



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

-----AGRICULTURAL ENGINEERING-----

Semester/Year		VII/IV		Program		B.Tech				
Subject Category		DE-VII		Subject Code: AG-1881 (A)		Subject Name:		Processing Technology of Fruits and Vegetables		
Maximum Marks Allotted										
Theory			Practical			Contact Hours			Total Credits	
End Sem		Mid-Sem	Quiz	End Sem	Lab-Work	Total Marks	L	T		P
70		20	10			100	3	-	-	3
Prerequisites:										
Course Objective:										
At the end of this course, the student will be thorough in various methods of processing, preservation and storage of fruits and vegetables using latest technologies.										
Course Outcomes:										
After completion of the course, the student will be able to:										
<ol style="list-style-type: none"> 1. To understand the basics of Post Harvest Technology of fruits and vegetables through their structure and composition 2. To study the different methods of processing and preservation of fruits and vegetables including drying and dehydration 3. To learn the latest methods of storage of fruits and vegetables 										
UNITS	Descriptions						Hrs.	CO's		
I	STRUCTURE, COMPOSITION, RIPENING AND SPOILAGE Importance of post harvest technology of horticultural crops – post harvest losses – factors causing losses - structure, cellular components, composition and nutritive value of horticultural crops – fruit ripening – mechanism and equipment - spoilage of perishable commodities – mechanism and factors causing spoilage.						7	CO1		
II	CLEANING, GRADING AND ON-FARM PROCESSING Harvesting and washing of fruits and vegetables – cleaning and grading – fruits and vegetables -peeling - equipments – construction and working – pre-cooling – importance, methods, pretreatments and advantages.						8	CO2		
III	PRESERVATION OF FRUITS AND VEGETABLES Thermal and non-thermal techniques of preservation of fruits and vegetables and their products -methods - minimal processing of horticultural commodities – fruits and vegetables, advantages -quick freezing preservation - commercial canning of fruits, vegetables and other perishable commodities – processing and concentration of juice - membrane separation process and application - hurdle technology of preservation and techniques						9	CO2		
IV	DRYING AND DEHYDRATION						8	CO2		

	Dehydration of fruits and vegetables – types of dryers, construction and working - methods –fluidized bed dryer, freeze drying, osmotic dehydration and foam mat drying – principles, construction, operation and applications - quality parameters and advantages.		
V	STORAGE Storage of fruits and vegetables – storage under ambient conditions, low temperature storage, evaporative cooling – cold storage of horticultural commodities – estimation of cooling load -controlled atmosphere storage – concept and methods – modified atmosphere packaging – gas composition, quality of storage – waxing of fruits – types of wax, equipment and advantages.	8	CO3
Guest Lectures (if any)			
Total Hours		40	
Suggestive list of experiments:			
Text Book-			
Reference Books-			
<ol style="list-style-type: none"> 1. U.D. Chavan and J.V. Patil. 2013. Industrial Processing of Fruits and Vegetables. Astral International Pvt. Ltd., New Delhi. 2. S. Rajarathnam and R.S. Ramteke. 2011. Advances in Preservation and Processing Technologies of Fruits and Vegetables. New India Publishing Agency, New Delhi. 3. Y.H. Hui. 2006. Handbook of Fruits and Fruit Processing. Blackwell Publishing Ltd., Oxford,UK. 4. W.V. Cruess. 2004. Commercial Fruit and Vegetable Products. Agrobios India, Jodhpur. 5. Y. H. Hui, Sue Chazala, Dee M. Graham, K.D. Murrell and Wai-Kit Nip. 2004. Handbook of Vegetable Preservation and Processing. Marcel Dekker, Inc., NY, USA. 			
Modes of Evaluation and Rubric			
Quiz, Assignment, Mid-term exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.			
List/Links of e-learning resource			
Recommendation by Board of studies on		08.06.2023	
Approval by Academic council on			
Compiled and designed by			
Subject handled by department			



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-----AGRICULTURAL ENGINEERING-----

Semester/Year		VI/III	Program		B.Tech					
Subject Category	DE-VIII	Subject Code:	AG-1881(B)	Subject Name:	Special Farm Equipment					
Maximum Marks Allotted						Contact Hours			Total Credits	
Theory			Practical		Total Marks	L	T	P	3	
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		3	-	-		
70	20	10	-	-	150				3	
Prerequisites:										
Course Objective:										
To study the special machineries used for agricultural applications										
Course Outcomes:										
<ol style="list-style-type: none"> 1. Know about the farm machineries used in agricultural production 2. Know about construction, operation of different machines 3. Know about the operating parameters and performance of the machines 										
UNITs	Descriptions						Hrs.	CO's		
I	MOWERS AND WEEDING EQUIPMENT Weeding and intercultural equipment. Junior hoe, guntaka, blade harrow, rotary weeders for upland and low land, selection, constructional features and adjustments, Spading machine, coir pith applicators, Mower mechanism, lawn mowers.						8	CO1		
II	SPRAYERS AND DUSTERS Sprayers – Sprayer operation, boom sprayer, precaution, coverage, factors affecting drift. Rotating disc sprayers, Controlled Droplet Application (CDA), Electrostatic sprayers, Areal spraying, Air assist sprayers, orchard sprayers. Dusters - types - mist blower cum duster other plant protection devices, care and maintenance.						8	CO1, CO2, CO3		
III	REAPERS AND HARVESTERS Construction and adjustments - registration and alignment. Windrowers, reapers, reaper binders and forage harvesters. Diggers for potato, groundnut and other tubers. Sugarcane harvesters - cotton pickers - corn harvesters - fruit crop harvesters – vegetable harvesters						8	CO1, CO2, CO3		
IV	THRESHERS AND OTHER MACHINERIES Thresher – construction and working of multi crop thresher. Forest machinery - shrub cutters, tree cutting machines. post hole diggers, Chaff cutter, flail mowers, lawn mowers, tree pruners						8	CO1, CO2, CO3		
V	SPECIALIZED FARM EQUIPMENT Pneumatic planters, air seeders, improved ploughs, reversible ploughs, suction traps, seed and fertilizer broadcasting devices,						8	CO1, CO2, CO3		

	manure spreaders, sweep weeders, direct paddy seeders, direct paddy cum daincha seeder, coconut tree climbing devices, tractor operated hoist, tractor operated rhizome planter, Transplanters and Balers		
Guest Lectures (if any)			
Total Hours		40	
Suggestive list of experiments:			
<ol style="list-style-type: none"> 1. Study of sprayers and dusters, measurement of nozzle discharge, field capacity etc. 2. Familiarization with various Farm machines related to harvesting, threshing, root harvesting, combine etc. 3. Study of various types of mowers, constructional details, materials and working. 4. Study of various types of reaper and reaper binder, constructional details, materials and working & performance. 5. Study of various types of threshers, constructional details, materials and working & performance. 6. Study of various types of harvester tools, constructional details, materials and working. 7. Study of various types of combine harvester, constructional details, materials and working. 			
Text Book-			
<ol style="list-style-type: none"> 1. Jagdishwar Sahay. 2010. Elements of Agricultural Engineering. Standard Publishers Distributors, Delhi 2. Michael and Ojha. 2005. Principles of Agricultural Engineering. Jain brothers, New Delhi. 			
Reference Books-			
<ol style="list-style-type: none"> 1. Kepner, R.A., et al. 1997. Principles of farm machinery. CBS Publishers and Distributers, Delhi. 2. Harris Pearson Smith et al. 1996. Farm machinery and equipments. Tata McGraw-Hill pub., New Delhi. 3. Srivastava, A.C. 1990. Elements of Farm Machinery. Oxford and IBH Pub. Co., New Delhi 			
Modes of Evaluation and Rubric			
Quiz, Assignment, Mid-term exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.			
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-----AGRICULTURAL ENGINEERING-----

Semester/Year		VIII/IV	Program		B.Tech				
Subject Category	DE-VII	Subject Code:	AG-1881 (C)	Subject Name:	Mechanics of Tillage and Traction				
Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		Total Marks	L	T	P	
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work					
70	20	10			100	3	-	-	3
Prerequisites:									
Course Objective:									
<ol style="list-style-type: none"> 1. To impart the fundamental knowledge of mechanics and dynamics in various tillage implements 2. To study the tyres, traction and its applications 									
Course Outcomes:									
After completion of the course, the student will be able to:									
<ol style="list-style-type: none"> 1. After completion of the course, the students will be able to understand the concepts of mechanics, dynamics and traction of implements and their applications. 									
UNITs	Descriptions					Hrs.	CO's		
I	MECHANICS OF TILLAGE Introduction to mechanics of tillage tools, engineering properties of soil, principles and concepts, stress strain relationship,					7			
II	DYNAMICSOFTILLAGE Design of tillage tools principles of soil cutting, design equation, force analysis, application of dimensional analysis in soil dynamics performance of tillage tools					8			
III	TRACTION Introduction to traction and mechanics, off road traction and mobility, traction model, traction improvement, traction prediction					9			
IV	TYRES Tyre size, tyre lug geometry and their effects, tyre testing					8			
V	APPLICATIONS Soil compaction and plant growth, variability and geo statistics, application of GIS in soil dynamics.					8			
Guest Lectures (if any)									
Total Hours						40			
Suggestive list of experiments:									
1.									
Text Book-									
1. Klenin, N.L.; Popov, I.F. and V.A. Sakum, (1985). Agricultural machines. Amerind Pub.									

Co. NewYork	
2. J. B. Liljedahl, P. K. Turnquist, D. W. Smith, & M. Hoki , 1996. Tractors and their power units. Fourth ed. American Society of Agricultural Engineers, ASAE	
3. Kepner, R. A., Roy Bainer and E. L. Barger. 1978. Principles of farm machinery. Third edition; AVI Publishing Company Inc: Westport, Connecticut	
Reference Books-	
1. Ralph Alcock.1986. Tractor Implements System. AVI Publ.	
2. S. C. Jain, Farm Machinery- An Approach	
Modes of Evaluation and Rubric	
Quiz, Assignment, Mid-term exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.	
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-----**AGRICULTURAL ENGINEERING**-----

Semester/Year		VIII/IV		Program		B.Tech				
Subject Category	OC-V	Subject Code:	AG-1882(A)	Subject Name:	Remote Sensing And Geographical Information System					
Maximum Marks Allotted						Contact Hours			Total Credits	
Theory			Practical		Total Marks	L	T	P	3	
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		3	-	-		
70	20	10			100					
Prerequisites:										
Course Objective:										
<ol style="list-style-type: none"> To introduce the principles and basic concepts of Remote Sensing and GIS To introduce the remote sensing systems, data products and analysis To introduce the spatial data models, analysis and presentation techniques To study the applications of Remote Sensing and GIS in agriculture, soil and water resources 										
Course Outcomes:										
After completion of the course, the student will be able to:										
<ol style="list-style-type: none"> The students will understand the remote sensing principles, remote sensing systems satellite data processing and available data products. The students will understand decision making process using DBMS and utilization of these advanced techniques in addressing the real world problems. 										
UNITs	Descriptions						Hrs.	CO's		
I	CONCEPTS OF REMOTE SENSING AND SATELLITES Definition- Historical background - Components of remote sensing – Energy source, electromagnetic spectrum, radiation principle, platforms and sensors - Active and passive remote sensing interference - Atmospheric effects on remote sensing – Energy interaction with earth surface feature - Data acquisition - Reflectance, spectral signatures for water, soil and vegetation.- Satellites - Types - Sun synchronous - Geo synchronous remote sensing satellites - LANDSAT, SPOT & IRS - Resolution - Spectral, spatial, radiometric and Temporal resolution -Recent satellites with its applications						7			
II	DATA PRODUCTS AND IMAGE ANALYSIS Data products –based on level of processing- o/p – scale – area/coverage – data availability –data ordering- data price - Image interpretation – Visual interpretation elements – interpretation key. Digital image processing – Image enhancement – image classification – Supervised and						8			

	unsupervised – Vegetation Indices.		
III	CONCEPTS OF GIS Definition – Map and their influences – Characteristics of Maps – Elements – Map scale, Projection, Coordinate systems – Sources of spatial data – History and development of GIS – Definition – Components – Hardware and Software.	9	
IV	DATA INPUT AND ANALYSIS Data – Spatial, Non-Spatial – Database models – Hierarchical network, Relational and Object Oriented Data Models – Raster and Vector – Methods of Data input – Data Editing – Files and formats – Data structure – Data compression. Introduction to analysis – Measurements – Queries – Reclassification – Simple spatial analysis – Buffering – Neighboring functions – Map overlay – Vector and raster – Spatial interpolation – Modelling in GIS – Digital Elevation Modelling – Expert systems	8	
V	APPLICATION OF RS AND GIS Crop Acreage estimation - Estimation of Crop Water Requirement – Crop condition - Soil mapping– classification of soil with digital numbers – soil erosion mapping- reservoir sedimentation using image processing - Inventory of water resources – water quality assessment - Application of Remote Sensing and GIS in Precision Agriculture - Monitor Crop Health - Management Decision Support Systems	8	
Guest Lectures (if any)			
Total Hours		40	
Suggestive list of experiments:			
2.			
Text Book-			
<ol style="list-style-type: none"> Anji Reddy. M, Remote Sensing and Geographical Information Systems, BS Publications, Hyderabad, 2001 Lillesand, T. M., and Kiefer, R.W., Remote Sensing and Image Interpretation, John Wiley and Sons, New York, 2000. 			
Reference Books-			
<ol style="list-style-type: none"> Bettinger, P., and Michael, G.W., “Geographical Information System: Applications in Forestry and Natural Resources Management,” Tata McGraw–Hill Higher Education, New Delhi, 2003 Ian Heywood., “An Introduction to GIS”, Pearson Education, New Delhi, 2001. Jeffery Star and John Estes, “Geographical Information System – An Introduction,” Prentice Hall India Pvt. Ltd., New Delhi, 1998. Patel A.N & Surendra Singh, “Remote sensing principles & applications”, Scientific Publishers , Jodhpur 1992 			
Modes of Evaluation and Rubric			

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
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Semester/Year		VIII/IV	Program		B.Tech				
Subject Category	OC-V	Subject Code:	AG-1882 (C)	Subject Name:	Gully And Ravine Control Structures				
Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		Total Marks	L	T	P	
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work					
70	20	10			100	3	-	-	3
Prerequisites:									
Course Objective:									
Course Outcomes:									
After completion of the course, the student will be able to:									
UNITs	Descriptions					Hrs.	CO's		
I	Introduction; floods - causes of occurrence, flood classification - probable maximum flood, standard project flood.					7			
II	Design flood, flood estimation - methods of estimation; estimation of flood peak – Rational method, empirical methods, Unit hydrograph method.					8			
III	Statistics in hydrology, flood frequency methods - Log normal, Gumbel' s extreme value, Log-Pearson type-III distribution; depth-area-duration analysis.					9			
IV	flood forecasting, flood routing – channel routing, Muskingum method, reservoir routing, modified Pul' s method; flood control - history of flood control, structural and non-structural methods of flood control measures.					8			
V	storage and detention reservoirs, levees, channel improvement; Gulley erosion and its control; soil erosion and sediment control measures; river training works, planning of flood control projects and their economics.					8			
Guest Lectures (if any)									
Total Hours						40			
Suggestive list of experiments:									
1.									
Text Book-									
1. Dhruvanarayana, V. V. (1993). Soil and Water Conservation Research in India. ICAR, New Delhi.									
2. Goldman, S. J, Jackson K. and Bursztynsky, T. A. (1986). Erosion and Sediment Control Handbook. McGraw- Hill Book Company.									

3. Murthy, V.V.N. (1998). Land and Water Management. Kalyani Publishing, New Delhi.	
Reference Books-	
1. Suresh, R. (1997). Soil and water Conservation Engineering. Standard Publishers and Distributors.	
2. USBR. (1978). Design of Small Canal Structures. U S Bureau of Reclamation.	
3. USBR. (1987). Design of Small Dams. US Bureau of Reclamation.	
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