DEPARTMENT OF AGRICULTURAL ENGINEERING

PROGRAMME: B. TECH. AGRICULTURAL ENGINEERING

VISION

- To disseminate excellent professionals in Agriculture Engineering through quality education, leadership skills and ethical values to serve the society.

MISSION

- To ensure effective teaching learning process imparting practical knowledge on conventional and modern Technologies.
- To provide in-depth knowledge and applications of Agriculture Engineering.
- Strive to develop innovative technologies to meet the challenges in Agricultural Engineering.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- To train and educate students with general knowledge and skills in agricultural water management, agricultural production process, farm machinery and farm management.
- To provide a sound theoretical knowledge in engineering principles applied to agriculture.
- To prepare students for a successful agricultural engineering career integrating all aspects of engineering in agriculture.
- To develop innovative capacity of students for increasing agricultural production with scarce water resources available.
- To impart positive and responsive out their mission as engineers. reach attitudes, initiative and creative thinking in their mission as engineers.
- To understand ethical issues and responsibility of serving the society and the environment at large.

PROGRAM OUTCOMES (POs)

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences,

and engineering sciences.

- Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- To make expertise in design and engineering problem solving approach in agriculture with proper knowledge and skill.

- To enhance the ability of the students to formulate solutions to real-world problems pertaining to sustained agricultural productivity using modern technologies.
- To inculcate entrepreneurial skills through strong Industry-Institution linkage.

COURSE OUTCOMES (COs)

Regulation	2021
Semester	01
Course Code	IP3151
Course Name	Induction Programme
Course Outcome	❖ To make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

Regulation	2021
Semester	01
Course Code	HS3151
Course Name	Professional English - I
Course Outcome	❖ To listen and comprehend complex academic texts. ❖ To read and infer the denotative and connotative meanings of technical texts. ❖ To write definitions, descriptions, narrations and essays on various topics. ❖ To speak fluently and accurately in formal and informal communicative contexts. ❖ To express their opinions effectively in both oral and written medium of communication.

Regulation	2021
Semester	01
Course Code	MA3151
Course Name	Matrices and Calculus
Course Outcome	❖ Use the matrix algebra methods for solving practical problems. ❖ Apply differential calculus tools in solving various application problems. ❖ Able to use differential calculus ideas on several variable functions. ❖ Apply different methods of integration in solving practical problems. ❖ Apply multiple integral ideas in solving areas, volumes and other practical problems.

Regulation	2021
Semester	01
Course Code	PH3151
Course Name	Engineering Physics
Course Outcome	❖ Understand the importance of mechanics. ❖ Express their knowledge in electromagnetic waves. ❖ Demonstrate a strong foundational knowledge in oscillations, optics and lasers. ❖ Understand the importance of quantum physics. ❖ Comprehend and apply quantum mechanical principles towards the formation of energy bands.

Regulation	2021
Semester	01
Course Code	CY3151
Course Name	Engineering Chemistry
Course Outcome	❖ To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.

	❖ To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications. ❖ To apply the knowledge of phase rule and composites for material selection requirements. ❖ To recommend suitable fuels for engineering processes and applications. ❖ To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

Regulation	2021
Semester	01
Course Code	GE3151
Course Name	Problem Solving and Python Programming
Course Outcome	❖ Develop algorithmic solutions to simple computational problems. ❖ Develop and execute simple Python programs. ❖ Write simple Python programs using conditionals and looping for solving problems. ❖ Decompose a Python program into functions. ❖ Represent compound data using Python lists, tuples, dictionaries etc. ❖ Read and write data from/to files in Python programs.

Regulation	2021
Semester	01
Course Code	GE3171
Course Name	Problem Solving and Python Programming Laboratory
Course Outcome	❖ Develop algorithmic solutions to simple computational problems. ❖ Develop and execute simple Python programs. ❖ Implement programs in Python using conditionals and loops for solving problems. ❖ Deploy functions to decompose a Python program. ❖ Process compound data using Python data structures.

	❖ Utilize Python packages in developing software applications.

Regulation	2021
Semester	01
Course Code	BS3171
Course Name	Physics and Chemistry Laboratory
Course Outcome	❖ Understand the functioning of various physics laboratory equipment. ❖ Use graphical models to analyze laboratory data. ❖ Use mathematical models as a medium for quantitative reasoning and describing physical reality. ❖ Access, process and analyze scientific information. ❖ Solve problems individually and collaboratively. ❖ To analyze the quality of water samples with respect to their acidity, alkalinity, hardness. ❖ To determine the amount of metal ions through volumetric and spectroscopic techniques. ❖ To analyze and determine the composition of alloys. ❖ To learn simple method of synthesis of nanoparticles. ❖ To quantitatively analyse the impurities in solution by electro analytical techniques.

Regulation	2021
Semester	01
Course Code	GE3172
Course Name	English Laboratory
Course Outcome	❖ To listen and comprehend complex academic texts. ❖ To speak fluently and accurately in formal and informal communicative contexts. ❖ To express their opinions effectively in both oral and written medium of communication.

Regulation	2021
Semester	02
Course Code	HS3251
Course Name	Professional English - II
Course Outcome	❖ To compare and contrast products and ideas in technical texts. ❖ To identify cause and effects in events, industrial processes through technical texts ❖ To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. ❖ To report events and the processes of technical and industrial nature. ❖ To present their opinions in a planned and logical manner, and draft effective resumes in context of job search.

Regulation	2021
Semester	02
Course Code	MA3251
Course Name	Statistics and Numerical Methods
Course Outcome	❖ Apply the concept of testing of hypothesis for small and large samples in real life problems. ❖ Apply the basic concepts of classifications of design of experiments in the field of agriculture. ❖ Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. ❖ Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. ❖ Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

Regulation	2021

Semester	02
Course Code	AI3201
Course Name	Principles And Practices of Crop Production
Course Outcome	Students completing this course would have acquired knowledge on the basic principles of crop production. ❖ Students will be able to select suitable crops and decide upon its establishment procedures ❖ Students will get knowledge on the different crop management practices. ❖ The students will have the required knowledge in the area of production of agricultural and horticultural crops. ❖ Students will be able to delineate their role in relation to various crop production practices.

Regulation	2021
Semester	02
Course Code	BE3252
Course Name	Basic Electrical, Electronics And Instrumentation Engineering
Course Outcome	• Compute the electric circuit parameters for simple problems • Explain the concepts of domestics wiring and protective devices. • Explain the working principle and applications of electrical machines. • Analyze the characteristics of analog electronic devices. • Explain the types and operating principles of sensors and transducers.

Regulation	2021
Semester	02
Course Code	GE3251
Course Name	Engineering Graphics
Course Outcome	• Use BIS conventions and specifications for engineering drawing. • Construct the conic curves, involutes and cycloid.

	• Solve practical problems involving projection of lines. • Draw the orthographic, isometric and perspective projections of simple solids. • Draw the development of simple solids.
Regulation	2021
Semester	02
Course Code	GE3271
Course Name	Engineering Practices Laboratory
Course Outcome	• Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work. • Wire various electrical joints in common household electrical wire work. • Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work. • Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

Regulation	2021
Semester	02
Course Code	BE3272
Course Name	Basic Electrical, Electronics and Instrumentation Engineering laboratory
Course Outcome	• Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power. • Analyze experimentally the load characteristics of electrical machines. • Analyze the characteristics of basic electronic devices. • Use LVDT to measure displacement.

Regulation	2021
Semester	02
Course Code	GE3272
Course Name	Communication Laboratory
Course Outcome	• Speak effectively in group discussions held in a formal/semi formal context. • Write emails and effective job applications.

Regulation	2021
Semester	03
Course Code	MA3301
Course Name	Fourier Series And Linear Programming
Course Outcome	❖ Apply Fourier series techniques used in wide variety of situations in which the functions used are not periodic and to solve boundary value problems.. ❖ Apply the Fourier transform techniques to solve boundary value problems. ❖ Develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the Simplex method for solving linear programming problems. ❖ Analyze the concept of developing, formulating, modeling and solving transportation and assignment problems. ❖ Determine the optimum solution for non-linear programming problems.

Regulation	2021
Semester	03
Course Code	AI3301
Course Name	Principles of Soil Science And Engineering
Course Outcome	On completion of the course, the student is expected to ❖ Understand the fundamental knowledge of soil physical parameters. ❖ Perform soil survey and classify soil based on its characteristics.

	❖ Explain the phase relationship and soil compaction. ❖ Analyze Engineering properties of soil. ❖ Understand Concepts of bearing capacity and slope stability.

Regulation	2021
Semester	03
Course Code	AI3302
Course Name	Unit Operations in Agricultural Processing
Course Outcome	On completion of the course, the student is expected to ❖ Examine the evaporation process and types of evaporators for food industry ❖ Analyze the principles of filtration and mechanical separation equipment. ❖ Identify size reduction and grinding equipment and understand the factors affecting the process.

Regulation	2021
Semester	03
Course Code	AI3303
Course Name	Fluid Mechanics and Pumps
Course Outcome	On completion of the course, the student is expected to ❖ Demonstrate the properties of fluid and its behaviour in static conditions along with pressure measurements ❖ Recognize the market forms of timber, steel, aluminum and applications of various composite materials. ❖ Identify the best construction and service practices such as thermal insulations and air conditioning of the building. ❖ Select various equipments for construction works conditioning of building. ❖ Understand the construction planning and scheduling techniques.

Regulation	2021
Semester	03
Course Code	ME3491
Course Name	Theory of Machines
Course Outcome	On completion of the course, the student is expected to ❖ Discuss the basics of mechanism. ❖ Solve problems on gears and gear trains. ❖ Examine friction in machine elements. ❖ Calculate static and dynamic forces of mechanisms. ❖ Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient.

Regulation	2021
Semester	03
Course Code	CE3351
Course Name	Surveying And Levelling
Course Outcome	❖ Introduce the rudiments of various surveying and its principles. ❖ Imparts knowledge in computation of levels of terrain and ground features. ❖ Imparts concepts of Theodolite Surveying for complex surveying operations. ❖ Understand the procedure for establishing horizontal and vertical control. ❖ Imparts the knowledge on modern surveying instruments

Regulation	2021
Semester	03
Course Code	AI3311
Course Name	Fluid Mechanics Laboratory
Course Outcome	On completion of the course, the student is expected to ❖ Apply Bernoulli equation for calibration of flow measuring devices.

	❖ Measure friction factor in pipes and compare with Moody diagram. ❖ Determine the performance characteristics of rotodynamic pumps. ❖ Determine the performance characteristics of positive displacement pumps.

Regulation	2021
Semester	03
Course Code	AI3312
Course Name	Soil Science Laboratory
Course Outcome	On completion of the course, the student is expected to ❖ Explain soil physical properties and compare the properties based on soil and water system. ❖ Analyse the soil chemical properties to classify the arable and problem soils to develop different reclamation practices.

Regulation	2021
Semester	03
Course Code	CE3361
Course Name	Surveying and Levelling Laboratory
Course Outcome	On completion of the course, the student is expected to ❖ Impart knowledge on the usage of basic surveying instruments like chain/tape, compass and levelling instruments. ❖ Able to use theodolite for various surveying operations. ❖ Able to carry out necessary surveys for social infrastructures. ❖ Able to prepare planimetric maps.

Regulation	2021
Semester	03
Course Code	GE3361

Course Name	Professional Development
Course Outcome	❖ Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements. ❖ Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding. ❖ Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

Regulation	2021
Semester	04
Course Code	AI3401
Course Name	Tractors and Engine Systems
Course Outcome	On completion of the course, the student is expected to ❖ Get an idea on various machinery available for farm mechanization. ❖ Calculate the valve timing of an IC engine and represent by a drawing. ❖ Gain knowledge on the transmission system of a tractor. ❖ Understand the hydraulic system in a tractor and estimate the traction. ❖ Gain knowledge on power tillers, bulldozers and different tractor testing procedures.

Regulation	2021

Semester	04
Course Code	AI3402
Course Name	Soil and Water Conservation Engineering
Course Outcome	On completion of the course, the student is expected to. ❖ Gain fundamental knowledge on the concepts of erosion and sedimentation. ❖ Gain knowledge about evolution of Universal Soil Loss Equation: and its applications. ❖ Explain and design erosion control measures types and design specifications. ❖ Have sufficient knowledge on soil and water conservation measures. ❖ Have sufficient knowledge on reservoir sedimentation and sediment control methods.

Regulation	2021
Semester	04
Course Code	AI3403
Course Name	Strength of Materials For Agricultural Engineering
Course Outcome	On completion of the course, the student is expected to ❖ Find the stress distribution and strains in regular and composite structures subjected to axial loads. ❖ Evaluate the stresses in plane trusses. ❖ Assess the shear force, bending moment and bending stresses in beams ❖ Apply torsion equation in design of circular shafts and helical springs. ❖ Evaluate the slope and deflection of beams and buckling loads of columns under different boundary conditions.

Regulation	2021
Semester	04
Course Code	AI3404
Course Name	Hydrology and Water Resources Engineering
Course Outcome	On completion of the course, the student is expected to ❖ Define the hydrological processes and their integrated behaviour in catchments ❖ Apply the knowledge of hydrological processes to address basin characteristics, runoff and hydrograph. ❖ Explain the concept of hydrological extremes and its management strategies. ❖ Describe the principles of storage reservoirs ❖ Understand and apply the concepts of groundwater management.

Regulation	2021
Semester	04
Course Code	ME3391
Course Name	Engineering Thermodynamics
Course Outcome	On completion of the course, the student is expected to ❖ Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems ❖ Apply the second law of thermodynamics in analyzing the performance of thermal devices through energy and entropy calculations.

	❖ Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart. ❖ Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relation. ❖ Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.

Regulation	2021
Semester	04
Course Code	GE3451
Course Name	Environmental Sciences and Sustainability
Course Outcome	❖ Gain knowledge about environment and ecosystem. ❖ Students will learn about natural resource, its importance and environmental impacts of human activities on natural resource. ❖ Gain knowledge about the conservation of biodiversity and its importance. ❖ Aware students about problems of environmental pollution, its impact on human and ecosystem and control measures. ❖ Students will learn about increase in population growth and its impact on environment.

Regulation	2021
Semester	04
Course Code	AI3411
Course Name	Tractor And Farm Engines Laboratory
Course Outcome	❖ Understand the working of tractors, power tillers and their functions. ❖ Identify and rectify problems in the functioning of tractors and power tillers.

	❖ Summarize the ergonomics of tractors and power tillers.

Regulation	2021
Semester	04
Course Code	AI3412
Course Name	Strength of Materials Laboratory
Course Outcome	❖ Find the stress distribution and strains in regular and composite structures subjected to axial loads. ❖ Assess the shear force, bending moment and bending stresses in beams. ❖ Apply torsion equation in design of circular shafts and helical springs

Regulation	2021
Semester	04
Course Code	CE3411
Course Name	Hydraulic Engineering Laboratory
Course Outcome	• Apply Bernoulli equation for calibration of flow measuring devices • Measure friction factor in pipes and compare with Moody diagram. • Determine the performance characteristics of rotodynamic pumps. • Determine the performance characteristics of positive displacement pumps. • Determine the performance characteristics of turbines.

Regulation	2021
Semester	04
Course Code	CE3412
Course Name	Materials Testing Laboratory

Course Outcome	• Determine the mechanical properties of steel. • Determine the physical properties of cement. • Determine the physical properties of fine and coarse aggregate. • Determine the workability and compressive strength of concrete. Determine the strength of brick and wood.