

NOTIFICATION

No. 89/2020

Date : 26/10/2020

Subject : Implementation of new Syllabi of Semester III & IV of B.E. (C.B.C.S.) as per A.I.C.T.E. Model Curriculum...

It is notified for general information of all concerned that the authorities of the University have accepted to implement new Syllabi of Semester III & IV of B.E./B.Text. E./B.Tech. (Chem.Tech.) (Food, Pulp & Paper, Oil & Paint and Petrochemical Tech.) (C.B.C.S.) as per A.I.C.T.E. Model Curriculum to be implemented from the academic session 2020-21 & onwards as per "Appendix - A" as given below:

Sd/-
(Dr.T.R.Deshmukh)
Registrar

"Appendix - A"

SYLLABI OF B.E. SEM. III & IV (CIVIL ENGINEERING) [C.B.C.S.]

THIRD SEMESTER

3CE01 MATHEMATICS III

Objectives:-

- Find general solutions of linear differential equations with constant coefficients using the roots of the auxiliary equation.
- Calculate the Laplace Transform of basic functions using the definition.
- Compute the partial Differential Equations.
- Understand the computational details behind certain numerical methods.
- Compute the Analytic function.
- Compute and interpret the correlation coefficient.

Course Outcomes:

After successfully completing the course, the students will be able to:

1. Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.
2. Apply Laplace transform to solve differential equations.
3. Demonstrate the use of Partial Differential Equations.
4. Compute different Numerical Methods.
5. Apply the knowledge of Complex Analysis.
6. Demonstrate the basic concepts of probability and statistics.

SECTION-A

Unit I : Ordinary Differential Equations :

Complete solution, Operator D, rules for finding the complementary function, the inverse operator, Rules for finding particular integral. Method of variation of parameters, Cauchy's and Legendre's Linear Differential equations. Simultaneous linear differential equations with constant coefficients Applications to civil engineering. (7)

Unit II: Laplace transforms:

Definition and elementary properties, Inverse L.T. by various methods, Convolution theorem, Solution of ordinary differential equation using Laplace transform of periodic functions. Application to problems of beams and fluids. (7)

Unit III : Partial Differential Equations :

P.D.E. of first order and first degree of types i) $f(p,q) = 0$ ii) $f(p,q,z)=0$, iii) $f(p,q,x,y)=0$ iv) $f(p,q,x,y,z)=0$ i.e. (a) Lagrange's form $Pp + Qq = R$ (b) Clairaut's form $z=px+qy+f(p,q)$ v) Equations reducible to above standard types linear Homogeneous P.D.E. of nth order with constant coefficients. (7)



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SECTION-B

Unit IV: Numerical Methods :- (i) Solution of Algebraic and transcendal Equations by Newton Raphson method and by method of False Position.

(ii) Solution of system of linear equations by Grout's method, Gauss Seidal method and Relaxation Method.

Numerical solution of differential equations by Picard's method, Taylor's series method, Euler's method, modified Euler's method and Rungekutta forth order method. (7)

Unit V : Complex variable :

Analytic functions, C.R.conditions, Harmonic functions. harmonic conjugate functions, Milne's method, conformal mappings (translation, rotation, magnification, inversion, bilinear transformation) (7)

Unit VI : Statistics :

Probability : Axioms, conditional probability, Baye's theorem, Mathematical Expectation and probability distributions (Binomial, Poisson and Normal). Curve fitting by method of least square only for line and parabola, Correlation, regression. (7)

TEXT BOOKS:

1. Elements of Applied Mathematics by P. N. Wartikar and J. N. Wartikar. Poona Vidhyarthi Publisher
2. Higher Engineering Mathematics by B.S.Grewal. Khanna Publishers
3. Introduction to method of Numerical Analysis- S. S. Shastry, 2ND Edition, PHI Pvt. Ltd., New Delhi.

REFERENCES:

1. A Mathematical Companion for Science and Engineering Students – Brettenbach, Oxford University Press, 2008
2. Advancing Engg. Mathematics, E.K.Kreyzig, John Wiley
3. Numerical Method for Mathematics Science and Engineering, John H. Mathew, PHI 4. Numerical Methods - Principles, Analysis & Algorithms Pal, Oxford.

3CE02 – STRENGTH OF MATERIALS

Learning Objectives of Subject:

1. To determine the Mechanical lbehavior of the body and construction materials by determining the stresses, strains produced by the application of loads.
2. To apply the fundamentals of simple stresses and strains.
3. To make one understand the concept of bending and its theoretical analysis.
4. To apply fundamental concepts related to deformation, moment of inertia, load carrying capacity, shear forces, bending moments, torsional moments, principal stresses and strains, slopes and deflection.

Course outcomes:

At the end of the subject the students will be able -

1. To understand the basics of material properties, stress and strain.
2. To apply knowledge of mathematics, science, for engineering applications
3. To identify, formulate, and solve engineering & real life problems
4. To design and conduct experiments, as well as to analyze and interpret action and reaction data.
5. To understand specific requirement from the component to meet desired needs within realistic constraints of safety.

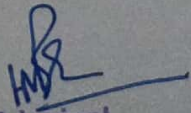
SECTION – A

Unit I: Mechanical properties: Concept of direct and shear stresses and strains, stress-strain relations, Biaxial and triaxial loading, elastic constants and their relationship, stress-strain diagrams and their characteristics for mild steel, tor steel, Generalized Hook's law, factor of safety. Uniaxial stresses and strains: Stresses and strains in compound bars in uniaxial tension and compression, temperature stresses in simple restrained bars and compound bars of two metals only.

Unit II: Axial force, shear force & bending moment diagrams: Beams, loading and support conditions, bending moment, shear force and axial load diagrams for all types of loadings for simply supported beams, cantilevers and beams with overhangs, relation between shear forces, bending moment and loading intensity.

Unit III: Stresses in beams (Bending, Shear), i) Bending: Theory of simple bending, section modulus, moment of resistance, bending stresses in solid, hollow and built up section. ii) Shear: Distribution of shear stresses on beam cross sections, impact loads and instantaneous stresses.




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SECTION - B

Unit IV: Torsion: Theory of torsion & assumptions, derivation of torsion equation, polar modulus, stresses in solid & hollow circular shaft, power transmitted by shaft, closed coiled helical spring with axial load. Thin cylinders subjected to internal pressures.

Unit V: Principal stresses: Biaxial stress system, principal stresses, principal planes, Mohr's circle of stresses, principal strains. Combined direct & bending stresses.

Unit VI: Slope & deflection of beams: Slope & deflection in statically determinate beams subjected to point loads, uniformly distributed loads, moments by Macauley's method. Theory of long columns, Euler, Rankin's formula.

Books Recommended:

1. E. P. Popov, "Mechanics of Materials", Prentice Hall of India, New Delhi.
2. S. Timoshenko and O. H. Young, 'Elements of Strength of Materials', East West Press Private Ltd., New Delhi.
3. Ferdinand L. Singer, 'Strength of Materials', Harper and Row, New York.
4. Shames, I. H., 'Introduction to Solid Mechanics', Prentice Hall of India, New Delhi.
5. R. K. Bansal, Strength of materials, Laxmi Publications Pvt Ltd.
6. Junnarkar, S. B., Mechanics of materials.
7. Mubeen, A., Mechanics of solids, Pearson education (Singapore) Pvt. Ltd.
8. Beer and Johnston, Mechanics of materials, Mc-Graw Hill.
9. S. Ramamrutham, Strength of Materials, Dhanpat Rai Publishing Co Pvt Ltd.

3CE03 - BUILDING CONSTRUCTION & ENGINEERING GEOLOGY

Learning Objectives of Subject:

1. To understand various types and components of civil structure.
2. To learn about the type of infilling material, its features and construction methodology.
3. To understand various levels in building - floor, sill, lintel, roof levels and their need.
4. To understand the need and type of vertical and horizontal circulation.
5. To make aware of knowledge and importance of rock, soil and its impact for site selection.
6. To help one to understand the reason for Earthquake and its impact on soil / rock properties.

Course outcomes:

At the end of the subject the students will be able -

1. To understand Load bearing and Frame structure.
2. To recognize various types of construction material and its suitability
3. To recognize the various levels in building and its need.
4. To know types of staircase, doors, windows and other related fixtures.
5. To recognize types of rock and minerals and its construction properties.
6. To know reason for earthquake and seismic waves.

SECTION - A

Unit I: Introduction: Definition, types of buildings as per national building code, components of buildings and their functions, Types of structure - load bearing & framed structures. Foundation: Definition and necessity, loads of foundation, Bearing Capacity soil, field methods of improving bearing capacity. Types of foundation - shallow foundation and Types of Shallow foundation. Causes of failure of foundations and precautions to be taken.

Unit II: Masonry: Classification of bricks, manufacturing of bricks, tests on bricks, properties of burnt bricks, fly ash bricks, ALC Blocks. Brick masonry construction - Technical terms, general principles, commonly used types of bonds such as stretcher, header, English bond and Flemish bond, their suitability. Formwork: Different types, their relative merits, demerits, period for removal of formwork for different members. Earthquake resistant bands in masonry- Types, location and application.

Unit III: Floors: Types of Floors - Basement floor, ground floor and upper floors, Floor finishes - Types of flooring material, different types of floor finishes, suitability, method of construction, criteria for selection. Roofs - Flat, pitched roof, steel roof trusses - types and suitability, types of roof covering. Arches, lintels - Types and their suitability, details of R.C.C. lintels.; chajja, precast lintels arches.

SECTION - B

Unit IV: Doors: Purpose, criteria for location, size of door, door frames.; its types, methods of fixing. Types of door shutters and their suitability, Windows - Purpose, criteria for location, no., sizes; shapes of Windows, types of windows; their suitability. Ventilators - Types and their suitability. Fixtures & fastening for doors and windows. Stairs - Function, technical terms, criteria for location, types of staircases, their suitability, principle of stair layout design.



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Unit V: Plastering - Necessity, types, processes of different types of plastering, defects in plastered work. Scaffolding - Purpose, types and suitability. Special Aspects of Construction - Damp proofing - causes of dampness, its effects, various methods of damp proofing. Fire proof construction - Fire protection requirements for a multistoried building. Sound proof Construction - Sound absorbents and their characteristic. Expansion & construction joints in building.

Unit VI: Introduction - Different branches of Geology and importance of Geology in Civil Engineering. Folds, faults, joints in Geology. Geological studies related to site selection for dams and reservoirs. Petrology - rock cycle, rock weathering and soil formation, study of common rock types. Earthquake Engineering - earthquake waves, causes and effects, magnitude and intensity, earthquake zones of India.

Books Recommended:

1. Mackay W.B.: Building Construction, Vol. I, II, III, Longmans.
2. Sushil Kumar: Building Construction, Standard Publishers Distributors.
3. Singh Parbin: General & Engineering Geology.
4. Mukherjee: A Text Book of Geology.
5. Tuyrell G.W.: The Principle of Petrology.
6. Wadia D.N. : Geology of India.
7. Sane L.S.: Construction Engg. Manak Talas, Mumbai.
8. National Building Code of India, 2016.
9. Punmia B.C.: Building Construction.
10. A Manual of Earthquake Resistant, Non-Engineered Construction Indian Society of Earthquake Tech.

3CE04 – TRANSPORTATION ENGINEERING

Learning Objectives of Subject:

1. To learn about basics of Road construction like surveys, alignment principles, types of roads.
2. To study and understand various road studies for safe road design principles and essential geometry.
3. To learn about various road pavements its construction and maintenance procedure.
4. To learn about railway transportation and terms related to it.
5. To learn about construction concepts of Airport runway, Apron layout, various survey and terms related to Airport Transportation.
6. To learn about Tunnels and Bridges components types and related transportation study.

Course outcomes:

At the end of the subject the students will be able –

1. To identify type of roads and its utility.
2. To understand the application of various road studies at time of survey and actual construction.
3. To design the various types of road pavements.
4. To understand rules regulations, signals, type of gauges and railway sleepers density.
5. To recognize the Airport features and design concept of components for Aero plains movement.
6. To identify types and components of Tunnels and bridges and its design components.

SECTION-A

Unit-I Highway: Road Transport characteristics, classification of Roads, Road Patterns, Alignment principles, Survey for highway.

Unit-II Geometric Design: Cross sectional elements, Right of way, Camber, Gradient, Typical Highway cross section in embankment and in cutting, PIEV Theory, stopping sight distance, overtaking sight distance, Horizontal alignment, curves, superelevation.

Unit-III Pavement Design and Traffic Engineering: Components of Flexible and Rigid pavement, Design factor, Traffic Characteristics, Traffic Studies, Construction and Maintenance - WBM Surface dressing, bituminous roads and construction procedure. Road parking system, traffic control devices and 3 E's of traffic

SECTION-B

Unit-IV: Railway: Railway transportation, track sections, embankment & cutting. Points and crossing Left & right hand turnouts. Objects, Permanent way, gauges, coning of wheels, components of permanent way, Sleeper density, Rail fixtures & fastening. Rail types and functions.

Unit-V: Airport: Agencies controlling national & international aviation, various surveys to be conducted, airport site selection, Aero plane component parts, Aircraft characteristics. Airport obstructions: Zoning laws, wind rose diagram. Basic runway length and corrections, Apron layout, Aircraft parking & parking system.



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Unit-VI: Tunnel and Bridges: Tunnels- necessity, types, tunnel alignment, Size and shape of tunnels, and Tunnel lining. Tunnel drainage, ventilation & lighting of tunnels. Bridge Engineering-Components, classification and identification, data collection, site selection, economic span, Estimation of flood discharge, water way, scour depth, depth of foundation, Afflux, clearance and free board, different structural form – culverts, types of foundation, abutments, piers and wing wall.

Books Recommended:

- 1) Khanna S.K. & Justo C.E. : Highway Engineering
- 2) Rao G.V. : Principles of Transportation & Highway Engg.
- 3) Dr.Kadiyali L.R. : Traffic Engg. & Transport Planning.
- 4) Bindra S.P. : Principles & Practice of Bridge Engg.
- 5) Saxena & Arora : Railway Engineering.
- 6) Agrawal M.M. : Railway Engineering.
- 7) Khanna S.K., Arora M.G., Jain S.S. : Airport Planning & Design,
- 8) Srinivasan: Tunnel Engineering.
- 9) Shrrama S.K. : Principles, Practice & Design of Highway Engg.
- 10) Duggal A.K. & Puri V.P. : Laboratory Manual in Highway Engg.

3CE05 – CONCRETE TECHNOLOGY & RCC

Learning Objectives of Subject:

1. To understand basic construction material - Cement, its property and suitability tests.
2. To learn about meaning of concrete, strength of concrete, mixing proportion and suitability test.
3. To understand meaning of RCC and its need.
4. To learn various properties of concrete and use of different admixtures.
5. To learn about special concrete materials and methods.
6. To be able to perform mix design of concrete

Course outcomes:

At the end of the subject the students will be able -

1. To know need and composition of binding material, cement.
2. To recognize concrete and RCC and will be able to perform desired test for suitability,
3. To analyze RCC Components like slab and lintels.
4. To decide and utilize the admixtures as per the need of Concrete.
5. To understand importance of mix design.

SECTION-A

Unit I: Cement: Physical properties of Portland cement, laboratory tests on cement, types of cements. Aggregate: Classification of aggregate, physical properties, bulking and moisture content, specific gravity, bulk density.

Unit II: Properties of fresh concrete: Workability of concrete, methods of measuring workability, nominal mix, mixing, centering & formwork, placing, compaction and curing of concrete. Properties of hardened concrete: Grades of concrete, properties of concrete, compressive, tensile, and shear strength, modulus of elasticity, creep, shrinkage. Durability of concrete, laboratory tests on concrete.

Unit III: Basic elastic theory and concept of reinforced concrete, types of reinforcement, Analysis of rectangular sections by working stress method, modes of failure, design of singly reinforced beams, one-way slabs (simply supported), lintels, and chajjas.


SECTION-B

Unit IV: Pozzolana and Admixtures: Plasticizer, retarders, accelerators, water proofing agents, mineral admixtures, IS code provisions. Construction chemicals: concrete curing compounds, polymer bonding agent, surface retarders, bond aid for plastering, protective and decorative coating.

Unit V: Special concrete: Ready Mix Concrete Light weight concrete, fiber reinforced concrete, Roller compacted concrete, self-compacted concrete, high strength concrete, high performance concrete, high volume fly ash concrete. Special concreting techniques: Guniting, grouting and shotcrete concrete, introduction & application of Ferrocement.

Unit VI: Introduction of mix design, factors governing mix design, IS Code method of mix design (IS: 10262 – 2019) and Ambuja method.




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