Syllabus For Mason (Construction & Building Repair)

Course Name	**Mason (Construction & Building Repair)**
Course Code	CON/2023/MCBR/196
Sector	Construction
Course Level equivalent to	Level 4
Occupation	Bricklayer & Mason (Construction and Building Repair)
Job Description	Oversee and execute various construction and repair projects like building construction, concrete structures, drainage systems, and related infrastructure. The role involves hands-on project management, coordination, and ensuring the successful completion of assigned projects.
Anticipated Volume of Training	660 Hrs (Theory-150 Hrs+ Practical- 330 Hrs, Employability Skill – 60 Hrs, OJT: 120 Hrs.)
Trainees' Entry Qualification	12th grade pass OR Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma OR 10th grade pass plus 2-year NTC in Mason Trade OR 10th grade pass and pursuing continuous schooling OR 10th Grade Pass with 2 yrs relevant experience OR Previous relevant Qualification of Level 3.0 or equivalent with minimum education as 8th Grade pass OR Previous relevant Qualification of Level 3.5 or Equivalent
RPL	Arrangements for the Recognition of Prior learning (RPL): Candidates with class 8 pass out and who have prior learning experience of more than 5 yrs in the Masonry Trade and are desirous of being certified will be considered. Such candidates, if applying for certification, will undergo a training for 20 Hrs and appear for assessment of their skills. Certificates will be provided to candidates after successful assessment.
Trainers Qualification	B.Tech /BE in Civil engineering or Construction engineering with 2 yrs experience OR Diploma in Civil engineering with 3 yrs experience OR ITI in Mason Trade with 5 yrs experience

Structure of Course:

Module No.	Outcome with Code	Theory (Hrs)	Practical (Hrs)	Total (Hrs)	RPL duration (Hrs)
1	**CON/0816/OC1** Identify different components of a building and their functions; different types of shallow foundations	10	20	30	2
2	**CON/0816/OC2** Identify different Building Construction materials with judgment on the quality and suitability of the same.	30	60	90	2

Module No.	Outcome with Code	Theory (Hrs)	Practical (Hrs)	Total (Hrs)	RPL duration (Hrs)
3	**CON/0816/OC3** Evaluate specification of different types of civil masonry works such as Brick walls, Cement Plastering, Concreting, reinforcing steel binding, Shuttering, Scaffolding etc.	30	90	120	4
4	**CON/0816/OC4** Demonstrate use of different construction equipment and tools	25	35	60	2
5	**CON/0816/OC5** Undertake repair work of Brick wall/Concrete system with proper evaluation	20	40	60	2
6	**CON/0816/OC6** Estimate quantity of materials and related cost for various masonry related item of works	25	65	90	4
7	**CON/0816/OC7** Work in a team at construction / renovation site following safe working Practices	10	20	30	2
8	**CON/0816/OC8** Work in a real job situation (OJT)		120	120	--------
9	**DGT/VSQ/N0102** Employability Skill	60		60	2
TOTAL:		210	450	660	20

SYLLABUS:

Module No. 1: Building Components:

Outcome:
Identify different components of a building and their functions; different types of shallow foundations

Theory Content:
Substructure and superstructure, name and function of different parts of a building such as footing, foundation, D.P.C, Plinth, lintel chajja, main wall and partition wall, slab, beam, column, staircase, parapet wall etc. Different types of soil and their suitability, Difference between shallow and deep foundation, Different types of shallow foundation

Practical Content:
- Understanding different parts of a building
- Understanding centre line and excavation drawing
- Setting out plan on ground.
- Excavating 1m X 1m X 1m trench
- Removing excess soil and stabilizing slopes.

Module No. 2: Materials for Construction:

Outcome:
Identify different Building Construction materials with judgment on the quality and suitability of the same.

Theory Content:

Cement: Types, uses and field tests of cement.
Bricks: Composition of brick earth, Characteristics of good bricks, classification of bricks, specific uses, size, weight, Special bricks – fly ash bricks, hollow bricks, fire clay bricks, Refractory bricks. Tests of bricks
Sand: Types and their uses, characteristics of good sand, bulking of sand
Stone chips: Types and their uses
Reinforcing bar: Mild Steel, HYSD bar(TMT)
Timber: Characteristics of good timber, Preservation of timber, Uses, Alternative material to Timber.
Tiles: Roofing tiles – Types, uses. Floor Tiles-Types, uses. Paving Blocks.

Practical Content:

- **Test of Cement**: Different types, Weight and Volume of one bag cement, Method of opening a cement bag, Preservation of cement bag, Different Field tests on cement.
- **Testing of Bricks**: Size, shape, color, Water absorption quality.
- **Test of Sand**: Types as per size, their uses, Determination of unit weight, bulking factor, sieve analysis.
- **Test of Stone chips**: Types as per size and shape, their significance and uses, Determination of unit weight, sieve analysis.
- **Timber**: Characteristic of a good timber. Timber Preservation technique. Different cross section commonly used.
- **Reinforcing Steel**: Types, Measure unit weight, length and dia. of different Steel Bar
- **Floor and Roof Tiles:** Use of different Floor and Roof Tiles Paving blocks

Module No. 3: Specification of Works

Outcome:
Evaluate specification of different types of civil masonry works such as Brick walls, Cement Plastering, Concreting, reinforcing steel binding, Shuttering, Scaffolding etc.

Theory Content:

Foundation: Procedure of open cut method and bracing excavation for shallow foundation.
Masonry: General principles to be observed in brick masonry construction, bonds in brick work, different types of bonding – uses, mortar ratio to be used in different thickness of brick masonry.
Damp Proof Course: Causes and effect of dampness, prevention of dampness, materials used for damp proofing, damp proofing treatment for basement, plinth, roofs, water proofing treatment for roofs.
Plastering: Types, Pointing mortar used for plaster, preparation of surface and application of plaster.
Concreting: Different grades of concrete, Types of mixing: Hand mixing & Machine mixing, Transportation, laying and compaction of concrete, Use of different types of Vibrators, curing of concrete.
Reinforcement: Types of steel Reinforcement, Cutting, bending, laying and binding of

reinforcing steel.
Form work: Scaffolding and staging – Materials used, requirement of good form work-types and time of removal of form work.
Flooring: Object, materials used, types –construction procedure of artificial stone floor, Marble floor, Tiles floor
Stairs: Technical name of different parts of a stair. Basic concept of lift and Escalator
Culvert & Bridge: Introduction of Culvert & Bridge. Classification of culverts, Component parts of culvert

Practical Content:

- **Brick Masonry:** brick masonry construction with different bonds in brick work, preparation of different grade of mortar used in brick masonry.
- **Damp Proofing and Water proofing: Proper use of damp proofing** for basement, plinth, roofs, water proofing treatment for roofs.
- **Concrete:** Mixing of concrete by hand mixing & machine mixing, method of transportation, laying and compaction of concrete, curing of concrete.
- **Reinforced cement concrete (R.C.C.)** – Reinforcement, nominal mix proportion, different grades of concrete making.
- **Form work:** Do's and Don'ts of good form work-types and removal of form work.
- **Flooring**: construction details of artificial stone floor, Marble floor, Tiles floor.
- **Plastering:** preparation of surface and steps to be followed for cement plastering
- **Stairs:** Technical name of different parts of a stair through models
- **Culvert & Bridge**: Identification of different parts of culverts through models.

Module No. 4: Construction Equipments:

Outcome:
Demonstrate use of different construction equipment and tools

Theory Content:

3.1 Construction Machineries: Different machineries, tools & plants used in construction site, identification & specific use, concrete mixer-types-capacity-working principle, Vibrators-types-working principles, floor grinding machines, pumps.

Practical Content:

- Follow how to use of concrete mixer, vibrator, floor grinding machines, pumps etc. in construction field.

Module No 5: Repairing Technique:

Outcome:

Undertake repair work of Brick wall/Concrete system with proper evaluation

Theory Content:

Understanding different cracks in buildings, their repairing techniques, steps of using different bonding admixtures, corrosion inhibiting agents.

Practical Content:

Evaluate different cracks,
Perform repair of cracks,
Use of bonding admixtures, corrosion inhibiting admixtures

Module No. 6: Estimation of quantity

Outcome:
Estimate quantity of materials and related cost for various masonry related item of works

Theory Content:

Estimation of quantity of materials required (such as Bricks, Cement, Sand, Stone chips, reinforcing steel, Shuttering and Scaffolding quantity etc.) for different items of works such as Brick flat soling, Plain Cement concrete(1:3:6), R.C.C. works(1:1.5:3),Brick work in cement mortar(1:6), Brick work for half brick thick wall with cement mortar(1:4), D.P.C.(1:1.5:3), Plastering work(1:6), Artificial stone flooring(1:2:4) and their cost

Practical Content:

Estimate quantity of materials required (such as Bricks, Cement, Sand, Stone chips, reinforcing steel, Shuttering and Scaffolding quantity etc.) for different items of works such as Brick flat soling, Plain Cement concrete (1:3:6), R.C.C. works (1:1.5:3, 1:1:2), Brick work in cement mortar (1:6), Brick work for half brick thick wall with cement mortar (1:4), D.P.C. (1:1.5:3), Plastering work (1:6), Artificial stone flooring (1:2:4)

Estimate cost of materials for above works

Module 7: Work Management and Collaboration in Sites

Outcome:
Work in a team at construction / renovation site following safe working Practices

Theory content:

1. Standard Practices:
    - Familiarize with approved work methods and practices for assigned tasks.
    - Utilize available resources efficiently and avoiding wastage.
    - Minimize damage and waste by employing proper techniques.
2. Safety Practices and Emergency Response:
    - Identify fire classifications and employing fire protection devices.
    - Respond to accidents and emergencies following prescribed procedures.
    - Use appropriate personal protective equipment applicable.
3. Handling Tools, Equipment, and Materials:
    - Safely use tools, equipment, and materials as required.
    - Understand potential health and environmental effects of construction materials.
    - Implement safe handling practices to prevent harm.
    - Apply housekeeping practices relevant to the task for a clean and safe environment

4. Environmental Protection:
    - Apply environmental protection methods:
        - Properly storing waste, including combustible, non-combustible, and hazardous materials.
        - Segregating general construction waste and trash from hazardous waste.
        - Handling flammable waste responsibly.
5. Cooperation and Communication:
    - Interact with co-workers to exchange techniques, material properties, and tool knowledge.
    - Support colleagues facing challenges to ensure smooth workflow.

Practical

1. Communication and Coordination:
    - Clearly communicate work-related information and requirements to team members.
    - Notify co-workers and superiors about any deviations from planned work.
    - Address problems effectively and escalate when necessary to immediate supervisors.
    - Receive and respond to instructions from superiors accurately.
    - Provide necessary resources, tools, equipment, and materials to interfacing teams.
2. Planning and Organization:
    - Understand set targets and timelines from superiors.
    - Plan activities according to schedules and sequences.
    - Arrange required resources before starting work.
    - Employ tools and equipment carefully to avoid damage.
3. Safety Practices:
    - Identify and report hazards, risks, or breaches in site safety promptly.
    - Follow emergency and evacuation procedures during accidents, fires, or calamities.
    - Practice safe handling of construction materials, including hazardous ones.
    - Participate in safety awareness programs and adhere to safety protocols.
4. Personal Protective Equipment (PPE) and Safe Practices:
    - Utilize appropriate PPE based on work requirements, including head, ear, fall, foot, eye, face, hand, body protection, and respiratory protection.
    - Handle tools, materials, and equipment safely to prevent accidents and damage.
    - Disposal of waste and hazardous materials according to environmental, health, and safety (EHS) guidelines.

Module No. 8: OJT

Work in a real job situation (OJT)

Detail Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain.

Module No. 9: Employability Skills

Detail Content

- **Introduction to Employability Skills Duration: 1.5 Hours**

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

- **Constitutional values - Citizenship Duration: 1.5 Hours**

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen.
4. Show how to practice different environmentally sustainable practices.

- **Becoming a Professional in the 21st Century Duration: 2.5 Hours**

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

- **Basic English Skills Duration: 10 Hours**

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

- **Career Development & Goal Setting Duration: 2 Hours**

11. Create a career development plan with well-defined short- and long-term goals

- **Communication Skills Duration: 5 Hours**

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

- **Diversity & Inclusion Duration: 2.5 Hours**

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

- **Financial and Legal Literacy Duration:5 Hours**

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

- **Essential Digital Skills Duration: 10 Hours**

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

- **Entrepreneurship Duration: 7 Hours**

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

- **Customer Service Duration: 5 Hours**

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

- **Getting Ready for apprenticeship & Jobs Duration: 8 Hours**

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

Assessment Criteria:

Module No.	Outcome	Assessment Criteria
1	Identify different components of a building and their functions; different types of shallow foundations	• Name different parts of a building • Mention different types of shallow foundation • Explain soil excavation technique
2	Identify different Building Construction materials with judgment on the quality and suitability of the same.	• Name and explain the use of different construction materials such as bricks, cement, sand, stone chips etc. • Explain the characteristics of good materials • Explain the importance of field tests on cement, bricks etc.
3	Evaluate specification of different types of civil masonry works such as Brick walls, Cement Plastering, Concreting, reinforcing steel binding, Shuttering, Scaffolding etc.	• Define the specification of brick wall of various thickness • Sequence of steps to be followed for preparation of concrete • Mention the Do's and Do not's in plastering process • Explain method of constructing different floors • Mention location and method of laying D.P.C • Importance of proper use of shuttering and scaffolding materials. • Name different components of stairs.
4	Demonstrate use of different construction equipment and tools	• Explain different types of construction machineries and tools used in construction site.
5	Undertake repair work of Brick wall/Concrete system with proper evaluation	• Explain methods of repairing works • Explain steps of using bonding admixtures, corrosion inhibiting agents
6	Estimate quantity of materials and related cost for various masonry related item of works	• Estimate the calculation of quantities of materials required for different items of work and approximate cost involved
7	Work in a team at	• Follow approved work methods and practices for

Module No.	Outcome	Assessment Criteria
	construction / renovation site following safe working Practices	assigned tasks. • Apply appropriate techniques to minimize damage and waste. • Identify different fire classifications and effectively use fire protection devices. • Respond to accidents and emergencies following prescribed procedures. • Wear and use appropriate personal protective equipment as required. • Safely operate tools, equipment, and materials according to guidelines. • Apply methods to protect the environment, including proper storage and disposal of waste, segregating combustible, non-combustible, and hazardous materials. • Collaborate effectively with co-workers, exchanging techniques, material knowledge, and tool insights. • Address problems effectively and escalate issues to immediate supervisors when necessary. • Plan activities in accordance with schedules and sequences.
8	Work in a real job situation (OJT)	• Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT). • Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain.
9	Employability Skill (60 hrs	As per NCVET guideline

List of Tools, Equipment & materials needed for 30 Trainees:

Sl No	Items with description	Qty
1.	**Masonry tools:** Brick Hammer Brick Trowel Gauging Trowel Margin Trowel Finishing Trowel Wooden Float Metal Float Plumb Bob Right angled scale Aluminium Channel (rectangular hollow section) 3 feet long Rope Measuring steel tape(5 m long) Mixing tray Mortar Pan	**3 nos each**

Sl No	Items with description	Qty
	Shovel Bucket Level tube Wire brush	
2.	**Geometric Model (Wooden / Plastic) – Culvert , Bridge and Stair(Dog legged)**	**1 no each**
3.	**Consumables Materials:**	
	Traditional bricks	**100nos**
	Floor Tiles (2ft x 2ft)	**1 packet**
	Sand	**5 cft**
	Stone Chips (20mm/15 mm/10 mm/6 mm nominal sizes)	**2 cft of each size**
	Hollow bricks	**10 nos**
	Fly ash bricks	**10 nos**
	Sample of Tor Steel and TMT bar of 1m length of different diameter	**1 no each**
	Cement	**2 bags**
	Paving blocks	**20 nos**
	Corrosion inhibiting agents	**1 bottle**
	Bonding admixture	**1 bottle**
4.	**Digital weighing machine1gm sensitivity**	**1 no**
5.	**Sand screen**	**2 nos**

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr. marks
Identify different components of a building and their functions; different types of shallow foundations	CON/0816/OC1	10	70
Identify different Building Construction materials with judgment on the quality and suitability of the same.	CON/0816/OC2	30	110
Evaluate specification of different types of civil masonry works such as Brick walls, Cement Plastering, Concreting, reinforcing steel binding, Shuttering, Scaffolding etc.	CON/0816/OC3	30	110
Demonstrate use of different construction equipment and tools	CON/0816/OC4	20	90
Undertake repair work of Brick wall/Concrete system with proper evaluation	CON/0816/OC5	30	110
Estimate quantity of materials and related cost for various masonry related item of works	CON/0816/OC6	20	90
Work in a team at construction / renovation site following safe working Practices	CON/0816/OC7	10	70
Work in real job situation (OJT)	CON/0816/OC8	0	150
Employability Skills (60 Hrs)	DGT/VSQ/N0102	50	0