# DESIGN OF CONCRETE STRUCTURES-I(GR18A3003)

III-B.Tech – I Semester

(AY 2021-22)

**Dr. T. SRINIVAS / Mr. K. VEERA BABU**

**Professor /Assistant Professor**


**Department of Civil Engineering**

**Gokaraju Rangaraju Institute of Engineering and Technology**

**Bachupally, Kukatpally, Hyderabad – 500 090.**

# Gokaraju Rangaraju Institute of Engineering and Technology
## Department of Civil Engineering

## Design of Concrete Structures - I

## Course File Check List

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**GOKARAJU RANGARAJU**

**INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**Department of Civil Engineering**

**DESIGN OF CONCRETE STRUCTURES-I**

**Course Code: GR18A3003** **L T P C**

**III Year I Semester** **3 0 0 3**

**UNIT I**

**Concepts of R.C Design**: Study of the strength, behaviour, and design of indeterminate reinforced concrete structures. Loads and stresses, load combinations. Working stress method and limit state approach as per IS-456-2000.

**UNIT II**

**Analysis and Design of Beams**: Analysis and design of rectangular and T-sections using limit state method. Beams with reinforcement in compression. Design for shear, torsion and bond using limit stateconcept. Mechanism of shear and bond failure. Development length of bars; I.S. code provisions- design examples in simply supported and continuous beams with detailing.

**UNIT III**

**Design of Slabs**: Design of two-way slab and one way slab using I S coefficients. Placement of reinforcement in slabs. Design of flat slab – direct method

**Design of Stair case and Canopy:** Design of staircase and canopy (portico).

**UNIT IV**

**Design of Columns**: Design of Short columns, columns with uni-axial and bi-axial bending. Design of long columns, use of design charts- I S code provisions.

**UNIT V**

**Design of Foundation**: Wall footing, Isolated and combined footing for columns. Limit state design of serviceability for deflection, cracking and codal provisions

**TEXT/REFERENCE BOOKS:**

1. Fundamentals of reinforced concrete design by M.L. Gambhir, Prentice Hall ofIndia Private Ltd.,New Delhi.
2. Reinforced concrete structural elements-behaviour, analysis and design by Purushotam, Tata Mc.Graw Hill, New Delhi.
3. Limit State design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jai, Laxmi publication Pvt.Ltd., New Delhi.

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

**Department of Civil Engineering**

**TIME TABLE**

**COURSE: Design of Concrete Structures - I**

**III YEAR I SEM** **w.e.f: 01-09-2021**

**III B.TECH(GR18) – I SEMESTER** **AY: 2021-22.** **SEC : A &B**

| Day/Hour | 9:00 - 9:55 | 9:55 - 10:50 | 10:50 - 11:45 | 11:45-12:25 | 12:45 - 1:15 | 1:15 - 2:05 | 2:05-2:55 |
|---|---|---|---|---|---|---|---|
| **MON** | | | DCS-I(B) | **LUNCH BREAK** | | | |
| **TUE** | | | | | | | |
| **WED** | | | | | DCS-I(A) DCS-I(B) | DCS-I(A) | |
| **THU** | | DCS-I(B) | DCS-I(A) DCS-I(B) | | | | |
| **FRI** | | | | | | | |
| **SAT** | DCS-I(A) | | | | | | |

Signature of HOD

Date:

Signature of faculty

Date:

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## Programme Educational Objectives (PEO's)

1. Graduates of the programme will be successful career in technical and professional career.
2. Graduates of the programme will have proficiency in solving real time Civil Engineering projects.
3. Graduates of the programme will continue to engage in lifelong learning with ethical and social responsibility.

## Program Outcomes (PO's)

Graduates of the Civil Engineering programme will be able to

a. apply knowledge of mathematics, science and fundamentals of Civil Engineering.
b. analyse problem and interpret the data.
c. design a system component, or process to meet desired needs in Civil Engineering within realistic constraints.
d. identify, formulate, analyse and interpret data to solve Civil Engineering problems.
e. use modern engineering tools such as CAD and GIS for the Civil Engineering practice.
f. understand the impact of engineering solutions in a global, economic and societal context.
g. understand the effect of Civil Engineering solutions on environment and to demonstrate the need for sustainable development.
h. understanding of professional and ethical responsibility.
i. work effectively as an individual or in a team and to function on multi-disciplinary context.
j. communicate effectively with engineering community and society.
k. demonstrate the management principles in Civil Engineering projects.
l. recognize the need for and an ability to engage in life-long learning.

## Program Specific Outcomes (PSO's)

**PSO1**: Recognize the need for a sustainable environment and design smart infrastructure considering the global challenges.

**PSO2:** Create and develop innovative designs with new era materials through research and development.

Signature of HOD

Date:

Signature of faculty

Date:

**Gokaraju Rangaraju Institute of Engineering and Technology**
**(Autonomous)**
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

# COURSE OBJECTIVES

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engg. Year: III Section: A & B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T. Srinivas / Mr.K. VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

On completion of this Subject/Course the student shall be able to:

| S.No | Objectives |
|---|---|
| 1 | Classify Working Stress and Limit State method in design of reinforced concrete structures. |
| 2 | Analyse and design of beams. |
| 3 | Design slabs, stair case and canopy. |
| 4 | Design columns |
| 5 | Design of footings, beams and slabs for Limit state of serviceability. |

Signature of HOD Signature of faculty

Date: Date:

**Gokaraju Rangaraju Institute of Engineering and Technology**
**(Autonomous)**
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

# COURSE OUTCOMES

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engg. Year: III Section: A & B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

On completion of this Subject/Course the student should be able to:

| S.No | Outcomes |
|---|---|
| 1 | Classify Working Stress and Limit State method in design of reinforced concrete structures. |
| 2 | Analyse and design of beams. |
| 3 | Design slabs, staircase and canopy. |
| 4 | Design columns. |
| 5 | Design footings, beams and slabs for limit state of serviceability. |

Signature of HOD Signature of faculty

Date: Date:

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## STUDENT ROLL LIST

## B.Tech CIVIL Engg. IIIyr-I Sem- Section A (GR18) 2021-22

| S.NO | Roll No | Name |
|---|---|---|
| 1 | 18241A0151 | SOHEB PATEL |
| 2 | 18241A0152 | SRIAM SHIVA ADITYA |
| 3 | 19241A0101 | RUHAIL AHMAD LONE |
| 4 | 19241A0102 | AITHA SAI TEJA |
| 5 | 19241A0103 | BARISETTY SHIVA KARTHIK |
| 6 | 19241A0104 | BENDHI VARUN THEJA GOUD |
| 7 | 19241A0105 | BHUKYA VAMSHI |
| 8 | 19241A0106 | BOGE VENKAT ROHITH |
| 9 | 19241A0107 | BONTHA PRANEETHKUMAR |
| 10 | 19241A0108 | CHILUKA RAHUL |
| 11 | 19241A0109 | DANDI KIRAN |
| 12 | 19241A0110 | DAYYA RAGNESH |
| 13 | 19241A0111 | E MANISH GOUD |
| 14 | 19241A0112 | ERRAM SAI PRIYA |
| 15 | 19241A0113 | G DEEPIKA |
| 16 | 19241A0114 | GORANTALA SAI |
| 17 | 19241A0115 | GUGULOTHU SANTHOSH |
| 18 | 19241A0116 | GURIJALA SAI KUMAR |
| 19 | 19241A0117 | GURUJALA SRIDHAR |
| 20 | 19241A0118 | IRUVANTI HEMANTH KUMAR |
| 21 | 19241A0119 | JANGITI VYSHNAVI |
| 22 | 19241A0120 | JARUPLA CHERAN |
| 23 | 19241A0122 | JETTI SREEVANI |
| 24 | 19241A0123 | K SOWMYA |
| 25 | 19241A0124 | KADALI KRISHNASRI SAI |
| 26 | 19241A0125 | KAMAREDDY AKSHAY |
| 27 | 19241A0126 | KATTA SAI KUMAR |
| 28 | 19241A0127 | KOLLURI.TEJASWI |
| 29 | 19241A0128 | KONDAPURAM SRIJA |
| 30 | 19241A0129 | KOTTE VIVEK |
| 31 | 19241A0130 | KRUTHIKA VIJAY PALANGE |
| 32 | 19241A0131 | MADA AKHIL REDDY |
| 33 | 19241A0132 | MADARAM SHRAVAN KUMAR REDDY |
| 34 | 19241A0133 | MADDIGATLA AJAY SAGAR |

| | | |
|---|---|---|
| 35 | 19241A0134 | CHANDANA MALPATEL |
| 36 | 19241A0135 | MANDALA CHINNI |
| 37 | 19241A0136 | MIREGILLA VIJAYAKUMAR |
| 38 | 19241A0137 | MOHD OBAID KASHIF |
| 39 | 19241A0138 | NARAPAKA MADHAV KUMAR |
| 40 | 19241A0139 | NIMMALA ARSHITHA |
| 41 | 19241A0141 | P SIDDARTHA |
| 42 | 19241A0142 | PAGIDIPALLY AJAY KUMAR |
| 43 | 19241A0143 | PALLAPU NAVEEN |
| 44 | 19241A0144 | PALLE SANATH KUMAR |
| 45 | 19241A0145 | PANTANGI PRANAY |
| 46 | 19241A0146 | PATIL SWAPNIL |
| 47 | 19241A0147 | POLISETTY SAAHAS |
| 48 | 19241A0148 | S.SAITEJA |
| 49 | 19241A0149 | SAI NEERAJ M |
| 50 | 19241A0150 | SATYA SAI PRASANNA REDDY SOLIPETA |
| 51 | 19241A0151 | SHAIK BILAL |
| 52 | 19241A0152 | SHAIK FIRDOUS AYESHA |
| 53 | 19241A0153 | SOORA VIKAS |
| 54 | 19241A0154 | TELLAM SRI SAI PAVANA ROSHINI |
| 55 | 19241A0155 | THALLAPALLY SWARANYA |
| 56 | 19241A0156 | THUMATI VENKATA VAYUNANDHAN |
| 57 | 19241A0157 | UDUMULA NIKHIL REDDY |
| 58 | 19241A0158 | VELISHALA GAYATHRI |
| 59 | 19241A0159 | VENKATA SIDDHARTHA RAJU VEGESNA |
| 60 | 19241A0160 | YASWANTH KURUVA |

# SECTION - B

| S.No. | Roll No | Name |
|---|---|---|
| 1 | 19241A0161 | ABDUL RAHEEM |
| 2 | 19241A0162 | ANEMONI MURALI MANOHAR |
| 3 | 19241A0163 | ASKANY HARISH SAGAR |
| 4 | 19241A0164 | BODLA AKSHITH |
| 5 | 19241A0165 | BURRA VAMSHI KRISHNA |
| 6 | 19241A0166 | CHERLAKOLA AKHILA |
| 7 | 19241A0167 | CHINTAPALLI VIKRAM |
| 8 | 19241A0168 | CHIRRIBOYINA DHANYA |
| 9 | 19241A0169 | D SREE MADHURI |
| 10 | 19241A0170 | GADDAM SAHITHI |
| 11 | 19241A0171 | GAJJALA SUKENDHAR REDDY |
| 12 | 19241A0172 | YASHASWI GANGAVARAM |
| 13 | 19241A0173 | GINDHAM ADITYA KUMAR |

| | | |
|---|---|---|
| 14 | 19241A0174 | GUDHETI NARENDAR REDDY |
| 15 | 19241A0175 | GUMMADI SAI PRATEEK REDDY |
| 16 | 19241A0176 | HANMAPUR DHEERAJ GOUD |
| 17 | 19241A0177 | JAVVAJI AISHWARYA |
| 18 | 19241A0178 | JULAPALLY NITHIN RAO |
| 19 | 19241A0179 | K NAVEEN |
| 20 | 19241A0180 | K RAJESHWARI |
| 21 | 19241A0181 | KACHAVA SURENDAR |
| 22 | 19241A0182 | KODATHALA INDU |
| 23 | 19241A0183 | KOTARU SRINIVASA VARAPRASAD |
| 24 | 19241A0184 | MALOTH RAHUL |
| 25 | 19241A0185 | MATURI SATHVIK |
| 26 | 19241A0186 | MD ABDUL MAAJID |
| 27 | 19241A0187 | MEDARI DAYANA |
| 28 | 19241A0188 | NARSINGA SANDEEP |
| 29 | 19241A0189 | PALANATI ROHITH |
| 30 | 19241A0190 | PURALASETTY BHAVANA |
| 31 | 19241A0191 | RODDA MALAVIKA REDDY |
| 32 | 19241A0192 | SAPRAM NAGA SRILOWKYA MUKTHA |
| 33 | 19241A0193 | SHAIK PARVEZ ANSARI |
| 34 | 19241A0194 | SIDDELA THARUN KUMAR |
| 35 | 19241A0195 | TALARI CHANDANA SREE |
| 36 | 19241A0196 | VALLEPU KALYAN |
| 37 | 19241A0197 | VRASHAB PATEL |
| 38 | 19241A0198 | YELLAVULA NARENDER |
| 39 | 19241A0199 | BADDELA SAI THARUN |
| 40 | 20245A0101 | Aamanchi Bowmi |
| 41 | 20245A0102 | Aviraboina Sai Chaithanya |
| 42 | 20245A0103 | Bairy B S Anirudh |
| 43 | 20245A0104 | Daddu Tejasree |
| 44 | 20245A0105 | Dopathi Raviteja |
| 45 | 20245A0106 | Eruventi Niharika |
| 46 | 20245A0107 | Gaddamidi Aanil |
| 47 | 20245A0108 | Gandla Rishik Raj |
| 48 | 20245A0109 | Gone Naveen Kumar |
| 49 | 20245A0110 | Kota Vishal |
| 50 | 20245A0111 | Kummari Mahesh |
| 51 | 20245A0112 | Lakavath Anil |
| 52 | 20245A0113 | Madavaram Rohith |
| 53 | 20245A0114 | Mandala Akshitha |
| 54 | 20245A0115 | M Manjunath |
| 55 | 20245A0116 | Porandla Nababhushanam |
| 56 | 20245A0117 | Pulishetty Bhavani |
| 57 | 20245A0118 | Racha Kranthi Ranadeer |
| 58 | 20245A0119 | S Manoj Kumar |
| 59 | 20245A0120 | Samudrala Manideep |
| 60 | 20245A0121 | Sangepaga Goutham |
| 61 | 20245A0122 | Sodadasi Rahul |
| 62 | 20245A0123 | Vanga Harshith |

| | | |
|---|---|---|
| 63 | 20245A0124 | Choleti Vineetha |
| 64 | 20245A0125 | Gangula Grishma |
| 65 | 20245A0126 | Bollampalli Sai Poojith |
| 66 | 20245A0127 | Pamulapati Sumanth |
| 67 | 20245A0128 | T Sanghamithra |
| 68 | 20245A0129 | Abeda Akanksha |
| 69 | 20245A0130 | Doppalapudi Ramvineeth Sai |
| 70 | 20245A0131 | Pilly Uday Kiran |

Signature of HOD

Date:

Signature of faculty

Date:

**Gokaraju Rangaraju Institute of Engineering and Technology**
**(Autonomous)**
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

# GUIDELINES TO STUDY THE COURSE/SUBJECT

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering. Year: III Section: A & B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

**Guidelines to students:**

Guidelines to study the course: Design of Concrete Structures-I

The course helps the students to learn and understand about the design of various structural elements of buildings by using Limit state method. The course makes the students to understand the design procedure of Beams, Slabs, Columns, Footings, Stairs and Canopy. It also makes the students to understand the design of beams and slabs for Limit state of serviceability.

The students should have the prerequisites:

- Knowledge of Concrete and Steel.
- Knowledge of various structural elements of Buildings.

**Where will this subject help?**

- Useful in knowing the difference between Limit State method and Working Stress method.
- Useful in determining the area of steel, spacing between the bars and size of elements such as beams, slabs, footings, stairs and canopy for the given moment/Loads.
- Useful in determining the capacity of structural elements for the given size of section and area of steel.

**Books/Material**

1. Limit state design of Reinforced Concrete by P.C.Varghese, Printice Hall of India, New Delhi.
2. Reinforced Concrete Design by N.Krishna Raju and R.N.Pranesh, New Age International Publishers, New Delhi.

3. Reinforced Concrete Design by S.Unnikrishna Pillai & Devada Menon, Tata Mc.Graw Hill, NewDelhi.

**Reference Books**

1. Fundamentals of Reinforced Concrete Design by M.L.Gambhir, Printice Hall of India, New Delhi.
2. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications Pvt.Ltd., New Delhi.

**Web Sites**

www.nptel.ac.in/course/civil engineering/design of reinforced concrete structures
www.google.com

**Course Design and Delivery System (CDD):**

- The Course syllabus is written into number of learning objectives and outcomes.
- These learning objectives and outcomes will be achieved through lectures, assessments, assignments, experiments in the laboratory, projects, seminars, presentations, etc.
- Every student will be given an assessment plan, criteria for assessment, scheme of evaluation and grading method.
- The Learning Process will be carried out through assessments of Knowledge, Skills and Attitude by various methods and the students will be given guidance to refer to the text books, reference books, journals, etc.

The faculty be able to –

- Understand the principles of Learning
- Understand the psychology of students
- Develop instructional objectives for a given topic
- Prepare course, unit and lesson plans
- Understand different methods of teaching and learning
- Use appropriate teaching and learning aids
- Plan and deliver lectures effectively
- Provide feedback to students using various methods of Assessments and tools of Evaluation
- Act as a guide, advisor, counselor, facilitator, motivator and not just as a teacher alone

Signature of HOD

Signature of faculty

Date:

Date:

**Gokaraju Rangaraju Institute of Engineering and Technology**
**(Autonomous)**
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

# COURSE SCHEDULE

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

The Schedule for the whole Course / Subject is:

| S. No. | Description | Duration (Date) | | Total No. of Periods |
|---|---|---|---|---|
| | | From | To | |
| 1. | **UNIT-1**<br>Concepts of R.C.Design | 18/08/21 | 16/09/21 | 8 |
| 2. | **UNIT-II**<br>Analysis and Design of Beams | 18/09/21 | 06/10/21 | 13 |
| 3. | **UNIT-III**<br>Design of Slabs, Design of Stair case and Canopy | 06/10/21 | 04/11/21 | 13 |
| 4. | **UNIT-IV**<br>Design of Columns | 04/11/21 | 17/11/21 | 8 |
| 5. | **UNIT-V**<br>Design of Foundation, Limit State Design of Serviceability | 17/11/21 | 10/12/21 | 13 |

Total No. of Instructional periods available for the course: 55 Hours / Periods

Signature of H.O.D Signature of faculty

Date : Date:

**Gokaraju Rangaraju Institute of Engineering and Technology**
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# COURSE SCHEDULE

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

The Schedule for the whole Course / Subject is:

| S. No. | Description | Duration (Date) | | Total No. of Periods |
|---|---|---|---|---|
| | | From | To | |
| 1. | **UNIT-1**<br>Concepts of R.C.Design | 17/08/21 | 01/09/21 | 8 |
| 2. | **UNIT-II**<br>Analysis and Design of Beams | 04/09/21 | 28/09/21 | 13 |
| 3. | **UNIT-III**<br>Design of Slabs, Design of Stair case and Canopy | 29/09/21 | 27/10/21 | 13 |
| 4. | **UNIT-IV**<br>Design of Columns | 30/10/21 | 13/11/21 | 8 |
| 5. | **UNIT-V**<br>Design of Foundation, Limit State Design of Serviceability | 16/11/21 | 08/12/21 | 13 |

Total No. of Instructional periods available for the course: 55 Hours / Periods

Signature of H.O.D Signature of faculty

Date : Date:

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## SCHEDULE OF INSTRUCTIONS
## COURSE PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr. T.Srinivas / Mr. K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

| Unit No. | Lesson No. | Date | No.of periods | Topics/Sub-Topics | Objectives & Outcomes Nos. | References |
|---|---|---|---|---|---|---|
| I | 1 | 18/08/21 | 1 | General Introduction about subject | CobNos:1 CoNos:1 | Reinforced Concrete Limit State Design by (a)DrAK Jain (b) IS456-2000 |
| | 2 | 19/08/21 | 1 | Limit state method | CobNos:1 CoNos:1 | RC-LSD-AKJ,PPN:69 |
| | 3 | 21/08/21 | 1 | Material stress strain curves | CobNos:1 CoNos:1 | RC-LSD-AKJ,PPN:79-81 |
| | 4 | 26/08/21 | 1 | Safety factors, Characteristic values | CobNos:1 CoNos:1 | RC-LSD-AKJ,PPN:77 |
| | 5 | 01/09/21 | 1 | Stress block parameters | CobNos:1 CoNos:1 | RC-LSD-AKJ,PPN:80 |
| | 6 | 15/09/21 | 1 | IS 456-2000 Uses | CobNos:1 CoNos:1 | IS456 |
| | 7 | 15/09/21 | 1 | Working stress method | CobNos:1 CoNos:1 | RC-LSD-AKJ,PPN:60 |
| | 8 | 16/09/21 | 1 | Comparison of LSD | CobNos:1 | RC-LSD- |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | with WSM | CoNos:1 | AKJ,PPN:60&64 |
| II | 9 | 18/09/21 | 1 | Analysis and design of singly reinforced beams | Cobs:2<br>CoNos:2 | RC-LSD-<br>AKJ,PPN:87-96 |
| | 10 | 18/09/21 | 1 | Problems solving | Cobs:2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:99-108 |
| | 11 | 20/09/21 | 1 | Analysis and design of doubly reinforced beams | Cobs:2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:100 – 113 |
| | 12 | 20/09/21 | 1 | Problems solving | Cobs:2<br>CoNos:2 | RC-LSD-<br>AKJ,PPN:114-119 |
| | 13 | 21/09/21 | 1 | Analysis and Design of T Beams | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:121-126 |
| | 14 | 22/09/21 | 1 | Problems solving | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:127-132 |
| | 15 | 23/09/21 | 1 | Analysis and Design of L Beams | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:121-126 |
| | 16 | 25/09/21 | 1 | Design of beam section for shear | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:134-144 |
| | 17 | 27/09/21 | 1 | Problems solving | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:145-155 |
| | 18 | 29/09/21 | 1 | Design of beam section for Torsion | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:251-256 |
| | 19 | 01/10/21 | 1 | Concept of Bond and Anchorage | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:156-160 |
| | 20 | 04/10/21 | 1 | Development length and Detailing | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:165-178 |
| | 21 | 06/10/21 | 1 | Problems solving | Cobs: 2<br>Cos: 2 | RC-LSD-<br>AKJ,PPN:160-162 |
| III | 22 | 06/10/21 | 1 | Introduction of slabs | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:287 |
| | 23 | 07/10/21 | 1 | Design of one way slab | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:288 |
| | 24 | 09/10/21 | 1 | Problems solving | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:289 |
| | 25 | 09/10/21 | 1 | Problems solving | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:290-291 |
| | 26 | 23/10/21 | 1 | Design of Two way slab | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:295-303 |

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|---|---|---|---|---|---|---|
| | 27 | 27/10/21 | 1 | Problems solving | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:303-310 |
| | 28 | 27/10/21 | 1 | Design of continuous slab | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:292-293 |
| | 29 | 28/10/21 | 1 | Problems solving | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:293-294 |
| | 30 | 29/10/21 | 1 | Design of Stair case- Longitudinal | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:239-240 |
| | 31 | 03/11/21 | 1 | Problems solving | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:249 |
| | 32 | 03/11/21 | 1 | Design of Doglegged stair case | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:241-242 |
| | 33 | 03/11/21 | 1 | Design of open well stair case | Cobs: 3<br>Cos: 3 | RC-LSD-<br>AKJ,PPN:245-246 |
| | 34 | 04/11/21 | 1 | Design of Canopy | Cobs: 3<br>Cos: 3 | DRCS by<br>S.Ramamrutham,<br>PPN:485 |
| IV | 35 | 04/11/21 | 1 | Design of axial columns | Cobs: 4<br>Cos:4 | RC-LSD-<br>AKJ,PPN:400-410 |
| | 36 | 08/11/21 | 1 | Problems solving | Cobs:4<br>Cos:4 | RC-LSD-<br>AKJ,PPN:411-415 |
| | 37 | 08/11/21 | 1 | Design of uniaxial bending columns | Cobs:4<br>Cos:4 | RC-LSD-<br>AKJ,PPN:415-422 |
| | 38 | 09/11/21 | 1 | Problems solving | Cobs:4<br>Cos:4 | RC-LSD-<br>AKJ,PPN:422-427 |
| | 39 | 09/11/21 | 1 | Problems solving | Cobs:4<br>Cos:4 | RC-LSD-<br>AKJ,PPN:428-435 |
| | 40 | 10/11/21 | 1 | Design of biaxial bending columns | Cobs:4<br>Cos:4 | RC-LSD-<br>AKJ,PPN:436-442 |
| | 41 | 12/11/21 | 1 | Problems solving | Cobs:4<br>Cos:4 | RC-LSD-<br>AKJ,PPN:463-466 |
| | 42 | 17/11/21 | 1 | Problems solving | Cobs:4<br>Cos:4 | RC-LSD-<br>AKJ,PPN:463-466 |
| V | 42 | 17/11/21 | 1 | Introduction about footings | Cobs:5<br>Cos:5 | RC-LSD-<br>AKJ,PPN:466-480 |
| | 43 | 24/11/21 | 1 | Design of isolated square footing | Cobs:5<br>Cos:5 | RC-LSD-<br>AKJ,PPN:480-487 |
| | 44 | 24/11/21 | 1 | Design of rectangular footing | Cobs:5<br>Cos:5 | RC-LSD-<br>AKJ,PPN:466-480 |

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|---|---|---|---|---|---|---|
| | 45 | 26/11/21 | 1 | Problems solving | Cobs:5<br>Cos:5 | RC-LSD-<br>AKJ,PPN:480-487 |
| | 46 | 01/12/21 | 1 | Design of circular footing | Cobs:5<br>Cos:5 | RC-LSD-<br>AKJ,PPN:466-480 |
| | 47 | 01/12/21 | 1 | Design of combined footings | Cobs:5<br>Cos:5 | RC-LSD-<br>AKJ,PPN:488 |
| | 48 | 02/12/21 | 1 | Introduction about Limit state design for serviceability | CobNos:5<br>CoNos:5 | RC-LSD-<br>AKJ,PPN:185 |
| | 49 | 03/12/21 | 1 | Limit state design for deflection | CobNos:5<br>CoNos:5 | RC-LSD-<br>AKJ,PPN:186 |
| | 50 | 04/12/21 | 1 | Limit state design for creep. | CobNos:5<br>CoNos:5 | RC-LSD-<br>AKJ,PPN:196-197 |
| | 51 | 04/12/21 | 1 | Limit state design for vibration. | CobNos:5<br>CoNos:5 | RC-LSD-<br>AKJ,PPN:189-193 |
| | 52 | 08/12/21 | 1 | Problems solving | CobNos:5<br>CoNos:5 | RC-LSD-<br>AKJ,PPN:193-195 |
| | 53 | 08/12/21 | 1 | Problems solving | CobNos:5<br>CoNos:5 | RC-LSD-<br>AKJ,PPN:197 |
| | 54 | 09/12/21 | 1 | Problems solving | CobNos:5<br>CoNos:5 | RC-LSD-<br>AKJ,PPN:198 |
| | 55 | 10/12/21 | 1 | Problems solving | CobNos:5<br>CoNos:5 | RC-LSD-<br>AKJ,PPN:199 |

Signature of H.O.D

Signature of faculty

Date :

Date:

Note: 1. Ensure that all topics specified in the course are mentioned.
2. Additional topicscovered, if any, may also be specified in bold
3. Mention the corresponding course objective and out come numbers against each topic.

# Gokaraju Rangaraju Institute of Engineering and Technology
# (Autonomous)
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## SCHEDULE OF INSTRUCTIONS
## COURSE PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr. T.Srinivas / Mr.K. VEERA BABU Dept.: Civil Engineering

| S.No. | Date | Unit No. | Session Duration | Topics |
|---|---|---|---|---|
| 1 | 17/08/2021 | 1 | 1 | Limit state method, characteristic values and safety factors, Material stress strain curves. |
| 2 | 18/08/2021 | 1 | 1 | Material stress strain curves. |
| 3 | 21/08/2021 | 1 | 1 | Loads and its combinations |
| 4 | 24/08/2021 | 1 | 1 | Modes of failures of flexural members, |
| 5 | 25/08/2021 | 1 | 1 | Difference among working stress, ultimate load and limit state methods. |
| 6 | 28/08/2021 | 1 | 1 | Stress block parameters of singly reinforced beams |
| 7 | 31/08/2021 | 1 | 1 | Stress block parameters of singly reinforced beams |
| 8 | 01/09/2021 | 1 | 1 | Problems |
| 9 | 04/09/2021 | 2 | 1 | Concepts on analysis and design of singly reinforced beams, Problems on singly reinforced beams |
| 10 | 04/09/2021 | 2 | 1 | Concepts on analysis and design of doubly reinforced beams |

| | | | | |
|---|---|---|---|---|
| 11 | 07/09/2021 | 2 | 1 | Problems on design of doubly reinforced beams |
| 12 | 07/09/2021 | 2 | 1 | Problems on doubly reinforced beams |
| 13 | 08/09/2021 | 2 | 1 | Concepts on M.R of singly reinforced and doubly reinforced T Beams |
| 14 | 11/09/2021 | 2 | 1 | Problems on M.R of singly reinforced and doubly reinforced T Beams |
| 15 | 14/09/2021 | 2 | 1 | Design of singly reinforced and doubly reinforced T Beams |
| 16 | 15/09/2021 | 2 | 1 | M.R of L-Beams |
| 17 | 18/09/2021 | 2 | 1 | Design of L-Beams |
| 18 | 21/09/2021 | 2 | 1 | Design of beam section for shear |
| 19 | 22/09/2021 | 2 | 1 | Design of beam section for torsion |
| 20 | 25/09/2021 | 2 | 1 | Design Problems on T Beams |
| 21 | 28/09/2021 | 2 | 1 | Concept of bond and anchorage length with problems |
| 22 | 29/09/2021 | 3 | 1 | Introduction of slabs |
| 23 | 05/10/2021 | 3 | 1 | Introduction of slabs and design of one way slab |
| 24 | 06/10/2021 | 3 | 1 | Design of two way slabs |
| 25 | 09/10/2021 | 3 | 1 | Design of two way slabs |
| 26 | 12/10/2021 | 3 | 1 | Design of continuous slab |
| 27 | 13/10/2021 | 3 | 1 | Design of dog legged stair case |
| 28 | 16/10/2021 | 3 | 1 | Design of dog legged stair case |
| 29 | 20/10/2021 | 3 | 1 | Design Problem on Canopy |
| 30 | 23/10/2021 | 3 | 1 | Design Problem on Canopy |
| 31 | 26/10/2021 | 3 | 1 | Design of Flat Slab |
| 32 | 26/10/2021 | 3 | 1 | Design of Flat Slab |
| 33 | 27/10/2021 | 3 | 1 | Problems |

| | | | | |
|---|---|---|---|---|
| 34 | 27/10/2021 | 3 | 1 | Problems |
| 35 | 30/10/2021 | 4 | 1 | Columns Concepts and Design of axial columns |
| 36 | 30/10/2021 | 4 | 1 | Design of uni-axial bending columns |
| 37 | 02/11/2021 | 4 | 1 | Design of uni-axial bending columns |
| 38 | 03/11/2021 | 4 | 1 | Design of biaxial bending columns |
| 39 | 06/11/2021 | 4 | 1 | Design of biaxial bending columns |
| 40 | 09/11/2021 | 4 | 1 | Problems on Uni-axial and Bi axial columns |
| 41 | 10/11/2021 | 4 | 1 | Problems on Uni-axial and Bi axial columns |
| 42 | 13/11/2021 | 4 | 1 | Design of long columns |
| 43 | 16/11/2021 | 5 | 1 | Introduction to footings |
| 44 | 17/11/2021 | 5 | 1 | Introduction to footings and Design of isolated rectangle flat footing |
| 45 | 20/11/2021 | 5 | 1 | Design of isolated rectangle flat footing |
| 46 | 23/11/2021 | 5 | 1 | Design of square flat Footing |
| 47 | 24/11/2021 | 5 | 1 | Design of square flat Footing |
| 48 | 27/11/2021 | 5 | 1 | Design of square sloped footing |
| 49 | 30/11/2021 | 5 | 1 | Design of square sloped footing |
| 50 | 01/12/2021 | 5 | 1 | Design of combined footing |
| 51 | 04/12/2021 | 5 | 1 | Limit state of serviceability and Problem on cracks |
| 52 | 07/12/2021 | 5 | 1 | Problem on deflection |
| 53 | 07/12/2021 | 5 | 1 | Problem on deflection. |
| 54 | 08/12/21 | 5 | 1 | Problem on deflection. |
| 55 | 08/12/21 | 5 | 1 | Revision |

Signature of H.O.D

Date :

Signature of faculty

Date:

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# SCHEDULE OF INSTRUCTIONS
# UNIT PLAN

**A**cademic **Y**ear : 2021-22 **Unit No: I**
Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

| Lesson No. | Date | No. of Periods | Topics / Sub - Topics | Objectives & Outcomes Nos. | Blooms Taxonomy | References (Text Book, Journal…) Page Nos.: |
|---|---|---|---|---|---|---|
| 1. | 18/08/21 | 1 | General Introduction about subject | CobNos:1 CoNos:1 | K2 | Reinforced Concrete Limit State Design by (a)DrAK Jain (b) IS456-2000 |
| 2. | 19/08/21 | 1 | Limit state method | CobNos:1 CoNos:1 | K2 | RC-LSD-AKJ,PPN:69 |
| 3. | 21/08/21 | 1 | Material stress strain curves | CobNos:1 CoNos:1 | K2 | RC-LSD-AKJ,PPN:79-81 |
| 4. | 26/08/21 | 1 | Safety factors, Characteristic values | CobNos:1 CoNos:1 | K2 | RC-LSD-AKJ,PPN:77 |
| 5. | 01/09/21 | 1 | Stress block parameters | CobNos:1 CoNos:1 | K3 | RC-LSD-AKJ,PPN:80 |
| 6. | 15/09/21 | 1 | IS 456-2000 Uses | CobNos:1 CoNos:1 | K3 | IS456 |
| 7. | 15/09/21 | 1 | Working stress method | CobNos:1 CoNos:1 | K2 | RC-LSD-AKJ,PPN:60 |
| 8. | 16/09/21 | 1 | Comparison of LSD with WSM | CobNos:1 CoNos:1 | K2 | RC-LSD-AKJ,PPN:60&64 |

Signature of HOD
Date:

Signature of faculty
Date:

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# SCHEDULE OF INSTRUCTIONS
# UNIT PLAN

**A**cademic **Y**ear : 2021-22 **Unit No: II**

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

| Lesson No. | Date | No. of Periods | Topics / Sub - Topics | Objectives & Outcomes Nos. | Blooms Taxonomy | References (Text Book, Journal…) Page Nos.: |
|---|---|---|---|---|---|---|
| 1. | 18/09/21 | 1 | Analysis and design of singly reinforced beams | Cobs:2 CoNos:2 | K4 | RC-LSD-AKJ,PPN:87-96 |
| 2. | 18/09/21 | 1 | Problems solving | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:99-108 |
| 3. | 20/09/21 | 1 | Analysis and design of doubly reinforced beams | Cobs:2 CoNos:2 | K4 | RC-LSD-AKJ,PPN:100 - 113 |
| 4. | 20/09/21 | 1 | Problems solving | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:114-119 |
| 5. | 21/09/21 | 1 | Design of T Beams | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:121-126 |
| 6. | 22/09/21 | 1 | Problems solving | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:127-132 |

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|---|---|---|---|---|---|---|
| 7. | 23/09/21 | 1 | Design of L Beams | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:121-126 |
| 8. | 25/09/21 | 1 | Design of beam section for shear | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:134-144 |
| 9. | 27/09/21 | 1 | Problems solving | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:145-155 |
| 10. | 29/09/21 | 1 | Design of beam section for Torsion | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:251-256 |
| 11 | 01/10/21 | 1 | Concept of Bond and Anchorage | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:257-260 |
| 12 | 04/10/21 | 1 | Development length and Detailing | Cobs:2 CoNos:2 | K3 | RC-LSD-AKJ,PPN:156-160 |
| 13 | 06/10/21 | 1 | Problems solving | Cobs:2 CoNos:2 | K5 | RC-LSD-AKJ,PPN:160-162 |

Signature of HOD

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Signature of faculty

Date:

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# SCHEDULE OF INSTRUCTIONS
# UNIT PLAN

**A**cademic **Y**ear : 2021-22 **Unit No: III**

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

| Lesson No. | Date | No. of Periods | Topics / Sub - Topics | Objectives & Outcomes Nos. | Blooms Taxonomy | References (Text Book, Journal…) Page Nos.: |
|---|---|---|---|---|---|---|
| 1. | 06/10/21 | 1 | Introduction of slabs | Cobs:3 Cos: 3 | K2 | RC-LSD-AKJ,PPN:287 |
| 2. | 07/10/21 | 1 | Design of one way slab | Cobs:3 Cos: 3 | K5 | RC-LSD-AKJ,PPN:288 |
| 3. | 09/10/21 | 1 | Problems solving | Cobs:3 Cos:3 | K5 | RC-LSD-AKJ,PPN:289 |
| 4. | 09/10/21 | 1 | Problems solving | Cobs:3 Cos: 3 | K5 | RC-LSD-AKJ,PPN:290-291 |
| 5. | 23/10/21 | 1 | Design of Two way slab | Cobs:3 Cos: 3 | K5 | RC-LSD-AKJ,PPN:295-303 |
| 6. | 27/10/21 | 1 | Problems solving | Cobs:3 Cos: 3 | K5 | RC-LSD-AKJ,PPN:303-310 |
| 7. | 27/10/21 | 1 | Design of continuous slab | Cobs:3 Cos: 3 | K5 | RC-LSD-AKJ,PPN:292-293 |
| 8. | 28/10/21 | 1 | Problems solving | Cobs:3 Cos: 3 | K5 | RC-LSD-AKJ,PPN:293-294 |
| 9. | 29/10/21 | 1 | Design of Stair case-Longitudinal | Cobs:3 Cos: 3 | K5 | RC-LSD-AKJ,PPN:239-240 |

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|---|---|---|---|---|---|---|
| 10. | 03/11/21 | 1 | Problems solving | Cobs:3<br>Cos: 3 | K5 | RC-LSD-AKJ,PPN:249 |
| 11 | 03/11/21 | 1 | Design of Doglegged stair case | Cobs:3<br>Cos: 3 | K5 | RC-LSD-AKJ,PPN:241-242 |
| 12 | 03/11/21 | 1 | Design of open well stair case | Cobs:3<br>Cos: 3 | K5 | RC-LSD-AKJ,PPN:243-244 |
| 13 | 04/11/21 | 1 | Design of Canopy | Cobs:3<br>Cos: 3 | K5 | RC-LSD-AKJ,PPN:245-246 |

Signature of HOD

Date:

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Date:

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# SCHEDULE OF INSTRUCTIONS
# UNIT PLAN

**A**cademic **Y**ear : 2021-22 **Unit No: IV**

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr. T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

| Lesson No. | Date | No. of Periods | Topics / Sub - Topics | Objectives & Outcomes Nos. | Blooms Taxonomy | References (Text Book, Journal…) Page Nos.: |
|---|---|---|---|---|---|---|
| 1. | 04/11/21 | 1 | Design of axial columns | Cobs: 4 Cos:4 | K5 | RC-LSD-AKJ,PPN:400-410 |
| 2. | 08/11/21 | 1 | Problems solving | Cobs: 4 Cos:4 | K5 | RC-LSD-AKJ,PPN:411-415 |
| 3. | 08/11/21 | 1 | Design of uniaxial bending columns | Cobs: 4 Cos:4 | K5 | RC-LSD-AKJ,PPN:415-422 |
| 4. | 09/11/21 | 1 | Problems solving | Cobs: 4 Cos:4 | K5 | RC-LSD-AKJ,PPN:422-427 |
| 5. | 09/11/21 | 1 | Problems solving | Cobs: 4 Cos:4 | K5 | RC-LSD-AKJ,PPN:428-435 |
| 6. | 10/11/21 | 1 | Design of biaxial bending columns | Cobs: 4 Cos:4 | K5 | RC-LSD-AKJ,PPN:436-442 |
| 7. | 12/11/21 | 1 | Introduction about footings | Cobs: 4 Cos:4 | K2 | RC-LSD-AKJ,PPN:463-466 |
| 8. | 17/11/21 | 1 | Design of isolated square footing | Cobs: 4 Cos:4 | K5 | RC-LSD-AKJ,PPN:466-480 |

Signature of HOD Signature of faculty

Date: Date:

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# SCHEDULE OF INSTRUCTIONS
# UNIT PLAN

**A**cademic **Y**ear : 2021-22 **Unit No: V**

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

| Lesson No. | Date | No. of Periods | Topics / Sub - Topics | Objectives & Outcomes Nos. | Blooms Taxonomy | References (Text Book, Journal…) Page Nos.: |
|---|---|---|---|---|---|---|
| 1. | 17/11/21 | 1 | Introduction about footings | Cobs: 5 Cos:5 | K3 | RC-LSD-AKJ,PPN:480-487 |
| 2. | 24/11/21 | 1 | Design of isolated square footing | Cobs:5 Cos:5 | K5 | RC-LSD-AKJ,PPN:466-480 |
| 3. | 24/11/21 | 1 | Design of rectangular footing | Cobs: 5 Cos:5 | K5 | RC-LSD-AKJ,PPN:480-487 |
| 4. | 26/11/21 | 1 | Problems solving | Cobs: 5 Cos:5 | K5 | RC-LSD-AKJ,PPN:466-480 |
| 5. | 01/12/21 | 1 | Design of circular footing | Cobs: 5 Cos:5 | K5 | RC-LSD-AKJ,PPN:480-487 |
| 6. | 01/12/21 | 1 | Design of combined footings | Cobs: 5 Cos:5 | K5 | RC-LSD-AKJ,PPN:185 |
| 7. | 02/12/21 | 1 | Limit state design for deflection | Cobs: 5 Cos:5 | K4 | RC-LSD-AKJ,PPN:186 |
| 8. | 03/12/21 | 1 | Limit state design for cracking | Cobs: 5 Cos:5 | K4 | RC-LSD-AKJ,PPN:196-197 |
| 9. | 04/12/21 | 1 | Problems solving | Cobs: 5 Cos:5 | K5 | RC-LSD-AKJ,PPN:189-193 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10. | 04/12/21 | 1 | Problems solving | Cobs: 5<br>Cos:5 | K5 | RC-LSD-AKJ,PPN:193-195 |
| 11. | 08/12/21 | 1 | Problems solving | Cobs: 5<br>Cos:5 | K5 | RC-LSD-AKJ,PPN:197 |
| 12. | 09/12/21 | 1 | Problems solving | Cobs: 5<br>Cos:5 | K5 | RC-LSD-AKJ,PPN:198 |
| 13. | 10/12/21 | 1 | Problems solving | Cobs: 5<br>Cos:5 | K5 | RC-LSD-AKJ,PPN:199 |

Signature of HOD

Date:

Signature of faculty

Date:

**Gokaraju Rangaraju Institute of Engineering and Technology**
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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 1…… Duration of Lesson: 1hr …….

Lesson Title: General Introduction about subject

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Discuss about the importance of this subject in civil engineering.

2. Explain about different elements of RCC frame.

TEACHING AIDS: White board, Marker pens and Code book.

TEACHING POINTS :

| Sub topics |
|---|
| Grade of concrete |
| Grade of steel |
| Beams, slabs, columns and footings |

Assignment / Questions: 1.Indicate the data required for designing structural element?
2. Explain the various structural elements of an RCC building?

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 2…… Duration of Lesson: 1hr …….

Lesson Title: Limit state method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:
1. Express the importance of Limit state method.

2. Express different Limit state methods.

3. Discuss the assumptions considered for Limit state method

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Limit state method of collapse |
| Limit state method of compression |
| Limit state method of serviceability |

Assignment / Questions: 1.Describe Limit state method.
2. Discuss about the various Limit state methods.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 3…… Duration of Lesson: 1hr …….

Lesson Title: Material stress strain curves

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Explain the importance of Material stress strain curves.

2. Discuss about stress strain curve for concrete.

3. Discuss about stress strain curve for steel.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| stress strain curve for concrete |
| stress strain curve for steel |

Assignment / Questions: 1.Interpret stress strain curve for concrete.
2. Interpret stress strain curve for steel.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 4…… Duration of Lesson: 1hr …….

Lesson Title: Safety factors, Characteristic values

INSTRUCTIONAL/LESSON OBJECTIVES:
On completion of this lesson the student shall be able to:

1. Discuss the importance of partial safety factors and Characteristic values.

2. Discuss about Characteristic values of strength.

3. Discuss about Characteristic values of loads.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
|---|
| Partial safety factor for concrete. |
| Partial safety factors for steel. |
| Characteristic values of strength. |
| Characteristic values of loads. |

Assignment / Questions: 1.Defend the statement partial safety factor of concrete is more when compared to steel.

2. Distinguish between characteristic value of strength and loads?

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 5…… Duration of Lesson: 1hr …….

Lesson Title: Stress block parameters

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Explain the importance of Stress block parameters.

2. Discuss about the shape of Stress block.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
|---|
| Depth of neutral axis. |
| Effective depth |
| Lever arm. |
| Force of tension, force of compression. |

Assignment / Questions: 1.Distinguish between depth of neutral axis and effective depth.
2. Distinguish between force of tension and force of compression.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 6…… Duration of Lesson: 1hr …….

Lesson Title: IS 456-2000 Uses

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Recognize the importance of IS 456-2000.

2. Recognize the data which is useful in designing structural elements.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
|---|
| Various grades of concrete and steel. |
| Minimum and maximum reinforcement requirements for various structural elements. |
| Minimum and maximum spacing requirements for steel of various structural elements. |
| Minimum cover to the reinforcement for various exposure conditions. |
| Various formulas used for finding area of steel and moment of resistance. |

Assignment / Questions: 1. Classify various grades of concrete based on IS456 2000.
2. Indicate the various grades of steel.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 7…… Duration of Lesson: 1hr …….

Lesson Title: Working stress method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Discuss about the Working stress method.

2. Discuss about the short comings of Working stress method

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Safety factors in Working stress method. |
| Principle of working stress method. |

Assignment / Questions: 1.Indicate the safety factor of concrete in Working stress method.
2. Indicate the assumption made in Working stress method.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 8…… Duration of Lesson: 1hr …….

Lesson Title: Comparison of LSD with WSM

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Distinguish between LSD and WSM.
2. Discuss about the short comings of Working stress method
3. Discuss about the merits of Limit state method

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Safety factors in Working stress method and Limit state method. |
| Principle of working stress method and limit state method. |

Assignment / Questions: 1.Distinguish between LSD and WSM.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 9…… Duration of Lesson: 1hr …….

Lesson Title: Analysis and design of singly reinforced beams

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Distinguish between the balanced and un balanced sections.
2. Explain about the force of compression and tension.
3. Discuss about the lever arm
4. Discuss about the moment of resistance.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Balance section, under reinforced section and over reinforced section. |
| Force of tension and compression. |
| Lever arm and Moment of resistance. |

Assignment / Questions: 1.Distinguish between balanced section and unbalanced section.
2. Estimate the moment of resistance for under reinforced section.

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**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 10…… Duration of Lesson: 1hr …….

Lesson Title: Problems solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Calculate the depth of neutral axis.
2. Calculate the force of compression and tension.
3. Calculate the maximum depth of neutral axis.
4. Categorize the section whether it is balanced section or unbalanced section.
5. Calculate the moment of resistance based on class of section for given steel.
6. Calculate area of steel for the given moment.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Force of compression, force of tension, depth of neutral axis, maximum depth of neutral axis, class of section, moment of resistance offered by the section and steel required to resist the given moment. |

Assignment / Questions: 1.Distinguish between depth of neutral axis and maximum depth of neutral axis. 2. Calculate area of tension steel for the given moment?

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 11…… Duration of Lesson: 1hr…….

Lesson Title: Analysis and Design of doubly reinforced beams.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Classify the type of beam.
2. Identify the importance of Doubly Reinforced Beam.
3. Analyze the Additional moment carried by the additional tensile steel and compression steel.
4. Analyze the ultimate moment or moment of resistance offered by the $A_{st1.}$

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Force of compression, force of tension, depth of neutral axis, maximum depth of neutral axis, class of section, additional moment of resistance offered by the section and steel required to resist the additional moment, moment of resistance offered by the compression steel. |

Assignment / Questions: 1.Distinguish between singly reinforced beam and doubly reinforced beam.

2. Analyze the doubly reinforced beam.

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**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

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Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 12…… Duration of Lesson: 1hr …….

Lesson Title: Problems solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Calculate the depth of neutral axis.
2. Calculate the force of compression and tension.
3. Calculate the maximum depth of neutral axis.
4. Calculate additional moment of resistance based on additional tensile steel or compression steel.
5. Calculate area of steel for the given moment.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Force of compression, force of tension, depth of neutral axis, maximum depth of neutral axis, class of section, additional moment of resistance offered by the section and steel required to resist the additional moment, moment of resistance offered by the compression steel. |

Assignment / Questions: 1.Calculate the design stress in compression reinforcement for the given data.

2. Calculate the additional moment for the given data.

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Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 13…… Duration of Lesson: 1hr …….

Lesson Title: Analysis and Design of T- Beams.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Classify the type of beam.
2. Identify the importance of T-Beam.
3. Determine the position of neutral axis in the T-Beam.
4. Determine the ultimate moment or moment of resistance offered by the T-Beam.
5. Determine the amount of steel required for the given moment.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Force of compression, force of tension, maximum depth of neutral axis, class of section, position of neutral axis, Flange width, moment of resistance and Area of steel. |

Assignment / Questions: 1. Calculate effective flange width of T-Beam for the given data
2. Calculate the position of neutral axis for the given data.

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Semester : I

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Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 14…… Duration of Lesson: 1hr …….

Lesson Title: Problems solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Calculate the depth of neutral axis.
2. Calculate the force of compression and tension.
3. Calculate the maximum depth of neutral axis.
4. Calculate the position of neutral axis.
5. Calculate the effective flange width of T-Beam.
6. Calculate the moment of resistance based on tensile steel..
7. Calculate the area of steel for the given moment.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Force of compression, force of tension, depth of neutral axis, maximum depth of neutral axis, position of neutral axis, effective flange width of T-Beam, moment of resistance offered by the section and steel required to resist the moment. |

Assignment / Questions: 1.Design the T-beam for the given data.
2. Calculate moment of resistance when neutral axis lies in web for the given data.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 15…… Duration of Lesson: 1hr …….

Lesson Title: Analysis and Design of L- Beams.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Classify the type of beam.
2. Identify the importance of L-Beam.
3. Determine the position of neutral axis in the L-Beam.
4. Determine the ultimate moment or moment of resistance offered by the L-Beam.
5. Determine the amount of steel required for the given moment.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Force of compression, force of tension, maximum depth of neutral axis, class of section, position of neutral axis, Flange width, moment of resistance and Area of steel. |

Assignment / Questions: 1. Design the L-Beam for the given data
2. Calculate the position of neutral axis for the given data.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 16…… Duration of Lesson: 1hr …….

Lesson Title: Design of Beams for shear.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Calculate the nominal shear strength of beam.
2. Calculate the design shear strength of beam.
3. Calculate the maximum shear stress of beam.
4. Calculate the area of shear reinforcement and spacing of stirrups for resisting shear.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Nominal shear strength, design shear strength, maximum shear stress and shear reinforcement.<br>Spacing of stirrups. |

Assignment / Questions: 1. Calculate the area of shear reinforcement for the given data
2. Calculate the spacing of stirrups.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

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Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 17…… Duration of Lesson: 1hr…….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Calculate the nominal shear strength of beam.
2. Calculate the design shear strength of beam.
3. Calculate the maximum shear stress of beam.
4. Calculate the area of shear reinforcement and spacing of stirrups for resisting shear.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Nominal shear strength, design shear strength, maximum shear stress and shear reinforcement.<br>Spacing of stirrups. |

Assignment / Questions: 1. Calculate the area of shear reinforcement for the given data
2. Calculate the spacing of stirrups.

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**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 18…… Duration of Lesson: 1hr …….

Lesson Title: Design of Beams for Torsion.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Analyze the beam for Torsion
2. Identify the equivalent shear
3. Identify the equivalent moment.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Equivalent shear, equivalent moment, Longitudinal reinforcement and Transverse reinforcement. |

Assignment / Questions: 1. Design the beam for Torsion.

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Semester : I

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Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 19…… Duration of Lesson: 1hr …….

Lesson Title: Concept of Bond and Anchorage.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Identify the importance of Bond.
2. Identify the importance of Anchorage.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Bond |
| Anchorage |

Assignment / Questions: 1.Classify the various bonds.
2. Classify the Anchorage.

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Semester : I

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Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 20…… Duration of Lesson: 1hr …….

Lesson Titl: Development length and Detailing.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Importance of development length.
2. Identify the importance of detailing.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Development length, Bond stress and Detailing |

Assignment / Questions: 1.Illustrate about detailing.

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# LESSON PLAN

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Semester : I

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Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 21…… Duration of Lesson: 1hr …….

Lesson Title: Problem Solving .

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Appraise whether the beams is safe in bond or not..
2. Infer detailing.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Development length, anchorage and detailing. |

Assignment / Questions: 1. Determine the bond length for the given data and check whether it is safe or not in bond.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

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Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 22…… Duration of Lesson: 1hr …….

Lesson Title: Introduction of slabs.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Categorize the slabs.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Types of slabs, difference between slab and beam. |

Assignment / Questions: 1.Categorize the slabs based on shape, span ratio and end conditions.

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# LESSON PLAN

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Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 23…… Duration of Lesson: 1hr …….

Lesson Title: Design of one way slab.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design one way slab

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Span ratio, thickness of slab, Area of steel along short span, distribution steel, check for shear, check for development length and check for deflection. |

Assignment / Questions: 1.Compile the steps involved in the design of one way slab.

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# LESSON PLAN

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Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

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Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 24…… Duration of Lesson: 1hr …….

Lesson Title: One way slab problem.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the one way slab such as finding thickness of slab, Area of steel along short span and distribution steel.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Span ratio, thickness of slab, Area of steel along short span and distribution steel. |

Assignment / Questions: 1.Design one way slab for the given data.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 25…… Duration of Lesson: 1hr …….

Lesson Title: One way slab problem.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Establish the Check for shear, check for development length and check for deflection.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Check for shear, check for development length and check for deflection |

Assignment / Questions: 1. Establish the checks for shear, development length and deflection.

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**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 26…… Duration of Lesson: 1hr …….

Lesson Title: Design of Two way slab.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design two way slab.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Span ratio, thickness of slab, Area of steel along short span, long span, check for shear, check for development length and check for deflection. |

Assignment / Questions: 1. Compile the steps involved in the design of two way slab.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 27…… Duration of Lesson: 1hr …….

Lesson Title: Two way slab problem.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design two way slab.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Span ratio, thickness of slab, Area of steel along short span, long span, check for shear, check for development length and check for deflection. |

Assignment / Questions: 1. Design two way slab for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 28…… Duration of Lesson: 1hr …….

Lesson Title: Design of continuous slab.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design continuous slab

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Thickness of slab, BM and SF coefficients, Area of steel along short span, long span, check for shear, check for development length and check for deflection. |

Assignment / Questions: 1. Compile the steps involved in the design of continuous slab.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 29…… Duration of Lesson: 1hr …….

Lesson Title: Continuous slab problem solving

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INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design continuous slab.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Thickness of slab, BM and SF coefficients, Area of steel along short span, long span, check for shear, check for development length and check for deflection. |

Assignment / Questions: 1.Design continuous slab for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 30…… Duration of Lesson: 1hr …….

Lesson Title: Design of Longitudinal stair case.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the longitudinal stair case.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Step width, rise, tread, main reinforcement and distribution reinforcement. |

Assignment / Questions: 1. Compile the steps involved in the design of longitudinal stair case.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 31…… Duration of Lesson: 1hr …….

Lesson Title: Longitudinal stair case problem.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design longitudinal stair case.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Step width, rise, tread, main reinforcement and distribution reinforcement. |

Assignment / Questions: 1. Design longitudinal stair case for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 32…… Duration of Lesson: 1hr …….

Lesson Title: Design of Dog legged stair case.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design of dog legged stair case.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Step width, rise, tread, main reinforcement and distribution reinforcement. |

Assignment / Questions: 1. Design dog legged stair case for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 33…… Duration of Lesson: 1hr…….

Lesson Title: Design of open well stair case.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design open well stair case.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Step width, rise, tread, main reinforcement and distribution reinforcement. |

Assignment / Questions: 1. Design open well stair case for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 34…… Duration of Lesson: 1hr …….

Lesson Title: Design of canopy.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design canopy.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Design of beam and slab for canopy. Main reinforcement and distribution reinforcement. |

Assignment / Questions: 1. Design canopy for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 35…… Duration of Lesson: 1hr …….

Lesson Title: Design of axial columns.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design axial column.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Longitudinal reinforcement, Lateral ties and Pitch. |

Assignment / Questions: 1. Compile the steps involved in the design of axial columns.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 36…… Duration of Lesson: 1hr …….

Lesson Title: Axial columns problem.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design axial column.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Longitudinal reinforcement, Lateral ties and Pitch. |

Assignment / Questions: 1. Design the axial column for the given data.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 37…… Duration of Lesson: 1hr …….

Lesson Title: Design of columns subjected to combined axial load and uni axial bending

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design columns subjected to combined axial load and uni axial bending.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Longitudinal reinforcement, Pu-Mu charts, Mux, Muy, Lateral ties and Pitch. |

Assignment / Questions: 1. Compile the steps involved in the design of column subjected to combined axial load and uni axial bending.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 38…… Duration of Lesson: 1hr …….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design of columns subjected to combined axial load and uni axial bending.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Longitudinal reinforcement, Mux, Muy |

Assignment / Questions: 1. Design the column for the given data.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 39…… Duration of Lesson: 1hr …….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design of columns subjected to combined axial load and uni axial bending.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Lateral ties, pitch and check for safety |

Assignment / Questions: 1. Design the column for the given data.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 40…… Duration of Lesson: 1hr …….

Lesson Title: Design of columns subjected to combined axial load and bi axial bending

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design columns subjected to combined axial load and bi axial bending.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Longitudinal reinforcement, Pu-Mu charts, Mux, Muy, Lateral ties and Pitch. |

Assignment / Questions: 1. Design the column for the given data.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 41…… Duration of Lesson: 1hr …….

Lesson Title: Introduction about footings.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Categorize the footings.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Types of footings. Stepped, flat and sloped footings. |

Assignment / Questions: 1. Classify the footings based on shape in plan and section.

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 42…… Duration of Lesson: 1hr …….

Lesson Title: Design of Isolated square footing.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design Isolated square footing.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Size of footing, Moment of resistance, Area of reinforcement, check for one way shear, check for two way shear and transfer of load at base of column. |

Assignment / Questions: 1. Compile the steps involved in the design of isolated square footing.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 43…… Duration of Lesson: 1hr …….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design Isolated square footing.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Size of footing, Moment of resistance, Area of reinforcement, check for one way shear, check for two way shear and transfer of load at base of column. |

Assignment / Questions: 1. Design Isolated square footing for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 44…… Duration of Lesson: 1hr …….

Lesson Title: Design of Isolated Rectangular footing.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design Isolated rectangular footing.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Size of footing, Moment of resistance, Area of reinforcement, check for one way shear, check for two way shear and transfer of load at base of column. |

Assignment / Questions: 1. Compile the steps involved in the design of isolated rectangular footing.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 45…… Duration of Lesson: 1hr…….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design Isolated rectangular footing.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Size of footing, Moment of resistance, Area of reinforcement, check for one way shear, check for two way shear and transfer of load at base of column. |

Assignment / Questions: 1. Design Isolated rectangular footing for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 46…… Duration of Lesson: 1hr …….

Lesson Title: Design of Isolated circular footing.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design Isolated circular footing.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Size of footing, Moment of resistance, Area of reinforcement, check for one way shear, check for two way shear and transfer of load at base of column. |

Assignment / Questions: 1. Compile the steps involved in the design of isolated circular footing.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 47…… Duration of Lesson: 1hr …….

Lesson Title: Design of combined footing.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design combined footing.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Size of footing, Moment of resistance, Area of reinforcement, check for one way shear, check for two way shear and transfer of load at base of column. |

Assignment / Questions: 1. Compile the steps involved in the design of combined footing.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 48…… Duration of Lesson: 1hr …….

Lesson Title: Introduction about Limit state design for serviceability.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Classify the Limit state of serviceability.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Limit state of deflection, cracking, vibration and creep. Factors affecting deflection. |

Assignment / Questions: 1. Classify the Limit state of serviceability.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 49…… Duration of Lesson: 1hr …….

Lesson Title: Limit state Design for deflection.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the beam for limit state design of deflection.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Short term and long term deflection. |

Assignment / Questions: 1. Design the beam for limit state design of deflection.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 50…… Duration of Lesson: 1hr …….

Lesson Title: Limit state Design for creep.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the beam for limit state design of creep.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Creep |

Assignment / Questions: 1. Design the beam for limit state design of creep.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 51…… Duration of Lesson: 1hr …….

Lesson Title: Limit state Design for vibration.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the beam for limit state design of vibration.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Vibration |

Assignment / Questions: 1. Design the beam for limit state design of vibration.

Signature of faculty

**Gokaraju Rangaraju Institute of Engineering and Technology**
**(Autonomous)**
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 52…… Duration of Lesson: 1hr …….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the beam for Limit state of serviceability.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Limit state of serviceability |

Assignment / Questions: 1. Design the beam for Limit state of serviceability for the given data.

Signature of faculty

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**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 53…… Duration of Lesson: 1hr …….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the beam for Limit state of serviceability.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Limit state of serviceability |

Assignment / Questions: 1. Design the beam for Limit state of serviceability for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 54…… Duration of Lesson: 1hr …….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the slab for Limit state of serviceability.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Limit state of serviceability |

Assignment / Questions: 1. Design the slab for Limit state of serviceability for the given data.

Signature of faculty

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# LESSON PLAN

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Lesson No: 55…… Duration of Lesson: 1hr …….

Lesson Title: Problem solving.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Design the slab for Limit state of serviceability.

TEACHING AIDS: White board, Marker pens and Code book

TEACHING POINTS :

| Sub topics |
| --- |
| Limit state of serviceability |

Assignment / Questions: 1. Design the slab for Limit state of serviceability for the given data.

Signature of faculty

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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## TUTORIAL SHEET - 1

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

This Tutorial corresponds to Unit No. / Lesson: One

Q1. Explain about stress block parameters.

Q2. Illustrate about. a. Balanced section b. Under reinforced section c. Over reinforced section.

Q3. Summarize the stress strain behavior of Steel and concrete with the help of figures.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 1
Outcome Nos.: 1

Signature of HOD Signature of faculty

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## TUTORIAL SHEET - 2

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

This Tutorial corresponds to Unit No. / Lesson: Two

Q1. A rectangular beam is 250mm wide and 400mm deep up to the center of reinforcement. Determine the reinforcement required if it has to resist a working moment of 25kN-m. Use M20 concrete and SAIL:300 HY grade steel.

Q2. Determine the Moment of resistance of a beam 250mmx500mm deep if it is reinforced with 2 bars of 12mm diameter in compression zone and 4 bars of 20mm diameter in tension zone each at an effective cover of 40mm. Use M25 concrete and Fe415 steel.

Q3. Design the flanged beam for the given data.

$b_f$=2950mm, $D_f$=100mm, D=675mm, $b_w$=300mm, spacing of beams = 4000mm c/c.

Effective cover to the steel=90mm, $L_e$= 12m, L.L = 12kN/m, Concrete=M20, Steel= Fe415 and ends simply supported.

Q4. Design a section of a ring beam 500mm wide and 700mm deep subjected to a B.M of 130kN-m, T.M of 10kN-m and a shear force of 130kN at ultimate. Use M25 concrete and Fe415 steel.

Q5. Explain about various modes of shear failures.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 2
Outcome Nos.: 2

Signature of HOD Signature of faculty

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## TUTORIAL SHEET - 3

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

This Tutorial corresponds to Unit No. / Lesson: Three

Q1. Discuss the difference between Design Parameter of Slab and Beam.

Q2. Design a two way slab when the edges are simply supported for a room 5.5m x 4.0m clear in size if the superimposed load is 5kN/$m^2$. Use M20 concrete and Fe415 steel.

Q3. Design a canopy beam and slab over a 4.5m wide opening. The L.L of canopy may be taken as 750 N/$m^2$. Use M20 concrete and Fe415 steel.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 3
Outcome Nos.: 3

Signature of HOD Signature of faculty

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## TUTORIAL SHEET - 4

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

This Tutorial corresponds to Unit No. / Lesson: Four

Q1. Design a circular column to carry an axial load of 1500kN using lateral ties**.** Use M20 concrete and Fe415 steel.

Q2. Design a R.C. Column 300mmx400mm rectangular to carry an ultimate load of 600kN at an eccentricity of 120mm. Use M20 concrete and Fe415 steel.

Q3. Design the reinforcement for R.C.C column 250mm x400mm for the given data.

Pu= 100kN, L=6m, $l_{eff(x)}$ =4.8m, $l_{eff(y)}$ =4.0m, Mux2= 30kN-m @top, Mux1= 20kN-m @bottom, Muy= 10kN-m @top and bottom. Column is braced and bents in single curvature.

Q4. Design an isolated rectangular footing for a column size of 230mm x 550mm carrying a factored axial load of 1800 kN. Safe bearing capacity of the soil is 120kN/$m^2$. Use M20 concrete and Fe415 steel.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 4
Outcome Nos.: 4

Signature of HOD Signature of faculty

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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## TUTORIAL SHEET - 5

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

This Tutorial corresponds to Unit No. / Lesson: Five

Q1. Design a beam of cross section 350mm x400mm used as a SSB subjected to a central point load of 5kN and full U.D.L of 1kN/m over entire span of 5m. Check for shear and deflection. Use M20 concrete and Fe415 steel

Q2. Establish the factors affecting short term deflection?

Q3. Design a beam of cross section 350mm x400mm used as a cantilever subjected to a central point load of 2kN and full U.D.L of 1kN/m over entire span of 6m. Check for shear and deflection. Use M20 concrete and Fe415 steel.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 5
Outcome Nos.: 5

Signature of HOD Signature of faculty

# Gokaraju Rangaraju Institute of Engineering and Technology
# (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## ASSIGNMENT SHEET - 1

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

This Tutorial corresponds to Unit No. / Lesson: One

Answer any five of the following

1. a) Define limit state and list out the types of limit states considered in the design of RC structures.
   b) Discuss the assumptions in limit state of collapse in flexure.
2. Discuss the need for doubly reinforced concrete beam.
3. Explain modes of failures of reinforced concrete member.
4. Differentiate working stress and limit state method.

Objective Nos.: 1
Outcome Nos.: 1

Signature of HOD Signature of faculty

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## ASSIGNMENT SHEET - 2

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

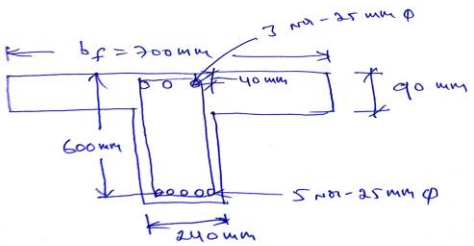
Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas / Mr.K.VEERA BABU Dept.: Civil Engineering

Designation: Professor / Assistant Professor

Answer all Questions

1. Determine the moment of resistance of T-beam, if the beam carries compression reinforcement as given below in the fig. Use M 20 and Fe 415.




2. Verify for bond in a simply supported beam of 230 mm x 4000 mm effective dimensions, it is resting on 300 mm wide supports, subjected to factored shear force of 120 kN at critical section and consists of 5 bars of 12 mm dia on tension side. Adopt M 20 and Fe 415
3. Determine the moment of resistance of a singly reinforced concrete beam of rectangular section 230 mm wide and 430 mm deep (effective depth), reinforced with 4 bars of 16 mm dia , use M20 grade of concrete and Fe 415 grade of steel, redesign the beam if necessary.
4. Find the reinforcement for the beam section for an applied moment of 68 kN-m, the width of beam is limited to 200 mm, if the depth of the beam is kept equal to the one, obtained from working stress method. Use M20 grade of concrete and Fe 415 grade of steel.

5. Simply supported beam of 225 mm wide and 450 mm effective depth carries a u.d.l. of 80 kN/m including its own weight over an effective span of 6 m. The reinforcement consists of 5 bars of 25 mm dia, out of these 2 bars can be safely bent up at 1 m distance from the support. Design the shear reinforcement. Adopt M 20 grade of concrete and Fe 415 grade of steel. Assume width of support as 300 mm.

6. Determine the reinforcement required for a rectangular beam section with the following data:
   Width of section = 230 mm, depth of section = 450 mm, factored B.M = 125 kN-m, factored torsional moment = 50 kN-m, factored S.F. = 80 kN. Adopt M 25 grade of concrete and Fe 415 grade of steel.

7. A T – beam consists of a flange 1100 mm wide and 120 mm deep. The depth of the beam is 550 mm up to the centre of steel and width of the web is 250 mm. Design the T – beam completely for an ultimate moment of 460 kN-m. Use M 25 grade concrete and Fe 415 grade steel.

Objective Nos.: 2
Outcome Nos.: 2

Signature of HOD

Signature of faculty

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## ASSIGNMENT SHEET - 3

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech –Civil Engg. Year: III Section: A & B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr. T. SRINIVAS, Mr. K.VEERA BABU Dept.: Civil Engineering

Designation: Professor, Assistant Professor.

Answer all questions

1. Design a cantilever canopy for a span of 3 m to cover an area of 5 m x 3 m with rectangular cantilever beams of 230 mm width spaced at 3 m c/c, slab spanning between these beams and having clear overhanging of 0.885 m on either side of the portico. Adopt M 20 and Fe 415. Assume a live load of 1.5 $kN/m^2$ on the portico roof.
2. Design a two way slab when the edges are simply supported for a room 5.5m x 4.0m clear in size if the superimposed load is $5kN/m^2$. Use M20 concrete and Fe415 steel.
3. Design a canopy beam and slab over a 4.5m wide opening. The L.L of canopy may be taken as 750 $N/m^2$. Use M20 concrete and Fe415 steel.
4. Design the a dog-legged staircase for a room of 5.1 m x 2.5 m with a floor to floor height of 3 m. Assume that staircase is liable to be overcrowded. Adopt M 25 and Fe 415.

Objective Nos.: 3
Outcome Nos.: 3

Signature of HOD Signature of faculty

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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## ASSIGNMENT SHEET -4

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech –Civil Engg. Year: III Section: A & B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr. T. SRINIVAS, Mr. K.VEERA BABU Dept.: Civil Engineering

Designation: Professor, Assistant Professor.

Answer all questions

1. Determine the reinforcement required in a column of 230 mm x 450 mm subjected to an axial factored load of 1100 kN and a factored moment of 28 kN-m about shorter axis. Adopt M20 and Fe415 and assume two sides (shorter sides) reinforcement.
2. Design a square column of 300 mm x 300 mm, is subjected to an axial factored load of 1800 kN and factored moments of 28 kN-m and 32 kN-m about the two mutually perpendicular axes respectively. Adopt M 25, Fe 415 and assume an effective cover as 40 mm.
3. Design an axially loaded tied column with an unsupported length of 3.1 m. The column is fixed at one end and pinned at the other end. The column has to carry a factored load of 1800 kN. Use M 25 grade of concrete and Fe 415 grade of steel. Sketch the reinforcement details.

Objective Nos.: 4
Outcome Nos.: 4

Signature of HOD Signature of faculty

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## ASSIGNMENT SHEET -5

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech –Civil Engg. Year: III Section: A & B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr. T. SRINIVAS, Mr. K.VEERA BABU Dept.: Civil Engineering

Designation: Professor, Assistant Professor.

Answer all questions

1 A rectangular cantilever beam is of span 3.6 m and 300 mm x 500 mm in cross section. The beam is subjected to a service load of 12 kN/m in addition to its self weight. It may be assumed that 45% of the total moment is due to permanent loads. The beam is reinforced with 4 no. of 20 mm diameter

2. A rectangular cantilever beam is of span 4.5 m and 400 mm x 500 mm in cross section. The beam is subjected to a service load of 15 kN/m in addition to its self weight. It may be assumed that 45% of the total moment is due to permanent loads. The beam is reinforced with 4 no. of 25 mm diameter on the tension side. Check the beam for deflection. Adopt M30 and Fe 415.

3. Design a square isolated flat footing for a column of size 300 mm × 300 mm carrying an axial load of 1300 kN. The S.B.C. of the soil is 250 kN /m2 .Use M 20 and Fe 415.

4. Design a rectangular isolated footing of uniform depth for a column of size 300 mm × 450 mm, carrying an axial load of 1600 kN. The S.B.C. of the soil is 350 kN /m2 .Use M 25 and Fe 415. Sketch the plan and sectional elevation of the footing showing the reinforcement details

Objective Nos.: 5
Outcome Nos.: 5

Signature of HOD Signature of faculty

Date: Date:

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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## EVALUATION STRATEGY

**A**cademic **Y**ear : 2021-22

Semester: I

Name of the Program: B.Tech Civil Engineering Year: III Section: A & B

Course/Subject: Design of Concrete Structures-I Course Code: GR18A3003

Name of the Faculty: Dr.T.Srinivas and K. Veera Babu

Dept.: Civil Engineering

Designation: Professors/Asst. Professor

### 1. TARGET:

A) Percentage for pass: 90%

b) Percentage of class:

Total Strength: 130

| S.No. | Class / Division | No. of Students |
|---|---|---|
| 1 | First Class with distinction | 75 |
| 2 | First Class | 46 |
| 3 | Pass Class | 09 |

### 2. COURSE PLAN& CONTENT DELIVERY

| S.No | Plan | Brief Description |
|---|---|---|
| 1 | Practice classes | 55 Theory classes for Section A, B |
| 3 | Assignments | Assignments for solving numerical problems |

## 3. METHOD OF EVALUATION

### 3.1 Continuous Assessment Examinations

- Assignments: Assignments to assess the knowledge of the student on the basics and concepts in Concrete, Reinforced Concrete, Loads, Stress block parameters, various elements of frame Slabs, Beams, Columns, Footings, Stairs and limit state of serviceability.
- Seminars: To assess the knowledge of the student in DCS-I.
- Quiz: To assess the knowledge of the student in various concepts and basics of DCS-I.
- Internal Examination: Internal Examinations to assess their overall knowledge in DCS-I.

### 3.2. Semester/End Examination

To test their abilities in the course Design of Reinforced Concrete Structures and to approve their abilities learnt during the same.

**4.** List out any new topic(s) or any innovation you would like to introduce in teaching the subjects in this Semester.

Introduce drawing of reinforcement details.

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# MAPPING

| GR18A3003/ **Design of Concrete Structures-I** | **Course Outcomes** | | | | |
|---|---|---|---|---|---|
| **Course Objectives** | 1 | 2 | 3 | 4 | 5 |
| 1 | X | | | | |
| 2 | | X | | | |
| 3 | | | X | | |
| 4 | | | | X | |
| 5 | | | | | X |

## Assessments

1. Assignment 2. Internal Examination 3. External Examination

4. Practical Projects 5. Viva

| GR18A3003/ **Design of Concrete Structures-I** | **Course Outcomes** | | | | |
|---|---|---|---|---|---|
| Assessments | 1 | 2 | 3 | 4 | 5 |
| 1 | X | X | X | X | X |
| 2 | X | X | X | X | X |
| 3 | X | X | X | X | X |
| 4 | | | | | |
| 5 | | | | | |

| GR18A3003/ **Design of Concrete Structures-I** | **Course Objectives** | | | | |
|---|---|---|---|---|---|
| Assessments | 1 | 2 | 3 | 4 | 5 |
| 1 | X | X | X | X | X |
| 2 | X | X | X | X | X |
| 3 | X | X | X | X | X |
| 4 | | | | | |
| 5 | | | | | |

| GR18A3003/ **Design of Concrete Structures-I** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COs/POs** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** | **K** | **L** | **PSO's** | |
| | | | | | | | | | | | | | **1** | **2** |
| 1. Classify Working Stress and Limit State method in design of reinforced concrete structures. | H | | | M | H | M | | M | M | | | H | | M |
| 2. Analyze and design of beams. | H | M | | M | | | | M | M | | | M | M | M |
| 3. Design of slabs, staircase and canopy. | H | M | | M | | | | M | M | | | M | M | M |
| 4. Design of columns. | H | M | | M | | | | M | M | | | M | M | M |
| 5. Design of footings, beams and slabs for limit state of serviceability. | H | M | | M | | | | M | M | | | M | M | M |

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# RUBRIC TEMPLATE

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A / B

Course/Subject: Design of Concrete Structures-I

Course Code: **Sub Code: GR18A3003**

Name of the Faculty: Dr.T.Srinivas/ K.Veerababu Dept.: Civil Engineering

Designation: Professor/ Asst.Professor

Objective: To learn design aspects of reinforced concrete structures.
Student Outcome: Learn design concepts, use of code, design of elements such as beams, columns, footings and slabs against strength and serviceability.

| | | | **Beginning** | **Developing** | **Reflecting Development** | **Accomplished** | **Exemplary** | **Score** |
|---|---|---|---|---|---|---|---|---|
| **S. No** | **Name of the Student** | **Performance Criteria** | **1** | **2** | **3** | **4** | **5** | |
| 1 | 19241A0179 | The level of knowledge on basic requirements for design | Low level of knowledge on basic rquirements of design | Able to discuss the basic requirements of design | Ability to explain the basic requirements of design | Full knowledge on basic requirements of design | Analysing and implementing the knowledge of requirements of design | 5 |
| | | The level of knowledge on design of structural elements. | Low level of knowledge on design of structural | Able to discuss on design of structural elements. | Ability to explain design of structural elements. | Full knowledge on design of structural | Analysing and application of knowledge on | 5 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | elements. | | | elements. | design of structural elements. | |
| | | The level of knowledge to analyse serviceability of structural elements. | Low level of knowledge to analyse serviceability of structural elements. | Ability to discuss and to study the serviceability of structural elements. | Ability to explain the serviceability of structural elements. | Full knowledge on serviceability of structural elements. | Analysing and implementing the knowledge of serviceability of structural elements. | 5 |
| | | | | | | | Average Score | 5 |

| | | | **Beginning** | **Developing** | **Reflecting Development** | **Accomplished** | **Exemplary** | **Score** |
|---|---|---|---|---|---|---|---|---|
| **S. No** | **Name of the Student** | **Performance Criteria** | **1** | **2** | **3** | **4** | **5** | |
| 1 | 19241A0161 | The level of knowledge on basic requirements for design | Low level of knowledge on basic rquirements of design | Able to discuss the basic requirements of design | Ability to explain the basic requirements of design | Full knowledge on basic requirements of design | Analysing and implementing the knowledge of requirements of design | 2 |
| | | The level of knowledge on design of structural elements. | Low level of knowledge on design of structural elements. | Able to discuss on design of structural elements. | Ability to explain design of structural elements. | Full knowledge on design of structural elements. | Analysing and application of knowledge on design of structural elements. | 2 |
| | | The level of knowledge | Low level of knowledge | Ability to discuss and to | Ability to explain the serviceabili | Full knowledge on | Analysing and implement | 2 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | to analyse serviceability of structural elements. | to analyse serviceability of structural elements. | study the serviceability of structural elements. | ty of structural elements. | serviceability of structural elements. | ing the knowledge of serviceability of structural elements. | |
| | | | | | | | Average Score | 2 |
| | | | **Beginning** | **Developing** | **Reflecting Development** | **Accomplished** | **Exemplary** | **Score** |
| **S. No** | **Name of the Student** | **Performance Criteria** | **1** | **2** | **3** | **4** | **5** | |
| 1 | 2024 5A0130 | The level of knowledge on basic requirements for design | Low level of knowledge on basic rquirements of design | Able to discuss the basic requirements of design | Ability to explain the basic requirements of design | Full knowledge on basic requirements of design | Analysing and implementing the knowledge of requirements of design | 3 |
| | | The level of knowledge on design of structural elements. | Low level of knowledge on design of structural elements. | Able to discuss on design of structural elements. | Ability to explain design of structural elements. | Full knowledge on design of structural elements. | Analysing and application of knowledge on design of structural elements. | 4 |
| | | The level of knowledge to analyse serviceability of structural elements. | Low level of knowledge to analyse serviceability of structural elements. | Ability to discuss and to study the serviceability of structural elements. | Ability to explain the serviceability of structural elements. | Full knowledge on serviceability of structural elements. | Analysing and implementing the knowledge of serviceability of structural elements. | 2 |
| | | | | | | | Average Score | 3 |

# Gokaraju Rangaraju Institute of Engineering and Technology
# (Autonomous)
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## COURSE COMPLETION STATUS

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: A

Course/Subject: Design of Concrete Structures-I

Course Code: **Sub Code: GR18A3003**

Name of the Faculty: Dr.T.Srinivas/ K.Veerababu Dept.: Civil Engineering

Designation: Professor/ Asst.Professor

Actual Date of Completion & Remarks, if any

| **Units** | **Remarks** | **Objectives Achieved** | **Outcomes Achieved** |
|---|---|---|---|
| Unit I | 16-09-2021<br>Unit covered on time | 1 | 1 |
| Unit II | 06-10-2021<br>Unit covered on time | 2 | 2 |
| Unit III | 04-11-2021<br>Unit covered on time | 3 | 3 |
| Unit IV | 17-11-2021<br>Unit covered on time | 4 | 4 |
| Unit V | 10-12-2021<br>Unit covered on time | 5 | 5 |

Signature of HOD Signature of faculty

Date: Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

# Gokaraju Rangaraju Institute of Engineering and Technology
# (Autonomous)
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

## COURSE COMPLETION STATUS

**A**cademic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engineering Year: III Section: B

Course/Subject: Design of Concrete Structures-I

Course Code: **Sub Code: GR18A3003**

Name of the Faculty: Dr.T.Srinivas/ K.Veerababu Dept.: Civil Engineering

Designation: Professor/ Asst.Professor

Actual Date of Completion & Remarks, if any

| **Units** | **Remarks** | **Objectives Achieved** | **Outcomes Achieved** |
|---|---|---|---|
| Unit I | 01-09-2021<br>Unit covered on time | 1 | 1 |
| Unit II | 28-09-2021<br>Unit covered on time | 2 | 2 |
| Unit III | 27-10-2021<br>Unit covered on time | 3 | 3 |
| Unit IV | 13-11-2021<br>Unit covered on time | 4 | 4 |
| Unit V | 08-12-2021<br>Unit covered on time | 5 | 5 |

Signature of HOD Signature of faculty

Date: Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

**Department of Civil Engineering**

**Descriptive Paper (2021-22)**

**III B.Tech. I Semester, I Mid Examinations, October, 2021**

**Design of Concrete Structures-I (Sub Code: GR18A3003)**

**Time: 90 Minutes** **Date of Exam: 19-10-2021 (FN)** **Max Marks: 15**

**I Answer any Three Questions**

| Question No. | | Marks | Blooms Levels* | Course Outcome |
|---|---|---|---|---|
| 1 | a) Define limit state and list out the types of limit states considered in the design of RC structures.<br>b) Differentiate working stress and limit state method . | 2M<br>3M | BL1<br>BL2 | CO1 |
| 2 | A T – beam consists of a flange 1100 mm wide and 120 mm deep. The depth of the beam is 550 mm up to the centre of steel and width of the web is 250 mm. Design the T – beam completely for an ultimate moment of 460 kN-m. Use M 25 grade concrete and Fe 415 grade steel | 5M | BL5 | CO2 |
| 3 | Simply supported beam of 225 mm wide and 450 mm effective depth carries a u.d.l. of 80 kN/m including its own weight over an effective span of 6 m. The reinforcement consists of 5 bars of 25 mm dia, out of these 2 bars can be safely bent up at 1 m distance from the support. Design the shear reinforcement. Adopt M 20 grade of concrete and Fe 415 grade of steel. Assume width of support as 300 mm | 5M | BL3 | CO2 |
| 4 | a) List out the types of slabs.<br>b) Explain the behavior of one way and two way | 2M<br>3M | BL1<br>BL 2 | CO3 |

| | | | | |
|---|---|---|---|---|
| | slab with neat sketches | | | |

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

**Department of Civil Engineering**

**Objective Paper (2021-22)**

**III B.Tech. I Semester, I Mid Examinations, October, 2021**

**Design of Concrete Structures-I (Sub Code: GR18A3003)**

**Time: 10 Minutes** **Date of Exam: 19-10-2021 (FN)** **Max Marks: 5**

**Answer All Questions** **All Questions Carry Equal Marks**

**Name: _____ Hall Ticket No.**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

**II. Choose the correct alternative:**

1. Yield strength of Fe250 grade steel is [ ]
   A.415 N/mm$^2$ B. 500 N/mm$^2$ C. 550 N/mm$^2$ D. 250 N/mm$^2$
2. The maximum strain in concrete at the outer most compression fiber is [ ]
   A. 0.035 B. 0.002 C. 0.0035 D. 0.87/$f_y$
3. The minimum clear cover for slabs as per IS 456:2000 [ ]
   A. 15 mm B. 20 mm C. 25 mm D. 30 mm
4. In a simply supported beam of span "l", the maximum shear force, if it is subjected to uniformly distributed load of "w" kN/m [ ]
   A.0.65wl B. 0.5 wl C. 0.25 wl D. wl
5. the ratio between longer span to shorter span of slab is greater than 2, it is called[ ]
   A. Two way slab B. One way slab C. Flat slab D. Ribbed slab
6. Indian Standard code for live load is [ ]
   A. 875 (Part2) B. 875 (Part1) C. 456 (Part2) D. 456 (Part1)
7. In M25 grade of concrete, 25 number means [ ]
   A. 25 N/m$^2$ B. 20 C. 20 N/mm$^2$ D Testing after 20 days
8. Minimum grade of concrete to be used for RCC as per IS 456:2000? [ ]
   A. M15 B. M20 C. M25 D. M30
9. An effective cover can be defined as [ ]
   A. Clear cover + radius of bar B. Clear cover + dia of bar C. Clear cover D. Twice dia of bar
10. Which one of the following sections performs better on ductility criterion [ ]
    A. Balanced B. Under reinforced C. Over reinforced D. All the above

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

**Department of Civil Engineering**
**Descriptive Paper (2021-22)**
**III B.Tech. I Semester, II Mid Examinations, December, 2021**
**Design of Concrete Structures-I (Sub Code: GR18A3003)**

**Time: 90 Minutes** **Date of Exam: 10-12-2021 (FN)** **Max Marks: 15**

**I Answer any Three Questions**

| Question No. | | Marks | Blooms Levels* | Course Outcome |
|---|---|---|---|---|
| 1 | Design a cantilever canopy for a span of 3 m to cover an area of 5 m x 3 m with rectangular cantilever beams of 230 mm width spaced at 3 m c/c, slab spanning between these beams and having clear overhanging of 0.885 m on either side of the portico. Adopt M 20 and Fe 415. Assume a live load of 1.5 kN/m2 on the portico roof. | 5M | BL3 | CO3 |
| 2 | Design an axially loaded rectangular column with an unsupported length of 3.1 m. The column is fixed at one end and pinned at the other end. The column has to carry a factored load of 1800 kN. Use M 25 grade of concrete and Fe 415 grade of steel. Sketch the reinforcement details. | 5M | BL3 | CO4 |
| 3 | Design a rectangular isolated footing of uniform depth for a column of size 300 mm × 450 mm, carrying an axial load of 1600 kN. The S.B.C. of the soil is 350 kN /m2 .Use M 25 and Fe 415. Sketch the plan and sectional elevation of the footing showing the reinforcement details | 5M | BL3 | CO5 |
| 4 | A rectangular cantilever beam is of span 3.6 m and 300 mm x 500 mm in cross section. The beam is subjected to a service load of 12 kN/m in addition to its self weight. It may be assumed that 45% of the total moment is due to permanent loads. The beam is reinforced with 4 no. of 20 mm diameter on the tension side. Check the beam for deflection. Adopt M 25 and Fe 415. | 5M | BL5 | CO5 |

# Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

**Department of Civil Engineering**
**Descriptive Paper (2021-22)**
**III B.Tech. I Semester, II Mid Examinations, December, 2021**
**Design of Concrete Structures-I (Sub Code: GR18A3003)**

**Time: 10 Minutes** **Date of Exam: 10-12-2021 (FN)** **Max Marks: 5**

**Answer All Questions** **All Questions Carry Equal Marks**

**Name: _____ Hall Ticket No.**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

**II. I. Choose the correct alternative:**

1. Maximum percentage of reinforcement in case of columns as per IS456-2000 [ ]
   A. 3 B. 6 C. 2 D. 1
2. Minimum clear cover to main reinforcement for RCC slabs in case of mild condition as per IS456-2000 [ ]
   A.25 mm B. 50 mm C. 20 mm D. 40 mm
3. Minimum number of longitudinal bars in a circular column as per IS456-2000 [ ]
   A.4 B. 6 C. 5 D. 7
4. Maximum allowable thickness of a structural crack where there is a severe environmental effect as per IS456-2000 [ ]
   A.0.1 mm B. 0.3 mm C. 0.2 mm D. 0.5 mm
5. The effective length of a column when both ends are pinned [ ]
   A. 1.0 L B.2.0 L C. 1.2 L D. 0.5 L
6. The value of $k_3$ in calculation of deflection due to shrinkage in cantilever beam [ ]
   A. 0.125 B. 0.75 C. 0.5 D. 1.0
7. Creep coefficient at one year as per IS456-2000 is [ ]
   A. 1.6 B. 1.1 C. 2.2 D. 2.0
8. Two way slab is defined as, when the ratio of $l_y$ to $l_x$ is [ ]
   A. $\leq 2$ B. >2 C. =2 D. $\leq 2.5$
9. The torsion reinforcement can be provided over a length of ----- in a two way slabs [ ]
   A. Lx/8 B. Lx/4 C. 3Lx/4 D. Lx/5
10. Slender column is defined as, if its length to least lateral dimension as per IS456-2000 [ ]
    A. $\leq 12$ B. > 12 C. > 6 D. > 3

**Gokaraju Rangaraju Institute of Engineering and Technology**
**(Autonomous)**
**Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

# MID-1 AND M-II MARKS SECTION-A

| MID I & II EXAM | | | MID-I | MID-II |
|---|---|---|---|---|
| S.NO | ROLL NO. | NAME | 20 | 20 |
| 1 | 18241A0151 | SOHEB PATEL | 10 | 7 |
| 2 | 18241A0152 | SRIAM SHIVA ADITYA | AB | AB |
| 3 | 19241A0101 | RUHAIL AHMAD LONE | 4 | 4 |
| 4 | 19241A0102 | AITHA SAI TEJA | 20 | 19 |
| 5 | 19241A0103 | BARISETTY SHIVA KARTHIK | 11 | 10 |
| 6 | 19241A0104 | BENDHI VARUN THEJA GOUD | 15 | 7 |
| 7 | 19241A0105 | BHUKYA VAMSHI | 13 | 13 |
| 8 | 19241A0106 | BOGE VENKAT ROHITH | 8 | 5 |
| 9 | 19241A0107 | BONTHA PRANEETHKUMAR | 15 | 13 |
| 10 | 19241A0108 | CHILUKA RAHUL | 13 | 12 |
| 11 | 19241A0109 | DANDI KIRAN | 16 | 12 |
| 12 | 19241A0110 | DAYYA RAGNESH | 8 | 6 |
| 13 | 19241A0111 | E MANISH GOUD | 11 | 6 |
| 14 | 19241A0112 | ERRAM SAI PRIYA | 14 | 12 |
| 15 | 19241A0113 | G DEEPIKA | 13 | 13 |
| 16 | 19241A0114 | GORANTALA SAI | 18 | 14 |
| 17 | 19241A0115 | GUGULOTHU SANTHOSH | 17 | 13 |
| 18 | 19241A0116 | GURIJALA SAI KUMAR | 8 | 7 |
| 19 | 19241A0117 | GURUJALA SRIDHAR | 8 | 8 |
| 20 | 19241A0118 | IRUVANTI HEMANTH KUMAR | 13 | 11 |
| 21 | 19241A0119 | JANGITI VYSHNAVI | 14 | 14 |
| 22 | 19241A0120 | JARUPLA CHERAN | 17 | 14 |
| 23 | 19241A0122 | JETTI SREEVANI | 17 | 14 |
| 24 | 19241A0123 | K SOWMYA | 15 | 16 |
| 25 | 19241A0124 | KADALI KRISHNASRI SAI | 11 | 9 |
| 26 | 19241A0125 | KAMAREDDY AKSHAY | 7 | 5 |
| 27 | 19241A0126 | KATTA SAI KUMAR | 15 | 14 |
| 28 | 19241A0127 | KOLLURI.TEJASWI | 18 | 14 |
| 29 | 19241A0128 | KONDAPURAM SRIJA | 14 | 12 |
| 30 | 19241A0129 | KOTTE VIVEK | AB | 7 |
| 31 | 19241A0130 | KRUTHIKA VIJAY PALANGE | 9 | 15 |
| 32 | 19241A0131 | MADA AKHIL REDDY | 14 | 12 |
| 33 | 19241A0132 | MADARAM SHRAVAN KUMAR REDDY | 17 | 16 |
| 34 | 19241A0133 | MADDIGATLA AJAY SAGAR | 14 | 7 |
| 35 | 19241A0134 | CHANDANA MALPATEL | 15 | 14 |
| 36 | 19241A0135 | MANDALA CHINNI | 6 | 4 |
| 37 | 19241A0136 | MIREGILLA VIJAYAKUMAR | 14 | 12 |
| 38 | 19241A0137 | MOHD OBAID KASHIF | 13 | 11 |

| | | | | |
|---|---|---|---|---|
| 39 | 19241A0138 | NARAPAKA MADHAV KUMAR | 6 | 4 |
| 40 | 19241A0139 | NIMMALA ARSHITHA | 14 | 15 |
| 41 | 19241A0141 | P SIDDARTHA | AB | AB |
| 42 | 19241A0142 | PAGIDIPALLY AJAY KUMAR | 14 | 11 |
| 43 | 19241A0143 | PALLAPU NAVEEN | 12 | 8 |
| 44 | 19241A0144 | PALLE SANATH KUMAR | 13 | 16 |
| 45 | 19241A0145 | PANTANGI PRANAY | 14 | 9 |
| 46 | 19241A0146 | PATIL SWAPNIL | 7 | 5 |
| 47 | 19241A0147 | POLISETTY SAAHAS | 15 | 14 |
| 48 | 19241A0148 | S.SAITEJA | 15 | 5 |
| 49 | 19241A0149 | SAI NEERAJ M | 14 | 7 |
| 50 | 19241A0150 | SATYA SAI PRASANNA REDDY SOLIPETA | AB | AB |
| 51 | 19241A0151 | SHAIK BILAL | AB | 7 |
| 52 | 19241A0152 | SHAIK FIRDOUS AYESHA | 16 | 17 |
| 53 | 19241A0153 | SOORA VIKAS | 12 | 7 |
| 54 | 19241A0154 | TELLAM SRI SAI PAVANA ROSHINI | 18 | 14 |
| 55 | 19241A0155 | THALLAPALLY SWARANYA | 14 | 12 |
| 56 | 19241A0156 | THUMATI VENKATA VAYUNANDHAN | 11 | 6 |
| 57 | 19241A0157 | UDUMULA NIKHIL REDDY | 16 | 8 |
| 58 | 19241A0158 | VELISHALA GAYATHRI | 19 | 19 |
| 59 | 19241A0159 | VENKATA SIDDHARTHA RAJU VEGESNA | 11 | 8 |
| 60 | 19241A0160 | YASWANTH KURUVA | 15 | 12 |

# MID-I AND M-II MARKS SECTION-B

| MID II EXAM | | | MID -I | MID -II |
|---|---|---|---|---|
| **S.NO** | **ROLL NO.** | **NAME** | **20** | **20** |
| 1 | 19241A0161 | ABDUL RAHEEM | 15 | 7 |
| 2 | 19241A0162 | ANEMONI MURALI MANOHAR | 13 | 13 |
| 3 | 19241A0163 | ASKANY HARISH SAGAR | 8 | 5 |
| 4 | 19241A0164 | BODLA AKSHITH | 15 | 13 |
| 5 | 19241A0165 | BURRA VAMSHI KRISHNA | 13 | 12 |
| 6 | 19241A0166 | CHERLAKOLA AKHILA | 16 | 12 |
| 7 | 19241A0167 | CHINTAPALLI VIKRAM | 8 | 6 |
| 8 | 19241A0168 | CHIRRIBOYINA DHANYA | 11 | 6 |
| 9 | 19241A0169 | D SREE MADHURI | 14 | 12 |
| 10 | 19241A0170 | GADDAM SAHITHI | 13 | 13 |
| 11 | 19241A0171 | GAJJALA SUKENDHAR REDDY | 18 | 14 |
| 12 | 19241A0172 | YASHASWI GANGAVARAM | 17 | 13 |
| 13 | 19241A0173 | GINDHAM ADITYA KUMAR | 8 | 7 |
| 14 | 19241A0174 | GUDHETI NARENDAR REDDY | 8 | 8 |
| 15 | 19241A0175 | GUMMADI SAI PRATEEK REDDY | 13 | 11 |
| 16 | 19241A0176 | HANMAPUR DHEERAJ GOUD | 14 | 14 |
| 17 | 19241A0177 | JAVVAJI AISHWARYA | 17 | 14 |
| 18 | 19241A0178 | JULAPALLY NITHIN RAO | 17 | 14 |
| 19 | 19241A0179 | K NAVEEN | 15 | 16 |
| 20 | 19241A0180 | K RAJESHWARI | 11 | 9 |
| 21 | 19241A0181 | KACHAVA SURENDAR | 7 | 5 |
| 22 | 19241A0182 | KODATHALA INDU | 15 | 14 |
| 23 | 19241A0183 | KOTARU SRINIVASA VARAPRASAD | 18 | 14 |
| 24 | 19241A0184 | MALOTH RAHUL | 14 | 12 |
| 25 | 19241A0185 | MATURI SATHVIK | AB | 7 |
| 26 | 19241A0186 | MD ABDUL MAAJID | 9 | 15 |
| 27 | 19241A0187 | MEDARI DAYANA | 14 | 12 |
| 28 | 19241A0188 | NARSINGA SANDEEP | 17 | 16 |
| 29 | 19241A0189 | PALANATI ROHITH | 14 | 7 |
| 30 | 19241A0190 | PURALASETTY BHAVANA | 15 | 14 |
| 31 | 19241A0191 | RODDA MALAVIKA REDDY | 6 | 4 |
| 32 | 19241A0192 | SAPRAM NAGA SRILOWKYA MUKTHA | 14 | 12 |
| 33 | 19241A0193 | SHAIK PARVEZ ANSARI | 13 | 11 |
| 34 | 19241A0194 | SIDDELA THARUN KUMAR | 6 | 4 |
| 35 | 19241A0195 | TALARI CHANDANA SREE | 14 | 15 |
| 36 | 19241A0196 | VALLEPU KALYAN | AB | AB |
| 37 | 19241A0197 | VRASHAB PATEL | 14 | 11 |
| 38 | 19241A0198 | YELLAVULA NARENDER | 12 | 8 |
| 39 | 19241A0199 | BADDELA SAI THARUN | 13 | 16 |
| 40 | 20245A0101 | Aamanchi Bowmi | 14 | 9 |
| 41 | 20245A0102 | Aviraboina Sai Chaithanya | 7 | 5 |
| 42 | 20245A0103 | Bairy B S Anirudh | 15 | 14 |

| | | | | |
|---|---|---|---|---|
| 43 | 20245A0104 | Daddu Tejasree | 15 | 5 |
| 44 | 20245A0105 | Dopathi Raviteja | 14 | 7 |
| 45 | 20245A0106 | Eruventi Niharika | AB | AB |
| 46 | 20245A0107 | Gaddamidi Aanil | AB | 7 |
| 47 | 20245A0108 | Gandla Rishik Raj | 16 | 17 |
| 48 | 20245A0109 | Gone Naveen Kumar | 12 | 7 |
| 49 | 20245A0110 | Kota Vishal | 18 | 14 |
| 50 | 20245A0111 | Kummari Mahesh | 14 | 12 |
| 51 | 20245A0112 | Lakavath Anil | 11 | 6 |
| 52 | 20245A0113 | Madavaram Rohith | 16 | 8 |
| 53 | 20245A0114 | Mandala Akshitha | 19 | 19 |
| 54 | 20245A0115 | M Manjunath | 11 | 8 |
| 55 | 20245A0116 | Porandla Nababhushanam | 15 | 12 |
| 56 | 20245A0117 | Pulishetty Bhavani | 15 | 7 |
| 57 | 20245A0118 | Racha Kranthi Ranadeer | 13 | 13 |
| 58 | 20245A0119 | S Manoj Kumar | 8 | 5 |
| 59 | 20245A0120 | Samudrala Manideep | 15 | 13 |
| 60 | 20245A0121 | Sangepaga Goutham | 13 | 12 |
| 61 | 20245A0122 | Sodadasi Rahul | 16 | 12 |
| 62 | 20245A0123 | Vanga Harshith | 8 | 6 |
| 63 | 20245A0124 | Choleti Vineetha | 11 | 6 |
| 64 | 20245A0125 | Gangula Grishma | 14 | 12 |
| 65 | 20245A0126 | Bollampalli Sai Poojith | 13 | 13 |
| 66 | 20245A0127 | Pamulapati Sumanth | 18 | 14 |
| 67 | 20245A0128 | T Sanghamithra | 17 | 13 |
| 68 | 20245A0129 | Abeda Akanksha | 8 | 7 |
| 69 | 20245A0130 | Doppalapudi Ramvineeth Sai | 8 | 8 |
| 70 | 20245A0131 | Pilly Uday Kiran | 13 | 11 |

# Sample of Answer Scripts
# MID I EXAM

Gokaraju Rangaraju Institute of Engineering & Technology
(Autonomous College Affiliated to JNTUH) (12 Pages)
Bachupally, Kukatpally, Hyderabad - 500090

I II MID TERM EXAMINATION

No. 375052 H.T. No. 19841A0102

Name of the Examination III B.tech I Sem., I Mid Design of Concrete Structures-I Examination.

Course B.Tech Branch Civil-A Date 19/10/2021

Signature of the Invigilator

| Q.NO. | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a | b | a | b | a | b | a | b | a | b | a | b | |
| MARKS | 2 | 3 | | | 5 | | 2 | 3 | | | | | 15 |

ASatya

START WRITING FROM HERE

3 tot

Given, a Simply Supported beam of 225 mm wide (b)
effective depth (d) = 450 mm
carries a UDL of w = 80 kN/m
factored udl W = 80 × 1.5 = 120 kN/m
effective span Leff = 6 m

Reinforment consists of 5 bars of 25mm dia, out of 2 bars are safely bent and 3 bars are used as reinforcement.

$A_{st} = 3 \times \frac{\pi}{4}(25)^2$

$A_{st} = 1472.62\ mm^2$

$V_{u_2} = 120 \times 0.6$

$V_{u_2} = 72\ kN$

Shear force $V_u = V_{u_1} - V_{u_2}$

$V_u = 360 - 72$

$V_u = 288\ kN$

Nominal Shear Stress ($\tau_v$)

$\tau_v = \frac{V_u}{b.d}$

$\tau_v = \frac{288}{225 \times 450} \times 1000$

$\tau_v = 2.84\ N/mm^2$

Find out the value of $\tau_{c,max}$ from [IS:456-2000 page 73 Table 20]

for M20 grade of concrete

$\tau_{c,max} = 2.8\ N/mm^2$

$\therefore \tau_v > \tau_{c,max}$

we, should re-design, increase width, let b = 230mm

$\tau_v = \frac{288 \times 10^3}{230 \times 450}$

$\tau_v = 2.78\ N/mm^2$

$A_{svb} = 2 \times \frac{\pi}{4}(25)^2$

$A_{svb} = 981.74\ mm^2$

$f_{ck} = 20\ N/mm^2$

$f_y = 415\ N/mm^2$

breadth of wall (bw) = 300 mm.

Shear force due to UDL $V_{u_1} = \frac{WL}{2}$

$V_{u_1} = \frac{120 \times 6}{2}$

$V_{u_1} = 360\ kN$

distance between effective length from center of wall

$L_{eff} = \frac{\text{breadth of wall}}{2} + d$

$L_{eff} = \frac{300}{2} + 450$

$L_{eff} = 600\ mm = 0.6\ m$

Effective shear force at the distance from support

$V_{u_2} = W.L_{eff}$

$\tau_v < \tau_{c,max}$ Hence, Ok.

design shear reinforcement ($\tau_c$)

% of reinforcement $P_t = \frac{A_{st}}{bd} \times 100$

$P_t = 1.42\ \%$

| $P_t$ | $\tau_c$ |
|---|---|
| 1.25 | 0.67 |
| 1.42 | ? |
| 1.50 | 0.72 |

$\tau_c = 0.67 + \frac{(0.72-0.67)}{(1.5-1.25)}(1.42-1.25)$

$\tau_c = 0.704\ N/mm^2$

$\tau_v > \tau_c$

shear force taken by concrete ($V_{uc}$)

$\tau_c\ b \times d = V_{uc}$

$V_{uc} = 0.704 \times 230 \times 450$

$V_{uc} = 72.86\ kN$

shear force for bentup bars $V_{us} = V_u - V_{uc}$

$V_{us} = 288 - 72.86$

$V_{us} = 215.14\ kN$

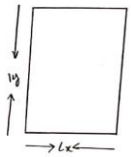
i.) Based on the supports:

a) Cantilever Slab
b) Simply Supported Slab
c) Continous Slab

b) One-way Slab:

If the ratio of the longer side to the shorter side of the beam section is greater than 2. The the Slab is said to One-way slab.

$$\frac{l_y}{l_x} > 2 \quad \text{where } l_y > l_x$$



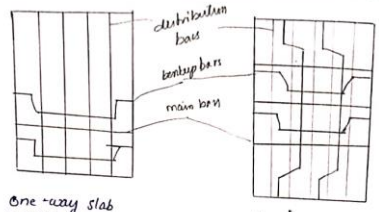

-3-

When an external force applied on slab, the bending take place in the longer length side.

Distributed reinforcement is provided parallel to longer side.

Main reinforcement is provided parallel to shorter side.

Bent up bars also parallel to shorter side as shown below.




One-way slab

two-way slab

Two way Slab:

When the ratio of longer side to shorter side is less than 2, it is known as two-way slab.

$$\frac{l_y}{l_x} \leq 2$$

Reinforcement is provided on both direction, because bending takes place in shorter as well as in longer side also. distributions bars are provided. Bent up bars and main bars are provided on both the directions in order to restrict moments.

1(a) SM

Limit State:

The acceptable limit for the safety and serviceability requirements before failure occurs is called "limit state".

All relevant limit states shall be considered in design

Types of Limit state:

1) Limit State of Collapse:
- LSC of flexual
- LSC of tension
- LSC of sheer.
- LSC of torsion
- LSC of compression

-2-

2) Limit State of Serviceability:
- LSC of deflection
- LSC of Cracking.
- LCS of shrinkage, creep etc.

1(b) Difference bit working stress method and limit state method.

| working stress method | Limit state method |
|---|---|
| It is also known as plastic method | It is also known as elastic method. |
| This method depends on the elastic properties of the material to solve the | This method depends on the design and plastic properties. |
| Size and shape of members are very large | Size and shape of members are less compared to working stress method. |
| The design material is more than a balanced | The design condition balanced limit. |
| It is the oldest method | It is the new method. |
| Safety of factor is for materials | Safety of factor is applied for loads. |
| It is not economical | It is economical. |

-3-

Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
Objective Paper (2021-22)
III B.Tech. I Semester, I Mid Examinations, October, 2021
Design of Concrete Structures-I (Sub Code: GR18A3003)
Time: 10 Minutes Date of Exam: 19-10-2021 (FN) Max Marks: 5
Answer All Questions All Questions Carry Equal Marks

A. Sai Teja

Name: Aitha Sai Teja Hall Ticket No. 1 9 2 4 1 A 0 1 0 2

5/5

II. Choose the correct alternative:

1. Yield strength of Fe250 grade steel is [ D ]
A. 415 N/mm² B. 500 N/mm² C. 550 N/mm² D. 250 N/mm²
2. The maximum strain in concrete at the outer most compression fiber is [ C ]
A. 0.035 B. 0.002 C. 0.0035 D. 0.87/f_y
3. The minimum clear cover for slabs as per IS 456:2000 [ B ]
A. 15 mm B. 20 mm C. 25 mm D. 30 mm
4. In a simply supported beam of span "l", the maximum shear force, if it is subjected to uniformly distributed load of "w" kN/m [ B ]
A. 0.65wl B. 0.5 wl C. 0.25 wl D. wl
5. the ratio between longer span to shorter span of slab is greater than 2, it is called [ B ]
A. Two way slab B. One way slab C. Flat slab D. Ribbed slab
6. Indian Standard code for live load is [ A ]
A. 875 (Part2) B. 875 (Part1) C. 456 (Part2) D. 456 (Part1)
7. In M25 grade of concrete, 25 number means [ A ]
A. 25 N/m² B. 20 C. 20 N/mm² D Testing after 20 days
8. Minimum grade of concrete to be used for RCC as per IS 456:2000? [ B ]
A. M15 B. M20 C. M25 D. M30
9. An effective cover can be defined as [ A ]
A. Clear cover + radius of bar B. Clear cover + dia of bar C. Clear cover D. Twice dia of bar
10. Which one of the following sections performs better on ductility criterion [ B ]
A. Balanced B. Under reinforced C. Over reinforced D. All the above

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Bachupally, Kukatpally, Hyderabad - 500090

I II MID TERM EXAMINATION

Sreeja.

H.T. No. 1 9 2 4 1 A 0 1 1 3

Name of the Examination 375062 Design of Concrete Structures-I III B.Tech 1st Sem 1st Mid

Course B.Tech Branch Civil A Date 19/10/21

Signature of the Invigilator

| Q.NO. | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a | b | a | b | a | b | a | b | a | b | a | b | |
| MARKS | 2 | 3 | | | 2 | | 1 | 2 | | | | | 10 |

START WRITING FROM HERE

(1a) Limit state :- the acceptable limit state of design structure
→ The acceptable limit state for the safty and serviceability requirements before feilure occurs is called a limit state.

Types of limit state :-
1. Limit state of collapse
2. Limit state of serviceability.
   i. Deflection
   ii. Cracking.

2

---

(1b)

| Working stress | Limit State Method |
|---|---|
| 1) This method is easy to calculations | 1) The limit state method is difficult to design and hard to calculations. |
| 2) The material strength is not fully utilised for this method | 2) The material strength is fully utilised for this method |
| 3) The working stress method is an reducing the thing | 3) The limit state method is recreate to design the structure. |
| 4) recreating the design of structure | 4) Easy to recreate the design. |

5

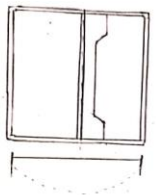
(4a) There are two type of slabs
1) One-way slab
2) Two-way slab

Slab :- Slab which like plate on its beam of flexure is called slab.

---

(4b) One-way slab :-
→ The relation between the longer and short slab will be greater than 2 is called one-way slab

$\frac{l_y}{l_x} > 2$

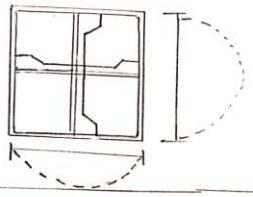


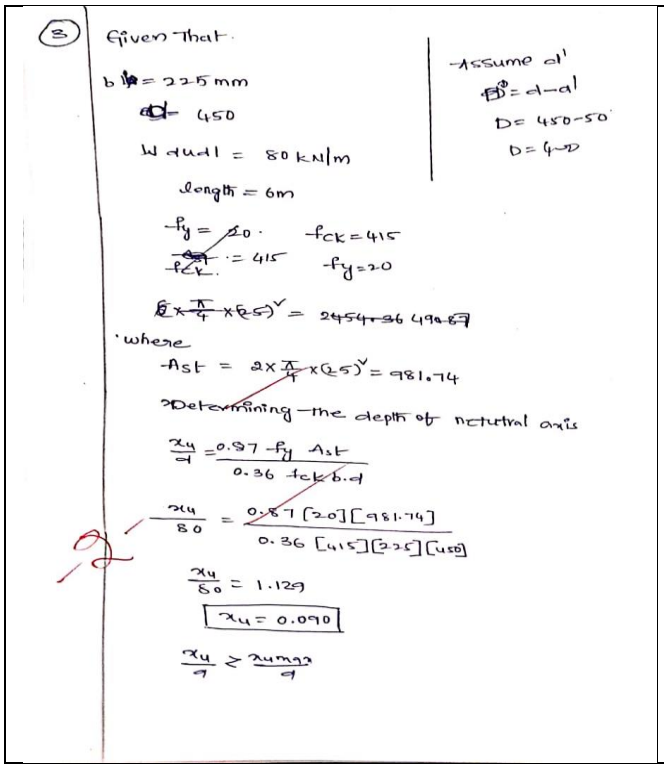
Two-way slab :-
→ The relation between the longer and shorter slab is column less than or equal to 2 is called Two-way slab

$\frac{l_y}{l_x} \leq 2$.

$l_x$ = Shorter column
$l_y$ = longer column

2





(8) Given That

b = 225 mm

d = 450

W dual = 80 kN/m

length = 6m

$f_y$ = 420 · $f_{ck}$ = 415

$f_{ck}$ = 415 $f_y$ = 420

$\frac{\pi}{4} \times (25)^2$ = 490.87

where

$A_{st} = 2 \times \frac{\pi}{4} \times (25)^2 = 981.74$

Determining the depth of neutral axis

$\frac{x_u}{d} = \frac{0.87 f_y A_{st}}{0.36 f_{ck} b d}$

$\frac{x_u}{80} = \frac{0.87 [420][981.74]}{0.36 [415][225][450]}$

$\frac{x_u}{80} = 1.129$

$x_u = 0.090$

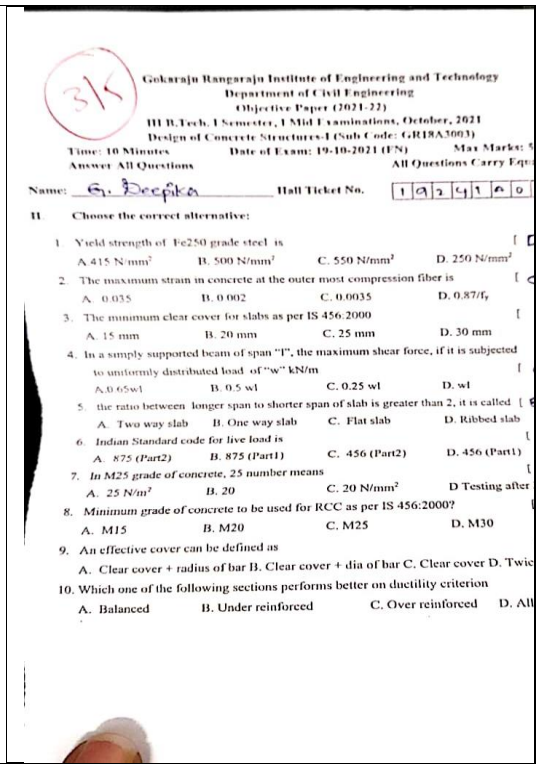
$\frac{x_u}{d} \geq \frac{x_{umax}}{d}$

Assume d'

d' = d - d'

D = 450 - 50

D = 400



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
Objective Paper (2021-22)
III B.Tech. I Semester, I Mid Examinations, October, 2021
Design of Concrete Structures-I (Sub Code: GR18A3003)
Time: 10 Minutes Date of Exam: 19-10-2021 (FN) Max Marks: 5
Answer All Questions All Questions Carry Equ

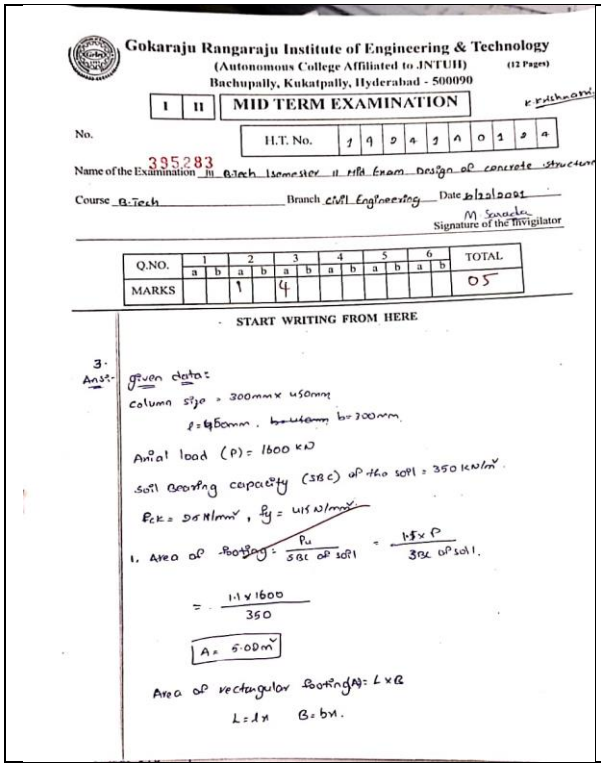
Name: G. Deepika Hall Ticket No. 19241A0

II. Choose the correct alternative:

1. Yield strength of Fe250 grade steel is [
   A. 415 N/mm² B. 500 N/mm² C. 550 N/mm² D. 250 N/mm²
2. The maximum strain in concrete at the outer most compression fiber is [
   A. 0.035 B. 0.002 C. 0.0035 D. 0.87/$f_y$
3. The minimum clear cover for slabs as per IS 456:2000 [
   A. 15 mm B. 20 mm C. 25 mm D. 30 mm
4. In a simply supported beam of span "l", the maximum shear force, if it is subjected to uniformly distributed load of "w" kN/m [
   A.0.65wl B. 0.5 wl C. 0.25 wl D. wl
5. the ratio between longer span to shorter span of slab is greater than 2, it is called [
   A. Two way slab B. One way slab C. Flat slab D. Ribbed slab
6. Indian Standard code for live load is [
   A. 875 (Part2) B. 875 (Part1) C. 456 (Part2) D. 456 (Part1)
7. In M25 grade of concrete, 25 number means [
   A. 25 N/m² B. 20 C. 20 N/mm² D Testing after
8. Minimum grade of concrete to be used for RCC as per IS 456:2000? [
   A. M15 B. M20 C. M25 D. M30
9. An effective cover can be defined as
   A. Clear cover + radius of bar B. Clear cover + dia of bar C. Clear cover D. Twic
10. Which one of the following sections performs better on ductility criterion
    A. Balanced B. Under reinforced C. Over reinforced D. All

# Sample of Answer Scripts

# MID II EXAM



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I II MID TERM EXAMINATION

No. H.T. No. 1 9 2 A 1 A 0 1 2 A

Name of the Examination 395283 III B.Tech I Semester II Mid Exam Design of concrete structure

Course B.Tech Branch Civil Engineering Date 6/12/2021

Signature of the Invigilator

| Q.NO. | 1 a | 1 b | 2 a | 2 b | 3 a | 3 b | 4 a | 4 b | 5 a | 5 b | 6 a | 6 b | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MARKS | | | 1 | | 4 | | | | | | | | 05 |

START WRITING FROM HERE

3. Ans:- given data:

column size = 300mm x 450mm

d = 450mm, b = 300mm

Axial load (P) = 1600 kN

Soil bearing capacity (SBC) of the soil = 350 kN/m²

$f_{ck}$ = 20 N/mm², $f_y$ = 415 N/mm²

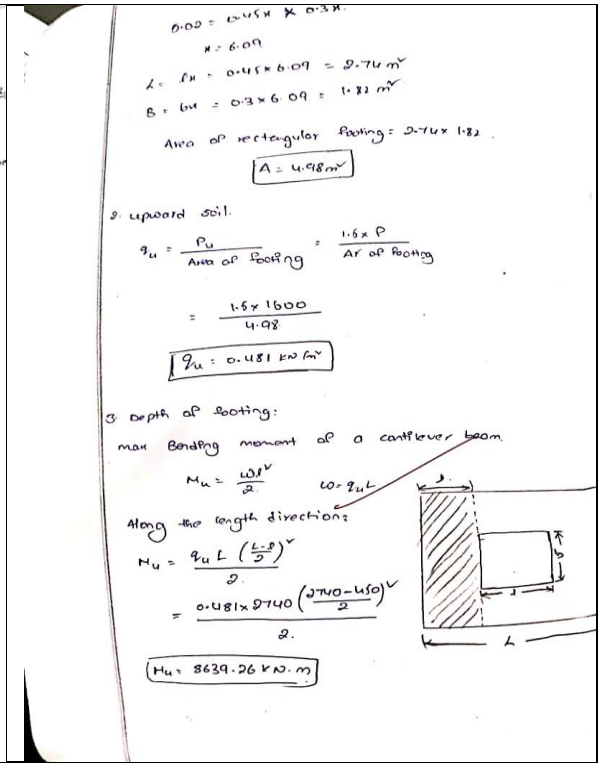
1. Area of footing = $\frac{P_u}{SBC \text{ of soil}} = \frac{1.5P}{SBC \text{ of soil}}$

$= \frac{1.5 \times 1600}{350}$

$A = 6.86 m^2$

Area of rectangular footing (A) = L x B

L = 1x B = bx.



$0.02 = 0.45x \times 0.3x$

$x = 6.09$

$L = 1x = 0.45 \times 6.09 = 2.74 m$

$B = bx = 0.3 \times 6.09 = 1.82 m$

Area of rectangular footing = 2.74 x 1.82

$A = 4.98 m^2$

2. upward soil.

$q_u = \frac{P_u}{\text{Area of footing}} = \frac{1.5P}{A_r \text{ of footing}}$

$= \frac{1.5 \times 1600}{4.98}$

$q_u = 0.481 kN/m^2$

3. Depth of footing:

max Bending moment of a cantilever beam

$M_u = \frac{wl^2}{2}$ $w = q_u L$

Along the length direction:

$M_u = \frac{q_u L \left(\frac{L-s}{2}\right)^2}{2}$

$= \frac{0.481 \times 2740 \left(\frac{2740-450}{2}\right)^2}{2}$

$M_u = 8639.26 kN.m$

Along the breadth direction:

$M_u = \frac{q_u B \left(\frac{B}{3}\right)^2}{2}$

$= \frac{0.481 \times 1830 \left(\frac{1830 - 300}{3}\right)^2}{2}$

$M_u = 3528.21$ mm KN-m

$M_u = M_{u\,lim} = 0.138 f_{ck} L d^2$

$3639.26 \times 10^6 = 0.138 \times 25 \times 2740 d^2$

$d = 325$ mm

Now we have to take twice the above value to reduce shear and bond

$d = 2 \times 325 = 650$ mm

overall depth = d + d'

$= 650 + 50$

D = 700mm

Main Reinforcement:

Along the length direction

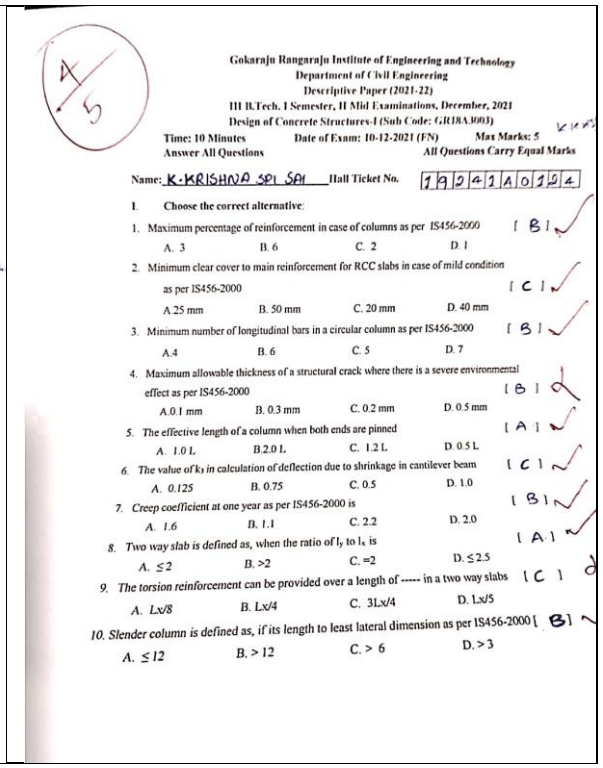
$M_u = 0.87 f_y A_{st} d \left[1 - \frac{f_y A_{st}}{f_{ck} L d}\right]$

~~$863918 = 0.87 \times 415 \times 650 \times A_{st}$~~

$3639.26 \times 10^6 = 0.87 \times 415 \times 650 \times A_{st} \left[1 - \frac{415 A_{st}}{25 \times 2740 \times 650}\right]$

~~$3639.26 \times 10^6 = 0.87 \times 230682.5 A_{st} \left[1 - \frac{415 A_{st}}{44875000}\right]$~~

$3639.26 \times 10^6 = 234682.5 A_{st} - 2.187 A_{st}^2$



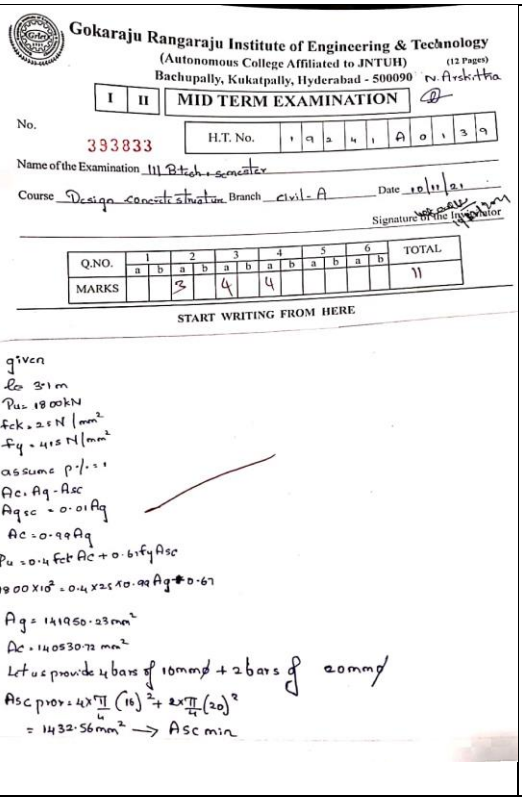
Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
Descriptive Paper (2021-22)
III B.Tech. I Semester, II Mid Examinations, December, 2021
Design of Concrete Structures-I (Sub Code: GR18A3003)

Time: 10 Minutes | Date of Exam: 10-12-2021 (FN) | Max Marks: 5
Answer All Questions | All Questions Carry Equal Marks

Name: K.KRISHNA SRI SAI Hall Ticket No. 1 9 0 4 1 A 0 1 0 4

I. Choose the correct alternative:

1. Maximum percentage of reinforcement in case of columns as per IS456-2000 [ B ]
   A. 3 B. 6 C. 2 D. 1
2. Minimum clear cover to main reinforcement for RCC slabs in case of mild condition as per IS456-2000 [ C ]
   A. 25 mm B. 50 mm C. 20 mm D. 40 mm
3. Minimum number of longitudinal bars in a circular column as per IS456-2000 [ B ]
   A. 4 B. 6 C. 5 D. 7
4. Maximum allowable thickness of a structural crack where there is a severe environmental effect as per IS456-2000 [ B ]
   A. 0.1 mm B. 0.3 mm C. 0.2 mm D. 0.5 mm
5. The effective length of a column when both ends are pinned [ A ]
   A. 1.0 L B. 2.0 L C. 1.2 L D. 0.5 L
6. The value of $k_3$ in calculation of deflection due to shrinkage in cantilever beam [ C ]
   A. 0.125 B. 0.75 C. 0.5 D. 1.0
7. Creep coefficient at one year as per IS456-2000 is [ B ]
   A. 1.6 B. 1.1 C. 2.2 D. 2.0
8. Two way slab is defined as, when the ratio of $l_y$ to $l_x$ is [ A ]
   A. ≤2 B. >2 C. =2 D. ≤2.5
9. The torsion reinforcement can be provided over a length of ----- in a two way slabs [ C ]
   A. Lx/8 B. Lx/4 C. 3Lx/4 D. Lx/5
10. Slender column is defined as, if its length to least lateral dimension as per IS456-2000 [ B ]
   A. ≤12 B. >12 C. >6 D. >3



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Bachupally, Kukatpally, Hyderabad - 500090

I | II MID TERM EXAMINATION

No. 333833 H.T. No. 19241A0139

Name of the Examination III B.tech I semester

Course Design concrete structure Branch Civil-A Date 10/12/21

Signature of the Invigilator

| Q.NO. | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a | b | a | b | a | b | a | b | a | b | a | b | |
| MARKS | | | 3 | | 4 | | 4 | | | | | | 11 |

START WRITING FROM HERE

Sol given

$l_e = 3.1$ m

$P_u = 1800$ kN

$f_{ck} = 25$ N/mm²

$f_y = 415$ N/mm²

assume p.t. = 1

$A_c = A_g - A_{sc}$

$A_{sc} = 0.01 A_g$

$A_c = 0.99 A_g$

$P_u = 0.4 f_{ck} A_c + 0.67 f_y A_{sc}$

$1800 \times 10^3 = 0.4 \times 25 \times 0.99 A_g + 0.67$

$A_g = 141950.23$ mm²

$A_c = 140530.72$ mm²

Let us provide 4 bars of 16mmϕ + 2 bars of 20mmϕ

$A_{sc\,prov} = 4 \times \frac{\pi}{4}(16)^2 + 2 \times \frac{\pi}{4}(20)^2$

$= 1432.56$ mm² → $A_{sc\,min}$

$\tau_{div} = \frac{P_u}{\{[(L \times B) - (l_e \times d)(b + d)]\}}$

$= \frac{P_u [(L \times B) - (l_e \times d)(b + d)] \times d}{2(l_e + d) + (b + d)) \times d}$

$\tau_{div} = 1.01$ N/mm²

$\tau_{pr} = k_s \times \delta_c$

$k_s = 0.5 + \beta_c$

$\beta_c = \frac{0.5}{0.115} = 0.67$

Take $k_s = 1$

$\tau_c = 0.15 \sqrt{f_{ck}}$

$= 1.25$

$\tau_{pr} = 1 \times 1.25$

$= 1.25$ N/mm² (hence ok)

$\tau_{div} < \sqrt{\tau_{pr}}$ (hence ok)

check for load transfer

$f_{div} < f_{pr}$

$f_{div} = \frac{P_u}{l \times b} = 17.72$ N/mm²

$f_{pr} = 0.45 f_{ck} \sqrt{\frac{A_1}{A_2}}$

where $A_1$ = area of footing

$A_2$ = area of column

$A_1 = 2.6 \times 2.1 = 5.46$ m²

$A_2 = 0.3 \times 0.45 = 0.135$ m²

$\sqrt{\frac{A_1}{A_2}} \neq 2$

$\sqrt{\frac{A_1}{A_2}} = 6.36 > 2$

So Take $\sqrt{A_1/A_2} = 2$

Reinforcement

$A_{st} = 0.5 \times \frac{f_{ck}}{f_y}\left[1 - \sqrt{1 - \frac{4.6 m u_0}{f_{ck} b d^2}}\right] b d$

$= 2827.58 > A_{st\,min}$

where $A_{st\,min} = \frac{0.12}{100} \times 8 \times d$

$= 137.4 mm^2$

hence ok

$A_{st\,B} = \frac{0.5 \times f_{ck}}{f_y}\left[1 - \sqrt{1 - \frac{4.6 m u_0}{f_{ck} L d^2}}\right] L \times d$

$= 2421.11 mm^2 > A_{st\,min}$

$A_{st\,min} = \frac{0.12}{100} \times 2600 \times 565$

$= 1700.4 mm^2$

Check for oneway slab

$V_{uL} = (P_a \times B) \times \left[\left(\frac{L-L}{2}\right) - d\right]$

$= 484.23 kN$

$V_{uB} = (P_a \times L) \times \left[\left(\frac{B-b}{2}\right) - d\right]$

$= 405.71 kN$

$T_{uc} < T_c$

$\tau_c = \frac{0.4 L}{B \times d} = 0.42 N/m$

$\tau_c$ depends on p/. of steel

$P/. = \frac{100}{BJ} A_s t = 0.24$

0.15 - 0.29

0.2L - ?

0.25 - 0.36

check for oneway slab

Creep

$acc(perm) = a(ecm)perm) - a_i(perm)$

$a_{ecc} = \frac{\omega l^4}{8 E_c I_{eff}} = 9.66 mm$

$\omega = 0.4 \times 15.75$

$\frac{E_{eff}}{1+\phi} = \frac{E_c}{1+\phi} = \frac{25000}{1+1.6}$

$= \frac{25000}{1+1.6}$

$E_{eff} = 9615.34$

$a_i(perm) = \frac{\omega l^4}{8 E_c I_{eff}}$

$= 3.71$

$acc(perm) = 9.66 - 3.71 = 5.95 mm$

Total def = 16.85 mm

$span = \frac{l}{250} = 10.2 8$

S > span

hence beam fails

given

3. $b = 300 mm$

$l = 4 comm$

$P = 2400 kN$

$P_4 = 2400 kN$

$q_{safe} = 350 kN/m^2$

$f_{ck} = 25 N/mm^2$

$f_y = 415 N/mm^2$

$A_{req} = \frac{P_{axial}}{q_{safe}} = \frac{8400}{350} = 5.25 m^2$

Where $P_{axial} = P_4 + 10\%$ self wt of footing

$= \frac{2400}{1.5} + \frac{10}{100}\left(\frac{2400}{1.5}\right)$

$= 1584 kN$

Let $\frac{B}{L} = 0.9$

$B \times L = 5.25$

$0.82 \times L = 5.25$

$L = 2.56 m$

$B = 2.04 m$

Provide $L = 2.6 m$

$B = 2.1 m$

$A_{prov} = 2.6 \times 2.1 = 5.46$

$P_a = \frac{P_4}{a_{prov}} = \frac{2400}{5.46} = 439.5604 kN$

$BM_L = (P_a \times B) \times \left(\frac{L-b}{2}\right)^2$

$= 533.36 kN \cdot m$

$BM_B = (P_a \times L) \times \frac{(B-b)^2}{8}$

$= 462.8 kN \cdot m$

$M_u = 0.138 f_{ck} B d^2$

$BM_L = 0.138 f_{ck} B d^2$

$533.36 \times 10^6 = 0.138 \times 25 \times 2100 \times d^2$

$d_{req} = 271.37 mm$

Let us provide $D = 600 mm$

$d_{prov} = 600 - 50 - \frac{10}{2}$

$d_{prov} = 545 mm$

$\frac{M_u l^2}{2} = \frac{15.75 \times 3.6^2}{2} = 102.06 kN \cdot m$

$z = d - \frac{x}{3} = 485 - \frac{213.19}{3} = 393.9 mm$

$I_{eff} = \frac{1606393976}{1.2 - \left(\frac{437 \times 10^4}{102.06 \times 10^4}\right)\left(\frac{293.93}{485}\right)\left(1 - \frac{213.14}{485}\right)}$

$I_{eff} = 1601041121 mm^4$

$I_{cr} \leq I_{eff} \leq I_{gr}$

$1606393976 \leq 1601041121 \leq 3125000000$

$\delta = \frac{\omega L^4}{8 E_c I_{eff}} = 8.26 mm$

Due to shrinkage

$\varepsilon_{cs} = k_3 \varepsilon_{sc}^2$

$k_3 = 0.5$ [for continuity]

$\varphi_{us} = k_4 \frac{\varepsilon_{cs}}{\sigma} = 0.65 \times \frac{0.0005}{500}$

$= 4.01 \times 10^{-7}$

where $\varepsilon_{cs} = 0.0003$

$P_t = \frac{100 A_s}{bd} = 0.9$

$P_c = 0$

$P_t - P_c = 0.9$

$k_u = \frac{0.72 \times P_t - P_c}{\sqrt{P_t}} \leq 0.8 = 0.68$

$a_{cs} = 0.5 \times 4.08 \times 10^{-7} \times 3600^2$

$a_{cs} = 2.64 mm$

$\frac{M \cdot \omega L^2}{2} = \frac{15.75 \times 3.6^2}{2} = 102.06\ kN-m$

$z = d - \frac{x}{3} = 465 - \frac{213.19}{3} = 393.9\ mm$

$I_{eff} = \frac{1606393976}{1.2 - \left(\frac{4375 \times 10^4}{102.06 \times 10^6}\right)\left(\frac{293.93}{465}\right)\left(1 - \frac{213.14}{465}\right)}$

$I_{eff} = 1601041121\ mm^4$

$I_r \le I_{eff} \le I_{gr}$

$1606393976 \le 1601041121 \le 3125000000$

$\delta = \frac{\omega L^4}{8 E I_{eff}} = 8.26mm$

Due to shrinkage

$\phi_{cs} = k_3 \varepsilon_{cs} c$

$k_3 = 0.5$ [for cantilever]

$\varphi_{us} = k_4 \frac{\varepsilon_{cs}}{D} = 0.65 \times \frac{0.0003}{500}$

$= 4.01 \times 10^{-7}$

where $\varepsilon_{cs} = 0.0003$

$P_t = \frac{100 A_{st}}{bd} = 0.9$

$P_c = 0$

$P_t - P_c = 0.9$

$k_u = \frac{0.72 \times P_t - P_c}{\sqrt{P_t}} = 0.68$

$a_{cs} = 0.5 \times 4.08 \times 10^{-7} \times 3600^2$

$a_{cs} = 2.64mm$

4. Given

$l = 3.6m$

$b = 300mm$

$D = 500mm$

$f_{ck} = 25\ N/mm^2$

$f_y = 415\ N/mm^2$

$A_{st} = 4 \times \frac{\pi}{4}(20)^2 = 1256$

$\omega = 12\ kN/m +$ self wt

self wt $= 0.3 \times 0.5 \times 25 = 3.75\ kN/m$

$\omega = 12 + 3.75 = 15.75\ kN/m$

1. short term deflection

$\delta = \frac{\omega L^4}{8 E I}$

$I_{eff} = \frac{I_r}{1.2 - \frac{M_r}{M_a}\frac{z}{d}\left[\frac{x}{d}\right]}$

$I_r = \frac{bx^3}{3} + mA_{st}(d-x)^2$

$m = \frac{E_s}{E_c} = \frac{2 \times 10^5}{25000} = 8$

Depth of NA

$\frac{300x^2}{2} = 8 \times (1256.63)(d-x)$

$x = 213.19mm$

$I_r = 1606393976\ mm^4$

$M_r = \frac{f_{cr} I_{gr}}{y_t}$

$f_{cr} = 0.7\sqrt{f_{ck}} = 0.7\sqrt{25} = 3.5\ N/mm^2$

$I_{gr} = \frac{b}{12} = 3125 \times 10^6 mm^4$

$y_t = 250mm$

$M_r = \frac{3.5 \times 3125 \times 10^6}{250} = 4375 \times 10^4$

hence ok

greater of following

1. $\frac{l}{4} \times 20 = 5mm$
2. 6mm

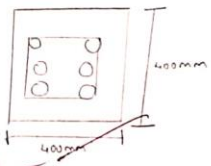
Let us provide 5mm dia of lateral ties

least of following

1. $16 \times 16 = 256mm$
2. 400 mm
3. 300mm
4. $48 \times 8 = 384mm$

provide 8mm dia

@ 250mm c/c




3

**Gokaraju Rangaraju Institute of Engineering and Technology**
**Department of Civil Engineering**
**Descriptive Paper (2021-22)**
**III B.Tech I Semester, II Mid Examinations, December, 2021**
**Design of Concrete Structures I (Sub Code: 4CI8A3003)**

Time: 10 Minutes | Date of Exam: 10-12-2021 (FN) | Max Marks: 5
Answer All Questions (2) | All Questions Carry Equal Marks

Name: N. Arshitha | Hall Ticket No. 19241A0137

**1 Choose the correct alternative**

1. Maximum percentage of reinforcement in case of columns as per IS456-2000 [ B ]
   A. 3 B. 6 C. 2 D. 1
2. Minimum clear cover to main reinforcement for RCC slabs in case of mild condition as per IS456-2000 [ A ]
   A. 25 mm B. 50 mm C. 20 mm D. 40 mm
3. Minimum number of longitudinal bars in a circular column as per IS456-2000 [ B ]
   A. 4 B. 6 C. 5 D. 7
4. Maximum allowable thickness of a structural crack where there is a severe environmental effect as per IS456-2000 [ A ]
   A. 0.1 mm B. 0.3 mm C. 0.2 mm D. 0.5 mm
5. The effective length of a column when both ends are pinned [ A ]
   A. 1.0 L B. 2.0 L C. 1.2 L D. 0.5 L
6. The value of $k_3$ in calculation of deflection due to shrinkage in cantilever beam [ C ]
   A. 0.125 B. 0.75 C. 0.5 D. 1.0
7. Creep coefficient at one year as per IS456-2000 is [ B ]
   A. 1.6 B. 1.1 C. 2.2 D. 2.0
8. Two way slab is defined as, when the ratio of $l_y$ to $l_x$ is [ A ]
   A. $\le 2$ B. $>2$ C. $=2$ D. $\le 2.5$
9. The torsion reinforcement can be provided over a length of ----- in a two way slabs [ D ]
   A. Lx/8 B. Lx/4 C. 3Lx/4 D. Lx/5
10. Slender column is defined as, if its length to least lateral dimension as per IS456-2000 [ D ]
    A. $\le 12$ B. $>12$ C. $>6$ D. $>3$

S. Rahul

2024SA0122

D.C.S - 1

Assignment - 01

CIVIL - IIIB

# Design of Concrete Structures - I

## UNIT 01. Concepts of RC Design

Answer all the following Questions

1) Explain why steel using as Reinforcement in R.C.C and also Explain significance of steel in R.C structures?

A) steel is used as reinforcement to take up of the Tensile stresses in R.C.C Construction because of the Following Reasons:

a) Its Tensile strength is high
b) It can develop good bond with Concrete
c) Its coefficient of Expansion is Nearly same as for of Concrete
d) It is Easily Available.

### Significance of steel in RC structures:

The Reinforcement in RCC serves the following different types of Functions

a) To resist the Bending tension in flexural members like slabs,

beams and walls of water tanks etc

b) To increase the load carrying capacity of compression members like columns

c) To resist diagonal Tension due to shear

d) To resist the effects of secondary stresses like Temperature

e) To reduce the shrinkage of Concrete

f) To resist spiral cracking due to Torsion

g) To prevent the development of wide cracks in concrete due to Tensile strains.

2) a) Define limit state and list out the Types of limit states considered in the Design of RC structures?

A) Limit states are the Acceptable limits for the safety and serviceability requirements of the structure before failure occurs.

The two limit states which are usually considered

i) limit state of collapse
ii) limit state of serviceability.

**Limit state of collapse:**

In it is the limit state at which the structure is likely to collapse. The structure may collapse due to rupture of one (or) more critical sections (or) loss of overall stability due to Buckling or overturning. This limit state may corresspond to

a) Flexure b) Compression
c) shear d) Torsion

**Limit state of serviceability:**

Limit state of serviceability relate to the performance of the structure at working loads. It is the limit state at which the structures undergo Excessive deflection, which adversly affect the finishes

Causing discomfort to the users and Excessive Cracking which Effects the Efficiency & Appearance of structure. This may be Corrspand to

a) Deflection b) Cracking

c) Other Disturbances ( Vibrations, fire resistance, Durability)

b) Discuss the Assumptions in limit state of collapse in flexure.

A) i> Assumptions :—

1) plane section xlormal to the axis, remain plane after bending

2) The maximum strain in concrete at the outermost Compressian fiber is taken as 0.0035 in Bending

3) The Tensile strength of Concrete is Ignored

4) The Relationship between stress - strain distribution in Concrete is assumed to be parabolic. and compressive strength of Concrete in the structure is Assumed to be 0.67 Times the Characteristic strength of Concrete.

The partial safety factor $\gamma_m$ Equal to 1.50 is Applied to the strength of Concrete in Addition to it. Therefore the design strength of Concrete is $\frac{0.67 f_{ck}}{1.5} = 0.446 f_{ck}$

5) The stress in reinforcement is derived from the representative stress-strain curve for the Type of steel used as. The partial safety factor $\gamma_m$ equal to 1.15 is Applied to the strength of Reinforcement. Therefore, the Design strength of steel is $\frac{f_y}{1.15} = 0.87 f_y$

6)

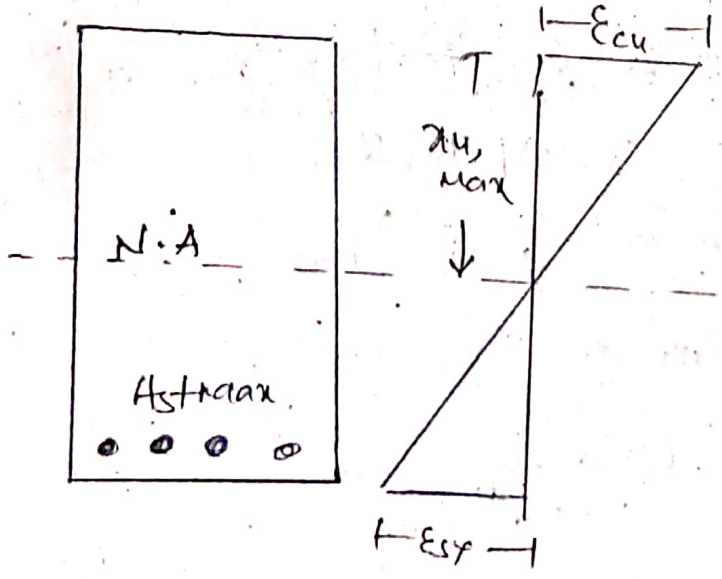
3) Explain the modes of failures of reinforced concrete member.

A reinforced concrete member is considered to have failed when the strain in concrete in extreme compression fiber reaches its ultimate value equal to 0.0035

1) Balanced section :

when the maximum strains in steel and concrete reach their maximum values simultaneously, the section is known as Balanced section. The percentage of steel provided for Balanced section is called as limiting percentage of steel.

$$x_u = x_{u,max}$$



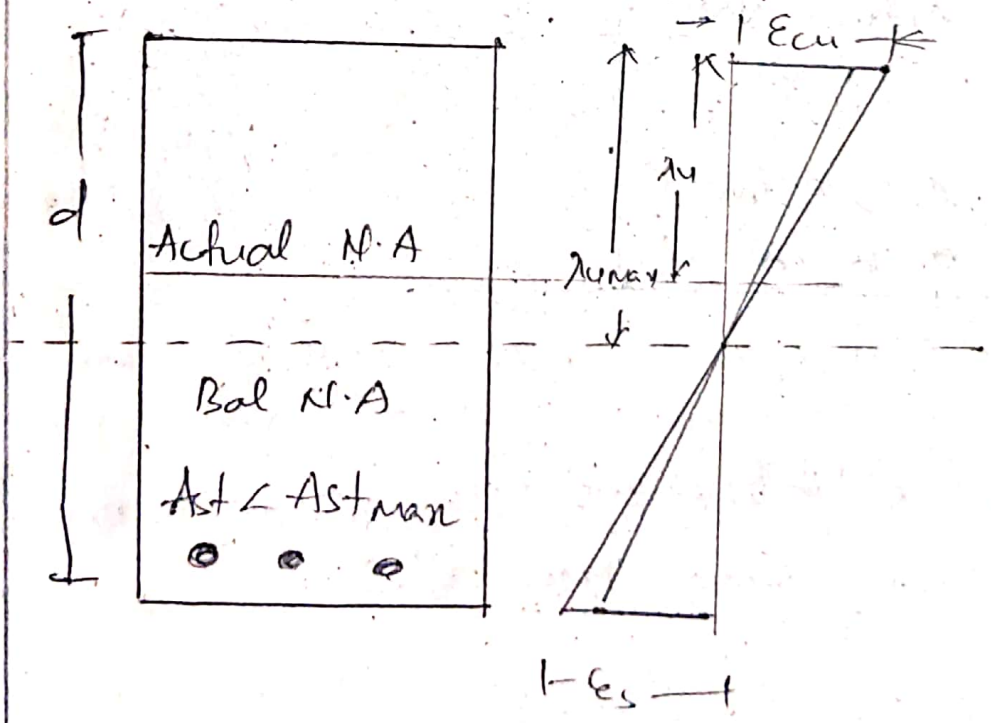
2) under reinforcement Failure :

(Tensian / Ductile failure)

When the amount of steel in a section is less than that required for a Balanced section, the section is called as under reinforced section.

In under Reinforced sections ; the Strain in Concrete doesnot reach its maximum value while the strain in steel reaches its maximum value.

$x_u < x_{u,max}$



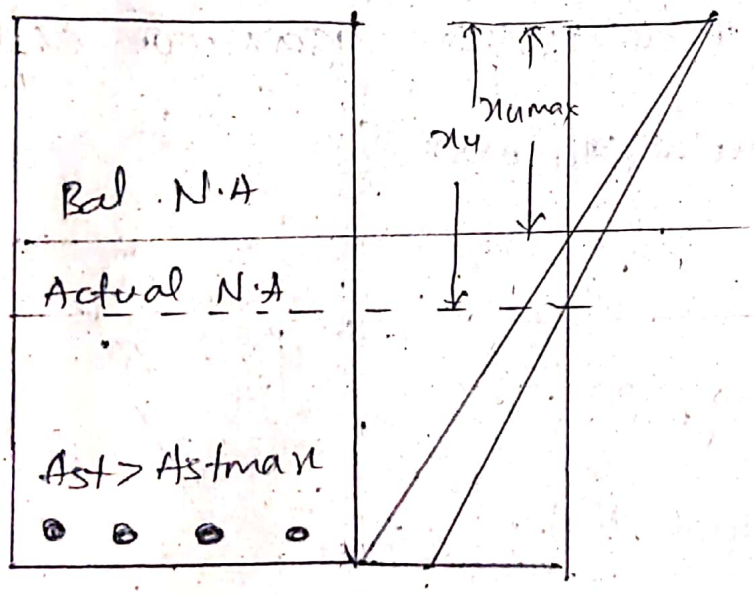

3) over - reinforced section :

[compression failure (a) Brittle failure)

when there amount of steel in a section is more than that required for Balanced section, the section is called over-reinforced section.

In over Reinforced sections, the strain in concrete reaches its ultimate value before steel reaches its yield value.

$x_u > x_{umax}$.

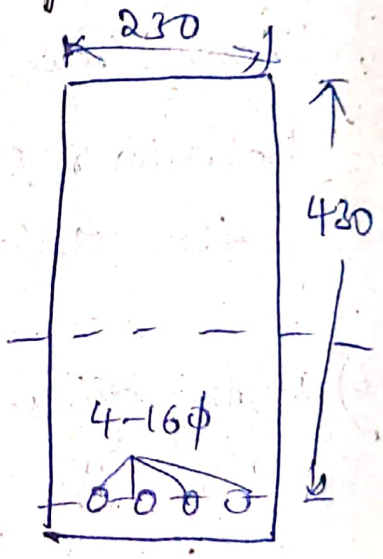



4) Differentiate working stress and Limit state method.

Differences :

| working stress method | Limit state Method |
|---|---|
| 1) The stresses in an element is obtained from the working loads and Compared with permissible stresses | The stresses are obtained from design loads and Compared with Design strength |
| 2) This Method follows linear stress- strain behaviour of both the Materials | 2) In this Method, it follows non linear stress relationship but linear strain relationship |
| 3) Factor of safety is used in W.S.M | 3) Partial safety factors are used in L.S.M |
| 4) W.S.M is a stress Based method | 4) LSM is a strain Based Method |
| 5) This Method Yields to uneconomical sections | 5) This Method Yields to the Economical Design |

6) Q: Determine the moment of resistance of a singly reinforced concrete Beam of rectangular section 230mm wide and 430mm deep (Effective depth), Reinforced with 4-bars of 16mm diameter, Use M30 grade of Concrete and Fe415 grade of steel, Re-design the Beam if necessary




b = 230mm

d = 430mm (Effective depth)

fck = 20 N/mm²

fy = 415 N/mm²

Ast = 4-bars of 16mm ϕ

$Ast = 4 \times \frac{\pi}{4} \times (16)^2 = 4 \times \frac{\pi}{4} \times (16)^2$

Ast = 804.24 mm²

**Ast = 804.24 mm²**

According to Equilibrium,

Compression = Tension

$0.36 f_{ck} b x_u = 0.87 f_y A_{st}$

$$x_u = \frac{0.87 \times f_y \times A_{st}}{0.36 f_{ck} b}$$

$$x_u = \frac{0.87 \times 415 \times 804.24}{0.36 \times 20 \times 230}$$

$$x_u = 175.344 \text{ mm}$$

For fe 415

$$\frac{x_{u,max}}{d} = 0.48 = 0.48 d = x_{umax}$$

$x_{u,max} = 0.48 \times 430 = 206.4 \text{ mm}$

$x_{u,max} = 206.4 \text{ mm}$

∴ Therefore, $x_u$ is less than $x_{u,max}$

$x_u < x_{umax}$

under reinforced section

Then Moment of resistance

$M.O.R = 0.87 f_y A_{st} (d - 0.416 x_u)$

$M.O.R = 0.87 \times 415 \times 804.24 (430 - (0.416 \times 175.344))$

$M.O.R = 103.67 \times 10^6 \text{ N.mm}$

Then Moment of resistance

$$M.O.R = 103.67 \text{ KN.m}$$

# UNIT-01. Concept of R.C Design

## Quiz

1) In a Concrete grade M20, 20 Means
a) 20 N/mm² b) 20 N/m² c) 20 kN/m²
d) Testing after 20 days

2) Minimum grade of Concrete to be used for RCC as per IS:456:2000?
a) M10 b) M15 c) M20 d) M25

3) The Time dependent deformation of Constant loading is known as
a) Tension b) fracture
c) shrinkage d) creep

4) The presence of voids in Concrete will
a) Reduce its strength
b) Increase its strength
c) Retard setting
d) Increase its Density

5) In an under-reinforced Concrete Beam

a) Actual depth of Neutral Axis is less than the critical depth of Neutral Axis

b) Moment of Resistance is less than that of Balanced sections

c) Both a and b

d) None of these

6) In case of under reinforced Beam section the Neutral Axis lies

a) Above Neutral Axis of Balanced Section

b) Below Neutral Axis of Balanced Section

c) on Neutral Axis of Balanced Section

d) Independent of Neutral Axis of Balanced section

7) In case of over-reinforced section which element fails first

a) Both steel and Concrete simultaneously

b) Neither steel (or) Concrete

c) steel

d) Concrete

8) The Tensile strength of $M_{25}$ grade of Concrete is ____

a) 2N/mm$^2$ b) 2.5N/mm$^2$

c) 3N/mm$^2$ d) 3.5 N/mm$^2$

9) Maximum shrinkage strain allowed in RC Design as per IS:456:2000 ?

a) 0.0035 b) 0.00035

c) 0.0003 d) 0.03

10) partial safety factor used for Concrete and steel respectively as per Limit state method of Design ?

a) 1.2 & 1.2 b) 1.5 and 1.15

c) 1.5 & 1.5 d) 1.8 and 1.5

11) Partial safety factor used in for Concrete and steel respectively as per working stress Method ?

a) 1.2 and 1.5

b) 1.80 and 1.15

c) 3 and 1.80

d) 3 and 1.50

12) Nominal mix proportions for $M_{20}$ grade of concrete?

a) 1:2:4 b) 1:3:6

c) 1:1:2 d) 1:1.5:3

13) what is the value of Modulus of Elasticity of $M_{25}$ grade of concrete.

a) 20000 N/mm$^2$ b) 25,000 N/mm$^2$

c) 30,000 N/mm$^2$ d) 35,000 N/mm$^2$

14) The Number given for Indian Standard Code of practice for Design loads [other than Earthquake] for Buildings and structures is _____

a) 456 b) 800

c) 875 d) 876

15) what is the Design Strength of $M_{20}$ grade of concrete as per

Limit state method of Design

a) 8 N/mm$^2$ b) 9 N/mm$^2$

c) 10 N/mm$^2$ d) 12 N/mm$^2$