# Civil Construction & Maintenance Assistant (CCMA)

## Core Qualification File Syllabus:

**Objective:** For the future Entrepreneurs, the subjects of Building Materials and Surveying as well as Survey Practical will take important role in Technical development. The Civil Construction & Maintenance comprises of those two subjects i.e. Building Materials and Surveying

**Aims:** To develop an overall concept about the properties of Construction Materials & knowledge different Civil Construction procedure as well as Maintenance of the members.

**Course Contents:**

**Theory:**

| **Duration: 168 Hrs. (Theory: 72 hrs. Practical: 96 hrs.)** | | |
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| **Sl No.** | **Trade Theory** | **Trade Practical** |
| 1. | Introduction<br>History of Civil Construction Work :<br>i) Building Construction,<br>ii) Road Construction (NH, SH, District Road, Rail-Road),<br>iii) Irrigation (Diversion head work) | Demonstrate the :<br>1. Concept, properties and use of different Building materials involved in building construction.<br>2. Sequence of construction of a building.<br>3. Name of different parts of building.<br>4. Classification and construction of different types of roads, component parts<br>5. Concept of different construction work in Irrigation structure Diversion head work - Dams, Barrages, Weir, Reservoir and Canals. |
| 2. | Construction Materials, Reinforcing Materials, Structural Steel Section, Admixture | **Describe the different Construction materials, their Characteristics, types, physical properties, field identification of quality and different fields' applications.**<br>1. aggregates,<br>2. Bricks,<br>3. Lime,<br>4. Mineral admixture,<br>5. Cement,<br>6. Sand,<br>7. Clay Products,<br>8. Mortar<br>9. Concrete including various concreting operations viz- **Selection of ingredients of concrete, Batching, Volume & weigh batching, volume batching for nominal mixes, Transportation, placing, compaction & finishing of concrete, Curing of concrete, durability of concrete and Carry out field and laboratory tests on concrete in fresh and** |

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| | | **hardened stage**.<br>10. Water proofing materials,<br>11. Timber,<br>12. Wood based products,<br>13. Tar,<br>14. Bitumen,<br>15. Asphalt,<br>16. Paint,<br>17. 16 Varnishes,<br>18. 17. Metal,<br>19. 18. Plastics.<br>20. 19. Reinforcing Materials – Tor Steel, Plain Steel & their quality.<br>20. Different type of Structural Steel Section and application.<br>21. Use of Admixture in Cement Concrete & Plaster for improving Setting time, Strength, Waterproofing quality |
| 3. | Types , Function & Method of Construction of different Parts of a building. | Demonstrate the different parts of building and their functions and construction :<br>a) Sub Structure –<br>i) Earth work in excavation<br>ii) B.F.S. work<br>iii) P.C.C. work<br>iii) Brick work in foundation & plinth<br>iv) D.P.C. work<br>b) Super Structure –<br>i) Brick work<br>ii) Formwork for columns, footings, retaining walls (Shuttering) , for floor beams & Slabs(Centering).<br>iii) Staging<br>iv) Scaffolding<br>v) Lintel, Chajja, Arches<br>vi) R.C.C. work<br>vii) Plastering & Pointing<br>viii) Grill works<br>ix) Wooden works<br>x) Stair Case, Lift, Escalator<br>xi) Ventilator<br>xii) Roof<br>x) Flooring , Skirting |

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| 4 | Construction of Building Service related structures in Sanitary works and Plumbing Works | Demonstrate the :a) Sanitary Works - House drainage of building, sanitary fittings, terms used in PHE, system of sanitation, Manholes & Septic Tank.<br>b) Plumbing Works - System of Plumbing, different fittings. |
| 5. | Requirement of different Construction machineries, Equipment, tools and accessories | Demonstrate the use of: mason's hand tools such as trowel, straight edge, pipe level, plumb bob, wooden and metal float, right angled scale, measuring tape, brick layer's hammer etc. Tractor, Bull dozer, Grader, Scraper, Basic shovel, Power shovel, Drag Line, Clam Shell, Back Hoe, Dumper Trucks, Road Roller, Sheep's Foot Roller, Concrete Mixers, Pump in Concrete, Concrete Vibrator, Crushers. |
| 6. | Building Planning process, knowledge about building rules and Local by law | Describe the: Local by law- Building Rules, Bengal Municipal Act, Panchayat Rules, Principal of planning of building, Requirements of parts of buildings, Open space, Classification of building, Ground coverage, FAR, Covered area, Plinth area |
| 7. | Demonstrate the Maintenance of Building and other structure : | Demonstrate the:<br>1) **Constructional parts maintenance –**<br>i**) Management aspects** –<br>a) Scope of Civil Maintenance Works<br>b) Categories of Civil Maintenance works<br>c) Tool and Tackles required for Civil Maintenance works<br>d) Management of Routine Maintenance works<br>e) Management of Preventive Maintenance<br>f) Management of Major Maintenance Works of Special Repairs<br>g) Costing of Civil Maintenance<br>h) Manpower Planning in Civil Maintenance<br>ii) **Technical Aspects** –<br>a) Cracks in Building<br>b) Seepage and Dampness in building<br>c) Painting works<br>d) Plastering works<br>e) Concrete works – PCC & RCC<br>f) Brick and Stone masonry<br>g) Wood Work<br>h) Structural Steel Work<br>i) Door Window Fittings<br>j) Flooring<br>h) Roofing and Drainage |

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| | | i) Water Supply and Sewerage<br>j) Road Work<br>k) Functional Requirements of Buildings<br>iii) **Useful Products and Chemicals for use in Civil Maintenance –** Name of different types of works, name of Manufacturer, compounds name, uses<br>iv**) Suggested makes of materials for quality maintenance –** Name of different Materials Products and their brand name |
| 8. | Building Service maintenance | Demonstrate the:<br>a) Sanitary & Plumbing maintenance<br>b) Electrical maintenance |

## OUTCOMES

| Outcomes to be assessed | Assessment criteria for the outcome |
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| 1. Explain Civil Construction Work for:<br>i) Building Construction, ii) Road Construction (NH, SH, District Road, Rail-Road), iii) Irrigation (Diversion head work). | Students will be able to |
| | 1.1. Explain the concept, properties and use of different Building materials involved in building construction. |
| | 1.2 Prepare Sequence of construction of a building. |
| | 1.3 writes the name of different parts of building. |
| | 1.4 Demonstrate Classification and construction of different types of roads, component parts. |
| | 1.5 Explain the concept of different construction work in Irrigation structure Diversion head work - Dams, Barrages, Weir, Reservoir and Canals. |
| 2. Identify different Construction materials, Reinforcing Materials, Structural Steel Section, Admixture their uses, properties and field identification of quality. | Students will be able to identify the different Construction materials, their Characteristics, types, physical properties, field identification of quality and different fields' applications. |
| | 2.1 Explain different types construction materials, their Characteristics, and field identification of quality & uses like – Stones, Bricks, Lime, Mineral admixture , Cement, Sand, Clay Products, Mortar & **Concrete including various concreting operations viz- Selection of ingredients of concrete, Batching, Transportation, placing, compaction & finishing, Curing of concrete, durability of concrete and Carry out field and laboratory tests on concrete in fresh and hardened stage**., Timber, Wood based products, Tar, |

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| | Bitumen, Asphalt, Paint, Varnishes, Metal, Plastics. |
| | 2.2 Identify Reinforcing Materials – Tor Steel, Plain Steel & their quality. |
| | 2.3. Demonstrate different type of Structural Steel Section and application. |
| | 2.4 Demonstrate the use of Admixture in Cement Concrete & Plaster for improving Setting time, Strength, Waterproofing. |
| 3. Classify Types, Function & Method of Construction of different Parts of a building. | Students will be able to explain and demonstrate the different parts of building and their functions and construction: |
| | **a) Sub Structure -** |
| | 3.1 B.F.S. work |
| | 3.2 P.C.C. work. |
| | 3.3 Brick work in foundation & plinth. |
| | 3.4 D.P.C. work. |
| | **b) Super Structure –** |
| | 3.5 Brick work |
| | 3.6 Formwork for columns, footings, retaining walls (Shuttering),for floor beams & Slabs(Centering) |
| | 3.7 Staging |
| | 3.8 Scaffolding |
| | 3.9 Lintel, Chajja, Arches |
| | 3.10 R.C.C. work |
| | 3.11 Plastering & Pointing. |
| | 3.12 Grill works. |
| | 3.13 Wooden works. |
| | 3.14Stair Case, Lift, Escalator. |
| | 3.15 Ventilator. |
| | 3.16Roof. |
| | 3.17 Flooring, Skirting. |
| 4. Explain and demonstrate Construction of Building Service related structures in | Students will be able to explain and demonstrate the different parts of building Sanitary works and Plumbing Works and |

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| Sanitary works and Plumbing Works. | their functions and construction: |
| | **a) Sanitary Works-** |
| | 4.1. House drainage of building |
| | 4.2 sanitary fittings |
| | 4.3 terms used in PHE |
| | 4.4 system of sanitation |
| | 4.5 Manholes & Septic Tank |
| | **b) Plumbing Works** |
| | 4.7 System of Plumbing |
| | 4.8 different fittings of Plumbing, |
| 5 Make a judgment of the Requirement of different Construction machineries, Equipment, tools and accessories. | Students will be able to understand and explain the Requirement of different Construction Equipment and their functions in construction such as: |
| | 5.1. Mason's hand tools such as trowel, straight edge, pipe level, plumb bob, wooden and metal float, right angled scale, measuring tape, brick layer's hammer etc Tractor, Bull dozer, Grader, Scraper, Basic shovel, Power shovel, Drag Line, Clam Shell, Back Hoe, Dumper Trucks, Road Roller, Sheep's Foot Roller, Concrete Mixers, Pump Crete, Concrete Vibrator, Crushers |
| 6. Know and apply building rules and Local by law. | Students will be able to understand and explain the: |
| | 6.1 Local by law-Building Rules, Bengal Municipal Act, Panchayat Rules. |
| | 6.2 Principal of planning of building, |
| | 6.3. Requirements of parts of buildings. |
| | 6.4. Requirements Open space, Classification of building, Ground coverage, FAR, Covered area, Plinth area. |
| 7. Demonstrate the Maintenance of Building and other structure : | Students will be able to: |
| | 7.1 understand and explain the Requirements Tool and Challenges required for Civil Maintenance works |
| | 7.2 estimate and Costing of Civil Maintenance |
| | 7.3. explain the reason of Cracks in Building |
| | 7.4. explain the reason of Seepage and Dampness in |

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| | building |
| | 7.5 understand, explain the Requirements and demonstrate the Maintenance of Building Painting, Plastering, PCC & RCC, Brick and Stone masonry, Wood, Structural Steel Door Window Fittings, Flooring, Roofing and Drainage, Water Supply and Sewerage works. |
| | 76 Functional Requirements of Buildings |
| | 7.7 Name of different types of Products and Chemicals, name of Manufacturer, compounds name, brand name, uses |
| 8. Explain and demonstrate Building Service maintenance | Students will be able to understand , explain and demonstrate the: |
| | 8.1. Sanitary & Plumbing maintenance |
| | 8.2. Electrical maintenance. |