

**AG-1831 (BSC)
NUMERICAL ANALYSIS**

Course Objectives : It aims to equip the students to solve various advanced level of engineering problems as well as real world problems with the use of transformation and numerical techniques.

Course Contents & Grade

Branch	Subject Title	Subject Code	Credit allotted subject wise		
			L	T	P
B.Tech.-III Sem. AG Engg.	NUMERICAL ANALYSIS	AG1831(BSC)	3	1	-

Interpolation : Finite Differences, Factorial Notations , Newton's Forward Interpolation Formula, Newton's Backward Interpolation Formula, Gauss Forward Interpolation Formula, Gauss Backward Interpolation Formula, Bessel's Formula, Sterling Formula, Newton's Divided Difference Interpolation Formula, Lagrange's Interpolation Formula, Inverse Interpolation Formula.

Numerical Differentiation: Methods of Numerical Differentiation, Numerical Integration : Quadrature Formula, Trapezoidal Rule, Simpson's One-third Rule, Simpson's Three-Eight Rule and Weddle's Rule. Solution of Simultaneous Linear Equations : Solution of simultaneous linear equations by Gauss elimination, Gauss Jordan, Crout's Methods, Jacobi's and Gauss-Siedel Iterative Method.

Numerical Solution of Ordinary differential Equations : Picard's Method, Taylor's Series Method, Euler's Method, Modified Euler's Method, Runge-Kutta Method of Fourth Order .

Introduction to Probability

Events and their Probability, Elementary Operations with Events, Total Probability Theorem, Independence, Bayes' Theorem, Random Variables and Vectors, Discrete and Continuous Probability Distributions, Functions of Random Variables and Derived Distributions, Expectation of Random Variables and Functions of Random Variables, Moments of Variables and Vectors, Conditional Second Moment Analysis, Selected Distribution Models: Normal, Lognormal, Extreme, Multivariate Normal Distributions

Introduction to Statistics

Point Estimation of Distribution Parameters: Methods of Moments and Maximum Likelihood, Bayesian Analysis, Simple and Multiple Linear Regression.

Text Books:

- 1 .Engineering Mathematics by B. V. Ramanna, Tata McGraw Hill
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers
- 3 Advanced Engineering Mathematics by Kreyszig
4. Numerical Methods in Engineering and Science by B.S. Grewal, Khanna Publishers

Course Outcomes

This course primarily contributes to applied mathematics program outcomes that develop students abilities to:

1. Students will learn the expansion of functions and various transformations.
2. It will help them to solve various physical science and engineering with the application of Laplace transform.
3. Interpolation will help them to find the solution of various types of problems like census problems, weather problems etc.
4. It is useful to solve various differentiation and integration problems using numerical techniques.
5. It will be very much useful to solve various boundary value problems.

AG-1832 (DC)

STRENGTH OF MATERIAL & MATERIALSCIENCE

Course objective- Students are expected to learn basic concept of mechanical properties of materials, concept of stress, strain and deformation of solid and state of stress, strain energy, principal stress and principal planes, theory of torsion and stresses in springs, and material constitutive behavior so that the students can solve real engineering problems and design engineering systems.

Course Contents & Grade

Branch	Subject Title	Subject Code	Credit allotted subject wise		
			L	T	P
B.Tech.-III Sem. Ag Engg.	STRENGTH OF MATERIAL & MATERIAL SCIENCE	AG1832 (DC)	3	1	2

Mechanical Properties of Materials

Definition of elastic materials; Plastic materials; Ductile materials; Brittle materials; Permanent set; Elastic limit, Fatigue Limit; Ultimate strength; Modulus of resilience; Modulus of toughness; Modulus of rupture; Proof stress; Malleability; Toughness and hardness and their measurement.

Simple Stresses and Strains

Normal and shearing stresses in axially loaded members; Concept of factor of safety; Normal and shearing strains; Stress strain relationship; Hook's law; Modulus of rigidity; Complementary shear stress; Poisson's ratio; Bulk modulus; Relation between various elastic constants; Volumetric strain.

Bending Moment, Shear Force & Theory of bending

Definition and concept; SFD and BMD for cantilever; Simply supported and over hanging beams subjected to various combination of loadings; Point of inflection; Elastic curves; Relation between the load S.F. and B.M. Flexure formula; Stress variation and different types of beam sections; Beams of uniform strength; Composite beams.

Torsion of Shafts.

Torsion's formula; Maximum torque transmitted by a solid and hollow circular shaft; Shear stress; power transmitted by a shaft; Circular shaft under combined bending and torsion.

Crystal Structures, Dielectric Materials & Polymers

Space lattice and crystal structures, Determination of Crystal structure by X-ray technique, Imperfections in crystals like point, line and planar defects. Influence of imperfections on properties of materials, Dislocation multiplication. Diffusion, Mechanisms, Laws and applications.

Principles, temperature and frequency effects, ferroelectric materials, Types, properties, additives, application.

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Lab

- To study the micro-structure of Cast Iron, Mild Steel, Brass Solder Under, Annealed, Cold Worked, forged/rolled conditions.
- Creep Test
- Impact Test
- Uniaxial tension test (Mild steel, Timber)
- Uniaxial compression test (Timber-along and across, concrete, bricks, etc.)

Suggested Text Books & References

- Vlack, Van. "Material Science for Engineers".
- Raghavan, V. "Material Science and Engineering", Prentice Hall. Callister, "Material Science and Engineering", astem Wiley.
- Singh, Surendra. "Strength of Materials". Vikas Publishing House Pvt. Ltd., New Delhi.
- Jain, O.P. and Jain, B.K. "Theory and Analysis of Structures".Vol. I. Nemchand and Bros. Roorkee.
- Popov,E.P: "Mechanics of Materials". Prentice Hall of India,1993.
- Beer and Johnston. "Mechanics of Materials". McGraw Hill Book Company, 1987.TimoshenkoandYoung. "Strength of Materials". Van Nostrand and Company,1993.

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AG-1833 (DC)

FLUID MECHANICS

COURSE OBJECTIVES:

Students are expected to learn basic concepts of fluid flow, fluid properties and relationship between them, fundamental principles of fluid mechanics (principles of continuity, momentum, and energy) as applied to fluid motions.

Course Contents & Grade

Branch	Subject Title	Subject Code	Credit allotted subject wise		
			L	T	P
B.Tech.-III Sem. Ag Engg.	Fluid Mechanics	AG1833 (DC)	2	01	2

Unit-I

Review of Fluid Properties: Engineering units of measurement, mass, density, specific weight, specific volume, specific gravity, surface tension, capillarity, viscosity, bulk modulus of elasticity, pressure and vapor pressure. Classification of different Fluids, Rheological Classification of Fluid. Fluid Static's : Pressure at a point, pressure variation in static fluid, Absolute and gauge pressure, manometers, Forces on plane and curved surfaces (Problems on gravity dams and Tainter gates); buoyant force, Stability of floating and submerged bodies, Relative equilibrium.

Unit-II

Kinematics of Flow :Path lines, streak lines, streamlines and stream tubes; Types of motion of Fluid Particles, Types of flow-ideal & real , steady & unsteady, uniform & nonuniform, flow one, two and three dimensional flow, continuity equation for one and three dimensional flow, rotational & irrotational flow, circulation, stagnation point, separation of flow, sources & sinks, velocity potential, stream function, flow nets- their utility & method of drawing flow nets.

Unit-III

Dynamics of Flow: Euler's equation of motion along a streamline and derivation of Bernoulli's equation, application of Bernoulli's equation, energy correction factor, linear momentum equation for steady flow; momentum correction factor. The moment of momentum equation, forces on fixed and moving vanes and other applications. Velocity measurement (Pitot tube, Prandtl tube, current meters etc.); flow measurement (orifices, nozzles, mouth pieces, orifice meter, nozzle meter, venture meter, weirs and notches).

Unit-IV

Dimensional Analysis and Dynamic Similitude: Dimensional analysis, dimensional homogeneity, use of Buckingham-pi theorem, calculation of dimensionless numbers, similarity laws, specific model investigations (submerged bodies, partially submerged bodies, weirs, spillways, roto dynamic machines etc.)

Unit-V

Laminar Flow: Introduction to laminar & turbulent flow, Reynolds experiment & Reynolds number, relation between shear & pressure gradient, laminar flow through circular pipes, laminar flow between parallel plates, laminar flow through porous media, Stokes law, lubrication principles.

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LIST OF EXPERIMENT :

1. Verification of Energy equation
2. Calibration of venture meter.
3. Calibration of orifice meter.
4. Calibration of Mouth Piece.
5. Calibration of Water meter.
6. Calibration Nozzle meter.
7. Determination of C_c , C_v , C_d of orifices.
8. Reynolds experiment for demonstration of stream lines & turbulent flow.
9. Determination of Friction Factor of a pipe.
10. Verification of impulse momentum principle.
11. Calibration Notches.(Rectangular & V notch)

COURSE OUTCOMES:

After completion of the course, the student will be able to:

1. Perceive the knowledge of basic properties of fluids, different types of flows and analyze the fluid behavior under static condition.
2. Apply the basic concepts to examine the behavior of fluid under kinematic and dynamic conditions.
3. Perform dimensional analysis and dynamic similitude.
4. Evaluate practical flow problems for pipes, open channels.
5. Compare the difference between theoretical and practical values of different flow parameters and calibrate the equipment's accordingly (Lab).

REFERENCES BOOKS:

1. Modi & Seth; Fluid Mechanics; Standard Book House, Delhi
2. Som and Biswas; Fluid Mechanics and machinery; TMH
3. Cengel; Fluid Mechanics; TMH
4. White ; Fluid Mechanics ; TMH
5. Essential of Engg Hyd. By JNIK DAKE; Afrikan Network & ScInstit. (ANSTI)
6. A Text Book of fluid Mech. for Engg. Student by Francis JRD
7. R Mohanty; Fluid Mechanics By; PHI
8. Fluid Mechanics; Gupta Pearson.
9. Dr. D.S. Kumar, Fluid Mechanics and Fluid Power Engineering.

AG-1834 (DC)

SOILSCIENCE

COURSE OBJECTIVES:

1) To provide a better appreciation of the distribution and variability of soils and their properties across the landscape, 2) a knowledge of how these properties are created and how they affect landscape processes (both at a large and small scale), 3) a preliminary ability to investigate soil characteristics and, 4) an understanding how we manage (or not) soils and their properties for a multitude of objectives.

Course Contents & Grade

Branch	Subject Title	Subject Code	Credit allotted subject wise		
			L	T	P
B.Tech.-III Sem. AGEngg.	SOIL SCIENCE	AG-1834	2	1	2

Soil genesis and classification

Weathering, formation and composition of soil, classification of soils.

Soil colloids

Inorganic and organic colloids, their nature and physico-chemical properties, ion exchange phenomena, and nutrient availability.

Mineral nutrition of plants

Essential elements, chemical fertilizers, organic manures.

Physics of soil

Texture, structure and basic physical properties, retention and movement of soil water, permeability and ground water flow, gaseous exchange, soil strength and thermal properties of soil.

Soil tillage

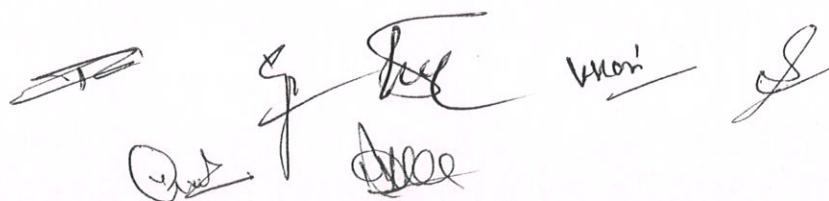
Types of tillage and their influence on soil physical properties and crop performance.

Soil management

Management of acid, saline, sodic, highly and slowly permeable soils, water quality.

Laboratory

- Determination of soil pH and soil electrical conductivity
- Estimation of soil organic matter Estimation of cation exchange capacity
Determination of major available nutrients Determination of particle size distribution
- Estimation of single value soil physical constants .Determination of soil particle and bulk density Measurement of soil strength
- Evaluation of liquid and plastic limits Compatibility test
- Determination of soil water
- Evaluation of water - retention characteristics of soil Measurement of saturated hydraulic conductivity of-soil Measurement of infiltration rate
- Evaluation of water quality



Instruments Equipment

pHmeter, conductivitymeter, spectrophotometer, flamephotometer, pressureplateapparatus, permeabilityrack, doublingringinfiltrrometer, depthcoresampler, cone penetrometer, Casagrandeapparatus, water quality checker, comptometer.

Suggested Text Books & References

- Brady, N.C. "Nature and Properties of Soils", New YORK, Macmillan, 1990. Biswas TD. And Mukherjee, S.K. "text Book of Soil Science "New Delhi, TataMgraw, 1987.
- Ghildyal B.P. and Tripathi, R.P. "Soil Physics", Wiley eastern Ltd, 1987. Hillel, D. "Introduction to Soil Physics", San Diego, Academic press, 1982. Singer Michael J. and Munns, D.N. "Soils-An Introduction", 1983. /
- Foth, Henry D "Fundamentals of Soil Science", New Delhi, Wiley Eastern, 1972. Tandon, H.L.S "Methods of Analysis of Soils, Plants, Waters and Fertilizers", 1985.

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AG-1835 (HSMC)

MANAGEMENT FUNDAMENTAL

Course Contents & Grade

Branch	Subject Title	Subject Code	Credit allotted subject wise		
			L	T	P
B.Tech.-III Sem. AG Engg.	MANAGEMENT FUNDAMENTAL	AG-1835	2	1	0

Basic Concepts and Functions of Management: Importance, characteristics of management, managerial skills, managerial roles, levels of management, Functions of management:- Planning concepts, importance and Objectives of Planning, Organizing: Importance and principles, Directing: nature and importance, controlling: System and Process of Controlling.

Human Resource Management: Concepts of Human Resource Management, Nature and Scope of Human Resource planning, Training and Development, Recruitment and Selection, Career planning, Motivation and its types, Need for Motivation, Reward and Punishment, Leaders: Kind of Leaders, leadership styles, Roles and Function of Leaders, Conflict Management, Kinds and Cause of Conflict, Settlement of Conflict, Group and Team working.

Marketing Management: Marketing Environment: Consumer Markets and Industrial market, Buyer Behaviour, Marketing Mix, Advertising and Sales Promotion, Concepts of supply chain management.

Financial Management and Accounting Concepts: Financial accounting- concepts, importance and scope, concepts of budget aims and objectives of financial management, Financial Statement Analysis, Financial Ratios, Break-Even Analysis..

Management Information System: Role of information in decision making, Information system planning, Design and Implementation, Evaluation and Effectiveness of Information System.

Suggested Text Books & References

- Philip Kotler, "Marketing Management", Prentice Hall of India 1997.
- Fred Luthans, "Human Resource Management", McGraw Hill, Inc. 1997.
- Stephen P. Robbins, "Organizational Behaviour Concepts, Controversies and Applications", Prentice Hall, Englewood, Cliffs, New Jersey, 1989.
- Khan M. Y. and Jain, P.K "Financial Management", Tata McGraw Hill, 1997. Porter, Michael, "Competitive Advantage", The Free Press. 1985
- Porter, Michael, "Competitive Strategy", The Free Press, 1985
- Bhusan, Y.K "Fundamentals of Business Organisation and Management", S.Chand and sons, 1998.
- Ahuja, KK "Industrial Management", Khanna Publishers, 1998

