RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Engineering, VIII-Semester

AN801- Precision Agriculture and Management

Course Objective: To impart basic knowledge in Precision Agriculture and farming, system approach in machinery selection.

Unit 1

Precision Agriculture – need and functional requirements. Familiarization with issues relating to natural resources.

Unit II

Familiarization with equipment for precision agriculture including sowing and planting machines, power sprayers, land clearing machines, laser guided land levellers, straw-chopper, straw-balers, grain combines, etc.

Unit III

Introduction to GIS based precision agriculture and its applications. Introduction to sensors and application of sensors for data generation. Database management.

Unit IV

System concept. System approach in farm machinery management, problems on machinery selection, maintenance and scheduling of operations. Application to PERT and CPM for machinery system management

Practical:

1. Familiarization with precision agriculture.
2. Familiarization with problems and issues of precision agriculture.
3. Familiarization with various machines for resource conservation.
4. Familiarization with protected cultivation – Greenhouse, Glasshouse etc.
5. Problem solving on GIS.
6. Integrated electronic communications for Tractor and equipment's
7. Variable Rate Technology
8. Familiarization with image processing and data interpretation
9. Solving problems related to system limitation.
10. Problems related to cost analysis.
11. Problems related to inflation
12. Problems related to selection of equipment.
13. Problems related to replacement of equipment.
14. Problems related to break-even analysis.
15. Problems related to time value of money etc.
16. Problems related to PERT and CPM.

Course Outcome: Students have knowledge in precision agriculture, use of GIS based or sensor based modern equipment for precision farming, system approach in machinery selection and improve the related problem solving skills.

Suggested Readings:

1. Brahma Singh, Balraj Singh, NavedSabir and MurtazaHasan, 2014.Advances in Protected Cultivation.New India Publishing Agency, New Delhi.
2. Donell Hunt, 2013.Farm Power and Machinery Management.10th edition.MedTec Publishers, New Delhi.
3. Jana, B. L., 2008. Precision Farming.AgroTech Publishing Academy.
4. Kali CharanSahu, 2008. Text Book of Remote Sensing and Geographical Information Systems.Atlantic Publishers and Distributors Pvt Ltd.
5. K. RadhaManohar and C. Ignathinathane. 2015.Greenhouse Technology and Management. 2nd edition. B. S. Publications.
6. Robert *et.al*. 2011. Precision Farming Tools: Variable-Rate Application. Virginia Cooperative Extension. Publ. 442-505. Online Address :https://pubs.ext.vt.edu/442/442- 505/442-505_PDF.pdf
7. Zelenin, A. N., Balovnev, V. I. and Kerov, I. P. 1986.Machines for Moving the Earth. Oxian Press, New Delhi.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Engineering, VIII-Semester

Departmental Elective AN 802 (A) Ergonomics and Safety in Agriculture Engineering

UNIT I

Description of human-machine systems; ergonomics and its areas of application in the work system; history of ergonomics; modern ergonomics. Physiological parameters and their measurements;

UNIT II

Psychological and mental stresses and their measurement techniques; human energy expenditure; calibration of subjects; human workload and its assessment. Environmental heat stress and human physiology: heat stress index, skin temperature.

UNIT III

Anthropometry and its role in daily life; application of anthropometry in equipment design; human postures, postural stress and its role in design of farm machinery.

UNIT IV

Anthropometric principles in workspace and equipment design; design of manual handling tasks. Human factors in tractor seat design, entry system, controls; shape, colour coding, dial and indicators.

UNIT V

Modern technology for comfort in driving places. Safety considerations and operators protective gadgets in farm operations; Standards/ codes for tractors and agricultural machinery safety.

Suggested Readings

1. Bridger R S. Introduction to Ergonomics. CRC Press. 2009.
2. Mark S Sanders and Ernest J McCormick. Human Factors in Engineering and Design. McGraw Hill. 2000.
3. P Astrand, K Rodahl, H A Dahl and S B Stromme. Textbook of Work Physiology - Physiological Bases of Exercise. McGraw Hill. 2003.
4. L P Gite. Anthropometric and Strength Data of Indian Agricultural Workers for Farm Equipment Design. Central Institute of Agricultural Engineering, Bhopal. 2009.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Engineering, VIII-Semester

Departmental Elective AN802 (B) Management of Canal Irrigation System

Course Objectives: To familiarize the students with the canal irrigation system and to impart knowledge about the design of irrigation canal systems.

Unit I

Purpose benefits and ill effects of irrigation; typical network of canal irrigation system and its different physical components; canal classification based on source of water, financial output, purpose, discharge and alignment; canal alignment: general considerations for alignment; performance indicators for canal irrigation system evaluation.

Unit II

Estimation of water requirements for canal command areas and determination of canal capacity; water duty and delta, relationship between duty, base period and delta, factors affecting duty and method of improving duty; silt theory: Kennedy's theory, design of channels by Kennedy's theory, Lacey's regime theory and basic regime equations, design of channels by Lacey's theory, Use of Garrett's diagram

Unit III

Maintenance of unlined irrigation canals, measurement of discharge in canals, rostering (canal running schedule) and warabandhi, Seepage losses in canals- measurement – necessity of canal lining: advantages and disadvantages, types of canal lining and desirable characteristics for the suitability of lining materials; design of lined canals;

Unit IV

Functions of distributaries – head and cross regulators; canal falls, their necessity and factors affecting canal fall; sources of surplus water in canals and types of canal escapes; requirements of a good canal outlet and types of outlet.

Course Outcomes: Students have knowledge about canal irrigation system, its components, alignment and performance indicators; and knowledge about the estimation of water requirement of crops grown in command areas, to design irrigation canal systems.

Suggested Readings:

1. Arora, K.R. 2001.Irrigation, Water Power and Water Resources Engineering. Standard Publishers Distributors, Delhi.
2. Garg S. K. 2014. Irrigation Engineering and Hydraulic Structures, Khanna Publishers New Delhi.
3. Sahasrabudhe SR. 2011. Irrigation Engineering and Hydraulic structures.SK Kataria& Sons Reprint 2015.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Engineering, VIII-Semester

Departmental Elective AN802 (C) Drainage Engineering

UNIT I

Water logging- causes and impacts; drainage, objectives of drainage, familiarization with the drainage problems of the state; surface drainage coefficient, types of surface drainage.

UNIT II

Desig n of surface drains; sub-surface drainage: purpose and benefits, investigations of design parameters - hydraulic conductivity, drainable porosity, water table.

UNIT III

Derivation of Hooghoudt's and Ernst's drain spacing equations; design of subsurface drainage system.

UNIT IV

Drainage materials, drainage pipes, drain envelope; layout, construction and installation of drains; drainage structures; vertical drainage; b io- drainage; mole drains; salt balance.

UNIT V

Reclamation of saline and alkaline soils, leaching requirements, conjunctive use of fresh and saline water.

Suggested Readings:

1. Luthin. J.N. 1966, Drainage Engineering, John Wiley and Sons, New York.
2. Michael, A.M and Ojha T.P. 2015. Principles of Agricultural Engineering, Volume II, Jain Brothers Publication New Delhi.
3. Murthy, V.V.N. 1998, Land and water management, Kalyani publishing, New Delhi.
4. Bhattacharya AK and Michael AM. 2013. Land Drainage, Principles , Methods and Applications. Vikas Publication House, Noida (UP)
5. Ritzema H.P.1994 Drainage Principles and Applications, ILRI Publication 16, Second Edition (Completely Revised)

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Engineering, VIII-Semester

Departmental Elective AN802 (D) Food Plant Design and Management

Course Objective: To acquaint and equip the students with the design features of food processing equipments in the food industries.

Unit I
Food plant location, selection criteria, Selection of processes, plant capacity, Requirements of plant building and its components, Project design, flow diagrams, selection of equipment, process and controls, Objectives and principles of food plant layout.

Unit II
Salient features of processing plants for cereals, pulses, oilseeds, horticultural and vegetable crops, poultry, fish and meat products, milk and milk products. Introduction to Finance, Food Product Marketing, Food Business Analysis and Strategic Planning.

Unit III
Introduction to Marketing, Food Marketing Management, Supply chain management for retail food products, Entrepreneurship development in food industry, SWOT analysis, generation, incubation and commercialization of ideas and innovations, New product development process,

Unit IV
Government schemes and incentive for promotion of entrepreneurship, Govt. policy on small and medium scale food processing enterprise, export and import policies relevant to food processing sector, procedure of obtaining license and registration under FSSAI, Cost analysis and preparation of feasibility report.

Course Outcome: Students have knowledge about the design features of different food processing equipments used in the food industries and also have an idea about the plant layout.

Suggested Readings:

1. Lopez Antonio. Gomez. 2005. Food Plant Design.
2. James,M.More.1976. Plant Layout and Design. MacMillian Publishing Co., NewYork.
3. Geankoplis,C.J.1997. Transport processes and Unit operations, Prentice Hall of IndiaPublication, New Delhi
4. Jowitt, R.(Ed.), 1980. Hygienic Design and Operation of Food Plant. Ellis Horwood, Chichester.
5. Slade,F.H.1967. Food processing plant. Leonardhill Books, London.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Engineering, VIII-Semester

Open Elective AN803 (A) Entrepreneurship in Agriculture

UNIT I

Entrepreneurship, management – Management functions – planning- Organizing -Directing – motivation – ordering – leading – supervision-Communication and control – Capital – Financial management – importance of financial statements – balance sheet – profit and loss statement, Analysis of financial statements – liquidity ratios – leverage ratios, Coverage ratios – turnover ratios– profitability ratios.

UNIT II

Agro -based industries – Project – project cycle – Project appraisal and evaluation techniques – undiscounted measures – payback period – proceeds per rupee of outlay, Discounted measures – Net Present Value (NPV) – Benefit-Cost Ratio (BCR) – Internal Rate of Return (IRR) – Net benefit investment ratio (N / K ratio) – sensitivity analysis-Importance of agribusiness in Indian economy International trade-WTO agreements – Provisions related to agreements in agricultural and food commodities.

UNIT III

Agreements on agriculture (AOA) – Domestic supply, market access, export subsidies agreements on sanitary and phyto -sanitary (SPS) measures, Trade related intellectual property rights (TRIPS). Concept of entrepreneur and entrepreneurship. Assessing overall business environment in Indian economy– Entrepreneurial and managerial characteristics.

UNIT IV

Entrepreneurship development Programmes (EDP)- Generation incubation and commercialization of ideas and innovations- Motivation and entrepreneurship development. Managing an enterprise: Importance of planning, budgeting, monitoring evaluation and follow -up managing competition. Role of ED in economic development of a country.

UNIT V

Economic system and its implications for decision making by individual entrepreneurs- Social responsibility of business. Morals and ethics in enterprise management- SWOT analysis- Government schemes and incentives for promotion of entrepreneurship. Government policy on small and medium enterprises (SMEs)/SSIs/MSME sectors - Venture capital (VC), contract farming (CF) and joint ventures (JV), public -private partnerships (PPP)- Overview of agricultural industry and their characteristics

Suggested Readings:

1. Harsh, S.B., Conner, U.J. and Schwab, G.D. 1981. Management of the Farm Business. Prentice Hall Inc., NewJersey.
2. Omri Rawlins, N. 1980. Introduction to Agribusiness. Prentice Hall Inc., New Jersey
3. Gittenger Price, J. 1989. Economic Analysis of Agricultural Projects. John Ho pkins University, Press, London.
4. Thomas W Zimmer and Norman M Scarborough. 1996. Entrepreneurship. Prentice -Hall, New Jersey.
5. Khanka S S. 1999. Entrepreneurial Development. S. Chand and Co. New Delhi.
6. Mohanty S K. 2007. Fundamentals of Entrepreneurship. Prentice Hall India Ltd., New Delhi.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Engineering, VIII-Semester

Open Elective AN803 (B) Farm Machinery Management

UNIT I

Importance and objectives of farm mechanization in Indian Agriculture, its impact, strategies, myths and future needs. Estimation of operating cost of tractors and farm machinery.

UNIT II

Management and performance of power, operator, Labour. Economic performance of machinery, field capacity, field efficiency and fact ors affecting field efficiency.

UNIT III

Tractor power performance in terms of PTO, drawbar and fuel consumption. Power requirement problems to PTO, DBHP. Selection of farm machinery, size selection, timeliness of operation, optimum width and problem related to its power selection; selecting proper power level and problems related to it.

UNIT IV

Reliability of agricultural machinery. Replacement of farm machinery and inventory control of spare parts. Systems approach to farm machinery management and application of programming techniques to farm machinery selection and scheduling.

UNIT V

Network Analysis: Transportation, CPM & PERT, Dynamic programming, Markovchain.

Suggested Readings:

1. Hunt, D, Farm Power and Machinery Management, Iowas State University Press, USA, 1979
2. Kapoor V.K. Operation Research: Concepts, Problems and Solutions by Sultan Chand & sons-2012
3. Culpin, C, Profitable farm mechanization, Lock Wood & Sons, London, 1996
4. Singh, S. and Verma, S.R. Farm Machinery Maintenance and Management. DIPA, ICAR, KAB-I, New Delhi.
5. Carveille, L.A. (1980). Selecting farm machinery. Louisiana Cooperative Extn. Services publication
6. FAO (1980). Agricultural Engineering in develop: selection of mechanization inputs, FAO, Agri service Bulletin

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Technology, VIII-Semester

Open Elective AN803 (C) Remote Sensing & GIS Application

UNIT I

Basic component of remote sensing (RS), advantages and limitations of RS, possible use of RS techniques in assessment and monitoring of land and water resources; electromagnetic spectrum, energy interactions in the atmosphere and with the Earth's surface; major atmospheric windows.

UNIT II

Principal applications of different wavelength regions; typical spectral reflectance curve for vegetation, soil and water; spectral signatures; different types of sensors and platforms; contrast ratio and possible causes of low contrast; aerial photogr aphy ; types of aerial photographs, scale of aerial photographs, planning aerial photography- end lap and side lap.

UNIT III

Stereoscopic vision, requirements of stereoscopic photographs; air -photo interpretation - interpretation elements; photogrammetry measurements on a single vertical aerial photograph, measurements on a stereo- pair-vertical measurements by the parallax method; ground control for aerial photography.

UNIT IV

Satellite remote sensing, multispectral scanner - whiskbroom and push-broom scanner; different types of resolutions; analysis of digital data - image restoration; image enhancement; information extraction, image classification, unsupervised classification, supervised classification, important consideration in the identification of training areas, vegetation indices; microwave remote sensing.

UNIT V

GI Sand basic components, different sources of spatial data, basic spatial entities, major components of spatial data, Basic classes of map projections and their properties, Methods of data input into GIS, Data editing, spatial data models and structures, Attribute data management, integrating data (map overlay) in GIS, Application of remote sensing and GIS for the management of land and water resources.

Suggested Readings:

1. Reddy Anji, M. 2006. Textbook of Remote Sensing and Geographical Information Systems. BS Publications, Hyderabad.
2. Elangovan, K. 2006. GIS Fundamentals Applications and Implementations. New India Publication Agency, New Delhi.
3. George Joseph. 2005. Fundamentals of Remote Sensing. 2nd Edition. Universi ties Press (India) Private Limited, Hyderabad.
4. Jensen, J.R. 2013. Remote Sensing of the Environment: An Earth Resource Perspective. Pearson Education Limited, UK.
5. Lillesand, T., R.W. Kiefer and J. Chipman. 2015. Remote Sensing and Image Interpretation. 7th Edition, John Wiley and Sons Singapore Pvt. Ltd., Singapore.
6. Sabins, F.F. 2007. Remote Sensing: Principles and Interpretation. Third Edition, Waveland Press Inc., Illinois, USA.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Technology, VIII-Semester

Open Elective AN803 (D) Tractor Design and Testing

Course Objective: To impart knowledge about traction, design of an agricultural tractor and its components and knowledge in testing and evaluation of tractor.

Unit I

Introduction to procedure for design and development of agricultural tractors. Traction theory-Traction mechanism. mechanics of traction devices. Kinematics and dynamic aspects of Rolling elements. Tire selection. Traction devices for wet lands. Mechanics of traction-Traction performance. Tread design- traction improvements. Mechanics of tractor chassis – Static equilibrium analysis. Centre of gravity & moment of inertia.

Unit II

Tractor Engine - Parameters affecting design of tractor engine-General design considerations. Design of engine components. Design of fuel injection system, lubrication system, cooling system and ignition system. Design of mechanical power transmission in agricultural tractors. Friction brakes and clutches. Design of Ackerman Steering and tractor hydraulic steering. Mechanics of steering & front suspension.

Unit III

Hydraulic systems & controls – basic principles, components and symbols. Flow and circuit analysis, motors, actuators, valves, hydraulic fluids and controls. Draft sensing, automatic control, power steering. Hydraulic circuit design. Hitches, hitching and weight transfer. Force and moment relations for a tractor when pulling an implement, control of hitches.

Unit IV

Human factors in tractor design - environmental factors, noise, and vibration. Operator – machine interface, Design aspects of foot and hand controls, rollover protection, thermal comfort and safety. Operator's seat. Pollution control technologies.

Course Outcome: Students understand the mechanics and factors affecting traction, have knowledge about components such as engine, transmission system, fuel system, lubrication system, cooling system, hydraulic system and controls and the ergonomics in tractor design; and knowledge in the problem solving skills related to tractor stability.

References:

1. Liljedahl J B, Turnquist P K, SmithD W, and Hoki M.(1996), Tractors and Their Power Units, CBS Publishers & Distributers.
2. Mehta ML, SR Verma, SK Mishra, VK Sharma.(2010), Testing & Evaluation of Agricultural Machinery.
3. Pandey, M M& Others.(2013), Handbook of Agricultural Engineering, Indian Council of Agricultural Engineering, New Delhi.
4. Raymond N Y, EEzzat A F and Nicolas Skiadas.(1984), Vehicle Traction Mechanics, Elsevier Science Publishers B V, New York.
5. Sharma, D N and Mukesh, S.(2010), Design of Agricultural Tractor- Principles and problems,Jain brothers, New Delhi.
6. William R G and Vanden Berg G E. (1968), Soil Dynamics in Tillage and Traction, Agricultural Research Service, USA.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Agriculture Technology, VIII-Semester

AN804 Web Designing

Practical Schedule:

1. DREAM WEAVER: Exploring Dreamweaver Interface
2. Planning & Setting Web Site Structure
3. HTML tags
4. JAVA SCRIPT: Working with variables, operators
5. Understanding loop, while loop
6. For loop
7. alert, confirm and prompt
8. Creating rollover image
9. Gif animation: Understanding gif animation interface, Knowing GIf file format
10. Gif animation: Creating basic web banners, Creating web banners with effects
11. Creating animated web buttons.
12. Learning to use FTP
13. Setting FTP
14. Uploading of site
15. Project

Suggested Readings:

1. Dan Donault et al., ASP 3.0 Programmers Reference, Wrox Press. Frainand Ben. Responsive Web Design with HTML5
2. George Q. Huang, K. L Mak. Internet Applications in Product Design and Manufacturing. ISBN:3540434658.
3. Jennifer Niederst Robbins. Developing web design latest edition. Nicholas c.Zakas.Java Script for Web Developers.