



NATIONAL ENGINEERING COLLEGE
(An Autonomous Institution – Affiliated to Anna University Chennai)
K.R. NAGAR, KOVILPATTI – 628 503

SUSTAINABLE DEVELOPMENT GOALS – 14

LIFE UNDER WATER





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14.1 Aquatic Ecosystems – Education

National Engineering College (Autonomous), Kovilpatti integrates aquatic ecosystem conservation and water resource management into its academic curriculum through various engineering programmes. The institution educates students on sustainable management of water resources, pollution control, and environmental protection through classroom teaching, laboratory practice, and field-based learning.

1. Curriculum includes Environmental Engineering, Water Resources Engineering, Hydrology, Wastewater Engineering, and Environmental Science.
2. Laboratory experiments provide practical knowledge on water quality analysis and pollution monitoring.
3. Field visits expose students to water treatment plants, reservoirs, and irrigation systems.
4. Students undertake projects related to water conservation and aquatic ecosystem protection.
5. Workshops and seminars create awareness on sustainable water resource management.



Laboratory Facilities for Wastewater Quality Monitoring



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23CE54C

WASTEWATER ENGINEERING

L	T	P	E	C
3	0	2	0	4

COURSE OUTCOMES

Upon completion of this course, the students will be able to

Theory Component

CO1: Estimate sewage generation and design sewer system.

CO2: Perform basic design of the unit operations used in sewage treatment

CO3: Design the suitable secondary treatment processes

CO4: Acquire knowledge of advance treatment technology

CO5: Perceive the concepts of self-purification of streams and sludge disposal methods

Practical Component

CO6: Determine the physical and chemical characteristics of wastewater and compare with discharge standards

CO1: Estimate sewage generation and design sewer system.

CO6: Determine the physical and chemical characteristics of wastewater and compare with discharge standards

9+30

Sources, *Characteristics of sewage and its composition* - population equivalent - Estimating quantity of sewage - Storm runoff estimation - Sewerage - separate, combined and partially separate system - Hydraulic design of flow in sanitary sewers -Sewer design-sewer materials -Laying and testing - sewer appurtenances – sewage pumping - Discharge standards for Effluents

CO2: Perform basic design of the unit operations used in sewage treatment

9

Objectives – Unit Operations and Processes - Collection system - Selection of treatment processes - Primary treatment – Principles, functions and design of sewage treatment units - screens - grit chamber - primary sedimentation tanks - Onsite sanitation - Septic tank - Operation and Maintenance aspects.



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CO3: Design the suitable secondary treatment processes	9
Objectives – Selection of Treatment Methods – Principles, Functions and design - Activated Sludge Process - Sludge Volume Index- Natural systems - Ponds and Lagoons - Trickling filters - Rotating biological contactors - Operation and Maintenance aspects.	
CO4: Acquire knowledge of advance treatment technology	9

Passed in the Board of studies meeting held on 21.11.2025 & Approved in the 24th Academic Council meeting dated 13.12.2025
B.E. – Civil Engineering *R-2023 Curriculum and Syllabus*

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Hybrid system - Sequential Batch Reactor - Anaerobic systems - Anaerobic filters - UASB - Biogas recovery- Reclamation and Reuse of sewage - Constructed Wetland - Nutrient removal systems-DEWATS (Basics).

CO5: Perceive the concepts of self-purification of streams and sludge disposal methods.	9
Dilution – Self-purification of surface water bodies - Oxygen sag curve – Streeter Phelps equation - Eutrophication - Land Disposal – Sewage farming – Sewage sickness - sodium hazards - Soil dispersion system- Sludge Digestion- characterization - Thickening – Dewatering – Drying - Disposal - Septage Management.	

TEXT BOOKS

1. Garg, S.K., Environmental Engineering Vol. II, Khanna Publishers, New Delhi, 43rd Edition, 2024
2. Duggal K.N., “Elements of Environmental Engineering” S.Chand and Co. Ltd., New Delhi, 2014.

REFERENCES

1. Metcalf and Eddy- Wastewater Engineering–Treatment and Reuse, Tata Mc.Graw-Hill Company, New Delhi, 2010.



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ESTD : 1984

23CE14E

HYDROLOGY

L	T	P	E	C
3	0	0	0	3

COURSE OUTCOMES

Upon completion of this course, the students will be able to

CO1: Discuss the hydrological process and estimate the rainfall characteristics.

CO2: Estimate the losses of precipitation and runoff

CO3: Interpret the concept of hydrographs

CO4: Apply the concepts of groundwater

CO5: Implement the flood routing and understand about droughts

CO1: Discuss the Hydrological process and estimate the rainfall characteristics L:10

Hydrological Cycle - Climate - Weather - Layers in Atmosphere - Types and Forms of Precipitation - Measurement of Rainfall - Spatial Measurement Methods - Thiessen and Isohyetal Method - Frequency and Intensity/Duration Analysis - Cyclones - Winds - Wind - Monsoon - Clouds - Requirements of Precipitation.

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CO2: Estimate the losses of precipitation and runoff

L:9

Factors Affecting Runoff - Effective Rainfall - Losses From Precipitation - Evaporation Process - Reservoir Evaporation - Measurement Of Evaporation - Infiltration Process - Measurement Of Infiltration - Infiltration Indices

CO3: Interpret the concept of hydrographs

L:9

Factors Affecting Hydrograph - Base Flow Separation - Unit Hydrograph - Derivation Of Unit Hydrograph - S Curve Hydrograph - Unit Hydrograph Of Different Deviations - Synthetic Unit Hydrograph.



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CO3: Interpret the concept of hydrographs

L:9

Factors Affecting Hydrograph - Base Flow Separation - Unit Hydrograph - Derivation Of Unit Hydrograph - S Curve Hydrograph - Unit Hydrograph Of Different Deviations - Synthetic Unit Hydrograph.

CO4: Apply the concepts of groundwater

L:9

Origin - Classification And Types - Properties Of Aquifers - Governing Equations - Recuperation Test - Transmissibility - Specific Capacity - Pumping Test - Importance Rain Water Harvesting In Rural And Urban Areas

CO5: Implement the flood routing and understand about droughts

L:8

Flood Estimation - Flood Frequency Studies - Flood Routing - Reservoir Flood Routing - Flood Control - Storm - Definitions Of Droughts - Meteorological, Hydrological And Agricultural Droughts - Case Studies On Recent Floods And Droughts In India.

TEXT BOOKS

1. Subramanya, K and Priyank J. Sharma., Engineering Hydrology, Tata McGraw - Hill Publishing Company, Limited, 6th Edition, 2024.
2. Jayarami Reddy.P, Hydrology, Tata McGraw - Hill Publications Private Limited, New Delhi, 3rd Edition, 2021.

REFERENCES

1. Santosh Kumar Garg, Hydrology and Water Resources Engineering, Khanna Publications Private Limited, New Delhi, 2021.
2. Singh, V.P., - Hydrology, McGraw - Hill Inc., Limited, 2017.
3. Chow, V.T. and Maidment, Hydrology for Engineers, McGraw - Hill Inc., Limited, 2017.

L: 45; TOTAL: 45 PERIODS



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CO3: Describe the features of LEED, TERI and GRIHA ratings of buildings. 9

Strategies for energy conservation in building – Overview of codes and standards: National Building Code (NBC), ECBC and relevant codes from tropical countries – concepts and calculations of OTTV (Overall Thermal Transfer Value) – LEED, TERI–Griha, and their features in green building certification - Role of insulation, thermal properties and moisture content in construction materials – Modeling and Performance evaluation of green buildings - Zero energy building: principles and case study.

CO4: Attains the core knowledge of lean construction and their importance 9

Introduction to lean principles in construction - Need for Productivity Measurement and improvement in construction industry – Overview of the Productivity Measurement System (PMS).

CO5: Apply lean tools & techniques to achieve sustainability in construction projects 9

Work Sampling and foreman delay survey - Value Stream and Process Mapping for efficiency improvements – implementation of 5S concepts - Collaborative Planning System (CPS) and Last Planner System (LPS) – Big Room Approach for collaborative working – Integration of IT/BIM with Lean principles – Practical steps for implementing lean tools on Project Site.

TEXTBOOKS

1. Charles J Kibert, Sustainable Construction: Green Building Design & Delivery, 5th Edition, Wiley Publishers, 2022.
2. "Sustainable Building Design: Principles and Practice" (2022) by Miles Keeping and David Shiers.

REFERENCES

1. Craig A. Langston & Grace K.C. Ding, Sustainable Practices in the Built Environment, Butterworth Heinemann Publishers, 2011.
2. Lean Project Delivery and Integrated Practices in Modern Construction (2nd Edition, 2020), Lincoln H. Forbes and Syed M. Ahmed.

14.2 Aquatic Ecosystems – Outreach

National Engineering College (Autonomous), Kovilpatti conducts outreach programmes to promote awareness on water conservation and aquatic ecosystem protection among students and the surrounding community.

1. NSS volunteers organize awareness campaigns on water conservation.



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2. Programmes are conducted on clean water, sanitation, and environmental protection.
3. Tree plantation and watershed awareness activities promote sustainable ecosystems.
4. Students participate in World Water Day and Environment Day programmes.
5. Community outreach encourages responsible water usage.

14.3 Aquatic Ecosystems – Conservation and Sustainable Utilization

National Engineering College (Autonomous), Kovilpatti promotes the sustainable utilization of water resources through education, research, and campus management practices.

1. Rainwater harvesting systems conserve water resources.
2. Water conservation measures reduce unnecessary consumption.
3. Sustainable drainage and groundwater recharge practices are encouraged.
4. Students are educated on watershed management.
5. Green campus initiatives support environmental sustainability.

14.4 Seafood Policy

National Engineering College (Autonomous), Kovilpatti promotes healthy and sustainable food practices within the campus. The institution encourages responsible procurement of food items while ensuring quality, hygiene, and compliance with food safety regulations.

1. Hostel and canteen food procurement follows quality standards.
2. Hygienic food preparation practices are maintained.
3. Balanced and nutritious meals are provided.
4. Awareness is created on responsible food consumption.
5. Sustainable procurement practices are encouraged wherever feasible.

14.5 Research to Maintain and Extend Existing Ecosystems

National Engineering College (Autonomous), Kovilpatti encourages faculty members and students to undertake research focusing on water resource management, environmental protection, wastewater treatment, and ecosystem sustainability.



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1. Research projects address water quality improvement.
2. Studies focus on sustainable water management.
3. Faculty publish research on environmental conservation.
4. Student innovations support ecosystem sustainability.
5. Collaborative research promotes sustainable development.

14.6 Research to Prevent Damage of Aquatic Ecosystems

The institution promotes research aimed at preventing pollution and protecting aquatic ecosystems through innovative engineering solutions.

1. Research on wastewater treatment technologies.
2. Pollution control studies.
3. Sustainable construction materials reducing environmental pollution.
4. Water quality monitoring research.
5. Environmental impact assessment studies.

14.7 Standards for Water Quality and Water Discharge

National Engineering College (Autonomous), Kovilpatti follows responsible practices for water quality monitoring and wastewater management within the campus.

1. Regular monitoring of drinking water quality.
2. Wastewater management practices comply with environmental standards.
3. Water quality testing is carried out in laboratories.
4. Rainwater harvesting improves groundwater recharge.
5. Safe disposal practices minimize environmental impacts.

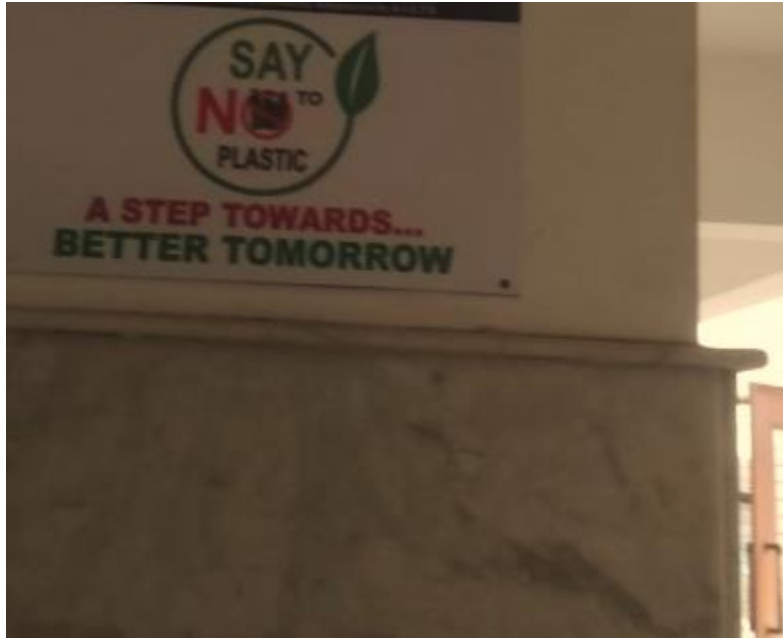
14.8 Reduce Plastic Waste

National Engineering College (Autonomous), Kovilpatti promotes a plastic-conscious campus through awareness programmes and responsible waste management practices.



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1. Single-use plastics are discouraged.
2. Waste segregation is practiced.
3. Reusable alternatives are promoted.
4. Awareness campaigns educate students.
5. NSS volunteers organize plastic-free initiatives.



Plastic-Free Campus Promoting Environmental Sustainability

14.9 Marine Pollution

Although located inland, National Engineering College (Autonomous), Kovilpatti contributes to the reduction of marine pollution by promoting responsible waste management, wastewater treatment, plastic waste reduction, and environmental awareness, thereby minimizing pollutants that may eventually reach rivers and oceans.

1. Effective waste segregation.
2. Plastic reduction initiatives.
3. Environmental awareness programmes.
4. Wastewater management.



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5. Community clean-up activities.

14.10 Local Aquatic Ecosystem Planning and Maintenance

The institution supports local water resource conservation through education, awareness, and community participation.

1. Rainwater harvesting.
2. Watershed awareness.
3. Water conservation campaigns.
4. Community participation.
5. Sustainable landscaping.

14.11 Health of Aquatic Ecosystem

National Engineering College (Autonomous), Kovilpatti promotes healthy aquatic ecosystems by encouraging pollution prevention, sustainable water management, and environmental education.

1. Water quality monitoring.
2. Environmental awareness.
3. Pollution prevention.
4. Research activities.
5. Sustainable resource utilization.

14.12 Good Aquatic Stewardship

The institution encourages responsible stewardship of water resources through sustainable campus practices and environmental education.

1. Efficient water utilization.
2. Conservation awareness.
3. Student participation.
4. Green campus initiatives.



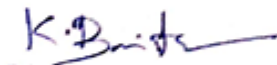
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5. Community engagement.

14.13 Local Partnership for Aquatic Ecosystems / Watershed Management Strategy

National Engineering College (Autonomous), Kovilpatti collaborates with government agencies, local communities, industries, and educational institutions to promote sustainable water resource management and environmental conservation.

1. Collaboration through NSS extension activities.
2. Awareness programmes with local communities.
3. Participation in government environmental campaigns.
4. Technical support through faculty expertise.
5. Promotion of sustainable watershed management practices.


Member


SDG Coordinator


Principal