



## Table (3) A Plan Of Study For B.Sc. In Civil Engineering

## (Third Year) Junior Year

| No              | Course<br>No. | Course Title                                    | Туре         | Weekly hours |          |           | Unita |
|-----------------|---------------|---|--------------|--------------|----------|-----------|-------|
| 110.            |               |   |              | Theoretical  | Tutorial | Practical |       |
| First Semester  | CE301         | Theory of Structures I                          | Eng. Science | 3            | 1        | _         | 3     |
|                 | CE303         | Reinforced Concrete Design I                    | Eng. Science | 3            | 1        | _         | 3     |
|                 | CE305         | Soil Mechanics I                                | Eng. Science | 2            | 1        | 2         | 3     |
|                 | CE307         | Engineering Analysis                            | Math         | 3            | 1        | _         | 3     |
|                 | CE309         | Construction Projects<br>Management             | Eng. Science | 2            | 1        | -         | 2     |
|                 | CE311         | Traffic Engineering                             | Eng. Science | 2            | 2        |           | 2     |
|                 | CE313         | Irrigation and Drainage                         | Eng. Science | 2            | 2        |           | 2     |
|                 | ER301         | Engineering Profession Ethics                   | Humanity     | 1            |          | -         | 1     |
|                 | Sum           |   |              | 18           | 9        | 2         |       |
|                 |               |   |              | 29           |          | 19        |       |
| Second Semester | CE302         | Theory of Structures II                         | Eng. Science | 3            | 1        | _         | 3     |
|                 | CE304         | Reinforced Concrete Design II                   | Eng. Science | 3            | 1        |           | 3     |
|                 | CE306         | Soil Mechanics II                               | Eng. Science | 2            | 1        | 2         | 3     |
|                 | CE308         | Numerical Analysis                              | Math         | 2            | 2        | _         | 2     |
|                 | CE310         | Engineering Economy                             | Eng. Science | 2            | -        | _         | 2     |
|                 | CE312         | Highway Geometric Design                        | Eng. Science | 2            | 1        | _         | 2     |
|                 | CE314         | Engineering Hydrology                           | Eng. Science | 2            | 1        | _         | 2     |
|                 | CE315         | Structural Analysis and Design by Computer      | Eng. Science | 1            |          | 2         | 2     |
|                 | ER303         | T <mark>echnical English Language</mark><br>III | Humanity     | 2            |          | -         | 2     |
|                 | ER302         | Sumner Training                                 |              | Satisfaction |          |           |       |
|                 | Sum           |   |              | 19           | 7        | 4         | 21    |
|                 |               | Sum   |              | 30           |          |           |       |





III - 3<sup>rd.</sup> Year

Course Number: CE301 Course Name: Theory of Structure I Credit hours: 4 Pre-requisite: Strength of Material I, II Course Contents:

This course covers: Introduction to the structural systems. Types of loads, supports, and connections. Stability and determinacy of beams, trusses, rigid frames, and composite structures. Analysis of statically determinant structures such as beams, trusses, rigid frames, and composite structures. Common types of trusses. Analysis of trusses using the method of joints and the method of sections. Analysis of compound trusses and complex trusses. Internal loading (axial, shear, and bending moment) developed in structural elements. Analysis of cables and arches. Influence lines of beams, trusses, rigid frames, and beam-girder systems. A approximate analysis of statically indeterminate structures such as trusses and portal frames.

#### Course Number: CE302 Course Name: Theory of Structure II Credit hours: 4 Pre-requisite: Theory of Structure I Course Contents:

This course covers: the elastic deformation of structures such as trusses, beams, and frames by using conjugate beam methods, and the method of virtual work. Analysis of statically indeterminate beams, trusses, and frames by using consistent deformation method. Analysis of statically indeterminate beams and trusses by using slop-deflection method. Slop-deflection method for frames with no joint translation and slop-deflection method for frames with joint translation. Analysis of statically indeterminate beams, trusses, and rigid frames by using moment distribution method. Introduction to stiffness method (beam, frame, truss) if time allows.

## Course Number: CE303 Course Name: Reinforcement Concrete Design I Credit hours: 4 Pre-requisite: None Course Contents:

Introduction, construction materials, working design method, ultimate design method, Behavior, strength, and design of reinforced concrete beams subjected to moment, shear force.



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Course Number: CE304 Course Name: Reinforcement Concrete Design II Credit hours: 4 Pre-requisite: Reinforcement Concrete Design I Course Contents:

This course covers: Introduction, analysis and design: two way slab, one way slab, continuous beam, short column, Long column, Introduction to the design of reinforced concrete structures.

Course Number: CE305 Course Name: Soil Mechanics I Credit hours: 5 Pre-requisite: None Course Contents:

This course covers : introduction of soil mechanics, such as geology, origin of Soils, Clay Minerals soil Formation, composition and description of individual soil particle size distribution, Atterberg limits, weight-volume relationships, soil classification, stress within a soil Mass, effective stress, capillarity, soil compaction, hydraulic conductivity, seepage drainage (fluid flow in soil) (one dimensional) and two dimensional flow. The most important methods of determining soil parameters, in the laboratory and in situ, are also described. and laboratory testing.

Course Number: CE306 Course Name: Soil Mechanics II Credit hours: 5 Pre-requisite: Soil Mechanics I Course Contents:

This course covers : the compressibility of Soil, consolidation Theory, consolidation Settlement, surcharge, shear Strength, slope stability, earth-retaining structures and special Topics. A number of practice problems also are given at the end of each subject, and laboratory testing.

Course Number: CE307 Course Name: Engineering Analysis Credit hours: 4 Pre-requisite: None Course Contents:

This course covers : First Order Ordinary Differential Equations(ODEs) and its applications, Second Order linear ODEs and its applications, Higher Order linear ODEs and its applications, Solving System of linear ODEs and its applications, Eigenvalues and Eigenvectors and its applications, Conversion of an nth-Order linear ODE to a System of n first-order linear ODEs, Fourier Series, Partial Differential



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Equations and its applications, Laplace Transforms, Inverse Laplace Transforms, solving of linear ODEs by Laplace Transforms, Solving System of linear ODE by Laplace Transforms.

Course Number: CE308 Course Name: Numerical Analysis Credit hours: 4 Pre-requisite: None Course Contents:

This course covers : Introduction to numerical analysis and Error, Methods of solving nonlinear Equations [Bracketing methods(Bisection method, False position method) Open methods(Fixed point iteration method, Newton- Raphson's method, Secant method ], Methods of solving Linear System of Equations(Gauss elimination method, Gauss-Jordan method, L-U Factorization method, Jacobi iteration method, Gauss-Seidel iteration method), Solving nonlinear System of Equations (Method of iteration, Newton-Raphson's method), Interpolation (introduction, Lagrange Interpolation, Newton's Divided Difference Interpolation, Newton's Forward Difference Formula, Newton's Backward Difference Formula, Gauss Forward formula, Gauss Backward formula), Curve Fitting, Numerical Integration[Trapezoidal Rule, Simpson's Rule(Simpson's one third Rule, Simpson's threeeighth Rule)], Numerical Differentiation, Numerical Solutions of Ordinary Differential Equations (Euler method, Modified Euler method, Runge Kutta method), Finite Differences method and its applications.

## Course Number: CE309 Course Name: Construction Projects Management Credit hours: 3 Pre-requisite: None Course Contents:

This course covers :- Introduction to Construction Projects and Construction Management, Principles & Functions & Processes of Construction Management), A Construction Project Life Cycle Approach, Construction Contracts, Contracts Types, Planning and Scheduling Techniques of Construction Projects[Bar Chart Method, Critical Path Method(Activity on Arrow, Floats, Activity on Node, Overlapped Precedence Networks Method, PERT Method(Program Evaluation and Review Technique)), Line of Balance], Cash Flow Forecasting, Leveling Resources.

## Course Number: CE310 Course Name: Engineering Economy Credit hours: 2 Pre-requisite: None Course Contents:

This course covers : Introduction to Economy and Engineering Economy , Interest , Cash Flows Diagramming , Interest Types(Simple Interest , Compound Interest , Nominal



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Interest), Effective Interest Rates, How Time and Interest Affect Money, Use the Engineering Economic Factors to Account for the Time Value of Money [(Compounding Factor), (Discount Factor), (Compounding Factor for Uniform Series), (Sinking Fund Factor), (Present Worth Factor for Uniform Series), (Capital Recovery Factor), Uniform Gradient Series], The basic Economic tools and techniques to evaluate one or more alternatives of Construction projects and Economic Decisions -Making (Net Present Value, Benefit Present Ratio to Cost Present, Internal Rate of Return, Pry –Back Period), Engineering Economic Comparisons and Selection of Best Alternative(Present Worth Method , Annual Worth Method), Depreciation, Types and Methods of Depreciation (Straight Line Method(Sinking Fund Method), Constant Percentage Method, The Sum of Years- digits Method)

**Course Number: CE311 Course Name: Traffic Engineering Credit hours: 3 Pre-requisite:** None **Course Contents:** 

This course covers: - Highway planning, administration functional, classification of highway, characteristics of driver, pedestrians, road and Vehicle Requirements. Stopping sight distance. Passing sight distance. Traffic Engineering Studies. Traffic volume counts, Types of speed, Spot Speed Study, Traffic Flow Characteristics. Flow- Density-Speed relations, Capacity and level of service. Level of Service Basic Freeway Segment, Traffic Signals, Traffic Safety, Intersections Design (Roundabout, Signalized & Signalized).

**Course Number: CE312** Course Name: Highway Geometric Design Credit hours: 3 Pre-requisite: None **Course Contents:** 

This course covers: Introduction, Highway Surveys and Locations, Crosssection elements, Horizontal alignment, Super Elevation on curves, Widening on horizontal Curves, Vertical alignment, Humps, Highway Accidents and Safety; Highway drainage. Lighting, Marking. Parking Studies, Ramp Analysis.

**Course Number: CE313 Course Name: Irrigation and Drainage Engineering Credit hours: 4 Pre-requisite:** None **Course Contents:** 



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This course covers : This course covers: Introduction to irrigation , Definition of irrigation (Sources and Types) , Basic planning of major irrigation network , Surface irrigation , Furrow irrigation design , Border irrigation , Border irrigation design , Basin irrigation , Basin irrigation design , Sprinkler irrigation , Drip irrigation , Drainage engineering (Define and Classification) , Darcy's law , Planning of drainage (open drains and closed drains) , Methods of planning the closed drains , Design of cross-section of (open drains and closed drains) , Distance between drains , Maintenance of drainage system.

#### Course Number: CE314 Course Name: Engineering Hydrology Credit hours: 3 Pre-requisite: None Course Contents:

This course covers : Introduction, Hydrology, Hydrologic cycle, Weather and Hydrology. Precipitation, estimating missing data, Double mass curve analysis, average rainfall depth, Probability and return period, Depth-intensity-duration relations, plotting positions, Evaporation, Factors controlling evaporation, Determination of evaporation. Stream flow, Water stage measurement, Discharge measurement, Stage-discharge relation, Estimation of rating curve. Hydrograph analysis, Components of hydrograph, Hydrograph separation, Analysis of complex hydrograph, Unit hydrograph, Conversion of unit hydrograph, Synthetic hydrograph, Rainfall and runoff relationship, Flood routing, Flood frequency analysis, Gumbel distribution, Log-Pearson type III distribution, Movement of groundwater, hydraulics of wells, Introduction to reservoir sedimentation.

## Course Number: CE315 Course Name: Structural Analysis and Design by Computer Credit hours: 3 Pre-requisite: None Course Contents:

This course covers : This course covers: Introduction to computer design packages, Computer implementation using the stiffness method, Flexibility and stiffness methods of structural analysis are applied to two- and three-dimensional framed structures, Application of software package (SAP2000) for design of reinforced concrete structures.

#### Course Number: ER301 Course Name: Engineering Profession Ethics Credit hours: 1 Pre-requisite: None Course Contents:

This course covers : Scope of engineering ethics. Moral reasoning and resolving ethical dilemmas. Codes of ethics. Engineering as experimentation, engineers as responsible experimenters. Commitment to safety: Safety and risk, Teamwork: Definition, types of teams



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and groups. Confidentiality and conflict of interest. Conflict management. Honesty, environmental ethics, global issues, engineering and ethnological progress: Optimism, pessimism and realism, shared responsibility, moral leadership.

Course Number: 303 Course Name: <u>Technical English Language III</u> Credit hours: Pre-requisite: <u>Technical English Language I, II</u>

## **Course Contents:**

This course covers: **Grammar** (auxiliary verbs, questions and negatives, past tenses, modal verbs – obligation and permission, future forms, present perfect, conditionals, modal verbs –probability, present perfect continuous, indirect questions, reported speech). **Vocabulary**, **Reading**, **Writing** (correcting mistakes in letters, letters and emails, a narrative, for and against, making a reservation, a description, a letter of application, writing a biography, words that loin ideas), **Listening and speaking skills**.

Course Number: ER302 Course Name: Summer Training Credit hours:-----Pre-requisite: None Course Contents:

This course covers : To be supplied by the authorities concerned.