



Kot, Bhalwal, Jammu

Model Institute of Engineering  
& Technology (Autonomous)  
**Course Handout**

## COURSE HANDOUT

HYDROLOGY & IRRIGATION ENGINEERING (CE-601)

BE – 6<sup>th</sup> Semester [Branch: CE]

ACADEMIC YEAR (2023-24)

**Mr. Ishan Anand**

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 -601	Hydrology & Irrigation Engineering	Core	4	3	1	0	50	100	150

### COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Determine hydro-meteorological and precipitation intensity.
CO2	Describe various techniques to calculate losses.
CO3	Describe Runoff and Draw hydrograph.
CO4	Draw channel flood routing and flood plain mapping
CO5	Design Irrigation channels

#### Unit-I

Precipitation: Hydrologic cycle, forms of precipitation, type of precipitation, measurement of precipitation, recording and non-recording gauges, gauge network, adjustments of precipitation data, and average depth of precipitation over an area - arithmetic mean, polygon and isohyetal method, hyetograph, mass curve, depth area duration curves.

(11 Hours)

#### Unit-II

Water Losses: Evaporation, transpiration and infiltration. Empirical relationships, analytical method, reservoir evaporation and methods of its control, transpiration, evapotranspiration and its measurement, Penman's equation and potential evapotranspiration. Infiltration process, initial loss, infiltration capacity and measurement of infiltration, infiltration indices.

(11 Hours)

#### Unit-III

Runoff: Factors affecting runoff, empirical formulae -runoff, hydrograph, components of hydrograph, separation of base flow, hydrograph for isolated storm and complex storm, unit hydrograph, derivation of unit hydrograph, unit hydrograph for different duration, S- hydrograph.

(10 Hours)

#### Unit- IV

Floods and Flood Routing: Flood frequency studies, recurrence interval, Gumbel's Method, flood routing, reservoir flood routing, channel flood routing and flood plain mapping.

(10 Hours)

#### Unit-V

Development of Irrigation in India: Necessity, benefits and ill effects of irrigation, systems of irrigation, methods of distribution of water, water requirement of crops, canal section, design procedure for irrigation channels, stable channel design, water logging and its control, canal lining. Khosla's theory and Bligh's creep theory.

(10 Hours)

#### Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Irrigation engineering	B.C. Punmia	Laxmi Publications Pvt Limited	17th (2021)
2.	Irrigation Engineering	Modi And Seth	Rajsons Publications Pvt Ltd	10th (2019)

#### Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Irrigation and water engineering	SK Garg	Pearson Education	4 <sup>th</sup> (2005)



COURSE PLAN		
Unit-I Precipitation		
S.No	Topics	Recommended Books
1	Hydrologic cycle, Precipitation: forms of precipitation	Book 1, Ch.1
2	Type of precipitation, measurement of precipitation – recording and non-recording gauges.	Book 1, Ch.2
3	Gauge network, adjustments of precipitation data, average depth of Precipitation over an area	Book 1, Ch.2
4	Arithmetic mean, Thiessen polygon and isohyet Al method	Book 1, Ch.2
5	Hyetograph, Mass curve, Depth area duration curves	Book 1, Ch.2
Unit-II Water Losses		
6	Water Loses: Evaporation, transpiration and infiltration	Book 1, Ch.3
7	Factors affecting evaporation, measurement of evaporation, Infiltration, factors affecting infiltration, Determination of infiltration rate	Book 1, Ch.3
Unit-III Runoff		
8	Run off: Factors affecting runoff	Book 1, Ch.5
9	Empirical formulae- runoff	Book 1, Ch.5
10	Hydrograph: Components of hydrograph	Book 1, Ch.6
11	Separation of base flow, unit hydrograph	Book 1, Ch.6
12	Hydrograph for isolated storm and complex storm, derivation of unit hydrograph, Unit hydrograph for different duration, S hydrograph	Book 1, Ch.6
Unit-IV Floods and Flood Routing		
13	Floods and Flood Routing: Flood frequency studies, recurrence interval,	Book 1, Ch.7
14	Gumbel's Method, flood routing, reservoir flood routing, channel flood routing and flood plain mapping.	Book 1, Ch.8
Unit-V Development of Irrigation in India		
15	Development of Irrigation in India: Necessity, benefits and ill effects of irrigation,	Book 2, Ch.1
16	Systems of irrigation, methods of distribution of water,	Book 2, Ch.2
17	Water requirement of crops,	Book 2, Ch.3,4
18	Canal section, design procedure for irrigation channels, stable channel design,	Book 2, Ch.5
19	Water logging and its control, canal lining	Book 2, Ch.6
20	Khosla's theory and Bligh's creep theory.	Book2, Ch. 8

**ADDITIONAL WEB RESOURCES**

1.	<b>NPTEL Lecture</b> <a href="https://nptel.ac.in/courses/105/105/105105110/">https://nptel.ac.in/courses/105/105/105105110/</a>
2.	<b>NPTEL Lecture</b> <a href="https://nptel.ac.in/courses/105/105/105105110/">https://nptel.ac.in/courses/105/105/105105110/</a>





### 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**  
[ishan.civ@mietjammu.in](mailto:ishan.civ@mietjammu.in)