Techno India NJR Institute of Technology

(Approved by AICTE, New Delhi and Affiliated to Rajasthan Technical University Kota (Raj.))

Course File

Subject Title/Subject Cod :7AG6-60.2-Environmental Engineering & Disaster Management

Semester : VII Year : IV

Name of the Faculty: Nishit Jain

E-mail id: nishit.jain@technonjr.org

Class Schedule

Total Number of Lectures: 42

i) **Course Objective**

Students will gain knowledge and comprehension of water supply systems, drinking water quality, wastewater, solid waste disposal, and disaster management, applying analytical and synthetic skills for practical solutions.

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INDEX - COURSE FILE

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VISSION & MISSION OF INSTITUTE

Vision

Empowering student with recent and emerging technologies to create innovative technical leaders capable of contributing to industrial and societal needs for betterment of mankind across the globe.

Mission

M1: To provide dynamic learning environment to students by providing constant exposure to latest technologies by linking closely with the industries.

M2: To establish effective interface with industry to obtain live problems to enhance critical thinking and problem solving skills among students and consultancy projects for faculty.

M3: To provide avenues and opportunities to faculty for domain specific trainings and qualification upgradation.

M4: To develop ethical leaders with strong communication skills.

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VISION & MISSION OF DEPARTMENT

Department Vision

To be among top five well known department of Computer Science and Engineering in the state of Rajasthan in placing the students at premier industry.

Department Mission

M1: To equip students with ability to be innovative and excellence to face the challenges in the digital world.

M2: To prepare students with high quality employability skills catering to current trends in industries, problem solving skills, innovative pursuits and ready to face challenges in the domain and allied disciplines.

M3: To provide ambience for entrepreneurship and start-ups through incubation center among students.

M4: To encourage continuous faculty training on industry-based Development, and Innovation.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Technical Proficiency Graduates will have a strong foundation in core concepts, tools, and technologies relevant to their discipline.

Career Development Graduate will be capable of pursuing diverse career paths in field of Computer Science & Engineering with proficiency in software development/ pursue higher education an or become entrepreneurs.

Problem-Solving Graduates will have a strong math foundation so that they will be proficient problem solvers, capable of identifying, analyzing , and solving complex technical problems using critical thinking and creative approaches.

Professional Attitude Graduates will be sensitive to societal and professional environment, possess strong communication skills and will be skilled in working collaboratively within diverse teams adhering to ethical standards and professional practices.

Learning Environment To create a learning environment that ensures graduates continue learning throughout their careers, effortlessly adopting new technologies to stay innovative in their chosen fields and remain effective contributors in their chosen field.

PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO1: Students will be able to design, develop, test, debug, deploy, analyze , troubleshoot, maintain, manage, and ensure security during the complete product lifecycle.

PSO2: Student will be able to apply software engineering/ information system development skills to solve problems across diverse domains.

PSO3: Students will be well-prepared to initiate and oversee innovative startups within their respective sectors.

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PROGRAMME OUTCOMES (POs)

A student will develop:

A student will develop:

PO01. ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO02. PROBLEM ANALYSIS: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO03. DESIGN/ DEVELOPMENT OF SOLUTION: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO04. CONDUCTION OF INVESTIGATION OF COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO05. MODERN TOOL USAGE: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with and understanding of the limitations.

PO06. THE ENGINEERING AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO07. ENVIRONMENT & SUSTAINABILITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO08. ETHICS: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO09. INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. PROJECT MANAGEMENT & FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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COURSE OUTCOMES (COs) OF THE SUBJECT

CO No.	Mapping	Statement
CO476602.1	Applying	To identify the significance of a secure water supply system, describe the needs for domestic water in urban and rural locations, and depict various water supply sources, including intakes and delivery systems.
CO476602.2	Understanding	To review drinking water quality, familiarise themselves with Indian Standards for drinking water, and comprehend the significance of water treatment for ensuring safe drinking water. Also recognise the importance of sanitation in maintaining public health.
CO476602.3	Analyzing	To examine the quantity, characteristics, and appropriate disposal methods of domestic wastewater in both urban and rural areas. To understand different sewer types, design discharge, and hydraulic design considerations for effective wastewater management.
CO476602.4	Understanding	To identify the quantity, characteristics, and suitable disposal methods for solid waste in urban and rural areas. Discuss the concept of air pollution, the different types of pollutants, their properties, and their effects on living beings.
CO476602.5	Understanding	To review various types of disasters and recognise the importance of disaster management. Illustrate the role of disaster management in mitigating the impact of disasters on communities and environments.

COS MAPPING WITH POs AND PSOs

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	2	2				1		2					
CO2		1	2	3			1	2		2					
CO3		3	2	1				1		3					
CO4		2	1	2			1	1		3					
CO5		1	0	2			2	0		2					

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UNIVERSITY ACADEMIC CALENDAR

Academic Calendar for Even Semester for Session

Academic Calendar

Academic Calendar for Odd Semester for Session 2023-24 (Odd Semester)

Course: Bachelor of Technology (B.TECH.)				
Semester	I	III	V	VII
Induction Program	10-08-2023			
Commencement of Classes	20-08-2023	11-09-2023	30-08-2023	22-08-2023
Commencement of First Mid Term	04-11.2023	02-11.2023	02-11.2023	27-09-2023
Commencement of Second Mid Term	15-01-2024	27-12-2023	27-12-2023	05-12-2023
Last Working Day	20-01-2024	12-01-2024	12-01-2024	20-12-2023
Commencement of Practical Exams	29-01-2024	15-01-2024	15-01-2024	31-12-2023
Commencement of Theory Exams	15-02-2024	30-01-2024	29-01-2024	27-12-2023

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Evaluation Scheme

FACULTY DETAILS:

Name of the Faculty : Nishit Jain

Designation : Assistant Professor

Department : Civil Engineering

1. TARGET

a) Percentage Pass : 100%
b) Percentage I class: 60 %

2. METHOD OF EVALUATION

2.1. ☐ Continuous Assessment Examinations (Mid-Term 1, Mid-Term 2)

2.2. ☐ Assignments / Seminars

2.3. ☐ Mini Projects

2.4. ☐ Quiz

2.5. ☐ Semester Examination

Others_____

3. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.

1. Take the help of creative tools to stimulate creativity. Include slide presentations, demonstration or forms of visual exercises that will excite the young minds and capture their interest.

Signature of Faculty: **Signature of HOD**

UNIVERSITY SYLLABUS

RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Open Electives Syllabus

B. Tech.: IV Year- VII & VIII Semester

7AG6-60.2 : Environmental Engineering and Disaster Management

Credit: 3 **Max. Marks: 150(IA:30, ETE:120)**

3L+0T+0P **End Term Exam: 3 Hours**

SN	Contents	Hours
1	Introduction: Objective, scope and outcome of the course. (This compulsory for all course)	01
2	Importance of safe water supply system. Domestic water requirements for urban and rural areas. Sources of Water supply. Intakes and transportation of water.	09
3	Drinking water quality. Indian Standards of drinking water. Introduction to water treatment for safe drinking, Importance of sanitation.	10
4	*Domestic waste water:* quantity, characteristics, disposal in urban and rural areas. Sewer: types, design discharge and hydraulic design. Introduction to domestic wastewater treatment.	10
5	*Solid waste:* quantity, characteristics and disposal for urban and rural areas. Introduction to air pollution. Types of pollutants, properties and their effects on living beings. BIS standards for pollutants in air and their abetments. Introduction to various disaster, Importance of disaster management.	10
	Total	40

Office of Dean Academic Affairs
Rajasthan Technical University, Kota

Scheme & Syllabus of 4th Year B. Tech. for students admitted in Session 2017-18 onwards Page 3

PRESCRIBED BOOKS

1. Water Supply Engineering - by Santosh Kumar Garg
2. Environmental Engineering - by N N Basak
3. Text Book on Waste Water Engineering - Environmental Engineering II - by Dr. Jai M Pau
4. Disaster Management - by R. Subramanian

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WEEKLY TIME TABLE OF THE TEACHER

First Time Table: with effect from (Date):

Day	1	2	3	4	5	6	7
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							

Revision: 1 with effect from (Date):

Day	1	2	3	4	5	6	7
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							

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COURSE-PLAN

UNIT	Lect. No.	TOPICS	**Teaching Methods/ Teaching Aids**
1	**1**	Introduction: Objective, scope and outcomes of course.	PPT
2	2	Safe water supply: Introduction of safe water.	PPT
2	3	Importance of safe water system.	PPT
2	4	Domestic water requirements for urban.	PPT
2	5	Domestic water requirements for Rural.	PPT
2	6	Important water sources.	PPT
2	7	Intake of water sources.	PPT
2	8	transportation and supply of water	PPT
2	9	Revision of the chapter	PPT
2	10	Class test of the chapter.	PPT
3	11	Drinking water quality: Introduction of pure water.	PPT
3	12	Quality of drinking water.	PPT
3	13	Indian standard quality of drinking water.	PPT
3	14	Introduction of water treatment plant.	PPT
3	15	Types of water treatment methods.	PPT
3	16	Characteristics of pure water.	PPT
3	17	Importance of sanitation.	PPT
3	18	Introduction of sanitation	PPT
3	19	Revision of the chapter.	PPT
3	20	Class test of the chapter.	PPT
4	21	Domestic wastewater: Introduction.	PPT
4	22	Quantity of domestic wastewater.	PPT
4	23	Characteristics of wastewater.	PPT
4	24	Disposal of wastewater in urban. Urban.	PPT

4	25	Disposal of wastewater in rural.	PPT
4	26	Introduction of sewer.	PPT
4	27	types of sewers	PPT
4	28	Discharge and Hydraulic design of sewer.	PPT
4	29	Introduction to domestic wastewater treatment.	PPT
4	30	Revision of the chapter.	PPT
5	**31**	Solid waste: Introduction.	PPT
5	31	Quantity of solid waste.	PPT
5	33	Characteristics of solid waste.	PPT
5	34	Disposal of solid waste in urban and rural.	PPT
5	35	Introduction of Air pollution and type of pollutants.	PPT
5	36	Properties and effects of pollutants on living beings.	PPT
5	37	BIS standard of pollutants of air and their abetment.	PPT
5	38	Introduction of various disaster.	PPT
5	39	Importance of disaster management and revision.	PPT
5	40	Class test of the chapter.	PPT

Signature of Faculty: **Signature of HOD**

Assignment – 1 ()

1. Explain the significance of a safe water supply system in both urban and rural areas, highlighting its impact on public health and community development.

2. Compare and contrast the domestic water requirements for urban and rural areas, considering factors such as population density, infrastructure, and socio-economic conditions.

3. Describe the various sources of water supply available for both urban and rural regions, discussing their reliability, sustainability, and potential challenges.

4. Evaluate the different methods of water intake and transportation used in water supply systems, analyzing their efficiency, cost-effectiveness, and environmental impacts.

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Assignment – 2 ()

1. What are the key factors influencing the quantity and characteristics of domestic wastewater in both urban and rural areas? How does the disposal process differ between these settings?

2. Describe the different types of sewers used for wastewater management. How is design discharge calculated, and what considerations are essential for hydraulic design to ensure effective sewage transportation?

3. Provide an overview of domestic wastewater treatment methods. How do these methods address various pollutants and contaminants present in wastewater?

4. Discuss the quantity and characteristics of solid waste generated in urban and rural areas. How are solid waste disposal methods selected, and what factors influence their effectiveness?

5. Explain the concept of air pollution, including its sources and types of pollutants. How do these pollutants vary in terms of their properties and their impacts on human health and the environment? Additionally, discuss relevant BIS standards for air pollutants and their abetments.

SAMPLE QUIZ QUESTIONS

1	How do domestic water requirements differ between urban and rural areas?
2	Describe the various sources of water supply and their significance.
3	Explain the process of water intake and transportation in a water supply system.
4	What factors influence drinking water quality and why is it important to maintain high standards?
5	What are the Indian standards for drinking water quality and how are they enforced?
6	Discuss the importance of water treatment in ensuring safe drinking water.
7	How does sanitation play a crucial role in public health maintenance?
8	What factors affect the quantity and characteristics of domestic wastewater?
9	Describe the different types of sewers used for wastewater management.
10	How is design discharge calculated for sewers and what factors influence hydraulic design considerations?
11	Provide an overview of domestic wastewater treatment methods.
12	What are the quantity and characteristics of solid waste generated in urban and rural areas?
13	How are solid waste disposal methods selected and what factors influence their effectiveness?
14	Explain the concept of air pollution and its significance.
15	What are the various types of pollutants found in the air and their properties?
16	Discuss the effects of air pollutants on living beings and the environment.
17	What are the BIS standards for air pollutants and how are they enforced?
18	Why is disaster management important, and what role does it play in mitigating the impact of various disasters on communities and environments?

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Mid Term Paper-I

TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR

B. TECH 4th – YEAR (VII SEM.) – MT-I

Environmental Engineering & Disaster Management (**7AG6-60.2**) (Common for all Branch)

Time: 2 Hr. Max. Marks: 70

Note:

1. The paper is divided into 2 parts: Part-A and, Part-B
2. Part-A contains 10 questions and carries 2 mark each.
3. Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

Part- A (20 Marks)

A.	Define term of Environmental Engineering	CO1
B.	Define Urban and Rural Areas	CO1
C.	Define water	CO2
D.	Define term sanitation	CO2
E.	Explain about Water Demand	CO3
F.	Explain about ponds	CO3
G.	Explain about Lakes	CO4
H.	Explain about Wastewater	CO4
I.	Write about solid Waste materials	CO5
J.	Write about Radioactive pollution	CO5

Part- B (50 Marks)

1.	State the concept on Sources of Water supply in detail	CO1
OR		
1.	State the concept on Various types of Water Demand in detail	CO1

2.	State a note on Indian standard of drinking Water Quality	CO2
OR		
2.	State a note on Water Treatment for safe drinking in detail	CO2

3.	Explain In detail about Impotence of Sanitation	CO3
OR		
3.	Write design steps of Hydraulic design of Sewers	CO3

4.	Explain in Detail about Domestic wastewater quantity and treatment	CO4
OR		
4.	Explain in detail about Types and Characteristics of Solid waste	CO4

5.	Illustrate in detail about Air Pollution and Types of Pollutants	CO5
OR		
5.	Illustrate in detail about Importance of Disaster Management	CO5

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Marks and Gap Analysis of Mid-Term 1

S.No.	University Roll No.	Name of Student	Mid-Term 1 MM-70	Remark (Remedial Class need or not – Y/N)
1.	20ETCCE001	Avinash Ahari	63	N
2.	20ETCCE002	Ayushi Choubisa	52	N
3.	20ETCCE004	Kamal Singh Rao	61	N
4.	20ETCCE005	Kritika Dodia	56	N
5.	20ETCCE006	Pradeep Sharma	50	N
6.	20ETCCE009	Rudraksh Pacholi	54	N
7.	20ETCCE010	Shailesh Meghwal	56	N
8.	20ETCCE011	Suryabhan Singh Sarangdevot	65	N
9.	20ETCCE012	Vinit Mali	52	N
10.	20ETCCE300	Shailesh Mali	50	N

*(Y, if obtained marks are <50%)

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Mid Term Exam – II

Marks and Gap Analysis of Mid-Term II

S.No.	University Roll No.	Name of Student	Mid-Term 2 MM-70	Remark (Remedial Class need or not – Y/N)
1.	20ETCCE001	Avinash Ahari	62	N
2.	20ETCCE002	Ayushi Choubisa	51	N
3.	20ETCCE004	Kamal Singh Rao	60	N
4.	20ETCCE005	Kritika Dodia	55	N
5.	20ETCCE006	Pradeep Sharma	49	N
6.	20ETCCE009	Rudraksh Pacholi	53	N
7.	20ETCCE010	Shailesh Meghwal	55	N
8.	20ETCCE011	Suryabhan Singh Sarangdevot	64	N
9.	20ETCCE012	Vinit Mali	51	N
10.	20ETCCE300	Shailesh Mali	49	N

*(Y, if obtained marks are <50%)

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Model Question Paper

7E1711

Roll No. _____ Total No of Pages: 2

7E1711

B. Tech. VII - Sem. (Main) Exam., Feb.- March - 2021
OE -I Open Elective-I Agricultural Engineering
7AG6 – 60.2 Environmental Engineering
& Disaster Management

Time: 2 Hours

[To be converted as per scheme]
Max. Marks: 82
Min. Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Define Environmental Engineering.
Q.2 What is disaster management?
Q.3 What is environment?
Q.4 What is water sanitation?
Q.5 List the sources of water supply.
Q.6 Define the pH of drinking water.
Q.7 What is air pollutant?
Q.8 Define smog with an example.
Q.9 What is bio-magnification?
Q.10 Enlist different types of air pollutants.

PART – B

(Analytical/Problem solving questions) **[4×8=32]**

Attempt any four questions

Q.1 Describe the components of environment in short.

Q.2 Write in brief, standards of drinking water.

Q.3 Write down steps /ways to meet the water crisis.

Q.4 What is waste and why does it require management?

Q.5 Write in short the various types of natural, human induced and slow acting disasters.

Q.6 When is the National Disaster Reduction Day celebrated in India and why?

Q.7 Report the state of urban air pollution in India. What is its impact on health, especially on that of children?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 Elaborate – scope and importance of Environmental Engineering. Why do we say that any study of the environment becomes an interdisciplinary one?

Q.2 Discuss the requirements for urban and rural water supply system. How does intake and transportation of water affect its quality?

Q.3 How will you measure the quality of drinking water? Why water is a unique source and how much water do we need daily?

Q.4 What is a solid waste? Describe sources of solid waste. Give a detailed account of solid waste management.

Q.5 Explain how do educated people view global warming and climate change. Why do we have so many sceptics? How can we convince them of the urgency of climate change?

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STUDENT PERFORMANCE REPORT

Roll No.	Name of Student	I Mid-Term	II Mid-Term	Average
20ETCCE001	Avinash Ahari	63	62	62.5
20ETCCE002	Ayushi Choubisa	52	51	51.5
20ETCCE004	Kamal Singh Rao	61	60	60.5
20ETCCE005	Kritika Dodia	56	55	55.5
20ETCCE006	Pradeep Sharma	50	49	49.5
20ETCCE009	Rudraksh Pacholi	54	53	53.5
20ETCCE010	Shailesh Meghwal	56	55	55.5
20ETCCE011	Suryabhan Singh Sarangdevot	65	64	64.5
20ETCCE012	Vinit Mali	52	51	51.5
20ETCCE300	Shailesh Mali	50	49	49.5

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RESULT ANALYSIS

S.NO.	RTU ROLL NUMBER	NAME OF STUDENT	END TERM MARKS	SESSIONAL MARKS	TOTAL
		MAX MARKS	**70**	**30**	**100**
1.	20ETCCE001	Avinash Ahari	52	28	80
2.	20ETCCE002	Ayushi Choubisa	48	23	71
3.	20ETCCE004	Kamal Singh Rao	27	27	54
4.	20ETCCE005	Kritika Dodia	32	25	57
5.	20ETCCE006	Pradeep Sharma	24	22	46
6.	20ETCCE009	Rudraksh Pacholi	23	24	47
7.	20ETCCE010	Shailesh Meghwal	37	25	62
8.	20ETCCE011	Suryabhan Singh Sarangdevot	42	29	71
9.	20ETCCE012	Vinit Mali	21	23	44
10.	20ETCCE300	Shailesh Mali	36	22	58

TOTAL	PASS	FAIL	ABSENT	PASS %
10	10	0	0	100

Indirect Assessment:

Overall Teacher Self Assessment (at the completion of course) in terms of course objective and outcomes

Course Objectives:

To understand the fundamental concepts of water supply system.

To learn about designing concepts of waste water systems.

To lean the importance of SWM and various pollutions.

To learn about various disasters and mitigation methods .

Course Outcomes:

Students can explain the theory and principles fresh water supply.

Students can design the waste water channels.

Students can implement a basic knowledge about solid waste and pollutions.

Students can explain how to mitigate a disaster.

Methodology to identify bright student

Considered a range of criteria, including academic performance, creativity, critical thinking, problem-solving skills, and enthusiasm for learning. Bright students often excel in multiple areas.Observed how students perform in the classroom. In terms of active participation, engagement in discussions, leadership, and the ability to grasp complex concepts.

Efforts to keep students engaged

1. Active Learning:
    - Incorporate active learning strategies, such as group discussions, problem-solving activities, and hands-on projects. Active participation keeps students engaged and encourages critical thinking.
2. Varied Teaching Methods:
    - Use a variety of teaching methods, including lectures, group work, multimedia presentations, and interactive activities to cater to different learning preferences.
3. Technology Integration:
    - Leverage technology, such as online platforms, educational apps, and interactive software, to make lessons more engaging and interactive.

Methodology to identify weak student

Considered a range of criteria, including classroom observation, formative assessment, summative assessment, assignment review e.t.c. Weak students are struggling students with sensitivity and a desire to support their learning. Some measures, such as additional tutoring, personalized assignments, or alternative assessment methods, to help students succeed.

Targeted inventions for weak student

1. Additional Resources

Offer supplementary learning materials, such as textbooks, online resources, or multimedia content, to provide alternative explanations and reinforce key concepts.

2. Remedial classes

Establish a tutoring program where students can receive extra help from teachers.

3. Flipped classroom

Students are assigned pre-class learning materials, often in the form of videos, readings, or online modules, to cover the foundational concepts before coming to class.