ADVANCED FOUNDATION ENGINEERING

Course Code : 13CE 2211

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Course Educational Objectives:

1. To produce civil engineering students who have ability to design foundation systems for structures such as tall towers, bridges etc.
2. To familiarize the student with design of sheet piles and coffer dams.

Course Outcomes:

1. Student will demonstrate the ability to identify a suitable foundation system for a structure.
2. Student will be capable of analyzing and designing foundations for structures such as tall towers, bridges

UNIT – I

Foundation design basics : Criteria for choice of foundation, bearing capacity, total and differential settlement tolerance for various types of structures, Interpretation of soil profile from design parameters like modulus of compressibility, Modulus of sub grade reaction, Poisson's ratio, etc.

UNIT – II

Raft foundations : Raft foundations for building and tower structures, including effects of soil-structure interaction and nonlinearity, different types of rafts

UNIT – III

Deep foundations : Pile foundation-types, methods of installation, codal practices for permissible load under vertical and lateral loads, stresses during pile driving, load carrying capacity of pile groups, negative skin friction, under-reamed piles

Foundation for heavy structures, well foundations, caisson foundations, equipment used for construction of these foundation systems.

UNIT – IV

Machine foundations : Theory of vibrations, free and forced vibrations with and without damping for a single degree freedom system, types of machine foundations, their design criteria, permissible amplitudes and bearing pressure.

UNIT – V

Cantilever sheet piles and anchored bulkheads: Earth pressure diagram, determination of depth of embedment in sands and clays, timbering of trenches, Earth pressure diagrams, forces in struts.

Cofferdams: Stability, bearing capacity, settlements (qualitative treatment only, no designs).

TEXT BOOKS

1. Das, B.M., *"Principles of Foundation Engineering",* 4th Edition, PWS Publishing, Singapore, 1999

2. Bowles, J.E., *"Foundation Analysis and Design",* 5th Edition, McGraw- Hill International, 2000

3. Shamsher Prakash, *"Soil Dynamics",* 3rd Edition, John Willey publications, 2000

REFERENCES

1) Murthy, V.N.S., *"Soil Mechanics and Foundation Engineering",* 4th Edition ,Sai Krupa Technical Consultants, 2000

2) Venkataramah, C., *"Geotechnical Engineering"*, 5th Edition, NewAge International Pvt.Ltd, Publishers, 2009

3) Swami Saran,*"Analysis and Design of Substructures"*, 2nd Edition, Oxford & IBH Publishing Company Pvt.Ltd 2009.

4) Gopal Ranjan & ASR Rao, *"Basics and Applied Soil Mechanics",* 3rd Edition, New Age International Pvt.Ltd, Publishers, 2002.

5) Srinivasulu, P and Vaidyanathan, G.V., *"Handbook of Machine Foundations",* 2nd Edition, Tata McGraw Hill, 1999.

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