

IIT Mandi

Proposal for a New course

Course Number: CE 402

Course Name: Geotechnical Engineering II

Credits: 2-1-0-3

Prerequisites: CE 302: Geotechnical Engineering – I or equivalent

Intended for: B.Tech 3rd or 4th year

Distribution: Discipline Elective

Semester: Odd/Even

1. Preamble: Any civil engineering structure needs a proper foundation to stand. This course provides an understanding to the student about the tests for ascertaining the strength in soil and later introduces the concepts for designing the foundation for the given soil and ambient conditions. The course also highlights the criteria for selecting shallow and deep foundations.

2. Modules:

- 1. Subsoil Exploration:** Methods of subsoil exploration Direct, semi direct and indirect methods, Soundings by Standard, Dynamic cone and static cone penetration tests, Types of Boring, Types of samples, Criteria for undisturbed samples, Transport and preservation of samples, Borelogs, planning of exploration programmes, report writing.
(8 contact hours)
- 2. Earth Pressure:** Types of Earth pressure. Rankines and Coulomb's Active and passive earth pressure in soils, concepts for slope stability and soil retaining wall design
(6 contact hours)
- 3. Bearing Capacity:** Safe bearing capacity and allowable bearing pressure, General and local shear failure conditions, Terzaghi's bearing capacity equations its modifications for square, rectangular and circular foundation, Factors affecting bearing capacity of Soil
(6 contact hours)
- 4. Design of Shallow Foundations:** Factors effecting locations of foundation and design considerations of shallow foundations, choice of type of foundations, Foundations on expansive soils.
(6 contact hours)
- 5. Settlement analysis:** Causes of settlement, Computation of settlement, immediate and consolidation settlement, allowable settlements, Measures to reduce settlement.
(4 contact hours)

6. **Pile Foundations:** Types, Construction, load carrying capacity of single pile – Dynamic Formula, Static formula, Pile load tests, Load carrying capacity of pile groups, settlement of pile groups, Negative skin friction.

(12 contact hours)

Text books:

- a) Braja M. Das, 'Principles of Foundation Engineering', Cengage Learning, 2015.
b) V.N.S. Murty, 'Geotechnical Engineering', Book World Enterprises, 2008.

Reference books:

- a) W.C Teng, 'Foundation Design ', Prentice Hall Publishers, 1962.
b) J. E. Bowles, 'Foundation Analysis and Design', TataMc-Graw Hill Publishers, 1997.
c) Shamsheer Prakash, Gopal Ranjan and Swami Saran, 'Analysis, Design of foundations and Earth retaining structures', IBH Publishers, 1979.

5. Similarity Content Declaration with Existing Courses:

S.No.	Course code	Similarity content	Appox. % of content
01	CE 302	Module 1-6	60%

6. Justification for new course proposal if cumulative similarity content is > 30%: The course 302 and earlier proposed IC course in Earth Science has been remodified. Since no decision was taken on IC course on Earth Science, hence it was decided in CIG- civil to restructure the contents. Hence, the content has been split to 2 courses, initial part in restructured CE 302 and remaining content shifted to present course.

Approvals:

Other Faculty interested in teaching this course: **Dr Mousumi Mukherjee**

Proposed by: **Dr K V Uday**

School: SE

Signature: _____ **Date:** _____

Recommended/Not Recommended, with Comments:

_____ **Date:** _____

Chairman, CPC

Approved / Not Approved

_____ **Date:** _____

Chairman, Senate

