Outcomes

- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

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(A63013) IRRIGATION AND DRAINAGE ENGINEERING

Unit –I:

Introduction Irrigation Engineering, advantages of irrigation, necessity and development of irrigation in India and AP and classification if irrigation projects, Irrigation terminology-GCA,CCA, Base period, crop period, Delta, Duty, Relationship between Duty and Delta (Delta= (864B) / Duty cm), Introduction soil-water plant relationships, soil physical properties such as soil texture, soil structure, capillary conductivity, soil consistency-volume-mass relationships of soil constituents, Water relations of soil, kinds of soil water-Hygroscopic, Capillary and Gravitational movement of water into soils, Infiltration, factors affecting infiltration, procedure for measurement of infiltration rate and development of infiltration equations (Kostia-Kov equations-curve fitting) $Ic=KT^n+b$), Soil moisture characteristic curves, difference between soil moisture stress and soil moisture tension, soil moisture constants such as saturation capacity, field capacity moisture equivalent and permanent wilting point. Terminology related with movement of water within soils-water intake, percolation, interflow, seepage, permeability, hydraulic conductivity and hydraulic gradient- Measurement soil moisture by different methods, Evaporation, transpiration and evapo-transpiration-Estimation by Blaney-Criddle Thornthwaite, penman and modified Penman equations only-Potential ET.

Unit-II:

Water requirements of crops-Importance of water in plant growth, procedures of working out the net irrigation requirement (depth of irrigation) gross irrigation requirement, irrigation frequency and Irrigation efficiency (conveyance, application, storage, distribution, water use efficiency) with few numerical examples, Water application methods-classification, border irrigation, components of border irrigation-Width, Length and Slope for different soils for different soils, Hydraulics of border irrigation(Advance curve, Recession Curve and Opportunity time through Time and Distance Curve) design of border irrigation. Derivation of Israelson's equation for the width of the border (X= (Q/W.I) (1-eity), Furrow irrigation system-advantages and disadvantages, determination of infiltration depth in furrows by inflow-outflow method (Steam size, Distance Advance time, CS area and Wetted Perimeter data problem on computation of infiltration depth), Check basin irrigation–advantages and disadvantages, estimation of infiltration under check basin conditions, adaptability and design considerations.

Unit-III:

Methods of conveyance of irrigation water-assessment of design capacity of irrigation channels. Design of irrigation canals using Lacey's and Kennedy's theories and problems, Measurement of irrigation water-units of measurements, methods of measurement, direct and indirect methods, measurement of velocity using current meter-indirect methods such as area velocity method and coordinate method for measuring discharges form pipes-dethridge meter, tracer method, Direct methods of measurement of discharges-different devices such as weirs flumes and notches and their installation procedures – Equations for Rectangular Triangular and Trapezoidal notches, Explanation on RBC flumes (critical flow flumes) Underground pipe lines for irrigation water distribution-types of pipes used for underground pipe lines, testing of pipes for its water absorption and pressure requirements, estimating the discharge capacity of pipe lines, Installation procedures of underground pipe lines and study of different structures associated with underground pipe lines.

Unit-IV:

Drainage-definition, objective and types, familiarization with the drainage problems (twin problems of water logging and salinity) and extent of areas in irrigated areas in the state, Surface drainage, effects of poor drainage, areas requiring drainage, factors affecting drainage requirement, drainage coefficient, determination of drainage coefficient based on different criteria, Types of surface drainage-random field drain system, bedding system, parallel field drain, parallel lateral open ditch, cross slope drain system interception system, design of open drainage channels using Manning's equation and alignment of open ditches (radius of curvature), Investigations on design parameters, hydraulic conductivity, drainable porosity fluctuations of depts. To water table in the areas, methods of determining hydraulic conductivity-single auger hole method and derivation of Hooghoudt's equation for 'K' with assumptions and inverse auger hole, Sub-surface drainage systems purpose and benefits, types of sub surface systems tile drains, mole drains, drainage wells, deep open drains and combinations and their suitability for different conditions and limitations.Components of Sub-surface drainage system Layouts and types –Random type herring bone, grid iron cutoff or interceptor drains, depth and spacing of drains, size of the pipe drains using Manning's equation, drain materials of burnt clay. Perforated corrugated and solid PVC and cement concrete, slope/grade for the drains, Envelope materials for sub-surface drains and selection criteria for uniform soils and graded soils, geo-textile and nylon mesh, outlets for sub surface drainage, gravity, gravity and pumped outlets.

Unit-V:

Design of sub surface drains under steady state (equilibrium) conditions

and derivation of Hooghoudt's equation for spacing, The Ernst's derivation for drain spacing, The Ernst's derivation for drain spacing. Glover-Dumm equation (only) for spacing under non-steady state conditions of water table to drop from 'm0' to 'm' in time 't', Drainage structures, Loads on conduits, ditch conduit conditions and projecting conduit conditions, construction and installation of drains, Bio-drainage, vertical drainage and drainage of irrigated and humid areas, Salt balance, classification and reclamation of saline and alkaline soils, soil amendments, leaching requirement-leaching ratio, Economic aspects of drainage with a typical example for total cost estimation SSD system and benefit – cost ratio.

TEXT BOOKS:

1. Irrigation Engineering, Muzumdar S K, 1983, Tat-McGraw Hill Publishing's. Co. Ltd., New Delhi.
2. Irrigation Theory & Practice, Michael A M, 2008, Vikas Publishing House, New Delhi.
3. Drainage Engineering, Luthin J M, 1970, Wiley Eastern Ltd., New Delhi.
4. Soil and Water Conservation Engineering, Schwab G O, Frevert R K, Edminister T w and Barner K K, 1981, John-Wiley and Sons, New Delhi.

REFERENCE:

1. Land & Water management Engineering, Murthy V V N, 2004, Kalyani Publishers, New Delhi.

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(A63015) TRACTOR SYSTEMS AND CONTROLS

Objective: To enable the students for acquiring the knowledge pertaining to systems like transmission system clutch, types of clutches, types of Gear, sliding, constant mesh type tractor power out lets like P. T.O, belt pully, drawbar, traction theory rolling, resistance, rim pull, crawler tractor.

Unit-I:

Introduction to transmission system – Power transmission system of Tractor – Functions of a power transmission system. Clutch – Necessity of clutch in a tractor – Essential features of good clutch – Principal working of clutch – Clutch repairs and maintenance. Types of Clutch – Friction clutch, Dog clutch and Fluid coupling – Friction clutch – Single Plate clutch or single disc clutch, Multiple plate clutch or multiple disc clutch, cone clutch. Single Plate clutch or single disc clutch – constructional details and principle of working mechanism. Multiple plate clutch, splinted sleeve clutch type – constructional details and principle of working mechanism Ratchet & Pawl arrangement mechanism – constructional details and principle of working mechanism.

Unit-II:

Gears – Necessity for providing gear box – selective sliding type & constant mesh type – Mechanical advantage in gears – Torque ratio in Gears – working of Gear box. Differential unit and Final drive – Differential – Functions of crown wheel – Differential lock – functions – Final drive – functions of Final drive.

Unit-III:

Fluid coupling and torque connector – Brake mechanism – Requirements of good braking systems – classification of brakes – Mechanical brake and Hydraulic brake – working mechanism. Steering mechanism – Qualities of Steering mechanism, Main parts of steering mechanism Types of steering boxes – working of hydraulic steering. Hydraulic control system – working principals – Basic components of Hydraulic system – Types of hydraulic system – Position control –Draft control – Mixed control – Precautions for hydraulic system.

Unit-IV:

Tractor power out lets – P.T.O. Construction details, Tractor power out let – Belt pulley constructional details, Tractor power out let – Draw bar – construction details. Traction-Traction efficiency – Method for improving traction – Coefficient of traction – Rolling resistance – Wheel Slip or Track slip – Rimpull – crawler tractor.

Unit-V:

Tractor testing – Preparation of tests – Types of tests – Test at the main power take off – Test at varying speeds at full load – Test at varying load-Belt or pulley shaft test – Drawbar test-Tractor engine performance. Determination of centre of Gravity – Suspension method – Balancing method – Weighing method. Tractor chassis machines – Functions of chassis frame – Tractor chassis – Mechanics of Tractor chassis.

TEXT BOOKS:

1. Farm Tractor Maintenance and Repair. Jain. S.C. and Roy C.R. 1984. TMH Publishing Co. Ltd., New Delhi.
2. Tractors and their power units. Liledahi J.B. Carleton W.M. Turnquist P. K. and Smith D.W. 1984. AVI Publishing Co.Inc., Westport, Connecticut.

REFERENCES:

1. Elements of Agricultural Engineering. Jasgishwar Sahay. 1992. Agro Book Agency, Patna.
2. Farm Gas Engines and Tractors. Fred J.R. 1963. Allied Publisher Pvt. Ltd., Bombay.
3. Farm Machines and their Equipment. Nakra C.P., 1986. Dhanpet Rai and Sons. 1982 Nai Sarak, New Delhi.

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(A63012) DESIGN OF SOIL AND WATER CONSERVATION STRUCTURES

Objective: To enable the students to design and execute the structures for controlling soil erosion, water erosion and irrigation in fields and prepare cost estimates for the structures.

Unit-I:

Introduction, Classification of structures, land treatment structures, gully control structures, functions of soil erosion control structures. Flow in open channels – types of flow, state of flow, regimes of flow, energy and momentum – principles, specific energy and specific force – critical depth concept–stage discharge relationship–sequent depths. Hydraulic jump and its application, type of hydraulic jump, energy dissipation due to jump, jump efficiency, relative loss of energy – Froude number and its significance in the design of hydraulic structures.

Unit-II:

Runoff measuring structures–Parshall flume, H-Flume and weirs, Water stage recorders. Straight drop spill way-general description, functional use, advantages and disadvantages, structural parts and functions, components of spillway. Three design phases – hydrologic and hydraulic design, free board and wave free board, aeration of weirs, concept of free and submerged flow. Structural design of a drop spillway–loads on headwall, variables affecting equivalent fluid pressure. Determination of saturation line for different flow conditions, seepage under the structure, equivalent fluid pressure of triangular load diagram for various flow conditions. Creep line theory, uplift pressure estimation, safety against sliding, overturning, crushing and tension. Chute spillway- general description and its components, hydraulic design, energy dissipaters – uplift pressure diagram – analysis of various forces etc. Design criteria of a SAF stilling basic and its limitations. Drop inlet spillway – General description, types of possible flow conditions, pipe flow, orifice flow, functional use, design criteria.

Unit-III:

Design of diversions, small earth embankments – their types and design principles, farm ponds and reservoirs. Estimation of volume of earthwork of farm ponds by various methods. Irrigation Engineering structures – Various types and their purposes. Differences between soil conservation and irrigation structures. Canal Falls – types of canal falls with line diagrams (elevations). Design of trapezoidal notch fall. Design of syphon well drop type of canal falls. Cross drainage works – Locations needing cross drainage works –

aqueduct – super passage – inverted siphon aqueduct – inlets and outlets – different types of cross drainage works with line diagrams. Design principles of various cross drainage works – Design of an aqueduct.

Unit–IV:

Irrigation outlets – non modular, semi modular rigid modular outlets battle sluice irrigation modules. Diversion head works – Different components of diversions head works – head regulator and cross regulator. Different types of weirs and barrages – Difference between a weir and barrage with example locations. Operation of gates in controlling water in irrigation structures. Planning of watershed development works with people's participation. Watershed development works. Preparation of projects. Impact assessment and post assessments of the soil conservation and Irrigation structures.

Unit–V:

Cost estimation of contour bund. Cost estimation of bench terraces. Cost estimation of terraces. Cost estimation of Drop spillway. Cost estimation of construction of farm ponds. Cost estimation of check dam.

TEXT BOOKS:

1. Soil and Water Conservation Engineering. Schwab G.O., Frevert R.K. Edminister T.W. and Barnes K.K. 1981. John Wiley and Sons, New York.
2. Irrigation Engineering and Hydraulic Structures. Garg S.K. 1986. Khanna Publications. New Delhi.

REFERENCES:

1. Irrigation Engineering. Mazumdar. S.K. 1983. TMH Publishing Co. Ltd., New Delhi.
2. Irrigation Water Resources. Modi P.N. 1990. Standard Book House. Post Box No. 1074. New Delhi.
3. Hydrology and Soil Conservation Engineering. Ghanshyam Das 2009 PHI Learning Private Limited, New Delhi.

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(A63011) DAIRY AND FOOD ENGINEERING

Objective: Knowledge on milk and food processing unit operations offer strength to students to handle pasteurization, sterilization, packaging, etc. of dairy products and control spoilage of food through process operations such as evaporation, freezing, membrane processing etc.,

Unit – I:

Dairy development in India and dairy technology- Introduction, statistics of production and consumption. Indian dairy products Concentrated whole mile products, coagulated milk products, products of the clarified butter for industry, Engineering, thermal and chemical properties of milk and milk products – Composition of milk, physic-chemical properties of milk, water content, acidity, pH, developed acidity, natural acidity, total acidity, density, specific gravity, freezing point of milk colour of milk, flavor, Rheology – basic concepts – ASTM standard definition of terms, Rheology properties – Force deformation behavior, stress and strain behavior, Visco-elasticity – time effects- Rheological models, Kelvin and Maxwell models-electrical equivalence of mechanical models, Rheological equations – Maxwell model-creep-Stress relaxation, Unit operations of various diary and food processing systems- Centrifugation, separation, separation by cyclone (Application of separation in the dairy industry, velocity of particles in a gravitational field, distribution of fat globule diameters in milk, velocity of particles in a centrifugal field, strength of centrifugal bowl, disc bowl centrifuge, design of centrifuges and methods of application, decanting centrifuge for lactose and casein, cyclones for separation from gas phase). Process flow charts for product manufacture – Pasteurized milk, flow chart, process steps, person method and mass balance method for making balances of cream and fat in making whole milk, ice cream manufacture, process steps, over run.

Unit-II:

Milk receiving – Quantity determination, quality evaluation, clearing and disinfection of transport facilities, milk returns, procedures for reception and returns, Pasteurization- Purpose, microorganisms and enzymes and their reaction to temperature and other influences, bacteria in milk, effect of temperature, Pasteurization – Methods of heating, design and mode of operation heating equipment (Vat, tubular heat exchanger, plate heat exchanger), Sterilization – UHT method (Direct and indirect heating), sterilization in the package (temperature and pressure patterns), equipment for sterilizing goods in the package (Batch autoclaves, continuously operating

sterilizers).

Unit – III:

Homogenization – Emulsifying, types of emulsions, emulsifiers, homogenizing (Application, mode of operation, technical execution, effect of the product) , Filling and packaging – Packaging of milk, cultured milk, cheese, butter, concentrated milk, products, dried milk products, and packaging materials of them, filling and metering, packaging methods, Butter manufacture – Principle, treatment of cream, churning, overrun, factors affecting churn ability, methods (Butter churn, continuous butter making), butter oil and special butter products (Composition, methods of manufacturing ,direct evaporation method, decantation, centrifugal separation, vacuum method), Dairy plant design and layout – target of minimum cost, factors in planning, importance of site selection. Location of building, size and type of dairy building, advantages of good plant layout, functional design, flow plan, Dairy plant design and layout – Operating schedule and layout, process selection, single – and multi –level construction of buildings, floor space, walls and ceiling ventilation, doors, windows and lighting, flooring, drainage. Composition and proximate analysis of food products- Carbohydrates, protein, lipids, minerals, vitamins, Deterioration in products and their controls – Food as a substitute to microorganisms, food preservation methods, principles of food preservation, causes of food spoilage and classification of food with respect to spoilage and consumption, Principles of food preservation, effects of pH and water content on growth of microorganisms, methods of controlling water content, effect of water activity, methods of measuring a oxidation-reduction potential effect on microorganisms, effect of nutrient content and effect of inhibitory substances, biological structures, Physical, chemical, and biological methods of food preservation, Change undergone by food components during processing –Changes during heating, evaporation, drying, freezing, juice extraction, filtration and separation.

Unit – IV:

Evaporation – Applications, functions, factors affecting rate of evaporation, basic evaporator construction, factors affecting liquid boiling point, thermodynamics of evaporation (phase change, boiling point elevation, Duhring plot, Evaporation – Hat and mass transfer in evaporator, factor influencing the overall heat transfer coefficient, influence of feed liquor properties on evaporation, factors influencing the economy of evaporation, boiling at a submerged surface, Evaporation – Types of evaporation equipment. Natural circulation evaporators – Batch type, horizontal short tube, vertical short tube, natural circulation with external calandria, long tube, forced circulation (General forced circulation, pate, expanding flow, mechanical /agitated thin film), Evaporation – Evaporator ancillary plant, design of evaporation systems, single effect multiple effect evaporators,

feeding methods of multiple effect evaporation systems, feed preheating, vapour recompression systems, Drying – Sorption isotherms, desorption, hysteresis, enthalpy of binding, drying process, Drying – Drying methods (radiation, dialectic, spray, form spray, roller, fluidized bed, freeze), grain drying theory, grain dryers.

Unit-V:

Freezing – Introduction, freezing point curve for food and water, freezing points of common food materials, freezing time calculation by using Plank's equation, types of freezing equipment, Juice extraction – Single stage liquid –liquid extraction processes (Introduction, equilibrium relations, single-stage equilibrium extraction) Types of equipment design for liquid-liquid extraction, continuous multistage countercurrent extraction, Juice extraction – Liquid solid leaching (process, preparation of solids. rate of leaching types of equipment of leaching, equilibrium relations and single state leaching counter current multistate leaching, Filtration – General considerations, materials for membrane construction, ultra-filtration, processing variables, applications or ultra-filtration in milk processing, reverse osmosis, mode of operation, and applications, Membrane separation – Membrane separation methods, demineralization by electro dialysis, gel filtration and on exchange, Thermal processing – Reaction kinetics (Principle, effect of time and temperature) temperatures which vary with time, Thermal processing _ Thermal death time curve, reaction kinetics of the heat treatment of milk and its use for the assessment of UHT treatment methods, change in milk produced by heating, Plant utilities requirement – Electricity, water, power.

REFERENCES:

1 Food Engineering and Dairy Technology, Kessler H G 1981. Veriag A. Kessler, Freising.

2 Outlines of Dairy Technology, Sukumar DC 2005. Oxford University Press, New Delhi

3 Principles of Food Science, Fennema OR 2006. Marcel Dekkar Inc., New York.

4 Food Science, Chemistry and Experimental Foods, Swaminathan M 2006. The Bangalore Printing & Publishing Co., Ltd., Bangalore

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(A63014) THEORY OF STRUCTURES

Objective: The Students will have acquired knowledge on the design principles of beams, slabs, columns, foundations and RCC structures, retaining walls and silos and other structures by the end of the course.

Unit-I:

Introduction to loads and BIS codes – loading of a bar, principle of superposition, classification of loaded bar, gradual, sudden, impact and shock loading, tension and compression, axially loaded bar. Design of connections. Design of thin cylindrical shells – Failure of thin cylindrical shells, stresses in a thin cylindrical shell, circumferential stress, longitudinal stress, problems on thin cylindrical shells. Design of thick cylindrical shells – Lame's theorem, stress, stress in compund thick cylindrical shells, difference of radii of shrinkage, problems on thick cylindrical shells. Design of spherical shells, thick spherical shells, problems on thick spherical shells. Combined bending and axial thrust.

Unit-II:

Design of steel roof trusses. Analysis and designing of single reinforced sections – Properties of reinforced concrete, advantages, assumptions, modular ratio, equivalent area of R.C.C., Stress and strain diagram, neutral axis, moment of resistance, design of rectangular section. Analysis of balanced over reinforced and under reinforced sections – Under reinforced sections, over reinforced sections, problems. Analysis and designing of double reinforced sections – Modular ratio for compression shell equivalent area of steel in compression, neutral axis, moment of resistance, steel beam theory, problems. Shear stresses in beams – Shear stress induced in homogeneous and R.C. beams, nominal shear stress, varying depth, effect of shear in R.C. beams, failures, shear resistance of concrete without shear reinforcement.

Unit-III:

Design of shear reinforcement; problems. Vertical stirrups and inclined bars – Development of length, development of stress in R.C.C. Anchorage for reinforced bars–Anchorage for reinforced bars, anchorage bars in tension, anchorage bars in compression. Curtailment of bars – Decision on the curtailment of bars, design considerations for bond, general concept of bond.

Unit- IV:

Design of flanges beams (CT and I beams). Design of one way slabs – Loading on slabs, arrangement of reinforcement, design of one way slab.

Design of one way slabs – Problems on design of one way slabs. Design of one way slabs – Design of reinforced brick slabs, problems. Design of one way slabs – Rankine – Grashoff theory, shear force on the edges, design, problems, Merco's method. Design of two way slabs – Torsion reinforcement, load and bending moment, problems, slabs with edges fixed. Design of two way slabs – Provision of torsion reinforcement, Marcor's method, problems. Axially loaded columns – Types of columns, effective length of columns, long and short columns, composite columns.

Unit- V:

Axially loaded columns – Basic rules for design of columns, arrangement of transverse reinforcement, problems. Foundations – Types of foundations, design criteria. Foundations – Problems on design criteria. Retaining walls – Earth pressure on a retaining wall, active earth pressure, passive earth pressure. Stability of walls – Conditions for stability of retaining walls, problems. Silos, circular or cylindrical tanks and design criteria – Permissible stresses in concrete, permissible stresses in steel, base, minimum reinforcement, design, problems. Silos, circular or cylindrical tanks and design criteria – Circular tanks with rigid joints, H. Carpenter's method, problems.

TEXT BOOKS:

1. Mechanics of Structures Vol. I, Junarkar, S.B. 2001 – Charotar Publishing Home, Anand.
2. Mechanics of Materials, Dr. B.C. Punmia, Laxmi Publications.
3. Strength of Materials by Basavarajaiah and Maha devazpa, University Press.

REFERENCES:

1. Strength of materials, R.S. Khumi 2001 – S. Chand & Company Ltd., 7361, Ram Nagar, New Delhi – 110055.
2 Treasure of R.C.C. Design, Sushil Kumar 2003 – R.K.Jain – 1705-A, Nai Sarak, Delhi.

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(A60018) HUMAN VALUES AND PROFESSIONAL ETHICS

(Open Elective)

Objectives : This introductory course input is intended

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

Unit I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Unit II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

Unit III:

Understanding Harmony in the Family and Society- Harmony in Human -

Human Relationship : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!

Unit IV:

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

Unit V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a) Ability to utilize the professional competence for augmenting universal human order,

b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,

c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers

b) At the level of society: as mutually enriching institutions and organizations

TEXT BOOK

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications,3rd Edition.

EFERENCE BOOKS

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

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(A60117) DISASTER MANAGEMENT

(Open Elective)

Unit-I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit –II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

Unit –III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Unit –IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters

Infrequent events: Cyclones – Lightning – Hailstorms

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion

Soil Erosion:— Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion

Chemical hazards/ disasters:— Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation

Biological hazards/ disasters:- Population Explosion.

Unit –V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

TEXT BOOKS:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning

REFERENCES

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
3. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
8. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction,CSIR, New Delhi
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management,IIPA, New Delhi, 2001

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. Ag. Engg.-II Sem	L	T/P/D	C
	4	-/-/-	4

(A60017) INTELLECTUAL PROPERTY RIGHTS

(Open Elective)

UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets : Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition : Misappropriation right of publicity, False advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah. E. Bouchoux, cengage learing.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. Ag. Engg.-II Sem	L	T/P/D	C
	-	-/3/-	2

(A63084) AGRICULTURAL PROCESS ENGINEERING LAB

1. Preparation of flow charts and layout of a food processing plant
2. Determination of fineness modulus and uniformity index
3. Determination of mixing index of a feed mixer
4. Determinaption of the efficiency of cyclone separator
5. Tutorial on extraction by McCabe and Theile plot
6. Tutorial on use of psychrometry chart
7. Tutorial Problems on distillation
8. Tutorial on power requirement in size reduction of grain using Rittnger's law, Kick's law and Bond's law
9. Performance evaluation of hammer mill and attribution mill.
10. Separation behavior in pneumatic separation
11. Evaluation of performance of indented cylinder and screen pre cleaner
12. Mixing index and study of mixers

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. Ag. Engg.-II Sem	L	T/P/D	C
	-	-/3/-	2

(A63085) SOIL AND WATER ENGINEERING LAB

1. Estimation of Soil Loss from using Cushocton Silt sampler and multi slot divisor.
2. Determination of sediment concentration through Oven Dry method.
3. Soil loss estimation using erosivity index and erodibility index.
4. Determination of rate of sedimentation and storage loss in reservoir.
5. Field planning for implantation of soil conservation measures.
6. Field visit to study different soil conservation structures
7. Field visit to study different gully control structures
8. Determination in filtration characteristics of soils.
9. Measurement of irrigation water with H-Flume.
10. Measurement of evapo-transpiration.
11. Visit to nearby irrigation projects
12. Use of current meter and water meter.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. Ag. Engg.-I Sem	L	T/P/D	C
	4	-/-/-	4

(A73021) MICRO IRRIGATION ENGINEERING

Objective: To impart knowledge and skills to students to design sprinkler and drip irrigation systems to improve water productivity of different crops and to perform economic analysis and to prepare project proposals and cost estimates of Micro – Irrigation Systems.

Unit – I:

Sprinkler Irrigation Historical development, Scenario in the World, Country and State, adoptability and limitations, Components of the sprinkler system, pump set, (Centrifugal, turbines and Submersible), Main lines, Lateral lines, Sprinkler heads, Debris screens, Desilting basins, booster pumps, Take-off valves, Flow control valves (individual sprinkler). Sprinkler heads, fertigation Equipment, Types of sprinkler Irrigation systems: A. Based on mechanism: i) Rotating head system, ii) Perforated pipe system, B. Based on portability: i) Portable systems, ii) Semi-portable systems, iii) Semi-permanent systems, iv) Permanent systems and v)Solid set systems.

Unit-II:

Precipitation profiles and Moisture distribution patterns, Recommended sprinkler spacings, Effects of wind speed on working of the system, Importance of distribution uniformity, Christiansen Uniformity coefficient, Design of Sprinkler system, layout, laterals and mains: i) Inventory of Resources and Conditions, ii) Types of system and Layout, iii)Sprinkler Selection and Spacing, iv) Capacity of Sprinkler Systems, v) Hydraulic Design of Sprinkler Systems, vi) Selection of pump, Operation and maintenance of system, Field evaluation of the system, Cost analysis.

Unit – III:

Drip Irrigation, Historical development, Scenario in the World, Country and State, Advantages and Limitations, Components of drip irrigation: A. Head Control- Non return valve, Air release & Vacuum breaker, Filter, Fertigation Tank, Throttle valve, Pressure gauge, other fittings, B. Wayer carrier systems- PVC pipeline, Control valve, Flush valve, other fittings, C. Water distribution systems- Drip lateral, Drippers, Emitting pie, Grommet, Start connector, Nipple, End cap, Micro tube, Barbed connector, Drip Hydraulics, Pipe section, Water flow in pipes, Velocity recommended pressure, Pressure and Hydrostatic, Pressure due to gravity, Friction and pressure losses, Coefficient of friction.

Unit-IV:

Types of Emitters: A) Based on Floe regime (Reynolds number): i) Laminar