**BRANCH: FOOD PROCESSING TECHNOLOGY**

Paper: COMPUTER APPLICATION

Code: Co-301 Theory: 70 marks L – T – P:

Total Marks: 100 Sessional: 30 2 – 0 – 6

1. Computer Fundamentals: Brief history – Babbage machine, Von Neumann. Architecture – Block diagrams, Role of Operating Systems, concept of language and language translators, editors. Memory – different types, functions, concept of I/O devices.
2. Number System: Number system and codes: Decimal, binary, octal, hexadecimal number systems and conversion from one system to another, arithmetic operations using these numbers. Representation of a negative number in the different number systems. Complement and complement subtraction. Different codes: ASCII, 8421, Ex-3, 2421, gray, Alpha-numeric, BCD, Seven segment codes etc. and code conversion.
3. Introduction to Operating System: Concept of resource management, single user and multi user OS, Various popular OS (DOS, Windows, Unix/ Linux), elementary commands.
4. Introduction to Internet: Fundamentals of networking – need of network topology, concept of LAN, WAN, MAN, network devices – NIC, hub, bridge, switch, repeaters, gateway, modem, transmission media. Internet services, concept of global net, different browsers, search engine.
5. MS – Office: Various products, their introduction and uses.

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**COMPUTER APPLICATION PRACTICAL**

Code: Co-301 (P) Practical: 25

Total Marks: 50 Sessional: 25

1. Introduction to MS Office: Basic feature of MS Office, Overview of different Office Tools.
2. Introduction to MS Word: Creating and editing document, formatting documents, working with Tables, Spell checking, Mail Merging, Importing Graphics into word Document.
3. Introduction to MS Excel: Creating a new work book, entering labels, values and formulas, formatting the layout, working with functions, creating chart from data writing macros.
4. Introduction to Power Point: Creating a presentation, adding/ editing text, working with objects, formatting the presentation, placing the chart in slide, slide show and printing.
5. Introduction to MS Access: Creation of database. Creation of tables – field declaration, data type declaration, constraint declaration, working with records, querying the data base, joining tables, designing the form, the report.

 **Reference Books:**

1. DOS quick reference: Rajib Mathur
2. Learning Word for Windows : Rajib Mathur
3. Learning Windows step by step: Rajib Mathur
4. Microsoft office unleashed: Techmedia
5. ABC of Office: Han
6. Mastering Excel: Chester
7. Excel 97 Bible: John Walkenbach
8. Teach yourself MS Access in 24 hours: Eddy and Buchanan
9. Microsoft Access 2000 fast and easy: Primatech BBP
10. Unix: S. Das

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ENGINEERING ECONOMICS & ACCOUNTANCY

Code: Hu-302 Theory: 70 L – T – P:

Total Marks: 100 Sessional: 30 3 – 0 – 0

PART A: ENGINEERING ECONOMICS

1. Introduction to Economics and its utility and scope of study.
2. Meaning and definition of utility, consumption, want value, price of goods, national income.
3. Meaning of wealth and its characteristics, classification of wealth.
4. Basic laws of demand and supply and its limitations.
5. Meaning and factors of production, land labour, capital and organisation, factors determining efficiency of labour.
6. Scale of Industries: types, advantages and disadvantages of large and small scale industries.
7. Unemployment: causes of unemployment in India and its remedies.

PART B: ACCOUNTANCY

1. Definitions, objects and principles of double entry book-keeping.
2. Transactions, classification of accounts, rules of credit and debit.
3. Journal and Ledger: Definition, posting and balance of accounts.
4. Cash Book: Single column, double column, triple column cashbook, impress system of petty cash book.
5. Trial Balance: Object of Trial balance preparation, types of errors.
6. Final accounts: preparation of trading account, profit and loss account and balance sheet.

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MATHEMATICS – III

Code: Sc-303 Theory: 70 L – T – P:

Total Marks: 100 Sessional: 30 3 – 2 – 0

GROUP A: DIFFERENTIAL EQUATIONS

1. Differential Equations: Definition and classification, order and degree, importance of differential equations in Engineering Field.
	1. Formation of ordinary differential equations.
2. Equation of the first order and of first degree with reference to Engineering.
	1. Separation of variables, equations reducible to variable separable form.
	2. Homogenous equations and its special form.
	3. Exact equation.
	4. Integrating factors – definition and rules of determining integrating factors.
	5. Linear equations and its solution.
	6. Bernoulli’s equation.
3. Equations of first order but not of the first degree.
	1. Left hand side resolvable into factors
	2. Left hand side not resolvable into factors
	3. Clairaut’s equation.
	4. Practice on units 3.1, 3.2, 3.3
4. DIFFERENTIAL EQUATIONS OF SECOND ORDER WITH CONSTANT CO-EFFICIENTS
	1. Linear equations with right hand number zero: introduction to operator D. Auxiliary equation having real and distinct roots, having equal roots, having a pair of complex roots.
	2. Equations with right hand member as an algebraic expression, trigonometric and exponential functions of X. Solution of linear equations: general and particular integral, complementary functions.
	3. Engineering application of differential equations such as L-R circuit, L-R-C circuit, Simple Harmonic Motion, Rate of growth and decay etc.

GROUP B: GRAPHICS

1. INTRODUCTION AND ITS CONCEPT
	1. Graphical solution of equations.
	2. Cubic equation (one part cubic and the other part linear)
	3. Quadratic equations
	4. Trigonometric equations
2. DETERMINATION OF LAWS OF FITTING OF CURVES

Linear, Quadratic, Exponential, Binomial etc.

GROUP C: STATISTICS

1. INTRODUCTION AND ITS APPLICATIONS IN ENGINEERING FIELD
2. MEASURES OF CENTRAL TENDENCY

2.01 Mean, median and mode (with illustration)

2.02 Relation between them, the empirical formula.

3.0 MEASURES OF DISPERSION

 3.01 Range, Mean Deviation and Standard deviation (with illustration)

 3.02 Variation and coefficient of variation

4.0 CORRELATION

 4.01 Meaning of correlation as a bi-variate relation, scatter diagram.

 4.02 Karl Pearson’s correlation formula for two variables

 4.03 Determination of correlation by Karl Pearson’s formula with reference to engineering applications.

5.0 PROBALITY

 5.01 Introduction to Probability

 5.02 Events: mutually exclusive events, exhaustive events etc.

 5.03 Definition of probability

 5.04 Addition and Multiplication laws of probability

 5.05 Examples on probability.

GROUP D: ANALYTICAL GEOMETRY OF 3-DIMENSIONS AND INTRODUCTION TO VECTOR ANALYSIS

1. INTRODUCTION AND DEFINITIONS
	1. Three dimensional rectangular Cartesian co-ordinates, co-ordinates of a point in space with reference to vectors, addition and subtraction formula.
	2. Coordinates of a point which divides a straight line in a given ratio.
	3. Distance between two points.
2. DIRECTION RATIOS AND DIRECTION COSINES WITH REFERENCE TO VECTORS
	1. Definition of direction ratios and direction cosines
	2. Properties of direction ratios and direction cosines
	3. Relation between direction ratios and direction cosines
	4. Angle between two lines in vector form
	5. Condition of perpendicularity and parallelism.

Recommended books:

1. Integral calculus: Das & Mukherjee
2. Engineering Mathematics: Shanti Narayan
3. An Introduction to Statistics (Vol. I&II): L. Choudhury
4. An easy approach to statistics: S.P. Gupta
5. Analytical Solid Geometry: Misra & Misra
6. Higher Secondary Mathematics: B.S. Grewal
7. Vector & Mechanics: Mena & Mishra

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APPLIED MECHANICS

Code: BES-304 L - T – P: 3 – 0 – 0

Total marks: 100 Theory: 28/70 Sessional: 15/30

1. Introduction to mechanics and SI unit, equivalent forces at a point, simplest resultants in two dimensions, equations of equilibrium: free body diagrams, reactions, number of unknowns, indeterminacy and solvability.
2. Two dimensional frames and trusses, method of members, method of joints and method of sections, principle of virtual work, friction forces, sliding and rolling friction.
3. Belt, rope and chain drives and power screws.
4. Properties of surfaces, centroids, mass centres, second moment and product of inertia of plane area, parallel axis theorem and polar moment of inertia of a particle.
5. Kinematics: Velocities, acceleration, curvilinear coordinate system and relative motion, particle dynamics: equations of motion, systems of particles.

**References:**

1. I.J. Shames, PHI Pvt. Ltd. New Delhi: Engineering Mechanics: Statics and Dynamics
2. J.L. Meriam and L.G. Krige, John Wiley and Sons, New York: Engineering Mechanics: Statics and Dynamics
3. S.B. Junnarkar, Charotor Publishing House, Anand: Mechanics of Structures, Vol.-I
4. K.L. Kumar, Tata McGraw Hill Publishing Co. Ltd. New Delhi: Engineering Mechanics

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INTRODUCTION TO FOOD PROCESSING TECHNOLOGY

Code: FPT-301 L – T – P: 4 – 0 – 2

Total Marks: 100 Theory: 28/70 Sessional: 15/30

1. Food constituents, viz. carbohydrates, lipids, proteins, vitamins and minerals and their properties: Physical, Chemical. Types and Causes of food spoilage.
2. Introduction to food micro-organism and enzymes, Factors affecting the growth and activities of Micro-organism. Microbial spoilage of food
3. Food preservation principles and methods; Physical, Chemical and Biological; Physical: Drying, evaporation, heat treatment, irradiation, refrigeration and freezing.
4. Chemical and Biochemical means of preservation viz. by addition of salt, sugar, oil spices and preservative; fermentation etc
5. Introduction to food packaging Introduction to hygienic aspect in food handling and processing

**References:**

1. Food Science, N. N. Potter, CBS Publisher & Distributors
2. Foods, Facts & Principles, N. S. Many & M. Shadaksharaswamy, New Age International (p) Ltd., New Delhi.
3. Technology of food preservation, Desrosier & Desrosier, CBS Publishers & Distributors, New Delhi.
4. Food Science, B. Srilakshmi, New Age International (p) Ltd., New Delhi.

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ELEMENTS OF FOOD ENGINEERING – I

Code: FPT – 302 L – T – P: 4 – 0 – 2

Total Marks: 100 Theory: 28/70 Sessional: 15/30

1. Laws of thermodynamics: zeroeth, first and second laws. Concepts of enthalpy, internal energy, entropy and absolute temperature. Properties of pure substances and mixtures, reversibility and irreversibility. Thermodynamic cycles.
2. Introduction to heat, different methods of heat transfer, Fourier’s Law, Steady State heat transfer through plain and composite slabs, cylindrical and spherical surfaces.
3. Natural and forced convection, concept of overall heat transfer coefficient, LMTD, Heat exchangers in food processing, effectiveness of heat exchanger, Relative heat transfer.
4. Refrigeration and freezing: refrigeration cycles, heat pump, problem shooting of refrigeration systems. Application of refrigeration in food processing and preservation. Food freezing systems.
5. Steam: steam generation, steam properties and application. Boiler operation and maintenance.

**References:**

1. Earle. R.L., Pergamon Press, New York: Unit operations in Food Processing
2. Brennan, J.G. et. Al.; Elsevier Applied Science, Amsterdam: Food Engineering Operations
3. Heldman, R.R. and R.P. Singh, CBS Publication: Food Process Engineering
4. Toledo, R.T., CBS Publication: Fundamentals of Food Engineering

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