

**Geotechnical Engineering**  
**Earth and Rockfill Dam**
**01GT1206 (PEC)**
**Objective of the Course:**

1. Critically review the principles and methods for construction of the earthen dam.
2. Analyze stresses and seepage in the earthen dam.
3. Selection of the earth material and its gradation for the various components of dam.

**Credit Earned: 3**
**Students learning outcomes:**

After successful completion of the course, it is expected that student will be able to,

1. Select the most suitable site for the construction of the earth dam
2. Analyze the local material and design the earth dam by using the same
3. Understand about the dam instrumentation for distress.
4. Analyze the flow of water in the sort of seepage

**Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	CSE (I)	IA (M)	Viva (V)	Term Work (TW)	
03	00	00	03	50	20	30	25	25	150

**Detailed Syllabus**

Sr. No.	Title of the unit	Number of hours
<b>1</b>	<b>Introduction</b>	<b>06</b>
	Dam and its classification, Procedure of construction for earthen dam, Site selection and common problems faced, Case studies	
<b>2</b>	<b>Earthen Dams</b>	<b>12</b>
	Concept of earthen dam, height of the dam, Design of the hearting and casing for zoned dam, Design of the various component parts of the dam: filter, cutoff wall, foundation, riprap, shear key etc,	
<b>3</b>	<b>Seepage analysis and Failure of Dam</b>	<b>12</b>

**Geotechnical Engineering**

	Seepage analysis, Flow nets, Stability conditions during construction, Full reservoir and drawdown Failure and damages, Nature and importance of failures in embankment and foundation piping, Differential settlement, Foundation slides, Earthquake damage creep and anisotropic effects, Reservoir wave action, Dispersive piping.	
<b>4</b>	<b>Health monitoring &amp; Dam safety</b>	
	Quality control of construction, Instrumentation for ambient measurements and its location, Common distresses and its remedies, case studies. Dam safety	<b>12</b>

**Suggested Theory Distribution**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	5%	20%	25%	25%	20%

**Instructional Method and Pedagogy:**

1. Use of Learning Management system like canvas
2. Demonstration through presentations on power point and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

**Recommended Study Material:**
**Reference Book:**

1. W. P. Engineering for dams, Wiley, 1967.
2. Singh, B. Earth and Rockfill dam, Sarita Prakashan, 1973.
3. Sowers G. I. Earth and Rockfill dam engineering, A. Earth Manual, USBR Publication.
4. Arcold - Volume on earth and rockfill dams.
4. Mistry J. F., Dams and Appurtenant Works (Imp. Aspects of River valley projects), Mahajan Book Dist., 1998.
5. Sharma H. D., Embankment Dams, Oxford and IBH Pub., 1991.
7. Design of Small Dams, USDI, Oxford and IBH, 1976

**Web Resources**

1. <http://nptel.ac.in/courses/105105110/pdf/m4l04.pdf>
2. <http://nptel.ac.in/courses/105105040/>