Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTAE101	**DCS**	**PRINCIPLES OF SOIL SCIENCE**	2	0	1	3	50	30	0	15	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class.

Course Objectives: Basic Knowledge of soil

Course Outcomes:

1. Students will able to understand origin, soil forming process, classification of soils
2. Students will exposed to hands- on practice of soil testing, physical and chemical properties/analysis of soil

Syllabus:

UNIT I

Nature and origin of soil; soil forming rocks and minerals, their classification and composition, soil forming processes, classification of soils – soil taxonomy orders; important soil physical properties; and their importance; soil particle distribution;

UNIT II

Soil inorganic colloids – their composition, properties and origin of charge; ion exchange in soil and nutrient availability;

UNIT III

Soil organic matter – its composition and decomposition, effect on soil fertility; soil reaction – acidic, saline and sodic soils; quality or irrigation water;

UNIT IV

Essential plants nutrients – their functions and deficiency symptoms in plants; important inorganic fertilizers and their reactions in soils.

UNIT V

Soil Pollution, Use of saline and sodic water for crop production, Gypsum requirement for reclamation of sodic soils and neutralising RSC; Liquid fertilisers and their solubility and compatibility.

Text Books:

1. Indian society of soil sciences (ISSS). Fundamentals of soil science. ICAR publication, New Delhi
2. Brady, N.C. & Well, R.R. The Nature and Properties of soil. Macmillan 15th edition
3. A.K. Saha. A Text Book of soil Physics. Kalyani Publication , New Delhi

Reference Books:

1. Brady Nyle C and Ray R Well. 2002. Nature and properties of soils. Pearson Education Inc., New Delhi.
2. Indian Society of Soil Science. 1998. Fundamentals of Soil Science. IARI, New Delhi.
3. Sehgal J.. A. Textbook of Pedology Concepts and Applications. Kalyani Publishers, New Delhi
4. Hillel D. 1982. Introduction to Soil Physics. Academic Press, London.

Practices:

Identification of rocks and minerals ; identification of soil sampling tools and gadgets; Examination of soil profile in field; collection of soil sample; Determination of Nitrogen ,organic carbon , phosphorous and potassium in soils; determination of density ,moisture and porosity of soils, Determination of soil texture by feel and Bouyoucos method ; studies of capillary rise phenomenon of water in soil column and watermovement in soil, Determination of soil color, Demonstration of heat transfer in soil, Estimation of organic matter content in soil ; Identification of nutrient, deficiency symptoms of crops in the field, Determination of gypsum requirement of sodic soils; determination of water quality parameters.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTAE 102	**DCS**	**ENGINEERING MECHANICS**	2	0	1	3	50	30	0	15	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class.

Course Objectives:

1. The students will be able to familiarize with different branches of mechanics.
2. To apply the principles of mechanics to practical engineering problem.
3. To identify appropriate structural system for studying a given problem and isolate it from its environment,
4. To learn the fundamental concepts of stresses.
5. To develop simple mathematical model for engineering problems and carry out static analysis.

Course Outcomes:

1. Students will be able to apply and demonstrate the Concepts of Mechanics to practical engineering problem.
2. Students will be able to determine the properties of planes and solids.
3. Students will be able to demonstrate various types of Forces and their Analysis.
4. Students will be able to demonstrate Centre of Gravity and Moment of Inertia of different geometrical shaped figures.
5. Students will be able to determine the concepts of Stress, Shear force and Bending moment in beams.

Syllabus:

UNIT I

Basic Concepts of Engineering Mechanics : Introduction, Laws of Mechanics, Force, Moment and couple, Varignon's theorem, Resultant of force systems, Concurrent and non-concurrent coplanar forces. Equilibrium of Rigid bodied, Free body diagram, Types of supports and their reactions, Equations of equilibrium of coplanar systems.

UNIT II

Analysis of Framed Structure: Introduction, Types of frames, Truss, Types of truss, Analysis of frame using Methods of Joints, Methods of Sections, Graphical Method.shear force and bending moment diagram.

UNIT III

Centroid: Centroid, Centre of Gravity, Determination of Centroid of Simple Figures, Centroid of composite Sections, basic concepts of Inertia,

Moments of Inertia: Basic concepts of moments of inertia, Principle of Moment of Inertia,

UNIT IV

Frictional Forces: Frictional Force, Laws of Friction, Types of Friction, Sliding Friction, Rolling Friction.

Stresses: definition and concept of stress and strain, Hooke's law,

UNIT V

Stresses in Beams- Introduction, pure bending theory, Torsion of shafts, analysis of plane and complex stresses: principal Stresses and principal planes, Maximum shear stress,

Text Books:

1. Kumar, K. L. (2003). Engineering Mechanics. Tata Mc Graw Hill Publishing Company, New Delhi.
2. R K Bansal 2005, "A Text Book of Engineering Mechanics", Laxmi Publishers, New Delhi.

Reference Books:

1. Sundarajan V 2002, "Engineering Mechanics and Dynamics", Tata McGraw Hill Publishing Co. Ltd., New Delhi.
2. Timoshenko S and Young D H 2003, "Engineering Mechanics", McGraw Hill Book Co., New Delhi.
3. Prasad I B 2004, "Applied Mechanics", Khanna Publishers, New Delhi.

List of Practical's:

1. Problems on composition and resolution of forces, moments of a force, couples, transmission of a couple, resolution of a force into a force & a couple.
2. Problems relating to resultant of Coplaner & Non-coplaner force system.
3. Problems relating to centroids of composite areas;
4. Problems on moment of inertia, polar moment of inertia, radius of gyration, polar radius of gyration of composite areas.
5. Equilibrium of concurrent: Co-planer and non-concurrent, Co-planer force systems.
6. Problems involving frictional forces.
7. Analysis of simple trusses by method of joints, method of sections & graphical method.
8. Problems relating to simple stresses and strains.
9. Problems on shear force and bending moment diagrams.
10. Problems relating to stresses in beams.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTAE103	**DCS**	**HEAT AND MASS TRANSFER**	2	0	0	2	50	40	10	0	0

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class.

Course Objectives:

To introduction with (A) Basic concepts of heat transfer, (B) various modes of heat transfer in detail, (C) Convection heat transfer.(D) Extended Surface

Course Outcomes:

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes

1. Students would be able to understand various modes of heat transfer.
2. Students would be able to analyses basics difference of conduction, convection and radiation.
3. Students would be able to understand significant of various dimension less no in convection.
4. Students will be able to understand concept of radiation.
5. Students would be able to explain concept of mass transfer and concentration difference.

Syllabus:

UNIT I

Basic Concepts of Heat Transfer

Concept, modes of heat transfer, thermal conductivity of materials, measurement. General heat conduction equation for Cartesian coordinates. One dimensional steady state heat conduction through plane and composite walls, without heat generation. Electrical analogy. Insulation materials. Heat transfer analysis involving conduction, convection and radiation by networks.

UNIT II

Free and Forced Convection. Newton's law of cooling, heat transfer coefficient in convection. Dimensional analysis of free and forced convection. Useful non dimensional numbers. Equation of laminar boundary layer on flat plate and in a tube. Laminar forced convection on a flat plate and in a tube. Combined free and forced convection, Fins.

UNIT III

Radiation

Introduction. Absorptivity, reflectivity and transmissivity of radiation. Black body and monochromatic radiation, Planck's law, Stefan- Boltzman law, Kirchoff's law, grey bodies and emissive power, solid angle, intensity of radiation. Radiation exchange between black surfaces, geometric configuration factor.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

UNIT IV

Heat Exchangers

Introduction,Types of heat exchangers, fouling factor, log mean temperature difference, heat exchanger performance, transfer units. Heat exchanger analysis restricted to parallel and counter flow heat exchangers.

UNIT V

Mass Transfer

Steady state molecular diffusion in fluids at rest and in laminar flow, Flick's law, mass transfer coefficients. Reynold's analogy.

Text Books:

1. Heat and mass transfer, 2005 by Sukhatme SP; University Press Hyderabad.
2. Heat and Mass Transfer, 2011 by Nag PK; TMH.
3. Heat and Mass transfer , 2015 by CengelYunus A; TMH.

Reference Books:

1. Geankoplis C.J. 1978. Transport Port Processes and Unit Operations. Allyn and Bacon Newton, Massachusetts.
2. Holman J P. 1989. Heat Transfer. McGraw Hill Book Co., New Delhi.
3. Incropera F P and De Witt D P. 1980. Fundamentals of Heat and Mass Transfer. John Wiley and Sons, New York.
4. Gupta C P and Prakash R. 1994. Engineering Heat Transfer. Nem Chand and Bros., Roorkee.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTAE 104	**DCS**	**ENGINEERING DRAWING**	0	0	2	2	0	0	0	60	40

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class.

Course Objectives:

1. To familiarize with concepts of (A) scale, (B) projections of points and line in all quadrants; (C) construction of geometrical figures & solids, with its orientation on horizontal and vertical planes, and its projection.
2. To familiarize with concepts of (A) section of solids, (B) development of surfaces, (C) isometric projection & orthographic view.
3. To familiarize with concepts of (A) dimensioning of drawing, (B) sectional drawing of machine parts.
4. To familiarize with concepts of (A) drawing conventions, (B) elements and (C) symbols of Fasteners and machine parts
5. To familiarize with concepts of (A) production drawing, (B) assembly drawings and (C) drawing standards.

Course Outcomes:

1. Student would be able to understand the concept of draw scale, Projection of points and lines and identify the use of these concepts in practical life.
2. Students would be able to understand the concept of projection of planes & solids at various orientations .
3. Student would be able to draw the projections of with and without sectioning of solid models and surface development.
4. Students would be able to understand the difference between orthographic view and isometric projections.
5. Students will be able to understand all drawing conventions, symbols and concepts of machine drawing Creation.

Syllabus:

UNIT I

Drawing Scales, Orthographic projection, Projection of points & Lines : Types of scales; Representative Factor, principle and construction of different scales. Principles of orthographic projections; References planes.

Projection of Points: Introduction of point; conventional representation. first angle and third angle projection.

Projection of Lines: Introduction of straight line, orientation of straight line, true inclination and true length, concepts of end projectors; plan and traces and auxiliary planes.

UNIT II

Projections of Planes: Introduction of planes, types of planes, orientation of planes, projection of planes in different positions, traces of planes.

Projection of Solids: Introduction of solids, classification of solids, recommended naming of corners of solids, Change of position method, alteration of ground lines; orientation of solids.

UNIT III

Section of solids and Interpenetration of solid surfaces: Introduction of section of solids, terminology, types of section planes, section of prisms, section of pyramid and section of composite solids.

Development of surfaces of geometrical solids: Introduction of development of surfaces, classification of surfaces; methods of development; development of prisms, pyramids, cylinder and cone, anti-development.

UNIT IV

Isometric projections, Dimensioning & Sectional drawing : Preparation of working drawing from models and isometric views, Drawing of missing views, Different methods of dimensioning, Concept of sectioning; Revolved and oblique sections, Sectional drawing of simple machine parts.

UNIT V

Drawing Conventions, Elements and Symbols : Types of rivet heads and riveted joints; Processes for producing leak proof joints, Symbols for different types of welded joints. Nomenclature, thread profiles, multi start threads, left and right hand threads. Square headed and hexagonal nuts and bolts. Conventional representation of threads. Different types of lock nuts, studs, machine screws, cap screws and wood screws. Foundation bolts. Forms of screw threads, representation of threads, Bolts- headed centre, stud screws, set screws, butt, hexagonal and square; keys-types, taper, rank taper, hollow saddle etc

Text Books:

4. Bhat N D. 2010. Elementary Engineering Drawing. Charotar Publishing House Pvt. Ltd., Anand.
5. Bhatt N D and Panchal V M. 2013. Machine Drawing. Charotar Publishing House Pvt. Ltd., Anand.
6. Narayana K L and Kannaiah P. 2010. Machine Drawing. Scitech Publications (India) Pvt. Ltd.,Chennai.
7. Lakshminarayanan ,V and Vaish Wannar , R. S. 2008 “Engg.Graphics”.Jain Brothers , New Delhi.
8. Machine drawing- N.D.Bhatt. & V.M. Panchal , Published 2010 by Charotar Publishing house.

Reference Books:

3. Gill, P.S. 2013 “A Text Book Of Machine Drawing” Katson Publishing House, Ludhiana.
4. Engineering Drawing” 2012, by C. Agarwal & Basant Agarwal. .
5. Fundamentals of Machine Drawing 2016 by Sadhu Singh & Shah, PHI

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

List of Practical's:

11. Drawing various types of scales using representative fraction.
12. Projection of points in all quadrants.
13. Projection of straight lines in all quadrants in various orientations.
14. Projection of geometrical planes with various orientations.
15. Projection of solid models with various orientations.
16. Projection of section of solids by using various types of cutting planes.
17. Drawing development of surface using various methods of prisms, pyramids, cone, cylinder, etc.
18. Drawing isometric projections using various methods and isometric views.
19. Dimensioning & Sectional drawing of Machine Parts.
20. Drawing of all types of joints, Threads & Fasteners.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCEAE 101	**ODS**	**SURVEYING AND LEVELLING**	1	0	2	3	50	30	0	15	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class,

Course Objectives:

1. To acquaint the students different land survey methods and to take various measurements.
2. Use various conventional instruments involved in surveying with respect to utility and precision

Course Outcomes:

1. To understand the importance of surveying in the field of agriculture engineering.
2. To study the basics of linear/angular measurement methods like chain surveying, compass surveying
3. To study the significance of plane table surveying in plan making
4. To know the basics of levelling and theodolite survey in elevation and angular measurements
5. To know about the different land features, specifications of work and to give layout of engineering structures
6. Computation of area of fields and volume of earthwork, items of works in construction

Syllabus:

UNIT I

Introduction- Surveying, definitions, basic concepts, classifications of survey, Classification and basic principles

Linear Measurements- Chain surveying, selection of survey stations, ranging and chaining of different type of chains Offsets measurements, cross staff, optical square, prism square, obstacles in chaining and ranging, chain and tape correction Obstacles in chaining and ranging, chain and tape corrections, errors in chaining

UNIT II

Compass Survey - Compass, meridian, bearings and angles, types of bearings, Quadrantal systems, local attraction, detection, traverse plotting, and errors in compass survey, their elimination and correction

Plane table survey- Plane table survey introduction, methods of plane tabling, two point and three point problems, errors in plane tabling

UNIT III

Levelling- definitions, methods of levelling, levelling instruments, Types of levelling, simple, differential, and profile

Contouring- Contouring, characteristics of contours, Methods of contour surveying by Theodolite, Contour Drawing by different methods.

UNIT IV

Computation of area and volume: Computation of areas, earthwork, mid ordinate rule, average ordinate rule, trapezoidal rule, Simpson's middle third rule, Calculation of volume by the use of contour, Planimeter: Its construction use and theory.

UNIT V

Theodolite survey, electronic theodolite, Total station survey, introduction to setting of curves, Introduction to GPS Survey

Text Books:

1. B.C.Punamia,; 1994 Surveying & Levelling Vol.-I ;Lakshmi Publication, New Delhi.
2. Kanetkar, T.P. and Kulkarni, S.P. 1965. Surveying and Levelling. A.V. Griha Prakashan, Pune-4.
3. Basak; Surveying and Leveling; TMH
4.

Reference Books:

1. Agor, R. 1998. Surveying and Levelling, Khanna Publishers, New Delhi.
2. Kochher, C.L. 1986. A Text book of Surveying. Vol. I and Vol. II. Katson Publishing House Ludhiana.
3. Arora K R 1990. Surveying(Vol.I), Standard Book House, Delhi
4. Kanetkar T P 1993. Surveying and Levelling. Pune Vidyarthi Griha, Prakashan, Pune

List of Practical's:

1. Chain survey of an area and preparation of map.
2. Compass survey of an area and plotting of compass survey
3. Plane table surveying; Leveling, L-section and X sections and its plotting.
4. Contour survey of an area and preparation of contour map
5. Theodolite surveying; Ranging by theodolite, Height of object by using theodolite.
6. Determination of area of irregular figure by using Planimeter.
7. Study of total station.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCHAE101	BS	ENGINEERING CHEMISTRY	2	0	1	3	50	30	0	15	5

. **Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class.

Course Objectives:

1. To give knowledge of Chemistry used in agricultural.
2. To develop understanding for chemical approaches.

Course Outcomes:

By the end of the course, the student will be able to

1. Know different type of fuel and their quality through various analytical methods
2. Understand the cause, effect and prevention of corrosion
3. Learn about the type of water and its effect on industries
4. Acquire knowledge about the modern instruments for analysis of samples
5. Know the nutrition value of food, types of food preservatives, coloring reagents and flavouringreagents
6. Acquire basic idea about polymerization and its properties
7. Determination of molecular mass through various methods

Syllabus

UNIT 1

A) Phase rule

Phase, component, degree of freedom, Application to one component system viz. Water system, Application to one component system Sulphur system, Two component system Pb-Ag system, desilverisation of Pb.

B) Colloids

Classification, properties like optical activity-Tyndall effect, Brownian movement, electrical properties –Electrophoresis.

UNIT - II

A) Water

Temporary and permanent hardness, disadvantages of hard water, Scale and sludge formation of boilers, boiler corrosion, hardness removal methods and numerical based on them.

B) Food Chemistry

Introduction to food preservatives, definition types natural and Artificial preservative and its use. Colouring and flavoring reagents of Food with examples. Enzymes and their use in manufacturing of Ethanol and Acetic Acid by fermentation.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

UNIT – III

A) Fuel

Classification of fuels, solid fuels, coal-origin and its classification, proximate and ultimate analysis of coal, significance of constituents, Gross and Net Calorific Values, Determination of Calorific value by Bomb Calorimeter. Knocking – Octane Number, Chemical Structure and Knocking – Anti Knock agents,

B) Lubricants

Properties-viscosity, flash point and fire Point mechanism of Lubrication, Neutralization point, Saponification number and mechanical stability.

UNIT - IV

A) Instrumental Techniques

Chromatographic techniques, UV-Visible Spectroscopy, IR Spectroscopy. Basic idea on thermo-gravimetric and differential thermal analysis, Polarography,

B) Nuclear Radiation

Idea about nuclear radiation, Detectors and analytical applications of radio-active materials, Radio-active tracer and carbon dating.

UNIT - V

A) Electrochemistry

Specific, molecular and equivalent conductivity. Effect of dilution on conductivity. Determination of conductivity. E.M.F and its measurements. Polarization and over voltages.

B) Corrosion

Definition and its significance theories of corrosion, Galvanic cell and concentration cell. Pitting and Stress Corrosion, Protection of corrosion. Use of inhibitors and passivasion. Alloying, protective coating – metallic, Inorganic and organic.

Text Books:

1. Jain P L and Jain M. 1994. Engineering Chemistry. Danpat Rai publishing company Pvt. Ltd., Delhi.
2. Bahl B S, Arun Bahl and Tuli B D. 2007. Essentials of Physical Chemistry. S. Chand and Co. Ltd., Delhi.

Reference Books:

1. Organic Chemistry: Robert. T. Morrison and Robert. N .Boyd, 2010 Pearson publication
2. Organic Chemistry: I. L. Finar, Pearson publication Spectroscopy: 2011 By Y.R.Sharma, Kalyani Publisher
3. Engg. Chemistry 2016 by Jain and Jain, Dhanpat Rai Publication.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

List of Practical's:

1. Experimental work for determination of temporary and permanent hardness of by EDTA method.
2. Estimation of chloride in water sample.
3. Experimental work for estimation of dissolved oxygen in water sample.
4. Experimental work for determination of λmax and verification of Beer-Lambert law
5. Determination of viscosity of oil by Redwood viscometer 1 & 2.
6. Determination of flash point and fire point by Pensky martin apparatus.
7. Determination of flash point and fire point by Abel's apparatus.
8. Determination of COD values of a water sample.
9. Determination of Alkalinity in water sample.
10. Electroplating of Copper from Copper Sulphate.
11. Analysis of Effluent.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	T/A	END SEM	T/A				
BTMAAE101	BS	**Engineering Mathematics-I**	50	30	0	15	5	2	-	1	3

Course Objective

To introduce the students with the fundamentals of the Calculus of Matrices, Differential, Integral and Vector Calculus.

Course Outcomes

After the successful completion of this course students will be able to:

1. *Understand and apply the basics of the calculus of matrices.*
2. *Understand and apply the basics of the differential calculus.*
3. *Know the fundamental principles of the integral calculus and apply them.*
4. *Understand and apply the basics of the vector calculus.*

Course Content:

UNIT – I

Matrices: Elementary transformations, rank of a matrix, reduction to normal form, Gauss-Jordon method to find inverse of a matrix, Eigen values and Eigen vectors, Cayley-Hamilton theorem, linear transformation, orthogonal transformations, diagonalisation of matrices, quadratic forms. PAQ form, Echelon form, Solution of linear equations, nature of rank, using Cayley-Hamilton theorem to find inverse of A.

UNIT– II

Differential calculus: Taylor's and Maclaurin's expansions; indeterminate form; curvature, function of two or more independent variables, partial differentiation, homogeneous functions and Euler's theorem, composite functions, total derivatives, maxima and minima.

UNIT – III

Integral calculus: volumes and surfaces of revolution of curves; double and triple integrals, change of order of integration, application of double and triple integrals to find area and volume.

UNIT – IV

Vector calculus-I: Differentiation of vectors, scalar and vector point functions, vector differential operator Del, Gradient of a scalar point function, Divergence and Curl of a vector point function and their physical interpretations, identities involving Del, second order differential operator.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

UNIT – V

Vector calculus-II: line, surface and volume integrals, Stoke's, divergence and Green's theorems (without proofs) and their applications.

Practical:

Tutorials on rank of a matrix, reduction to normal form, consistency and solution of linear equations, eigen values and eigen vectors, Cayley-Hamilton theorem, diagonalization of matrices, quadratic forms; Taylor's and Maclaurin's expansion, indeterminate form, curvature, tracing of curves, partial differentiation, maxima and minima, volume and surface of revolution, multiple integrals, Beta and Gama functions, differentiation of vectors, gradient, divergence and curl of a vector point function, line, surface and volume integrals, Stoke's divergence and Green's Theorems.

Suggested Readings:

1. Narayan Shanti. 2004. Differential Calculus. S. Chand and Co. Ltd. New Delhi.
2. Narayan Shanti. 2004. Integral Calculus. S. Chand and Co. Ltd. New Delhi.
3. Grewal B S. 2004. Higher Engineering Mathematics. Khanna Publishers Delhi.
4. Narayan Shanti. 2004. A Text Book of Vector. S. Chand and Co. Ltd. New Delhi.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

Subject Code	Category	Subject Name	Teaching and Evaluation Scheme								
			Theory			Practical		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BTPHAE101	BS	Engineering Physics	50	30	0	15	5	2	-	1	3

Course Objectives	1. To develop the comprehensive understanding of laws of physics. 2. To develop ability to apply laws of physics for various engineering applications. 3. To develop the experimental skills, ability to analyze the data obtained experimentally to reach substantiated conclusions.
Course Ourcomes	1. Student will be able to comprehend laws of physics. 2. Student will be able to apply laws of physics for various engineering applications. 3. Student will be able to determine physical parameter experimentally and will be able to analyze the data obtained experimentally to draw substantiate conclusions.

Abbreviation		**Teacher Assessment (Theory) shall be based on following components: Quiz / Assignment/ Project / Participation in class (Given that no component shall be exceed 10 Marks).**
Th	Theory	
T	Tutorial	**Teacher Assessment (Practical) shall be based on following components: Viva / File / Participation in Lab work (Given that no component shall be exceed 50% of Marks).**
P	Practical	

Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.TECH AGRICULTURAL ENGINEERING

SEMESTER I

UNIT 1: Introduction to Quantum hypothesis and spectroscopy: -Wave particle duality, wave velocity and group velocity, de-Broglie concept, uncertainty principle, wave function, time dependent and time independent Schrodinger wave equation, Spectroscopy: - Qualitative explanation of Zeeman effect, Stark effect and Paschan Back effect, Raman spectroscopy.

UNIT 2: Cause of magnetism: - Di, para and ferromagnetism-classification, Langevin theory of di and Para magnetism, adiabatic demagnetization, Weiss molecular field theory and ferromagnetism, Curie-Weiss law, B-H curve.

UNIT 3:Solid state physics: - Statement of Bloch's function, Bands in solids, velocity of Bloch's electron and effective mass, Distinction between metals, insulators and semiconductors, Intrinsic and Extrinsic semiconductors, law of mass action, determination of energy gap in semiconductors, Donor and acceptor levels, superconductivity: critical magnetic field, Meissner effect, Isotope effect, Type-I and Type-II superconductors, Josephson's effect DC and AC, Squids, Introduction to high T_c superconductors.

UNIT 4: Laser: Introduction, spontaneous and stimulated emission, Einstein A and B coefficients, population inversion, pumping, He-Ne and Ruby lasers, properties and applications of laser, Holography-Note.

UNIT 5: Introduction to optical fibre: physical structure, basic theory, Mode type, Input output characteristics of optical fibre and applications, V-number, numerical aperture, illumination: laws of illumination, luminous flux, luminous intensity, candle power, brightness.

REFERENCES

1. "Engineering Physics", by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi.
2. "Engineering Physics", by Navneet Gupta, Dhanpat Rai Publication, New Delhi.
3. "Engineering Physics", by H. J Sawant, Technical Publications, Pune, Maharashtra.
4. "Engineering Physics". by MN. Avdhanulu & P. G. Kshirsagar, S. Chand & Co.Edition (2012).
5. "Fundamentals of Physics", by Halliday, Wiley, India.
6. "Concepts of Modern Physics", by Beiser, TMH, New Delhi.
7. "Atomic and Nuclear physics", by Brijlal and Subraminiyan.

List of experiments

1. To find the frequency of A.C. supply using an electrical vibrator.
2. To find the low resistance using Carey Foster bridge without calibrating the bridge wire.
3. To determine dielectric constant of material using De Sauty's bridge.

4. To determine the value of specific charge (e/m) for electrons by helical method.
5. To study the induced e.m.f. as a function of velocity of the magnet.
6. To obtain hysteresis curve (B-H curve) on a C.R.O. and to determine related magnetic quantities.
7. To study the variation of magnetic field with distance along the axis of a current carrying circular coil and to detuning the radius of the coil
8. To determine the energy band gap in a semiconductor using a p-n Junction diode.
9. To determine the slit width from Fraunhofer diffraction pattern using laser beam.
10. To find the numerical aperture of optical fiber.
11. To set up the fiber optic analog and digital link.
12. To study the phase relationships in L.R. circuit; To study LCR circuit.
13. To study the variations of thermo emf of a copper-constantan thermo-couple with temperature.
14. To find the wave length of light by prism.