GUIDELINES FOR REGISTRATION AS A STRUCTURAL ENGINEER FOR THE DESIGN OF BUILDINGS WITH MORE THAN 4 FLOORS AS PER THE REQUIREMENTS OF THE URBAN DEVELOPMENT AUTHORITY FOR LISTING IN THE DIRECTORY OF STRUCTURAL ENGINEERS MAINTAINED BY IESL

REGISTRATION AS A STRUCTURAL ENGINEER

Corporate Members (Civil) who wish to register themselves as Structural Engineers those who wish to upgrade their registration category to a higher category from their present category, are required to satisfy the requirements set out below under different categories of buildings:

Category 1 – Buildings having 4 floors or less

- Should be a Corporate Member of the Institution in the field of Civil Engineering and should register as a structural engineer of the IESL.

Category 2 – Buildings having more than 4 floors but not more than 8 floors (Intermediate Rise)

- Should be a Corporate Member of the Institution in the field of Civil Engineering
- Possess a minimum of 2 years experience in the design of buildings of this category acquired under the direct supervision of a Structural Design Engineer acceptable to the Institution
- Has to successfully complete a written examination conducted by the Institution and obtain more than 50 out of 100 marks at the examination or should have successfully completed a PGDip or MSc in Structural Engineering acceptable to the Institution
- Has to be successful at an interview conducted by a Panel of Senior Engineers having experience in structural engineering appointed by the Institution

Category 3 – Buildings having more than 8 floors but not more than 12 floors (Middle Rise)

- Should be a Corporate Member of the Institution in the field of Civil Engineering
- Possess a minimum of 3 years experience in the design of buildings of this category acquired under the direct supervision of a Structural Design Engineer acceptable to the Institution
- Has to successfully complete a written examination conducted by the Institution and obtain more than 50 out of 100 marks at the examination or should have successfully completed a PGDip or MSc in Structural Engineering acceptable to the Institution
- Has to be successful at an interview conducted by a Panel of Senior Engineers having experienced in structural engineering and appointed by the Institution

As approved by the Council on February 1, 2019
Category 4 – Buildings having more than 12 floors but not more than 20 floors (High Rise) and for Category 5 – Buildings having 20 floors and above (High Rise – Unlimited). Candidate may satisfy either of the options given below

OPTION 1

- Should be a Corporate Member of the Institution in the field of Civil Engineering
- Possess a minimum of 3 years’ experience in the design of buildings of this category acquired under the direct supervision of a Structural Design Engineer acceptable to the Institution
- Should have successfully completed a PGDip or MSc in Structural Engineering acceptable to the Institution
- Has to be successful at an interview conducted by a Panel of Senior Engineers having experienced in structural engineering and appointed by the Institution

OPTION 2

- Should be a Corporate Member of the Institution in the field of Civil Engineering
- Posses a minimum of 10 years’ experience out of which 5 years in the design of buildings of this category acquired under the direct supervision of a Structural Design Engineer and balance 5 years under a Structural Design Engineer who has personal knowledge of the ability and competence of the applicant acceptable to the Institution OR having 5 years’ experience in the structural design and completing a CPD course conducted by IESL exclusively for Design of Multi-storied buildings. The minimum duration of the course shall be 100 hours.
- Has to successfully complete a written examination conducted by the Institution and obtain more than 50 out of 100 marks at the examination
- Has to be successful at an interview conducted by a Panel of Senior Engineers having experienced in structural engineering and appointed by the Institution

Entitlement to register under Category 4 or 5 also depends on the performance of the candidate at the interview and past experience of designing similar works.

Separate question papers will be set as Question Paper A, Question Paper B and Question Paper C for different categories stated above and the applicability of Question Papers are given below:

Question Paper A - for candidates applying to register for structural design of buildings up to 12 floors

Question Paper B - for candidates applying to register for structural design of buildings up to 20 floors and

Question Paper C - for candidates applying to register for structural design of buildings above 20 floors.
### Basis of design

- Design philosophy
- Loadings
  - Gravity loading
  - Wind loading
  - Seismic loading
  - Miscellaneous loadings
  - Combination of loadings
- Design criteria
  - Limitation of deflection and drifts
  - Limitation of crack widths
- Materials
  - Timber
  - Masonry
  - Reinforced Concrete
  - Steel
  - Pre-stressed Concrete
- Durability and Fire resistance

### Structural Forms

- Gravity structural system
- Lateral load resistance system

### Floor Systems

- Timber framing
- Reinforced Concrete Floor Systems
- Steel Framing
- Pre-stressed Floors Systems

### Analysis

- Understanding on structural analysis theories and assumptions
- Modal analysis
- Static analysis

### Modeling

- Fundamental of structural analysis and mechanics of material
- Basis of Finite element methods and application
- Knowledge on computer programs in the analysis and design
| Design | • Fundamental on structural design and detailing with different materials  
  ➢ Timber  
  ➢ Reinforced Concrete  
  ➢ Steel  
  ➢ Pre-stressed Concrete |
|---|---|
| Concrete technology | • Ingredients of concrete and mix designs  
  • Compliance of concrete  
  • Quality control strategies in concrete production |
| Sub-Structures | • Knowledge on geotechnical Engineering and site investigation  
  • Design and construction of various foundation types  
  ➢ Shallow foundation  
  ➢ Deep foundations  
  • Durability of foundation system  
  • Pile testing  
  • Water retaining structure  
  • Design & construction of basements  
  • Different type of Earth retaining structures  
  • Shoring systems  
  • Dewatering |
| Miscellaneous | • Building Facades  
  • Precast and modular constructions  
  • Water proofing methods |
### Basis of design

- Design philosophy
- Loadings
  - Gravity loading
  - Wind loading
  - Seismic loading
  - Miscellaneous Loadings
  - Combination of loadings
- Design criteria
  - Limitation of deflection and drifts
  - Limitation of crack widths
  - Human comfort criteria
- Materials
  - Timber
  - Masonry
  - Reinforced Concrete
  - Steel
  - Pre-stressed Concrete
- Durability and Fire resistance

### Structural Forms

- Gravity structural system
- Lateral load resistance system

### Floor Systems

- Timber framing
- Reinforced Concrete Floor Systems
- Steel Framing
- Pre-stressed Floors Systems

### Analysis

- Understanding on structural analysis theories and assumptions
- Modal analysis
- Static analysis
- Dynamic analysis
- Creep, Shrinkage and Temperature effects
| Modeling                                      | • Fundamental of structural analysis and mechanics of material  
  | • Basis of Finite element methods and application  
  | • Knowledge on computer programs in the analysis and design  
| Design                                       | • Fundamental on structural design and detailing with different materials  
  | ➢ Timber  
  | ➢ Reinforced Concrete (including High strength concrete)  
  | ➢ Steel  
  | ➢ Pre-stressed Concrete  
| Concrete technology                          | • Ingredients of concrete and mix designs  
  | • Compliance of concrete  
  | • Quality control strategies in concrete production  
  | • High performance and high strength Concrete  
| Sub-Structures                                | • Knowledge on geotechnical Engineering and site investigation  
  | • Design and construction of various foundation types  
  | ➢ Shallow foundation  
  | ➢ Deep foundations  
  | • Durability of foundation system  
  | • Pile testing  
  | • Water retaining structure  
  | • Design & construction of basements  
  | • Different type of Earth retaining structures  
  | • Shoring systems  
  | • Dewatering  
| Miscellaneous                                 | • Building Facades  
  | • Precast and modular constructions  
  | • Fire engineering  
  | • Water proofing methods  
  | • Sustainable construction  

As approved by the Council on February 1, 2019
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| Structural Forms                                   | • Gravity structural system                                     |
|                                                   | • Lateral load resistance system                                |

| Floor Systems                                      | • Timber framing                                                |
|                                                   | • Reinforced Concrete Floor Systems                             |
|                                                   | • Steel Framing                                                 |
|                                                   | • Pre-stressed Floors Systems                                   |

| Analysis                                           | • Understanding on structural analysis theories and assumptions |
|                                                   | • Modal analysis                                                |
|                                                   | • Static analysis                                               |
|                                                   | • Dynamic analysis                                              |
|                                                   | • P-Delta analysis                                              |
|                                                   | • Axial shortening analysis                                     |
|                                                   | • Creep, shrinkage and Temperature effects                      |
| **Modeling** | • Fundamental of structural analysis and mechanics of material  
|             | • Basis of Finite element methods and application  
|             | • Knowledge on computer programs in the analysis and design |
| **Design**  | • Fundamental on structural design and detailing with different materials  
|             | ➢ Timber  
|             | ➢ Reinforced Concrete (including High strength concrete)  
|             | ➢ Steel  
|             | ➢ Pre-stressed Concrete |
| **Concrete technology** | • Ingredients of concrete and mix designs  
|             | • Compliance of concrete  
|             | • Quality control strategies in concrete production  
|             | • High performance and high strength Concrete |
| **Sub-Structures** | • Knowledge on geotechnical Engineering and site investigation  
|             | • Design and construction of various foundation types  
|             | ➢ Shallow foundation  
|             | ➢ Deep foundations  
|             | • Durability of foundation system  
|             | • Pile testing  
|             | • Water retaining structure  
|             | • Design & construction of basements  
|             | • Different type of Earth retaining structures  
|             | • Shoring systems  
|             | • Dewatering |
| **Miscellaneous** | • Wind tunnel testing and Aerodynamic shaping of tall buildings  
|             | • Building Facades  
|             | • Precast and modular constructions  
|             | • Water proofing methods  
|             | • Sustainable construction |