



Model Institute of Engineering
& Technology (Autonomous)
Course Handout

Kot, Bhalwal, Jammu

COURSE HANDOUT

Geosynthetics Engineering (CE-702 (B))

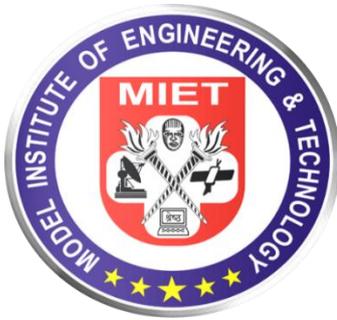
BE – 7th Semester [Branch: CE]

ACADEMIC YEAR (2024-25)

Prof. Arvind Dewangan

Assistant Professor

Department of Civil Engineering



Department of Civil Engineering

Model Institute of Engineering & Technology (Autonomous)

Kot Bhalwal, Jammu - 181122

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Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

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Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
CE-702 (B)	Geosynthetics Engineering	Core	3	2	1	0	50	100	150

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Prepare quantities for different items of work and probable cost in the construction project.
CO2	Explain the technical specifications for various works to be performed for a project and how they impact.
CO3	Evaluate cost of work for DPR
CO4	Analyse benefit/cost, life cycle breakeven on economic alternatives.
CO5	Estimate for valuation and depreciation of real estate structures.

Unit-I

Pro Basic Description of Geosynthetics: Historical Development, the Nomenclature, Function, Use around the World, Applications, Development in India. Raw Materials – Their Durability and Ageing: Raw Materials, Durability, Degrading Agencies, Polymers, Biological Resistance, Chemical Resistance, Weathering Resistance. (9 Hours)

Unit-II

Manufacturing Methods: Fibers, Yarn, Nonwoven Geotextiles, Woven Geotextiles, D.S.F. Fabrics. Geogrids- Testing and Evaluation: Factors influencing Testing, Sampling, Physical Properties, and Mechanical Properties under Uniaxial loading, Creep Testing. (12 Hours)

Unit-III

Application of Geosynthetics in Water Resource Projects: Case Study: Dharoidam, Hiran II Dam, Meda Creek Irrigation Scheme, Lining of Kakar par Canal. (10 Hours)

Unit-IV

Erosion Control with Geogrid: Wind Erosion, Rainwater Erosion, Erosion Control Measures, and Placement of Geogrid. Bearing Capacity Improvement with Geogrids: Advantages, Mechanism, and Modes of Failure, Friction Coefficient, and Experimental Studies. (11 Hours)

Unit-V

Design of Geosynthetics Reinforced Soil Structures: Design construction of geo-synthetic reinforced soil retaining structures – walls slopes; Codal provisions; bearing capacity improvement; embankments on soft soils. (10 Hours)

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Introduction to Geosynthetic engineering	Sanjay Kumar Shukla	CRC Press	1st(2016)
2.	Fundamentals of Geosynthetics Engineering	Shukla, S.K. and Yin, J.H.	Taylor & Francis	6 th (2021)



Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Engineering Geosynthetics with	G.V. Rao & G.V.S.S. Raju	A A Balkema Publishers	5 th (2004)
2	Engineering Geotextiles with	Rao G.V. & Rao G.V.S.,	Tata McGraw Hill	5 th (2013)

COURSE PLAN		
Unit-I Pro Basic Description of Geosynthetics		
S.No	Topics	Recommended Books
1	Historical Development	Book 1, Ch.1
2	The Nomenclature, Function, Use around the World	Book 1, Ch.1
3	Applications, Development in India	Book 1, Ch.1
4	Raw Materials – Their Durability and Ageing: Raw Materials, Durability, Degrading Agencies	Book 2, Ch.2
5	Polymers, Biological Resistance, Chemical Resistance, Weathering Resistance	Book 2, Ch.2
Unit-II Manufacturing Methods		
6	Fibers, Yarn, Nonwoven Geotextiles	Book 1, Ch.2
7	Woven Geotextiles, D.S.F. Fabrics	Book 1, Ch.2
8	Geogrids- Testing and Evaluation: Factors influencing Testing	Book 1, Ch.2
9	Sampling, Physical Properties	Book 1, Ch.2
10	Mechanical Properties under Uniaxial loading, Creep Testing	Book 1, Ch.2
Unit-III Application of Geosynthetics in Water Resource Projects		
11	Case Study: Dharoidam, Hiran II Dam	Book 2, Ch.2
12	Meda Creek Irrigation Scheme	Book 2, Ch.2
13	Lining of Kakar par Canal	Book 2, Ch.2
Unit-IV Erosion Control with Geogrid		
14	Wind Erosion, Rainwater Erosion, Erosion Control Measures and Placement of Geogrid	Book 2, Ch.3
15	Advantages, Mechanism, and Modes of Failure, Friction Coefficient, and Experimental Studies	Book 1, Ch.4
Unit-V Design of Geosynthetics Reinforced Soil Structures		
16	Design construction of geo-synthetic reinforced soil retaining structures – walls slopes	Book 2, Ch.1
17	Codal provisions; bearing capacity improvement; embankments on soft soils	Book 2, Ch.2

ADDITIONAL WEB RESOURCES

1.	NPTEL Course – Geosynthetics and Reinforced Soil Structures, IIT Madras, By Prof. K.Rajagopal https://onlinecourses.nptel.ac.in/noc21_ce06/preview
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| 2. | Swayam –
https://onlinecourses.nptel.ac.in/noc20_ce49/preview |
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GRADING AND ASSESSMENT

- **Sessional Test:** 20 marks
- **Assignment:** 20 marks
- **Attendance:** 10 marks
- **Final Examination:** 100 marks

COURSE POLICIES

- **Attendance:** Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity:** MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions:** Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**
Monday (12:05 PM - 12:55 PM)
Friday (12:05 PM - 12:55 PM)
- **Contact Information**
arvind.civ@mietjammu.in