GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

VI SEMESTER

(SESSION 2021-2022 & ONWARDS)

ENTREPRENEURSHIP AND START-UPS

Course Code	CV 6111(Same in All Branches of Engg.)
Course Title	Entrepreneurship and Start-ups
Number of Credits	4 (L- 3,T-1, P-0)
Prerequisites (Course code)	NIL
Course Category	HS

COURSE OBJECTIVES:

- Acquiring Entrepreneurial spirit and resourcefulness.
- Familiarization with various uses of human resource for earning dignified means of living.
- Understanding the concept and process of entrepreneurship-its contribution and role in the growth and development of individual and the nation.
- Acquiring entrepreneurial quality, competency, and motivation.
- Learning the process and skills of creation and management of entrepreneurial venture.

COURSE OUTCOME:

Upon completion of the course, these students will be able to demonstrate knowledge of the following topics:

- Understanding the dynamic role of entrepreneurship and small businesses
- Organizing and Managing a Small Business
- Financial Planning and Control
- Forms of Ownership for Small Business
- Strategic Marketing Planning
- New Productor Service Development
- Business Plan Creation

COURSE CONTENTS:

1. INTRODUCTION TO ENTREPRENEURSHIP AND START–UPS

1.1. Definitions, Traits of an entrepreneur, Intrapreneurship, Motivation
1.2. Types of Business Structures,
1.3. Similarities / differences between entrepreneurs and managers.

2. BUSINESS IDEAS AND THEIR IMPLEMENTATION

2.1. Discovering ideas and visualizing the business
2.2. Activity map
2.3. Business Plan

3. IDEA TO START-UP

3.1. Market Analysis– Identifying the target market,
3.2. Competition evaluation and Strategy Development,
3.3. Marketing and accounting,
3.4. Risk analysis

4. MANAGEMENT

4.1. Company's Organization Structure,
4.2. Recruitment and management of talent.
4.3. Financial organization and management

5. FINANCING AND PROTECTION OF IDEAS

5.1. Financing methods available for start-ups in India
5.2. Communication of Ideas to potential investors– Investor Pitch
5.3. Patenting and Licenses

6. EXIT STRATEGIES FOR ENTREPRENEURS ,BANKRUPTCY, AND SUCCESSION ANDHARVESTING STRATEGY

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	The Startup Owner's Manual: The Step by-Step Guide for Building a Great Company	Steve Blank and Bob Dorf	K & S Ranch ISBN–978-0984999392
2.	The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses	Eric Ries	Penguin UK ISBN–978-0670921607
3.	Demand: Creating What People Love Before They Know They Want It	Adrian J. Slywotzky with Karl Weber	Headline Book Publishing ISBN–978-0755388974
4.	The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business	Clayton M. Chris Tensen	Harvard business ISBN:978-142219602

SUGGESTEDSOFTWARE/LEARNINGWEBSITES:

a. https://www.fundable.com/learn/resources/guides/startup
b. https://corporatefinanceinstitute.com/resources/knowledge/finance/corporatehstructure/
c .https://www.finder.com/small-business-finance-tips
d. https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/

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PROJECT MANAGEMENT

CourseCode	CV 62001(Same in All Branches of Engg.)
CourseTitle	Project Management
NumberofCredits	3(L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE OBJECTIVES

•To develop the idea of project plan, from defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved.

•To develop an understanding of key project management skills and strategies.

COURSE OUTCOMES

At the end of the course, the student will be able to:

CO1	Understand the importance of projects and its phases.
CO2	Analyze projects from marketing, operational and financial perspectives.
CO3	Evaluate projects based on discount and non-discount methods.
CO4	Develop network diagrams for planning and execution of a given project.
CO5	Apply crashing procedures for time and cost optimization.

COURSE CONTENTS

1. CONCEPT OF A PROJECT:

1.1. Classification of projects
1.2. Importance of project management
1.3. The project Life cycle
1.4. Establishing project priorities (scope-cost-time)
1.5. Project priority matrix
1.6. Work break down structure.

2. CAPITAL BUDGETING PROCESS:

2.1. Planning -Analysis-Selection-Financing-Implementation-Review.
2.2. Generation and screening of project ideas
2.3. Market and demand analysis
2.4. Demand forecasting techniques.
2.5. Market planning and marketing research process
2.6. Technical analysis

3. FINANCIAL ESTIMATES AND PROJECTIONS:

3.1. Cost of projects
3.2. Means of financing
3.3. Estimates of sales and production-cost of production
3.4. Working capital requirement and its financing
3.5. Profitability project , cash flow statement and balance sheet.
3.6. Breakeven analysis.

4. BASIC TECHNIQUES IN CAPITAL BUDGETING:

4.1. Non discounting and discounting methods
4.2. pay-back period
4.3. Accounting rate of return
4.4. Net present value
4.5. Benefit cost ratio
4.6. Internal rate of return.
4.7. Project risk.

4.8. Social cost benefit analysis and economic rate of return.
4.9. Non-financial justification of projects.

5. PROJECT ADMINISTRATION:

5.1. Progress payments,
5.2. Expenditure planning,
5.3. Project scheduling and network planning,
5.4. Use of Critical Path Method (CPM),
5.5. Schedule of payments and physical progress,
5.6. time-cost trade off.
5.7. Concepts and uses of PERT
5.8. Cost as a function of time,
5.9. Project Evaluation and Review Techniques
5.10. Cost mechanisms.
5.11. Determination of least cost duration.
5.12. Post project evaluation.
5.13. Introduction to various Project management softwares.

REFERENCE BOOKS

1.Project planning, analysis, selection, implementation and review –Prasannachandra–Tata McGraw Hill
2.Project Management – the Managerial Process– Clifford F. Gray & Erik W. Larson-McGrawHill
3.Project management- David I Cleland- Mcgraw Hill International Edition, 1999
4.Project Management– Gopala krishnan– Mcmillan India Ltd.
5.Project Management- Harry – Maylor – Peason Publication

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RENEWABLE ENERGY TECHNOLOGIES

CourseCode	CV 62002 (Same in All Branches of Engg.)
CourseTitle	Renewable Energy Technologies
NumberofCredits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

•To understand present and future scenario of world energy use.
•To understand fundamentals of solar energy systems.
•To understand basics of wind energy.
•To understand bio energy and its usage in different ways.
•To identify different available non-conventional energy sources.

COURSE OUTCOMES

At the end of the course, the student will be able to:

CO1	Understand present and future energy scenario of the world.
CO2	Understand various methods of solar energy harvesting.
CO3	Identify various wind energy systems.
CO4	Evaluate appropriate methods for Bio energy generations from various Bio wastes.
CO5	Identify suitable energy sources for a location.

COURSE CONTENTS

1. INTRODUCTION:

1.1. World Energy Use;
1.2. Reserves of Energy Resources;
1.3. Environmental Aspects OF Energy Utilisation;
1.4. Renewable Energy Scenario in India and around the World;
1.5. Potentials; Achievements/ Applications;
1.6. Economics of renewable energy systems.

2. SOLAR ENERGY:

2.1. Solar Radiation;
2.2. Measurements of Solar Radiation;
2.3. Flat Plate and Concentrating Collectors;
2.4. Solar direct Thermal Applications;
2.5. Solar thermal Power Generation
2.6. Fundamentals of Solar Photo Voltaic Conversion;
2.7. Solar Cells;
2.8. Solar PV Power Generation;
2.9. Solar PV Applications.

3. WIND ENERGY:

3.1. Wind Data and Energy Estimation;
3.2. Types of Wind Energy Systems;
3.3. Performance; Site Selection;
3.4. Details of Wind Turbine Generator;
3.5. Safety and Environmental Aspects.

4. BIO-ENERGY:

4.1. Bio mass direct combustion;

4.2. Bio mass gasifiers;
4.3. Bio gas plants;
4.4. Digesters;
4.5. Ethanol production;
4.6. Bio diesel;
4.7. Cogeneration;
4.8. Bio mass Applications.

5. OTHER RENEWABLE ENERGY SOURCES:

5.1. Tidal energy;
5.2. Wave Energy;
5.3. Open and Closed OTEC Cycles;
5.4. Small Hydro Geothermal Energy;
5.5. Hydrogen and Storage;
5.6. Fuel Cell Systems;
5.7. Hybrid Systems.

REFERENCE BOOKS

1. Non-Conventional Energy Sources, Rai. G. D., Khanna Publishers, New Delhi, 2011.
2. Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN SponLtd.,UK,2 006.
3. Solar Energy, Sukhatme. S. P., Tata Mc Graw Hill Publishing CompanyLtd. ,New Delhi, 1997.
4. Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press, U.K., 1996.
5. Fundamental of Renewable Energy Sources, G N Tiwari and M K Ghoshal, Narosa, New Delhi, 2007.
6. Renewable Energy and Environment A Policy Analysis for India ,NHRavindranath, U K Rao, B Natarajan, P Monga, Tata McGraw Hill.
7. Energy and The Environment, R A Ristinen and J JKraushaar, second edition, John Willey & Sons, New York, 2006.
8. Renewable Energy Resources, J W T widell and A D Weir, ELBS, 2006.

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PRODUCT DESIGN

CourseCode	CV 63001(Same in All Branches of Engg.)
CourseTitle	Product Design
NumberofCredits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE OBJECTIVES

•To acquire the basic concepts of product design and development process
•To understand the engineering and scientific process in executing a design from concept to finished product
•To study the key reasons for design or redesign.

COURSE OUTCOMES

At the end of the course, the student will be able to:

CO1	Understand the basic concepts of product design and development process.
CO2	Illustrate the methods to define thecustomer needs.
CO3	Describe an engineering design and development process.
CO4	Understand the intuitive and advanced methods used to develop and evaluate a concept.
CO5	Apply modelling and embodiment principles in product design and development process.

COURSE CONTENTS

1. DEFINITION OF A PRODUCT

1.1. Types of product;
1.2. Levels of product;
1.3. Product-market mix;
1.4. New product development (NPD) process;
1.5. Idea generation methods;
1.6. Creativity;
  1.6.1. Creative attitude;
  1.6.2. Creative design process;
1.7. Morpho logical analysis;
1.8. Analysis of inter-connected decision areas;
1.9. Brain storming.

2. PRODUCT LIFECYCLE;

2.1. The challenges of Product development;
2.2. Product analysis;
2.3. Product characteristics;
2.4. Economic considerations;
2.5. Production and Marketing aspects;
2.6. Characteristics of successful Product development;
2.7. Phases of a generic product development process;
2.8. Customer need identification;
2.9. Product development practices and industry-product strategies.

3. PRODUCT DESIGN

3.1. Design by evolution;
3.2. Design by innovation;
3.3. Design by imitation;
3.4. Factors affecting product design;
3.5. Standards of performance and environmental factors;
3.6. Decision making and iteration;
3.7. Morphology of design (different phases);

3.8. Role of aesthetics in design.

4. INTRODUCTION TO OPTIMIZATION IN DESIGN

4.1. Economic factors in design;
4.2. Design for safety and reliability;
4.3. Role of computers in design;
4.4. Modeling and Simulation;
4.5. The role of models in engineering design;
4.6. Mathematical modeling;
4.7. Similitude and scale models;
4.8. Concurrent design;
4.9. Six sigma and design for six sigma;
4.10. Introduction to optimization in design;
4.11. Economic factors and financial feasibility in design;
4.12. Design for manufacturing;
4.13. Rapid Proto typing (RP);
4.14. Application of RP in product design;
4.15. Product Development versus Design.

5. DESIGN OF SIMPLE PRODUCTS DEALING WITH VARIOUS ASPECTS OF PRODUCT DEVELOPMENT;

5.1. Design Starting from need till the manufacture of the product

REFERENCE BOOKS

1.Product Design and Development, Karl T.Ulrichand Steven D.Eppinger, TataMc Graw–Hill edition.
2.Engineering Design– George E. Dieter.
3.An Introduction to Engineering Design methods Vijay Gupta.
4.Merie Crawford: New Product management, McGraw-Hill Irwin.
5.Chitale A K and Gupta R C," Product Design and Manufacturing", Prentice Hall of India, 2005.
6.Kevin Otto and Kristin Wood, Product Design, Techniques in Reverse Engineering and New Product Development, Pears on education.

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DISASTER MANAGEMENT

Course Code	CV 63002 (Same in All Branches of Engg.)
Course Title	Disaster Management
Number of Credits	3 (L: 3, T: 0 ,P :0)
Prerequisites	NIL
Course Category	OE

COURSE OBJECTIVES

Following are the objectives of this course:

- To learn about various types of natural and man-made disasters.
- To know pre and post-disaster management for some of the disasters.
- To know about various information and organizations in disaster management in India.
- To get exposed to technological tools and their role in disaster management.

COURSE OUTCOMES:

- After competing this course, student will be:
- Acquainted with basic information on various types of disasters
- Knowing the precautions and awareness regarding various disasters
- Decide first action to be taken under various disasters
- Familiarised with organization in India which are dealing with disasters
- Able to select IT tools to help in disaster management

COURSE CONTENTS

1. UNDERSTANDING DISASTER

1.1. Understanding the Concepts and definitions of Disaster,
1.2. Hazard,
1.3. Vulnerability,
1.4. Risk,
1.5. Capacity–Disaster and Development,
1.6. Disaster management.

2. TYPES, TRENDS, CAUSES, CONSEQUENCES AND CONTROL OF DISASTERS

2.1. Geological Disasters (earth quakes, land slides,tsunami, mining);
2.2. Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hailstorms, avalanches, droughts, cold and heat waves)
2.3. Biological Disasters (Epidemics, Pestattacks,Forestfire);
2.4. Technological Disasters (chemical, industrial, radiological, nuclear)
2.5. Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters)
2.6. Global Disaster Trends
2.7. Emerging Risks of Disasters
2.8. Climate Change and Urban Disasters.

3. DISASTER MANAGEMENT CYCLE AND FRAME WORK

3.1. Disaster Management Cycle
3.2. Paradigm Shift in Disaster Management.
3.3. Pre-Disaster
3.4. Risk Assessment and Analysis,
3.5. Risk Mapping,
3.6. Zonation and Microzonation,
3.7. Prevention and Mitigation of Disasters,
3.8. Early Warning System
3.8.1. Preparedness,

3.8.2. Capacity Development;
3.8.3. Awareness.

3.9. During Disaster
3.9.1. Evacuation
3.9.2. Disaster Communication
3.9.3. Search and Rescue
3.9.4. Emergency Operation Centre
3.9.5. Incident Comm and System
3.9.6. Relief and Rehabilitation

3.10. Post-disaster
3.10.1. Damage and Needs Assessment,
3.10.2. Restoration of Critical Infra structure
3.10.3. Early Recovery Reconstruction and Redevelopment;
3.10.4. IDNDR, Yokohama Stretegy, Hyogo Frame-work of Action.

4. DISASTER MANAGEMENT IN INDIA

4.1. Disaster Profile of India
4.2. Mega Disasters of India and Lessons Learnt.
4.3. Disaster Management Act 2005
4.4. Institutional and Financial Mechanism,
4.5. National Policy on Disaster Management,
4.6. National Guidelines and Plans on Disaster Management;
4.7. Role of Government (local, state and national),
4.8. Non-Government and Inter Governmental Agencies

5. APPLICATIONS OF SCIENCE AND TECHNOLOGY FOR DISASTER MANAGEMENT

5.1. Geo informatics in Disaster Management (RS, GIS, GPS and RS).
5.2. Disaster Communication System (Early Warning and Its Dissemination).
5.3. Land Use Planning and Development Regulations,
5.4. Disaster Safe Designs and Constructions,
5.5. Structural and Non Structural Mitigation of Disasters
5.6. S & T Institutions for Disaster Management in India

REFERENCES

1.Publications of National Disaster Management Authority (NDMA) on Various Templates and Guide lines for Disaster Management
2.Bhandani, R. K., An over view on natural & man-made disasters and their reduction, CSIR, New Delhi
3.Srivastava, H. N., and Gupta G. D. , Management of Natural Disasters in developing countries, Daya Publishers, Delhi
4.Alexander, David, Natural Disasters, Kluwer Academic London
5.Ghosh, G .K. ,Disaster Management, APH Publishing Corporation
6.Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

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INDIAN CONSTITUTION

CourseCode	CV 6333(Same in All Branches of Engg.)
CourseTitle	Indian Constitution
NumberofCredits	0 (L:2,T:0;P:0)
Prerequisites(Coursecode)	None
CourseCategory	AU

COURSE CONTENT

1. THE CONSTITUTION –

1.1. Introduction
1.2. The History of the Making of the Indian Constitution
1.3. Preamble and the Basic Structure, and its interpretation
1.4. Fundamental Rights and Duties and their interpretation
1.5. State Policy Principles

2. UNION GOVERNMENT

2.1. Structure of the Indian Union
2.2. President– Role and Power
2.3. Prime Minister and Council of Ministers
2.4. Lok Sabha and Rajya Sabha

3. STATE GOVERNMENT

3.1. Governor– Role and Power
3.2. Chief Minister and Council of Ministers
3.3. State Secretariat

4. LOCAL ADMINISTRATION

4.1. District Administration
4.2. Municipal Corporation
4.3. Zila Panchayat

5. ELECTION COMMISSION

5.1. Role and Functioning
5.2. Chief Election Commissioner
5.3. State Election Commission

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	Ethics and Politics of the Indian Constitution	Rajeev Bhargava	Oxford University Press, New Delhi, 2008
2.	The Constitution of India	B.L.Fadia	Sahitya Bhawan; New edition(2017)
3.	Introduction to the Constitution of India	D DBasu	Lexis Nexis; Twenty-Third 2018 edition

SUGGESTED SOFTWARE / LEARNING WEBSITES:

1. https://www.constitution.org/cons/india/const.html
2. http://www.legislative.gov.in/constitution-of-india
3. https://www.sci.gov.in/constitution
4. https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/

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INDUSTRIAL WASTE TREATMENT

Course Code	CV 6001
Course Title	Industrial Waste Treatment
Number of Credits	3 (L: 3 T: 0, P: 0)
Prerequisites	NIL
Course Category	PC

Course objective

- To learn about various industrial effulents.
- To know the various type of industries.
- Determination of BOD, COD, DO
- Determination of solids

Course outcome

1 BOD, COD of streams calculations
2 Calculate quantity of solids
3 Learn about industrial waste management
4 Visit different industries

1. Introduction

1.1 Types of industries & industrial pollution – solid, liquid, gases.
1.2 Characteristics of industrial waste.
1.3 Effect of industrial waste on
- 1.3.1 Streams
- 1.3.2 Sewer
- 1.3.3 Land
- 1.3.4 Sewage treatment plant
- 1.3.5 Human health

1.4 Environmental legislation related to prevention & control of industrial effluent
1.5 Clean up Goals

2. Industrial Waste Water Treatment

2.1 Introduction
2.2 Sources
2.3 Methods of treatment
- 2.3.1 Equalization
- 2.3.2 Neutralization
- 2.3.3 Physical treatment
- 2.3.4 Chemical treatment
- 2.3.5 Biological treatment

2.4 Flow charts of certain Indian industries
- 2.4.1 Dairy
- 2.4.2 Distillery
- 2.4.3 Fertilizer plant
- 2.4.4 Oil Refineries
- 2.4.5 Paper pulp mills
- 2.4.6 Sugar mill
- 2.4.7 Textiles

3. Industrial Solid Waste Management

3.1 Classification
3.2 Storage Transportation & Disposal

3.3 Methods of treatment
3.4 Existing Legislation to manage solid waste
3.5 Environmental impact of solid waste

4. Hazardous Waste

4.1 Biomedical waste

4.1.1 Biomedical waste and their impact on human health and environment
4.1.2 Legislative laws on management of Biomedical wastes in India
4.1.3 Collection & treatment
4.1.3.1 Colour coding
4.1.3.2 Collection of Sharp Waste
4.1.3.3 Labelling & identification
4.1.3.4 Storage
4.1.3.5 Transportation to treatment & Disposal sites
4.1.3.6 Treatment & Disposal

5. E-Waste

5.1 Definition & E-Waste components
5.2 Quantity – E-Waste Data
5.3 Waste Electrical & Electronic Equipment (WEEE)
5.4 Environmental Impact
5.5 Basel Convention – e waste recycling sites
5.6 Consumer awareness efforts

SUGGESTED LEARNING RESOURCES

1. Environmental Engineering (Vol. II) S. K. GargKhann Publishers, New Delhi
2. Shad T. T. "Industrial Pollution Prevention" Springer
3. Rao M. N. & Dutta A. K. "Wastewater Treatment", Oxford – 1 BH Publications
4. Pat wardhan A. D., "Industrial Wastewater Treatment" Prentice Hall of India, New Delhi

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ENVIRONMENTAL IMPACT ASSESSMENT

Course Code	CV 60021
Course Title	Environmental Impact Assessment
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	NIL
Course Category	PE

COURSE OBJECTIVES:

Following are the objectives of this course:

- To study the importance of EIA
- To know the role of public in EIA studies
- To understand the phenomena of impacts on the environment
- Know the impact quantification of various projects on the environment

COURSE OUTCOMES:

After completing this course, student will be able to:

- Identify the objectives and scope of EIA
- Illustrate the necessity of public participation in EIA studies
- Explain the phenomena of Impacts on environment

COURSE CONTENTS

1. Introduction and overview of EIA

1.1 Concept of EIA
1.2 Utility of EIA
1.3 Scope of EIA

2. EIA methodologies

2.1 Preliminary assessment
2.2 Quantification
2.3 Comparison of alternatives and comprehensive EIA's using checklist, matrices and network methods

3. Prediction and assessment of impact on:

3.1 Air
3.2 Water
3.3 Noise
3.4 Land4.

4. Environmental management plan

4.1 Plan for mitigation of adverse impact on environment
4.2 Options for mitigation of impact on water, air, land
4.3 Addressing the issues related to project affected people

5. EIA reporting

5.1 Objectives of environmental audit
5.2 Evaluation of audit data
5.3 Preparation of audit report

SUGGESTED LEARNING RESOURCES

1. Canter L.W., EIA,2nd ed., McGraw Hill, 1997
2. Kulkarni, V. and Ramchandra, T.V. , "Environmental Management", TERI Press 2009
3. United Nations Environment Programme (UNEP) EIA Manual

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ENVIRONMENTAL ACT AND LEGISLATION

Course Code	CV 60022
Course Title	Environmental Act and Legislation
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	NIL
Course Category	PE

COURSE OBJECTIVES:

The various objective of this course are:

- To learn the basic principles of environmental Laws so that the scientific gains can be put into use within the parameters of a legal system.
- To introduce the laws and policies both at the national and international level related to environment.
- To obtain the fundamental knowledge and skills to understand environmental problems and issues.

COURSE OUTCOME:

After completing this course students would be able to

- Understand the basic principles of environmental Laws.
- Understand the laws and policies both at the national and international level related to environment.
- Recognise the various issues regarding the environmental problems and issues.

COURSE CONTENT

1. Introduction to environmental laws

1.1 Environmental Protection: Issues & Problems

1.2 Key International Efforts for Environmental protection

1.3 Sustainable Development: Essential features and Legal Implications

1.4 UN Framework Convention on Climate Change, 1992

1.5 Kyoto Protocol, 1997

2. Environmental protection and the law

2.1 Environment (Protection) Act, 1986: Salient Features.

2.2 Prevention, Control & abatement of environmental pollution under EPA

2.3 Hazardous wastes (Management, Handling and Transportation) Rules, 2008

2.4 Public Liability Insurance Act, 1991. (Note: Only relevant provision of the above Acts)

3. Pollution abatement and the law

3.1 Water ((Prevention & Control of Pollution) Act, 1974: Salient Features

3.2 Air (Prevention & Control of Pollution) Act, 1981.

3.3 Noise pollution (Regulation and Control) Rules, 2000 (Note: Only relevant provisions of the above Acts)

4. Natural resource conservation and the law

4.1 Wildlife (Protection) Act, 1972: Salient Features

4.2 Protected Areas and Trade & Commerce under WPA

4.3 National Forest Policy

4.4 Forest Conservation Act, 1986

4.5 Biological Diversity Act, 2002 (Note: Only relevant provisions of the above Acts)

5. Judicial activism and environmental protection

5.1 Indian Constitution and Environmental Protection

5.2 Judicial Response towards Environmental Protection

5.3 Public Nuisance under IPC (Sections 268,277,278,284, 290,291) 5.4 Sections 133-143 of Criminal Procedure Code, 1973.

5.5 Role of NGO's for the promotion and protection of Environment.

SUGGESTED LEARNING RESOURCES

1. Diwan,P. (1997). Environmental Administration - Law & Judicial Attitude, Vol. I, II. Deep & Deep Pub. New Delhi.

2. Divan, S.andRoscencranj, A. (2001). Environmental Law & Policy in India. Oxford Pub. New Delhi.

3. Lal, S. (1990). Commentaries on Water, Air pollution & Environment (protection) Law. Law Pub. Pvt. Ltd. India.

4. Leelakrishnan, P. (1999). Environmental Law in India. Butterworths Publications, N.Delhi.

5. Singh, G. (1995). Environmental Law: International & National Perspectives.

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INDUSTRIAL WASTE TREATMENT LAB

Course Code	CV 6003
Course Title	Industrial Waste Treatment Lab
Number of Credits	1 (L: 0,T: 0,P:2)
Prerequisites	Nil
Course Category	PC

Course Objectives

- To learn about various industrial effulents.
- To know the various type of industries.
- Determination of BOD, COD, DO.
- Determination of solids.

Course outcomes

- BOD, COD of streams calculations.
- Calculate quantity of solids.
- Learn about industrial waste management.
- Visit different industries.

LIST OF PRACTICAL TO BE PERFORMED

1	Determination of solids
2	Determination of BOD, COD, DO
3	Determination of iron & manganese
4	Determination of sulphate & sulphides
5	Visit to textile industry & make a flow chart of it
6	Visit to paper & pulp industry & make a flow chart of it
7	Visit to steel industry & make a flow chart of it

References :

1. Environmental Engineering (Vol. II) S. K. GargKhann Publishers, New Delhi
2. Shad T. T. "Industrial Pollution Prevention" Springer
3. Rao M. N. & Dutta A. K. "Wastewater Treatment", Oxford – 1 BH Publications
4. Pat wardhan A. D., "Industrial Wastewater Treatment" Prentice Hall of India, New Delhi

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