COURSEFILE

Programme Name : Civil Engineering

Name of the Course : structural Engineering -I

Course Code: 23CE503

Semester and Year : III-I

Faculty Name : M.venkateswari

S.No.:	Contents	Included
1.	Vision, Mission, POs, PSOs, and PEOs	
2.	Academic Calendar	
3.	Syllabus	
4.	CO/PO/ PSO Mapping	
5.	Nominal Rolls of the Students	
6.	Time Table	
7.	Lesson Plan	
8.	Unit wise Question Bank	
9.	Old Question Papers	
10.	Question Papers(CIA&SEE)	
11.	Tutorial sheets	
12.	Details of slow and Advanced learners with analysis	
13.	Learning Methodologies: Experimental Learning (Industrial Visits, Internships, Mini Projects, Academic Projects, Guest Lectures. Student Workshopsetc..,),ProblemSolvingMethodologies(assignments,quiz,case study etc.) **Note:** **1. Atleast TWO learning Methodologies to be included in your course.** **2. The above methodologies for illustration, you may add more**	
14.	Subject Notes/PPTs/self study materials	
15.	Feedback on Curriculum Design and development	
16.	CO Attainment , Analysis and Action Taken Report	
17.	PO Attainment, Analysis and Action Taken Report	

Recommendation/Remarks

Signature of the faculty **Verified by HOD** **Dean Academics** **Principal**

1. Vision, Mission, POs, PSOs, and PEOs

Vision of the Institute

To produce competent professionals who can contribute to the industry, research and societal benefits with environment consciousness and ethical values.

Mission of the Institute

- Adapt continuous improvements in innovative teaching-learning practices and state-of-the-art infrastructure to transform students as competent professionals and entrepreneurs in multi-disciplinary fields.
- Develop an innovative ecosystem with strong involvement and participation of students and faculty members.
- Impart National development spirit among the students to utilize their knowledge and skills for societal benefits with ethical values.

Vision of the Department

To impart knowledge and excellence in Civil Engineering and technology with global perspectives to our students and to make them ethically strong engineers to Shape our nation.

Mission of the Department

- To make the department a Centre of excellence in the field of Civil Engineering and allied research.
- To provide knowledge base and consultancy services to the society in all areas of Civil Engineering.
- To promote innovative and Applied thinking amidst budding engineers to face the challenges of the future.

Course Outcomes (COs)

CO1	Compare and Design the singly reinforced, doubly reinforced and flanged sections.**[Creating]**
CO2	Design the axially loaded, uniaxial and biaxial bending columns.**[Creating]**
CO3	Classify the different types of footings **[Understanding]**
CO4	Design the isolated square, rectangular and circular footings**[Creating]**
CO5	Distinguish and Design the one-way and two-way slabs. **[Creating]**

PROGRAMME OUTCOMES (POs)

The following are the program out comes of Engineering Graduates

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

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO6:The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7)
PO7:Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO8:Individual and Collaborative Team work: Function effectivelyas an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9:Communication: Communicate effectively and inclusively with in the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11: Life-Long Learning: Recognize the need for and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

Programme Specific Outcomes (PSOs)

PSO1 Graduates of this program will be able to demonstrate that they can meet the needs of society in the design and execution of quality construction work that is in accordance with standards andtakesintoaccounthealthandsafetyconsiderationsaswellascultural,societal,and environmental considerations.

PSO2 After gaining knowledge of building analysis through the use of various software packages, the Graduates will be able to analyse and design both simple and complex engineering structures.

PSO3 Graduates will be able to work effectively as individuals or as part of teams, having acquiredskillsinleadership,research-basedthinking,andtheabilitytomanageprojectsin Environments requiring knowledge from multiple disciplines.

Programme Educational Objectives(PEOs)

PEO1 To produce students who can excel in civil engineering profession or higher education by Acquiring thorough knowledge in mathematical, computing and engineering concepts.

PEO2 To produce students who can apply their knowledge and skills to real life problems there by not only rendering safe and economical structures against natural calamities but also environmentally sustainable and useful to the society.

PEO3 Mould and groom students to exhibit professional attitude,ethical behavior,ability to Communicate effectively with every one and adapt to the latest developments and trends by engaging themselves in life-long learning.

PEO4 Graduates will have awareness of contemporary professional issues and support the engineering profession through participation in professional societies and/or educational institutions.

2. Academic Calendar

NARSIMHA REDDY ENGINEERING COLLEGE
UGC-AUTONOMOUS INSTITUTION
An Autonomous Institute
NAAC Accreditation 'A' Grade
Accredited by NBA
Approved by AICTE, Affiliated to JNTUH

ACADEMIC CALENDAR :: 2025-26
B.TECH III YEAR I & II SEMESTER

I SEM

S.No.	Description	Duration		Duration (Weeks)
		From	To	
1	Commencement of I Semester class work	**30.06.2025**		
2	1st Spell of Instructions	30.06.2025	30.08.2025	9
3	First Mid Term Examinations	01.09.2025	06.09.2025	1
4	2nd Spell of Instructions (Including Dussera Recess)	08.09.2025	15.11.2025	10
5	Second Mid Term Examinations	17.11.2025	22.11.2025	1
6	Preparation Holiday & Lab Examinations	24.11.2025	29.11.2025	1
7	End Semester Examinations	01.12.2025	13.12.2025	2

II SEM

S.No.	Description	Duration		Duration (Weeks)
		From	To	
1	Commencement of II Semester class work	**15.12.2025**		
2	1st Spell of Instructions	15.12.2025	21.02.2026	10
3	First Mid Term Examinations	23.02.2026	28.02.2026	1
4	2nd Spell of Instructions	02.03.2026	02.05.2026	9
5	Second Mid Term Examinations	04.05.2026	09.05.2026	1
6	Summer Vacation	11.05.2026	23.05.2026	2
7	Preparation Holiday & Lab Examinations	25.05.2026	30.05.2026	1
8	End Semester Examinations	01.06.2026	13.06.2026	2

Copy to:
1. Deans
2. IQAC
3. All HODs
4. Administrative Officer
5. Account officer
6. Web Portal I/C
7. ERP I/C
8. Library
9. Student Notice Boards

PRINCIPAL
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UGC AUTONOMOUS
Sy.No. 518, Maisammaguda (V), Dhulapally (P),
Medchal (M & Dist.), Hyderabad 500100, T.G

3. Syllabus

B.Tech III Year I Semester Syllabus

STRUCTURAL ENGINEERING–I(RCC)

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
23CE503	Professional core	3	0	0	3	40	60	100
Contact Classes:Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

Course Objectives : The objectives of the course are to

- **Identify** the basic components of any structural system and the standard loading for the RC structure.
- **Identify** and **tell** the various codal provisions given in IS.456.
- **Describe** the salient feature of limit state method, compare with other methods and the concepts of limit state of collapse and limit state of serviceability.
- **Evaluate** the behaviour of RC member under flexure, shear and compression, torsion and bond.

Course Out comes: After the complet in of the course student should be able to

- **Compare** and **Design** the singly reinforced, doubly reinforced and flanged sections.
- **Design** the axially loaded, uni axial and biaxial bending columns.
- **Classify** the footings and **Design** the isolated square, rectangular and circular footings
- **Distinguish** and **Design** the one-way and two-way slabs.

UNIT-I

Introduction- Structure –Components of structure-Different types of structures-Equilibrium and compatibility–Safety and Stability - Loads —Different types of Loads —Dead Load, Live Load, Earthquake Load and Wind Load–Forces–What is meant by Design?–Different types of materials– RCC,PSC and Steel–Planning of structural elements- Concepts of RCC Design–Different methods of Design- Working Stress Method and Limit State Method–Load combinations as per Limit state method-Materials-Characteristic Values — Partial safety factors—Behaviour and Properties of Concrete and Steel-Stress BlockParameters as per IS456-2000.

Limit state Analysis and design of sections in Flexure —Behaviour of RC section under flexure - Rectangular, T and L-sections, singly reinforced and doubly reinforced Beams — Detailing of reinforcement

UNIT–II

Design for Shear , Bond and Torsion – Mechanism of shear and bond failure-Design of shear using limit state concept—Design for Bond–Anchorage and Development length of bars-Design of sections for torsion - Detailing of reinforcement

UNIT- III

Design of Two-way slabs with different end conditions, one-way slab, and continuous slab Using IS Coefficients -Limit state design for serviceability for deflection, cracking and codal provisions.

UNIT–IV

Design of compression members - Short Column - Columns with axial loads, uni-axial and bi-axial bending—Use of design charts-Long column—Design of long columns-IS Code provisions.

UNIT–V

Design of foundation - Different types of footings —Design of flat isolated square, rectangular, combined footings for two columns.

TEXTBOOKS:

1. Limit state designe of reinforced concrete–P.C.Varghese,PHILearningPvt.Ltd.
2. Reinforced concrete design by S.UnnikrishnaPillai & Devdas Menon, TataMcGrawHill.
3. Reinforced concrete design by N.Krishna Raju and R.N.Pranesh,NewageInternational Publishers.

REFERENCEBOOKS:

1. Reinforced concrete structures, Vol. 1, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd.
2. FundamentalsofReinforcedconcretedesignbyM.L.Gambhir,PrenticeHallofIndiaPvt.Ltd.,
3. DesignofReinforcedConcreteStructuresbyN.Subramanian,OxfordUniversityPress
4. DesignofconcretestructuresbyJ.N.BandhyopadhyayPHILearningPrivateLimited.
5. DesignofReinforcedConcreteStructuresbyI.C.SyalandA.K.Goel,S.Chand&company.

4.CO/PO/PSO Mapping

Structural Engineering-I(23CE503): Course Outcomes

CO1	Compare and Design the singly reinforced, doubly reinforced and flanged sections.**[Creating]**
CO2	Design the axially loaded, uniaxial and biaxial bending columns.**[Creating]**
CO3	Classify the different types of footings **[Understanding]**
CO4	Design the isolated square, rectangular and circular footings**[Creating]**
CO5	Distinguish and Design the one-way and two-way slabs. **[Creating]**

CO-PO-PSO-MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	2	2	3	1	3	-	-	2	1	2	-	-	1	2
CO2	3	2	3	1	1	-	-	1	-	-	-	-	1	-
CO3	2	1	1	-	-	1	-	-	-	-	-	-	1	-
CO4	2	1	3	-	1	1	-	2	1	2	-	-	1	2
CO5	2	2	3	-	2	1	-	2	1	2	-	-	1	2

5.Nominal Rolls

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PROMOTION LIST (2025-2026) – III B.Tech, I Semester

CIVIL ENGINEERING

S.No	Roll Number	Full Name
1	23X01A0101	ANNELADEVI AJAY
2	23X01A0102	BHUKYA SHIVA
3	23X01A0103	GIRAGANI ABHINAV
4	23X01A0104	KANAKATLA AJAY
5	23X01A0105	MAJJARI GANESH BABU
6	23X01A0106	MASKURI PRAVEEN KUMAR
7	23X01A0107	PATHLAVATH RAMU
8	23X01A0108	VOGARI IZRAYEL
9	23X01A0109	VURE VIKAS VARDHAN
10	24X05A0101	BANDARI PRASHANTH
11	24X05A0102	BUDHE JYOTHSNA
12	24X05A0103	DASARI SAI SRUTHI
13	24X05A0104	EDLA ANAND VARDHAN
14	24X05A0105	EMMADOJU ASHRITHA
15	24X05A0106	GANTE GANESH
16	24X05A0107	GODISALA BHUMESH GOUD
17	24X05A0108	KAVALI SATWIKA
18	24X05A0109	KONYALA SRIRAM
19	24X05A0110	KONYALA VANI
20	24X05A0111	KOTHURI PRASHANTH
21	24X05A0112	MADHUNALA DINESH
22	24X05A0113	MEGAVATH PRAMEELA
23	24X05A0114	MEKALA LAXMI
24	24X05A0115	MOHAMMAD ABDUL MOID
25	24X05A0116	MYLAVARAPU SOWMYA
26	24X05A0117	NALKOTI VIJAY KUMAR
27	24X05A0118	NEELAM SHIVANI
28	24X05A0119	NEERADI BHAVANI
29	24X05A0120	NUTHI VYSHAVI
30	24X05A0121	PULLURI KARTHIK
31	24X05A0122	RENKA BHAVANI

S.No	Roll Number	Full Name
32	24X05A0123	SAGIRAJU SAKETHVARMA
33	24X05A0124	SUDHAABOINA SRAVANI

Note: As per the Academic Regulation of NR23 the students who got less credits than the stipulated credits for the promotion from II B.Tech to III B.Tech will be detained after announcement of Regular & Supplementary Results. Hence, all the Head's and students please make a note of it. **Detained list due to shortage of credit and revised Nominal Rolls will be circulated immediately after declaration of results.**

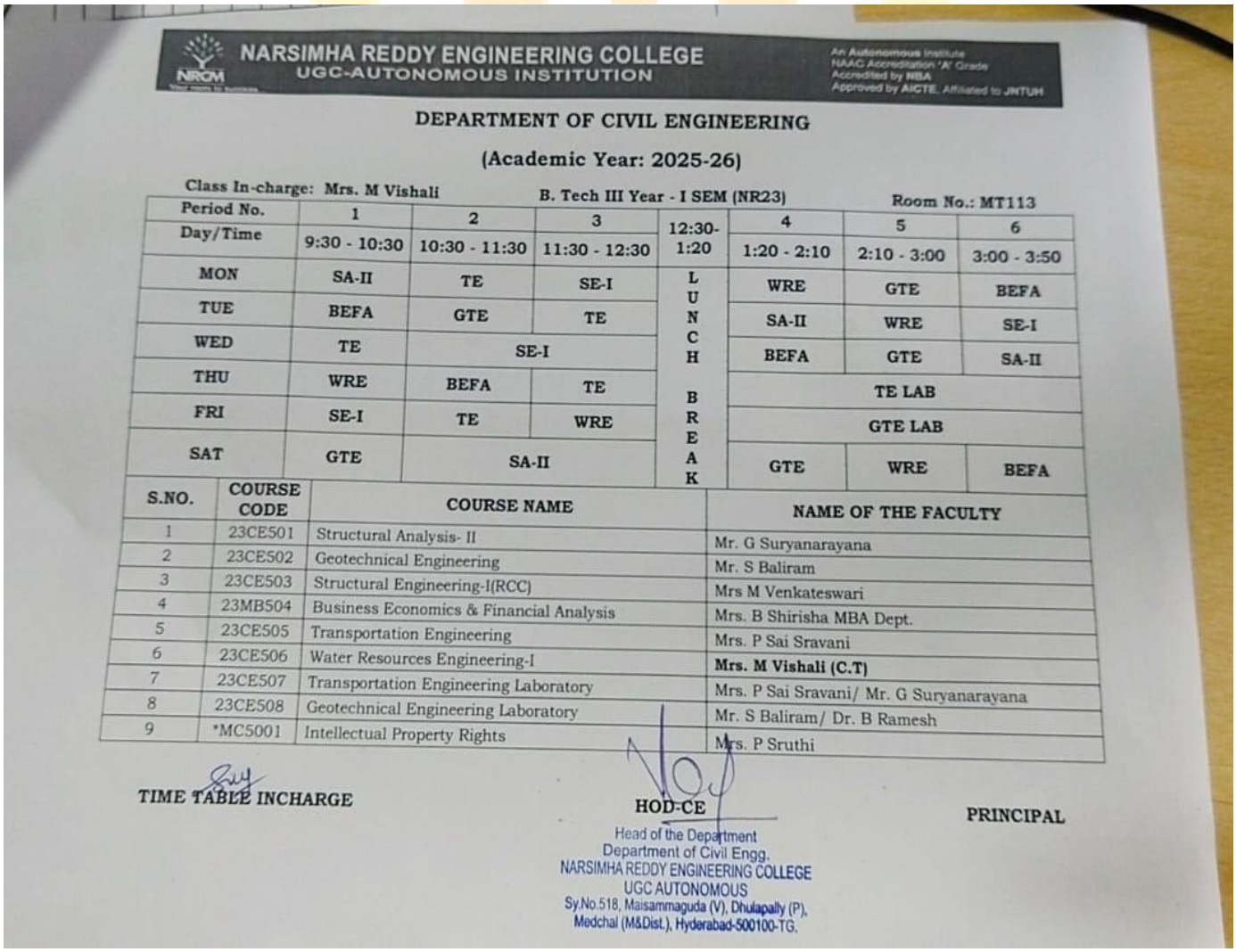
PRINCIPAL

PRINCIPAL

NARASIMHA REDDY ENGINEERING COLLEGE
UGC AUTONOMOUS
Survey No.518, Maisammaguda (V), Dhulapally (P)
Medchal (M), Medchal Dist., Hyderabad-500100

6.Time table

Class Time table



NARSIMHA REDDY ENGINEERING COLLEGE
UGC-AUTONOMOUS INSTITUTION

DEPARTMENT OF CIVIL ENGINEERING

(Academic Year: 2025-26)

Class In-charge: Mrs. M Vishali | B. Tech III Year - I SEM (NR23) | Room No.: MT113

Period No.	1	2	3	12:30-1:20	4	5	6
Day/Time	9:30 - 10:30	10:30 - 11:30	11:30 - 12:30		1:20 - 2:10	2:10 - 3:00	3:00 - 3:50
MON	SA-II	TE	SE-I	LUNCH BREAK	WRE	GTE	BEFA
TUE	BEFA	GTE	TE		SA-II	WRE	SE-I
WED	TE	SE-I			BEFA	GTE	SA-II
THU	WRE	BEFA	TE		TE LAB		
FRI	SE-I	TE	WRE		GTE LAB		
SAT	GTE	SA-II			GTE	WRE	BEFA

S.NO.	COURSE CODE	COURSE NAME	NAME OF THE FACULTY
1	23CE501	Structural Analysis- II	Mr. G Suryanarayana
2	23CE502	Geotechnical Engineering	Mr. S Baliram
3	23CE503	Structural Engineering-I(RCC)	Mrs M Venkateswari
4	23MB504	Business Economics & Financial Analysis	Mrs. B Shirisha MBA Dept.
5	23CE505	Transportation Engineering	Mrs. P Sai Sravani
6	23CE506	Water Resources Engineering-I	**Mrs. M Vishali (C.T)**
7	23CE507	Transportation Engineering Laboratory	Mrs. P Sai Sravani/ Mr. G Suryanarayana
8	23CE508	Geotechnical Engineering Laboratory	Mr. S Baliram/ Dr. B Ramesh
9	*MC5001	Intellectual Property Rights	Mrs. P Sruthi

TIME TABLE INCHARGE

HOD-CE
Head of the Department
Department of Civil Engg.
NARSIMHA REDDY ENGINEERING COLLEGE
UGC AUTONOMOUS
Sy.No.518, Maisammaguda (V), Dhulapally (P),
Medchal (M&Dist.), Hyderabad-500100-TG.

PRINCIPAL

INDIVIDUAL TIMETABLE

Faculty Name: M. Venkateswari

Day/Time	1 09:30 10:30	2 10:30 11:30	3 11:30 12:30	4 01:20 02:10	5 02:10 03:00	6 03:00 03:50
Monday			SE-1			
Tuesday						SE-1
Wednesday		SE-1				
Thursday						
Friday	SE-1					
Saturday						

7 .LESSON PLAN

Branch: CIVIL Year: III Semester: I Section A Academic Year: 2025-2026

Subject: STRUCTURAL ENGINEERING – I (23CE503) Sub Code : 23CE503

Name of the faculty : M.VENKATESWARI

Lecture No.	Date (As per Academic calendar)	Topics to be covered	Actual Date of completion	Remarks
1.	30-06-2025	**I- UNIT** : Introduction of Structure - Components of structure		
2.	1-7-25	- Different types of Structures		
3.	2-7-25	Equilibrium and Compatibility – Safety and Stability		
4.	4-7-25	Loads – Different types of Loads – Dead Load, Live Load, Earthquake Load and Wind Load		
5.	7-7-25	Forces & Difference b/w Analysis 7 Design, Different types of materials –RCC, PSC and Steel		
6.	8-7-25	Planning of Structural elements- Concepts of RCC Design – Different methods of Design		
7.	9-7-25	Working Stress Method and Limit State Method – Load combinations as per Limit state method		
8.	11-7-25	Materials - Characteristic Values – Partial Safety Factors		
9.	14-7-25	Behaviour and Properties of Concrete and Steel		
10.	16-7-25	Stress Block Parameters as per IS 456 -2000. Limit state Analysis and design of sections in Flexure		
11.	18-7-25	Behaviour of RC section under flexure		
12.	21-7-25	Type of Rectangular, T and L-sections		
13.	22-7-25	Design procedure of Singly reinforced and Doubly reinforced Beams		
14.	23-7-25	Design of Singly reinforced beam with Detailing of reinforcement. (Problems)		
15.	25-7-25	Design of Doubly reinforced beam with Detailing of reinforcement. (Problems)		
16.	28-7-25	UNIT-II **Design for Shear , Bond and Torsion** –		
17.	29-7-25	Mechanism of shear and bond failure		

18.	30-7-25	Mechanism of shear and bond failure		
19.	1-8-25	Design of shear using limit state concept		
20.	4-8-25	Design for Bond–Anchorage		
21.	5-8-25	Design for Bond–Anchorage		
22.	5-8-25	Design of sections for torsion		
23	11-8-25	Detailing of reinforcement		
24	12-8-25	Detailing of reinforcement		
25	13-8-25	Development length of bars		
26	13-8-25	Development length of bars		
27	18-8-25	**UNIT -3** , Introductions of Codal Provisions of Slabs- One Way & Two Way Slabs		
28	19-8-25	Design procedure of One way slab		
29.	20-8-25	Design of one way slab with Reinforcement Detailing (Problems)		
30.	20-8-25	Design procedure of Two way slab with End Conditions of 1. Slabs with Ends Held Down. 2. Slabs with Ends Not Held Down		
31.	22-8-25	Design of Two way slab with ends held down & its Reinforcement Detailing (Problems)		
32.	25-8-25	Design of Two way slab with Ends Not Held Down & its Reinforcement Detailing (Problems)		
33.	26-8-25	Design procedure of Continuous Slab using I.S Coefficients		
34.	26-8-25	Design procedure of Continuous Slab (problems)		
35.	29-8-25	Design of Dog-Legged Staircase		
36.	8-9-25	Limit state design for Serviceability for Deflection, Cracking and Codal provisions		
37.	10-9-25	Design of Two way slab with ends held down & its Reinforcement Detailing (Problems)		
38.	11-9-25	**UNIT – 4** , Introduction of COLUMns & its Types based on different aspects		
39.	12-9-25	I.S Code provisions of columns- Long & Short Columns		
40.	15-9-25	Design procedure of Compression Members		
41.	15-9-25	Design procedure of Short Columns with Axial Loads, Uni-Axial and Bi-Axial Bending with Reinforcement Detailing		
42.	17-9-25	Design procedure of Short Columns with axial loads		
43.	18-9-25	Design procedure of Short Columns with bi-axial bending		
44.	19-9-25	Design Of Columns By Using Of Charts		
45.	3-10-25	Design of procedure of Long Columns		
46.	11-9-25	Design Of Long Columns with Reinforcement Detailing		

47.	11-9-25	Design procedure of Short Columns with bi-axial bending		
48.	8-10-25	**UNIT – 5** , Introduction of Foundation & its Types based on different aspects		
49.	8-10-25	I.S Code provisions of Footings		
50.	10-10-25	Design procedure of foundation		
51.	13-10-25	Design of Wall Footing (Problems)		
52.	14-10-25	Design procedure of Flat Isolated Square		
53.	14-10-25	Design of Flat Isolated Square (Problems)		
54.	16-10-25	Introduction of Foundation & its Types based on different aspects		
55.	17-10-25	Introduction of Foundation & its Types based on different aspects		
56	21-10-25	I.S Code provisions of Footings		
57	24-10-25	I.S Code provisions of Footings		
58	27-10-25	revision		

Course Instructor **Head of the Dept.** **Principal**

8. Unit Wise Question Bank

UNIT-I

1. Find the moment of Resistance of T beam having the following data
   B_f=780mm, d=400mm, b_w=240mm, A_{st}=6-16mm dia mild steel, D_f=150mm, use M20 concrete.

2. A concrete beam has 230mm breadth and 500mm effective depth. Design the beam if it is subjected to a super imposed bending moment of 250kNm. Use M20 and Fe 500.

3. A beam section 300mm wide and 500mm deep is reinforced with a tension reinforcement of 2800mm^2 at an effective cover of 300mm. Determine the ultimate moment of resistance of beam section. Use M20 concrete and Fe 415.

4. Find the moment of resistance of a T beam having the following data B_f=800mm, d=400mm, b_w=200mm, A_{st}=3800mm^2, D_f=100mm, use M20 and Fe 415.

5. Design a balanced singly reinforced concrete beam section for an applied moment of 60kNm. The width of the beam is limited to 200mm. use M25and Fe415 bars.

6. What are the advantages of T beam, Explain in brief?

7. Derive the Stress block parameters of reinforced concrete in limit state design.

8. Design a Reinforced concrete slab to carry a live load of 5kN/m2 on an effective span of 4m. Use M20 grade concrete and Fe415 grade steel Reinforcement. Sketch the Reinforcement details.

9. A R.C.C. beam is simply supported beam on two masonry walls of 230mm thick which are 6m apart (centre-to-centre). The beam is carrying an imposed load of 20kN/m. Design the beam with all necessary checks (Check for Shear and check for Deflection). Use M20 Concrete and Fe500 Steel.

10. A beam section 350mm wide and 550mm deep is reinforced with a tension reinforcement of 3000mm^2 at an effective cover of 300mm. Determine the ultimate moment of resistance of beam section. Use M20 concrete and Fe 500.

11. Find the moment of resistance of a T beam having the following data B_f=750mm, d=300mm, b_w=230mm, A_{st}=4000mm^2, D_f=100mm, use M20 and Fe 415.

12. Design a balanced singly reinforced concrete beam section for an applied moment of 56kNm. The width of the beam is limited to 150mm. use M15 and Fe250 bars.

UNIT-II

13. Design a rectangular Cantilever Rc beam over a clear span of 6m, if the superimposed load is 12kN/m and the support width is 230mm. use M20 grade concrete and Fe 415 grade steel. The beam is to have width of 300mm. design the shear reinforcement and check for deflection.

14. .Find the M.R of a singly Reinforced Concrete Beam of 350mm width and 550mm effective depth, reinforced with 4 bars of 20mm dia of Fe 415 grade steel, use M20 grade concrete.

15. An RCC beam of 230mm wide and 450mm deep is reinforced with 4 bars of 16mm dia and Fe415 grade steel on tension side. If design shear force value is 60kN. Design the shear reinforcement consisting only vertical bars, use M20.

16. A rectangular beam of width 250mm & effective depth is 460mm, The beam carries a tensile Reinforcement of 4 numbers of 16mm dia and 2 numbers of 12mm dia in compression steel with an effective cover of 30mm on both sides. The effective span of the beam is 5.25m with simply supported ends, use M20 grade and Fe 415 grade steel.

17. Calculate the area of reinforcement required for a simply supported reinforced concrete beam 230mm wide and 400mm effective depth to resist on ultimate moment of 60KNm. Use M20, Fe415

UNIT-III

18. Determine the reinforcement for a column of a braced frame for the following data, size 400 mm x 600 mm, u= 2000 KN, M_{ux} = 160 KN, M_{uy} = 120 KNM, unsupported length = 4m.E.C= 60 mm, M_{20}, Fe415 used

19. Design a short column square in section to carry an axial load of 2000 KN using M 20 grade concrete and Fe415 steel. Take load factor as 1.5.

20. Determine the rfm for a column of a braced frame for the following data, size 400 mm x 600 mm, u= 2000 KN, M_{ux} = 160 KN, M_{uy} = 120 KNM, unsupported length = 4m. E.C = 60 mm, M_{20}, Fe415 used

21. Design a short column square in section to carry an axial load of 2000 KN using M 20 grade concrete and Fe415 steel. Take load factor as 1.5.

22. A short column 300x300mm is reinforced with 5 numbers of 20mm dia. Find the axial factored load that the column can carry, use M25 and Fe250 grade steel.

UNIT-IV

23. Design a two way slab for a room 5.5 x 4m clear in size if the super imposed load is 7 KN/M^2. Use M20, Fe415, Corners not held down

24. Design a simply supported RC slab for room of clear size 3.5mx4.5m superimposed load is 2.5KN/sq. m and weight of finishes is 1.0 KN/sq. m. The corners of the slab are not held down . Use M-20 concrete and Fe-415 steel.

25. Design a Reinforced concrete slab to carry a live load of 3kN/m2 on an effective span of 3.5m. Use M20 grade concrete and Fe415 grade steel Reinforcement. Sketch the Reinforcement details.

26. Design a slab for a classroom 3x4.5m to carry a live load of 3.5kN/m2 and a floor finish of 1kN/m2. The slab is discontinuous over all the four sides. The corners of the slab are free to lift, take wall thickness as 230mmand use M20 and Fe415 grade steel.

27. Design a simply supported roof slab for a room 7.5mx3.5m clear in size. The slab is carrying an imposed load of 10kN/m^2. Use M25 Concrete and Fe415 Steel

UNIT-V

28. Design a square footing of uniform thickness for a reinforced concrete column 500x500mm carrying an axial load of 500 KN. The safe bearing capacity of soil is 125KN/m2. Use M20 grade concrete and Fe 415 steel. Check for on way and two way shear

29. Design a reinforced Concrete footing of uniform thickness for a reinforced concrete column of 500mmx500mm size carrying an axial load of 1500kN using M25 grade of concrete and Fe415 grade of steel. The SBC of soil is 220kN/m2 .

30. Design a footing of uniform thickness for a reinforced concrete column of 250mmx400mm size carrying an axial load of 1200kN using M20 and Fe415 grade steel. The SBC of soil is 180kN/m2.

31. Design a footing of uniform thickness for a reinforced concrete column of 400mmx600mm size carrying an axial load of 1000kN using M25 and Fe500 grade steel. The SBC of soil is 200kN/m2.

32. Design a square footing of uniform thickness for a reinforced concrete column 400x400mm carrying an axial load of 450 KN. The safe bearing capacity of soil is 120KN/m2. Use M20 grade concrete and Fe 500 steel. Check for on way and two way shear.

9. Previous Year Question Papers

R13

Code No: 115AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2017
REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING
(Common to CE, CEE)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A
(25 Marks)

1.a) Explain about the different Limit states. [2]
b) Distinguish between Working stress and limit state method of design of RCC structures. [3]
c) Write about local bond and anchorage length. [2]
d) Explain how the shear reinforcement improves the strength of beam? [3]
e) State the differences between one way slab and two way slab. [2]
f) Write the code provisions for minimum reinforcement to be provided as primary and secondary reinforcement in R. C. slab. [3]
g) Differentiate between long and short column. [2]
h) Describe about the function of lateral ties in a RC column. [3]
i) Define punching shear. [2]
j) Write any two situations in which combined footings are preferred to isolated footings. [3]

PART - B
(50 Marks)

2.a) Describe briefly about under-reinforced, balanced and over-reinforced sections.
b) What do you mean by uncracked and cracked sections and how will you determine the moment of resistance of these section? [5+5]

OR

3. Design the reinforcement for a T-beam for the following data:

Effective span	:	9 m: Ends simply supported.
Spacing of beams	:	3.5 m centre to centre.
Thickness of slab	:	125 mm
Width of web	:	230 mm
Total depth	:	450 mm
Live load on the floor	:	5 kN/m^2
Floor finish load	:	1 kN/m^2

The beam also supports a partition wall which transmits a load of 14 kN/m run.
Use M 20 concrete and Fe 500 steel.
Draw a suitable scale: The cross section and the longitudinal section of the beam. [10]

4. A simply supported beam is 8m in span and carries a characteristic load of 50kN/m. If six numbers of 20 mm diameter bars are provided at the mid span and four numbers of these bars are continuous into the supports, check the development length at the supports. Adopt M 20 grade concrete and Fe 415 grade steel. [10]

OR

5. A beam of rectangular section 300 mm width and 450 mm effective depth is subjected to factored moment of 150 kN-m, factored shear force of 45 kN and factored twisting moment of 30kN-m. Determine the area of reinforcement to resist the above forces. Use M25 grade concrete and Fe 415 grade steel. [10]

6.a) Discuss the three basic methods using factor of safety to achieve safe workable structures?

b) Sketch edge and middle strips of a two way slab. [5+5]

OR

7. Design a R.C. slab for a room measuring 6 m × 8 m size. The slab is simply supported on all the four edges with corners held down, and carries a super-imposed load of 3.5 kN/m^2, inclusive of floor finishes. Use M 20 mix and Fe 415 steel. Draw the top plan and bottom plan of the designed slab. [10]

8. Design a reinforced concrete column, 400 mm square, to carry an ultimate load of 1500 kN at an eccentricity of 160 mm. Use M 20 grade concrete and Fe 415 grade steel. [10]

OR

9. Design a slender braced circular column under uni-axial bending with the following data:
Size of column: 300 × 300 mm
Concrete grade: M 20 and Steel grade: Fe 415
Effective length: 5 m and Unsupported length: 6 m
Factored load: 1000 kN ,Factored moment: 50 kN-m at top, 30 kN-m at bottom.
The column is bent in single curvature. [10]

10. Design the footing for a reinforced concrete column 230 × 450 mm carrying an axial load of 1100 KN. The bearing capacity of the soil is 110 KN/m^2. Use M 20 concrete and Fe 415 steel. [10]

OR

11. Draw the shear force and bending moment diagrams and design the 20 mm diameter bars as top steel for maximum hogging moment for a RC rectangular combined footing using the following data:
Centre to centre distance between the columns is 5m. Each column is square in shape with 450 mm side. Each column carries an axial load at service state = 1200kN. The projection of footing parallel to the length beyond the axis of each column is 1.2m. The limiting bearing capacity of soil is 300kN/m^2.Use M25 grade and Fe 415 steel bars. [10]

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R13

Code No: 115AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, November/December - 2016

REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING

(Common to CE, CEE)

Time: 3 hours Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) What are the assumptions made in the working stress method of design? [2]
b) Explain the salient features of under-reinforced, balanced and over-reinforced sections. [3]
c) What are the different methods of strengthening the RC section to resist shear force? [2]
d) Explain the factors influencing the crack-width in flexural member. [3]
e) Distinguish between the behavior of one-way and two-way slabs. [2]
f) Explain the necessity of corner reinforcement in two-way slabs. [3]
g) Explain the functions of transverse reinforcement in a RC column. [2]
h) Define slenderness ratio of a column and what are its implications? [3]
i) What is the purpose of providing a footing for any structure? [2]
j) Explain the load transfer mechanism in a two-column combined footing. [3]

PART - B

(50 Marks)

2. Design a doubly reinforced concrete simply supported rectangular beam of span 6 m and cross-section 300 mm × 600 mm (Over all depth). The beam is to carry a factored imposed load of 120 kN/m. Use M25 grade of concrete and Fe415 steel. [10]

OR

3. Determine the moment of resistance of a T-beam section with an effective flange width of 1100 mm, width of rib 230 mm and overall depth of the T-beam is 550 mm. The thickness of the slab is 125 mm. The beam is reinforced with 4 bars of 25 mm diameter on tension side. Use M20 grade of concrete and Fe415 steel. [10]

4. Design the reinforcement of a beam section 300 mm × 600 mm subjected to an ultimate twisting moment of 120 kNm and an ultimate shear force of 80 kN. Use M 20 concrete and Fe 415 steel. Sketch the reinforcement details. [10]

OR

5. A simply supported RC beam of effective span 5 m has cross-section 230 mm × 450 mm (overall depth) is reinforced with 3 bars of 20 mm diameter on tension and 2 bars of 12 mm diameter on compression side. The beam is subjected to an imposed working load of 15 kN/m. Determine the short term deflection and long term deflection. Adopt M 20 grade concrete and Fe 415 steel. [10]

6. Design a simply supported RCC slab for a room of clear dimensions 4.2 m × 6.0 m subjected to live load of 3 kN/m^2 and floor finish of 1 kN/m^2. Assume the width of supports is 300 mm. Use M 20 concrete and Fe 415 steel. Draw the reinforcement detailing. [10]

OR

7. Design a continuous reinforced concrete roof slab for a room of 5 m × 14 m. The thickness of the roof is 125 mm and supported by RCC beams of 230 mm wide spaced at 3.5 m c/c. The slab is to carry an imposed load of 3 kN/m^2 and floor finish of 1 kN/m^2. Use M 20 concrete and Fe 415 steel. Also draw the reinforcement detailing. [10]

8. Design an RC column of height 3.6 m and cross-section 400 mm × 400 mm located at the corner of a multi-storied building to support an axial load of 2250 kN together with moments 60 kNm and 45 kNm acting in two perpendicular planes. Use M 25 concrete and Fe 415 steel. [10]

OR

9. Design the reinforcement for a rectangular column 450 mm × 500 mm and effective length 6.6 m, using the following data:
Factored axial load: 1500 kN.
Factored moment about major axis is 60 kNm at top and 45 kNm at bottom
Factored moment about minor axis is 45 kNm at top and 30 kNm at bottom
The column is restrained against sway. Use M 25 concrete and Fe 415 steel. [10]

10. Design an RC square footing for a column of size 400 mm × 400 mm subjected to an axial factored load of 1800 kN. The safe bearing capacity of soil is 200 kN/m^2. Use M 25 concrete and Fe 415 steel. [10]

OR

11. A staircase room has clear dimensions 4 m × 2.5 m and the height between the floors is 3.3 m. Design a suitable dog-legged stair case with mid-landing. Use M 20 grade concrete and Fe 415 steel. Draw the reinforcement detailing in one of the flights. [10]

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10.Question Papers(CIA&SEE)

MID-I EXAMINATION QUESTIONS

ANSWER ANY TWO QUESTIONS 2*5=10M

S.no	Questions	Marks	CO	Blooms level
1	What is stress block diagram as per limit state method? Describe the stress block diagrams parameters	2.5	CO1	L2
	Find the ultimate moment of resistance of singly reinforced rectangular beam 230X500mm reinforced with 5 bars of 20 mm dia with an effective cover of 50mm. use M20 grade concrete and Fe 415 steel.	2.5	CO1	L3
2	Design a rectangular reinforced concrete beam for a clear span of 4000mm. The super imposed load is 35KN/m and the size of the beam is limited to 250X400mm. use M20 and Fe 415 steel. Support width is 300mm each and effective cover is 40mm.	5	CO2	L6
3	A Single reinforced rectangular beam 300 X 600 mm effective depth carries a uniformly distributed load of 40 KN/m including self weight over a simply supported span of 6m and is reinforced with 5 bars of 25mm dia of which 2 bars are cranked up near the support. Use M20 grade concrete and Fe 415 steel. Design the beam for shear reinforcement at support.	5	CO2	L6
4	a) Write the different types of columns	2.5	CO3	L4
	b) A short column 400X400mm is reinforced with 4 numbers of 25 mm dia. Find the axis factored load that the column can carry. The materials are M20 grade concrete and HYSD reinforcement of Fe 415.	2.5	CO3	L6

MID-II EXAMINATION QUESTIONS

ANSWER ANY TWO QUESTIONS 2*5=10M

S.no	Questions	Marks	CO	Blooms level
1	Design a circular column of diameter 350mm, 2.5m long subjected to a working load pf 1300 KN. The column is effectively held in position and direction at both the ends. Use M20 grade concrete and Fe 415 steel.	5	CO3	L6
2	Design a square footing of uniform thickness for a reinforced concrete circular column of diameter 400mm carrying an axial load of 1000 KN. The safe bearing capacity of soil is 200 KN	5	CO4	L6
3	Design the floor slab for a hall 4 x 5 m to carry a live load of 3 KN and floor finish of 1 KN. The slab is continuous over two adjacent walls of the hall. Walls are 300 mm wide. Use concrete of grade M20 and steel of Fe 415.	5	CO4	L6
4	Design a dog legged staircase between two intermediate R.C floors of a multi-stored building using concrete grade M20 and Fe 415 steel. The vertical height between two floors is 3.3m. The clear size of staircase room is 4.6 x 2.5 m. Live load on stairs is 3 KN. width of supporting walls is 230 mm the flight slab and landing slab span longitudinally. Weight of concrete steps may be taken as 25KN.	5	CO5	L6

11. TUTORIAL SHEETS

ASSIGNMENT QUESTIONS-I

1. Determine the moment of resistance of the beam having dimension as 250x500 (Effective). The beam is reinforced with 2400 mm2 of steel in the tension zone. Use M25 concrete and Fe 500 steel.

2. A singly reinforced RCC beam is subjected to a moment of 200 kNm. Design the beam using M20 concrete and Fe415 steel.
3. Design a singly reinforced beam of width 230mm simply supported over a clear span of 3.5m. The width of the support is 230mm and it carries a live load of 22KN/m. use M20 and Fe415 grades.

4. Draw the stress block parameters of a singly reinforced section and explain is elements.
5. . Find the factored moment of resistance of an RCC beam 300x550 mm (Effective). The beam is reinforced with 4-20 mm diameter bars in the tension zone. 2-16 mm diameter bars are placed at a distance of 40 mm from top in the compression zone. Use M20 concrete and Fe 415 steel

6. 2. A rectangular beam of width 250mm & effective depth is 420mm, the beam carries a tensile Reinforcement of 4 numbers of 20mm dia and 2 numbers of 16mm dia in compression steel with an effective cover of 30mm on both sides. The effective span of the beam is 6m with simply supported ends, use M25 grade and Fe 415 grade steel.

7. 3. Calculate the area of reinforcement required for a simply supported reinforced concrete beam 230mm wide and 400mm effective depth to resist on ultimate moment of 50KNm. Use M20, Fe415.

8. 4. An RCC beam of 230mm wide and 450mm deep is reinforced with 4 bars of 16mm dia and Fe415 grade steel on tension side. If design shear force value is 100 kN. Design the shear reinforcement consisting only vertical bars, use M20.

9. Design a circular column to carry an axial load of 1000KN, using lateral ties. Use M20 grade concrete and Fe415 steel.
10. Design a Short column square in section to carry an axial load of 800KN, using lateral ties. Use M20 grade concrete and Fe415 steel.

ASSIGNMENT QUESTIONS-II

1. Design a short reinforced concrete rectangular column with one side as 230mm to carry an axial load of 2000KN.Use M30 concrete and Fe415 steel.

2. Design a square column of size 500 x 500 mm2 carrying an axial factored load of 2000 kN and factored moment of Mux & Muy of 120 kN-m and 160 kN-m. Assume that the moment due to minimum eccentricities are less than the applied moment. Use M20 and Fe415 steel.

3. A short square column of size 400 x 400 mm2 , is subjected to an axial factored load of 2000 kN and a factored moment of 150 kN-m. Determine the reinforcement in the column if the moment due to minimum eccentricity is less than the applied moment. M20 and Fe415 grade are used.

4. Design a slab over a room of internal dimensions 7m x 3 m , supported on 230 mm thick wall. Considering a live and floor finishing loads as 2 and 0.5 kN/m2 . Use M20 and FE415 grades of concrete and steel.

5. Design a slab for a room 4000mmx3500mm clear in size, if the superimposed load is $3KN/m^2$ and floor finish of $1KN/m^2$ .the edges of the slab are simply supported and corners are not held down. Use M20 grade concrete and Fe415 steel.

6. The floor slab of a class room is 3mx 5m is discontinuous on all its four sides. The corners of the slab are prevented from lifting .50mm thick floor finish of unit weight $20kN/m^3$ is to be provided over the slab .Live load on the slab is $3KN/m^2$,width of the support is 250mm. Design the slab using M20 grade concrete and Fe415 steel. Design the torsion reinforcement also.

7. A rectangular simply supported beam of span 5m is 300mm x650mm in cross section and it is reinforced with 3 bars of 20mm diameter on tension side with an effective cover of 50mm .Determine the short term deflection, imposed load is 20KN/m .Assume M20 and Fe415 steel.

8. Design a doglegged staircase for a building in which the height of floor is 3.3m. Adopt rise and tread of each step are 150mm and 225mm respectively. The stair hall is 2.5m x4.5m .Live load may be taken as $3KN/m^2$ .Use M20 and Fe415 grades .Assume the stairs are supported on 230mm walls at the ends of the outer edges of landing slabs.

9. A reinforced column of size 300mmx500mm carries a load of 1800KN.The safe bearing capacity of soil is $220KN/m^2$ .Design an isolated footing with uniform thickness. Use M25 and Fe 500 Grades.

10. The floor slab of a class room is 3mx 5m is discontinuous on all its four sides. The corners of the slab are prevented from lifting .50mm thick floor finish of unit weight $20kN/m^3$ is to be provided over the slab .Live load on the slab is $3KN/m^2$,width of the support is 250mm. Design the slab using M20 grade concrete and Fe415 steel. Design the torsion reinforcement also.

14.Details of Slow Advanced learners with analysis

List of Slow Learners

S No.	Roll No.	Nameof the Student
1		
2		
3		
4		
5		

List of Advanced Learners

S No.	Roll No.	Name of the Student
1		
2		
3		
4		
5		

12. Subject Notes / PPTs /self-study materials