E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

NAGAPATTINAM – 611002

(Affiliated to Anna University, Chennai | Accredited by NAAC with 'A++' Grade|Accredited by NBA T1(B.E. – CSE, CIVIL, ECE, EEE, MECH& B.Tech – IT) | Approved by AICTE, New Delhi)

M.E. – COMMUNICATION SYSTEMS R- 2024

SECOND YEAR

CURRICULUM AND SYLLABUS FOR THIRD SEMESTER

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	C	MAX.MARKS		
							CA	ES	TOTAL
Theory Courses									
	Professional Elective - III	PEC	3	0	0	3	40	60	100
	Professional Elective - IV	PEC	3	0	0	3	40	60	100
	Open Elective - I	OEC	3	0	0	3	40	60	100
Laboratory Courses									
2404EV301	Project Work I	EEC	0	0	12	6	60	40	100
2404EV302	Industrial Training (4 weeks)	EEC	0	*	0	2	100	0	100
TOTAL			**9**	**0**	**12**	**17**	**280**	**220**	**500**

L-Lecture |T –Tutorial |P- Practical |CA – Continuous Assessment |ES – End Semester

2403EV004 CLIMATE CHANGE AND MODELLING

L	T	P	C
3	0	0	3

PREREQUISITE:

Introduction to Mathematics and Statistics, Core Scientific Concepts, Basic Climatology

COURSE OBJECTIVES:

To equip students with a comprehensive understanding of the science behind climate modeling, from fundamental atmospheric principles to advanced analytical techniques, and to enable them to critically assess and apply climate change projections and impact assessments.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Evaluate the influence of atmospheric equations on climate parameters.
CO2: Construct a narrative explaining the assumptions behind the different IPCC Special Report on Emissions Scenarios (SRES) storylines.
CO3: Discriminate between the advantages and disadvantages of GCMs and RCMs in climate modeling.
CO4: Design a methodology for downscaling GCM to a regional scale for a specific climate study.
CO5: Formulate adaptation strategies based on climate change impact and vulnerability assessments.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	-	3	3	-	-	-	3	2	-
CO2	3	2	1	-	-	3	3	-	-	-	3	2	-
CO3	3	2	1	-	-	3	3	-	-	-	3	2	-
CO4	3	2	1	-	-	3	3	-	-	-	3	2	-
CO5	3	2	1	-	-	3	3	-	-	-	3	2	-

COURSE CONTENTS:

MODULE I CLIMATE CHANGE AND CLIMATE VARIABILITY 12 Hours

Introduction – Atmosphere - weather and Climate - climate parameters (Temperature, Rainfall, Humidity, Wind, etc.) – Equations governing the atmosphere - Numerical Weather Prediction Models - Introduction to GCMs - Application in Climate Change Projections

MODULE II IPCC SRES SCENARIOS 12 Hours

Intergovernmental Panel on Climate Change (IPCC) - An Overview - Key Assumptions - Scenario Family - Storyline (A1, B1, A2, B2).

MODULE III GLOBAL CLIMATE MODEL (GCM) AND REGIONAL CLIMATE MODEL (RCM) 12 Hours

Some typical GCMs (HadCM3Q-UK Met Office) - Issues with GCMs - Introduction to RCMs and LAMs - some typical RCMs like PRECIS, SimCLIM, MAGICC/SCENGENE - Advantages and Disadvantages of

GCMs and RCMs.

MODULE IV DOWNSCALING GLOBAL CLIMATE MODEL - AN OVERVIEW 12 Hours

Need for downscaling - Selection of GCMs for regional climate change studies - Ensemble theory – Selection of - Ensembles, Model Domain (Spatial domain and temporal domain), Resolution and climate variables - Lateral boundary conditions - Methods of downscaling (Statistical and Dynamical) - examples from each and their limitations.

MODULE V ANALYSIS /POST PROCESSING 12 Hours

Model validation - post processing – Introduction to Analysis tools - Ferret, R, Grads, IDL, SPSS, ArcGIS Climate change Impact - Vulnerability assessment – adaptation strategies.

TOTAL: 60Hours

REFERENCES:

1. *IPCC Sixth Assessment Report, Cambridge University Press, Cambridge, UK.*
2. *McGuffie, K. and Henderson-Sellers, A. (2005) "A Climate Modelling Primer, Third Edition, John Wiley & Sons, Ltd, Chichester, UK.*
3. *Neelin David J, "Climate Change and Climate Modelling", Cambridge University Press, Cambridge, UK.*
4. *Thomas Stocker, "Introduction to Climate Modelling", Advances in Geophysical and Environmental Mechanics and Mathematics. Springer Publication.*
5. *Douglas Maraun and Martin Widmann (2018), "Statistical Downscaling and Bias Correction for Climate Research", Cambridge University Press, Cambridge, UK.*

2403EV006 ENVIRONMENT, HEALTH & SAFETY FOR INDUSTRIES

L	T	P	C
3	0	0	3

PREREQUISITE:

COURSE OBJECTIVES:

To equip students with a comprehensive understanding of the legal and regulatory framework for occupational health, safety, and environmental protection in India and internationally, enabling them to identify and apply the correct statutory requirements across various industrial contexts.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Analyze the statutory provisions for health, safety, and welfare of workers under the Factories Act and the specific Tamil Nadu Factories Rules.

CO2: Evaluate the central government's powers and the rules governing environmental pollution, including biomedical waste, noise, and batteries, under the Environment Act and related legislation.

CO3: Construct plans for the management of hazardous chemicals by understanding the duties of authorities, the responsibilities of occupiers, and the requirements for safety reports and data sheets.

CO4: Discern the key regulations and legal frameworks for various hazardous activities and industries, including boilers, mining, and construction, by examining a range of acts and rules.

CO5: Compare the principles of international safety and health legislation and standards like OSHA, HASAWA, and OSHAS 18000.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	-	3	3	-	-	-	3	2	-
CO2	3	2	1	-	-	3	3	-	-	-	3	2	-
CO3	3	2	1	-	-	3	3	-	-	-	3	2	-
CO4	3	2	1	-	-	3	3	-	-	-	3	2	-
CO5	3	2	1	-	-	3	3	-	-	-	3	2	-

COURSE CONTENTS:

MODULE I FACTORIES ACT – 1948 **9 Hours**

Statutory authorities – inspecting staff, health, safety, provisions relating to hazardous processes, welfare, workinghours,employmentofyoungpersons–specialprovisions–penaltiesand procedures-Tamilnadu Factories Rules 1950 under Safety and health chapters of Factories Act 1948.

MODULE II ENVIRONMENT ACT – 1986 **9 Hours**

General powers of the central government, prevention, control and abatementofenvironmental pollution-Biomedical waste (Management and handling Rules, 1989-The noise pollution (Regulation andcontrol)Rules,2000-TheBatteries(ManagementandHandlingRules)2001-NoObjection certificate from

statutory authorities like pollution control board.

Air Act 1981 and Water Act 1974:Central and stateboards for the prevention and control of air pollution-powers and functions of boards – prevention and control of air pollution and water pollution – fund – accounts and audit, penalties and procedures.

MODULE III MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICAL RULES 1989 **9 Hours**

Definitions – duties of authorities – responsibilities of occupier – notification of major accidents – information to be furnished – preparation of offsite and onsite plans – list of hazardous and toxic chemicals – safety reports – safety data sheets.

MODULE IV OTHER ACTS AND RULES **9 Hours**

Indian Boiler Act 1923, static and mobile pressure vessel rules (SMPV), motor vehicle rules, mines act 1952, workman compensation act, rules – electricity act and rules – hazardous wastes (management and handling) rules, 1989, with amendments in 2000- the building and other construction workers act 1996., Petroleum rules, Gas cyclinder rules-Explosives Act 1983-Pesticides Act.

MODULE V INTERNATIONAL ACTS AND STANDARDS **9 Hours**

Occupational Safety and Health act of USA (The Williames - Steiger Act of 1970) – Health and safety work act (HASAWA 1974, UK) – OSHAS 18000 – ISO 14000 – American National Standards Institute (ANSI).

TOTAL: 45 HOURS

REFERENCES:

1. *The Factories Act 1948, Madras Book Agency, Chennai, 2000*
2. *The Environment Act (Protection) 1986, Commercial Law Publishers (India) Pvt.Ltd., New Delhi.*
3. *Water (Prevention and control of pollution) act 1974, Commercial Law publishers (India) Pvt.Ltd., New Delhi.*
4. *Air (Prevention and control of pollution) act 1981, Commercial Law Publishers (India) Pvt.Ltd., New Delhi.*
5. *The Indian boilers act 1923, Commercial Law Publishers (India) Pvt.Ltd., Allahabad.*
6. *The Mines Act 1952, Commercial Law Publishers (India) Pvt.Ltd., Allahabad.*
7. *The manufacture, storage and import of hazardous chemical rules 1989, Madras Book Agency, Chennai.*

2403EV024 ENVIRONMENTAL POLICY AND LEGISLATION

L	T	P	C
3	0	0	3

PREREQUISITE:

Environmental Science

COURSE OBJECTIVES:

To impart knowledge on policies, legislation, institutional framework and enforcement mechanisms for environmental management in India.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Explain the constitutional and legal framework for environmental protection in India, including key national policies and principles.

CO2: Discuss the Water (Prevention and Control of Pollution) Act, 1974, encompassing regulatory agency jurisdictions, obligations of occupiers, consent protocols, legal sample methodologies, and enforcement mechanisms.

CO3: Elucidate the Air (Prevention and Control of Pollution) Act, 1981, detailing the authorities of regulatory agencies, obligations of occupiers, permission protocols, legal sampling methodologies, and enforcement mechanisms for air pollution control.

CO4: Describe the Environment (Protection) Act 1986, EIA, waste management, pollution control, and stakeholder responsibilities.

CO5: Exhibit comprehension of pertinent Indian legal statutes and judicial mechanisms of environmental preservation, encompassing forest legislation, liability insurance, criminal proceedings, and significant Supreme Court rulings.

COs Vs POs MAPPING:

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CO1	3	2	1	-	-	3	3	-	-	-	3	2	-
CO2	3	2	1	-	-	3	3	-	-	-	3	2	-
CO3	3	2	1	-	-	3	3	-	-	-	3	2	-
CO4	3	2	1	-	-	3	3	-	-	-	3	2	-
CO5	3	2	1	-	-	3	3	-	-	-	3	2	-

COURSE CONTENTS:

MODULE I INTRODUCTION **9 Hours**

Indian Constitution and Environmental Protection –NationalEnvironmentalpolicies– Precautionary Principle and Polluter Pays Principle – Concept of absolute liability – multilateral environmental agreements and Protocols – Montreal Protocol, Kyoto agreement, Rio declaration– Environmental Protection Act, Water (P&CP) Act, Air (P&CP) Act – Institutional framework (SPCB/CPCB/MoEF).

MODULE II WATER (P&CP) ACT, 1974 **9 Hours**

Power & functions of regulatory agencies - responsibilities of Occupier Provision relating to prevention and control Scheme of Consent to establish, Consent to operate – Conditions of the consents – Outlet – Legal sampling procedures, State Water Laboratory – Appellate Authority – Penalties for violation of consent conditions etc. Provisions for closure/directions in apprehended pollution situation.

MODULE III AIR (P&CP) ACT, 1981 **9 Hours**

Power & functions of regulatory agencies - responsibilities of Occupier Provision relating to prevention and control Scheme of Consent to establish, Consent to operate – Conditions of the consents – Outlet – Legal sampling procedures,State Air Laboratory – Appellate Authority – Penalties for violation of consent conditions etc. Provisions for closure/directions in apprehended pollution situation

MODULE IV ENVIRONMENT (PROTECTION) ACT 1986 **9 Hours**

Genesis of the Act – delegation of powers – Role of Central Government - EIA Notification – Sitting of Industries – Coastal Zone Regulation - Responsibilities of local bodies mitigation scheme etc., for Municipal Solid Waste Management - Responsibilities of Pollution Control Boards under Hazardous Waste rules and that of occupier, authorization – Biomedical waste rules – responsibilities of generators and role of Pollution Control Boards

MODULE V OTHER ACTS **9 Hours**

Relevant Provisions of Indian Forest Act, Public Liability Insurance Act, CrPC, IPC -Public Interest Litigation – Writpetitions - Supreme Court Judgments in Landmark cases.

TOTAL: 45 HOURS

REFERENCES:

1. *CPCB "Pollution Control acts, Rules and Notifications issued there under "Pollution Control Series – PCL/2/1992, Central Pollution Control Board, Delhi, 1997.*
2. *Greger I.Megregor "Environmental law and enforcement", Lewis Publishers, London. 1994.*
3. *Shyam Divan and Armin Roseneranz "Environmental law and policy in India "Oxford University Press, New Delhi, 2001.*
4. *Environmental Law by S.C. Shastri (2022), Eastern Book Company, Lucknow, India.*
5. *Environmental Law in India by P. Leelakrishnan (2025), LexisNexis, India.*
6. *The Water (Prevention and Control of Pollution) Act, 1974 with Rules, Commercial Law Publishers, Delhi, India.*
7. *The Air (Prevention and Control of Pollution) Act, 1981 with Rules, Commercial Law Publishers, Delhi, India.*
8. *The Environment (Protection) Act, 1986 with Rules, Commercial Law Publishers, Delhi, India.*