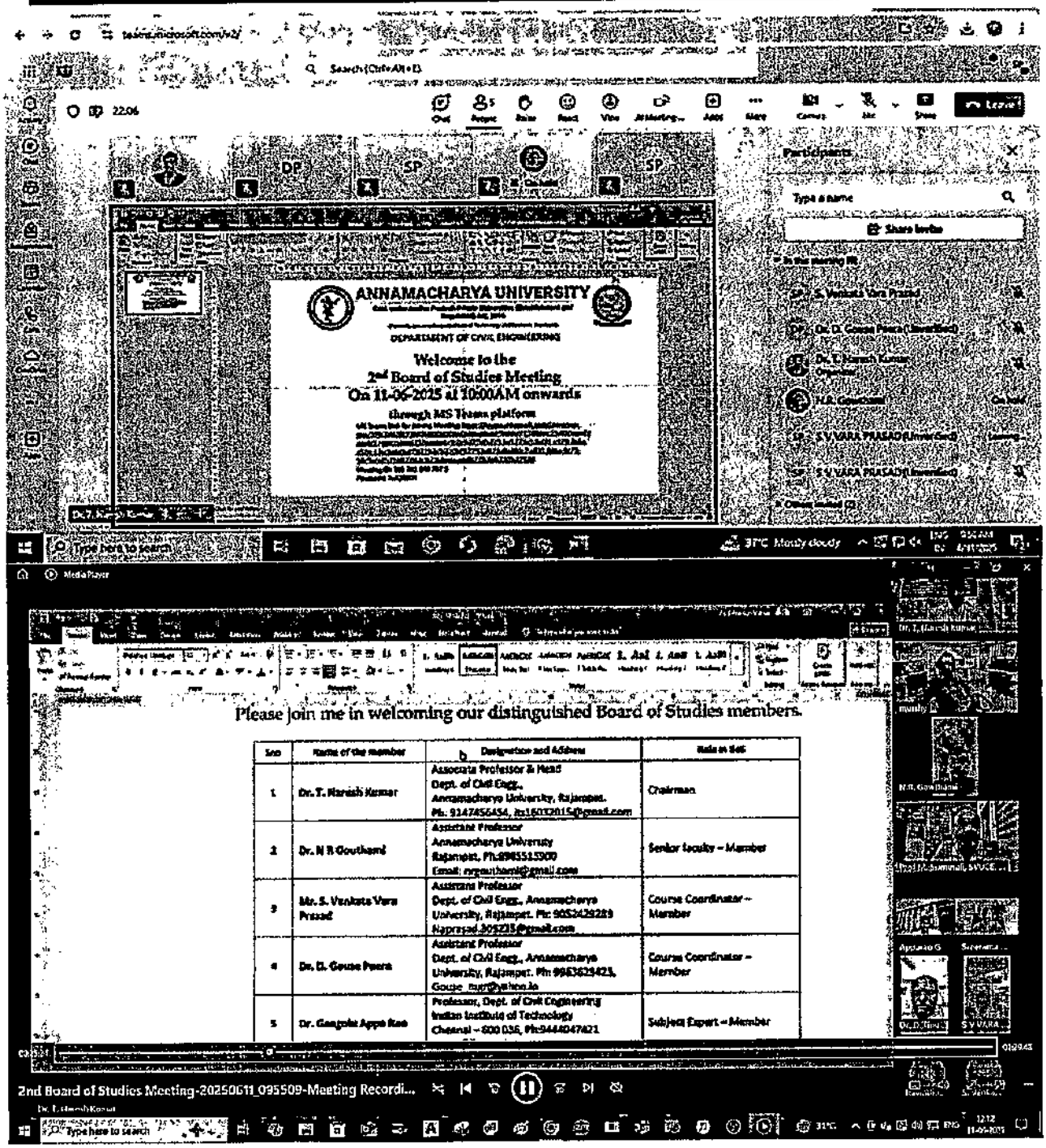

Sno	Name of the member	Designation and Address	Role in BoS
1	Dr. T. Manish Kumar	Associate Professor & Head Dept. of Civil Engg., Annamacharya University, Rajampet. Ph: 9347456454, its160tkm15@gmail.com	Chairman
2	Dr. N R Gouthami	Assistant Professor Annamacharya University Rajampet. Ph:8985515900 Email: nrgouthami@gmail.com	Senior faculty – Member
3	Mr. S. Venkata Vara Prasad	Assistant Professor Dept. of Civil Engg., Annamacharya University, Rajampet. Ph: 9052429289 Naprasad.305215@gmail.com	Course Coordinator – Member
4	Dr. D. Gouse Peera	Assistant Professor Dept. of Civil Engg., Annamacharya University, Rajampet. Ph: 9963625423, Gouse.nayr@yahoo.in	Course Coordinator – Member
5	Dr. Gangole Appa Rao	Professor, Dept. of Civil Engineering Indian Institute of Technology Chennai – 600 036, Ph:9444047421	Subject Expert – Member

1.	2.	3.	4.	5. Attended Online
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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Date: 11-06-2025

2nd Board of Studies online Attendance on 11-06-2025

1. Summary						
Meeting title	2nd Board of Studies Meeting					
Attended participants	13					
Start time	6/11/25, 9:28:09 AM					
End time	6/11/25, 12:02:42 PM					
Meeting duration	2h 34m 32s					
Average attendance time	1h 38m 23s					
2. Participants						
Name	First Join	Last Leave	In-Meeting Duration	Email	Participant ID (UPN)	Role
Dr. T. Naresh Kumar	6/11/25, 9:28:15 AM	6/11/25, 12:02:42 PM	2h 29m 31s	tnk@altsrajampet.ac.in	tnk@altsrajampet.ac.in	Organizer
S. Venkata Vara Prasad	6/11/25, 9:34:07 AM	6/11/25, 11:50:34 AM	2h 16m 27s	svvp@altsrajampet.ac.in	svvp@altsrajampet.ac.in	Presenter
N.R. Gowthami	6/11/25, 9:36:17 AM	6/11/25, 11:50:23 AM	2h 14m 5s	nrg@altsrajampet.ac.in	nrg@altsrajampet.ac.in	Presenter
Dr. D. Gouse Peera (Unverified)	6/11/25, 9:36:45 AM	6/11/25, 11:50:44 AM	2h 13m 59s			Presenter
S V VARA PRASAD (Unverified)	6/11/25, 9:42:58 AM	6/11/25, 10:40:41 AM	57m 43s			Presenter
Dr. Ramachandra Murthy A SERC (External)	6/11/25, 10:00:30 AM	6/11/25, 10:01:50 AM	1m 19s	murthyarc.serc@csir.res.in	murthyarc.serc@csir.res.in	Presenter
Prof M. Srimurali, SVUCE, Tirupati (Unverified)	6/11/25, 10:03:47 AM	6/11/25, 11:47:49 AM	1h 42m 48s			Presenter
murthy (Unverified)	6/11/25, 10:07:13 AM	6/11/25, 11:50:14 AM	1h 43m 1s			Presenter
Ravindra Kumar (Unverified)	6/11/25, 10:07:44 AM	6/11/25, 11:50:27 AM	1h 41m 15s			Presenter
Apparao G (External)	6/11/25, 10:13:35 AM	6/11/25, 11:50:13 AM	1h 36m 37s	garao@icarpis.iitm.ac.in	garao@icarpis.iitm.ac.in	Presenter
Sreerama Babu (External)	6/11/25, 10:15:51 AM	6/11/25, 11:47:49 AM	1h 31m 58s	sreerama.babu@nccltd.in	sreerama.babu@nccltd.in	Presenter
SMV narayana (Unverified)	6/11/25, 10:23:29 AM	6/11/25, 11:50:21 AM	1h 26m 51s			Presenter
S VENKATA VARA PRASAD (Unverified)	6/11/25, 10:39:18 AM	6/11/25, 12:02:42 PM	1h 23m 24s			Presenter
3. In-Meeting Activities						
Name	Join Time	Leave Time	Duration	Email	Role	
Dr. T. Naresh Kumar	6/11/25, 9:28:15 AM	6/11/25, 11:57:39 AM	2h 29m 24s	tnk@altsrajampet.ac.in	Organizer	
Dr. T. Naresh Kumar	6/11/25, 12:02:34 PM	6/11/25, 12:02:42 PM	7s	tnk@altsrajampet.ac.in	Organizer	
S. Venkata Vara Prasad	6/11/25, 9:34:07 AM	6/11/25, 11:50:34 AM	2h 16m 27s	svvp@altsrajampet.ac.in	Presenter	
N.R. Gowthami	6/11/25, 9:36:17 AM	6/11/25, 11:50:23 AM	2h 14m 5s	nrg@altsrajampet.ac.in	Presenter	
Dr. D. Gouse Peera (Unverified)	6/11/25, 9:36:45 AM	6/11/25, 11:50:44 AM	2h 13m 59s		Presenter	
S V VARA PRASAD (Unverified)	6/11/25, 9:42:58 AM	6/11/25, 10:40:41 AM	57m 43s		Presenter	
Dr. Ramachandra Murthy A SERC (External)	6/11/25, 10:00:30 AM	6/11/25, 10:01:50 AM	1m 19s	murthyarc.serc@csir.res.in	Presenter	
Prof M. Srimurali, SVUCE, Tirupati (Unverified)	6/11/25, 10:03:47 AM	6/11/25, 11:22:32 AM	1h 18m 45s		Presenter	
Prof M. Srimurali, SVUCE, Tirupati (Unverified)		6/11/25, 11:23:45 AM			Presenter	
Prof M. Srimurali, SVUCE, Tirupati (Unverified)	6/11/25, 11:23:45 AM	6/11/25, 11:47:49 AM	24m 3s		Presenter	
murthy (Unverified)	6/11/25, 10:07:13 AM	6/11/25, 11:50:14 AM	1h 43m 1s		Presenter	
Ravindra Kumar (Unverified)	6/11/25, 10:07:44 AM	6/11/25, 10:09:51 AM	2m 7s		Presenter	
Ravindra Kumar (Unverified)	6/11/25, 10:11:18 AM	6/11/25, 11:50:27 AM	1h 39m 8s		Presenter	
Apparao G (External)	6/11/25, 10:13:35 AM	6/11/25, 11:50:13 AM	1h 36m 37s	garao@icarpis.iitm.ac.in	Presenter	
Sreerama Babu (External)	6/11/25, 10:15:51 AM	6/11/25, 11:47:49 AM	1h 31m 58s	sreerama.babu@nccltd.in	Presenter	
SMV narayana (Unverified)	6/11/25, 10:23:29 AM	6/11/25, 11:50:21 AM	1h 26m 51s		Presenter	
S VENKATA VARA PRASAD (Unverified)	6/11/25, 10:39:18 AM	6/11/25, 12:02:42 PM	1h 23m 24s		Presenter	

1.	2.	3.	4.	5. Attended Online
6. Attended Online	7. Attended Online	8. Attended Online	9. Attended Online	

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Rajampet, Annamayya District, A.P – 516126, INDIA

Action Taken Report on minutes of 1st BOS (AU-24)meeting held on 24th Aug 2024 at 10:00 AM

1.2 Review and Approval of First-Year B.Tech. Course Structure and Syllabi under AU24 Regulations

Resolution : The BoS unanimously approved the First-Year B.Tech. course structure and syllabi under AU24 Regulations.

Action Taken

- The Board reviewed the proposed course structure and detailed syllabi for the First-Year B.Tech. program. After thorough discussion, the structure and syllabi were unanimously approved.
- Practical hours for the course Engineering Mechanics (24ACIV21T) has been changed from 3 to zero in the course structure of AU-24.
- Engineering Mechanics (24ACIV21T) under AU 24 Regulations, included in the First Year B.Tech II Semester, has been amended. Minor spelling errors were identified in unit-2 and some prescribed and reference textbook titles have been revised in the detailed syllabus.

1.3 Introduction of New Programs (if applicable)

Resolution: No new programs were proposed or approved in this meeting.
Action Taken: No new programs were proposed

1.4 Review and Approval of M.Tech Course Structure and Detailed Syllabi under AU24 Regulations

Resolution: The M.Tech course structure and syllabi under AU24 Regulations were approved with minor revisions.
Action Taken: The Board reviewed the M.Tech program structure and syllabi under the AU24 regulations. All proposed modifications and additions were approved with minor suggestions.

1.5 Discussion on the Inclusion of Industry-Relevant Courses and Emerging Technologies for Upcoming 2nd, 3rd, and 4th Years under AU24 Regulations

Resolution : It was resolved to revise the upcoming 2nd, 3rd, and 4th-year syllabi to include industry-relevant electives and emerging technologies, subject to further committee review.
Action Taken: Members discussed the importance of integrating industry-relevant content such as AI in Civil Engineering, Sustainable Construction, Smart Infrastructure, and BIM. Recommendations were made to incorporate such topics in electives and practical training components.

1.6 Discussion and Approval of the Annamacharya University Research Admission Test - 2024 (AURAT) Syllabus for Civil Engineering

Resolution: The Board approved the AURAT-2024 syllabus for Civil Engineering as presented.
Action Taken: The AURAT-2024 syllabus for Civil Engineering was reviewed. The panel approved the syllabus with a focus on aligning it with core competencies and research aptitude.

1.7 Discussion and Approval of the Course Work, Including Core Subjects and Research Methodology, for Research Programs

Resolution : The proposed coursework for Research Programs was reviewed and approved.
Action Taken: The proposed course work structure, including the Core Subject list and Research Methodology component, was approved. Members emphasized the need for periodic revision to align with research trends.

1.8 Approval of the List of Examiners for First-Year Courses/Subjects

Resolution : The submitted panel of examiners for First-Year courses was approved.
Action Taken:The Board reviewed and approved the submitted panel of examiners for the first-year courses, ensuring coverage of all subjects with qualified personnel

1.	2.	3.	4.	5. Attended online
6.	7.	8.	9.	

Annexure-I

ANNAMACHARYA UNIVERSITY

Course Structure for R24 Regulations

Department of Civil Engineering

Semester III (Second year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
			Theory Courses				
1	HSMC	24AMBA31T	Managerial Economics and Financial Analysis	3	0	0	3
2	HSMC	24AUHV31T	Universal Human Values-II	3	0	0	3
3	PCC	24ACIV31T	Strength of Materials	3	0	0	3
4	PCC	24ACIV32T	Surveying and Geomatics	3	0	0.	3
5	PCC	24ACIV33T	Fluid Mechanics, Hydraulics and Hydraulic Machinery	3	0	0	3
			Laboratory Courses				
6	PCC	24ACIV31L	Strength of Materials Laboratory	0	0	3	1.5
7	PCC	24ACIV32L	Surveying and Geomatics Laboratory	0	0	3	1.5
8	PCC	24ACIV33L	Fluid Mechanics Laboratory	0	0	3	1.5
9	SC	24ACIV34L	Building Planning and Drawing	1	0	2	2
			Total credits				**21.5**

Category	Credits
Basic Science course	-
Professional core Courses	13.5
Humanities Sciences	6
Skill oriented Course	2
Mandatory Course	--
Total Credits	**21.5**

Semester IV (Second year)

Sl.No	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
			Theory Courses				
1	BSC	24AMAT41T	Probability and Statistics	3	1	0	3
2	ESC	24ACIV41T	Building Materials and Construction	3	0	0	3
3	PCC	24ACIV42T	Concrete Technology	3	0	0	3
4	PCC	24ACIV43T	Engineering Geology	3	0	0	3
5	PCC	24ACIV44T	Structural Analysis	3	0	0	3
			Laboratory Courses				
6	PCC	24ACIV42L	Concrete Technology Laboratory	0	0	3	1.5
7	PCC	24ACIV43L	Engineering Geology Laboratory	0	0	3	1.5
8	PCC	24ACIV45L	Hydraulics and Hydraulic Machinery Laboratory	0	0	3	1.5
9	SC	24ACSE45L	Java Programming	1	0	2	2
10	MC	24AENS41T	Environmental Science	3	0	0	0
			Total credits				**21.5**
			Internship 2 Months (Mandatory) during summer vacation				

Category	Credits
Basic Science Courses	3
Professional core Courses	13.5
Engineering Science Courses	3
Humanities Sciences	-
Skill oriented course	2
Mandatory Course	--
Total Credits	**21.5**

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Managerial Economics and Financial Analysis
Category:	HSMC
Semester:	III Semester
Couse Code:	24AMBA31T
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To inculcate the basic knowledge of microeconomics and financial accounting.
2. To make the students learn how demand is estimated for different products, input output relationship for optimizing production and cost.
3. To Know the Various types of market structure and pricing methods and strategy.
4. To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
5. To provide fundamental skills on accounting and to explain the process of preparing financial statements.

Course Outcomes:

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

1. Define the concepts related to Managerial Economics, financial accounting and management.
2. Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets.
3. Apply the Concept of Production cost and revenues for effective Business decision .
4. Analyze how to invest their capital and maximize returns
5. Evaluate the capital budgeting techniques.
6. Develop the accounting statements and evaluate the financial performance of business entity.

Unit 1 Managerial Economics **12**

Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

Unit 2 Production and Cost Analysis **12**

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Iso quants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

Unit 3 Business Organizations and Markets **12**

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies.

Unit 4 Capital Budgeting **12**

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems) .

Unit 5 Financial Accounting and Analysis **12**

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

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6. Attended online	7. Attended online	8. Attended online	9. Attended online	

Prescribed Textbooks:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH.

Reference Textbooks:

1. Ahuja Hl Managerial economics Schand.
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	PSO1	PSO2
24AMBA31T.1	1	1	1	-	1	2	-	1	1	2	1	-	-
24AMBA31T.2	2	1	1	1	1	1	1	-	1	1	1	-	-
24AMBA31T.3	1	1	-	1	2	1	1	2	1	1	1	-	-
24AMBA31T.4	1	1	-	1	1	-	1	1	-	1	1	-	-
24AMBA31T.5	-	2	1	1	-	1	-	1	1	-	1	-	-

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Universal Human Values-II
Category:	HSM
Course Code:	24AUHV31T/24AUHV41T
Branches:	AIDS, AIML,CSE(AI),CSE(AIML), CSE(DS), ECE, CE, EEE/CSE,CSE(ICB), ME
Year	II
Semester:	I Semester/ II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The course aims to help students recognize the vital interplay between values and skills, promoting sustained happiness and prosperity. It seeks to foster a holistic perspective on life and profession, encouraging value-based living through a clear understanding of human reality and existence. Additionally, the course emphasizes the ethical implications of such an understanding, fostering trustful behaviour, fulfilling human interactions, and a harmonious relationship with nature.

Course Outcomes:

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

1. comprehend the terms like Natural Acceptance, Happiness and Prosperity
2. analyze one's self, and one's surroundings (family, society, nature)
3. apply human values in enriching human relationships and human society.
4. analyze the need for universal human values and harmonious existence.
5. evaluate themselves as socially and ecologically responsible engineers.

12

Unit 1 Introduction to Value Education

Lecture1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture2: Understanding Value Education
Tutorial 1: Practice Session1: Sharing about oneself
Lecture 3: Self-Exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – The Basic Human Aspirations
Tutorial 2: Practice Session2: Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario
Lecture 6: Method to Fulfill the Basic Human Aspirations
Tutorial 3: Practice Session3: Exploring Natural Acceptance

8

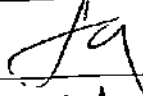
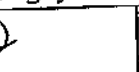
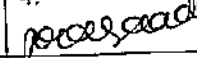
Unit 2 Harmony in the Human Being

Lecture 7: Understanding Human being as the co-existence of the self and the body.
Lecture 8: Distinguishing between the needs of the self and the body
Tutorial 4: Practice Session4: Exploring the difference of needs of self and body.
Lecture 9: The body as an instrument of the self
Lecture 10: Understanding harmony in the self
Tutorial 5: Practice Session5: Exploring sources of imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and health
Tutorial 6: Practice Session 6: Exploring harmony of self with the body

8

Unit 3 Harmony in the Family and Society

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session7: Exploring the Feeling of Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session 8: Exploring the Feeling of Respect
Lecture 16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session9: Exploring systems to fulfil human goal

1. 	2. 	3. 	4. 	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

10

Unit 4 Harmony in the Nature/Existence

Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, Self-Regulation and Mutual Fulfilment among the Four Orders of Nature
Tutorial 10: Practice Session 10: Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session11: Exploring Co-existence in Existence

10

Unit 5 Implications of the Holistic Understanding – A Look at Professional Ethics

Lecture 23: Natural Acceptance of Human Values
Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session 12: Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session13: Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management
Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession
Tutorial 14: Practice Session14: Exploring Steps of Transition towards Universal Human Order

Practice Sessions for UNIT I – Introduction to Value Education

PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance

Practice Sessions for UNIT II – Harmony in the Human Being

PS4 Exploring the Difference of Needs of Self and Body
PS5 Exploring Sources of Imagination in the Self
PS6 Exploring Harmony of Self with the Body

Practice Sessions for UNIT III – Harmony in the Family and Society

PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature (Existence)

PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics

PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

Prescribed Textbooks:

1. **The Textbook** - R R Gaur, R Asthana, G P Bagaria. *A Foundation Course in Human Values and Professional Ethics.* 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1.
2. The Teacher's Manual - R R Gaur, R Asthana, G P Bagaria. *Teachers' Manual for A Foundation Course in Human Values and Professional Ethics.* 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books:

1. A. Nagaraj. *Jeevan Vidya: Ek Parichaya.* Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N. Tripathi. *Human Values.* New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi. *The Story of My Experiments with Truth*
5. E. F Schumacher. *Small is Beautiful*

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Web Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3S2%20Respect%20July%2023.pdf
4. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
5. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%202325%20Ethics%20v1.pdf
6. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-humanvalues/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385https://onlinecourses.swayam2.ac.in/aic22_ge23/preview
7. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf

CO-PO Mapping:

Course outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24AUHV31T/41T.1	-	-	-	-	-	-	3	-	1	-	2	-	-
24AUHV31T/41T.2	-	-	-	-	-	-	3	-	1	-	2	-	-
24AUHV31T/41T.3	-	-	-	-	-	-	3	-	1	-	2	-	-
24AUHV31T/41T.4	-	-	-	-	-	-	3	-	1	-	3	-	-
24AUHV31T/41T.5	-	-	-	-	-	2	3	-	1	-	2	-	-

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Strength of Materials
Category:	PCC
Semester:	III Semester
Couse Code:	24ACIV31T
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To impart knowledge on the fundamental concepts of stress, strain, and elastic behavior of materials.
2. To enable students to understand and apply the concepts of flexural and shear stresses in beams and analyze the behavior of axially loaded compression members using Euler's theory
3. To develop the ability to calculate flexural and shear stresses in various structural members.
4. To provide methods for computing deflections in beams using standard techniques.
5. To introduce principal stresses and strain theories and failure theories.

Course Outcomes:

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

1. Analyze stresses and strains in materials under axial loading and determine elastic constants for various conditions.
2. Construct shear force and bending moment diagrams for beams under different loading scenarios.
3. Calculate flexural and shear stresses in various beam sections and evaluate the stability of columns using Euler's buckling theory under different end conditions.
4. Determine the slope and deflection of beams using analytical methods such as double integration and moment area method.
5. Apply theories of failure and principal stress analysis to evaluate materials and shells behaviour under complex stress conditions.

Unit 1 Simple Stresses and Strains 12

Concept of stress and strain- Principle-Stress and Strain Diagram - Elasticity and Plasticity–Types of stresses and strains – Hooke's law–stress –strain diagram for mild steel– Working stress –Factor of safety –Lateral strain, Poisson's ratio and volumetric strain –Elastic moduli and the relationship between them– Bars of varying section –composite bars– Temperature stresses. Strain energy –Resilience –Gradual, sudden and impact –simple applications.

Unit 2 Shear Force and Bending Moment 12

Definition and classification of beams– Concept of shear force and bending moment– S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, UDL, UVL and combination of loads– Point of contra flexure –Relation between S.F, B.M and rate of loading at a section of a beam.

Unit 3 Flexural Stresses and Shear Stresses 12

Flexural stresses: Theory of simple bending –Assumptions –Derivation , Neutral axis– Determination of bending stresses– section modulus of rectangular and circular sections (Solid and Hollow), I, T & C sections –Design of simple beam sections.
Shear stresses: Derivation of formula– Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T and C-Sections.
Basics of Columns: Axially loaded compression members – Euler's crippling load theory – Derivation of Euler's critical load formulae for various end conditions – Equivalent length – Slenderness ratio –Limitations of Euler's theory.

Unit 4 Deflection of Beams 12

Bending in to a circular arc– slope, deflection and radius of curvature –and Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, -UDL – Double Integration method and Moment area method.

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

Unit 5 **Basics of Principal Stresses and Strains , Theories of Failures, Thin and Thick Shell** **12**

Principal stresses and strains: Basics of Stresses on an inclined section of a bar under axial loading Normal and tangential stresses on an inclined plane for biaxial stresses–Mohr's circle of stresses– Principal stresses and strains – Analytical and graphical solutions.

Theories of failures: Various Theories of failures like Maximum Principal stress theory– Maximum Principal strain theory– Maximum shear stress theory– Maximum strain energy theory –Maximum shear strain energy theory.

Basics of Thin and Thick Shells- Longitudinal and circumferential stresses.

Prescribed Textbooks:

1. Mechanics of Solid, Ferdinand Beer and others – Tata McGraw-Hill Publications 2000
2. A Text book of Strength of materials by Dr. R. K.Bansal, 4th edition,Laxmi publications, 2010.

Reference Textbooks:

1. Strength of Materials by R. Subramaniyan, Oxford University Press, 2015.
2. D.H. Young, S.P. Timoshenko " Elements of Strength of Materials" East West Press Pvt. Ltd., 5th Edition ,Reprint 2014.
3. Advanced Mechanics of Solids, L.S Srinath, McGraw Hill Education, , 3rd Edition, 2017.
4. Mechanics of Materials, Beer and Johnston, McGraw Hill India Pvt. Ltd. 8th Edition, 2020.
5. Mechanics of Solids — E P Popov, Prentice Hall, 2nd Edition, 2015.
6. A Textbook of Strength of Materials, by R. K. Rajput, 7e (Mechanics of Solids) SI Units S. Chand & Co, New Delhi 7th edition 2022
7. Strength of Materials by S. S. Ratan Tata Mc Grill Publications 3rd Edition, 2016.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative Teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV31T.1	3	3	1	2	-	2	-	-	-	-	1	3	2
24ACIV31T.2	3	3	1	2	-	1	-	-	-	-	1	3	2
24ACIV31T.3	3	3	1	2	-	2	-	-	-	-	1	3	2
24ACIV31T.4	3	3	1	2	-	2	-	-	-	-	1	3	2
24ACIV31T.5	3	3	1	2	-	1	-	-	-	-	1	3	2

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6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Surveying and Geomatics
Category:	PCC
Semester:	III Semester
Couse Code:	24ACIV32T
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To introduce the principles, classification, and tools of surveying and measurement of distances and directions using traditional instruments.
2. To develop understanding of levelling, contouring, and area/volume computations essential for engineering projects.
3. To provide knowledge and skills in the use of theodolites, traversing methods, and tacheometry for determining angles, distances, and heights.
4. To explain the geometry and setting of various curves and introduce modern surveying tools like EDM and total station.
5. To introduce photogrammetry principles, geometry of aerial photos, and mapping techniques using aerial imagery.

Course Outcomes:

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

1. Apply basic surveying principles using chains, tapes, compass, and plane table.
2. Learn the concepts and techniques of leveling and contouring, and compute areas and volumes for engineering projects involving earthworks.
3. Gain proficiency in handling theodolites, performing traversing, and applying tacheometric methods for measuring heights and distances.
4. Understand the geometry and purpose of different types of curves and explore the use of modern surveying instruments like EDM and Total Station
5. Acquire knowledge of photogrammetry techniques including aerial photography, flight planning, stereoscopy, and methods of topographic mapping.

Unit 1 **Basic Concepts of surveying, Measurement of Distances and Directions** 15

Basic Concepts of surveying: Introduction, concept ,purpose, Objectives, classification and principles of surveying

Measurement of Distances and Directions

Chain Surveying : Instruments for chaining , Ranging out survey lines, Errors in chaining ,Field book, Basic problems in chaining - Obstacles for chaining. List the errors and mistakes in Chain surveying and apply the corrections for measurement due to incorrect length of chain.

Prismatic Compass- Types of compass – Bearings - Whole Circle Bearing, Quadrantal Bearing, True meridian, Magnetic meridian, True bearing, Magnetic bearing, Convert Whole Circle Bearing in to Quadrantal Bearing and vice versa. Included angles– Declination - Dip and local attraction.

Plane table surveying: Introduction, accessories, setting up of plane table, techniques, testing, adjustments, errors, advantages and disadvantages

Unit 2 **Levelling, Contouring and Computation of Areas & Volumes** 12

Levelling - Basics definitions, types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels- Height of the Instrument Method-Rise and Fall method, Effect of Curvature of Earth and Refraction.

Contouring- Characteristics and uses of Contours, Direct & Indirect methods of contour surveying, interpolation and sketching of Contours.

Computation of Areas and Volumes: Areas - Determination of areas consisting of irregular boundary and regular boundary. Volumes - Determination of volume of earth work in cutting and embankments, volume of borrow pits, capacity of reservoirs.

Unit 3 **Theodolite Surveying, Traversing & Tacheometric Surveying** 12

Theodolite Surveying: Types of Theodolites, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle.

Traversing: Methods of traversing, adjustments, Introduction to Omitted measurements.

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry, Heights and distance using tachometric principles.

Unit 4 Curves & Modern Surveying Methods 10

Curves: Types of curves and their necessity, elements of simple, compound, reverse curves.

Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station- Advantages and Applications.

Unit 5 Photogrammetry Surveying 10

Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes.

Prescribed Textbooks:

1. Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011.
2. Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010.

Reference Textbooks:

1. R. Subramanian, Surveying and Leveling, 1stEdition, Oxford University Press, New Delhi, 2010.
2. Arthur R. Benton and Philip J. Taety, Elements of Plane Surveying, 3rd Edition, McGraw Hill, 2010.
3. Arora, K. R., Surveying - Vol. I, II and III, 10th Edition, Standard Book House, Delhi, 2011.
4. Anji Reddy, M., Remote sensing and Geographical information system, B.S.Publications, 2001. 6. Arora, K.R., Surveying, Vol-I and II, Standard Book House, 2015
5. Chandra, A.M, Plane Surveying, 2nd Edition, New Age International Publishers, New Delhi, 2010.
6. Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV32T.1	2	3	3	1	1	1	-	-	-	-	1	1	1
24ACIV32T.2	2	3	3	1	1	1	-	-	-	-	1	1	1
24ACIV32T.3	2	3	3	1	1	2	-	-	-	-	1	1	1
24ACIV32T.4	2	3	3	1	1	1	-	-	-	-	1	1	1
24ACIV32T.5	2	3	3	1	-	2	-	-	-	-	1	1	1

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Fluid Mechanics, Hydraulics and Hydraulic Machinery
Category: PCC
Semester: III Semester
Couse Code: 24ACIV33T
Branch/es: CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To introduce fundamental fluid properties, fluid statics concepts, and methods of pressure measurement.
2. To explain fluid kinematics and dynamics, including flow classification, governing equations, and their applications.
3. To develop understanding of flow through pipes, including energy losses, flow regimes, and pipe network analysis.
4. To study open channel flow characteristics, critical flow computation, and flow measurement techniques.
5. To familiarize students with hydraulic turbines, pumps, their working principles, design, and performance characteristics.

Course Outcomes:

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

1. Identify and explain physical properties of fluids, fluid statics principles, and analyze forces on submerged surfaces.
2. Apply fluid kinematics and dynamics principles to classify flow types and solve problems using continuity, Bernoulli, and momentum equations.
3. Analyze pipe flow systems by calculating major and minor losses, understanding laminar and turbulent flows, and solving pipe network problems.
4. Evaluate open channel flow parameters, classify flow regimes, and design hydraulic structures like weirs and notches.
5. Understand the operation and efficiency of hydraulic turbines and pumps, interpret characteristic curves, and address issues like cavitation and surge.

Unit 1 Basic Definitions and Fluid statics 12

Properties of fluids: mass density, specific weight, specific volume, specific gravity, viscosity, compressibility, vapor pressure, surface tension and capillarity. Pressure measurement devices - manometers, pressure gauges.
Fluid statics: Fluid Pressure, Pressure at a point, Hydrostatic law, Pascal's law, Atmospheric, Gauge and Absolute pressure, Equation of state, Hydrostatic forces on submerged plane and curved surfaces, Total pressure and Centre of Pressure, Practical applications-Dams and Gates, Buyoyancy, Buyoyant force, Centre of Buoyancy.

Unit 2 Fluid Kinematics and Fluid Dynamics 12

Fluid Kinematics : Classification of fluid flow-Steady and Unsteady flow, Uniform and Non-uniform flow, Laminar and Turbulent flow, Rotational and Irrotational flow, One, two and three dimensional flows; Stream line, Path line and stream tube, Velocity, Acceleration and rotation of fluid particles
Fluid Dynamics : Derivation of continuity equation-one-dimensional, three dimensional; stream function, velocity potential; Flow net-uses. Euler's Equation, Bernoulli's Equation, Applications of Bernoulli's equation-Venturimeter, Orifice Meter and Pitot tube, Momentum equation, Momentum correction factor, Applications of momentum equation.

Unit 3 Flow through pipes 12

Reynold's experiment, energy losses-major and minor losses; Laws of fluid friction; Darcy-Weisbach equation, Hydraulic Grade Line and Total Energy Line; Pipes in series and parallel; Equivalent pipe, Branched pipe, Siphon, Water Hammer in pipes,
Laminar flow-Laminar flow through circular pipes-Hazen poiseuille law; Laminar flow between parallel plates-Bothplates at rest, one plate moving and other at rest, Turbulent flow-Hydrodynamically smooth and rough boundaries, resistance to flow of fluid in smooth and rough pipes, Moody'sdiagram

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

Unit 4 Open Channel Flow 12

Types of channels – Velocity distribution – Chezy's, Manning's and Bazin's formulae for uniform flow – Most Economical sections - Critical flow – Specific Energy - Critical depth – Computation of critical depth – Critical, subcritical and super critical flows – Velocity measuring instruments. Non uniform flow - Dynamic equation for gradually varied flow - Mild, critical, steep, horizontal and adverse slopes – Surface profiles - Rapidly varied flow - Hydraulic jump and its applications - Energy dissipation

Weirs and notches: Flow over Notches and Weirs: Types of Notches and Weirs; Flow over - Rectangular, Triangular, Trapezoidal Notches and Weirs.

Dimensional Analysis :methods of Dimension Analysis, types of Similarities and Similarity Laws

Unit 5 Hydraulic Turbines and Centrifugal Pumps 12

Hydraulic Turbines : Layout of a typical hydropower installation-Heads and efficiencies-classification of turbines-Pelton wheel- Francis turbine-Kaplan turbine-working proportions- Velocity diagrams-Work done and efficiency- Hydraulic design, Surge tanks, Cavitation.

Centrifugal pumps: pump installation details-Heads-Losses and efficiencies-Limitation of suction lift-Work done-Minimum starting speed-Specific speed- Multistage pumps-Pumps in parallel-Performance of pumps-Characteristic curves-Net Positive Suction Head-Priming devices

Prescribed Textbooks:

1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House 22nd, 2019.
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2nd edition 2018

Reference Textbooks:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications(P) Ltd., New Delhi 11th edition, 2024.
2. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
3. Fluid Mechanics by Frank M. White, Henry Xue, Tata McGraw Hill, 9th edition , 2022.
4. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
5. Introduction to Fluid Mechanics & Fluid Machines by S K Som, Gautam Biswas, S Chakraborty Tata McGraw Hill, 3rd edition 2011.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV33T.1	2	2	1	1	1	1	-	-	-	-	1	2	3
24ACIV33T.2	3	3	2	2	1	-	-	-	-	-	1	3	3
24ACIV33T.3	3	2	2	2	1	-	-	-	-	-	1	3	3
24ACIV33T.4	3	3	2	3	1	-	-	-	-	-	1	2	2
24ACIV33T.5	3	3	2	3	1	1	-	-	-	-	1	2	2

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6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY
(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Strength of Materials Laboratory
Category: PSC
Semester: III Semester
Couse Code: 24ACIV31L
Branch/es: CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. Impart hands-on experience in testing materials under various loading conditions such as tension, compression, bending, torsion, and impact
2. Enable students to understand the mechanical behavior of engineering materials and structural members through experimental evaluation.
3. Demonstrate the practical application of theoretical principles such as stress-strain relationships, elastic constants, and deformation analysis.
4. Develop students' ability to analyze test results and draw conclusions related to strength, stiffness, and ductility of materials.
5. Promote the safe and effective use of universal testing machines, impact testers, torsion testing equipment, and other lab instruments.

Course Outcomes:

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

1. Conduct tensile, compression, torsion, bending, and hardness tests to determine the mechanical properties of metals and non-metals.
2. Analyze the load-deformation behavior of springs and beams under static loading.
3. Evaluate the impact strength of materials using Izod and Charpy tests.
4. Perform shear and deflection tests on metal specimens and structural elements.
5. Validate fundamental theorems like Maxwell's Reciprocal Theorem through experimental methods and interpret the test data accurately.

LIST OF EXPERIMENTS:

1. Tension test.
2. Bending test on Cantilever beam.
3. Bending test on simply supported beam.
4. Bending test on Continuous beam
5. Determination of torsion.
6. Hardness test.
7. Compression test on Open coiled springs
8. Tension test on Closely coiled springs
9. Compression test on wood/ concrete
10. Izod / Charpy Impact test on metals
11. Shear test of mild steel/wood
12. Maxwell Reciprocal Theorem

Note- 80 Percentage of the experiments should be covered mandatorily.

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV31L.1	2	2	3	3	1	3	3	3	3	-	1	3	3
24ACIV31L.2	2	2	3	3	1	3	3	3	3	-	1	3	3
24ACIV31L.3	2	2	3	3	1	3	3	3	3	-	1	3	3
24ACIV31L.4	2	2	3	3	1	3	3	3	3	-	1	3	3
24ACIV31L.5	2	2	3	3	1	3	3	3	3	-	1	3	3

1.	2.	3.	4.	5.
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ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Surveying and Geomatics Laboratory
Category:	PSC
Semester:	III Semester
Couse Code:	24ACIV32L
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. To provide hands-on experience in basic chain surveying techniques including closed traverse and obstacle chaining.
2. To develop competency in using compass and plane table for distance measurement and area determination.
3. To impart skills in levelling methods such as fly levelling and contouring for elevation and terrain mapping.
4. To train students in advanced angular measurements and height calculations using theodolite and tachometric principles.
5. To familiarize students with modern surveying instruments like the total station for precise measurements and plotting.

Course Outcomes:

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

1. Conduct a closed traverse chain survey and accurately plot the surveyed area.
2. Measure distances across obstacles and determine distances between inaccessible points using compass and total station.
3. Perform plane table surveys using radiation method to calculate areas of boundaries.
4. Execute fly levelling and contouring to determine heights, reduced levels, and topographic profiles.
5. Use theodolite and tachometer for precise measurement of horizontal and vertical angles, height of objects, and curve setting.

LIST OF EXPERIMENTS:

1. Survey of an area by chain survey (closed traverse) & Plotting
2. Chaining across obstacles
3. Determination of distance between two inaccessible points by using compass.
4. Plane table survey: finding the area of a given boundary by the method of radiation
5. Fly levelling: Height of the Instrument Method & Rise and Fall Method
6. Determining the levels of contours by Section Method
7. Theodolite survey: Determine the horizontal angles by Repetition Method & Height of far object by vertical angles.
8. Tachometric survey: Heights and Distance problems using tachometric principles.
9. Setting Out a Simple Circular Curve by Offset Method.
10. Determination of plot area & distance between two inaccessible points by using Total Station.

Note- 80 Percentage of the experiments should be covered mandatorily.

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV32L.1	3	3	2	2	2	2	2	1	3	-	1	1	1
24ACIV32L.2	3	3	2	2	2	2	2	1	3	-	1	1	1
24ACIV32L.3	3	3	2	2	2	2	2	1	3	-	1	1	1
24ACIV32L.4	3	3	2	2	2	2	2	1	3	-	1	1	1
24ACIV32L.5	3	3	2	2	2	2	2	1	3	-	1	1	1

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Fluid Mechanics Laboratory
Category: PSC
Semester: III Semester
Couse Code: 24ACIV33L
Branch/es: CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. To experimentally verify fundamental fluid flow principles such as Bernoulli's equation.
2. To develop skills in calibrating flow measuring devices like Venturimeter and Orifice meter.
3. To determine discharge coefficients for different hydraulic structures and flow conditions.
4. To analyze flow characteristics including friction losses and head loss in pipe fittings.
5. To understand laminar and turbulent flow regimes through Reynolds experiment.

Course Outcomes:

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

1. Verify Bernoulli's equation and explain its practical applications in fluid flow analysis.
2. Calibrate Venturimeter and Orifice meter and interpret their performance curves.
3. Calculate the coefficient of discharge for orifices, notches, and weirs under varying flow conditions.
4. Measure friction factors and head losses in pipes and pipe fittings, applying Darcy-Weisbach equation.
5. Identify laminar and turbulent flow patterns and determine the critical Reynolds number experimentally.

LIST OF EXPERIMENTS:

1. Verification of Bernoulli's equation.
2. Determination of Coefficient of discharge by using Venturimeter.
3. Determination of Coefficient of discharge by using Orifice meter.
4. Determination of Coefficient of discharge for a small orifice by constant head method.
5. Determination of Coefficient of discharge for an external mouth piece by variable head method.
6. Determination of Coefficient of discharge for contracted Rectangular Notch and /or Triangular Notch
7. Determination of Coefficient of discharge for sharp and broad crested weir
8. Determination of friction factor
9. Determination of Coefficient of loss of head in a sudden contraction.
10. Study of Reynold's Experiment.

Note- 80 Percentage of the experiments should be covered mandatorily.

1.	2.	3.	4. Recommended	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV33L.1	3	3	3	3	3	3	3	2	3	-	1	3	3
24ACIV33L.2	3	3	3	3	3	3	3	2	3	-	1	3	3
24ACIV33L.3	3	2	2	2	2	3	3	3	3	-	1	3	3
24ACIV33L.4	3	2	2	2	2	3	3	3	3	-	1	3	3
24ACIV33L.5	3	3	3	3	3	3	3	3	3	-	1	3	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Building Planning and Drawing
Category:	SC
Semester:	III Semester
Couse Code:	24ACIV34L
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	2	2

Course Objectives:

1. To understand the objectives, scope, and applicability of building bye-laws as per local (RMC & KUDA) and national (NBC) authorities.
2. To study basic services and planning principles essential for residential building design.
3. To familiarize students with area requirements, minimum dimensions, and standards of building components as per regulations.
4. To develop skills in architectural drawing using AutoCAD, including bonds, doors, windows, and building plans.
5. To train students in 2D drafting and 3D modeling techniques for residential building components and layouts.

Course Outcomes:

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

1. Develop drawing skills for effective demonstration of detailing.
2. Draw building components using Computer Aided Design software.
3. Draw line diagram of buildings with standards and bye-laws.
4. Develop building's elevation and sections and incorporating details.
5. Develop parameters in 2D and converting to 3D

Theory

Unit-1 Building Bye laws and aspects of planning **12**

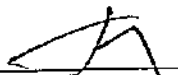
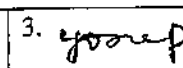
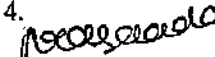
Building Bye-laws, Objectives, Scope and Applicability as per Local (RMC & KUDA) and National authority (NBC), Types of basic services in buildings.

Planning aspects of a residential building- Aspect, Prospect, Privacy, Circulation, Roominess, Grouping, Elegance, Sanitation, Flexibility, Economy List of components and functions of a residential building. Area requirements for various components. Minimum dimensions and standards as per bye-laws.

Practice Excerscises:

1. Introduction to Auto CAD
2. Detailing & Drawing of English Bond.
3. Detailing & Drawing of Flemish Bond.
4. Detailing & Drawing of Doors.
5. Detailing & Drawing of Windows.
6. Development of plan/drawing by Block editing & drafting settings.
7. Drawing of Line Diagram of Residential Buildings by using Building Bye- Laws.
8. Drawing of Plan, Elevation & Section for a Single Storey Building.
9. Drawing of Plan, Elevation & Section for Multi Storey Building.
10. Practice exercise on 3-D modeling of a building.
11. Practice exercise on 3-d modeling of types of stair cases.

Note- 80 Percentage of the experiments should be covered mandatorily.

1. 	2. 	3. 	4. 	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV34L.1	3	-	-	-	3	3	3	1	-	-	1	2	2
24ACIV34L.2	3	-	-	-	3	3	3	1	-	-	1	2	2
24ACIV34L.3	3	-	-	-	3	3	3	1	-	-	1	2	2
24ACIV34L.4	3	-	-	-	3	3	3	1	-	-	1	2	2
24ACIV34L.5	3	-	-	-	3	3	3	1	-	-	1	2	2

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course	Probability and Statistics
Category	BS&H
Couse Code	24AMAT41T
Year	II Year
Semester	II Semester
Branch	CSE, AIDS, AIML, CSE (AI), CSE (DS), CSE(AIML), CSE(IOT), ME, CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Outcomes:

Upon successful completion of this course the student should be able to

1. Apply the concepts of probability theorems in stochastic process
2. Apply the probability distribution in real life problems
3. Calculate the correlation between two variables
4. Evaluate the hypotheses of large samples
5. Evaluate the hypotheses of small samples

Unit 1: Probability **10 hrs**

Probability - axioms of probability – addition theorem of probability - conditional probability-multiplication theorem of probability (without proof) - Baye's theorem.
Random variables - discrete and continuous - Distribution functions - Mean and Variance.

Unit 2: Probability distributions **8 hrs**

Probability distributions – Binomial and Poisson distribution - fitting - normal distribution - their properties.

Unit 3: Introduction of statistics **8 hrs**

Introduction of Statistics – Mean - Median and Mode for ungrouped and grouped data.
Correlation - correlation coefficient : Karl Pearson's coefficient - Spearman's rank correlation

Unit 4: Estimation and Testing of hypothesis for large samples **10 hrs**

Estimation - Point estimation - Interval estimation of one mean (small and large) - one Proportion (large).
Test of Hypothesis: Types of errors, one and two tailed tests, level of significance, single mean -difference of means - single proportion - difference of proportions (large).

Unit 5: Testing of hypothesis for small samples **8 hrs**

Student t-distribution test for single mean - two means and paired t-test,
Testing of equality of variances (F-test) - χ^2 test for goodness of fit - χ^2 test for independence of attributes.

Textbooks:

1. Miller and Freund, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

Reference Books:

1. S. Ross, a First Course in Probability, Pearson Education India, 2002.
2. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.
3. T. K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, Probability and Statistics, 2nd edition, S. Chand, 2010.

CO-PO Mapping:

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

CO	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and society	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning
24AMAT41T.1	3	2	1	2	-	-	-	-	-	-	-
24AMAT41T.2	3	2	1	2	-	-	-	-	-	-	-
24AMAT41T.3	3	2	1	2	-	-	-	-	-	-	-
24AMAT41T.4	3	3	1	2	-	-	-	-	-	-	-
24AMAT41T.5	3	3	1	2	-	-	-	-	-	-	-

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6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Building Materials and Construction
Category: ESC
Semester: IV Semester
Couse Code: 24ACIV41T
Branch/es: CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

ourse Objectives:

1. To understand the classification, properties, and structural requirements of various building materials including stones, wood, metals, and composites.
2. To study the physical and mechanical properties of aggregates, bricks, cement, lime, and supplementary materials used in construction.
3. To learn different types of foundations, masonry techniques, and structural components like arches, doors, and windows.
4. To gain knowledge about formwork, scaffolding, their types, erection procedures, and fire protection measures in construction.
5. To understand plastering, pointing, painting, varnishing processes, and methods for damp proofing in buildings.

Course Outcomes:

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

1. Identify and describe the characteristics and applications of common building materials such as stones, timber, metals, and plastics.
2. Evaluate the quality of aggregates, bricks, cement, and lime based on physical and chemical properties for construction suitability.
3. Select appropriate foundation types and masonry methods for different building requirements, and explain the function of arches, doors, and windows.
4. Plan and supervise safe erection of formwork and scaffolding, and apply fire protection strategies in building design.
5. Implement suitable plastering, pointing, painting, and damp proofing techniques to enhance durability and aesthetics of structures.

12

Unit 1 Building Materials-I

Building stone: classifications, properties and structural requirements;
Wood and Wood products: Introduction to wood macrostructure, sap wood and heart wood, defects and decay of timber, seasoning and preservation of timber, fire resisting treatment, introduction to wood products- veneers, plywoods, fibre board, particle board, block board, batten boards. **Metals:** Steel: Important properties and uses of Iron (Cast iron, wroght iron and steel), Important tests on steel rebar, aluminum and copper. **Glass:** types and uses, **gypsum:** source, properties, uses; **plastic:** properties and uses, paint: types, distemper, varnish, **Adhesive:** Types, Bitumen: types, properties and tests.

12

Unit 2 **Building Materials-II**

Aggregate: Classification, Physical and mechanical properties, thermal properties of aggregate. **Bricks and Masonry Blocks:** Types, properties, field and laboratory tests to evaluate quality. **Lime:** classification, properties. **Cement:** types, Portland cement: chemical composition of raw material, bogue compounds, hydration of cement, role of water in hydration, testing of cements, **fly ash:** properties and use in manufacturing of bricks and cement.

12

Unit 3 Building Construction-I

Foundation: purpose, types of foundation- shallow, deep, pile, raft, grillage foundation.
Masonry: Brick Masonry: types of bonds, relative merits and demerits of English, Single Flemish and Double Flemish bond. Stone Masonry: General principles, classification of stone masonry and their relative merits and demerits. Cavity wall: components and construction
failures in buildings - Type of cracks in buildings, principal causes-moisture movement, thermal variations, elastic deformation, creep, chemical reaction.

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Materials for sustainability: Energy conservation in buildings- use of recycled materials, regional materials and industrial waste products as means of sustainable development. Green Building Materials

Unit 4 Building Construction-II 12

Form work- Types of Form work, types of materials used in form work
Scaffoldings- Types of Scaffoldings, Scaffolding Erection & dismantling, Scaffolding Inspection
Fire protection in structures- Classification of fire, general causes of fire, detection of fire, methods for fire control, Analysis for structural components for fire resistance (wood, steel, concrete and masonry).

Unit 5 Building Construction-III 12

Plastering and Pointing: Different types of plasters and plastering process, defects in plastering.
Paints, Varnish and Distemper: Constituents, characteristics of good paints, bases, vehicles, thinners and coloring pigments. Painting of different types of surfaces varnish and its types, application. Distemper, dry and oil bound, and application of distemper.
Damp Proof Course-Causes of dampness, effects of dampness, methods of damp proofing

Prescribed Textbooks:
1. VN. Vazirani, and S.P. Chandola, Engineering Materials, Khanna Publishers 1993.
2. S.P. Arora and S.P. Bindra, Text book on Building Construction, Dhanpath Raj Publications, 1999

Reference Textbooks:
1. Kyriakos Komvopoulos, Mechanical Testing of Engineering Materials, Cognella, 2011.
2. E.N. Dowling, Mechanical Behaviour of Materials,Prentice Hall International, 2nd Edition, 1993.
3. Building materials by R.S.Rangwala,Charotar publications, 4th edition, 2019.
4. Sushil Kumar, Building Construction, Standard Publilshers 1992.
5. Gurucharan singh, Building materials and construction, Standard book house, 2023.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV41T.1	2	-	-	-	-	2	2	-	-	-	2	2	2
24ACIV41T.2	2	-	-	-	-	2	2	-	-	-	2	2	2
24ACIV41T.3	3	-	-	-	-	3	2	-	-	-	2	2	2
24ACIV41T.4	3	-	-	-	-	3	2	-	-	-	2	2	2
24ACIV41T.5	3	-	-	-	-	3	2	-	-	-	2	2	2

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ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Concrete Technology
Category:	PCC
Semester:	IV Semester
Couse Code:	24ACIV42T
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To introduce the basic ingredients of concrete including cement, aggregates, water, and admixtures along with their properties and standards.
2. To study the properties of fresh and hardened concrete and various methods to test and measure workability and strength.
3. To understand the concepts of elasticity, shrinkage, creep, and curing processes in concrete.
4. To learn the principles and procedures of concrete mix design as per IS and ACI standards, including quality control.
5. To explore special types of concrete such as lightweight, high-performance, fiber-reinforced, and self-compacting concretes.

Course Outcomes:

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

1. Identify and characterize the essential ingredients of concrete and their effects on concrete performance.
2. Conduct and interpret tests to evaluate workability and strength of fresh and hardened concrete.
3. Analyze the effects of curing, elasticity, shrinkage, and creep on concrete behavior and durability.
4. Design concrete mixes for various applications using IS and ACI guidelines ensuring desired strength and durability.
5. Differentiate between conventional and special concretes, and select appropriate types for specific engineering applications.

Unit 1 Ingredients of Concrete **14**

Cement-chemical composition-hydration process-Bogue's compounds-Tests on properties of cement-Types of cement -I.S. Specifications. Aggregates- classification of aggregate – tests on properties of aggregates - characteristics of aggregate - I.S. Specifications. Water-quality of water - characteristics of water - I.S. Specifications. Admixtures –classification of chemical admixtures and mineral admixtures for sustainability – properties and limitations – classification of mineral admixtures – properties and limitations - I.S. Specifications

Unit 2 Properties of Concrete **14**

Fresh concrete: Manufacture of concrete-workability-factors influencing workability- measurement of workability for conventional concrete (Slump Cone, Compaction Factor and Vee-Bee test) & SCC (V-Funnel, L-Box, U- Box, Slump Flow and J–Ring).

Hardened concrete: Water/Cement Ratio(Abram's Law)-Gel Space Ratio-tests on hardened concrete-Destructive Tests (Compression, Split Tensile and Flexural)-Semi Destructive Tests (Core Cutter and Pull out test) and Non Destructive Tests (Rebound Hammer-UPV - Radiological methods)

Unit 3 Curing, Elasticity, Shrinkage and Creep **10**

Curing of concrete -methods of curing-effects of improper curing-self curing-Modulus of Elasticity-Poisson's Ratio-Dynamic, Modulus of Elasticity- Shrinkage and various types -Factors Affecting Shrinkage-Moisture Movement-Creep of Concrete Factors Influencing Creep.

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Unit 4 Concrete Mix Design 10

Proportioning of Concrete Mixes-factors influencing - IS:10262-2019 & ACI Methods- IS 456 provisions on Durability-Quality Control and Statistical Methods – Mix Design of High Strength concrete, Mix Design of SCC using EFNARC guidelines

Unit 5 Special Concretes for sustainability 10

Light Weight Concretes - Cellular Concrete - No Fines Concrete - High Density Concrete – High Performance Concrete - Fiber Reinforced Concrete - Polymer Concrete - Self Compacting Concrete.

Prescribed Textbooks:

1. M.S. Shetty, Concrete Technology, Theory and Practice, S. Chand Publication, Sixth Edition, 2018
2. A. M. Neville Properties of Concrete, Pearson Publication – 4th Edition, 2012.

Reference Textbooks:

1. M.L. Gambhir, Concrete Technology, McGraw Hill Book Company, Fifth Edition, 2017
2. A.R. Santhakumar, Concrete Technology, Oxford University Press, New Delhi, 2018.
3. N. Krishna Raju, Design of Concrete Mixes, CBS Publishers.
4. P. K. Mehta and J. M. Monteiro, Concrete: Micro Structure, Properties and Materials Mc-Graw Hill Publishers, 3rd edition, 2006.
5. J. Prasad, C.G.K. Nair, Non-Destructive Test and Evaluation of Materials, Tata Mcgraw Hill Publishers, New Delhi, 2nd edition, 2018.
6. B.L. Gupta and A. Gupta, Concrete Technology, Jain Book Agency, 2013.
7. IS10262 (2009), Mix Design
8. IS269 (2015), Ordinary Portland Cement (33 Grade).
9. IS12269 (2013), Ordinary Portland Cement (53 Grade).
10. IS650 (1991), Specification of Standard Sand.
11. IS383 (1970), Specification for Coarse and Fine

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV42T.1	2	-	-	-	-	2	2	-	-	-	2	2	2
24ACIV42T.2	3	3	2	2	-	2	2	-	-	-	2	3	3
24ACIV42T.3	3	-	-	-	-	2	2	-	-	-	2	3	3
24ACIV42T.4	3	3	3	3	2	2	2	-	-	-	2	3	3
24ACIV42T.5	3	-	-	-	-	2	2	-	-	-	2	3	3

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ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Engineering Geology
Category: PCC
Semester: IV Semester
Couse Code: 24ACIV43T
Branch/es: CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To introduce the fundamental concepts of geology and its significance in civil engineering projects with real-world case studies.
2. To study mineralogy and petrology including identification, classification, and properties of common minerals and rocks.
3. To understand structural geology concepts such as folds, faults, joints, and their relevance in civil engineering.
4. To examine geological hazards like earthquakes and landslides, and their impact on construction with preventive measures.
5. To explore groundwater geology, and geological considerations for the construction of dams and tunnels.

Course Outcomes:

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

1. Explain the branches of geology and apply geological knowledge to solve civil engineering problems.
2. Identify and classify minerals and rocks based on their physical properties and geological origin.
3. Analyze geological structures and assess their implications for engineering design and construction.
4. Evaluate seismic and landslide hazards and apply appropriate measures for safe construction in affected areas.
5. Assess groundwater movement and geological factors critical to the successful design and construction of dams and tunnels.

Unit 1 Introduction 10

Branches of Geology, Importance of Geology in Civil Engineering with case studies, weathering of rocks, Geological agents, weathering process of Rock, Rivers and geological work of rivers.

Unit 2 Mineralogy and Petrology 14

Definitions of mineral and rock, Different methods of study of mineral and rock, Physical properties of minerals and rocks for megascopic study. Common rock forming minerals: Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and Ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite and Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, Metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

Unit 3 Structural Geology 10

Strike, Dip and Outcrop, Study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- Parts, types, mechanism and their importance in Civil Engineering.

Unit 4 10

Earthquakes and Land Slides: Terminology, Classification, Causes and Effects, Richter scale intensity of the Earthquakes, Precautions for building constructions in the Seismic areas. Classification of Landslides, Causes and Effects, Measures to be taken prevent their occurrence at Landslides.

Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study- Gravity methods,

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

Magnetic methods, Electrical methods, Seismic methods, Radiometric methods and Electrical resistivity and Seismic refraction methods and Engineering properties of rocks.

Unit 5 Ground Water ,Geology of Dams & Tunnels 12

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

Geology of Dams & Tunnels: Types and Purpose of Dams, Geological considerations in the selection of a Dam site, Geological considerations for successful constructions of reservoirs, Life of Reservoirs. Purpose of Tunnelling, Effects and Lining of Tunnels, Influence of Geology for successful Tunnelling.

Prescribed Textbooks:

1. Engineering Geology by N. ChennaKesavulu, Laxmi Publications, 2nd Edition, 2005.
2. Engineering & General Geology by Parbin Singh Katson educational series 8th edition, 2023.

Reference Textbooks:

1. K.V.G.K. Gokhale, Principals of Engineering Geology, B.S publications, 2023.
2. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.
3. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution, kindle edition, 2018.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV43T.1	3	-	-	-	-	2	2	-	2	-	1	3	3
24ACIV43T.2	3	-	-	-	-	2	2	-	2	-	1	3	3
24ACIV43T.3	3	-	-	-	-	2	2	-	2	-	1	3	3
24ACIV43T.4	3	-	-	-	-	2	2	-	2	-	1	3	3
24ACIV43T.5	3	-	-	-	-	2	2	-	2	-	1	3	3

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ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Structural Analysis
Category:	PCC
Semester:	IV Semester
Couse Code:	24ACIV44T
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To understand the behavior and analysis of fixed and continuous beams under various loading conditions including effects of support settlement and rotation.
2. To learn the application of energy theorems such as Castigliano's theorems in determining deflections of beams and trusses.
3. To study slope-deflection and moment distribution methods for analyzing continuous beams and single bay portal frames.
4. To gain proficiency in Kani's method for analyzing continuous beams and portal frames with side sway.
5. To understand the concept and construction of influence lines and analyze moving loads on beams for shear force and bending moment.

Course Outcomes:

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

1. Analyze fixed and continuous beams subjected to various loads and interpret the effects of support settlements and rotations.
2. Apply energy theorems including Castigliano's theorems to determine deflections in beams and truss structures.
3. Use slope-deflection and moment distribution methods effectively to analyze continuous beams and portal frames without sway.
4. Employ Kani's method for structural analysis of continuous beams and single-storey portal frames with side sway.
5. Construct influence lines for shear force and bending moment, and analyze beams under moving loads to find critical load positions and maximum effects.

Unit 1 12

Fixed Beams & Continuous Beams: Introduction to statically indeterminate beams with uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams -- Deflection of fixed beams effect of sinking of support.

Unit 2 12

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem Deflections of simple beams.

Analysis of Indeterminate Structures: Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses with up to two degrees of internal and external indeterminacies – Castigliano's– II theorem.

Unit 3 12

Analysis of Structures by Slope-Deflection Method: Introduction-derivation of slope deflection equations- application to continuous beams with and without settlement of supports - Analysis of single bay portal frames without sway.

Unit 4 12

Analysis of Structures by Moment Distribution Method: Analysis of continuous beams – including settlement of supports and single bay, single storey portal frames without sway

1.	2.	3.	4.	5. Attended online
6. Attended	7. Attended online	8. Attended online	9. Attended online	

12

Unit 5 Influence Lines and Moving Loads

Influence Lines: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section single point load, U.D.L longer than the span, U.D.L shorter than the span.

Moving Loads: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single Concentrated load U.D.L longer than the span, U.D.L shorter than the span, two point loads with fixed distance between them and several point loads.

Prescribed Textbooks:

1. Analysis of Structures-VolI& Vol IIbyV.N.Vazirani& M.M.Ratwani, Khanna Publications, New Delhi, 16th edition,1994.
2. Theory of Structures by R.S. Khurmi, S. Chand Publishers, 2000.

Reference Textbooks:

1. Mechanics of Structures by S.B.Junnarkar, Charotar Publishing House, 32nd edition, 2016.
2. Theory of Structures by Gupta, Pandit& Gupta; Tat Mc.Graw– Hill Publishing Co. Ltd., New Delhi, 2023.
3. Strength of Materials and Mechanics of Structures- by B.C.Punmia, Khanna Publications, NewDelhi, 2018.
4. Introduction to structural analysis by B.D. Nautiyal, New age international publishers, NewDelhi, 2001.
5. Structural Analysis by V.D.Prasad Galgotia publications,2nd Editions.2011.
6. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi, 2011
7. Comprehensive StructuralAnalysis-Vol.I&2by Dr. R. Vaidyanathan & Dr.P.Perumal- Laxmi publications pvt.Ltd., New Delhi,4 th edition, 2006.
8. Basic structural Analysis by C.S.Reddy, Tata Mc Grawhill, New Delhi, 3rd edition, 2017.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV44T.1	3	3	3	3	2	-	-	-	-	-	1	3	3
24ACIV44T.2	3	3	3	3	2	-	-	-	-	-	1	3	3
24ACIV44T.3	3	3	3	3	2	-	-	-	-	-	1	3	3
24ACIV44T.4	3	3	3	3	2	-	-	-	-	-	1	3	3
24ACIV44T.5	3	3	3	3	2	-	-	-	-	-	1	3	3

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ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Concrete Technology Laboratory
Category: PCC
Semester: IV Semester
Couse Code: 24ACIV42L
Branch/es: CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. To determine and analyze the essential properties of cement such as consistency, fineness, setting time, specific gravity, soundness, and compressive strength for quality assessment.
2. To understand the physical characteristics of bricks and fine aggregates through tests like water absorption and bulking of sand for appropriate selection in construction.
3. To evaluate the workability and behavior of fresh concrete using various methods like slump test, compaction factor test, and Vee-Bee test.
4. To gain knowledge of concrete mix design principles and determine characteristic compressive strength for different grades of concrete.
5. To explore and perform advanced concrete testing techniques such as flexural strength and non-destructive testing methods to assess the durability and strength of structural elements.

Course Outcomes:

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

1. Understand and evaluate the physical and mechanical properties of cement through tests such as normal consistency, fineness, setting time, specific gravity, soundness, and compressive strength.
2. Analyze the quality and suitability of construction materials like bricks and sand through tests such as water absorption and bulking of sand.
3. Demonstrate the ability to assess the workability and behavior of fresh concrete using slump test, compaction factor, and Vee-Bee consistency methods.
4. Design and proportion concrete mixes based on characteristic compressive strength, ensuring performance as per codal requirements.
5. Apply advanced testing techniques like flexural strength and non-destructive testing to evaluate the performance of hardened concrete and ensure structural reliability.

LIST OF EXPERIMENTS:

1. Normal Consistency of cement.
2. Fineness of cement.
3. Initial setting time and final setting time of cement.
4. Specific gravity of cement.
5. Soundness of cement.
6. Compressive strength of cement.
7. Water absorption of bricks.
8. Workability test on concrete by compaction factor, slump and Vee-bee.
9. Mix design: Concrete.
10. Mechanical and Elastic Properties of Concrete.
11. Bulking of sand.
12. Non-Destructive testing on concrete (for demonstration).

Note- 80 Percentage of the experiments should be covered mandatorily.

1.	2.	3.	4.	5.
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CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV42L.1	3	3	2	3	1	2	2	3	3	-	3	3	3
24ACIV42L.2	3	3	2	3	1	2	2	3	3	-	3	3	3
24ACIV42L.3	3	3	2	3	1	2	2	3	3	-	3	3	3
24ACIV42L.4	3	3	2	2	1	2	2	3	3	-	3	3	3
24ACIV42L.5	3	3	2	3	1	2	2	3	3	-	3	3	3

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ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Engineering Geology Laboratory
Category:	PCC
Semester:	IV Semester
Couse Code:	24ACIV43L
Branch/es:	CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. The objective of the course is to make the student to understand the fluid flow concepts and get familiarity with flow measuring devices.

Course Outcomes:

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

1. Identify and classify rock-forming and ore-forming minerals based on their physical and megascopic properties.
2. Recognize and describe igneous, sedimentary, and metamorphic rocks through megascopic examination of texture and mineral composition.
3. Interpret geological maps and accurately draw cross-sections showing tilted beds, faults, and unconformities.
4. Solve basic structural geology problems involving strike, dip, and thickness calculations.
5. Analyze borehole data and perform laboratory tests to evaluate rock strength for geotechnical applications.

LIST OF EXPERIMENTS:

1. Physical properties of minerals: Mega-scopic identification of Rock forming minerals
2. Physical properties of minerals: Mega-scopic identification of Ore forming minerals
3. Megascopic description and identification of Igneous rocks.
4. Megascopic description and identification of Sedimentary rocks.
5. Megascopic Description and identification of Metamorphic rocks.
6. Geological map interpretation drawing of sections for Tilted beds.
7. Geological map interpretation drawing of sections for Faults and unconformities.
8. Simple Structural Geology problems.
9. Bore hole data.
10. Strength of the rock using laboratory tests.

LAB EXAMINATION PATTERN:

1. Description and Identification of Four minerals
2. Description and Identification of Four (Including Igneous, Sedimentary and Metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple Structural geology problems.
5. Problems on Bore holes.

References:

1. 'Applied Engineering Geology Practicals' by M T Mauthesha Reddy, New Age International Publishers, 2nd Edition.
2. 'Foundations of Engineering Geology' by Tony Waltham, Spon Press, 3rd edition,2009.

Note- 80 Percentage of the experiments should be covered mandatorily.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV43L.1	2	-	-	-	-	-	2	3	3	-	1	2	3
24ACIV43L.2	2	-	-	-	-	-	2	3	3	-	1	2	3
24ACIV43L.3	2	2	3	3	3	2	2	3	3	-	2	2	3
24ACIV43L.4	2	2	3	3	3	2	2	3	3	-	2	2	3
24ACIV43L.5	2	2	3	3	3	2	2	3	3	-	2	2	3

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ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Hydraulics and Hydraulic Machinery Laboratory
Category: PCC
Semester: IV Semester
Couse Code: 24ACIV45L
Branch/es: CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. To understand the working principles and performance characteristics of different types of hydraulic turbines and pumps.
2. To study the impact of water jets on vanes and analyze the energy transfer mechanisms involved.
3. To conduct experiments to observe and analyze hydraulic jumps and their applications.
4. To measure and evaluate the efficiency andp performance of centrifugal, reciprocating pumps and various turbines.
5. To calculate and interpret specific speed and other performance parameters of hydraulic machines.

Course Outcomes:

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

1. Demonstrate the impact of jet on vanes and relate it to practical turbine applications.
2. Analyze hydraulic jump characteristics and apply them in hydraulic engineering problems.
3. Conduct performance tests on single-stage and multi-stage centrifugal pumps and assess their efficiencies.
4. Perform efficiency tests on reciprocating pumps and different types of turbines such as Pelton, Francis, and Kaplan.
5. Calculate specific speed of turbines and interpret its significance in selecting appropriate hydraulic machines for given conditions.

LIST OF EXPERIMENTS:

1. Impact of jet on vanes.
2. Study of hydraulic jump.
3. Efficiency test on single-stage Centrifugal pump.
4. Efficiency test on Multi-stage Centrifugal pump
5. Efficiency test on Reciprocating pump.
6. Performance test on Pelton wheel turbine.
7. Performance test on Francis turbine.
8. Performance test on Kaplan turbine.
9. Specific speed of Pelton wheel turbine

Note- 80 Percentage of the experiments should be covered mandatorily.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV45L.1	3	3	2	3	1	2	2	3	3	-	1	3	3
24ACIV45L.2	3	3	2	3	1	2	2	3	3	-	1	3	3
24ACIV45L.3	3	3	2	3	1	2	2	3	3	-	1	3	3
24ACIV45L.4	3	3	2	3	1	2	2	3	3	-	1	3	3
24ACIV45L.5	3	3	2	3	1	2	2	3	3	-	1	3	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Environmental Science
Category:	MC
Course Code:	24AENS31T/41T
Branches:	CSE, CSE(AIML), CSE(IOT), EEE, ME / CSE(AI), AIML, CSE(DS), AIDS, CE & ECE
Year	II
Semester:	I Semester/II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
2	-	-	-

Course Objectives: This course aims to raise environmental awareness, promote sustainable practices aligned with the Sustainable Development Goals (SDGs), and highlight the significance of ecosystems and biodiversity. It sensitizes students to major pollution issues and related legislative measures, fosters ethical responsibility and problem-solving skills to tackle environmental challenges, and explains the impact of human population growth on the environment and public health. The course also emphasizes the role of education, information technology, and public policy in promoting environmental sustainability.

Course Outcomes:

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

1. explain how natural resources should be utilised with a focus on sustainability.
2. describe the need to protect ecosystems and biodiversity for future generations.
3. comprehend major pollution problems related to ecosystems.
4. Summarize key environmental issues, sustainable practices, and laws supporting environmental protection in the context of sustainable development goals.
5. explain the effects of population growth on environment and health, and the role of education, IT, and welfare programs in managing them.

Unit 1 Natural resources 7

Natural Resources: Renewable and non-renewable resources – Forest resources: Uses, deforestation – Water resources: Uses, floods, drought – Mineral resources: Uses, environmental effects of extracting mineral resources– Energy resources: Renewable and non-renewable energy sources (overview only).

Unit 2 Ecosystems, Biodiversity and its conservation 6

Ecosystems: Producers, consumers and decomposers – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and functions of the following ecosystems: Forest ecosystem and lake ecosystem.
Biodiversity and its conservation: Definition – Values of biodiversity – Hot-spots of biodiversity – Threats to biodiversity – Conservation of biodiversity.

Unit 3 Environmental pollution 5

Definition, causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards.
Self-learning: Genetically modified crops

Unit 4 Social issues and the Environment 6

Sustainable development – Rainwater harvesting – Environmental ethics – Climate change, global warming, acid rain, ozone layer depletion – Air (Prevention and Control of Pollution) Act – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Environment Protection Act.

Unit 5 Human population and the Environment 6

Population explosion – Family welfare programmes – Environment and human health – Value education – Role of information technology in environment and human health, Field work – Visit to a local area to document environmental assets.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Prescribed Textbooks:

1. Kaushik, Anubha, and C. P. Kaushik. *Perspectives in Environmental Studies*. 7th ed., New Age International Publishers, 2022.
2. Chawla, Shashi. *A Textbook of Environmental Studies*. 1st ed., McGraw Hill Education, 2017.

Reference Books:

1. Joseph, Benny. *Environmental Studies*. 3rd ed., McGraw Hill Education India, 2017.
2. Dhinakaran, A., and Sankaran, B. *A Textbook of Environmental Studies*. 1st ed., Himalaya Publishing House, 2023.
3. Basu, Mahua, and Xavier, S. *Fundamentals of Environmental Studies*. 1st ed., Cambridge University Press, 2017.
4. Bharucha, Erach. *Textbook of Environmental Studies for Undergraduate Courses*. 3rd ed., Universities Press (India), 2021.
5. Tiwari, Vijay Kumar. *A Textbook of Environmental Studies*. 1st ed., Himalaya Publishing House, 2024.

CO-PO Mapping:

Course outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning
24AENS31T/41T.1	2	2	-	-	-	-	2	-	-	-	2
24AENS31T/41T.2	2	2	-	-	-	-	2	-	-	-	2
24AENS31T/41T.3	2	2	-	-	-	-	2	-	-	-	2
24AENS31T/41T.4	3	2	-	-	-	-	2	-	-	-	3
24AENS31T/41T.5	2	2	-	-	-	-	2	-	-	-	2

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Java Programming
Category:	Skill Course
Couse Code:	24ACSE45L
Year	II B. Tech
Semester:	II Semester
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	2	2

Course Objectives: This course will be able to

1. Understand the basic concepts of java programming.
2. Analyze and apply concepts like packages, interfaces, and exception handling.
3. Implement the multi-threading and GUI applications developed using JAVA

Course Outcomes: At the end of the course, the student will be able to

1. Understand the importance of datatypes, operators, functions, arrays and strings in Java Programming.
2. Apply reusability concepts like Inheritance, interfaces and packages in real time applications developed using JAVA
3. Relate the abstract class and interfaces in java programming
4. Construct and classify error and exception handling
5. Implement genetics and JavaFX basic concepts in java programs

Unit 1	**Introduction to Java Programming**	10

Introduction to Java: Install Java & Java IDE, First Java Program, Variables and Data Types in Java, Operators in Java, Flow Control Statements in Java, functions in java, arrays in java, Strings in java

Unit 2	**Object Oriented Programming**	10

Object-Oriented Programming, Classes and Objects, Encapsulation, Abstraction, Inheritance, polymorphism.

Unit 3	**Packages and Interfaces**	10

Packages and Interfaces: Packages, Defining a Package, A Short Package Example, Access Protection, an Access Example, Importing Packages.Abstract keyword, Interfaces: Defining an Interface, Implementing Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces, Interfaces Can Be Extended

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Unit 4	Exception Handling and Multithreaded Programming	10

Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Displaying a Description of an Exception, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Built-in Exceptions

Multithreaded Programming: The Java Thread Model, Thread Priorities, Synchronization, Messaging, The Thread Class and the Runnable Interface, The Main Thread, Creating a Thread, Implementing Runnable, Extending Thread, Choosing an Approach, Creating Multiple Threads

Unit 5	Generics and JavaFX Basics	10

Generics: What Are Generics, Generics Work Only with Reference Types, A Generic Class with Two Type Parameters, The General Form of a Generic Class.

JavaFX Basic Concepts, Using Image and Image View, Button, Radio Button, CheckBox, TextField

Prescribed Text Book:

1. Herbert Schildt.Java. The complete reference, TMH, 9th Edition

Reference Books:

1. Nino and F.A. Hosch, An Introduction to programming and OO design using Java, John Wi & sons.
2. Y. Daniel Liang, Introduction to Java programming, Pearson Education. 6th Edition
3. R.A. Johnson- Thomson, An introduction to Java programming and object-oriented Application Development

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACSE36L-1	3	3	-	-	-	-	-	-	-	-	-	-	2	-
24ACSE36L-2	-	3	3	2	-	-	-	-	-	-	-	-	3	-
24ACSE36L-3	3	3	3	2	-	-	-	-	-	-	3	3	2	-
24ACSE36L-4	3	3	3	-	-	-	-	-	-	-	3	3	3	-
24ACSE36L-5	3	3	3	-	-	-	-	-	-	-	3	3	3	3

1.	2.	3.	4.	5.
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Annexure-III

ANNAMACHARYA UNIVERSITY

Course Structure for R24 Regulations

Department of Civil Engineering

Course Structure for M. Tech-Structural Engineering

Semester I

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	PC	24DSTE11T	Advanced Structural Analysis	3	-	-	3
2	PC	24DSTE12T	Advanced Concrete Technology	3	-	-	3
3	*Program Elective-I (MOOC-1)	24DSTE1AT	Theory of Elasticity and Plasticity	3	-	-	3
		24DSTE1BT	Stability of Structures				
		24DSTE1CT	Design of Advance Concrete Structures				
4	*Program Elective-II (MOOC-2)	24DSTE1DT	Earthquake Resistant Structures	3	-	-	3
		24DSTE1ET	Structural Health Monitoring, Repair and Rehabilitation of Structures				
		24DSTE1FT	Theory and Analysis of Plates				
5	MC	24DHUM1AT	Research methodology and IPR	2	-	-	2
6	AU	24DSTE1GT	Disaster Management	-	-	-	-
		24DHUM1AT	English for Research paper Writing				
		24DHUM1CT	Value Education				
Lab Courses							
7	PL	24DSTE11L	Advanced Structural Design Laboratory - I	-	-	4	2
8	PL	24DSTE12L	Advanced Concrete Laboratory- I	-	-	4	2
				Total			18

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Semester II

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	PC	24DSTE21T	Advanced Reinforced Concrete Structures	3	-	-	3
2	PC	24DSTE22T	Advanced Steel Design	3	-	-	3
3	*Program Elective-III (MOOC-3)	24DSTE2AT	Finite Element Analysis of Structures	3	-	-	3
		24DSTE2BT	Advanced Foundation Engineering				
		24DSTE2CT	Structural Dynamics				
4	*Program Elective-IV (MOOC-4)	24DSTE2DT	Analysis of Shells and Folded Plates	3	-	-	3
		24DSTE2ET	Design of Masonry Structures				
		24DSTE2FT	Design of Form work				
5	AU	24DHUM2AT	Constitution of India	-	-	-	-
		24DHUM2BT	Pedagogy Studies				
		24DHUM2CT	Stress Management by Yoga				
		24DHUM2DT	Personality Development through Life Enlightenment skills				
Lab Courses							
6	PL	24DSTE23L	Advanced Structural Design Laboratory-II	-	-	4	2
7	PL	24DSTE24L	Advanced Concrete Laboratory-II	-	-	4	2
8	MC	24DSTE21P	Mini Project with Seminar	-	-	2	2
				Total			18

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Advanced Structural Analysis
Category:	Program Core
Couse Code:	24DSTE11T
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides a comprehensive introduction to advanced structural analysis techniques, focusing on matrix methods. Students will learn to analyze both two-dimensional and three-dimensional structures, including portal frames and pin-jointed trusses. The course emphasizes understanding indeterminacy, transformation of coordinates, and the application of stiffness and flexibility methods. Practical computational techniques for solving linear algebraic equations will also be covered, enabling students to apply theoretical concepts to real-world engineering problems.

Course Objectives:

1. To introduce fundamental characteristics of elements and system by evaluation of its flexibility and stiffness matrices
2. To impart knowledge about analysis of system through direct and element approach of flexibility method.
3. Analysis of structures by direct and element approach of stiffness method is to be included.
4. Programming techniques for simple problems and use of standard programmes to be practiced.
5. Awareness to the use of advanced techniques of matrix methods are to be created.

Course Outcomes:

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

1. Analyze and classify structures based on their static and kinematic indeterminacies.
2. Utilize stiffness and flexibility matrices to perform structural analysis for a variety of systems.
3. Effectively analyze continuous beams with different support conditions and internal hinges using matrix methods.
4. Calculate joint displacements and member forces for 2D portal frames and pin-jointed trusses, and create corresponding bending moment diagrams.
5. Implement transformations between local and global coordinate systems and assemble global stiffness matrices from element matrices.
6. Employ various numerical methods to solve systems of linear algebraic equations encountered in structural analysis.

Unit 1 10

Introduction: -Indeterminancy-Determination of static and kinematic indeterminacies of two-dimensional and three-dimensional portal frames, pin jointed trusses and hybrid frames-coordinate systems –structural idealization. Introduction to Matrix Methods of Analysis-Flexibility and stiffness matrices-Force displacement relationships for axial force, couple, tensional moments – stiffness method of analysis and flexibility method of analysis

Unit 2 10

Analysis of Continuous Beams- stiffness method and flexibility method of analysis –continuous beams of two and three spans with different end conditions-internal hinges.

Unit 3 10

Analysis of Two-Dimensional Portal Frames & Pin jointed Trusses – stiffness and flexibility method of analysis of 2D portal frames with different end conditions-plotting of bending moment diagrams. Computation of joint displacement and member forces for pin jointed trusses.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Unit 4 10

Transformation of Co-Ordinates - Local and Global co-ordinate systems-transformation of matrices from local to global coordinates of element stiffness matrix-direct stiffness method of analysis-assembly of global stiffness matrix from element stiffness matrices –static condensation-sub-structuring.

Unit 5 10

Equation Solvers-solution of system of linear algebraic equations-direct inversion method-gauss elimination method-Cholesky method-banded equation solvers-frontal solution technique.

Prescribed Text books:

1. Structural Analysis by Pundit & Gupta, Tata MC Graw Hill Book company.
2. Structural Analysis by C.S.Reddy, Tata MC Graw Hill Book company

Reference Textbooks:

1. Cotes, R.C., Counties, M.G., and Kong, F.K., Structural Analysis, ELBS.
2. MC.Guire, Wand Gallagher, R.H., Matrix Structural analysis, John Wiley and sons
3. John L.Meek., Matrix Structural Analysis, MC Graw Hill Book company.
4. Structural Analysis – R.C.Hibbeler, Pearson Education

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE11T.1	3	-	-	2	-	3
24DSTE11T.2	3	-	-	2	-	3
24BCIV11T.3	3	-	-	2	-	3
24BCIV11T.4	3	-	-	2	-	3
24BCIV11T.5	3	-	-	2	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Advanced Concrete Technology
Category:	Program Core
Couse Code:	24DSTE12T
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides a comprehensive study of concrete technology, focusing on the essential materials and methods used in concrete production. Students will explore the hydration process of various types of cement, the role of aggregates, and the impact of different admixtures on concrete properties. The course will also delve into high-strength, high-performance, and ultra-high-performance concrete, covering their production principles and testing methods. Additionally, students will learn about non-destructive testing techniques and formwork design principles, equipping them with the knowledge required for effective concrete construction and quality assessment.

Course Objectives:

1.comprehensive understanding of different types of cement and their hydration processes, including various aggregate types and their roles in concrete.

2.examine the function and effects of mineral and chemical admixtures in concrete production, and their influence on the properties of fresh and hardened concrete.

3.Toinvestigate the principles, materials, and production techniques associated with high-strength, high-performance, and ultra-high-performance concrete.

4.To introduce non-destructive testing methods for evaluating concrete strength and durability, including corrosion assessment techniques

5.To teach students about the materials and design principles of formwork for various concrete structures, including considerations for load-bearing and safety.

Course Outcomes:

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

1. Recognize and describe the different types of cement and their hydration processes, including Bogues compounds.
2. Assess the physical, mechanical, and durability properties of various aggregates used in concrete, including special aggregates.
3. Select and evaluate suitable mineral and chemical admixtures for specific concrete applications and understand their effects on performance.
4. Distinguish between high-strength, high-performance, and ultra-high-performance concrete, and understand their production methods and properties.
5. Create formwork designs that effectively support concrete during curing, accounting for different structural elements and construction techniques.

Unit I 10

Concrete making materials: Portland Hydration process Bogues compounds, different types of cement, OPC, PPC, PSC, Air entraining cement, masonry cement oil well cement, sulphate resistant cement, High alumina cement, Rapid Hardening cement, Quick setting cement, low heat cement. Aggregate in concrete: Purpose and role of aggregates, Physical, mechanical and durability properties of aggregates, special aggregate: low density, High density aggregates, aggregates for refractory concrete, abrasion resistant aggregates

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Unit 2 10

Admixtures, concreting methods: Mineral and chemical admixtures: pulverized fuel ash, Blast furnace stag, silica fume, Rice Husk ash, metakaolin, water reducing agents, effect of water reducing agents on properties of concrete, air entraining agents and effect of air entraining agents on properties of concrete, Accelerators, retarders.

Special purpose admixtures: Process of manufacturing of concrete, extreme weather concreting, vacuum dewatering, under water concreting.

Unit 3 10

High strength concrete: Introduction,Principles for production, constituent materials, properties, delivery, Q.C and testing.
High performance concrete: Principles, materials selection, producing HPC, mechanical properties and durability properties of HPC.
Ultra-High-performance concrete: Introduction, Principles for production of UHPC, basic material, mechanical properties of UHPC, durability.
Super-High Strength HPC: Principles, raw materials, problems with preparation techniques, strength, durability, test methods.

Unit 4 10

Non destructive and durability tests on concrete: Penetration resistance methods, pull out test, break off test, maturity methods to evaluate corrosion of reinforcement, short pulse rador method, thermo graphic method, durability tests.

Unit 5 10

Form work for concrete: Form work materials: Timber, Plywood, aluminum, Plastic forms, other materials, form work design concepts, loads form work for foundations walls, columns, beams & slabs, form work for folded plates,Domes, shells, slip form work, flying form work, flying form work, scaffolding, form work supports, formwork failures.

Prescribed Text books:

1. Concrete Technology by M.S.Shetty. – S.Chand & Co Ltd.
2. Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill

Reference Textbooks:

1. Non-Destructive Test and Evaluation of materials by J.Prasad&C.G.Krishna Das. Nair, Tata McGrawHill.
2. Form work for concrete by Neeraj Kumar Jh: Tata MC Graw Hill

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE12T.1	3	2	-	2	1	3
24DSTE12T.2	3	2	-	2	1	3
24DSTE12T.3	3	2	-	2	1	3
24DSTE12T.4	3	2	-	2	1	3
24DSTE12T.5	3	2	-	2	1	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Theory of Elasticity and Plasticity
Category:	Program Elective-1
Couse Code:	24DSTE1AT
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This comprehensive course on the Theory of Elasticity and Plasticity delves into the fundamental principles governing the behavior of materials under stress and strain.

Course Objectives:

1. To make the students to understand the concepts of elasticity and equip them with the knowledge to independently handle the problems of elasticity
2. To enhance the competency level and develop the self-confidence through quality assignments in theory of Elasticity.
3. To inculcate the habit of researching and practicing in the field of elasticity.
4. To understand the concepts of plasticity, yield criteria, plastic flow etc.,

Course Outcomes:

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

1.Apply numerical methods to solve continuum problems..
2. Solve the problems of 3-D elasticity with confidence.
3. Can independently work with the problems of 2-D elasticity in Cartesian/Polar Coordinates
4. Familiarized with the use of Airy"s stress function in 2-D problems of elasticity in Cartesian/Polar Coordinates.
5. Equipped with the knowledge of various theories of torsion of prismatic bars of various cross sections and can solve the problems of torsion.

Unit 1 10

Introduction To Plane Stress And Plane Strain Analysis: Elasticity –Notation for forces and stresses-Components of stresses – components of strain –Hooke"s law. Plane stress-plane strainDifferential equations of equilibrium- Boundary conditions-Compatibility equations-stress functionBoundary conditions.

Unit 2 10

Two Dimensional Problems In Rectangular Coordinates: Solution by polynomials-Saint Venant"s principle-Determination of displacements-bending of simple beams-application of Fourier series for two dimensional problems - gravity loading.

Unit 3 10

Two-Dimensional Problems In Polar Coordinates: General Equation in polar co-ordinates - stress distribution symmetrical about an axis –Pure bending of curved bars- strain components in polar coordinates-Displacements for symmetrical stress distributions-simple symmetric and asymmetric problems-General solution of two dimensional problem in polar coordinates-Application of the general solution of two dimensional problem in polar coordinates-Application of the general solution in polar coordinates.

Unit 4 10

Analysis of Stress And Strain In Three Dimensions: Principle stress - ellipsoid and stressdirector surface-Determination of principle stresses- Maximum shear stresses-Homogeneous deformation-principle axis of strain rotation. General Theorems:

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Balance laws - Differential equations of equilibrium- conditions of compatibility - Determination of displacement-Equations of equilibrium in terms of displacements-principle of superposition-Uniqueness of solution –the Reciprocal theorem.

Unit 5 10

Torsion of Prismatical Bars: Torsion of prismatic bars- Elliptical cross section-other elementary solutions-membrane analogy-Torsion of rectangular bars-solution of torsional problems by energy method-use of soap films in solving torsional problems-hydra dynamical analogies-Torsion of shafts, tubes, bars etc.

Prescribed Text books:

1. Theory of Elasticity and Plasticity by Timoshenko, S., MC Graw Hill Book company.
2. Advanced Strength of materials by Papoov, MC Graw Hill Book company.

Reference Textbooks:

1. Theory of Elasticity and Plasticity by Sadhu Singh. Khanna Publishers.
2. Chen, W.F.-and Han, D.J.Plasticity for structural Engineers, Springer – Verlag, New York.
3. Lubliner, J., Plasticity theory, Mac Millan Publishing Co., New York.
4. Foundations of Solid Mechanics by Y.C.Fung, PHI Publications.
5. Advanced Mechanics of Solids by L.S. Srinath, Tata MC Graw Hill Book company

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE1AT.1	2	-	3	-	-	3
24DSTE1AT.2	2	-	3	-	-	3
24DSTE1AT.3	2	-	3	-	-	3
24DSTE1AT.4	2	-	3	-	-	3
24DSTE1AT.5	2	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Stability of Structures
Category:	Program Elective-1
Couse Code:	24DSTE1BT
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course on the Stability of Structures provides a thorough exploration of the principles and methodologies used to analyze and ensure the stability of various structural systems.

Course Objectives:

1. Equip students with a fundamental understanding of stability concepts, essential for analyzing structural systems.
2. Foster analytical and critical thinking skills through the application of theoretical principles to practical stability problems.
3. Introduce students to advanced topics in stability analysis, including inelastic buckling, torsional buckling, and the behavior of composite structures.
4. Train students in the use of computational tools and software for stability analysis and design, enabling them to tackle real-world engineering challenges.
5. Instill an understanding of safety factors, allowable stresses, and code requirements related to stability, preparing students for professional practice in engineering.

Course Outcomes:

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

1. Demonstrate a solid understanding of the fundamental concepts of stability in structural engineering, including the different types of stability and their relevance to design and analysis.
2. Apply various analytical techniques, including differential equations and energy methods, to solve complex stability problems in beam columns and structural elements.
3. Analyze and evaluate the effects of different loading conditions on the buckling behavior of structural elements, including elastic and inelastic buckling scenarios.
4. Utilize advanced mathematical methods, such as the ritz and galerkin methods, to model and solve stability problems effectively
5. Integrate their knowledge of stability concepts into the design process, ensuring that structures are safe and compliant with relevant codes and standards.

Unit 1 10

Formulations related to beam columns: Concept of Stability, Differential equation for beam columns –Beam column with concentrated loads –continuous lateral load –couples -beam column with built in ends –continuous beams with axial load – application of Trigonometric series – Determination of allowable stresses.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Unit 2 10

Elastic Buckling of Bars: Elastic buckling of straight columns –Effect of shear stress on bucklingEccentrically and laterally loaded columns –energy methods –Buckling of a bar on elastic foundation, buckling of a bar with intermediate compressive forces and distributed axial loads – Buckling of bars with change in cross section –Effect of shear force on critical load –Built up columns

Unit 3 10

Inelastic Buckling and Torsional Buckling: Buckling of straight bars-Double modulus theory – Tangent modulus theory. Pure torsion of thin walled bar of open cross section-Non – Uniform torsion of thin walled bars of open cross section-Torsional buckling – Buck ling under Torsion and Flexure.

Unit 4 10

Mathematical Treatment of Stability Problems: Buckling problem orthogonality relation –Ritz method-Timosheńko method, Galerkin method

Unit 5 10

Lateral Buckling of simply supported Beams and rectangular plates: Beams of rectangular cross section subjected for pure bending. Derivation of equation of rectangular plate subjected to constant compression in two directions and one direction.

Prescribed Text books:

1. Stability of metallic structure by Bleich –McGraw hill
2. Theory of Beam columns Vol I by chen& Atsuta McGraw Hill.

Reference Textbooks:

1. Smites, Elastic stability of structures, Prentice Hall,1973 4.
2. Timoshenko, S.and Gere. Theory of Elastic stability, McGraw Hill Book company, 1973
3. Brush and Almorth., Buckling of bars plates and shells, McGraw Hill book company ,1975
4. Chajes, A., Principles of Structural Stability Theory, Prentice Hall,1974
5. Ashwini Kumar, stability theory of structures, TATA McGraw Hill publishing company Ltd, New Delhi,1985

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE1BT.1	-	-	3	-	-	3
24DSTE1BT.2	-	-	3	-	-	3
24DSTE1BT.3	-	-	3	-	-	3
24DSTE1BT.4	-	-	3	-	-	3
24DSTE1BT.5	-	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Design of Advance Concrete Structures
Category:	Program Elective-1
Couse Code:	24DSTE1CT
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course covers calculation of short- and long-term deflections of various types of beams, mechanism of flexural cracking and estimation of crack width, design of reinforced concrete deep beams, design of elevated water tanks and shear walls, design of beam column joints and design of bunkers and silos.

Course Objectives:

1. To understand the short term and long-term deflections of beams and slabs.
2. To understand the mechanism of flexural cracking and its estimation.
3. To understand the design of deep beams, plain concrete walls and shear walls.
4. To understand the design of beam column joints.

Course Outcomes:

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

1. Design of R.C. beams and slabs to satisfy the limit state of serviceability by determining the short term and long term deflection and Estimate the crack width in beams for the given load.
2. Design deep beams as per the codal provisions
3. Design of elevated water tanks
4. Design of shear walls
5. Design beam-column joint for the given loading system 7. Design of bunkers and Silos

Unit 1 10

Deflection of Reinforced Concrete Beams and Slabs: Introduction -Short-term Deflection of beams and Slabs -Deflection due to -Imposed loads – Short-term deflection of beams due to applied loads- Calculation of deflection by IS 456- Deflection of continues beams by IS 456 - Deflection of Cantilevers - Deflection of Slabs.

Estimation of Crack Width in Reinforced Concrete Members: Introduction - Factors affecting Crack width in beams - Mechanism of Flexural cracking Calculation of crack widths - Simple Empirical method - Estimation of Crack width in – beams by IS 456 of BS 8110 - Shrinkage and Thermal Cracking.

Unit 2 10

Design of Reinforced Concrete Deep Beams: Introduction - Minimum Thickness- Steps of Designing deep beams - Design of beam by IS 456 - Design according to British Practice- ACI Procedure for design of deep beams - Checking for local failures - Detailing of deep beams.

Unit 3 10

Design of Elevated Water Tanks: Introduction - Types of overhead water tanks- Design of Intze type water tank- design of conical or funnel shaped water tank. Design of Shear Walls: Introduction - Classification of shear walls – Classification according to behaviour - Loads in shear walls - Design of Rectangular and flanged shear walls- Derivation of formula for moment of Resistance of Rectangular shear walls

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Unit 4 10

Design of Cast In-Situ Beam-Column Joints: Introduction - Types of cast in-situ joints - Joints in multi-storeyed Buildings - Forces acting on Joints - Strength Requirement of Columns - Forces directly acting on joints - Design of joints for strength - Anchorage - Confinement of core of joint - Shear strength of joint - Corner (Knee) joint- Detailing for Anchorage in exterior beam-column joint - Procedure for design of joint.

Unit 5 10

Bunkers and Silos: Introduction - Differences between bunkers and Silos- Design of Square, Rectangular and Circular bunkers- Design of Silos - Silos for storage of cement

Prescribed Text books:

1. P.C. Verghese, Advanced Reinforced Concrete Design, PHI Learning, New Delhi
2. N. Krishna Raju, Advanced Reinforced Concrete Design, CBS Publishers & Distributors.

Reference Textbooks:

1. C.E. Reynolds and J.C. Steed man, Reinforced Concrete- Designers Hand book, a view point Publication.
2. P.Dayaratnam , Limit State Design of Reinforced Concrete Structures, Oxford & IBH Publishers, 2004 edition

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE1CT.1	3	-	3	-	-	3
24DSTE1CT.2	3	-	3	-	-	3
24DSTE1CT.3	3	-	3	-	-	3
24DSTE1CT.4	3	-	3	-	-	3
24DSTE1CT.5	3	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Title of the Course: Earthquake Resistant Structures
Category: Program Elective-II
Couse Code: 24DSTE1DT
Branch/es: Structural Engineering
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:
This course explores the principles of earthquake engineering, focusing on seismic analysis, structural dynamics, and design approaches for earthquake-resistant structures.

Course Objectives:

1. To understand the fundamental concepts of earthquake causes, seismic waves, and their effects on structures.
2. To analyze structural vibrations and develop models for predicting structural response to seismic forces.
3. To explore various seismic design methodologies and their application in real-world scenarios.
4. To evaluate earthquake-resistant design principles for different structural materials and systems.
5. To integrate seismic planning and innovative technologies for effective earthquake mitigation.

Course Outcomes:
At the end of the course, the student will be able to

1. Demonstrate a comprehensive understanding of earthquake mechanics and their implications for structural design.
2. Model structural responses to seismic activity and assess potential damage.
3. Apply seismic design principles to create effective earthquake-resistant structures.
4. Evaluate various construction materials and methods for their performance under seismic loads.
5. Develop practical strategies for implementing seismic planning in engineering projects

Unit 1 10

Engineering seismology: Earthquake– causes of earthquake – earthquakes and seismic waves – scale and intensity of earthquakes – seismic activity – Measurements of earth quakes – seismometer- strong motion accelerograph/ field observation of ground motion – analysis of earthquakes waves – earth quake motion – amplification of characteristics of surface layers – earthquake motion on the ground surface.

Unit 2 10

Vibration of structures underground motion: Elastic vibration of simple structures – modelling of structures and equations of motion – free vibrations of simple structures – steady state forced vibrations – Non-steady state forced vibrations – response spectrum representations; Relation between the nature of the ground motion and structural damage.

10

1.	2.	3.	4.	5.
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Unit 3

Design approaches: Methods of analysis – selection of analysis – equivalent lateral force procedure seismic base shear – seismic design co-efficient - vertical distribution of seismic forces and horizontal shear – twisting moment - Over turning moment – vertical seismic load and orthogonal effects lateral deflection – P- Δ characteristics effect – soil structure Interaction. Seismic – Graphs study, earthquake records for design – factors affecting Accelerogram characteristics - artificial Accelerogram – zoning map. Dynamic – analysis procedure: Model analysis – Inelastic – time history analysis Evaluation of the results

10

Unit 4

Earthquake – Resistant design of structural Components and systems: Introduction – monolithic reinforced – concrete structures – precast concrete structures – Prestressed concrete structures – steel structures – composite – structures, masonry structures – Timber structures.

Unit 5 10

Fundamentals of seismic planning: Selection of materials and types of construction form of superstructure – framing systems and seismic units – devices for reducing. Earthquake loads.

Prescribed Text books:

1.Design of earthquake resistant structures by Minoru Wakabayashi.

2. A.K.Chopra, Structural Dynamics for Earthquake Engineering", Pearson Publications.

Reference Textbooks:

1. R.W.Clough and „Dynamics of structures. McGraw – Hill, 2nd edition,1992.
2. N.M Newmark and E.Rosenblueth, Fundamentals of Earthquake Engineering" prentice hall,1971.
3. David Key, Earthquake design practice for buildings." Thomas Telford,London,1988
4. R.L. Wegel, Earthquake Engg; Prentice Hall 12nd edition 1989

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE1DT.1	3	2	-	-	-	3
24DSTE1DT.2	3	2	-	-	-	3
24DSTE1DT.3	3	2	-	-	-	3
24DSTE1DT.4	3	2	-	-	-	3
24DSTE1DT.5	3	2	-	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Structural Health Monitoring, Repair and Rehabilitation of Structures
Category:	Program Elective-II
Couse Code:	24DSTE1ET
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides an in-depth examination of the serviceability and durability of concrete structures, focusing on factors affecting performance such as environmental conditions, material properties, and construction practices.

Course Objectives:

1. To learn various distress and damages to concrete and masonry structures
2. To understand the importance of maintenance of structures
3. To study the various types and properties of repair materials
4. To assess the damage to structures using various tests
5. To learn the importance and methods of substrate preparation
6. To learn various repair techniques of damaged structures corroded structures
7. To learn the fundamentals of structural health monitoring.

Course Outcomes:

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

1. understand the key factors influencing the serviceability and durability of concrete structures.
2. Evaluate quality assurance processes and assess concrete properties affecting performance.
3. Apply maintenance and repair strategies to enhance structural longevity.
4. Design retrofitting solutions to strengthen existing structures and address performance issues.
5. Implement corrosion mitigation techniques and structural health monitoring systems for proactive maintenance.

Unit 1 10

Influence on serviceability and Durability:-General: Quality assurance for concrete construction, As built concrete properties, strength, permeability, volume changes, thermal properties, cracking. Effects due to climate, temperature, chemicals, wear and erosion, design and construction errors, corrosion mechanism, Effects of cover thickness and cracking methods of corrosion protection, inhibitors, resistant steels, coatings cathodic protection.

Unit 2 10

Maintenance and Repair Strategies: - Inspection, Structural Appraisal, Economic appraisal, components of equality assurance, conceptual bases for quality assurance schemes. Materials for Repair: -Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, Sulphur infiltrated concrete, Ferro cement, Fibre reinforced concrete.

Unit 3 10

Techniques for Repair: - Rust eliminators and polymers coating for rebars during repair, foamed concrete, mortar and dry pack, vacuum concrete, Granite and shotcrete Epoxy injection, Mortar repair for cracks, shoring and underpinning

Unit 4 10

Retrofitting/Strengthening: Need for retrofitting- Design philosophy of strengthening structures - Techniques available for strengthening including conventional and advanced techniques. Case Studies: - Repairs to overcome low member strength, Deflection, cracking, chemical disruption, weathering, wear, fire, leakage, marine exposure.

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Unit 5 10

Protection & Maintenance of Structures: Importance of protection & maintenance - Categories of maintenance - Building maintenance, Corrosion mitigation techniques to protect the structure from corrosion Long term health monitoring / structural health monitoring (SHM): Definition and motivation for SHM- Basic components of SHM and its working mechanism- SHM as a tool for proactive maintenance of structures.

Prescribed Text books:

1. Concrete microstructure, Properties and materials - P Kumar Mehta and Paulo J. M. Monterio.
2. Denison Campbell, Allen and Harold Roper, Concrete Structures, Materials, Maintenance and Repair, Longman Scientific and Technical, U.K. 1991.

Reference Textbooks:

1. Handbook on Repairs and Rehabilitation of RCC buildings - CPWD, Government of India.
2. RT.Allen and S.C. Edwards, Repair of concrete Structures, Blaikie and sons, UK, 1987.
3. MS. Shetty, Concrete Technology – Theory and practice, S.Chand and company, New Delhi, 1992.
4. Santha Kumar, A.R.Training Course notes on damage assessment and Repair in low cost housing RHDC-NBO Anna University, Madras, July, 1992.
5. Raikar, R.N.learning from failures – deficiencies in Design, construction and service – R&D centre (SDCPL), Raikar Bhavan, Bombay, 1987.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE1ET.1	2	-	3	-	-	3
24DSTE1ET.2	2	-	3	-	-	3
24DSTE1ET.3	2	-	3	-	-	3
24DSTE1ET.4	2	-	3	-	-	3
24DSTE1ET.5	2	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Theory and Analysis of Plates
Category: Program Elective-II
Couse Code: 24DSTE1FT
Branch/es: Structural Engineering
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course focuses on the theoretical foundations and practical applications of plate analysis in structural engineering. Students will explore the derivation of plate equations for various loading conditions and boundary conditions, including rectangular and circular plates

Course Objectives:

1. Describe the fundamental theories related to plate behavior, including classical plate theory, sandwich theory, and other relevant models.
2. Utilize differential equations and numerical methods to analyze the bending, stability, and vibration of various plate types under different loading conditions.
3. Examine the effects of different boundary conditions on the performance of plates and how they influence stress distribution and deflection.
4. Evaluate experimental results related to plate behavior, including load testing and material characterization, and compare them with theoretical predictions

Course Outcomes:

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

1. Derive and understand the governing equations for rectangular plates under various loading conditions.
2. Analyze circular plates, including symmetrically loaded and annular configurations.
3. Apply the principles of bending and stretching to derive governing equations and solve practical problems.
4. Explore orthotropic plate behavior and apply these concepts to grillage problems.
5. Utilize numerical methods, including finite element and variational approaches, to analyze complex plate problems and large deflections.

Unit 1 10

Derivation of Plate Equations For Rectangular Plates –In plane bending and transverse bending effects. Plates under various loading conditions like concentrated, U.D.L and hydrostatic pressureNaiver and Levy"s type of solutions for various boundary conditions.

Unit 2 10

Circular Plates: Symmetrically loaded, circular plates under various loading conditions, annular plates.

Unit 3 10

Plates Under Simultaneous Bending And Stretching: Derivation of the governing equation and application to simple cases.

Unit 4 10

Orthotropic Plates: Derivation of the governing equation, applications to grillage problems as equivalent orthotropic plates.

Unit 5 10

Numerical And Approximate Methods: Energy solutions by variational methods, finite difference and finite element methods of analysis for plate problems. Study of few simple cases for large deflection theory of plates.

1.	2.	3.	4.	5.
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Prescribed Text books:

1.Timoshenko, S., and Krieger, S.W., Theory of plates and shells, McGraw Hill Book company.

2. Theory of plates by Chandra Shekhara, K, Universities Press ltd

Reference Textbooks:

1. Szilard, R., Theory and Analysis of Plates, Prentice Hall Inc.
2. N.K.Bairagi, Plate analysis, Khanna Publishers, Delhi, 1986.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE1FT.1	3	-	3	-	-	3
24DSTE1FT.2	3	-	3	-	-	3
24DSTE1FT.3	3	-	3	-	-	3
24DSTE1FT.4	3	-	3	-	-	3
24DSTE1FT.5	3	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Research methodology and IPR
Category:	Mandatory Course
Couse Code:	24DHUM1AT
Branch/es:	Structural Engineering
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course covers calculation of short and long term deflections of various types of beams, mechanism of flexural cracking and estimation of crack width, design of reinforced concrete deep beams, design of elevated water tanks and shear walls, design of beam column joints and design of bunkers and silos.

Course Objectives:

1. Identify an appropriate research problem in their interesting domain.
2. Understand ethical issues understand the Preparation of a research project thesis report.
3. Understand the Preparation of a research project thesis report
4. Understand the law of patent and copyrights.
5. Understand the Adequate knowledge on IPR
6. Identify an appropriate research problem in their interesting domain.

Course Outcomes:

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

1. Analyze research related information
2. Follow research ethics.
3. Summarize that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
4. Understanding that when IPR would take such important place in growth of individuals & nation
5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D.

Unit 1 10

IntIroduction: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.

10

Unit 2

Technical Writing: Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.

10

Unit 3

Intellectual Property :Retail Pricing Strategies - Approaches for Setting Prices - Price Adjustments - Using Price Stimulate Retail Sales - Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 4 10

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

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6.	7.	8.	9.	

Unit 5 10

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

Prescribed Text books:

1. P.C. Verghese, Advanced Reinforced Concrete Design, PHI Learning, New Delhi
2. N. Krishna Raju, Advanced Reinforced Concrete Design, CBS Publishers & Distributors.

Reference Textbooks:

1. C.E. Reynolds and J.C. Steedman, Reinforced Concrete- Desigers Hand book, a view point publication.
2. P.Dayaratnam, Limit State Design of Reinforced Concrete Structures, Oxford & IBHPublishers, 2004 edition.
3. Devadas Menon, Reinforced cement concrete Structures, Tata McGraw Hill Education
4. P.Purushothaman, Reinforced concrete Structural Elements: Behaviour, analysis and Design, TATA Mc Graw Hill.

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DHUM1AT.1	3	-	-	2	1	3
24DHUM1AT.2	3	-	-	2	1	3
24DHUM1AT.3	3	-	-	2	1	3
24DHUM1AT.4	3	-	-	2	1	3
24DHUM1AT.5	3	-	-	2	1	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Disaster Management
Category:	Audit Course
Couse Code:	24DSTE1GT
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course explores the principles and practices of disaster management, focusing on risk assessment, preparedness, response, and recovery strategies. Students will learn to develop effective plans and policies to mitigate the impacts of natural and human-made disasters.

Course Objectives:

Upon the completion of subject student will be able to-

Course Objectives:

Students will be able to:

1. learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
2. critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
3. develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
4. critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in

Course Outcomes:

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

1. Differentiate between hazards and disasters, understanding their types, significance, and the differences between natural and man-made disasters.
2. Assess the economic, human, and ecological impacts of various disasters, recognizing the damage caused by both natural and man-made events.
3. Identify and map disaster-prone areas in India, with a focus on post-disaster issues like diseases and epidemics.
4. Implement disaster preparedness techniques, including risk evaluation and formulating community and governmental preparedness plans.
5. Conduct disaster risk assessments, engage in disaster risk reduction efforts, and develop mitigation strategies focusing on emerging trends.

Unit 1 Introduction 10

Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference,Nature, Types And Magnitude.

Unit 2 10

Repercussions of Disasters And Hazards: Economic Damage, Loss Of Human And Animal Life, Destruction of Ecosystem. **Natural Disasters:** Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man- made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks of Disease And Epidemics, War and Conflicts

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Unit 3 10

Disaster Prone Areas In India

Study Of Seismic Zones; Areas Prone to Floods And Droughts, Landslides and Avalanches; Areas Prone to Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases and Epidemics

Unit 4 Disaster Preparedness And Management 10

Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

Unit 5 Risk Assessment 10

Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques of Risk Assessment, Global Co- Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival.

Disaster Mitigation: Meaning, Concept And Strategies Of Disaster Mitigation, Emerging trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.

Prescribed Text books:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies",New Royal book Company.
2. Sahni, Pardeep et.al. (Eds.),"Disaster Mitigation Experiences and Reflections", Prentice Hall Of India, New Delhi.

Reference Textbooks:

1. Goel S. L., Disaster Administration And Management Text and Case Studies", Deep& Deep Publication Pvt. Ltd., New Delhi.
2. 4. Ghosh G.K., 2006, "Disaster Management", APH Publishing Corporation.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE1GT.1	-	-	3	-	-	3
24DSTE1GT.2	-	-	3	-	-	3
24DSTE1GT.3	-	-	3	-	-	3
24DSTE1GT.4	-	-	3	-	-	3
24DSTE1GT.5	-	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	English for Resarch Paper Writing
Category:	Audit Course
Couse Code:	24DHUM1AT
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course equips participants with essential academic writing skills, covering planning, structuring, and refining research papers. Through a comprehensive approach, learners will engage in writing exercises focused on clarity, conciseness, and effective argumentation.

Course Objectives:

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title.
4. Ensure the good quality of paper at very first-time submission.

Course Outcomes:

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

1. Construct well-organized papers with clear, concise language.
2. Effectively highlight findings and avoid ambiguity.
3. Master the components of research papers, including abstracts and literature reviews.
4. Apply techniques for paraphrasing and proper citation to avoid plagiarism.
5. Prepare submissions that meet academic standards for quality

Unit 1 10

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

Unit 2 10

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction.

Unit 3 10

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check..

Unit 4 10

Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature.

Unit 5 10

Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Prescribed Text books:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press

Reference Textbooks:

1. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook .
2. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DHUM1AT.1	-	-	3	-	3	3
24DHUM1AT.2	-	-	3	-	3	3
24DHUM1AT.3	-	-	3	-	3	3
24DHUM1AT.4	-	-	3	-	3	3
24DHUM1AT.5	-	-	3	-	3	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Value Education
Category:	Audit Course
Couse Code:	24DHUM1CT
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course aims to instill core ethical values and life skills essential for personal and social development. Through interactive discussions, case studies, and experiential learning, participants will explore concepts such as integrity, empathy, respect, and responsibility.

Course Objectives:

1.Understand value of education and self- development
2.Imbibe good values in students
3.Let the should know about the importance of character

Course Outcomes:

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

1. Knowledge of self-development
2. Learn the importance of Human values
3. Developing the overall personality

Unit 1 10

Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non-moral valuation. Standards and principles.Value judgements

Unit 2 10

Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism Love for nature Discipline

Unit 3 10

Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labour. Universal brotherhood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for savingnature.

Unit 4 10

Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science of reincarnation. Equality, Nonviolence,Humility, Role of Women.

Unit 5 10

All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively

Prescribed Text books:

1. Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University Press, New Delhi

1.	2.	3.		5.
6.	7.	8.	9.	

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DHUM1CT.1	-	-	3	-	-	3
24DHUM1CT.2	-	-	3	-	-	3
24DHUM1CT.3	-	-	3	-	-	3
24DHUM1CT.4	-	-	3	-	-	3
24DHUM1CT.5	-	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Advanced Structural Design Laboratory - I
Category:	Program Core Lab
Couse Code:	24DSTE11L
Branch/es:	Structural Engineering
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course offers a hands-on approach to the analysis and design of structural elements using advanced software tools such as STAAD Pro and MS Excel. Students will gain practical experience in modeling, analyzing, and designing various structural components, including plane frames, trusses, beams, slabs, columns, footings, and bridge decks. The course emphasizes the application of engineering principles to real-world scenarios, fostering a deep understanding of structural behavior and design methodologies.

Course Objectives:

1. To familiarize students with STAAD Pro and MS Excel for structural analysis and design.
2. To enable students to perform analysis on various structural components, including frames, trusses, and retaining walls.
3. To teach students the design principles for continuous beams, slabs, columns, and footings using relevant codes and standards.
4. To provide hands-on experience in designing both one-way and two-way slabs and combined footings.
5. To equip students with the skills necessary to analyze and design bridge deck slabs, understanding their unique requirements.

Course Outcomes:

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

1. Understand the software usages for structural members.
2. Analyse plane, space frames and dynamic response and natural frequency for beams and frames.
3. Design, detailing and estimations of RC members.
4. Design the steel members like truss, beams and columns.

List of Experiments

1. Analysis and Design of plane frame using STAAD Pro
2. Analysis and Design of truss using STAAD Pro
3. Design of continuous beam using MS Excel/STAAD Pro
4. Design of columns using MS Excel/STAAD Pro
5. Design of one way Slab using MS Excel/STAAD Pro
6. Design of two way Slab using MS Excel/STAAD Pro
7. Analysis of Bridge Deck slab using STAAD Pro
8. Design of Combined Footing using MS Excel/STAAD Pro
9. Analysis of Multistoreyed space frame using STAAD Pro
10. Analysis of Retaining wall using MS Excel/STAAD Pro

1.	2.	3.	4.	5.
6.	7.	8.	9.	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE11L.1	3	2	-	2	1	3
24DSTE11L.2	3	2	-	2	1	3
24DSTE11L.3	3	2	-	2	1	3
24DSTE11L.4	3	2	-	2	1	3
24DSTE11L.5	3	2	-	2	1	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Advanced Concrete Laboratory- I
Category: Program Core Lab
Couse Code: 24DSTE12L
Branch/es: Structural Engineering
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides a practical exploration of concrete technology, focusing on the properties, behavior, and testing methods of concrete and its constituent materials. Students will learn various workability tests, aggregate assessments, specific gravity measurements, and compressive strength evaluations. The course emphasizes hands-on experience in conducting experiments and understanding their significance in mix design and quality control. By the end of the course, students will have a robust understanding of the material properties essential for effective concrete construction.

Course Objectives:

1. Understanding of the fundamental properties and testing methods of construction materials, particularly concrete and aggregates.
2. Learn to conduct various experiments to assess workability, specific gravity, and strength characteristics of materials.
3. Emphasize the importance of quality control in construction through hands-on laboratory experiences.
4. Additionally, students will gain insights into concrete mix design principles and their practical applications
5. The course seeks to equip students with the skills necessary for effective material evaluation in civil engineering.

Course Outcomes:

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

1. Execute slump, compaction factor, and Vee-Bee tests, and interpret the results to assess concrete workability.
2. Perform flakiness and elongation tests, and determine the specific gravity and bulk density of various aggregates.
3. Accurately test the compressive strength of cement and concrete specimens and analyze the results.
4. Develop concrete mix designs suitable for different applications and execute the casting process for concrete specimens.
5. Effectively analyze and report on the results of various concrete tests, understanding their implications for structural performance and durability.

List of Experiments:

1. Workability
   - (a)Slump Test
   - (b)Compaction Factor Test
   - (c)Vee-Bee Test
2. Flakiness Test
3. Elongation Test
4. Specific Gravity of
   - (a) Cement
   - (b) Coarse Aggregate
   - (c) Fine Aggregate
5. Bulk density of
   - (a) Fine Aggregate
   - (b) Coarse Aggregate
6. Fineness Modulus of
   - (a) Fine Aggregate
   - (b) Coarse Aggregate
7. Compressive strength of Cement
8. Mix Design of Concrete and compressive strength.
9. Young's Modulus of Concrete
10. Flexural Strength of Concrete

1.	2.	3.	4.	5.
6.	7.	8.	9.	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE12L.1	3	2	-	2	1	3
24DSTE12L.2	3	2	-	2	1	3
24DSTE12L.3	3	2	-	2	1	3
24DSTE12L.4	3	2	-	2	1	3
.24DSTE12L.5	3	2	-	2	1	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Advanced Reinforced Concrete Structures
Category: Program Core
Couse Code: 24DSTE21T
Branch/es: Structural Engineering
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:
This course covers calculation of short and long term deflections of various types of beams, mechanism of flexural cracking and estimation of crack width, design of reinforced concrete deep beams, design of elevated water tanks and shear walls, design of beam column joints and design of bunkers and silos.

Course Objectives:

1. To understand the short term and long term deflections of beams and slabs.
2. To understand the mechanism of flexural cracking and its estimation.
3. To understand the design of deep beams and shear walls.
4. To understand the design of beam column joints.

Course Outcomes:
At the end of the course, the student will be able to

1. Estimate limit state of serviceability by determining the short term and longterm deflection and crack width in beams for the given load
2. Design deep beams as per the codal provisions.
3. Design of elevated water tanks
4. Design of Shear wall.
5. Design of bunkers and silos.

Unit 1 10

Deflection of Reinforced Concrete Beams and Slabs:
Introduction -Short-term Deflection of beams and Slabs -Deflection due to -Imposed loads – Short term deflection of beams due to applied loads- Calculation of deflection by IS 456 - Deflection of continues beams by IS 456 - Deflection of Cantilevers - Deflection of Slab .

Estimation of Crack Width In Reinforced Concrete Members:
Introduction - Factors affecting Crack width in beams - Mechanism of Flexural cracking Calculation of crack widths - Simple Empirical method - Estimation of Crack width in –beams by IS 456 of BS 8110 - Shrinkage and Thermal Cracking.

10

Unit 2

Design of Reinforced Concrete Deep Beams:
Introduction - Minimum Thickness - Steps of Designing deep beams - Design of beam by IS 456 - Design according to British Practice - ACI Procedure for design of deep beams - Checking for local failures - Detailing of deep beams.

Unit 3 10

Design of Elevated Water Tanks:
Introduction - Types of overhead water tanks- Design of Intze type water tank- design of conical or funnel shaped water tank.

10

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Unit 4

Design of Shear Walls: Introduction - Classification of shear walls – Classification according to behaviour - Loads in shear walls - Design of Rectangular and flanged shear walls - Derivation of formula for moment of Resistance of Rectangular shear walls

10

Unit 5

Bunkers and Silos:

Introduction - Differences between bunkers and Silos- Design of Circular bunkers- Design of Silos - Silos for storage of cement.

Prescribed Text books:

1. P.C. Verghese, Advanced Reinforced Concrete Design, PHI Learning, New Delhi
2. N. Krishna Raju, Advanced Reinforced Concrete Design, CBS Publishers & Distributors.

Reference Textbooks:

1. C.E. Reynolds and J.C. Steedman, Reinforced Concrete- Desigers Hand book, a view point publication.
2. P.Dayaratnam , Limit State Design of Reinforced Concrete Structures, Oxford & IBHPublishers, 2004 edition.
3. Devadas Menon, Reinforced cement concrete Structures, Tata McGraw Hill Education
4. P.Purushothaman, Reinforced concrete Structural Elements: Behaviour, analysis and Design, TATA Mc Graw Hill.

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24BCIV21T.1	3	-	-	2	1	3
24BCIV21T.2	3	-	-	2	1	3
24BCIV21T.3	3	-	-	2	1	3
24BCIV21T.4	3	-	-	2	1	3
24BCIV21T.5	3	-	-	2	1	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Advanced Steel Design
Category:	Program Core
Couse Code:	24DSTE22T
Branch/es:	Structural Engineering
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course focuses on the advanced design of steel structures, emphasizing the analysis and design of self-supporting stacks, cold-formed sections, gantry girders, portal frames, and steel truss girder bridges. Students will learn the principles of structural design, including considerations for mechanical and thermal requirements, wind load estimations, and load combinations for various applications.

Course Objectives:

1. To familiarize students with the preliminary design considerations for self-supporting stacks, including thermal and mechanical requirements, as well as load estimations.
2. To provide insights into the design techniques, properties, and code provisions for cold-formed steel sections as per IS 801 & 811.
3. To teach the design principles for gantry girders, including load calculations and permissible stress considerations for crane operations.
4. To introduce theorems of plastic analysis and their application to rectangular portal frames, emphasizing optimization in structural design.
5. To equip students with the knowledge to design steel truss girder bridges, understanding various components, load effects, and economic proportions.

Course Outcomes:

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

1. Conduct a detailed design of self-supporting stacks, considering all relevant loadings and structural requirements.
2. Apply IS 801 & 811 provisions to design cold-formed steel sections, accounting for local buckling and post-buckling behavior.
3. Perform design calculations for gantry girders, including determining maximum moments and shears under crane loading conditions.
4. Utilize plastic analysis theorems for optimizing the design of rectangular portal frames, including deflection estimation.
5. Analyze and design steel truss girder bridges, considering the effects of wind loads, bracing, and member proportions for structural efficiency.

Unit 1 10

Design of self-supporting stacks/chimneys – Considerations for preliminary design (industrial requirements – thermal requirement – mechanical force requirement – wind load and dead load estimation) – Detailed estimation of wind; dead-and other accidental – loads; Analysis; Detailed design including provision of stakes /spoilers – Design of super structure only.

Unit 2 10

Design of cold formed sections: Techniques and properties- Advantages, Typical profiles, stiffened and un stiffened elements, local buckling and post buckling strength, shear lag and flange curling, unusually wide flange section, short span sections, members subjected to axial tension, compression and bending. IS 801& 811 code provisions- numerical examples, beam design, column design.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Unit 3 10

Design of Gantry Girder: Introduction – Loads acting on the gantry girder – permissible stresses - types of gantry girders and crane sails – crane data – maximum moments and shears – design procedure (restricted to electrically operated cranes)

10

Unit 4

Theorems of plastic analysis: applications to the cases of rectangular portal frames. Principles of optimization in structural design – Application to simple – rectangular portal frame – minimum weight design.

General methods of plastic design: combining mechanics methods, plastic moment redistribution method; Application to few cases of simple two storied rectangular portal frames including estimation of deflection.

Unit 5 10

Design of Steel Truss Girder Bridges : Types of truss bridges, component parts of a truss bridge, economic proportions of trusses, self weight of truss girders, design of bridge compression members, tension members; wind load on truss girder bridges; wind effect on top lateral bracing; bottom lateral bracing; portal Bracing; sway bracing.

Prescribed Text books:

1. Rama Chandra and Gehlot, V. (2007), Design of Steel Structures Vol. 1 and II, Standard Publication, New Delhi.

Reference Textbooks:

1. Subramanian, N. (2008), Design of Steel Structures-Limit State Design, Oxford University press, India.
2. Relevant BIS codes and international codes

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE22T.1	3	-	-	2	-	3
24DSTE22T.2	3	-	-	2	-	3
24DSTE22T.3	3	-	-	2	-	3
24DSTE22T.4	3	-	-	2	-	3
24DSTE22T.5	3	-	-	2	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Title of the Course:	Finite Element Analysis of Structures
Category:	Program Elective-III
Couse Code:	24DSTE2AT
Branch/es:	Structural Engineering
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course offers a thorough introduction to the Finite Element Method (FEM), a critical computational technique widely used in structural engineering for analyzing complex systems. Students will learn the fundamental principles, steps involved in FEM, and its applications in one-dimensional, two-dimensional, and three-dimensional analyses.

Course Objectives:

1. To introduce the fundamental concepts and theoretical foundations of the Finite Element Method (FEM).
2. To develop the ability to derive and apply stiffness matrices for one-dimensional structural elements.
3. To explore two-dimensional FEM, including the formulation of elements for plane stress and plane strain analyses.
4. To understand isoperimetric formulations and their role in enhancing element accuracy and convergence.
5. To equip students with the skills to analyze three-dimensional structural problems using FEM.

Course Outcomes:

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

1. Explain the key principles of FEM and the significance of discretization in structural analysis.
2. Demonstrate proficiency in formulating and solving stiffness matrices for one-dimensional beam and bar elements.
3. Analyze two-dimensional elements for plane stress and plane strain problems using appropriate shape functions and displacement models
4. Apply isoperimetric formulations to create and analyze 4-noded and 8-noded elements for improved accuracy.
5. Formulate and solve three-dimensional FEM problems, applying the strain-displacement relationships to practical engineering scenarios.

Unit 1 10

Introduction-Concepts of FEM –steps involved –merits &demerits –energy principles – Discretization –Rayleigh –Ritz method of functional approximation. Elastic formulations: Stress equations-strain displacement relationships in matrix form-plane stress, plane strain and Axi-symmetric bodies of revolution with axi symmetric loading.

Unit 2 10

One Dimensional FEM-Stiffness Matrix for Beam and bar elements shape functions for ID elements –static condensation of global stiffness matrix-solution –Initial strain and temperature effects.

Unit 3 10

Two-Dimensional FEM-Different types of elements for plane stress and plane strain analysis – Displacement models – generalized coordinates-shape functions-convergent and compatibility requirements –Geometric Invariance –Natural coordinate system-area and volume coordinates Generation of element stiffness and nodal load matrices –static condensation.

Unit 4 10

Isoperimetric formulation-Concept, Different isoperimetric elements for 2d analysis-Formulation of 4-noded and 8-noded isoperimetric quadrilateral elements –Lagrangian elements-serendipity elements

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Axi-symmetric analysis –bodies of revolution-axi symmetric modelling –strains displacement relationship-formulation of axi symmetric elements.

Unit 5 10

Three-Dimensional FEM-Different 3-D elements, 3D strain –displacement relationship- formulation of hexahedral and isoperimetric solid element.

Prescribed Text books:

1.Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla and Ashok D. Belegundu – Pearson Education Publications.

2. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata McGraw Hill Publishers

Reference Textbooks:

1. Finite element method and its application by Desai ,2012, Pearson Pubilications.
2. Finite element methods by Darrel W.Pepper, VikasPublishers
3. Finite element analysis and procedures in engineering by H.V.Lakshminaryana, 3rd edition, universities press, Hyderabad.
4. Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla, Universities Press India Ltd. Hyderabad.
5. Finite element analysis in Engineering Design by S.Rajasekharan, S.Chand Publications, New Delhi.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE2AT.1	3	2	-	-	-	3
24DSTE2AT.2	3	2	-	-	-	3
24DSTE2AT.3	3	2	-	-	-	3
24DSTE2AT.4	3	2	-	-	-	3
24DSTE2AT.5	3	2	-	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Advanced Foundation Engineering
Category:	Program Elective-III
Couse Code:	24DSTE2BT
Branch/es:	Structural Engineering
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides an in-depth understanding of shallow and deep foundation systems in civil engineering. Students will explore the general requirements, types, and selection criteria for shallow foundations, as well as the bearing capacity theories of Terzaghi and Meyerhof

Course Objectives:

1. To understand the general requirements and types of shallow foundations and the factors influencing their selection.
2. To apply bearing capacity theories for shallow foundations and analyze local and general shear failures.
3. To evaluate the bearing capacity and settlement of isolated footings under various loading conditions.
4. To analyze and design deep foundation systems, including piles and well foundations.
5. To address challenges associated with foundations in problematic soils and implement effective foundation techniques.

Course Outcomes:

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

1. Identify the requirements and various types of shallow foundations and justify their selection based on site conditions.
2. Demonstrate proficiency in calculating the bearing capacity of shallow foundations using Terzaghi's and Meyerhof's theories.
3. Analyze isolated footings subjected to eccentric and inclined loads and design reinforced concrete footings.
4. Evaluate the bearing capacity and settlement of pile foundations using dynamic and static formulas, including the analysis of pile groups
5. Apply principles of foundation design to address issues related to problematic soils, utilizing techniques such as lime columns and under-reamed piles.

Unit 1 10

Shallow Foundations-I: General requirements of foundations. types of shallow foundations and the factors governing the selection of type of shallow foundation. Bearing capacity of shallow foundations by Terzaghi"s theory and Meyerhof"s theory (derivation of expressions and solution to problems based on these theories). Local shear and general shear failure and their identification

Unit 2 10

Shallow Foundations-II: Bearing capacity of isolated footing subjected to eccentric and inclined loads. Bearing capacity of isolated footing resting on stratified soils- Button"s theory and Siva Reddy analysis. Analysis and structural design of R.C.C isolated, combined and strap footings.

Unit 3 10

Deep Foundations-I: Pile foundations-types of pile foundations. Estimation of bearing capacity of pile foundation by dynamic and static formulae. Bearing capacity and settlement analysis of pile groups. Negative skin Friction, Pile load tests. Sheet Pile Walls. Cantilever sheet piles and anchored bulkheads, Earth Pressure diagram, Determination of depth of embedment in sands and clays-Timbering of trenches-Earth Pressure diagrams-forces in struts.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Unit 4 10

Deep Foundations-II: Well Foundations-Elements of well foundation. Forces acting on a well foundation. Depth and bearing capacity of well foundation. Design of individual components of well foundation (only forces acting and principles of design). Problems associated with well sinking.

Unit 5 10

Foundations in Problematic Soils: Foundations in black cotton soils-basic foundation problems associated with black cotton soils. Lime column techniques-principles and execution. Under reamed piles-principle of functioning of under reamed pile-Analysis and structural design of under reamed pile. Use of Cohesive Non-Swelling (CNS) layer below shallow foundations

Prescribed Text books:

1. Analysis and Design of Foundations and Retaining Structures-Shamsher Prakash, Gopal Ranjan and Swami Saran.
2. Analysis and Design of Foundations-J.E.Bowles

Reference Textbooks:

1. Foundation Design and Construction-Tomlinson
2. Foundation Design-Teng.
3. Geotechnical Engg – C.Venkatramaiah

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE2BT.1	3	3	-	-	-	3
24DSTE2BT.2	3	3	-	-	-	3
24DSTE2BT.3	3	3	-	-	-	3
24DSTE2BT.4	3	3	-	-	-	3
24DSTE2BT.5	3	3	-	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Structural Dynamics
Category:	Program Elective-III
Couse Code:	24DSTE2CT
Branch/es:	Structural Engineering
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides a comprehensive overview of vibration theory and dynamic analysis applicable to structural engineering. Students will explore the fundamental principles of vibrations, including single and multi-degree of freedom systems, and the formulation of equations of motion.

Course Objectives:

1. To understand the basic concepts of vibratory systems, including degrees of freedom and oscillatory motion.
2. To formulate and solve the equations of motion for single-degree-of-freedom (SDOF) systems under various dynamic loading conditions.
3. To analyze multi-degree-of-freedom (MDOF) systems, including eigenvalue problems and the dynamic response of structures.
4. To apply practical vibration analysis methods for real-world engineering problems.
5. To introduce students to earthquake analysis methods and the behavior of continuous systems under dynamic loads.

Course Outcomes:

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

1. Identify and describe the elements of vibratory systems and their behavior under free and forced vibrations.
2. Formulate and solve the equations of motion for SDOF systems, analyzing their response to harmonic and dynamic loads.
3. Evaluate the dynamic properties of MDOF systems, including natural frequencies and mode shapes, using appropriate mathematical techniques.
4. Apply practical vibration analysis methods, such as Stodola and Holzer's methods, to analyze vibratory systems.
5. Demonstrate an understanding of earthquake analysis methodologies and apply them to assess the dynamic behavior of structures, particularly continuous systems like beams.

Unit 1 10

Theory of Vibrations: Introduction –Elements of a vibratory system – degrees of freedomcontinuous systems –lumped mass idealization –Oscillatory motion –Simple harmonic motion – pictorial representation of S.H.M - free vibrations of single degree of Freedom (SDOF) systems – undammed and Damped –Critical damping –Logarithmic decrement –Forced vibrations of SDOF systems-Harmonic excitation –Dynamic magnification factor- Bandwidth. Fundamental objective of dynamic analysis-types of prescribed loading- Methods of discretization- Formulation of the equations of motion.

Unit 2 10

Single degree of Freedom System: Formulation and solutions of the equation of motion - free Vibration response –response to harmonic, periodic, Impulsive and general Dynamic loading – Duhamel integral

Unit 3 9

Multi Degree of Freedom System: selection of the degree of freedom –Evaluation of structural property matrices-Formulation of the MDOF equations of motion –Undammed free vibrationsSolution of Eigen value problem for natural frequencies and mode shapes- Analysis of dynamic response –Normal coordinates –Uncoupled equations of motion –Orthogonal properties of normal modes-mode superposition procedure

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Unit 4 10

Practical vibration analysis: Stodola method- Fundamental mode analysis –analysis of second and higher modes –Holzer"s method –basic procedure –transfer matrix procedure.

Unit 5 9

Introduction to Earthquake analysis: Introduction –Excitation by rigid base translation –Lumped mass approach -SDOF and MDOF system- I.S code methods of analysis. Continuous system: Introduction –Flexural vibrations of beams- Elementary Case-Equation of motion –Analysis of undamped free shapes of simple beams with different end conditions-principles of application to continuous beams.

Prescribed Text books:

1.A.K.Chopra, "Structural Dynamics for Earthquake Engineering", PearsonPublications

2.Dynamics of structures by Clough &Penziem

Reference Textbooks:

1. Structural dynamics by Mario Paz
2. I.S:1893(latest)"code of practice for earthquakes resistant design of structures"
3. Anderson R.A fundamentals of vibration, AmerindPublishing Co.,1972

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE2CT.1	3	3	-	-	-	3
24DSTE2CT.2	3	3	-	-	-	3
24DSTE2CT.3	3	3	-	-	-	3
24DSTE2CT.4	3	3	-	-	-	3
24DSTE2CT.5	3	3	-	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Analysis of shells and folded plates
Category:	Program Elective-IV
Couse Code:	24DSTE2DT
Branch/es:	Structural Engineering
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides an in-depth exploration of the analysis and design of shell structures and folded plates, which are widely used in modern engineering for their efficient load-bearing capabilities and aesthetic appeal

Course Objectives:

1. To understand the basic equations, bending effects of plates.. 4. To study the concepts of orthotropic plates, numerical, approximate methods, large deflection theory of plates. 6. To apply the numerical techniques and tools for the complex problems in shells
2. To understand the symmetrical loading and various loading conditions of circular and annular plates.
3. To understand the simultaneous bending and stretching of plates and to develop governing equation
4. To study the concepts of orthotropic plates, numerical, approximate methods, large deflection theory of plates.
5. To understand the analytical methods for the solution of shells.
6. To apply the numerical techniques and tools for the complex problems in shells

Course Outcomes:

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

1. Understand behaviour of plates for UDL, hydrostatic, concentrated load.
2. Perform cylindrical bending of long rectangular plates, pure bending of rectangular and circular plates, and deflection theories
3. Understand bending theory for structural behaviour of plates.
4. Implement numerical and approximate methods for plate problems.
5. Use analytical methods for the solution of shells.

Unit 1

Equations of equilibrium:Introduction, classification, derivation of stress Resultants, Principles of membrane theory and bending theory. 10

Unit 2

Cylindrical shells: Derivation of governing DKJ equation for bending theory, details of Scherer"s theory, Applications to the analysis and design of short shells and long shells, Introduction of ASCE manual co-efficient for design. 10

Unit 3

Introduction to shells of double curvature: (other than shells of revolution) Geometry and analysis of elliptic paraboloid, rotal 10

Unit 4

Folded Plates: Folded plate theory, plate and slab action, Whitney"s theory, Simpson"s theory for the analysis of different types of folded plates (Design is not included) 10

Unit 5

Shells of double Curvature: Surfaces of revolution. Derivation of equilibrium equations by membrane theory, Applications to spherical shell and rotational Hyperboloid 10

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Prescribed Text books:

1.Design and construction of concrete shell roofs by G.S. Rama Swamy – CBS Publishers & Distributors, 485, Jain BhawanBholaNath Nagar, Shahotra, Delhi.

2. Fundamentals of the analysis and design of shell structures by VasantS.Kelkar Robert T.Swell – Prentice hall, Inc., Englewood cliffs, new Jersy -02632.

Reference Textbooks:

1.N.k.Bairagi, Shell analysis, Khanna Publishers, Delhi, 1990.

2.Bollington, Ithin shell concrete structures, McGraw Hill Book company, New York, St. Louis, Sand Francisco, Toronto, London.

3.ASCE Manual of Engineering practice No.31, design of cylindrical concrete shell roofs ASC, New York.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE2DT.1	3	-	3	-	3	3
24DSTE2DT.2	3	-	3	-	3	3
24DSTE2DT.3	3	-	3	-	3	3
24DSTE2DT.4	3	-	3	-	3	3
24DSTE2DT.5	3	-	3	-	3	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Design of Masonry Structures
Category:	Program Elective-IV
Couse Code:	24DSTE2ET
Branch/es:	Structural Engineering
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course includes the basic of Masonry Structures including its types and classifications. Further, in this course, strength and stability of Masonry structures have been discussed along with design considerations, loads and the complete procedure for design. Reinforced masonry and the composite action of Masonry walls have also been discussed.

Course Objectives:

1. To understand the properties and classifications of masonry units and materials, including their strengths and limitations.
2. To analyze the strength and stability of concentrically loaded masonry walls and the factors influencing their performance.
3. To explore design considerations for masonry structures, including effective height, openings, and load dispersion.
4. To apply relevant codes (IS: 1905 and SP: 20) in the design of load-bearing masonry for multi-storey buildings.
5. To investigate the principles of reinforced masonry and its application in enhancing structural performance.

Course Outcomes:

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

1. Identify the types of Masonry structures
2. Identify the materials used in Masonry structures.
3. Apply analytical skills to assess strength and stability of Masonry structures.
4. Analyze and Design Masonry structures.
5. Understand codal provisions pertaining to Masonry structures.

Unit 1 10

Masonry Units, Materials, Types & Masonry Construction Brick, stone and block masonry units - strength, modulus of elasticity and water absorption of masonry materials -classification and properties of mortars, selection of mortars. Defects and errors in masonry construction, cracks in masonry, types, reasons for cracking, methods of avoiding cracks

Unit 2 10

Strength and Stability Strength and Stability of concentrically loaded masonry walls, effect of unit strength, mortar strength, joint thickness, rate of absorption, effect of curing, effect of ageing, workmanship, strength formulae and mechanism of failure for masonry subjected to direct compression.Permissible Stresses: Permissible compressive stress, stress reduction and shape reduction factors, increase in permissible stresses for eccentric vertical and lateral loads, permissible tensile and shear stresses.

Unit 3 10

Design Considerations Effective height of walls and columns, opening in walls, effective length, effective thickness, slenderness ratio, eccentricity, load dispersion, arching action, lintels.

Load Considerations For Masonry: Wall carrying axial load, eccentric load with different eccentricity ratios, walls with openings,freestanding wall.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

10

Unit 4

Design of Masonry Walls Design of load bearing masonry for building up to 3 storeys using IS : 1905 and SP : 20 procedure.

10

Unit 5

Reinforced Masonry Application, flexural and compression elements, shear walls. Masonry Walls In Composite Action Composite wall-beam elements, in filled frames.

Prescribed Text books:

1. A.W. Hendry, B.P. Sinha, S.R. Davies, Design of Masonry Structures, Third Edition, Tata McGraw Hill Publications

Reference Textbooks:

1. NarendraTaly, Design of Reinforced Masonry Structures, 2nd Edition.
2. Richard E. Klingner, Masonry Structural Design, 2nd Edition, Jennifer Eisenhauer Tanner

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE2ET.1	3	3	3	-	-	3
24DSTE2ET.2	3	3	3	-	-	3
24DSTE2ET.3	3	3	3	-	-	3
24DSTE2ET.4	3	3	3	-	-	3
24DSTE2ET.5	3	3	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Design of Form work
Category: Program Elective-IV
Couse Code: 24DSTE2FT
Branch/es: Structural Engineering
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides an in-depth exploration of formwork in construction, emphasizing its critical role in shaping concrete structures.

Course Objectives:

1. To Understand Formwork Fundamentals
2. To Learn the principles of formwork design, focusing on systems and methodologies for foundations, walls, columns, slabs, and beams
3. To Delve into the unique design considerations for formwork in special structures such as shells, domes, folded plates, and overhead tanks.
4. Investigate innovative formwork techniques including flying formwork, table form, tunnel form, and slip form, as well as management issues related to formwork in precast concrete applications.
5. Identify common causes of formwork failures through case studies and understand the implications for multi-story building construction.

Course Outcomes:

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

1. Select proper formwork, accessories and material.
2. Design the form work for Beams, Slabs, columns, Walls and Foundations.
3. Design the form work for Special Structures.
4. Understand the working of flying formwork.
5. Judge the formwork failures through case studies.

Unit 1 10

Introduction: Requirements and Selection of Formwork. Formwork Materials- Timber, Plywood, Steel, Aluminium, Plastic, and Accessories. Horizontal and Vertical Formwork Supports.

Unit 2 10

Formwork Design: Concepts, Formwork Systems and Design for Foundations, Walls, Columns, Slab and Beams.

Unit 3 10

Formwork Design for Special Structures: Shells, Domes, Folded Plates, Overhead Water Tanks, Natural Draft Cooling Tower, Bridge

Unit 4 10

Flying Formwork: Table Form, Tunnel Form, Slip Form, Formwork for Precast Concrete, Formwork Management Issues – Pre- and Post-Award

Unit 5 10

Formwork Failures: Causes and Case studies in Formwork Failure, Formwork Issues in Multi-Story Building Construction.

Prescribed Text books:

1. Formwork for Concrete Structures, Peurify, McGraw Hill India, 2015.

Reference Textbooks:

1. Formwork for Concrete Structures, Kumar Neeraj Jha, Tata McGraw Hill Education, 2012.
2. IS 14687: 1999, false work for Concrete Structures - Guidelines, BIS

1.	2.	3.	4.	5.
6.	7.	8.	9.	

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE2FT 1	3	-	3	-	-	3
24DSTE2FT.2	3	-	3	-	-	3
24DSTE2FT.3	3	-	3	-	-	3
24DSTE2FT.4	3	-	3	-	-	3
24DSTE2FT.5	3	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Constitution of India
Category: Audit Course
Couse Code: 24DHUM2AT
Branch/es: Structural Engineering
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:
This course provides a comprehensive overview of the Constitution of India, its historical context, and its significance as the supreme law of the land.

Course Objectives:
1. To understand the importance of the constitution
2. To learn the structure of executive, legislature, and judiciary
3. To understand the philosophy of fundamental rights and duties
4. To learn the autonomous nature of constitutional bodies like the Supreme Court and High Court, Controller and Auditor General of India and Election Commission of India.
5. To understand the union and state financial and administrative relations

Course Outcomes:
At the end of the course, the student will be able to
1. Understand the historical background of the constitution making and its importance for building a democratic India.
2. Understand the functioning of three wings of the government, i.e., executive, legislative and judiciary.
3. Understand the value of the fundamental rights and duties for becoming good citizens of India.
4. Understand the decentralization of power between union, state and local self government.
5. understand the operation of constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy

Unit 1 10
Introduction to Indian Constitution: Constitution, meaning of the term, Indian Constitution - Sources and Constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

Unit 2 10
Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions

Unit 3 10
State Government and its Administration - Governor - Role and Position - CM and Councilof ministers, State Secretariat Organization, Structure and Functions

Unit 4 10
Local Administration - District Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation Panchayati Raj: Functions PRI: Zila Panchayat, Elected.

Unit 5 10
Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission: Functions of Commissions for the welfare of SC/ST/OBC and women

1.	2.	3.	4.	5.

Prescribed Text books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.

Reference Textbooks:

1. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
2. 4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DHUM2AT.1	-	-	3	-	-	3
24DHUM2AT.2	-	-	3	-	-	3
24DHUM2AT.3	-	-	3	-	-	3
24DHUM2AT.4	-	-	3	-	-	3
24DHUM2AT.5	-	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course:	Pedagogy Studies
Category:	Audit Course
Couse Code:	24DHUM2BT
Branch/es:	Structural Engineering
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course explores the theories, principles, and practices of effective teaching and learning. Participants will examine various pedagogical approaches, instructional strategies, and assessment techniques that enhance student engagement and achievement.

Course Objectives:

1.Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.

2. Identify critical evidence gaps to guide the development

Course Outcomes:

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

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Unit 1 10

Introduction and Methodology-Aims and rationale, Policy background, Conceptu framework and terminology, Theories of learning, Curriculum, Teacher education. Conceptu framework, Research questions. Overview of methodology and Searching.

Unit 2 10

Thematic overview: Pedagogical practices are being used by teachers in formal an informal classrooms in developing countries. Curriculum, Teacher education

Unit 3 10

Evidence on the effectiveness of pedagogical practices, Methodology for the indepth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy. Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

Unit 4 10

Professional development: alignment with classroom practices and follow-up support. Peer support. Support from the head teacher and the community. Curriculum and assessment, Barriers to learning: limited resources and large class sizes.

Unit 5 10

Research gaps and future directions, Research design. Pedagogy-Teacher education. Curriculum and assessment, Dissemination and research impact.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Prescribed Text books:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2):245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.

Reference Textbooks:

1. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
2. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basicmaths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
3. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education.Oxford and Boston: Blackwell.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DHUM2BT.1	-	-	3	-	-	3
24DHUM2BT.2	-	-	3	-	-	3
24DHUM2BT.3	-	-	3	-	-	3
24DHUM2BT.4	-	-	3	-	-	3
24DHUM2BT.5	-	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Stress Management by Yoga
Category: Audit Course
Couse Code: 24DHUM2CT
Branch/es: Structural Engineering
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course introduces participants to the principles and practices of yoga as effective tools for managing stress and enhancing overall well-being. Through a combination of asanas (postures), pranayama (breath control), meditation, and mindfulness techniques, students will learn how to reduce anxiety, improve focus, and promote relaxation.

Course Objectives:

1. To achieve overall health of body and mind
2. To overcome stress

Course Outcomes:

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

1. Develop healthy mind in a healthy body thus improving social health.
2. Improve efficiency

Unit 1 8

Definitions of Eight parts of yoga. (Ashtanga)

Unit 2 8

Yam: Do`s in life

Ahinsa, satya, astheya, bramhacharya and aparigraha

Unit 3 8

Niyam: Don't's in life
Shaucha, santosh, tapa, swadhyay, ishwarpranidhan

Unit 4 6

Pranayam: Regularization of breathing techniques and its effects-Types of pranayam

Unit 5 5

Asan: Various yog poses and their benefits for mind & body

Prescribed Text books:

1. Yogic Asanas FOR Group Training-Part-1: Janardhan Swami Yoghabyasi Mandal, Nagpur.

Reference Textbooks:

1. Rajayoga by Swami Vivekananda, Advaitha Ashrama, Kolkata.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DHUM2CT.1	-	-	3	-	-	3
24DHUM2CT.2	-	-	3	-	-	3
24DHUM2CT.3	-	-	3	-	-	3
24DHUM2CT.4	-	-	3	-	-	3
24DHUM2CT.5	-	-	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Personality Development through Life Enlightenment Skills.
Category: Audit Course
Couse Code: 24DHUM2DT
Branches: Structural Engineering
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course is designed to help individuals cultivate self-awareness, emotional intelligence, and resilience, empowering them to navigate life's challenges with confidence and purpose.

Course Objectives:

1.To learn to achieve the highest goal happily
2. To become a person with stable mind, pleasing personality and determination
3. To awaken wisdom in students

Course Outcomes:

1.Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
3. Study of Neetishatakam will help in developing versatile personality of students.

Unit 1 10

Neetisatakam-Holistic development of personality
- Verses- 19,20,21,22 (wisdom)
- Verses- 29,31,32 (pride & heroism)
- Verses- 26,28,63,65 (virtue)

Unit 2 10

Neetisatakam-Holistic development of personality
- Verses- 52,53,59 (dont's)
- Verses- 71,73,75,78 (do's)

Unit 3 10

Approach to day to day work and duties. •
Shrimad BhagwadGeeta:
Chapter 2-Verses 41, 47,48,
Chapter 3-Verses 13, 21, 27, 35,

Unit 4 10

Approach to day to day work and duties.
Shrimad BhagwadGeeta
Chapter 6-Verses 5,13,17, 23, 35,
Chapter 18-Verses 45, 46, 48

Unit 5 10

Statements of basic knowledge.
- Shrimad BhagwadGeeta:

Chapter2-Verses 56, 62, 68
- Chapter 12 -Verses 13, 14, 15, 16,17, 18

Personality of Role model. Shrimad BhagwadGeeta:
Chapter2-Verses 17,
Chapter 3-Verses 36,37,42
Chapter 4-Verses 18, 38,39
Chapter18 – Verses 37,38,63

Prescribed Text books:

1. "Srimad Bhagavad Gita" by Swami SwarupanandaAdvaita Ashram (Publication Department), Kolkata

Reference Textbooks:

1. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.

1.	2.	3.	4.	5.
6.	7.	8.	9.	

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DHUM2DT.1	3	2	3	-	-	3
24DHUM2DT.2	3	2	3	-	-	3
24DHUM2DT.3	3	2	3	-	-	3
24DHUM2DT.4	3	2	3	-	-	3
24DHUM2DT.5	3	2	3	-	-	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Advanced Structural Design Laboratory-II
Category: Program Core Lab
Couse Code: 24DSTE23L
Branch/es: Structural Engineering
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides an in-depth exploration of the design principles and methodologies for various civil engineering structures, including bunkers, silos, bridges, and water tanks. Students will engage in hands-on projects that emphasize the application of theoretical concepts to real-world scenarios. Through a combination of lectures, case studies, and design assignments, learners will gain proficiency in structural analysis and design practices. Emphasis will be placed on understanding material properties, load calculations, and safety considerations. By the end of the course, students will be equipped with the skills necessary to design and analyze complex engineering structures.

Course Objectives:

1. To develop a solid understanding of the fundamental principles of structural design for various civil engineering applications.
2. To enable students to perform load calculations and material selection for effective and safe design.
3. To foster the ability to apply theoretical knowledge to practical design problems through project-based learning.
4. To cultivate skills in using software tools for structural analysis and design documentation.
5. To instill a strong awareness of safety, environmental, and sustainability considerations in engineering design practices.

Course Outcomes:

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

1. Demonstrate the ability to design and analyze square, rectangular, and circular bunkers according to engineering standards
2. Design silos for cement storage, considering material properties and load requirements.
3. Apply structural design principles to create safe and efficient designs for various types of bridges.
4. Detailed drawings and specifications for overhead water tanks and culverts, ensuring compliance with relevant codes.
5. Evaluating structural integrity and performance through advanced analysis techniques and software applications.

List of Experiments

1. Design of Square/ Rectangular Bunker.
2. Design of Circular Bunker.
3. Design of silos for storing of cement.
4. Design of Transmission tower.
5. Design of Intz Type overhead water tank.
6. Design of Conical Type overhead water tank.
7. Design of Box Culvert.
8. Design of slab Deck Bridge.
9. Design of T-Beam Bridge.
10. Design of Gantry girder.
11. Design and detailed drawing of complete G+ 3 structures.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE23L.1	3	3	-	2	1	3
24DSTE23L.2	3	3	-	2	1	3
24DSTE23L.3	3	3	-	2	1	3
24DSTE23L.4	3	3	-	2	1	3
24DSTE23L.5	3	3	-	2	1	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Title of the Course: Advanced Concrete Technology laboratory-II
Category: Program Core Lab
Couse Code: 24DSTE24L
Branch/es: Structural Engineering
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Description:

This course provides a comprehensive exploration of concrete technology and structural testing methodologies in civil engineering. Students will engage in hands-on experiments that focus on the properties, performance, and behavior of concrete under various conditions. The course covers essential topics such as mix design, curing methods, and non-destructive testing techniques. Emphasis is placed on understanding the relationship between material properties and structural performance. By the end of the course, students will be well-prepared to apply their knowledge in real-world engineering applications.

Course Objectives:

1. To familiarize students with concrete properties and the factors influencing its strength and durability.
2. To enable learners to conduct various tests to assess concrete performance, including both destructive and non-destructive methods.
3. To provide skills in mix design for different types of concrete, including high strength and environmentally friendly options.
4. To enhance understanding of concrete behavior under different loading conditions through experimental analysis.
5. To promote critical thinking and problem-solving skills in evaluating concrete technology and its applications.

Course Outcomes:

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

1. Demonstrate proficiency in conducting standard concrete tests and interpreting the results.
2. Design and execute concrete mixes tailored to specific performance requirements
3. Understanding of the effects of additives and curing methods on concrete properties.
4. Analyze concrete performance through non-destructive testing techniques.
5. Address real-world challenges in concrete construction and sustainability.

List of Experiments

1. Accelerated curing test on Concrete cubes.
2. Non-destructive test on concrete.
3. Study of effect of dosage of super plasticizer on Strength and workability of concrete.
4. Mix design of high strength concrete including casting and testing of specimens.
5. Mix design of fly ash concrete including casting and testing of specimens.
6. Determination of coefficient of permeability of concrete.
7. Determination of drying shrinkage of concrete.
8. Bending test on an RCC beam under Two-point load

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6
24DSTE24L.1	3	3	-	2	1	3
24DSTE24L L.2	3	3	-	2	1	3
24DSTE24L.3	3	3	-	2	1	3
24DSTE24L.4	3	3	-	2	1	3
24DSTE24L.5	3	3	-	2	1	3

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Annexure-IV

Programme Educational Objectives (PEOs), Programme Specific Outcomes (PSOs) of Civil Engineering department.

Program Educational Objectives (PEOs)

PEO 1: Graduates will utilize innovative approaches and critical thinking to tackle complex civil engineering challenges, promoting sustainable infrastructure development.

PEO 2: Graduates will uphold high ethical standards and professional integrity, reflecting the values of 'Vidwan Sarvatra Pujyathey' in their work and interactions.

PEO 3: Graduates will engage in impactful research and development, advancing civil engineering knowledge and technological innovations for societal benefit.

PEO 4: Graduates will actively contribute to their communities through inclusive practices and sustainable solutions, emphasizing service and societal advancement.

Program Specific Outcomes (PSOs)

PSO 1: Graduates will demonstrate advanced technical skills and knowledge in civil engineering, applying cutting-edge methods to design and analyze complex infrastructure projects.

PSO 2: Graduates will effectively incorporate sustainable engineering practices and principles into their projects, addressing environmental and societal impacts in their engineering solutions.

1.	2.	3.	4.	5. attended online
6. attended online	7. attended online	8. attended online	9. attended online	

Annexure-V

Sustainable Development Goals (SDGs), cross-cutting issues and Indian Knowledge System (IKS) in the curriculum of the Civil Engineering departments.

Title of the Course: Building Materials and Construction
Category: ESC
Semester: IV Semester
Couse Code: 24ACIV41T
Branch: CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To understand the classification, properties, and structural requirements of various building materials including stones, wood, metals, and composites.
2. To study the physical and mechanical properties of aggregates, bricks, cement, lime, and supplementary materials used in construction.
3. To learn different types of foundations, masonry techniques, and structural components like arches, doors, and windows.
4. To gain knowledge about formwork, scaffolding, their types, erection procedures, and fire protection measures in construction.
5. To understand plastering, pointing, painting, varnishing processes, and methods for damp proofing in buildings.

Course Outcomes:

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

1. Identify and describe the characteristics and applications of common building materials such as stones, timber, metals, and plastics.
2. Evaluate the quality of aggregates, bricks, cement, and lime based on physical and chemical properties for construction suitability.
3. Select appropriate foundation types and masonry methods for different building requirements, and explain the function of arches, doors, and windows.
4. Plan and supervise safe erection of formwork and scaffolding, and apply fire protection strategies in building design.
5. Implement suitable plastering, pointing, painting, and damp proofing techniques to enhance durability and aesthetics of structures.

Unit 1 Building Materials-I 12

Building stone: classifications, properties and structural requirements.
Wood and Wood products: Introduction to wood macrostructure, sap wood and heart wood, defects and decay of timber, seasoning and preservation of timber, fire resisting treatment, introduction to wood products- veneers, plywoods, fibre board, particle board, block board, batten boards.
Metals: Steel: Important properties and uses of Iron (Cast iron, wroght iron and steel), Important tests on steel rebar, aluminum and copper.
Glass: types and uses, **gypsum:** source, properties, uses.
plastic: properties and uses, paint: types, distemper, varnish.
Adhesive: Types, Bitumen: types, properties and tests.

Unit 2 **Building Materials-II** 12

Aggregate: Classification, Physical and mechanical properties, thermal properties of aggregate.
Bricks and Masonry Blocks: Types, properties, field and laboratory tests to evaluate quality.
Lime: classification, properties. **Cement:** types, Portland cement: chemical composition of raw material, bogue compounds, hydration of cement, role of water in hydration, testing of cements.
Fly ash: properties and use in manufacturing of bricks and cement.

12

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6.	7.	8.	9.	

Unit 3 Building Construction-I

Foundation: purpose, types of foundation- shallow, deep, pile, raft, grillage foundation.

Masonry: Brick Masonry: types of bonds, relative merits and demerits of English, Single Flemish and Double Flemish bond. Stone Masonry: General principles, classification of stone masonry and their relative merits and demerits. Cavity wall: components and construction

failures in buildings - Type of cracks in buildings, principal causes-moisture movement, thermal variations, elastic deformation, creep, chemical reaction.

Materials for sustainability: Energy conservation in buildings- use of recycled materials, regional materials and industrial waste products as means of sustainable development. Green Building Materials

Unit 4 Building Construction-II 12

Form work- Types of Form work, types of materials used in form work

Scaffoldings- Types of Scaffoldings, Scaffolding Erection & dismantling, Scaffolding Inspection

Fire protection in structures- Classification of fire, general causes of fire, detection of fire, methods for fire control, Analysis for structural components for fire resistance (wood, steel, concrete and masonry).

Unit 5 Building Construction-III 12

Plastering and Pointing: Different types of plasters and plastering process, defects in plastering.

Paints, Varnish and Distemper: Constituents, characteristics of good paints, bases, vehicles, thinners and coloring pigments. Painting of different types of surfaces varnish and its types, application. Distemper, dry and oil bound, and application of distemper.

Damp Proof Course-Causes of dampness, effects of dampness, methods of damp proofing

Prescribed Textbooks:

1. VN. Vazirani, and S.P. Chandola, Engineering Materials, Khanna Publishers 1993.
2. S.P. Arora and S.P. Bindra, Text book on Building Construction, Dhanpath Raj Publications, 1999

Reference Textbooks:

1. Kyriakos Komvopoulos, Mechanical Testing of Engineering Materials, Cognella, 2011.
2. E.N. Dowling, Mechanical Behaviour of Materials,Prentice Hall International, 2nd Edition, 1993.
3. Building materials by R.S.Rangwala,Charotar publications, 4th edition, 2019.
4. Sushil Kumar, Building Construction, Standard Publilshers 1992.
5. Gurucharan singh, Building materials and construction, Standard book house, 2023.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and the World	Ethics	Individual and collaborative teamwork	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24ACIV41T.1	2	-	-	-	-	2	2	-	-	-	2	2	2
24ACIV41T.2	2	-	-	-	-	2	2	-	-	-	2	2	2
24ACIV41T.3	3	-	-	-	-	3	2	-	-	-	2	2	2
24ACIV41T.4	3	-	-	-	-	3	2	-	-	-	2	2	2
24ACIV41T.5	3	-	-	-	-	3	2	-	-	-	2	2	2

1.	2.	3.	4.	5.
6.	7.	8.	9.	

Annexure-VI

Syllabus for the Annamacharya University Research Admission Test (AURAT) – 2025 for the Civil Engineering Department.

Engineering Mechanics: System of forces, Internal forces in structures, Friction and its applications, Centre of mass, free Vibrations of undamped SDOF system.

Solid Mechanics: Bending moment and shear force in statically determinate beams, Simple bending theory, buckling of column, combined and direct bending stresses.

Structural Analysis: Statically determinate and indeterminate structures by force/energy methods, Method of superposition, Analysis of trusses, arches, beams, cables and frames, Displacement methods, Slope deflection and moment distribution methods

Concrete Structures: Working stress and Limit state design concepts, Design of beams, slabs.

Steel Structures: Design of tension and compression members, plate girders.

Soil Mechanics: Three-phase system, index properties, Permeability, flow nets, Principle of effective stress and quicksand condition, Compaction of soils, One dimensional Consolidation, Shear Strength, Mohr's circle

Foundation Engineering: Sub-surface investigations, plate load test, standard penetration and cone penetration tests, Rankine Earth pressure theory, Stability of slopes, Boussinesq's theory, Deep foundations, Axial load capacity of piles, pile load test, pile group efficiency

Fluid Mechanics and Hydraulic Engineering: Properties of fluids, fluid statics, Continuity, energy and momentum equations, Flow in pipes, Uniform flow in channels, specific energy, critical flow, hydraulic jump, Turbines, Pumps

Water Resources Engineering: Hydrologic cycle, unit hydrograph, ground water, duty, delta,

Gravity Dams and Spillways, Lined and unlined canals, Design of weirs on permeable foundation, cross drainage structures.

Transportation Infrastructure: Geometric design of Highways, sight distances, horizontal and vertical alignments and Geometric design of Railway Track

Highway Pavements: Highway materials, Design of flexible and rigid pavements

Water and Waste Water Quality and Treatment: Water quality, Physical, chemical and biological parameters, Drinking water treatment, Water distribution system, Sewerage system design, primary and secondary treatment

Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, solid waste management

Geomatics Engineering: Principles of surveying, Levelling and trigonometric levelling, Traversing and triangulation survey; Total station, Photogrammetry and Remote Sensing

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

ANNAMACHARYA UNIVERSITY

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Rajampet, Annamayya District, A.P – 516126, INDIA

Annexure-VII (List of Examiners for Second-Year (III SEMESTER) Courses/Subjects)

	24ACIV31T- Strength of Materials	24ACIV32T- Surveying and Geomatics	24ACIV33T-Fluid Mechanics, Hydraulics and Hydraulic Machinery
Faculty name and Designation with Address	Dr. K Venkateswarlu Associate Professor RGM, Nandyal 9705543261 Venkateswar154@gmail.com	Mr. P. Praveen Kumar Assistant Professor Guru Nanak Institute of Technology, RR district,Hyderabad, 501506. 8500867768 ppraveenkumar.cegnit@gniindia.org	Dr. K V R Prasad Professor,Sir MVIT ,Off Kempegowda International Airport, Bengaluru 9448225772 prasadkvrp@gmail.com
	Dr. M V Ravi Kishore Reddy Associate Professor KSRMCE Cuddapah, 9032158604 ravikishorereddymv@yahoo.in	Mr. M. Chandrasekhar Assistant Professor MJR College of Engineering and Technology, Piler, Annamayya District 8247582387,9494643818 mchandrasekhar105@gmail.com	Dr. P. Sreenivas Kumar Associate Professor JNTUA, Anantapur, 8105031455 srinivaskumar.civil@jntua.ac.in
	Dr. D Chandra Mouli Associate Professor,Dr. YSR ANU College of Engineering & Technology, 9985060799 Cm4ssm@gmail.com	Mr. Nagamala Tharuni Assistant Professor Srinivasa Institute of Technology and Science, Kadapa 9398972011,Nagamalatharuni@gmail.com	Dr. A Anil Associate Professor A.I.T.S., Tirupati 9000434205 anilachyutha@gmail.com
	Dr. N Venkata Ramana Associate Professor University B.D.T College of Engineering (UBDTCE), Dawangere 9493495295 rcramana@gmail.com	Dr. B Raghunath Reddy Associate Professor Sai Rajeswari institute of technology, Lingapuram , Proddatur 8008110085 rnreddy.srit@gmail.com	Dr. B.J.S. Vara Prasad Professor G Pulla Reddy Engineering College,Kurnool 9866084636 drbjsvp.ce@gprec.ac.in drbjsvp@gmail.com
	Dr. Sreelatha Vuggumudi Associate Professor NBKR, Vakadu, Vidyanagar 9494750640 drvuggumudi@nbkrist.org	Mr. Y. Ravi Reddy Associate Professor Bapatla Engineering College, GBC Rd, Mahatmajipuram, Bapatla, Andhra Pradesh 9849165681ravireddy29@gmail.com	Mr. Anjan Kumar M U Assistant Professor, Bearys Institute of Technology ,Bearys Knowledge Campus Lands End,Innoli Near Mangaluru University, Mangaluru - 9591609877 anjankumarmu@gmail.com

1.	2.	3.	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	

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Rajampet, Annamayya District, A.P – 516126, INDIA

Annexure-VII (List of Examiners for Second-Year Courses/Subjects(IV-SEM))

	24ACIV41T-Building Materials and Construction	24ACIV42T-Concrete Technology	24ACIV44T-Structural Analysis	24ACIV43T-Engineering Geology
Faculty name and Designation with Address	Dr. Parvathidevi. A Associate Professor Marri Laxman Reddy Institute of Technology and Management, Hyderabad. 7386943996 deviproject1@gmail.com	Mrs. S.Jyothirmayee Assistant Professor (ADHOC) JNTUA College of Engineering Pulivendula 9492185954 jyothisirigireddy16.ce@jntua.ac.in	Dr. V Sai Neeraja Associate Professor and Hod CBIT(A), Proddatur 9640776309 saineeraja6@gmail.com	Miss. Sreeja Keerthipati Assistant Professor Narayana Engineering College, Nellore.8897236011 sreejakeerthipati792@gmail.com
	Mr. N. Madhava Reddy Assistant Professor (ADHOC) JNTUA College of Engineering Pulivendula,9963116433 nmmadhava136.ce@jntua.ac.in	Dr.V.Guru Prathap Reddy Assistant Professor Department of Civil Engineering, NIT Nagaland, Chumoukedima, Nagaland, 9966320098.gutuv@nitnagaland.ac.in	Dr P.Kishore Kumar Reddy Associate Professor Malla Reddy Engineering College and Management Sciences, Kistapur Medchal,Telangana 9705558182,pkkrnitc@gmail.com	Mrs. P. Sravani Assistant Professor Sree Dattha Institute of Engineering and Science, Ibrahimpatnam, Hyderabad. 9908418946,sravanivelisala1204@gmail.com
	Mr. K. Anil Assistant Professor Bapatla Engineering College, GBC Rd, Mahatmajipuram, Bapatla, Andhra Pradesh 522102 9912340589 anilkodimela@gmail.com	Dr. Y Sudharsan Reddy Associate Professor Sai Rajeswari institute of technology, Lingapuram,Proddatur 8886502038 yenugusudharshan@gmail.com	Dr.G.Chennakesava Reddy Associate Professor KSRMCE (A) Kadapa 9182477938 gadikota.chenna@gmail.com	Dr. G. Prabhakaran Professor Siddharth Institute of Engineering & Technology, Puttur.9092530217 gprabhadhana@gmail.com
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1.	2.	3. yonapeera	4.	5. Attended online
6. Attended online	7. Attended online	8. Attended online	9. Attended online	