

SYLLABUS (PART B) – CIVIL

SYLLABUS OF PCE CIVIL

CIVIL ENGINEERING PRACTICE IN MALAYSIA

Civil engineering practice in Malaysia

Proficiency, experience and good working knowledge of Civil engineering practice in Malaysia covering general matter, geotechnical works, structural works and civil works as follows:

A. GENERAL MATTER

1. Procurement & Contract (Pre and Post) administration
2. Regulatory practice and submission procedure for civil engineers
 - a. "Street, Drainage & Building Act" and the Uniform Building By Law Malaysia (UBBL) where it pertains to the civil engineer.
 - b. Earth Works By-Laws
 - c. Submission procedures for planning approval, building plan and relevant Form Gs and Form F for Certificate of Completion and Compliance (CCC) as Submitting Person.
 - d. Fire Services Act where it pertains to Civil engineer submission.
 - e. Environmental Quality Act introductory level.
 - f. Temporary works and site safety.

B. GEOTECHNICAL WORKS

1. Site Investigation Works
 - a. Planning of site investigation field works and sampling
 - For earthworks inclusive cut and fill; and
 - For foundation design (shallow and deep foundation)
 - b. Planning of laboratory testing and interpretation of results
 1. Types of laboratory tests; and
 2. Interpretation of laboratory tests for necessary soil and rock design parameters.
- b. Earthworks
 - i. General Earthworks
 1. Determination of materials (acceptable materials vs unsuitable materials for filling or excavation);
 2. Compaction requirements;

3. Construction control of filling at site (e.g. loose thickness, testing, filling layer by layer, no tipping etc.);
 4. Construction control of cutting at site (e.g. to cut from top, to turf within certain time, etc.); and
 5. Erosion, sediment, control plan (ESCP).
- ii. Design of Earthworks
1. Selection of subsoil and rock parameters for analysis (e.g. shear strength, groundwater levels, stiffness, consolidation parameter etc.);
 2. Analysis and design of slope stability for cut and fill (e.g. type of analysis and factor of safety, etc.);
 3. Slope stabilization system (soil and rock slope);
 4. Earth retaining structures;
 5. Settlement analysis (e.g. immediate settlement, consolidation settlement, secondary compression, etc.);
 6. Ground treatment selection, analysis and design; and
 7. Application of Geosynthetic (vertical drain, geotextile, geogrid etc)
- c. Geotechnical Design for Foundation and Retaining Walls

C. STRUCTURAL WORKS

1. Specific requirements for Structure by UBBL
 - a. Loading requirements;
 - b. Fire resistance requirements.
 - c. Durability of concrete
 - d. QA/QC on concrete
2. Structural Analysis
3. Foundation and Substructure Design
 - a. Shallow foundations
 - b. Deep foundations
 - c. Pile cap design
 - d. Design of earth retaining walls and basement walls; and
 - e. Design of temporary earth retaining system for basement construction.
4. Reinforced Concrete Design

- i. Beam design - flexure, shear, span/depth ratios, crack width, curtailments, laps etc;
- ii. Rectangular and circular column design - short and slender; and
- iii. Design of load bearing walls
- b. Prestressed Concrete
 - i. Single and multi span slab and beam design at transfer and service state;
 - ii. Prestressed concrete bridge beams;
 - iii. Prestressing losses - Creep, shrinkage, frictional losses, curvature, etc.
- c. Water Retaining Structure
 - i. Slab and wall design subject to hydrostatic forces; and
 - ii. Crack width control calculation.
- d. Structural Steel Design
 - i. Beam section design;
 - ii. Column section design;
 - iii. Steel truss and frame analysis and design;
 - iv. Connection design by welding and bolting;
 - v. Protective coating
- e. Composite Steel Design
 - i. Concrete slab and steel beam design.

D. CIVIL WORKS

- a. Water supply design
 - i. External water supply
 - ii. Water demand calculations;
 - iii. Pipe network analysis; and
 - iv. Hydraulics calculations.
- b. Sewerage Design
 - i. External sewerage systems
 - ii. Understanding of sewage treatment plants and network pumping station.
- c. Road and highway designs

Design to JKR Arahkan Teknik and other relevant authorities

 - i. Horizontal and vertical curves for road alignment;
 - ii. Acceleration, deceleration lanes and junction design;
 - iii. Super elevation design;

iv. Road pavement design

E. Storm-water drainage design

v. Design to Manual Baru Saliran Mesra Alam Malaysia (MSMA):

Hydrologic design

1. Estimation of Design Rainstorm
2. Runoff Quality Controls
 - a. Detention;
 - b. Retention
3. Runoff Conveyance
 - a. Open drains;
 - b. Pipe drains; and
 - c. Culverts and bridge crossings.
4. Runoff Quantity Controls
 - a. Erosion and sediment control plans (ESCP);
 - b. Gross pollutant trap
 - c. Pumped Drainage
 - d. Sub-Soil Drainage