

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Department of Civil engineering/Civil water management
SYLLABUS FOR ENTRANCE TEST FOR Ph.D. IN CIVIL ENGINEERING

Paper on section A:

Research Methodology

(Common to all specializations of Civil Engineering)

1) Engineering Mechanics: System of Coplanar Forces, Centroids and Moment of Inertia, Friction , Kinematics of a particle, Kinematics of rigid bodies, Kinetics of particles and kinetics of rigid bodies, Momentum and Energy principles, Belt Friction.

2) Strength of materials: Shear force and bending moment, Simple Stresses and strains, Shear stresses in beams, Principal stresses and strains, Direct and bending stresses, Columns and struts, Thin cylinders.

3) Fluid mechanics: Fluid Statics, Pressure Measurement, Buoyancy & Flotation, Fluid Kinematics, Fluid Dynamics, Flow Measurement, Orifices, Mouth Pieces, Notches, Weirs, Flow through pipes, Dimensional Analysis and Models, Laminar Flow, Turbulent Flow in pipes, Boundary layer theory, Flow through channels, Rapidly varied flow.

4) Surveying: Measurement of Horizontal distances, Chain surveying, Measurement of angles, Measurement of elevations, Theodolite Surveying, Tacheometric Surveying, Curves, Hydrographic surveying,

5) Theory of Structures: Fixed Beams, Continuous Beams, Moving Load, influence lines, Strain Energy, Columns, Three Hinged Arches, Three Hinged Suspension Bridges.

6) Concrete Technology: Cement, Aggregates, Water, Admixtures, Fresh Concrete, Properties of Hardened Concrete, Concrete Mix Design.

7) Geotechnical Engineering : Structure of soil, The Three Phase System, Index Properties of soils, Classification of Soils, Soil Water and Effective stress principal, Permeability of soils, Compressibility, Compaction , Shear strength, Exploration and in situ soil measurements.

8) Water Resources Engineering; Hydrology, Precipitation, Infiltration, Evaporation and evapotranspiration, Run-off, Hydrographs, Floods, Ground water hydrology, Irrigation.

9) Environmental Engineering

A. Water Supply Engineering: Introduction to Water Supply, Quality of Water, Sources of Water, Raw Water Conveyance, Treatment of Water, Distribution of Water,

B. Sanitary Engineering: Sewage and Sewerage, Sewer Design, Sewer Appurtenances, Sewer Pumping, Waste Water Characteristics, Sewage Treatment, Effluent Disposal.

Specialization 1) Structural Engineering:

Unit 1:- Analysis of Stress and Strains

Unit 2:- Stress-Strain Relationship

Unit 3:- Polar Coordinate System

Unit 4:- Axisymmetric Problems

Unit 5:- Beams on Elastic Foundation

Unit 6:- Reinforced Concrete

Unit 7:- Prestressed Concrete

Unit 8:- Design of Foundation

References :

1. Timoshenko and Goodier - Theory of Elasticity, McGraw-Hill Publications
2. S. Crandall, N. Dahl and T. Lardner - Mechanics of Solids, McGraw Hill Publications
- 3 Wang - Applied Elasticity, Dover Publications
4. Irving Shames, Mechanics of deformable solids, Prentice Hall
5. Scholer, Elasticity in Engineering, McGraw- Hill Publications
6. Sadhu Singh – Theory of Elasticity, Khanna Publishers
7. L.S. Sreenath – Advanced Mechanics of Solids, Tata McGraw-Hill Publications
8. S M A Kazimi – Solid Mechanics, Tata McGraw-Hill Publications
9. T.Y. Lin & Ned H. Burns – Design of Prestressed Concrete Structures, John Wiley Publication
10. N. Krishna Raju – Prestressed Concrete, Tata Mc Graw Hill Publication Co
11. Edward Nawy – Prestressed Concrete – A Fundamental Approach, Prentice Hall International
12. B.C. Punmia, Ashok K. Jain, Arun K. Jain – Reinforced Concrete Structures Vol. II, Laxmi Publications, New Delhi
13. N.C. Sinha, S.K. Roy – Fundamentals of Reinforced Concrete, S. Chand & Co. Ltd, New Delhi
14. P.C. Varghese – Advanced Reinforced Concrete Design, Prentice Hall of India Pvt. Ltd., New Delhi
15. Kurain N.P - Modern Foundations: Introduction to Advance Techniques: TataMcGraw Hill,1982 .
16. Kurain N.P - Shell foundations : Geometry, Analysis Design and Construction, Alpha Science International, 2006
17. Kurain N. P. - Design of foundation systems Principles and Practice, Narosa Publishing house, New Delhi, 2005.
18. Dr. H.J.Shah, Reinforced Concrete, Vol II, Ch arotar Publishing House.
19. Winterkorn H.F. and Fan g H.Y. Ed., Foundation Engineerin g Hand Book, Van-Nostrand Reynold,
20. Bowles J.E., Foundation Analysis and Design (4th Ed.), Mc.Graw –Hill, NY, 1996

Specialization 2) Geotechnical Engineering

Unit 1:- Engineering behavior of Soils

Unit 2:- Applied Soil Mechanics

Unit 3:- Rock Mechanics and Tunneling

Unit 4:- Site Investigations and Ground Improvement

Unit 5:- Shallow and Deep Foundations

References :

- 1 Karl Terzaghi, Theoretical Soil Mechanics, Chapman and Hall, 1954.
- 2 R.F. Scott, Principles of soil Mechanics, Addison Wesley, World Student Edition, 1963.
- 3 Physical & geotechnical properties of soils – Joseph E.Bowels, Tata Mc.- Grawhill
- 4 Advanced soil mechanics- Braja M.Das, Tata Mc.- Grawhill
- 5 K.B. Woods, D.S. Berry and W.H. Goetz, Highway Engineering Handbook, 1960.
- 6 Physical & geotechnical properties of soils – Joseph E.Bowels, Tata Mc.- Grawhill
- 7 Advanced soil mechanics- Braja M.Das, Tata Mc.- Grawhill.
8. Rock Mechanics for Engineers: B.P.Varma, Khanna Publishers
9. Rock Mechanics and Design of Structures: Obert and Duvall, John Willey & Sons
10. Rock Mechanics in Engineering Practice: Stag and Zienkiewicz, John Willey & Sons
11. J.C. Jagger and N.G.W. Cook, Fundamentals of Rock Mechanics, Methuen and Co., London, 1971.
12. Obert, Leonard and W.I. Duvall, Rock Mechanics and Design Structures of Rock, 1967.
- 13 Site investigation by Clayton, Mathews and Simons.
14. Instrumentation in geotechnical engineering by K.R. Saxena and V.M. Sharma.
15. Hvorslev M.J. subsurface exploration and sampling of soils for Civil Engineering Purposes.
16. Elastic Analysis of Soil Foundation Interaction, Developments in Geotechnical Engg.vol-17, 16 Elsevier Scientific Publishing Co.
17. Vibration Analysis and Foundation Dynamics by N.S.V, Kameswara Rao, Wheeler publishing
18. Analysis and Design of Foundation for Vibration by P.J. Moore Oxford & IBH Publishing Company
19. Soil Dynamics and Machine Foundation by Swami Saran published by Galgotia Publication

Specialization 3) CONSTRUCTION AND MANAGEMENT

Unit 1:- Management and Project Planning in Construction

Unit 2:- Construction Technology

Unit 3:- New Construction Materials

Unit 4:- Disaster Management

Unit 5:- Construction Contracts, Administration and Management

Unit 6:- Project Economics & Financial Management

References :

1. Construction Management and Planning by Sengupta and Guha-Tata McGraw Hill publication.
2. Project Management – K Nagrajan – New age International Ltd.
3. Work study – Currie.
4. Professional Construction Management barrie-Paulson-McGraw Hill Institute Edition.
5. Project Management – Ahuja H.N. – John Wiley, New York
6. Construction Project Management Planning, Scheduling & Controlling-Tata McGraw Hill, New Delhi
7. Construction Management – Roy, Pilcher
8. Construction Management – O'Brien.
9. Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication
10. Construction Equipment Planning and Applications – Dr. Mahesh Verma

11. Journals such as CE & CR. Construction world, International Construction
12. Concrete Technology by Neville
13. Concrete Technology by M.S.Shetty
14. Building Materials by Ghosh
15. Construction Engineering and Management – Seetharaman
16. Project Management – K Nagarajan – New Age International Ltd.
17. Construction contracts and claims – Simon M.S., McGraw Hill, New York
18. Construction contract management-NICMAR publication
19. Estimates and contracts B.S.Patil
20. Prasanna Chandra, 'Projects planning, Analysis Selection, Implementation and Review. Tata McGraw Hill, New Delhi.
21. Singh H. 'Construction Management and Accounts', Tata McGraw Hill, New Delhi.
22. Cormican D. 'Construction Management : "Planning and finance"', Construction press, London.
23. Brealey R.A. "Principles of Corporate Finance", Tata McGraw Hill, New Delhi.
24. Leland T. Blank. Anthony Tarquin. 'Engineering Economy' McGraw Hill.
25. David Bedworth, Sabah Randhawa. 'Engineering Economics' McGraw Hill.
26. Bruggeman. Fishr 'Real Estate, Finance and investment' McGraw Hill.
27. Block Hirt. 'Foundations of Financial Management' McGraw Hill

Specialization 4) Environmental Engineering

Unit 1:- Transport of Water and Wastewater

Unit 2:- Unit Operations and Processes in Water and Wastewater Treatment

Unit 3:- Environmental Chemistry

Unit 4:- Environmental Microbiology

Unit 5:- Design and Operation of Water and Wastewater Treatment Plants

Unit 6:- Environmental Impact Assessment

Unit 7:- Solid and Hazardous Waste Management

References :

1. M.J. Hammer, " Water and Wastewater Technology ", Regents/Prentice Hall, New Jersey, 1991.
2. Metcalf & Eddy, Inc. " Wastewater Engineering - Treatment, Disposal, and Reuse ",Third Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi 1995.
3. Casey. T.J. " Unit Treatment Processes in Water and Wastewater Engineering ", John Wiley & Sons England 4. Sawyer, C.N. and McCarty, P.L., and Parkin, G.F. " Chemistry for Environmental Engineers ", 4th Edn. McGraw Hill, New Delhi, 1994.
5. De. A.K. " Environmental Chemistry ", New Age International Ltd., New Delhi, 1995.
6. Charles A. Wentz; " Hazardous Waste Management ", McGraw-Hill Publication, 1995.
7. Pelczar, Jr, M.J., Chan, E.C.S., Krieg, R.Noel., and Pelczar Merna Foss, " Microbiology ", 5th Edn., Tata McGraw Hill Publishing Company Limited, New Delhi-1996
8. Stainer, R.Y., Ingraham, J.L., Wheelis, M.C. and Painter, P.R. " General Microbiology ", Mac Millan Edn., Ltd., London, 1989.
9. Pichai, R. and Govindan, V.S., Edn., " Biological processes in pollution control ", Anna University, Madras,
10. Metcalf & Eddy, Inc. " Wastewater Engineering - Treatment, Disposal, and Reuse ",Third Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi 1995.
11. Canter, L.W., " Environmental Impact Assessment ", McGraw Hill, New York, 1996.
12. Petts, J., " Handbook of Environmental Impact Assessment Vol. I and II ", Blackwell Science, London, 1999.
13. The World Bank Group., " Environmental Assessment Sourcebook Vol. I, II and III ", The World Bank, Washington, 1991
14. George Techobanoglous et al, Integrated Solid Waste Management, McGraw- Hill Publication, 1993.

Specialization 5) Civil Water Management

Unit 1:- Numerical Methods

Unit 2:- Hydrology

Unit 3:- Ground Water Hydraulics

Unit 4:- Remote Sensing and GIS

Unit 5:- Water Resources Economics, Planning and Management

Unit 6:- Systems Engineering and Its Applications

Unit 7:- Watershed Management

Unit 8:- Hydraulic Structures

Unit 9:- Integrated Water Resource Management

References :

1. Numerical Methods for Engineers by Chapra S.C and Canale R.P., McGraw Hill Publications.
2. Numerical methods in Engineering practice by Amir Wadi Al- Khafaji, J.R. Tooley, H.R.W.
3. Numerical Methods for scientific and Engineering Computations by M.K. Jain et al, Wiley Eastern
4. Engineering Hydrology by K. Subramanya, Tata McGraw Hill, New Delhi.
5. Hydrology for Engineers by Linsley , Kohler and Paullahus, McGraw Hill Publication, New York.
6. Groundwater by Raghunath, Wiley Eastern publication.
7. Dynamics of fluids in porous media by Bear J., (1972), Elsevier Publications Co. New York.
8. Remote Sensing Methods and Application By R. Michael Horti, Wiley Interscience Publications.
9. Introduction to Environmental Remote Sensing By Barrett. E.C. and Curtis L.F., Chapman & Hall,
10. Remote sensing and Image Interpretation By Lillesand T.M. and Kiefer R.W., Wiley, New York
11. Water Resources Project Economics by Kuiper , (1971), Butterworth, London.
12. Water Resources System Planning and Management by M.C. Chaturvedi, (1987), Tata McGraw Hill Co.New Delhi.
13. Water Resources Planning and Management by O.J. Helweg., (1985), John Wiley and Sons Inc,USA
14. Water Resource, Distribution, Use and Management by Mather J.R. John Wiley & Sons publication.
15. A systems approach to Civil Engineering Planning and Design. By Jewell Thomas K., Harper & Row Pub.
16. Water Resources Systems Engineering by Hall and Dracup, Tata McGraw Hill publication.
17. Systems Approach to Water Management by Biswas A.K.
18. Soil and Water Conservation Engineering by Glen O. Schawb et al Wiley Publication.
19. Soil Erosion and Conservation by Morgan, R.P.C. Longman scientific Publication.
20. Watershed Hydrology by V.S.R. Murthy,
21. Open Channel Hydraulics by Chow V.T.
22. Design of Small Dams – USBR Oxford IBH Publishing Company Bombay.