COURSE OUTCOMES (CO)

(Agricultural Engineering)

Course No.	Course Title	Course Outcomes
BS 111	Mathematics - I	Expand function in Taylor's and Maclaurin's series The student will be able to apply the partial differentiation to compute the minima and maxima of functions of two variables. The student will be able compute areas and volumes by integration. Solve linear differential equations of higher order and homogenous differential equations with constant coefficients.
ME 113	Mechanical Engg.	
ME 114	Workshop Practice	
CE 115	Engineering Drawing	Select, Construct and Interpret appropriate drawing scale as per the situation. Draw simple curves like ellipse, cycloid and spiral. Draw Orthographic projections of points, lines and planes. Draw orthographic projection of solids like cylinders, cones, prisms and pyramids including sections. Layout development of solids for practical situations. Draw isometric projections of simple objects.
BS 100P	Engineering Physics	Apply vector calculus approach to problems in electric field and magnetic field. Apply laws of physics to simple LRC circuits. Learn physics behind various types of lasers and their characteristics. Understand the interference and diffraction from wave optics concepts and know its applications. Understand polarization of light and its applications
CE 100	Engineering Mechanics	Draw free body diagrams and determine the resultant of forces and/or moments. Determine the centroid and second moment of area of sections. Apply laws of mechanics to determine efficiency of simple machines with consideration of friction. Analyse statically determinate planar frames. Analyse the motion and calculate trajectory characteristics. Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies.
EE 100	Electrical Engg. - I	Solve DC networks. Apply fundamentals to solve the single phase AC circuits. Solve three phase AC circuit problems. Apply principles to determine parameters for single phase transformer. Identify and select appropriate type of instrument for measurement of electrical quantities.
ENVS 100	Environmental Studies	Develop an understanding of different natural resources including renewable resources. Realize the importance of ecosystem and biodiversity for maintaining ecological balance. Develop an

		understanding of environmental pollutions and hazards due to engineering/technological activities and general measures to control them. Demonstrate an appreciation for need for sustainable development and role of science. Aware of important acts and laws in respect of environment.
BS 100C	Engineering Chemistry	Demonstrate knowledge of science behind common impurities in water and methods to treat them. Knowledge of methods to determine the calorific value of fuels, perform flue gas analysis and combustion analysis. Apply the science for understanding corrosion and its prevention. Demonstrate a knowledge of superconducting and organic electronic materials.
EC 100	Electronics and Instrumentation	Characterize passive electronic components. Characterize diodes and transistors. Give a simple circuits for amplifiers and oscillators. Design power supplies with regulated output. Identify and select appropriate type of transducer for measurement of different quantities.
CS 100	Introduction to Computer Programming and Data Structure	Understand the basic building blocks of a computer. Learn different systems and codes to represent numbers in computers and be able to convert the numbers from one system to another. Learn the data types and syntax of C language. Write, compile and execute programs in C language for solving engineering problems. Demonstrate capability to choose appropriate type of data structures and perform operations on them.
BS 100E	English and Communication Skill	Understand basic grammar principles and be able to synthesise and transform sentences. Write CVs, letters for job application, complaints and emails. Prepare technical reports and short essays. Learn phonetic symbols and use correct sound, stress and intonation. Learn basic do's and don'ts of an interview. Show enhance communication ability in English.
BS 121	Mathematics - II	Show knowledge of vector calculus and its applications in engineering. Solve second order differential equations for application in their field of engineering. Solve partial differential equations of first order and higher orders (with constant coefficients). Solve simultaneous equations by matrix methods. Determine eigenvalues and eigenvectors. Diagonalise a matrix and invert a matrix.
CE 122	Civil Engineering	Demonstrate knowledge of various surveying methods.Conduct a chain survey. Conduct a compass survey. Conduct levelling survey and be able to do RL calculations. Demonstrate knowledge of properties of various building materials.
ME 123	Machine Drawing - I	
ME 124	Workshop Technology	
	NCC/NSS/NSO[1]	

[1] NCC/NSS/NSO is compulsory and the student will be assessed as satisfactory/ unsatisfactory at the end of IV semester.

Course No.	Course Title	Course Outcomes
BS 211	Mathematics - III	Learning Different Types Of Interpolation Formulas . Gaining Knowledge About Various Operators, Their Properties And Applications. Getting Knowledge Of Laplace Transform , Which Is Useful For Differential Equations.
CE 211	Strength of Materials	After completion of this course a student will be able to analyze the behavior of simple structural elements under simple loadings
PF 212	Introductory Food Engineering	To acquaint the students with various aspects of food engineering such as mass and energy balance, fluid flow, heat transfer and psychrometry
AG 213	Fundamentals of Agriculture	This course enable the Ag. Engg. Graduates to identify problematic soils and water and also basics of cereal and horticultural crop production
EE 213	Electrical Engineering - II	CO1:Understand of Characteristics D.C. Generators and Motors, Starting and Speed Control of Motors CO2: Understand Phasor Diagram and Equipment Circuits, Regulation, Efficiency and Their Determination. CO3: Comprehended Poly-Phase Induction Motors-Starters, Equivalent Circuit. Speed Control By Rotor Resistance, Pole Changing and Cascading. CO4: Understand Alternator- Calculation of Induced E.M.F, factors affecting Generating E.M.F. Open Circuit, Short Circuit and Load Characteristics and Synchronous Motor Starting. Application in industries
FM 214	Farm Power	The students will be able to learn about different sources of farm power, construction and functioning of CI and SI engines, IC engine fuels, Coolants, anti freeze and anti corrosion materials
ME 215	Heat and Mass Transfer	CO1:Thermal Engineering CO2:Understanding of conduction heat transfer from different surfaces. CO3:Knowledge of free and forced convective heat transfer. CO4:Introduction of Insulations and Heat Exchangers. CO5:Basic knowledge of theories of radiant heat transfer and radiaon exchange between different surfaces.
SW 216	Hydrology	To give an exposure to the students about the climatic parameters and their analysis to study direct and indirect effect on agriculture scenario of particular area, giving main focus on water availability, distribution and circulation.
CE 221	Fluid Mechanics	To impart the knowledge of properties of fluid, hydro-statics and kinematics of fluid flow
CE 222	Surveying	To impart the knowledge of basic principles of surveying, different types of surveying and applications
CE 223	Soil Mechanics	To impart the knowledge of basic properties of soil, analysis of stresses, bearing capacity of soil etc

ME 224	Theory and Design of Machines	CO1:Mechanisms and their motions under different degrees of freedom CO2:Transmission through Gears: mechanism, gear trains, classification and analysis, familiarity with gear standardization. CO3:Power transmission through belts and chains, mechanisms, materials CO4: Storage of mechanical energy and use of friction. CO5:Designing shafts, springs, joints and couplings
SW 225	Soil and Water Conservation Engineering	To have understanding about the degradation of productive soil globally and its effect thereon, also to know about the causes about water scarcity and their solution to fight against the evil effects through soil and water conservation technologies.
PF 226	Food Process Engineering	To acquaint the students with various operations of food processing such as cleaning, grading, size reduction, mixing, filtration and material handling
FM 227	Farm Machinery and Equipment - I	To identify the need of farm mechanization in India. Also equip the students with technical knowledge and skills required for the operation, maintenance and evaluation of Tillage, Sowing and intercultural operational machinery needed for agricultural farms. To abreast the students with mathematical, experimental and computational skills for solving different field problems. To develop skills in the students required to develop and modification of indigenous farm machines as per the need of the area and farmers
FM 228	Field Operations and Maintenance of Tractors	The student will acquire knowledge regarding makes and models of tractors, different systems and periodic maintenance tractors, tractor driving with and without two wheeled trailer and about driving safety rules
	NSS/NCC/NSO[2]	

[2] NSS/NCC/NSO is compulsory and the student will be assessed as satisfactory/ unsatisfactory at the end of IV semester.

Note: *Students have to undergo a practical training of 30 days at the end of IV semester during summer break for which the assessment will be made at the beginning of the next semester.*

Course No.	Course Title	Course Outcomes
FM 311	Farm Machinery and Equipment - II	To identify the need of timely harvesting of crops in India. Also equip the students with technical knowledge and skills required for the operation, maintenance and evaluation of harvesting, threshing and land preparation (heavy) machinery needed for agricultural farms. To abreast the students with mathematical, experimental and computational skills for solving different field problems. To develop skills in the students required to develop and modification of indigenous harvesting machines/methods as per the need of the area and farmers Also to give a brief introductory idea of importance of testing of agricultural machines and tractors.
RS 312	Renewable Energy Sources	After completion of the course, every student is exposed to various wastes recycling and renewable energy based efficient technologies. Practical exposure to analyse basic parameters of waste and waste management techniques is also provided.
ME 313	Refrigeration and Air Conditioning	Introduction of basic principle of different refrigerating systems. Understanding the effect of different components on the refrigerating machines. Knowledge of different Refrigerants and Refrigeration Equipments. Introduction of Psychrometry and different Psychrometry processes. Designing of airconditioning system and Estimation of airconditioning load.
PF 314	Post Harvest Engineering	To acquaint the students with various post harvest operations of cereal, pulses and oil seeds.
SW 315	Wells and Pumps	To enable the students to know about the ground water potential, its dynamic behaviour and exploration manual and mechanically.
CE 316	Design of Structures	To impart the knowledge of design of simple concrete structure and steel structures
CE 317	Construction Technology	To impart the knowledge of construction technology and estimation of quantities of various works
AG 318	Agri. Business Management and Entrepreneurship Development	This course enable the students for Agribusiness Management principles, marketing and processing of agricultural commodities in context with new economic era. Build up the students in globalization and international emerging business environment.
PF 321	Drying and Storage Engineering	To acquaint the students with drying of food materials. To acquaint the students with traditional and modern storage structures.
PF 322	Dairy and Food Engineering	To acquaint the students with various dairy engineering operations such as homogenization, pasteurization, thermal processing, evaporation, freezing and drying of milk.
ME 323	Computer Aided Design and Manufacturing	Computer graphics and tools for designing and drafting. Develop a good knowledge about construction of numerical control systems and machines. Develop a good knowledge about operation of numerical control systems and machines. Process planning and Part programming

		for manufacturing with CNC machines.
FM 324	Tractor Systems and Controls	Gaining knowledge about various tractor systems, their construction and working. Learning fundamentals of tractor chassis design and traction theory.
FM 325	Field Operations and Maintenance of Farm Machinery	Firsthand experience in field operation and adjustments of various agricultural implements and equipments Exposure to small scale farm machinery manufacturing unit
SW 326	Irrigation Engineering	To train the students and develop basic understanding of soil water plant relationship and select and design appropriate method of water application in varied situations.
SW 327	Drainage Engineering	To train the students about the reclamation of the agricultural lands suffering from excessive water application and problematic soils.
EC 328	Microprocessor and Logic Circuits	Acquired knowledge about basics of digital electronics. Acquired knowledge about solving problems related to number systems and Boolean algebra. Ability to identify, analyze and design combinational circuits. Ability to design various synchronous and asynchronous sequential circuits. Acquired knowledge about internal circuitry and logic behind any digital system Acquired knowledge about Microprocessors and its need. Ability to identify basic architecture of different Microprocessors. Foster ability to write the programming using 8085 microprocessor. Foster ability to understand the internal architecture and interfacing of different peripheral devices with 8085 Microprocessor. Foster ability to write the programming using 8086 microprocessor. Foster ability to understand the internal architecture and interfacing of different peripheral devices with 8085 Microprocessor.

Note: *Students have to undergo a practical training of 30 days at the end of VI semester during summer break for which the assessment will be made at the beginning of the next semester.*

Course No.	Course Title	Course Outcomes
AE 411	Project	
AE 412	Seminar	

Student will have to take minimum of 15 credits courses from the following

Course No.	Course Title	Course Outcomes
PF 411	Food Packaging Technology	To acquaint the students with various food packaging materials, various aspects of packaging methods and technology.
PF 412	Development of Processed Products	To acquaint the students with various methods and technologies of value addition to various food materials such as rice, oil, spices and extrusion
PF 413	Food Processing Plant Design and Layout	To acquaint the students with various aspects of design and layout of food plant.
PF 414	Agricultural Structures and Environmental Control	To acquaint the students with various aspects of agricultural structures such as farm stead and dairy barn. To acquaint the students with various aspects of environmental control and renewable and non-renewable resources of energy.
PF 415	Principles of Food Preservation	To acquaint the students with various methods of food preservation such as preservation by chemicals, thermal processing, Low temperature preservation, and drying of foods.
PF416	Horticultural Crop Processing	To acquaint the students with various aspects of horticultural crop processing such as processing scenario of fruits and vegetable, preparation of jam, jelly, marmalade and candy of fruits and drying of vegetables.
SW 411	Micro Irrigation Systems Design	To train the students about the field specific for design of Drip and Sprinkler Irrigation system, their proper operation and the maintenance of the system
SW 412	Watershed Planning and Management	To acquaint the students about the preparation of the detail report of the problems and causes related to the water, land, vegetation and social aspects of specific area and their remedies through watershed planning and management.
SW 413	Minor Irrigation and Command Area Development	To train the students for design of site specific lift irrigation system as per availability of water and command area on community basis.
SW 414	Gulley and Ravine Control Structures	To train the students about the understanding of extent of erosion, losses thereon and stabilization of gullies and ravines and rehabilitation of the affected area.
SW 415	Remote Sensing and GIS Applications	To train students in use of various hardware and software in use of satellite data, GPS technology in developing GIS based out puts for resource mapping and planning studies.
SW 416	Reservoir and Farm Pond Design	To acquaint the students about the importance of the water harvesting, means to harvest the water and designing of site specific water harvesting structures.
SW417	Ground Water Recharge Technology	To train the student about the latest method of groundwater recharge, their impact evaluation and monitoring the quality of groundwater.
SW418	Plasticulture Technology in Agriculture	Students are expose with the technology to design micro irrigation fertigation system greenhouse design, environment control for efficient management of crop to

		increase productivity.
FM 411	Tractor Design and Testing	Design parameters of tractor engine components and power transmission system. Stability during operation and different tests conducted on tractor
FM 412	Hydraulic Drive and Controls	Basic knowledge of hydraulic system of tractor its operation and maintenance Detailed information of different components of hydraulic system and construction of hydraulic circuits Selection criteria of different hydraulic components Common calculations for load and capacity of the system components.
FM 413	Farm Power and Machinery Management	Getting knowledge of Farm Mechanization scenario and report writing. Learning selection of farm machinery on the basis of various requirements, their costing and replacement.
FM 414	Human Engineering and Safety	Exposure to human factors for engineering design, measurement of energy cost of different activities. Use of anthropometric parameters in designing of different agricultural machines and equipments Knowledge of ergonomic assessment of different working environment
FM 415	Mechanics of Tillage and Traction	Mechanics of soil cutting Traction force, torque-slip relationship and traction aid for tractor and other traction machineries
FM 416	Land Development and Grading	Planning of land levelling operation, CPM and AOA diagram Knowledge and use of different earth moving machineries used for land levelling operation
FM 417	Pesticides Application and Equipment	Knowledge of pesticide application machineries Operation, repair and maintenance of pesticide application equipments Assessment of performance and safety during use of pesticide application equipments
RS 411	Renewable Power Sources	The course enables the student to outline the power generation potential from various renewable energy sources and performance evaluation of these devices.
RS 412	Greenhouse Technology	Benefits and advances in maintaining growth parameters for protected cultivation and of-season agriculture is highlighted through this course for entrepreneurship development.
RS 413	Environmental Engineering	This course is designed to expose the students towards sanitation, health and waste management aspects giving practical insight towards analysis of various pollution causing permanents and their control.
RS 414	Waste and By-product Utilization	The course is designed to generate awareness on recycling and energy recovery from different wastes and by-products from householda, municipal or industrial sectors. It is useful in creating confidence on reduced dependence of fossil fuel based economy.
RS 415	Energy Management	At the end of the course, the student will incline towards conservation of energy through application of efficient devices and practices, energy auditing for exposing inefficient method/routes in production and processing plants as also to promote best practices for

		recourse/energy management in various sectors.
BS 411	Operation Research	
ME 411	Production Technology of Agricultural Machinery	
ME 416 (a)	Finite Element Method	
STAT 411	Statistical Methods for Engineers	
Gen 410	Entrepreneurship Development[1]	

[1] Internal assessment

Students will undertake practical training and educational tour of 24 credit hours:

Course No.	Title	Credit		Duration	Marks		
		Th.	P		Th.	P	MT
AE 421	**Practical Training and Industrial Visit** Two hands-on training programme, during summer breaks of second year and third year	0	4	each of four weeks	-	100	-
AE 422	**Experiential Learning** Practical training at the Institution, Industrial Training	0	16	4 months 4 months or 2 months each		100	
	Total	0	20		-	-	-
Total Credits/Marks		20			200		

- The students will be required to have hands-on-experience at progressive farms, research institutions manufacturing or agro-processing industries and in rural areas.
- The experiential learning is intended to build practical skills and entrepreneurship among the graduates with aim to deal with work situations and for better employability and self employment. It will involve setting-up of model plans for food processing and value addition for product diversification, setting up of workshops for manufacturing, operation and maintenance of farm machinery and equipment, maintenance and custom hiring of farm machinery and equipment