# Maharashtra State Board of Vocational Examination, Mumbai 400 051

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|---|---|---|
| 1 | **Name of Course** | **Certificate Course in Construction Surveying** |
| 2 | **Course Code** | **304404** |
| 3 | **Max no. of Students** | 25 |
| 4 | **Duration** | 2 year |
| 5 | **Course Type** | Full Time |
| 6 | **No. of Days per week** | 6 days |
| 7 | **No. of hours per day** | 7 Hrs |
| 8 | **Space require** | Theory Class Room – 200 sqft Three Practical Lab – 500 sqft each |
| 9 | **Entry qualification** | S.S.C. Pass |
| 10 | **Objective of syllabus** | To get Knowledge of Building Construction, To Understanding Building Drawing, To Prepare Estimate, To Prepare Building Drawing on CAD, To carry our Civil Surveying Work |
| 11 | **Employment opportunities** | Office of Architect, Office of Consultant Civil Engineer, Office of Builder, any Civil Engineering Ferm, his own practice as Surveyor |
| 12 | **Teachers Qualification** | 1) For Vocational subject - B.E.Civil<br>2) For Non Vocational Subject - Master Degree in Concern subject |

13 **Teaching Scheme –**

| Sr. | Subject | Subject Code | Clock Hours / Week | | Total |
|---|---|---|---|---|---|
| | | | Theory | Practical | |
| 1 | **English (Communication Skill)** | 90000001 | 2 Hrs | 1 Hrs | 3 Hrs |
| 2 | **Elective – I** | | 2 Hrs | 1 Hrs | 3 Hrs |
| 3 | **Elective – II** | | 2 Hrs | 1 Hrs | 3 Hrs |
| 4 | **Building Material and Construction** | 30440001 | 3 Hrs | 8 Hrs | 11 Hrs |
| 5 | **Building Drawing and CAD** | 30440002 | 3 Hrs | 8 Hrs | 11 Hrs |
| 6 | **Construction Surveying and Estimating** | 30440007 | 3 Hrs | 8 Hrs | 11 Hrs |
| **Total** | | | | | **42 Hrs** |

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| 14 | **Internship** | Two Months Summer Internship from 1st May to 30th June is Compulsory. |

15 **Examination Scheme – Final Examination will be based on syllabus of both years.**

| Paper | Subject | Subject Code | Theory | | | | Practical | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Duration | Max | Min | Duration | Max | Min | Max | Min |
| **1** | **English (Communication Skill)** | 90000001 | 3 Hrs | **70** | **25** | 3 Hrs | **30** | **15** | **100** | **40** |
| **2** | **Elective – I** | | 3 Hrs | **70** | **25** | 3 Hrs | **30** | **15** | **100** | **40** |
| **3** | **Elective – II** | | 3 Hrs | **70** | **25** | 3 Hrs | **30** | **15** | **100** | **40** |
| **4** | **Building Material and Construction** | 30440001 | 3 Hrs | **100** | **35** | 3 Hrs | **100** | **50** | **200** | **85** |
| **5** | **Building Drawing and CAD** | 30440002 | 3 Hrs | **100** | **35** | 3 Hrs | **100** | **50** | **200** | **85** |
| **6** | **Construction Surveying and Estimating** | 30440007 | 3 Hrs | **100** | **35** | 3 Hrs | **100** | **50** | **200** | **85** |
| | | | | | | | | | **900** | **375** |

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16 **Teachers** – Three Teachers per batch for vocational component. For English, Elective-I & II guest faculty on clock hour basis.

17

**a) For Elective I – Student can choose any one subject**

| Code | Subject Name |
|---|---|
| 90000011 | Applied Mathematics |
| 90000012 | Business Economics |
| 90000013 | Physical Biology (Botany & Zoology) |
| 90000014 | Entrepreneurship |
| 90000015 | Psychology |

**b) For Elective II – Student can choose any one subject**

| Code | Subject Name |
|---|---|
| 90000021 | Applied Sciences (Physics & Chemistry) |
| 90000022 | Computer Application |
| 90000023 | Business Mathematics |

## Subject Name : English (Communication Skill) - 1st Year

## (Subject code : 90000001)

### 1) PROSE

| | TOPIC | AUTHOR | |
|---|---|---|---|
| 1 | SPOKEN ENGLISH AND BROKEN ENGLISH | GEORGE BERNARD SHAW | |
| 2 | THE HOMECOMING | RABINDRANATH TAGORE | |
| 3 | WHAT WE MUST LEARN FROM THE WEST | N.R. NARAYAN MURTHY | |
| 4 | AFTER 20 YEARS | O .HENRY | |
| 5 | THE HAPPY PRINCE | OSCAR WILDE | |

### 2) POETRY

| | | | |
|---|---|---|---|
| 1 | IF | RUDYAR KIPLING | |
| 2 | BABY'S WORLD | RABINDRANATH TAGORE | |
| 3 | POISON TREE | WILLIAM BLAKE | |
| 4 | PSALM OF LIFE | H.W.LONGFELLOW | |
| 5 | HOPE | SIDDHARTH ANAND | |

### 3) GRAMMER

| | | **EXCERCISES** |
|---|---|---|
| PARTS OF SPEECH<br>NOUNS : KINDS OF NOUNS AND USAGES<br>PRONOUNS<br>PREPOSITIONS<br>ADJECTIVES<br>CONJUNCTION<br>VERB<br>ADVERB<br>INTERJECTION | INTRODUCTION AND EXPLANATION | SENTENCE CORRECTIONS |

| | | |
|---|---|---|
| ARTICLES / APOSTROPHES | | |
| DIRECT /INDIRECT SPEECH | | |
| HOMONYMS/HOMOPHONES | | |
| FIGURES OF SPEECH | | |
| LETTER WRITING – FORMAL AND INFORMAL | | |
| COMPREHENSIONS | | |
| EMAIL AND BUSINESS LETTERS (FORMAT TO BE TAUGHT WHICH IS USED IN WORKPLACE ) | | |
| COMPOSITIONS | | |

## 4) NON DETAIL

My experiments with truth – M.K.GANDHI

(an autobiography)

## 5) PRACTICAL

PRACTICALS – 30 MARKS

(BASED ON PERSONAL ENHANCEMENT)(THROUGH SKITS/CHARTS/FLASH CARDS/SKITS/PRACTICAL PROJECT )

**OBJECTIVE : GROOMING THE STUDENT TOWARDS HIS CAREER.**

**AT THE END OF EACH TOPIC, THE STUDENT HAS TO HAVE BENEFITTED FROM IT.**

**KNOW THYSELF**

**GOAL SETTING HELP STUDENTS IDENTIFY THEIR OWN GOALS AND THUS LINK TO THEIR CAREERS AS PART OF CURRICULUM**

**TIME MANAGEMENT**

**TEAM WORK**

**INTERPERSONAL COMMUNICATION**

**GENERAL KNOWLEDGE/ QUIZ BASED ON THEIR SUBJECT**

**SPOKEN ENGLISH**

## English (Communication Skill) – 2nd year.

### 1) PROSE

| | TOPIC | AUTHOR | |
|---|---|---|---|
| 1 | SPEECH AT CHICAGO | SWAMI VIVEKANANDA | |
| 2 | THE CASE FOR THE DEFENCE | GRAHAM GREENE | |
| 3 | WAITING FOR THE BUDDHA | | |
| 4 | WATER – THE ELIXIR OF LIFE | C.V.RAMAN | |
| 5 | A HORSE AND TWO GOATS | R.K.NARAYAN | |

### 2) POETRY

| | | | |
|---|---|---|---|
| 1 | ROAD NOT TAKEN | ROBERT FROST | |
| 2 | Even this shall pass | | |
| 3 | TO INDIA | SAROJINI NAIDU | |
| 4 | ALL THE WORLDS A STAGE | WILLIAM SHAKESPEARE | |
| 5 | A PRAYER FOR MY MOTHERS BIRTHDAY | HENRY VAN DYKE | |

### 3) GRAMMER

| | | **EXCERCISES** |
|---|---|---|
| PARTS OF SPEECH<br>NOUNS : KINDS OF NOUNS AND USAGES<br>PRONOUNS<br>PREPOSITIONS<br>ADJECTIVES<br>CONJUNCTION<br>VERB<br>ADVERB<br>INTERJECTION | Different usages on the lines of competitive exams | SENTENCE CORRECTIONS |

| | | |
|---|---|---|
| ARTICLES / APOSTROPHES | | |
| DIRECT /INDIRECT SPEECH | | |
| HOMONYMS/HOMOPHONES | | |
| FIGURES OF SPEECH | | |
| LETTER WRITING – FORMAL AND INFORMAL | | |
| COMPREHENSIONS | | |
| EMAIL AND BUSINESS LETTERS (FORMAT TO BE TAUGHT WHICH IS USED IN WORKPLACE ) | | |
| COMPOSITIONS | | |

## 4) NON DETAIL

MY EXPERIMENTS WITH TRUTH – M.K.GANDHI

## 5) PRACTICALS

CAREER CHART.(DEPENDING ON THE STREAM CHOSEN BY THE STUDENT)

ETIQUETTE FOR INTERVIEWS

BODY LANGUAGE

BUSINESS LETTERS

PRESENTATIONS

MARKING SCHEME :

PROSE : 20

POETRY : 15

GRAMMAR : 25

NON DETAIL : 10

PRACTICALS : 30

# Elective 1 : Applied Mathematics - 1st Year

# (Subject code : 90000011)

| Theory | Practical |
|---|---|
| **Detailed Syllabus:**<br>**1.0. Trigonometric ratios**<br>1.1. Angles & its measurements<br>1.2. Trigonometric ratios<br>1.3. Relation between degree and radian.<br>1.4. Fundamental identities.<br>1.5. Examples based on Fundamental Identities<br>1.6. Trigonometric ratios of compound angles<br>1.7. Factorization formulae<br>1.8. Inverse trigonometric functions<br>1.9. Properties of a Triangle | **Detailed Syllabus:**<br>Solve problems on:<br>1) Conversion of radian to degree<br>2) Conversion of degree to radian |
| **2.0. Plane co-ordinate geometry**<br>2.1. Locus<br>2.2. Line | |
| **3.0 Vectors and Linear Equalities**<br>3.1. Definition of vector, position vector<br>3.2. Algebra of vectors(Equality, addition, subtraction and scalar multiplication)<br>3.3. Dot (Scalar) product with properties.<br>3.4. Vector (Cross) product with properties.<br>3.5. Solutions of Linear inequalities in one variable and two variables | |
| **4.0. Determinants and Matrices**<br>4.1. Definition and expansion of determinants of order 2 and 3.<br>4.2. Cramer's rule to solve simultaneous equations in 2 and 3 unknowns<br>4.3. Definition of a matrix of order m x n.<br>4.4. Types of matrices.<br>4.5. Algebra of matrices such as equality, addition, Subtraction, scalar multiplication and multiplication.<br>4.6. Transpose of a matrix.<br>4.7. Minor, cofactor of an element of a matrix, adjoint Of matrix and inverse of matrix by adjoint method.<br>4.8. Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method. | Solve problems on Cramer's rule |
| **5.0 Statistics and Probability**<br>5.1. Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/grouped data.<br>5.2. Analysis of frequency distributions with equal means but different variances.<br>5.3. Random experiments: outcomes, sample spaces (set representation).<br>5.4. Events: occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events<br>5.5. Probability of an event, probability of 'not', 'and' & 'or' events. | State and prove Baye's theorem |

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| **6.0. Set Relations & Functions**<br>6.1. Types of functions<br>6.2. Domain, Co – domain, Range of a function<br>6.3. Composite and Inverse functions<br>6.4. Graphs of functions | Solve problems on Graphs |
| **7.0. Logarithms**<br>7.1. Introduction and Definition<br>7.2. Laws of logarithms<br>7.3. Numerical problems based on multiplication, division and power. | Solve problems on power law |
| **8.0. Complex Numbers and Quadratic equations**<br>8.1. Complex Numbers in the form of a+ib<br>8.2. Modulus, Complex conjugate, Argument of complex numbers<br>8.3. Algebra of complex numbers<br>8.4. Square root of complex numbers<br>8.5. Argand diagram<br>8.6. Nature of roots<br>8.7. Sum and product of roots<br>8.8. Formation of quadratic equation<br>8.9. Symmetric functions of roots<br>8.10. Cube roots of unity | |
| **9.0. Sequences and Series**<br>9.1. Definition of a sequence<br>9.2. Geometric Progression and Arithmetic Progression<br>9.3. Arithmetic mean, Geometric mean, harmonic mean<br>9.4. Special Series | 1) **Proof of arithmetic progression and geometric progression**<br>2) **Proof of arithmetic mean and geometric mean** |
| **10.0 Permutations and Combinations**<br>10.1. Factorial notation<br>10.2. Fundamental principle of counting<br>10.3. Permutation<br>10.4. Combinations | |
| **11.0 Mathematical Induction and binomial theorem**<br>11.1. History, statement, Proof of Binomial theorem for positive integral indices, Pascal's triangle, general and middle term in binomial expansion<br>11.2. Principle of mathematical induction and it's application<br>11.3. Simple applications | **Proof of Binomial theorem** |

# Elective 1 : Applied Mathematics - 2 nd Year

# (Subject code : 90000011)

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**1.0. CALCULUS: Limits and Continuity**<br>1.1. Definition of a limit<br>1.2. Algebra of limits<br>1.3. Standard limits<br>1.4. Limit at infinity and infinite limits<br>1.5. Continuity of a function at a point<br>1.6. Algebra of continuous functions<br>1.7. Continuity in interval<br>1.8. Continuity of some standard functions | **Detailed Syllabus**<br>1) Theorem on a limit of a sequence<br>2) Theorem on continuity in interval |

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| **2.0. Differentiation**<br>2.1. Derivative using first principle<br>2.2. Rules of Differentiation<br>2.3. Derivatives of standard functions<br>2.4. Derivatives of logarithmic and exponential functions<br>2.5. Derivative of composite functions<br>2.6. Derivative of Inverse functions<br>2.7. Derivative of implicit and parametric functions<br>2.8. Second order derivatives | Proof of derivative using the first principle with the help of an example |
| **3.0. Applications of Derivatives**<br>3.1. Geometrical applications<br>3.2. Derivative as a rate of change measure<br>3.3. Approximations<br>3.4. Maxima and Minima | |
| **4.0. Integration**<br>4.1. Definition of an integral of a function<br>4.2. Integrals of some standard functions<br>4.3. Rules of integration<br>4.4. Indefinite Integration<br>4.5. Definite Integration | Solve problems on definite integration |
| **5.0 Application of Definite Integrals**<br>5.1. Area under the curve<br>5.2. Volume of solid of revolution | |
| **6.0. Differential equations**<br>6.1. Definition<br>6.2. Formation of differential equations<br>6.3. Solution of first order and first degree differential equations<br>6.4. Applications of differential equations | Solve problems on first order and first degree differential equations |
| **7.0 Numerical Methods**<br>7.1. Definition of various operators and relation between the operators<br>7.2. Interpolation methods<br>7.3. Numerical integration | |
| **8.0. Mathematical Logic**<br>8.1. Statements and logical connectives<br>8.2. Statement Pattern and Logical equivalence<br>8.3. Application of logic | |
| **9.0. Geometry**<br>9.1. Pair of straight lines passing & not passing through origin<br>9.2. **Circle**: definition, Tangent and Normal<br>**9.3. Conic:** Equation of Conics<br>9.4. **Three Dimensional Geometry:** Direction Cosines and ratios, Line, Plane | |
| **10.0. Linear Programming Problems**<br>10.1. Linear Programming Problems<br>10.2. Simplex Method | Solve problems on simplex method |
| **11.0. Boolean Algebra**<br>11.1. Boolean Algebra as an algebraic structure Algebra<br>11.2. Principle of Duality<br>11.3. Boolean function & switching circuits<br>11.4. Application of Boolean Algebra to switching circuits | State and explain the principle of duality |

## Elective - I - Business Economics – 1st year

## (Subject Code – 90000012)

| Theory | Practical |
|---|---|
| Detailed Syllabus :<br>1. **Introduction to Economics** –<br>1.1 Meaning & Scope -<br>1.2 Relevance of Economics to different disciplines - Economics & Management, Economics & Law- Economics and Humanities –<br>1.3 Micro Economics and Macro economics | 1) Prepare a project on usefulness of micro – economics.<br>2) Prepare a project on usefulness of micro – economics.<br>3) Conduct a GD on the importance of Micro Economics and Macro Economics |
| 2. **Macro Economics** –<br>2.1 Meaning, Definition and Features.<br>2.2 Aggregates-Nature of Aggregates , problems of Aggregation.<br>2.3 National Income, Meaning, Definition of National Income Different National Income Concepts<br>2.4. Estimation of National Income – Methods and Difficulties | 1) Prepare a PPT presentation on macro-economics, National Income and how it is computed and the difficulties in measuring National Income.<br>2) Prepare a chart on the circular flow of National Income.<br>3) Make a comparative study of closed economy and open economy.<br>4) Conduct a case study of 5 individual families and find out the Disposable income to the individuals. |
| 3. **Determinants of Aggregates**<br>3.1. Aggregate Demand and their components<br>3.2 Aggregate Supply and their components<br>. | Prepare a chart on the components of aggregate demand.<br>Conduct a GD on Keynes theory of employment and principles of effective demand.<br>Take 2 or 3 case studies on entrepreneurship and discuss to what extent they provide employment to people. |
| 4. **Money and Banking**<br>4.1 Meaning, definitions and functions of Money<br>4.2 Commercial Banks: Meaning and Functions.<br>4.3 Central Banks: Meaning and Functions. | Find out RBIs concept of money supply.<br>A visit to various financial institutions.<br>A visit to a rural bank, cooperative bank, commercial bank.<br>A visit to the RBI Training college, NABARD OR IDBI<br>Further For the first year the practical will consist developing familiarity with banking functions and will comprise Of what are different types of banking services, facilities, available to individuals/organizations? (to increase the financial literacy)<br>how to open a bank account?<br>different investments like – FD,MF<br>facilities for financial inclusion |

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| 5 **Public Economics**<br>5.1 Government Budget and the Economy<br>Government Budget – Meaning and its components<br>5.2 Types of Government Budget – Balanced, Surplus and Deficit. | Prepare a report on sourses of revenue in the budget of lacal Government. Comment.<br>Conduct of GD on last year's government budget.<br>Find out how a private budget/ finance differs from public budget/ finance<br>Prepare hypothetical master budget for an imaginary company and discuss how you have allocated the funds for each department.<br>Prepare a separate budget for production, personnel and administration, finance, marketing, advertising, etc. |
| 6. **International Trade**<br>6.1 Comparative cost principal of International Trade.<br>6.2 Free trade Advantages, Disadvantages<br>6.3 Protectionist trade advantages, Disadvantages | 1) Collect data on India's direction of trade<br>2) Collect data on India'strade Composition |
| Theory | Practical |
| **Detailed Syllabus :**<br>7.1. Concepts of Economic Growth and Economic Development<br>7.2 Indicators of Economic Development Monetary indicators<br>7.3 Human Development indicators | 1) To make a project on discrepancies in India's economic growth and development.<br>2) Discuss the patterns of education among women in the post independence period.<br>3) Collect information on Human Development Index for different Indian states. |
| 8.0. **Structural Changes in the Indian Economy since 1991.**<br>8.1 Economic reforms since 1991: Need and main features, Liberalization, privatization and Globalization. Their impact on Indian Agriculture, Industries and Service Sector.<br>8.2 Economic Planning – Meaning and Objectives<br>8.3 Achievements and Failures of 10th Five – Year Plan | 1) Conduct a GD on the New Economic Policy, 19991 and its impact on the various sectors.<br>2) Visit to Agricultural Produce Market Committee to study the price Fixation of agricultural commodities.<br>3) Collection of market intelligence of agricultural commodities from newspaper and journals.<br>4) A visit to a cottage industry, small scale industry, large scale industry.<br>5) A visit to a MNC.<br>Prepare an assignment on the WTO. |
| 9.0. Current Challenges of Indian Economy<br>9.1 Problem of Population Explosion in India Causes, Effects and Remedial Measures to remove these problems<br>9.2 Problem of Poverty in India Causes, Effects and Remedial Measures to remove these problems<br>9.3 Problem of Unemployment in India Causes, Effects and Remedial Measures to remove these problems | Conduct a GD on population explosion and its impact.<br>Prepare a comparative chart on employment in India dusting the five year plans.<br>Conduct a GD to find out measures for poverty alleviation.<br>Make ppt presentation on population explosion, poverty, unemployment. |

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| 10.0. Infrastructural Development in India<br>10.1 Transport and Communication,<br>10.2 Energy,<br>10.3 Health and Education | Prepare a project report on recent rends in communication.<br>Prepare transport documents of trade namely goods forwarding note, lorry receipt, delivery challan, railway receipt, mates receipt, Bill of lading, airway bill, etc.<br>Conduct case studies on different energy companies like Carin India, Power Corporation of India, Reliance Energy, Coal India ltd.<br>Collect secondary data on health and education. |

## Elective - I - Business Economics – 2 nd year

## (Subject Code – 90000012)

| Theory | Practical |
|---|---|
| . **Introduction Micro Economics –**<br>1.1 Meaning, Definition ,Nature<br>1.2 Tools of Analysis,<br>1.3 Role of Assumptions | **1)** Conduct a GD on the usefulness of Micre economics2) Prepare a PPT on the role of assumptions in Economics |
| **Consumer Behaviour and Demand Analysis**<br>2.1 Concept of Utility, Total and Marginal Utility, Law of Diminishing Marginal Utility. Law of Equi – marginal Utility.<br>2.2 Concept of demand, Types of demand, Determinants of Market demand, Law of demand.<br>2.3 Price elasticity of demand – Concept and Importance | 1) Make a ppt presentation on U. TU, MU, Law of diminishing marginal utility and law of equi – marginal utility.<br>2) Conduct a GD to substantiate the point that consumer behaviour mainly depends on economic theories.<br>3) Conduct a case discussion on elasticity of demand.<br>**4)** A visit to a mall/ departmental store to study consumer behaviour. |
| **Producer Behaviour and Supply Analysis.**<br>3.1 Meaning of Supply<br>3.2 Market Supply<br>3.3 Determinants of Market Supply and Law of Supply. | 1) Make a PPT differentiating total output, Stock and Supply concepts.<br>2) Make chart on law of supply with schedules and supply curve.<br>3) Prepare a project receipt on the Law of supply.<br>4) Conduct a case discussion on the elasticity of supply. |
| **Forms of Market and Price Determination**,<br>4.1 Perfect competition<br>4.2 Monopoly and Monopolistic Competition – Meaning and Features<br>4.3 Price Determination under Perfect Competition | 1) Conduct a discussion on 'prevalence of one price is the best test of perfect competition'<br>2) A visit to various markets to study the competition.<br>3) Write a report on the features of buyers market and sellers market. |

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| **Factors of Production**<br><br>5.1 Meaning and Features of Land as a factor of production,<br>5.2 Labour as a factor of production,<br>5.3 Capital as a factor of production,<br>5.4 Entrepreneur, Qualities and functions of entrepreneur. | 1) A visit to SISI, DIC to study about entrepreneurship.<br>practical will consist of:<br>• Preparing a project report<br>• How to start a business<br>• Collecting information about Permission/ Licenses required from various government agencies/ authorities<br>• Conducting proto type market surveys using the above statistical tools<br>• Preparing questionnaires for different types of market surveys<br>2) Prepare a project report on how to start an industry with financial details.<br>3) Conduct an interview with successful entrepreneurs.<br>4) Prepare a questionnaire for entrepreneurs.<br>5) Find out the problems faced by informal sector labour and prepare a report. |

| **Section II** | |
|---|---|
| 6.1 Meaning, Scope and Importance of Statistics in Economics | 1) Analyze the charts and diagram various statistical reports.<br>2) Collect secondary data from journals, magazines and newspapers. |
| **Collection and organization of data**<br>7.1 Collection of data – primary and secondary<br>7.2 Methods of data collection – primary methods – Observation, Interview, Methods of secondary data – Census and sampling, Random sampling.<br>7.3 Organization of data – Census and sampling, Ramdom sampling. | 1) Preparation of questionnaire for personal survey method, telephone interview and mail survey.<br>2) Select sample respondents and conduct socio – economic survey, marketing survey, etc.<br>3) Choose suitable sampling method to conduct the survey.<br>**4)** Classification of collected data, tabulation of data and analysis and interpretation of data. |
| **Graphical presentation of Data**<br>8.1 Tables – Components and Types<br>8.2 Graphs – Curves, Bar diagrams,<br>8.3 Pie – diagrams. | 1) Prepare a project report using statistical techniques, graphs, etc.<br>2) Prepare a bar diagram for the data collected.<br>**3)** Prepare pie charts. |
| **Measures of Central Tendency**<br>9.1 Mean<br>9.2 Median<br>9.3 Mode | 1) Solve practical problems of mean, median, etc. |

# Elective - I Physical Biology (Botany & Zoology) – 1st Year (Subject Code : 90000013)

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**1.0. General Biology**<br>1.1. Definition and its concept<br>1.2. Living World: Nature and scope of Biology<br>1.3. Cell and Cell division: Structure of the cell, Cell division<br>1.4. Main features of life and its characteristics (Irritability, Homeostasis, Adaptations, Reproduction and Growth & death.<br>1.5. Origin and evaluation of life<br>1.6. Theories of evaluation of life, origin of life, special creation, spontaneous generation, Abiogenesis, Evidences of organic evolution paleontological anatomical & embryological<br>1.7. Study of Tissues | Study of cells and tissues |
| **2.0. Introduction to Botany**<br>2.1 Origin, development and scope of Botany<br>1.2 Classification and its need<br>1.3 Nomenclature<br>1.4.Taxonomic Hierarchy<br>1.5. Five Kingdom system of classification<br>1.6. Two Kingdom system of classification<br>1.7. Thallophyta, Bryophyta and Pteridophyta<br>1.8. Gymnosperms, Angiosperms | Study of angiosperms and gymnosperms |
| **3.0. Vegetative Morphology of plants**<br>3.1.Root: Root System – types, modifications of root (storage roots, velaman roots, photosynthetic roots, respiratory roots, parasitic roots, nodular roots)<br>3.2 Stem: Characteristics and Functions of the stem Modifications of the stems (Aerial – Tendrils, Thorns, Hooks, Phylloclade, Tuberous stems, Bulbils: Sub Aerial – Runners, Stolons, Suckers, Offsets: Underground – Rhizome, Corm, Stem Tuber, Bulb)<br>3.3 Leaf: Parts and Functions (Types and Modifications of leaf base, stipule, petiole are excluded) Venation Types of leaves (simple and compound) Phyllotaxy (alternate, opposite, Whorled) Modifications of leaves (tendrils, spines, scale leaves, Phyllode, reproductive leaves, trap leaves (details of Nepenthes only) | Study of the structure of a plant(root, stem, leaf) |
| **4.0. Reproductive Morphology of plants**<br>4.1. Inflorescence – Types (racemose, cymose, special)<br>4.2. Flower – Parts, Sex Distribution, Symmetry, Position of Gynoecium, detailed description of flower (perianth, calyx, corolla, aestivation, androecium – parts, fixation, dehiscence of anther, lengths of stamens, union of stamens), gynoecium – number of carpels, fusion of carpels (excluding variations under syncarpous), ovary – number of locules, placentation, types of styles, stigma. | |

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| **SECTION B - ZOOLOGY**<br>**5.0. General Biology of Living world**<br>5.1. Main features of life and its characteristics (Irritability, Homeostasis, Adaptations, Reproduction and Growth & death.<br>5.2. Origin and evaluation of life<br>5.3. Theories of evaluation of life, origin of life, special creation, spontaneous generation, Abiogenesis, Evidences of organic evolution paleontological anatomical & embryological<br>5.4. Study of Tissues | |
| **6.0 Diversity of life**<br>6.1 Study and Classification of animals | Classification of animals |
| **7.0. Genetics**<br>**7.1. Chromosomal basis of inheritance** | |
| **7.0 Study of Phylum: Chordata**<br>7.1 General characters and out line classification of Chordata up to classes with typical examples.<br>7.2 Fishes: Distinctive features of cartilaginous and Bony fishes with typical examples.<br>7.3 Amphibia: Distinctive features of Urodela, Anura and Apoda with typical examples | Study of amphibians |
| **8.0 Study of Reptiles, Aves and Mammals**<br>8.1 Reptiles: Distinctive characters of Squamata, Rhynchocephalia, Crocodilia and Chelonia with typical examples.<br>8.2 Identification of Poisonous and Non- Poisonous Snakes, Poison apparatus, toxicity of Snake venom and treatment of snake bite including the first aid.<br>8.3 Aves: Distintive features of Carinatae and Ratitae with typical examples.<br>8.4 Mammals: Distinctive features of Prototheria , Metatheria and Eutheria. | 1) Study of mammals<br>2) study of reptiles |
| **9.0 Anatomy of Earthworm**<br>9.1. General characteristics of earthworm<br>9.2. Digestive and reproductive system<br>9.3. Inter-relation of earthworm with mankind | Study of earthworm |

# Elective - I Physical Biology (Botany & Zoology) – 2nd Year

# (Subject Code : 90000013)

| Theory | Practical |
|---|---|
| **Detailed Syllabus : SECTION A - BOTANY**<br>**1.0. Reproduction in Angiosperms**<br>1.1 Introduction<br>1.2 Microsporogenesis and development of male gametophyte<br>1.3 Ovule – structure, types, megasporogenesis, development of embryo sac<br>1.4 Pollination – Types, Contrivances of cross and self pollination. Agents of Pollination (definition with one example only)<br>1.5 Fertilization: Post Fertilization changes including seed structure (dicot, Monocot) and types of germination (epigeal, hypogeal & vivipary – definitions with one example) | Detailed Syllabus<br>Study of reproduction in angiosperms in details |

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|---|---|
| 1.6 Fruits: – Classification; false fruits, true fruits – simple (fleshy fruits – berry, pome, pepo, hesperidium, drupe: Dry fruits – dehiscent - legume, septicidal capsule, septifragal capsule, loculicidal capsule: Indehiscent – caryopsis, cypsela, nut: schizocarpic – lomentum, schizocarp), Aggregate and multiple fruits | |
| **2.0. Plant Taxonomy**<br>2.1 Introduction – alpha and omega taxonomy , aspects of taxonomy, flora, herbaria, botanical gardens (RBG – KEW , IBG – Kolkatta, NBG – Lucknow), binomial nomenclature, ICBN, Types of classification, Units of classification, brief account of Bentham and Hookers classification<br>2.2 Study of Malvaceae<br>2.3 Study of Fabaceae<br>2.4 Study of Solanaceae<br>2.5 Study of Liliaceae | |
| **3.0. Internal Organization of plants**<br>3.1 Tissues – Types (meristematic and permanent ) and Functions<br>3.2 Internal Structure of Dicot Root (Primary) and Monocot root<br>3.3 Internal Structure of Dicot Stem (Primary) and Monocot stem<br>3.4 Internal Structure of leaf (Dicot and Monocot)<br>3.5 Secondary Growth in Dicot Stem | Study of monocot and dicot stem |
| **4.0. Genetics**<br>4.1 Introduction to genetics<br>4.2 Mendel's Principles – Monohybrid, Dihybrid cross, Concept of probability in relation to Mendel's laws<br>4.3 Linkage and crossing over (only concept and significance)<br>4.4 Mutations – gene and chromosomal (only definitions of terms: – spontaneous, induced, chromosomal structural and chromosomal numerical changes) | **Mendel's principle** |
| **SECTION B - ZOOLOGY**<br>**5.0. Morphology of Humans**<br>5.1. Nutrition and respiration in man<br>5.2. Locomotion in man<br>5.3. Study of Human Skeleton | **Study of human skeleton(Bone theory)** |
| **6.0 Physiology of Humans**<br>6.1. Circulation<br>6.2. Osmoregulation and excretion<br>6.3. Nervous co – ordination<br>6.4. Hormonal co – ordination | **1) Study of hormones**<br>**2) study of circulation and excretion(diagrammatic chart)** |
| **7.0 Reproduction, growth and development**<br>7.1. Details of Reproduction and human development | **Study of reproduction in humans** |
| **8.0 Biology in Human welfare**<br>8.1. Aquaculture: List of animals of aquacultural importance in Tabular form only<br>8.2. Poultry: Poultry farming methods, Layers and Broilers, Poultry diseases (Bacterial,Viral and Fungal - Three each)<br>8.3. Study of diseases: AIDS, Cancer, Typhoid<br>8.4. Immunity system<br>8.5. Biotechnology ( Elementary aspects)<br>8.6. Applications of Biology: Vermiculture and Fishery | **Study of various diseases** |

# Subject Name : Entrepreneurship – 1st Year

# (Subject code : 90000014)

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**1.0. Entrepreneurship**<br>1.1. Concept, Functions and need<br>1.2. Entrepreneurship: Characteristics and Competency<br>1.3. Relevance of Entrepreneurship to Socio-Economic Gain: generating National Wealth, creating Wage and Self -Employment, Micro, Small and Medium Enterprises, Optimizing Human and Natural Resource and Solving Problems in the path of prosperity, building enterprising Personality and Society.<br>1.4. Process of Entrepreneurship Development. | **Detailed Syllabus**<br>I. Study visit by students to any enterprise of own choice. With the help of a schedule/questionnaire the students will record observation regarding – the background of entrepreneur, reasons for selecting the entrepreneurial career, starting the enterprise, the type of enterprise, the process of setting this enterprise, products/services, production process, investment made and marketing practices followed, profit or loss, growth and development, problems faced, institutions/organizations which offer support and entrepreneur's level and type of satisfaction. |
| **2.0. Entrepreneurial Pursuits and Human Activities:**<br>2.1. Nature, Purpose and pattern of Human Activities:<br>Economic and Non-Economic, Need for innovation.<br>2.2. Rationale and Relationship of Entrepreneurial pursuits and Human Activities. | II. Preparation of a brief report based on the observations made during study-visit to an enterprise. |
| **3.0. Acquiring Entrepreneurial Values and Motivation**<br>3.1 Entrepreneurial Values, Attitude and Motivation-Meaning and concept.<br>3.2 Developing Entrepreneurial Motivation and Competency – concept and process of Achievement Motivation, Self-efficacy, Creativity, Risk Taking, Leadership, Communication and Influencing Ability and Planning Action.<br>3.3. Barriers to Entrepreneurship<br>3.4. Help and support to Entrepreneurs | |
| **4.0. Introduction to Market Dynamics**<br>4.1. Understanding a Market<br>4.2. Competitive Analysis of the Market<br>4.3. Patents, Trademarks and Copyright | |
| **5.0. Project Selection**<br>5.1. Product Identification<br>5.2. Project Formulation | |

# Entrepreneurship – 2nd Year

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**1.0. Entrepreneurial Opportunities and Enterprise Creation**<br>1.1. Sensing Entrepreneurial Opportunities<br>1.2. Environment Scanning<br>1.3. Market Assessment<br>1.4. Identification of Entrepreneurial Opportunities<br>1.5. Selection of an Enterprise<br>1.6. Steps in setting up of an Enterprise | **Detailed Syllabus** |
| **2.0. Enterprise Planning and Resourcing**<br>2.1. Business Planning – Preparation of a Project Report<br>2.2. Resource Assessment -Financial and Non – Financial.<br>2.3. Fixed and Working Capital Requirement, Funds, Flows, Profit Ratios, Break Even Analysis etc.<br>2.4. Mobilizing Resources – Sources and Means of Fund, Facilities and Technologies for starting an Enterprise. | |
| **3.0. Enterprise Management**<br>3.1. General management: Basic Management functions.<br>3.2. Organizing/Production of goods and services – quality, quantity and flow of inputs.<br>3.3. Managing Market: Meaning, Functions of Marketing, Marketing Mix:<br>* Product<br>* Price<br>* Place<br>* Promotion (advertising and sales promotion).<br>3.4. Managing Finance – Sources of Long Term and Short Term Finances, Determination of Cost, Income, Calculation of Profit/Loss.<br>3.5. Managing Growth and Sustenance -Affecting Change, Modernization, Expansion, Diversification and Substitution.<br>3.6. Entrepreneurial Discipline – Laws of Land, Ecology, Consumer's Concept, Adherence to Contract and Credits. | |
| **4.0. Industrial Relations and Personnel Management**<br>4.1. Meaning, Source of recruitment, Internal/External recruitment procedure<br>4.2. Incentives, appraisal and training, Industrial relations,<br>Industrial disputes. | |
| **5.0. Report Writing**<br>5.1. Guidelines<br>5.2. Model project reports | |

## Subject Name : Psychology – 1st Year

## (Subject code : 90000015)

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**1.0. Psychology Introduction :**<br>1.1. Definition of Psychology<br>1.2. Methods of Psychology<br>1.3. Subfields of Psychology<br>1.4. Schools of Psychology (a) Old (b) New | **Detailed Syllabus**<br>I. Study until by student to any organization for differently able person with special needs or a centre for the treatment of the mentally ill. With the help of a questionnaire the student will record observation regarding the type of treatment given, different therapies available at the organization/centre, prognosis of the patients improvement in quality of life, support for previous care given to the patient/clients. |
| **2.0 Memory**<br>2.1 A Theory of General Memory Function<br>2.2 Information Processing Theories<br>2.3 The Levels of Processing Theories<br>2.4 The Organization of Long Term Memory<br>2.5 Retrieval From Long term memory.<br>2.6 Forgetting | **II.** Preparation of a brief report based on the observations made during case study-visit to an organization. |
| **3.0 Learning**<br>3.1 Definition<br>3.2 Classical Conditioning<br>3.3 Instrumental Conditioning<br>3.4 Escape Learning<br>3.5 Avoidance Learning<br>3.6 Signature of Instrumental Conditioning<br>3.7 Cognitive Learning | |
| **4.0 Motivation**<br>4.1 Definition<br>4.2 Motives as References, Explanations and Predictions.<br>4.3 Theories of Motivation<br>4.4 A Normal of Biological Motivation<br>4.5 Biological Motivation<br>4.6 Social Motives<br>4.7 Self-Actualization Motivation<br>4.8 Frustration and Conflict of motives | |
| **5.0 Personality**<br>5.1 Definition<br>5.2 Theories of Personality | |
| **6.0 Motivation**<br>6.1 Definition<br>6.2 Etiology<br>6.3 Diagnosis<br>6.4 Clinical Features<br>6.5 Treatment | |
| **7.0 Perception and Attention**<br>7.1 Definition of Perception<br>7.2 Sensory Processes<br>7.3 Illusions<br>7.4 Attention | |

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| **8.0 Emotions**<br>8.1 Definition<br>8.2 Expression and Perception of Emotions<br>8.3 Physiology of Emotions<br>8.4 Stress | |
| **9.0 Intelligence**<br>9.1 Definition<br>9.2 Intelligence Quotient (IQ)<br>9.3 Intelligence Testing | |

# Abnormal Psychology - 2nd Year

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**1.0. Abnormal Psychology**<br>1.1. Definition of Psychological Disorder<br>1.2. Classification of Psychological Disorder | **Detailed Syllabus**<br>The Main objective of the course in Psychology is to help the students establish a better rapport with their clients. A basic understanding and knowledge of this subject will enable the students to deal with each client as an individual, while also being aware of his/her unique needs. Also, due to the established mind-body connection, some patients requiring Physiotherapy have a Psychological cause as the basis of their physiological symptoms. Severe physiological symptoms requiring therapy can lead to psychological conditions in the patient. Relevant knowledge of psychology can help sensitize the physiotherapist to the needs of the client and treat the patient in a more holistic manner.<br><br>Such a course would need to have an experimental component in the form of practical work. The objectives of the practical work are :-<br>1. To give the students firsthand experience in field work with hospitals / centers catering to the psycho-physiological needs of patients.<br>2. To develop in the students the skill and sensitivity to deal with each patient as an individual with his or her own unique need.<br>3. To guide the students to prepare a project report.<br>4. To equip the students to make a note of patients psychological conditions in the case history of the patient.<br>5. To instill in the students the right values and a greater understanding of their patients. |

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| **2.0 Schizophrenia**<br>2.1 Definition<br>2.2 Symptoms<br>2.3 Subtypes<br>2.4 Treatment<br>2.5 Prognosis | |
| **3.0 Paranoia**<br>3.1 Definition<br>3.2 Symptoms<br>3.3 Subtypes<br>3.4 Treatment | |
| **4.0 Manic Depressive Psychosis**<br>3.1 Definition<br>3.2 Symptoms<br>3.3 Subtypes | |
| **5.0 Melancholia**<br>5.1 Symptoms<br>5.2 Treatment | |
| **6.0 Anxiety**<br>6.1 Symptoms of anxiety<br>6.2 Difference between normal fears and anxiety disorder<br>6.3 Peripheral manifestations of pathological anxiety.<br>6.4 Classification of anxiety disorder.<br>6.5 Treatment | |
| **7.0 Phobia**<br>7.1 Definition<br>7.2 Symptoms<br>7.3 Types of phobia<br>7.4 Treatment | |
| **8.0 Obsessive Compulsive neurosis (OCN)**<br>8.1 Definition of Obsession<br>8.2 Definition of Compulsion<br>8.3 Symptoms<br>8.4 Treatment | |
| **9.0 Hysterical Conversion Disorder**<br>9.1 Definition<br>9.2 Clinical features (Symptoms)<br>9.3 Treatment | |
| **10.0 Neurasthenia**<br>10.1 Definition<br>10.2 Symptoms<br>10.3 Treatment | |
| **11.0 Personality Disorders**<br>11.1 Definition<br>11.2 Symptoms<br>11.3 Classification / Types of Personality Disorders<br>11.4 Anti-social Personality Disorder<br>(i) Etiology<br>(ii) Treatment | |
| **12.0 Psychotherapy**<br>12.1 Definition<br>12.2 Types of Psychotherapy | |

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| **13.0 Organic Psychosis**<br>13.1 Definition<br>13.2 Symptoms<br>13.3 Types of Organic Psychosis<br>(i) Causes<br>(ii) Clinical Features<br>(iii) Treatment<br>(iv) Course and Prognosis | |
| **14.0 Alcohol Related Mental Disorders**<br>14.1 Definition<br>14.2 Etiology<br>14.3 Classification<br>14.4 Treatment and Rehabilitation. | |
| **15.0 Epilepsy**<br>15.1 Definition<br>15.2 Varieties / Types of epilepsy<br>15.3 Cause of epilepsy<br>15.4 Aggravating factors<br>15.5 Post-ictal disorders<br>15.6 Epilepsy Vs. Pseudo-seizures<br>15.7 Status Epilepticus & treatment<br>15.8 Treatment of Epilepsy | |
| **16.0 Mental Retardation (MR)**<br>16.1 Definition<br>16.2 Classification<br>16.3 Etiology<br>16.4 Diagnosis<br>16.5 Clinical Features<br>16.6 Treatment | |
| **17.0 Frustration and conflict**<br>17.1 Definition of Frustration<br>17.2 Sources of Frustration<br>17.3 Types of conflict | |
| **18.0 Mental Mechanisms**<br>18.1 Classification | |

**Practical (Second Year)**

**Introduction:**

The Main objective of the course in Entrepreneurship is to generate in the students initiative, self reliance and enthusiasm so as to empower them to become entrepreneurs both in spirit and performance. A number of skills such as observation, evaluation, communication, resource mobilization and management, risk assessment, team building etc. is also to be developed in the students. Leadership qualities, sensitivity to business ethics and adherence to a positive value system are the core issues that the course highlights while presenting different concepts related to entrepreneurship.

Such a course should necessarily have a strong experiential component in the form of practical work. The objectives of the practical work are:

1 To introduce the students to the world of business by developing in them the core skills and competencies required for an entrepreneur.

2. To develop in the students qualities such as leadership, self-confidence, initiative, facing uncertainties, commitment, creativity, people and team building, integrity and reliability.

3. To enable the students to acquire the skills and knowledge needed for conducting surveys, collecting, recording and interpreting data and preparing simple estimates of demand for products and services.

4. To guide the students to prepare a Project Report.

5. To equip the students with knowledge and skills needed to plan and manage an enterprise through case studies conducted and recorded by the students in different fields such as resource assessment, market dynamics, finance management, cost determination, calculation of profit and loss etc.

6. To instill in the students important values and entrepreneurial discipline.

## FORMAT

**Total marks: 30**

| | |
|---|---|
| 1. Project Report/Survey Report | 10 Marks |
| 2. Viva-Voce on PW /SR | 05 Marks |
| 3. Case Study | 10 Marks |
| 4. Problem Solving | 05 Marks |

### 1. Project Report/Market Survey Report — 10 Marks

**a) Project Report:**

Preparation of a Project Report for an enterprise involving products/services Students may be provided adequate guidance to choose a project based on their interests and availability of information and authentic inputs in the locality. The specimen proforma of project report given in the textbook may be used for preparing the report. However, mechanical preparation of the report by filling in the information in the proforma should be discouraged.

Further, as the students will be required to appear for a Viva-voce on the basis of their projects, sufficient care should be taken by the students to prepare the report after studying the various aspects involved thoroughly. In a nutshell, the project report should lead to viable enterprise.

**b) Market Survey Report**

Market research is the process and technique of finding out who your potential customers are and what they want. The survey may be on products and services already available in the market or students may also conduct surveys for new products and services. The report of the survey should be organised under the following broad headings :

1. Objectives.
2. Methods and tools (interviews ,questionnaires etc.) to be used to collect information.
3. Records of data and information.
4. Analysis of data and information.
5. Interpretation and conclusion.

For example, a survey may be conducted to find out the choice of households in toiletry soap, tooth paste etc. The data may be analysed to establish a pattern that may be useful to an entrepreneur.

**Guidelines for assessment of Project Report / Survey Report**

1. Presentation: Format, Clarity, Use of graphs, tables and other visuals, organisation, methodical recording of data and information and general neatness of execution. 5 marks

2. Originality and Creativity 3 marks

3. Authenticity of information and correctness of calculations and general feasibility of the project/ sustainability of conclusion drawn in the survey. 2 marks

**2. Viva Voce on the Project /Market Survey Report** 5 Marks

The questions should establish that the report is the original work of the student and that the student has a reasonably clear understanding of the work carried out by him/her. Entrepreneurial qualities such as leadership, self-belief, creativity, originality, initiative etc. may also be assessed by asking a variety of questions related to the report.

**3. Case Study**

10 marks

A case study is a focused research on an organisation, enterprise, practice, behaviour or person undertaken to highlight an aspect that the study attempts to examine. For instance, a case study may be conducted on the pollution control methods being employed by an industry. Or a successful industrialist may be chosen as a subject of a case study to analyze and understand the strategies that the industrialist adopted :to achieve success.

Ideally, a case study should be conducted on subjects with the objectives of bringing to the fore beliefs, practices, strategies, values etc. that have made them what they are. Such studies help us to understand the way in which great minds think and operate. We may also conduct case studies on failures; why a company collapsed, how a service lost its market etc. From both the types of case study, we learn lessons; how to do something or how not to do something. They also provide valuable insight into the processes involved in an enterprise.

## A few topics are suggested for carrying out case studies :

i) Drawing a profile of a successful entrepreneur.

ii) Studying a public sector undertaking and highlighting its sucess/failure, by analyzing the factors responsible.

iii) Studying a small scale unit in the locality to bring out the procedures and processes adopted by the unit to become a feasible business venture.

iv) A study of competition in business by choosing two or more rivals in the market and analyzing their strengths and weaknesses.

v) Take the school itself for a case study and analyze any two aspects of the school plant for chalking out a plan of action: infrastructure, academics, co-curricular activities etc.

vi) A case study on a thriving fast food shop/restaurant in your locality. What makes it so popular?

vii) A case study on the ways in which a business unit has mobilised its financial resources.

viii) A case study on the enterprise management techniques adopted by a business house.

ix) A case study on the marketing strategies of a sucessful consumer durable company.

x) A case study on the financial management of a Public Limited Company.

xi) A case study on any Specialized Institution that supports and guides the establishment of a small scale unit.

xii) Studying the balance sheets of two big private companies to assess their trade and credit worthiness.

xiii) Studying the inventory management of a large manufacturing industry to ascertain the processes involved for optimizing cost.

xiv) Carrying out a case study on an established industrial house/company to find out the value system of the company and how it fulfils its social commitment/obligations.

xv) Carrying out a case study on an established industry to ascertain the processes followed to reduce/prevent pollution.

xvi) Study on enviourment friendly companies and their contribution to preservation.

**Assessment of Case Studies**

i) Presentation: Format, accuracy, clarity, authenticity and general neatness 7 marks

ii) Analysis and Conclusions 3 marks

## 4. Problem Solving 5 marks

In this session, the students will be requried to solve a problem in the form of a written test. The examiner may choose any problem related to the units in class XII Text Book and set it for the class. The problem may be in the following areas :

a. How to scan the environment to establish the feasibility of a project.

b. Given certain figures showing the consumption pattern of a product, drawing conclusions that have a bearing on similar products.

c. Carrying out market assessment for a given product/service to ascertain the feasibility factor.

d. Assessment of Working Capital.

e. Calculation of total cost of production.

f. Calculation of break-even point.

g. Determining location of a manufacturing unit.

h. Problems in inventory control (calculation of the Economic Order Quantity and carrying out ABC analysis).

i. Applying Pricing methods to determine the price of a product or service.

j. Applying promotion mix to plan a sales campaign for a product or service.

k. Working out a simple budget for a given task or job.

**Assessment of Answers**

The examiner may prepare five problems which are solved by him/her before they are presented to the students. The student may choose anyone of the problems and solve it, showing the different steps/different reasons involved in the solution. If the problem does not involve actual calculations, it may not have anyone correct answer. So weightage should be given not only to the final answer but to the entire process of problem solving that the student has followed. Originality and innovative spirit should be rewarded. The students should not be penalized for pelling errors, grammatical mistakes etc. as long as the answer is coherent. Where definite formulas are involved, accuracy should be given due weightage.

## LIST OF SUGGESTED REFERENCE BOOKS


01. Entrepreneurship – Class XI – C. B. S. E., Delhi.
02. Entrepreneurship – Class XII- C. B. S. E., Delhi.
03. Udyamita (in Hindi) by Dr. M M.P. Akhouri and S.P Mishra, pub. by National Institute for Entrepreneurship and Small Business Development (NIESBUD), NSIC-PATC Campus, Okhla.
04. Trainer's Manual on Developing Entrepreneurial Motivation, By M.M.P. Aukhori, S.P. Mishra and R. Sengupta, Pub. by (NIESBUD), NSIC-PATC Campus, Okhla.
05. Behavioral Exercises and games – manual for trainers, learning systems, by M. V. Despande, P. Mehta and M. Nandami.
06. Product Selection by Prof. H.N. Pathak, Pub. By (NIESBUD), NSIC-PATC Campus, Okhla.
07. Entrepreneurial Development – Dr. S. Moharana and Dr. C.R.Dash, Pub. by RBSA Publishers, Jaipur.
08. Entreprenurial Development by S.S.Khanna, Published by S.Chand & Company Ltd., Ram Nagar, New Delhi.
09. Entrepreneurial Development by C.B. Gupta and N.P.Srinivasan, Publisher Sultan Chand & Sons, 1992.
10. Entrepreneurship Development – Principles, Policies and Programmes by P. Saravanavel, Publishers Ess Pee Kay Publishing House, Madras.
11. Entrepreneurship, Growth and Development, by Rashi Ali, Pub. by Chugh Publication and Strech Road, Civil Lines, Post Box No. 101, Allahabad-211991.
12. Entrepreneur and Entrepreneurship Development and Planning in India, by D.N.Mishra, pub. by Chugh Publication, Allahabad.
13. Aoudhogik Disha Nirdesh (in Hindi) Pub. by Centre for Entrepreneurship Development, M.P. (CEDMAP), 60, Jail Road, Jhangerbad, Bhopal-462008.
14. Entrepreneur, Industry and Self-employment Project, Part-l and 2(in Hindi), Pub. by Centre for Entrepreneurship Development, M.P. (CEDMAP), 60 Jail Road, Jhangerbad, Bhopal-462008.
15. Small Scale Industry & Self-Employment Projects, Part-l and 2 (in Hindi), Pub. by Centre for Entrepreneurship Development, M.P. (CEDMAP),60 Jail Road, Jhangerbad Bhopal.


### Magazines


01. Udyamita Samachar Patra,(Monthly, Hind), Pub. by Centre for Entrepreneurship Development, M.P.(CEDMAP), 60 Jail Road, Jhangerbad, Bhopal-462008.
02. Science Tec. Entrepreneur (A Bi Monthly Publication), centre for Enterprenurship Development, M.P. (CEDMAP), 60 Jail Road, Jhangerbad , Bhopal -462008.
03. Laghu Udhyog Samachar.
04. Project Profile by DCSSI.
05. Project Profile by Pub. Centre for Enterpreeurship Development, M.P. (CEDMAP), 60 Jail . Road, Jhangerbad, Bhopal-462008.

# Elective – II - APPLIED SCIENCE (Physics & Chemistry) – 1st Year

# (Subject Code – 90000021)

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**SECTION A : PHYSICS**<br>**1.0. Measurement, Units, and Dimension**<br>1.1 Introduction: Need for measurement, Units and documents, accuracy, precision of measuring instruments.<br>1.2 Types of Errors: Constant error, systematic error, environment error (errors due to external causes). Error due to imperfection, random error, gross error, percentage error.<br>1.3 Combination of Error: Error due to addition, subtraction, multiplication, division, powers of observed quantities.<br>1.4 Units and Dimensions: Fundamental and derived physical quantities, systems of units in SI systems. Rules for writing units in SI, derived units in SI. Multiples and submultiples of SI units.<br>1.5 Dimensions: dimensional formulae and dimensional equations, dimensional constants and dimensionless quantities, principle of homogeneity of dimensions.<br>1.6 Application of dimensional method of analysis: Conversion of one system of units into another, to check the correctness of an equation, to derive the relationship between different physical quantities.<br>1.7 Order of magnitude and significant figures<br>1.8 Concept of accuracy and estimation of errors | **Detailed Syllabus**<br>Perform a simple experiment on measurement and error |
| **2.0. Scalars and Vectors**<br>2.1. Introduction to scalars and vectors<br>2.2. Addition and subtraction of vectors<br>2.3. Product of vectors | |
| **3.0. Motion & Force**<br>3.1. Definition of Motion, Uniformly accelerated motion along straight line<br>3.2. Position time graph and velocity-time graph<br>3.3. Equation of a projectile path<br>3.4. Time of light, Horizontal range, Maximum height of a projectile<br>3.5. Definition and types of forces<br>3.6. Introduction to gravitation, electromagnetic and nuclear forces<br>3.7. Law of conservation of momentum<br>3.8. Elastic and inelastic collisions<br>3.9. Momentum of force, couple and properties of couple<br>3.10. Centre of mass and gravity<br>3.11. Conditions of equilibrium of a rigid body | **Experiment on gravitational force(example of a ball falling from a certain height)** |

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| **4.0. Friction**<br>4.1. Origin and nature of frictional forces<br>4.2. Laws of static and kinetic fictions<br>4.3. Pressure due to fluid column<br>4.4. Pascal's law and its applications<br>4.5. Newton's formula<br>4.6. Stoke's law<br>4.7. Equation for terminal velocity<br>4.8. Bernaulli's principle and its applications | **Proof of Stoke's theorem and Bernaulli's principle** |
| **5.0. Dynamics**<br>3.1 Introduction, Newton's Law of Motion.<br>3.2 Application of Newton's laws – Objects suspended by strings, blocks placed in contact with each other on frictionless horizontal surface, apparent weight in a lift.<br>3.3 Impulse, Law of conservation of linear momentum, Conservation of linear momentum during collision.<br>3.4 Work, power, energy potential Energy (PE), Kinetic Energy (KE), definition & derivation for both, relation between KE & linear momentum.<br>3.5 Conservation and non conservative forces, Work energy theorem, law of conservation of energy in case of freely falling body and vertically projected body. | **Derivation for Potential energy and kinetic energy** |
| **6.0. Sound waves**<br>6.1. Waves and oscillations<br>6.2. Progressive waves<br>6.3. Characteristics of transverse waves, longitudinal waves<br>6.4. Sound as longitudinal wave motion<br>6.5. Definition of period, frequency, wavelength giving their relations.<br>6.6. Newton's formula for velocity of sound, laplace's correction | |
| **7.0. Thermal expansion**<br>7.1. Expansion of solids, liquid<br>7.2. Linear expansion, area and volume expansion<br>7.3. Thermal conduction, temperature gradient and coefficient of thermal conductivity | **Experiment on expansion of solids in a thermal envirnment** |
| **8.0. Refraction of light and lens**<br>8.1. Refraction of light: Refraction of monochromatic light, Snell's law, Total internal reflection, Critical angle, Optical fiber, Dispersion of light, Prism formula, Rainbow, Scattering of light<br>8.2. Wave Theory of light: Huygen's principle, Construction of plane and spherical wave front, Wave front and wave normal, Reflection at a plane surface, Polarization, Plane polarized light<br>8.3. Interference and Diffraction: Interference of light, Condition's for producing steady interference, Young's experiment, analytical treatment, expression for path difference and fringe width, Measurement of wavelength by bi prism experiment, Diffraction due to single slit, Rayleigh's criteria, Difference between interference and diffraction<br>8.4. Critical angle, Optical fiber, dispersion of light, Prism formula, angular dispersion and dispersive power<br>8.5. Refraction at single curved surface | **Experiment on Refraction of light using a prism** |

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| 8.6. Lens maker's equation<br>8.7. Concept of conjugate foci<br>8.8. Magnifying power of simple microscope, compound microscope and telescope<br>8.9. Lens defects | |
| **9.0. Modern Physics**<br><u>Part A – Electrons and Photons</u><br>9.1. Discovery of electron<br>9.2. Charge and mass of electron<br>9.3. Photo electric current<br>9.4. Einstein's equation<br>9.5. Photoelectric cell and its applications<br><u>Part B – Atoms, Molecules and Nuclei</u><br>9.6. Bohr's model<br>9.7. Hydrogen spectrum<br>9.8. Laser as a light source<br>9.9. Wavelength of an electron<br>9.10. Davisson and Germer experiment<br>9.11. Elementary idea of electron microscope | |

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| **SECTION B – CHEMISTRY**<br>**1.0. Basics of Chemistry**<br>1.1. Importance of Chemistry<br>1.2. Fundamental and derived units and their SI units<br>1.3. Gay-Lussac's law, Avogadro's law<br>1.4. Derivation of molecular weight, gram molecular volume<br>1.5. Stoichiometry Mole concept<br>1.6. Equivalent weight, Atomic weight, Molecular weight<br>1.7. Percentage composition and molecular formula<br>1.8. Numerical based on weight-volume relationship | **Solve Problems based on weight – volume relationship** |
| **2.0. Atomic Structure**<br>2.1 Characteristics of electron, proton and neutron.<br>2.2 Rutherford model of an atom.<br>2.3 Nature of electromagnetic radiation,<br>2.4 Planck's quantum theory.<br>2.5 Explanation of photo electric effect.<br>2.6 Features of atomic spectra.<br>2.7 Characteristics of hydrogen spectrum.<br>2.8 Bohr's theory of the structure of the atom.<br>2.9 Bohr's explanation of spectral lines.<br>2.10 Failure of Bohr's theory.<br>2.11 Wave-particle nature of electron.<br>2.12 de Broglie's hypothesis, Heisenberg's uncertainty principle.<br>2.13 Important features of the quantum mechanical model of an atom.<br>2.14 Quantum numbers, concept of orbitals, define an atomic orbital in terms of quantum numbers – shapes of s, p and d orbitals, state Aufbau principle, Pauli's exclusion principle and Hund's rule of maximum multiplicity.<br>2.15 Electronic configurations of atoms. Explanation of stability of half filled and completely filled orbitals. | **Study of Planck's quantum theory and Bohr's theory** |

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| **3.0 Classification Of Element And Periodicity In Properties**<br>3.1 The concept of grouping elements In accordance to their properties.<br>3.2 The periodic law.<br>3.3 The significance of atomic number and electronic configuration as the basis for periodic classification.<br>3.4 Classify elements into s, p, d, f blocks and discuss their main characteristics.<br>3.5 Periodic trends in physical and chemical properties of elements.<br>3.6 Periodic trends of elements with respect to atomic radii, ionic radii, inert gas radii, ionization energy, electron gain energy, electro negativity and valence.<br>3.7 Variation of atomic radii in inner transition elements. | **Study of Structure of periodic table** |
| **4.0. Redox Reaction**<br>4.1. Introduction to Oxidation & Reduction<br>4.2. Electron transfer concept<br>4.3. Oxidising & Reducing agents<br>4.4. Redox reactions in aqueous solutions<br>4.5. Oxidation number and rules for assigning oxidation number<br>4.6. Balancing of chemical equations | |
| **5.0. Chemical Equilibrium**<br>5.1. Introduction: Reversible and irreversible reactions<br>5.2. Rate of reaction and factors affecting it<br>5.3. Chemical Equilibrium<br>5.4. Laws of Mass action, Equilibrium constant, relationship between $K_p$ and $K_c$ | **Numerical problems based on $K_p$ and $K_c$** |
| **6.0. Adsorption:**<br>6.1. Concept of adsorption<br>6.2. Difference between absorption and adsorption<br>6.3. Physical and chemical adsorption<br>6.4. Factors affecting adsorption<br>6.5. Applications of adsorption | **Experiment on absorption(example of a sponge) to give the difference between absorption and adsorption** |
| **7.0 Chemical Bonding and Molecular Structure**<br>7.1 Kossel-Lewis approach to chemical bonding.<br>7.2 Factors favorable for the formation of ionic bond, energy changes in ionic bond formation.<br>7.3 Crystal lattice energy – calculation of lattice energy – Bom-Haber cycle.<br>7.4 Crystal structures of sodium chloride and Caesium chloride.<br>7.5 Properties of ionic compounds.<br>7.6 Covalent bond – VSEPR theory and predict the geometry of simple molecules.<br>7.7 The valance bond approach for the formation of covalent bonds.<br>7.8 Directional properties of covalent bond.<br>7.9 Properties of covalent bond.<br>7.10 Different types of hybridization involving s, p and d orbitals and draw shapes of simple covalent molecules.<br>7.11 Definition of coordinate covalent bond with examples.<br>7.12 Description of molecular orbital theory of homonuclear diatomic molecules.<br>7.13 Bonding, antibonding molecular orbitals, o, n bond orbitals, their symmetry.<br>7.14 Energy diagrams of molecular orbitals of H2, N2 and 02. | |

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| 7.15 Concept of hydrogen bond – Types of hydrogen bonds, inter and intra molecular hydrogen bonds.<br>7.16 Effect of hydrogen bonds on some properties of substances with examples.<br>7.17 Different states of matter in terms of balance between intermolecular forces, thermal energy of particles. | |
| **8.0. S-block, P-block, d-block & F-block elements**<br>8.1. Introduction to S & P blocks<br>8.2. Position in periodic table, general electronic configuration<br>8.3. Comparison between alkali and alkaline earth metals<br>8.4. Sodium occurrence, uses of sodium<br>8.5. Methods of extraction<br>8.6. Physical and chemical properties<br>8.7. Difficulties in isolation of fluorine<br>8.8. Methods of preparation<br>8.9. Uses of fluorine | |

## Elective – II - APPLIED SCIENCE (Physics & Chemistry) – 2nd Year

## (Subject Code – 90000021)

| Theory | Practical |
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| **Detailed Syllabus :**<br>**SECTION A - PHYSICS**<br>**1.0. Electrostatics**<br>1.1 Gauss's theorem, proof and application<br>1.2 Mechanical force on unit area of a charged capacitor<br>1.3 Energy density of a medium<br>1.4 Concept of a condenser<br>1.5 Capacity of parallel plate condenser<br>1.6 Effect of dielectric on capacity<br>1.7 Energy of a charged condenser<br>1.8 Condensers in series and parallel | **Detailed Syllabus**<br>**1) Proof of Gauss's theorem**<br>**2) Solve numericals on series and parallel plate capacitors** |
| **2.0. Current, Electricity and Magnetic effects of electric current**<br>Part A – Current Electricity<br>2.1. Ohm's Law<br>2.2. Ohmic and non-ohmic resistances , specific resistance, conductance,<br>2.3. Temperature dependence of resistivity<br>2.4. Thermistor<br>2.5. emf of a cell - internal resistance and back e.m.f's<br>2.6. Kirchoff's laws: statement and explanation, application to wheatstone's bridge for its balance conditions , metre bridge, principle of potentiometer<br>2.7. Comparison of e.m.f. of cell, determination of internal resistance of a primary cell, Series and parallel combination of cells. | **1) Solve numericals on Ohm's law**<br>**2) Experiment on wheatstone's bridge** |

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| Part B – Magnetic effects of electric current<br>2.8. Biot Savart's law<br>2.9. Right hand Thumb rule<br>2.10. Magnetic induction at the center and at the point along the axis of circular coil carrying current<br>2.11. Flemming's left hand rule<br>2.12. Definition of Ampere<br>2.13. Ampere's law and its applications<br>2.14. Moving coil galvanometer<br>2.15. Ammeter<br>2.16. Voltmeter | |
| **3.0. Magnetism**<br>3.1. Coulomb's inverse square law<br>3.2. Couple acting on a bar magnet placed in a uniform magnetic field<br>3.3. Magnetic moment of a magnet<br>3.4. Expression for Magnetic induction due to a bar magnet on axial and Equatorial lines<br>3.5. Superposition of magnetic fields<br>3.6. Tangent law<br>3.7. Deflection Magnetometer<br>3.8. Comparison of magnetic moments in Tan-A and Tan-B positions by Equal distance method and null method | |
| **4.0. Electromagnetic waves**<br>4.1. Electromagnetic waves and their characteristics<br>4.2. Transverse nature of electromagnetic waves<br>4.3. Electromagnetic spectrum<br>4.4. Propagation of electromagnetic waves in atmosphere | |
| **5.0. Electromagnetic Induction**<br>5.1. Laws of electromagnetic induction<br>5.2. Eddy currents<br>5.3. Self and mutual induction<br>5.4. Transformer<br>5.5. Coil rotating in uniform magnetic field<br>5.6. Alternating currents<br>5.7. Reactance and impedance<br>5.8. Power in a a.c. circuit with resistance, inductance and capacitance<br>5.9. Resonant circuit | **Solve numericals on power in a.c circuit, transformers and resonating circuits** |
| **6.0. Semiconductors**<br>6.1. Energy bands in solids<br>6.2. Intrinsic and extrinsic semiconductors<br>6.3. p – type and n – type semiconductors<br>6.4. P – N junction diode<br>6.5. LED<br>6.6. Rectifiers<br>6.7. Zener diode as a voltage regulator<br>6.8. Solar cell<br>6.9. Transistor as an amplifier<br>6.10. Oscillators<br>6.11. Logic gates | |

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| **7.0 Communication**<br>7.1. Space communication<br>7.2. Ground, sky and space wave propagation<br>7.3. Satellite communication<br>7.4. Line communication<br>7.5. Two wire lines<br>7.6. Cables<br>7.7. Optical communication | **Study of various types of cables and wires** |
| **SECTION B - CHEMISTRY**<br>**6.0. Electrochemistry**<br>6.1 Electrolytes and Non-electrolytes.<br>6.2 Faraday's laws of electrolysis.<br>6.3 Galvanic & Voltaic cells representation<br>6.4 Nernst equation (No derivation) , e.m.f. calculations. | **Experiment on faraday's law of electroststics** |
| **7.0 Nuclear Chemistry**<br>7.1 Composition of Nucleus - Isotopes, Isotones, Isobars, Nuclear stability - Factors effecting Nuclear stability, mass defect, binding energy, Average binding energy, N/P ratio, Magic Numbers).<br>7.2 Radio-active disintegration and its rate-Half-life and average life.<br>7.3 Natural and artificial radio-activity, disintegration series-Group displacement law-Types of Nuclear reactions (fission and fusion)-Differences between Nuclear and Chemical reactions- Radio-active isotopes and their applications Idoine 131 , Cobalt 60 , Sodium 24 , C 14 and P 30. | **Solve numericals on binding energy and half life rate** |
| **8.0 Surface Chemistry**<br>8.1 Adsorption and absorption. Physical and chemical adsorption-distinguishing properties-Adsorption of gases on Metals Adsorption from solutions (Elementary treatment).<br>8.2 Colloidal state:- True and colloidal solutions – Explanation of the terms - Dispersion medium, dispersed phase, Iyo-phillic and Iyo-phobic sols using the examples; smoke, cloud, blood, milk, starch solution and gold sol.<br>8.3 Emulsions:- Emulsifying agent and emulsification - its applications. Cleansing action of soap.<br>8.4 Catalysis - Explanation of the terms – Homogeneous and Heterogeneous catalysis – distinctions with suitable Examples-auto catalysis with one example | |
| **9.0. Acids and Bases**<br>9.1 Theories of Acids and Bases Lowry - Bronsted concept Lewis theory of acids and bases.<br>9.2 Ionic product of water, PH, Buffers - Numerical problems on these, Indicators - Choice of indicators, PH-range and uses.<br>9.3 Salt hydrolysis - Types of hydrolysis with examples. | **Solve numericals on pH value.** |

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| **10.0 Alkanes, Akkenes, Alkynes and Aromatic compounds**<br>10.1. Introduction and importance of organic chemistry<br>10.2. General characteristics of organic compounds Classification of organic compounds | |
| **11. Ethers**<br>**11.**1 Introduction:- Definition<br>11.2 Classification:-<br>11.3 Nomenclature and metamerism<br>11.4 Preparation, Reactions & Uses | **Study of Simple and mixed ethers with examples.** |
| **12. Aidehydes and Ketones**<br>12.1 Introduction<br>12.2 Carbonyl Compounds & classification<br>12.3 Nomenclature of aldehydes and ketones<br>12.4 Preparation & reaction of Aldehydes and ketones | |
| **13.0 Acids & Esters**<br>13.1. Introduction, Nomenclature, preparation, Reaction and uses of Acids & Easters | **Study of various types of acids** |
| **14.0. Amines**<br>14.1. Introduction, Classification and Nomenclature<br>14.2. Preparation of primary amines<br>14.3. Reaction of amines | |
| **15.0. Biomolecules & Synthetic Fibres**<br>15.1. Introduction<br>15.2. Carbohydrates and Proteins<br>15.3. Fats & Oils<br>15.4. Classification of Fibres<br>15.5. Preparation of fibres<br>15.6. Physical properties and uses of fibres | **Study of fibres** |
| **16.0. Chemistry in application**<br>16.1. Application of Chemicals in Medicine & healthcare<br>16.2. Application of chemicals in Food preservatives<br>16.3. Application of chemicals in Agricultural products | |

## Elective –II - Computer Applications– 1st year
## (Subject Code – 90000022)

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**1.0. Introduction**<br>1.1. Basic Computer and its structural theory<br>1.2. Input devices<br>1.3. Output devices<br>1.4. Storage devices<br>1.5. Computer types and their applications<br>1.6. Computer Software/Hardware | **Detailed Syllabus**<br>**1.0. Computer basics**<br>1.1. Identification of Keyboard, Printer, Monitor Scanner, Webcam, Microphone, Speaker<br>1.2. Sample collection of various type of storage devices, specifications and charts |
| **2.0. Operating systems**<br>2.1. Various types of Operating systems<br>2.2. Comparison between the different types of OS<br>2.3. Network Operating systems and their features<br>2.4. Microsoft Disk Operating System, its nature and history.<br>2.5. Unix, features, merits and demerits in using Unix as OS.<br>2.6. Microsoft Windows, development & growth of MS Windows, features, merits and demerits of MS Windows.<br>2.7. MS Windows NT, features, merits & demerits<br>2.8. System requirements for various Operating Systems<br>2.9. Windows default icons and their applications | **2.0. Practice**<br>2.1. Practice of MS DOS commands<br>2.2. Installation of MS Windows<br>2.3. Practice on Add/Remove programs<br>2.4. Practice on My computer, Display properties, My documents, My Network places |
| **3.0. Microsoft Word**<br>3.1. Introduction to MS Office<br>3.2. MS Word applications<br>3.3 Creation of Document and file operations<br>3.4. Formatting features of document<br>3.5. Modification/ editing documents<br>3.6. Inserting images, files, tables, symbols and various attributes<br>3.7. Creating and formatting of tables<br>3.8. Mail merge<br>3.9. Page layout and design features<br>3.10. Spell & grammar check in documents<br>3.10. Print preview & printing of documents<br>3.11. Converting documents to PDF files. | **3.0. Documentation**<br>3.1. Create and save a document<br>3.2. Format the text with different font size,<br>font styles<br>3.3. Setting up different page sizes, orientation.<br>3.4. Making various type of documents like<br>Bio Data, letters, project reports<br>3.5. Printing of documents |
| **4.0. Microsoft Excel**<br>4.1. Introduction to Excel and its applications<br>4.2. Features of MS Excel<br>4.3. Outline of Worksheet & Workbook<br>4.4. Data types<br>4.5. Study of various menus of MS Excel<br>4.6. Creation of worksheet, editing worksheets, save, copy & deleting worksheets.<br>4.7. Functions of MS Excel<br>4.8. Formulas of MS Excel.<br>4.9. Types of charts, creation of data Charts, editing and insertion of charts.<br>4.10. Sort facility<br>4.11. Interconnecting Charts<br>4.12. Page setup, printing worksheets, charts… etc.<br>4.13. Converting Worksheets to PDF files. | **4.0. Practice of Worksheets**<br>4.1. Create and save worksheets<br>4.2. Editing the worksheets<br>4.3. Formatting worksheets<br>4.4. Insert charts<br>4.5. Making worksheets using formulas &<br>functions<br>4.6. Making worksheets & printing with different formatting effects<br>4.7. Making worksheets with images, numbers and print them |

| Theory | Practical |
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| **5.0. MS Power point**<br>5.1. General Introduction<br>5.2. Features & Applications of MS Power point<br>5.3. Creating Presentations<br>5.4. Study of different layouts and making presentations using different layouts<br>5.5. Using different animation effects.<br>5.6. Add Audio/Voice and visual effects to slides.<br>5.5. Filtration<br>5.6. Converting presentations to PDF files.<br>5.7. Inserting images, symbols to slides | **5.0. Power Point practice**<br>5.1. Create Slides of different types<br>5.2. Running presentations<br>5.3. Add slide transition effects and run slide show<br>5.4. Make presentations with audio/visual effects.<br>5.5. Printing PPT files<br>5.6. Making PDF format of PPT files |
| **6.0. Networking & Internet Utilities**<br>6.1. General Introduction of Computer Networking<br>6.2. Requirements/ Applications of Computer Networking<br>6.3. Layouts of Different Networks<br>6.4. Study of various Networking components<br>6.5. Limitations and merits of different topologies<br>6.6. Study of Server/client concept<br>6.7. Internet & its applications<br>6.8. Email and Chatting<br>6.9. E-trading concepts<br>6.10. Downloading files (Text and media files) | **6.0. Networking practice**<br>6.1. Identifying different network components 6.2. Collecting samples, charts, images of different networking components.<br>6.3. Installation of Network Interface card<br>6.4. Getting connected to Internet and accessing the internet<br>6.5. Creating personalized Email account<br>6.6. Chatting (Text and Voice chat)<br>6.7. Searching/surfing for the information in different sites.<br>6.8. Downloading |
| **7.0. Project work**<br>7.1. Understand the concept of making projects and preparing the project reports.<br>7.2. Preparation of a project using the software skills learned during the course. | **7.0. Project Work**<br>7.1. Making a working model/project using MS Excel/Power Point<br>7.2. Project Report |

## Elective –II - Computer Applications– 2nd year

## (Subject Code – 90000022)

| Theory | Practical |
|---|---|
| **Detailed Syllabus :**<br>**1.0. Introduction MS Access**<br>1.1. Objects of learning MS Access<br>1.2. Applications of MS Access<br>1.3. Database and Database Management System<br>1.4. Elements of Database Management System<br>1.5. Types of Data Bases & the merits & demerits | **1.0. Study of overview of MS Access**<br><br>1.1. Accessing MS Access and its menus to get familiar with it |
| **2.0. Controlling Data Entry**<br>2.1. Restrict Data Entry using field properties<br>2.2. Establish a pattern for entering field values<br>2.3. Create a list of values for a field | **2.0. Creating Data Tables, Designing Fields and setting field properties** |
| **3.0. Joining Tables and creating Queries**<br>3.1. Create Query joins<br>3.2. Join unrelated tables<br>3.3. Relate data within a table<br>3.4. Set Select Query properties<br>3.5. Create Parameter Queries<br>3.6. Create Action Queries | **3.0. Creating Queries** |

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| **4.0. Forms & Reports**<br>4.1. Design a Form Layout<br>4.2. Enhance the appearance of a Form<br>4.3. Restrict Data entry in forms<br>4.4. Adding a command button to a Form<br>4.5. Create a Subform<br>4.6. Organize report information<br>4.7. Format the report<br>4.8. Set Report Control properties<br>4.9. Control Report pagination<br>4.10. Summarize Report information<br>4.11. Add a sub report to an existing report<br>4.12. Create a mailing label report | **4.0. Practicing Forms and Reports**<br>4.1. Creating different forms using different layouts<br>4.2. Data entry in to the forms<br>4.3. Creating different Reports using different layouts<br>4.4. Data formatting in to reports |
| **5.0. Sharing data across applications**<br>5.1. Import data in to Access<br>5.2. Export data from Access<br>5.3. Analyze Access data in Excel<br>5.4. Export Access data to a Text file<br>5.5. Merge Access data with a Word document | **5.0. Practice:**<br>5.1. Import Excel sheets in to Access<br>5.2. Import Tables in to Access<br>5.3. Export Access tables in to Excel format<br>5.4 Export Access data to a Text file<br>5.5. Merging data |
| **6.0. Study of Application packages**<br>6.1. Introduction to application oriented software packages<br>6.2. Study of Railway reservation Package<br>6.3. Study of different modules and menus available in online Railway Reservation Package<br>6.4. Study of Banking packages<br>6.5. Study of Library Management packages<br>6.6. Study of Inventory control packages<br>6.7. Study of School Management Packages | **6.0. Practice**<br>6.1. Collection of different trial packages<br>6.2. Visiting Organizations to collect different formats and procedures used in the system<br>6.3. Creating forms and Reports for the different packages using appropriate data bases |
| **7.0. Project work**<br>7.1. Understand the concept of making projects and preparing the project reports.<br>7.2. Visiting different organizations to have an idea of different packages<br>7.3. Preparation of a project using the software skills learned during the course. | **7.0. Project Work**<br>7.1. Making a working model/project using MS Access<br>7.2. Project Report |

# Elective – II - Business Mathematics – 1st year

# (Subject Code – 90000023)

| Theory | Practical |
|---|---|
| **Detailed Syllabus:**<br>**1.0. Logarithms**<br>1.1. Introduction to logarithms<br>1.2. Laws of logarithm, characteristics and mantissa | **Practice:**<br>1. At least 5 to 10 exercises per chapter<br>2. One home/class assignment per chapter |
| **2.0. Sets, Relations and functions**<br>2.1. Study of Relation, Function<br>2.2. Types of functions<br>2.3. Domain, Co – domain, Range of a function<br>2.4. Composite and Inverse functions<br>2.5. Graphs of functions | |
| **3.0. Complex Numbers**<br>3.1. Definition of complex numbers<br>3.2. Line | |
| **4.0 Quadratic Equations**<br>4.1 Nature of roots of Quadratic Equation<br>4.2 Sum and Product of roots of quadratic equations<br>4.3 Formation of Quadratic Equations<br>4.4 Symmetric functions of roots<br>4.5 Cubs roots unity | |
| **5.0. Determinants**<br>5.1 Determinant of order three<br>5.2 Applications of Determinants | |
| **6.0. Trigonometric ratios**<br>1.1. Angles & its measurements<br>1.2. Trigonometric ratios<br>1.3. Relation between degree and radian.<br>1.4. Fundamental identities.<br>1.5. Examples based on Fundamental Identities<br>1.6. Trigonometric ratios of sum and difference of two angles<br>1.7. Factorization formulae<br>1.8. Inverse trigonometric functions<br>1.9. Properties of a Triangle | |
| **7.0. Plane Co-ordinate Geometry**<br>7.1. Locus<br>7.2. Line | |
| **8.0 Partition values and measure of dispersion**<br>8.1 Partition values<br>8.2 Measures of Dispersion | |
| **9.0. Moments Skewness Kurtosis**<br>9.1 Moments<br>9.2. Skewness<br>9.3 Kurtosis | |
| **10.0. Bivariate frequency distribution and correlation**<br>10.1.Bivariate frequency distribution<br>10.2 Bivariate Correlation<br>10.3 Rank correlation | |
| **11.0. Permutations and Combinations**<br>11.1 Factorial notation<br>11.2 Principle of counting<br>11.3 Permutations<br>11.4 Combinations | |

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| **12.0. Probability**<br>12.1 Types of Event<br>12.2 Addition Theorem<br>12.3 Conditional Probability | |
| **13.0. Random Variable and Probability Distribution**<br>13.1 Definition and Types of Random variable<br>13.2 Probability Distribution of random variable<br>13.4. Risk and uncertainty | |
| **14.0. Commercial Arithmetic**<br>14.1 Commission Brokerage<br>14.2 Discount<br>14.3 Insurance | |

# Elective – II - Business Mathematics – 2nd year

# (Subject Code – 90000023)

| Theory | Practical |
|---|---|
| **1.Mathematical Logic**<br>1.1 Statements and logical connectives<br>1.2 Statement pattern and logical equivalence<br>1.3 Venn Diagram | |
| **2. Matrices**<br>2.1 Definition and Types matrices<br>2.2 Algebra Matrices<br>2.3 Inverse of a Matrix<br>2.4 Solution of Equations | |
| **3. Limit and Continuity**<br>3.1 Definition<br>3.2 Algebra of limits<br>3.3 Application of Standard limits<br>3.4 Continuity of a function at a point | |
| **4. Differentiation**<br>4.1 definition of Derivative<br>4.2 Derivative from first principles<br>4.3 Rules of Differentiation<br>4.4 Derivative of composite functions<br>4.5Derivative of Inverse functions<br>4.6 Logarithmic Differentiate<br>4.7 Derivates of Implicit functions<br>4.8 Derivatives of Parametric functions.<br>4.9 Second order derivatives | |
| **5. Application of Derivatives**<br>5.1 Increasing and Decreasing functions<br>5.2 maxima and Minima<br>5.3 Approximation and Error | |
| **6. Integration**<br>6.1 Definition of an integral<br>6.2 Integral of standard functions<br>6.3 Rules of Integration<br>6.4 Methods of Integrations Integration by parts<br>6.5 Definite Integrals | |
| **7. Differential Equations**<br>7.1 Definition<br>7.2 Formation of Differential Equations<br>7.3 Solution of first order and first degree differential equations<br>7.4 Applications of Differential equations | |

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| **1.Theory of Attributes**<br>1.1 Introduction Notation and class frequencies<br>1.2 Consistency of data<br>1.3 independence of Attributes<br>1.4 Association of Attributes | |
| **8. Regression Analysis**<br>8.1 Introduction<br>8.2. Data and information<br>8.3. Tabulation of data<br>8.4. Graphs and diagrams, scatter diagrams, histograms, bar charts…etc<br>8.5 Equation of lines of regression<br>8.6 Regression coefficient and its properties | |
| **9. Numerical Methods**<br>9.1 Finite differences<br>9.2 Interpolation with equal intervals<br>9.3 Interpolation with unequal intervals<br>9.4 Numerical integration | |
| **10. Discrete Probability Distribution**<br>10.1 Binomial Theorem<br>10.2 Binomial Distribution<br>10.3 Poisson Distribution | |
| **11. Management Mathematics**<br>11.1 linear programming problem<br>11.2 Assignment problem<br>11.3 Sequencing | |
| **12. Demography**<br>12.1 Introduction, definition, Uses of vital statistics<br>12.2 Measurements of Mortality<br>12.3 Life tables | |
| **13. Index Number**<br>13.1 Introduction<br>13.2 Definition and Notations of index numbers<br>13.3 Types of index number<br>13.4 Construction of index number<br>13.5 cost of living index number<br>13.6 Uses of cost of living index number | |
| **14.0. Spread sheets**<br>14.1. Introduction to spread sheets<br>14.2. Features and functions of spread sheet softwares<br>14.3. Use and limitations of spread sheet softwares in business<br>14.4. Apply spread sheet software to the manual work of chartered management accountant. | **Practice:**<br>1. Using spread sheet package<br>2. Entering data in to Spread sheet<br>3. Making graphs the selected data using Spread sheet packages<br>4. Using functions and formulas<br>5. Making accounts using Spread sheet packages |

Subject - Building Material and Construction

Code No – 30440001

| Theory | Practical |
|---|---|
| **Chapter 1: Stone and Coarse Aggregate**<br>1.1. Classifications of Rocks<br>1.2. Quarrying for stone<br>1.3. Commonly used stones in building<br>1.4. Requirements of good building stone<br>1.5. Study of crushers for obtaining coarse Aggregate<br>1.6. Common sizes of coarse Aggregate used in concrete<br>1.7. Properties of coarse Aggregate | **Practical**<br>1) Visit to Quarry to observe quarrying operations<br>2) Conduct Compressive strength Test on stone<br>3) Conduct Abrasion Test of Metal |
| **Chapter 2: Bricks**<br>2.1. Study of earth (Soils) used in manufacturing of Brick<br>2.2. Procedure of manufacture of Bricks<br>2.3. Classification of Bricks<br>2.4. Properties of a good Brick<br>2.5. Other types of Brick | **Practical**<br>1. Field Tests of Brick<br>2. Conduct Compressive Test on Brick<br>3. Conduct Water absorption on Brick |
| **Chapter 3: Cement**<br>3.1 Grades of cement as per IS 12269 – 1987, IS 8182 - 1989 and IS 289 - 1989<br>3.2 Ingredients of Cement, Manufacture of Cement (only introduction)<br>3.3 Various Types of Cements and its uses<br>3.4 Effect of Cement on properties of concrete<br>3.5 Storing of Cement | **Practical**<br>1. Field Tests of Cement<br>2. Determining initial & final setting time of Cement<br>3. Determining fineness Modulus of Cement<br>4. Determination of Compressive strength of cement |
| **Chapter 4: Fine Aggregates**<br>4.1. Types of fine aggregates used in preparation of cement mortar and concrete<br>4.2. Sources of fine aggregate<br>4.3. Properties of River Sand<br>4.4. Silt content and necessity of Screening & Washing of fine Aggregates | **Practical**<br>1. Sieve Analysis of Sand for finding fineness modulus<br>2. Finding Silt content in Sand |
| **Chapter 5: Cement Mortar**<br>5.1. Ingredients of Cement Mortar<br>5.2. Preparation of Cement Mortar – Hand Mixing, Machine Mixing – Advantages and Disadvantages<br>5.3. Various Proportions of Cement Mortar<br>5.4. Lime Mortar, its properties and use | **Practical**<br>1. Preparation of Cement Mortar 1:6 |
| **Chapter 6: Concrete**<br>6.1) Ingredients of Concrete<br>6.2) Types of Concrete Plain Cement Concrete, (PCC) and Reinforced cement concrete (RCC)<br>6.3) Various proportion of Concrete and its uses, Batching of concrete- Volume batching and weigh batching<br>6.4) Procedure for preparing concrete – Hand Mixing, Machine Mixing<br>6.5) Transportation of concrete, precautions to taken .<br>6.6) Laying of concrete & precautions to taken<br>6.7) Necessity of compacting of concrete, equipments used for compacting concrete<br>6.8) Necessity of curing, Methods of curing<br>6.9) Workability - water cement ratio and its importance<br>6.10) Hydration of Cement | **Practical**<br>1) Conduct Compressive Test on Concrete (cube Test)<br>2) Conduct Test for Workability (slump test)<br>3) Conduct Compaction factor Test<br>4) Introduction to Non Destructive Tests on Concrete |

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| 6.11) Quality of water<br>6.12) Finishing of concrete surface<br>6.13) Admixtures used in concrete and properties of such concrete<br>6.14) Ready mix concrete, Properties, Manufacturing and its uses<br>6.15) Advances in concreting such as self compacted concrete, Trimix Concrete, etc | |
| **Chapter 7: Steel**<br>7.1) Types of steel used in RCC as per ISI<br>7.2) High Tensile Steel its properties, study of IS 1786<br>7.3) Cover for steel as per IS 456 - 2000<br>7.4) Types of sections used in Steel Structure and its properties<br>7.5) Rolled steel Joist of different sections and its uses | **Practical**<br>1) Conduct Tensile Test on mild steel bar / HYSD Bars |
| **Chapter 8: Flooring Tiles**<br>8.1) Shahabad Tiles, Kotah Tiles, Cuddappa Tiles, Marble Tiles, Granite, its occurrence, Sources of availability and its uses<br>8.2) Cutting of tiles<br>8.3) Cement tiles, marble mosaic tiles, chequered tiles- process of manufacture, and its uses<br>8.4) Ceramic Tiles, process of manufacture, Normal sizes & its uses<br>8.5) Cement mortar **Briquettes**, Process of manufactures and its uses | **Practical**<br>1) Conduct Bending Test of tiles<br>2) Conduct Abbreviation test of tile |
| **Chapter 9: Timber**<br>9.1) Types of Timber.<br>9.2) Sections of Timber.<br>9.3) Characteristics of Good Timber.<br>9.4) Defects in Timber.<br>9.5) Decay of Timber and remedies.<br>9.6) Seasoning of Timber, necessity and methods.<br>9.7) Preservation of Timber.<br>9.8) Timber based Product Plywood; Block Board, Veneers, Particle wood<br>9.9) Finishing to Timber<br>a) Painting b) Polishing c) Sun mica | **Practical**<br>Report on Visit to a Timber Factory |
| **Advance Building Materials**<br>10.1) Study of latest materials used in Flooring, Thermal Insulation, Sound proofing, Wall finishing, structural glazing, Metal Cladding & rendering, Partitioning, and Painting | |

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| **Chapter 8: Reinforced Cement Concrete**<br>8.1) Different types of RCC members Definitions, its properties and its locations<br>8.2) Ingredients of for R. C. C. Concrete<br>8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing<br>8.4) Shape and types of Reinforcing steel bars used in RCC members. Explain Terms used - Cutting of bar; Straightening of bar; Bending of bar; Hooking of bar; lapping of bar, Binding of bars, use of G.I. wire, cover for bars.<br>8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar<br>8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, & Procedure of construction of Providing Joints. | **Practical**<br>i) Visit to site for observing Bar bending, laying of Reinforcement bars<br>ii) Observe method of providing cover, placing concrete in RCC Members<br>iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft<br>iv) Exercise on preparing standard Bar bending Schedule<br>v) Perform bar bending and binding by using G.I. wire for forming Hook, EL, Bend, Lap, stirrups of 6 mm bar for column and beam |

## Subject - Building Material and Construction - 2nd Year
## Code No – 30440001

| Theory | Practical |
|---|---|
| **Chapter 1: Foundation**<br>1.1) Necessity and Purpose of Foundation<br>1.2) Shallow Foundation<br>1.2.1) Spread Foundation<br>1.2.1.1) Footing for load Bearing Structure<br>1.2.1.2) Column Footing and combined Footing<br>1.3) Raft Foundation<br>1.4) Grillage Foundation<br>1.5) Deep Foundation and its types<br>1.5.1) Cast in-situ R.C.C. concrete pile<br>1.5.2) Pre cast concrete piles<br>1.6) Foundation in Black cotton soil, Under reamed pile | **Practical**<br>1) Line out for 3 to 4 Room Load Bearing Building<br>2) Line out for Framed structure |
| **Chapter 2: Excavation**<br>2.1) Manual method of Excavation<br>2.2) Mechanical Method of Excavation<br>2.3) Machines used for excavation<br>2.4) Disposal of Excavated Material<br>2.5) Dewatering of trenches different methods used<br>2.6) Shoring and strutting of Trenches<br>3.0) Precaution while excavation, Fencing, caution signs, removing excavated material | **Practical**<br>Visit to Site to study different methods of Excavation |
| **Chapter 3: Plain cement concrete**<br>3.1) Mix design of concrete and uses of different mix of concrete<br>3.2) Procedure of preparing concrete. Manual and machine mixing, Transporting Laying, compacting and curing of concrete<br>3.3) Admixtures used in concrete<br>3.4) Ready mix concrete | **Practical**<br>1) Visit to site showing ingredients and process of mixing, transportation, laying, compacting and curing of concrete |

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| **Chapter 4: Stone Masonry**<br>4.1) Terms used in stone masonry<br>4.2) Procedure of constructing un coursed Rubble and Coursed masonry, purpose of through stone in stone masonry<br>4.3) Points to be observed while constructing stone Masonry | **Practical**<br>1) Construction of UCR stone masonry in foundation work, UCR stone masonry for compound wall (ht 1.2 m to 1.5 m) |
| **Chapter 5: Brick Masonry**<br>5.1) Terms used in Brick Masonry.<br>5.2) Construction of Brick Masonry in English bond and Flemish Bond in cement mortar, pre-construction preparation, procedure of construction, post construction precaution<br>5.3) Brick Masonry stretcher bond and half brick thick masonry.<br>5.4) Hollow and solid concrete block masonry<br>5.5) Fixing of Door and window Frame in masonry<br>5.6) Brief information of Siporex block masonry<br>5.7) Brief information of Concrete Block masonry | **Practical**<br>1) Construction of Burnt Brick Masonry in superstructures in English Bond / Flemish Bond<br>2) Construction of concrete block masonry in superstructure |
| **Chapter 6: Scaffolding**<br>6.1) Purpose and Necessity of Scaffolding<br>6.2) Single and Double Scaffolding, name of parts erecting Scaffolding.<br>6.3) Materials used for Scaffolding, Tubular steel Scaffolding | **Practical**<br>1) Erecting Single Scaffolding up to G + 1 floor<br>2) Erecting Double Scaffolding up to G + 1 floor |
| **Chapter 7: Lintels and Sills**<br>7.1) Necessity of lintels<br>7.2) R.C.C. Lintels<br>7.3) Jambs, Sills, Head cladding, its purpose, materials used and construction procedures. | 1) Study of Laying Lintels and Sills on Construction Site |
| **Chapter 8: Reinforced Cement Concrete**<br>8.1) Different types of RCC members Definitions, its properties and its locations<br>8.2) Ingredients of for R. C. C. Concrete<br>8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing<br>8.4) Shape and types of Reinforcing steel bars used in RCC members. Explain Terms used - Cutting of bar; Straightening of bar; Bending of bar; Hooking of bar; lapping of bar, Binding of bars, use of G.I. wire, cover for bars.<br>8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar<br>8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, & Procedure of construction of Providing Joints. | **Practical**<br>i) Visit to site for observing Bar bending, laying of Reinforcement bars<br>ii) Observe method of providing cover, placing concrete in RCC Members<br>iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft<br>iv) Exercise on preparing standard Bar bending Schedule<br>v) Perform bar bending and binding by using G.I. wire for forming Hook, EL, Bend, Lap, stirrups of 6 mm bar for column and beam |
| **Chapter 9: Centering and Form work**<br>9.1) Definitions, Different members used in Form work and centering<br>9.2) Materials used in preparing centering and form work<br>9.3) Procedure of Erecting Centering and form work<br>9.4) Precautions while erecting centering and form for RCC work. | **Practical**<br>1) Draw Sketches of form work for column, Beams, Slab, Lintel and Chajja<br>2) Visit to site to study Centering and form work for abovementioned members and table formwork, Mivon formwork etc. |

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| **Chapter 10: Pointing and Plastering**<br>**10.1 Necessity of Pointing**<br>10.1.1) Materials used for Pointing<br>10.1.2) Procedure of applying Pointing, preparation of surface to receive pointing, Procedure of applying pointing & post applying precautions<br>10.1.3) Type of Pointing<br>10.2 Necessity of Plastering<br>10.2.1 Materials used for plastering<br>10.2.2 Types of plaster internal wall plaster, External wall plaster, Ceiling plaster, different types of furnishings, Stucco plaster.<br>10.2.3 Procedure of plastering for each of above type, Use of machines for plastering<br>10.2.4 P.O.P. finish to wall | **Practical**<br>1) Visit to site for observing procedure for different type of plaster work<br>2) Hands on experience of applying plaster of size 3m x 3 m on internal & external wall surface |
| **Chapter 11: Painting**<br>11.1. Necessity of painting, Types of paints, thinner, varnishes. Surface preparation, Use of Primers<br>11.2. Anti corrosive paints, its primers, its necessity<br>11.3. White Washing to walls and ceiling, Materials used, procedure for new and old surface<br>11.4. Applying Dry Distemper to walls, Material, Procedure for new and old surface<br>11.5. Applying Oil Bound Distemper and Emulsion, Materials used, Procedure for new and old surface<br>11.6. Applying Cement Paint to External walls, Materials used, Procedure for New and old surface<br>11.7. Applying Oil Paint Primer coat, procedure of applying oil paint to woodwork, steel work and walls.<br>11.8. Melamine / French polish, its application on old and new wooden surfaces | **Practical**<br>Hands on experience of Painting of surface with<br>a) White wash 3m x 3m surface area<br>b) Dry Distemper 3m x 3m surface area<br>c) Oil Bound Distemper 3m x 3m surface area<br>d) Cement Paint 3m x 3m surface area<br>e) Oil Paint on new Steel work and old wood work |
| **Stairs**<br>1.1) Definitions of Terms used in Stair.<br>1.2) Classification of stairs based on shape and materials used for construction.<br>1.3) Requirements of good stairs<br>1.4) Design of stair Thumb Rules for Design of Dog legged stair<br>1.5) Hand Rails Types and Fixing Procedure | **Practical**<br>1) Draw neat Sketches of any 4 types of stairs<br>2) Prepare design for RCC Dog-legged stair<br>3) Draw its plan and sectional elevation<br>4) Visit site to site for observing various type of stair |
| **Roofs**<br>2.1 Definition & Purpose of Roof<br>2.2 Technical Terms used in Roof<br>2.3 Types of Roofs<br>2.3.1 Pitched Roof<br>2.3.2 Lean to Roof<br>2.3.3 Couple Roof<br>2.3.4.King Post Truss and Queen Post Truss<br>2.3.5 Steel Trusses<br>2.3.6 Roof Coverings necessity & Purpose<br>2.4 Types of Roof Covering and Procedure of fixing<br>**a)** Country Tile **b)** Mangalore Tile<br>**c)** CGI sheet Roof – Size and procedure of fixing<br>**d)** Acc sheet Roof – Type, Sizes and Procedure of fixing<br>2.5 Flat Roof only R.C.C. Slab | **Practical**<br>1. Draw sketch of couple Roof<br>2. Draw sketch of King post and Queen post Truss.<br>3. Draw Line Diagrams of steel Truss<br>4. Draw sketch showing details of Joint King Post for steel Truss |

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| **Flooring**<br>3.1 Definition and terms used in flooring<br>3.2 Flooring at Plinth level, Plinth filling & Plinth PCC<br>3.2 Types of Floor finishes and its suitability<br>3.3 Procedure of Laying Tiles such as Rough Shahabad for Pavement. Cement Briquette for pavement<br>3.4 Procedure of Laying polished Shahabad Tile floor.<br>3.5 Procedure for Laying cement Tiles, Marble Mosaic Tile, ceramic Tiles and Marble Tiles on floors.<br>3.6 Procedure for fixing PVC tiles on floors<br>3.7 Skirting – Function, materials used and procedure for fixing tiles.<br>3.8 Dado - Function, materials used and procedure for fixing. | **Practical**<br>1. Fixing of Tiles for Pavement<br>2. Fixing of Tiles in area 3mX4m<br>3. Fixing Tiles for Dado |
| **Door And Window**<br>4.1 Functions of Door, Functions of window<br>4.2 Rules for providing Doors & windows<br>4.3 Parts of a Door and Window<br>4.4 Materials used in making of Door & window<br>4.5 Wooden and Steel Door and Window frame<br>4.6 Types of Door Shutters<br>a) Fully paneled Shutter<br>b) Fully glazed shutter<br>c) Flush Door<br>4.7 Fixtures & fastenings for Doors<br>4.8 Rolling shutter, collapsible shutters, sliding doors<br>4.9 Types of Windows Shutter<br>a) Fully Paneled shutter<br>b) Fully glazed<br>c) Sliding shutters.<br>d) Lowered window<br>e) Steel Window<br>f) Aluminum sliding windows<br>4.10 Fixtures and Fastening for windows<br>4.11 Grills for window | **Practical**<br>1. Draw to a scale, drawing of fully paneled<br>2. Draw to a scale, drawing of fully glazed window<br>3. Visit to observe different types of doors and Windows<br>4. Draw Sketches of commonly used fixtures for Door & windows |

## List of Books

**Building Material**

1] TTTI Chandigarh Civil Engg. Materials N. Delhi, McGraw Hill, 1992
2] Rangwala S. C. Engg. Materials Chariot or Book Publications,
3] Anand Gujrath Kulkarni G. J. A Textbook of engg. Materials

**Building Construction**

1] Mackay Building Construction Vol. 1 to 4 VaynStrand
2] Mitchell Elementary Building Construction B. T. Batsford, London
3] Molnar Building Construction Drafting and Design CBS Publications. Delhi
4] Sushil Kumar Building Construction Delhi : Standard Publishers, 1999, 18th Ed.
5] Arora S. P. & Bindra S. P. Building Construction Jaipur : Dhanapat rai & Sons
6] Rangwala S. C. Building Construction Anand : Charotar & Publishing House

**Raw Material:**

Sufficient Raw Material for the Syllabus Practical should be compulsorily made available to perform the practical. (e.g. Bricks, Sand, Cement, Aggregate, Lime powder, white cement, Tiles, Reinforcement Bars, Binding wire, Color, Paint, Turpentine, Brush and other such consumable raw material )

**List of Tools and Equipment**

**A] General Class room**

| Sr | Name of Item | No. |
|---|---|---|
| 1 | Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm) | 4 |
| 2 | Chair with writing pad | 25 |
| 3 | Steel almari with self 6.5’ x 3’ (18 gauge) | 2 |
| 4 | Steel table 4’ x 3’ | 2 |
| 5 | Teacher chair | 2 |

**B] For Building Material and Construction Practical**

| Sr | Name of Item | No. |
|---|---|---|
| 1 | Compression Testing Machine 100 Ton Capacity (Hand Operated.) | 1 |
| 2 | Universal Testing Machine 40 T | 1 |
| 3 | Table Vibrator | 1 |
| 4 | Cube Mould (Small And Big) | 4 |
| 5 | Compaction Factor Test Apparatus | 1 |
| 6 | Aggregate Impact Test Apparatus | 1 |
| 7 | Shieve Shaker | 1 |
| 8 | Weighing Machine 100 Kg. | 1 |
| 9 | Small Sieve (All Type) | 1 |
| 10 | Mortar And Half Bag Concrete Mixer | 1 |
| 11 | Marble Cutter | 1 |
| 12 | High Speed Imact Drill | 1 |
| 13 | Marble Angle Grinder | 1 |
| 14 | Bench Grinder Double Ended Wheel Size 15 Cm | 1 |
| 15 | Vibratory Sand Screen | 1 |

| Sr | Name of Item | No. |
|---|---|---|
| 16 | Bolster 4” (100mm) | 1 |
| 17 | Pitching Tool (Mason) | 1 |
| 18 | Chisel Mason Hammer Headed Flat 200 Mm | 10 |
| 19 | Hammer Mason (Cube) 1.5 Lbs. | 10 |
| 20 | Hammer Mason | 10 |
| 21 | Level Masons 36” (1 Metre) | 10 |
| 22 | Plumb Bob. | 10 |
| 23 | Square ( Steel) 2’ X 1’ | 10 |
| 24 | Trowel Plastering Double Hand | 10 |
| 25 | Trowel Brick 10” | 10 |
| 26 | Tasla (Tin) Pans | 10 |
| 27 | Spade | 10 |
| 28 | Measuring Steel Tape 15 Mtr. | 5 |
| 29 | Measuring Steel Tape 30 Mtr. | 5 |
| 30 | Wooden Straight Edges For Ft. | 10 |
| 31 | Ladders 2 To 4 Mtr. | 2 |
| 32 | Sledge Hammer 10 Lbs. | 2 |
| 33 | Buckets 14 Lits. | 10 |
| 34 | Bar Bending Tools And Cutting Tools 6mm To 12 Mm | 2 set |
| 35 | Screw Driver 12 Inch | 5 |
| 36 | Pocket Steel Tape 2 Mtr. | 25 |
| 37 | Pick Axes | 5 |
| 38 | Wheel Barrow | 3 |
| 39 | Tubular Scaffolding 25 Mm Die With Coupling And Compete Fitting. | 400 RFT |
| 40 | Steel Measuring Boxes 3 Nos. ( 6cft C Fts), 3 Nos. (12cfts) | 6 |
| 41 | Adjustable Props Steel | 20 |
| 42 | Platform 4 Ft X 4 Ft X 6 Ft. | 2 |
| 43 | Boaning Rods | 2 |
| 44 | Spanner Sets | 1 |
| 45 | Carpenter Claw Hammer | 10 |
| 46 | Mortise Chisel 6 Mm. | 10 |
| 47 | Firmer Chisel | 10 |
| 48 | Mallet | 10 |
| 49 | Pane ( Iron) | 10 |
| 50 | Handsaw 1’6” | 10 |
| 51 | Drilling Machines | 1 |
| 52 | Sieve IS No. 9 | 1 |
| 53 | Vicat’apparatus | 1 |
| 54 | Needle measuring flask | 1 |
| 55 | A set of 10 IS sieves 80mm, 40mm, 20mm, 10mm, 4.75mm, 1.18mm, 600u, 150u. | 1 each |
| 56 | Top cover & bottom pan for sieves | 1 |
| 57 | Hacksaw frame | 1 |
| 58 | BSP Tap & Die set 18,20,25 mm | 1 set |
| 59 | Pipe vice ½ “ to 18” 2 each | 2 |
| 60 | Alluminum Level | 2 |
| 61 | Pipe Tube Level | 2 |

Subject - **Building Drawing and CAD - 1st Year**

Code No – 30440002

| Theory | Practical |
|---|---|
| **A] Building Drawing** | **1 Year** |
| **Chapter 1: Introduction to Drawing**<br>1.1) Different Drawing Instrument and their use<br>1.2) Letters its types, Sizes and its use in Drawing<br>1.3) Convention of different lines<br>1.4) Giving dimensions<br>1.5) Scales and its uses<br>1.6) Study of IS 962 | **Practical**<br>1) Prepare Sheet on lettering<br>2) Prepare Sheet on lines<br>3) Prepare Sheets on Geometrical Construction<br>4) Prepare Sheets on Conventional Sign and Symbols |
| **Chapter 2: Orthographic Projection**<br>2.1) Introduction to orthographic projections<br>2.2) First Angle Projections Method<br>2.3) Third Angle Projections Method<br>2.4) Drawing orthographic Projections of simple pictorial view | **Practical**<br>1) 1st Angle Projections ---------- 2 Solids<br>2) 3rd Angle Projections ---------- 2 Solids |
| **Chapter 3: Isometric View**<br>3.1) Method of Preparing Isometric Views<br>3.2) Isometric View of Rectangular Objects<br>3.3) Isometric View of Circular Objects<br>3.4) Isometric View of Building | **Practical**<br>1) Isometric View of Rectangular Objects<br>2) Isometric Vies of Circular Objects<br>3) Isometric View of Building |
| **Chapter 4: Building Drawing**<br>Dimensions and Details of Foundation C/S. DPC, Different Types of Door and Windows, Roof Trusses, Flooring C/S, Staircase, Brick Masonry, Lintel, Arches, Chajja, C/S details of RCC Chajja, Lintel, Beam, Footing, Column, Slab, Pardi, Staircase etc. | **Practical**<br>Detailed Drawing of Foundation C/S. DPC, Different Types of Door and Windows, Roof Trusses, Flooring C/S, Staircase, Brick Masonry, Lintel, Arches, Chajja, C/S details of RCC Chajja, Lintel, Beam, Footing, Column, Slab, Pardi, Staircase etc. |
| **Chapter 5: Building By Laws and Standard Norms**<br>3.1) Definitions of Plot Area, Plinth Area, Built up Area, Carpet Area, Floor Space Index ( FSI)<br>3.3) Permissible Built up Area for Residential Bldg., Public Building<br>3.4) Definition of Marginal Distance and their necessity, Normal Marginal Distances provided for Residential Buildings<br>3.5) Definition and Necessity of Building Line, Development Line<br>3.6) Min Dimensions for following<br>3.6.1) Plinth height, Sill height, Head Room in Residential Bldg, Public Buildings, Mezzanine floor, Basements and stilts for car parking<br>3.7) Minimum Dimensions of: Living Room, Bed Room, Master Bed Room, W.C. Bath, Toilet.<br>3.7.1) Min. Width for passage and Balcony<br>3.8) Rules for Window Opening<br>3.9) Min. width of step and Landing, Head Room, Thumb Rules for fixing Rise and Tread.<br>3.9.1) Permissible Height of Pardi, of Building as per FSI and Road Width | **Practical**<br>1) Student to Draw for A Residential. Bungalow (Load Bearing) i.e. minimum 2 Bedrooms (one Bed room with attached Toilet), 1Hall, 1Kitchen, Veranda, Staircase, Toilet block, and Car Parking.<br>a) Plan,<br>b) Elevation<br>c) Two sections<br>d) Schedule of door and window<br>e) Site plan,<br>f) Area statement,<br>g) Construction notes.<br>h) Schedule of finishes |

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| **Chapter 6: Development of Line Plan of a Building**<br>4.1) Symbols and notations as per BIS 696 in Civil Engg. Drawing.<br>4.2) Preparing Line Plan of Building, necessity of preparing line plan.<br>4.3) Development of Plan of Residential Building having living Room, Kitchen Room, Bed Room, Bath room and w.c. with slab. Draw to scale – Plan, Elevation Sections in 3 directions<br>4.4) Working drawings and its necessity. | 2) Draw tracing of above drawing<br>3) Prepare ammonia sheet<br>4) Prepare a working drawing for Staircase, Toilet block and kitchen |

## Subject - **Building Drawing and CAD - 2nd Year**

## Code No – 30440002

| Theory | Practical |
|---|---|
| **B] Computer Fundamental** | **6 Month** |
| **1] Fundamentals Of Computer**<br>Introduction<br>Components of PC<br>The system Unit<br>Front part of system Unit<br>Back part of system Unit<br>CPU<br>Memory of computer<br>Monitor<br>Mouse, Keyboard Disk, Printer, Scanner, Modem,<br>Video, Sound cards, Speakers | **List of Practical**<br>1. Working with Windows 2000 desktop ,start icon, taskbar, Recycle Bin, My Computer icon ,The Recycle Bin and deleted files Creating shortcuts on the desktop<br>2. The Windows 2000 accessories, WordPad – editing an existing document, Use of Paint – drawing tools<br>The Calculator, Clock<br>3. The Windows Explorer window, concept of drives, folders and files? Folder selection techniques, Switching drives, Folder creation, Moving or copying files, Renaming, Deleting files and folders<br>4. Printing, Installing a printer driver, Setting up a printer, Default and installed printers, Controlling print queues, Viewing installed fonts, The clipboard and 'drag and drop', Basic clipboard concepts Linking vs. embedding, |
| **2] Introduction To Windows 2000/Xp**<br>Working with window Desktop<br>Components of window Menu bar option<br>Starting window Getting familiar with desktop<br>Moving from one window to another<br>Reverting windows to its previous size<br>Opening task bar buttons into a windows<br>Creating shortcut of program<br>Quitting windows | 5. Moving through a Word document menu bar and drop down menus toolbars<br>6. Entering text into a Word 2000 document, selection techniques Deleting text<br>7. Font formatting keyboard shortcuts<br>8. Paragraph formatting Bullets and numbering<br>9. Page formatting What is page formatting? Page margins Page size and orientation Page breaks, Headers and footers<br>10. Introducing tables and columns |

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| **3] GUI Based Editing, Spreadsheets, Tables & Presentation**<br>Application Using MS Office 2000 & Open Office.Org Menus Opening, menus, Toolbars, standard toolbars, formatting toolbars & closing Quitting Document , Editing & designing your document Spreadsheets<br>Working & Manipulating data with Excel Changing the layout Working with simple graphs Presentation Working With PowerPoint and Presentation | 11. Printing within Word 2000 Print setup Printing options Print preview<br>12. Development of application using mail merge Mail merging addresses for envelopes Printing an addressed envelope and letter<br>13. Creating and using macros in a document<br>14. Creating and opening workbooks Entering data<br>15. Navigating in the worksheet Selecting items within Excel 2000 Inserting and deleting cells, rows and column Moving between worksheets, saving worksheet, workbook |
| **4] Introduction To Internet**<br>What is Internet<br>Equipment Required for Internet connection<br>Sending &receiving Emails<br>Browsing the WWW<br>Creating own Email Account<br>Internet chatting | 16. Formatting and customizing data<br>17. Formulas, functions and named ranges<br>18. Creating, manipulating & changing the chart type<br>19. Printing, Page setup, Margins<br>Sheet printing options, Printing a worksheet<br>20. ***** Preparing presentations with Microsoft Power Point. Slides and presentations, Opening an existing presentation , Saving a presentation |
| **5] Usage of Computer System in various Domains**<br>Computer application in Offices, books publication data analysis ,accounting , investment, inventory control, graphics, database management, Instrumentation, Airline and railway ticket reservation, robotics, artificial intelligence, military, banks, design and research work, real-time, point of sale terminals, financial transaction terminals. | 21. Using the AutoContent wizard ,Starting the AutoContent wizard, Selecting a presentation type within the AutoContent wizard Presentation type Presentation titles, footers and slide number<br>22. Creating a simple text slide, Selecting a slide Layout Manipulating slide information within normal and outline view, Formatting and proofing text, Pictures and backgrounds, drawing toolbar, AutoShapes, Using clipart, Selecting objects, Grouping and un-grouping objects, The format painter |
| | 23. Creating and running a slide show, Navigating through a slide show, Slide show transitions, Slide show timings. Animation effects<br>24. Microsoft Internet Explorer 5 & the Internet Connecting to the Internet The Internet Explorer program window, The on-line web tutorial Using hyper links, Responding to an email link on a web page<br>25.Searching the Internet, Searching the web via Microsoft Internet Explorer, Searching the Internet using Web Crawler, Searching the Internet using Yahoo, Commonly used search engines |

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| **6] Information technology for benefits of community**<br>Impact of computer on society<br>Social responsibilities<br>Applications of IT<br>Impact of IT<br>Ethics and information technology<br>Future with information technology | 26. Favorites, security & customizing Explorer Organizing Favorite web sites Customizing options – general, security, contents, connection, programs, advanced<br>27. ***** Using the Address Book Adding a new contact Creating a mailing group, Addressing a message, Finding an e-mail address<br>28. Using electronic mail, Starting Outlook Express Using the Outlook Express window, Changing the window layout, Reading file attachment, Taking action on message-deleting, forwarding, replying<br>29. Email & newsgroups, Creating and sending Emails Attached files, Receiving emails, Locating and subscribing to newsgroups, Posting a message to a newsgroup<br>30. Chatting on internet, Understating Microsoft chat environment, Chat toolbar |
| **C] Computer Aided Designing and Drafting** | **6 Month** |
| 1.0 **CAD Software**<br>Meaning, various CAD software available in the market AutoCAD, Felix Cad, Auto Civil, 3D Max; etc.) Starting up of CAD, CAD Window, Tool bar, Drop down menu, Command window, Saving the drawing. Introduction of Graphic screen. | Practical related Creating New file, Closing Drawing, Saving Drawing, Startup Methods, Modes in AutoCAD, Use of Function Keys, Use of Keyboard and Mouse in AutoCAD Practice. |
| 2.0 **CAD Commands**<br>WCS icon, UCS icon, co-ordinates, drawing limits, grid, snap, ortho features. All Drawing commands, line, circle, polyline, multiline, ellipse, polygon etc.<br>All Editing commands – Copy, move, offset, fillet, chamfer, trim, lengthen, mirror, rotate, array etc.<br>Working with Layers, Block, hatches, fills, dimensioning, text etc. | Practice on Small Drawing Objects using Commands in Draw Menu Practice of Editing command on above drawing objects, Dimensioning Drawing, Creating Title block, Area Statement and Schedule of Opening using Text in AutoCAD, |
| 3.0 **Use of Cad software for practice of:**<br>Generation of line plan, Detailed Plan, elevation, section, site plan, Area statement and print commands<br>Generation of 3D view using 3D Modeling commands and 3d Operation commands, Creating 3D of Building<br>Introduction to Auto desk Architect , 3D Max | Drawing Plan, Elevation, Section, Site Plan in AutoCAD<br>Creating 3D Model of Building and Generating required 3D view from all sides.<br>Other CAD Practical based on the Theory. |

**List of Books**

**Building Drawing**

1] Malik, R.S. & Meo G.S. Civil Engg Drawing Delhi: New Asian Publishing

2] Shah P. J. Engg. Drawing – 1 Ahmedabad : D. J. Shah Publishing

3] Bhat N. D. Engg. Drawing Anand : Charotor

4] Gurucharan Singh Civil Engg. Drawing Delhi : Standard Publishers

5] Sane Y.S Building planning

6] Shaha Kale & Patki Building Drawing

7] Mackay W. B. IS962 Beauro of standards India (ISI)

**Computer Fundamental**

1] Vikas Gupta Comdex Computer Course Kit First Dreamtech

2] Henry Lucas Information Technology for management 7Th Tata Mc-Graw Hills

3] B.Ram Computer Fundamentals Architecture and Organisation Revised 3rd New Age International Publisher

**CAD Books**

1] Reference Manual of AutoCAD AutoDesk

2] Reference Manual of Felix cad Felix CAD

3] Reference Manual of Intel CAD

4] Reference Manual of Auto Civil

5] Reference Manual of 3D-Max

**List of Tools and Equipment**

**A] General Class room**

| Sr | Name of Item | No. |
|---|---|---|
| 1 | Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm) | 4 |
| 2 | Chair with writing pad | 25 |
| 3 | Steel almari with self 6.5’ x 3’ (18 gauge) | 2 |
| 4 | Steel table 4’ x 3’ | 2 |
| 5 | Teacher chair | 2 |

**B] For Building Drawing Practical**

| Sr | Name of Item | No. |
|---|---|---|
| 1 | Drawing Board | 25 |
| 2 | Drawing Table | 25 |
| 3 | Mini Drafter | 25 |
| 4 | Triangular Scale | 10 |
| 5 | Glass board 8’ x 4’ | 2 |

**C] For Computer Fundamental and CAD Practical**

| Sr | Name of Item | No. |
|---|---|---|
| 1 | Computer System P4 with accessories Complete with license OS. compatible for- to run AutoCAD 2010 and Windows 7 OS. | 5+1 |
| 2 | Plotter- HP Design Jet 500 latest model | 1 |
| 3 | Scanner | 1 |
| 4 | Computer table | 5+2 |
| 5 | Chair for computer | 10+2 |
| 6 | Laser Printer | 1 |
| 7 | AutoCAD 2010 or above Software | 1 |
| 8 | M. S. Office Software | 1 |

**Construction Surveying & Estimating Costing– 1st year**

Code No – 30440007

| Theory | Practical |
|---|---|
| **Chapter : 1 Introduction**<br>1.1) Definition of Surveying<br>1.2) Objects of Surveying<br>1.3) Uses of Surveying<br>1.4) Principles of Surveying<br>1.5) Types of Survey: Plain Survey & Geodetic Surveying.<br>1.6) Scales - its types and uses | **Practical**<br>Construct different types of Scales, Use of Paper Scales, |
| **Chapter 2: Linear Measurement**<br>2.1) Study of 20m and 30m chains and its parts.<br>2.2) Study of metallic woven tape<br>2.3) Study of steel Tape.<br>2.4) Instruments – peg; arrows; ranging rod.<br>2.5) Fixing of stations; points to be observed in selection of station.<br>2.6) Ranging – Direct, Indirect and reciprocal ranging, to set up intermediate points between stations. use of ranging rod in ranging, use of Line Ranger in ranging.<br>2.7) Procedure of chaining between two stations. Entering in Field Book.<br>2.8) Testing o chain and tape before and after chaining of line.<br>2.9) Error in chain – Meaning of terms - chain is too long and chain to too short.<br>2.10) Correcting of chain.<br>2.11) Correction of length of line of if chain is too long and too short.<br>2.12) Correction of Area, if chain is too long or too short.<br>2.13) Chaining on sloping ground, Method of Stepping only.<br>2.14) Degree of accuracy desired. | **Practical**<br>1) Study of chain and its parts for 20m and 30m chain, arrows, pegs, Ranging Rod.<br>2) Fixing of station and measuring length of line joining them and entering in field book. Ranging a line using Ranging Rod.<br>3) Use of Line Ranger.<br>4) Chaining on sloping ground by Method of stepping. |
| **Chapter 3: Chain and Cross Staff Surveying**<br>3.1) Study of Cross Staff and Optical Square and their use.<br>3.2) Chain Triangulation<br>3.2.1) Selection of Stations<br>3.2.2) Setting up various lines such as Base Line, Check Line, and Tie Line.<br>3.2.3) Definition of offsets. Its use. Types of offsets : Long offset ; Short offset and oblique offset<br>3.2.4) How offset is set out and measured from an object. Recording of offset in field book.<br>3.3) Conventional signs used in Survey map:<br>Earth work in Cutting and Embankment Road, Railway, Stream, River, Culverts, Bridge, Tunnel, Orchard, Cultivated Land, Temple, Mosque, Church, Electric Lines, Fencing etc.<br>3.4) Chaining across an obstacles: Building ; Pond ; River<br>3.5) Chain and Cross Staff Survey for Calculating area of Field or plot. | **Practical**<br>1) Study of Cross-Staff and Optical Square.<br>2) Setting of a line; Taking offsets from objects, Recording in field book<br>3) Location sketch of a station<br>4) Measurement of area of a field or plot using Chain and Cross Staff |

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| **Chapter 4 : Chain and compass Survey**<br>4.1) Study of Prismatic Compass. It's Component parts and function<br>4.2) Definition of Bearing; Fore Bearing and back bearing<br>4.3) Setting up of Prismatic compass and observing bearings of a line, Finding included angle using fore and back bearings of a Line, Difference in Fore and Back bearing of a line.<br>4.4) Definition of Open Traverse and Closed Traverse<br>4.5) Definition of local Attraction<br>4.5.1) Causes of local attraction | **Practical**<br>1) Study and use of Prismatic Compass<br>2) Setting up of compass on a station and observing bearings and finding included angles between lines<br>3) Measuring of Fore Bearing and Back Bearings of polygon 4 to 5 sides. Identifying stations affected by Local Attraction Calculating Included Angle, Correcting Included Angles, Correcting Bearings |

**Construction Surveying & Estimating Costing– 1st year**

| Theory | Practical |
|---|---|
| 4.5.2) Errors due to local attractions<br>4.5.3) Precautions to be taken to avoid local attraction<br>4.5.4) Correction of bearing of line affected by local attraction<br>4.6) Running a closed Traverse by included angle method<br>4.6.1) Entering bearings of line in Field Book<br>4.6.2) Calculations of Included angle<br>4.6.3) Correction of Included angle<br>4.6.4) Correcting bearings of lines<br>4.6.5) Methods of Plotting Traverse<br>4.6.6) Graphical Adjustments for closing error by Bowdich's rule | 4) Carry out a closed Traverse Survey of 4 to 5 sides enclosing a building. Making Entry of collected Data in Field Book. Calculating Included Angles Correcting for local attraction. Plotting the surveyed area eliminating closing errors. Plotting internal details of plot from survey data |
| **Chapter 5: Leveling**<br>5.1) Definition of Terms Level Surface; Level Line; Horizontal Line; Datum Surface<br>5.2) Definition of Bench Mark, Types of Bench Marks<br>5.3) Study of Dumpy Level – Its parts; Various Axis of a Dumpy level -- Line of Sight, Line of Collimation; Axis of Bubble Tube, Vertical Axis. Setting up of Dumpy level , Temporary and Permanent Adjustments.<br>5.4) Study of Tilting level.<br>5.5) Study of Leveling staves<br>5.6) Terms used in Leveling, fore sight, Intermediate Sight, Back Sight, Change Point Height of Collimation<br>5.7) Taking Reading by levels and entering in field book. Calculation of Reduced Levels of Points by Height of Collimation Method and Rise And Fall Method and applying arithmetic checks.<br>5.8) Classification of Leveling: Simple Leveling, Differential Leveling, Fly Leveling, Profile Leveling and Cross Sectioning.<br>5.9) Errors in Leveling and to eliminate them.<br>6) Study of Auto Level – Setting up and observing Readings on staff | **Practical**<br>1) Study of Dumpy level. Parts of Dumpy level, Temporary Adjustment of level, Axis of Dumpy level.<br>2) Study of Leveling staves<br>3) Taking reading with Dumpy level on Leveling Staff<br>4) Simple Leveling Taking Reading, recording in Field Book Calculating of Reduced Level.<br>5) Differential Leveling Taking Reading recording in Field Book Calculating of Reduced Level.<br>6) Fly Leveling single check and Double check, Taking Reading, recording in Field Book, Calculating of Reduced Level.<br>7) Study of Tilting Level observing Readings on staff<br>8) Study of auto Level, observing Readings on staff |

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| **Chapter 6: Contouring**<br>6.1) Definition of Contour<br>6.2) Characteristics of Contour<br>6.3) Uses of Contour Map<br>6.4) Definitions of Contour Interval<br>6.5) Establishing grade Contour<br>6.6) Methods of Plotting Contour | **Practical**<br>1) Block Contouring for a block 200m X 200m on undulated ground by observing spot Levels at 10m X 10m. Draw a sheet showing contours at Contour interval 1.0m or 0.5m. |
| **Chapter 7: Planimeter**<br>Note: Theory to be covered in Practicals.<br>Coustruction of Planimeter, Use of Planimeter | **Practical**<br>7.1) Study of Polar Planimeter<br>7.2) Use of Planimeter to find area from drawings, Study of formula Anchor positions and relationship between constants<br>7.3) Study of Digital Planimeter, finding Area from given drawing using Digital Planimeter |

**Construction Surveying & Estimating Costing – 2nd year**

| Theory | Practical |
|---|---|
| **Chapter 8: Plane Table Survey**<br>1) Principles of plane table survey. Accessories required Setting out of plane table, Leveling, Centering and orientation. Methods of plane table surveying – Radiation, Intersection, and Traversing. Merits and Demerits of plane table Surveying. Situations where plane table survey is used. Use of Telescopic Alidade. | **Practical**<br>1) Using Accessories carrying out temporary adjustments of Plane table<br>2) Locating details with plane table by method of intersection and orientation by Back sighting<br>3) Using plane table with telescopic Alidade for survey of small area. |
| **Chapter 9: Theodolite Survey**<br>1) Components of Transit Theodolite and their functions.<br>2) Technical terms used. Temporary adjustments of Transit Theodolite.<br>3) Swinging the telescope, Transiting, Changing the face. Measurement of Horizontal angle, method of Repetition, errors eliminated by method of repetition. Measurement of Deflection angle. Measurement of Vertical angle. Measurement of magnetic bearing of a line by Theodolite. Prolonging a Straight line. Sources of errors in Theodolite Surveying. Permanent adjustment of transit Theodolite (only relationship of different axes of Theodolite.).<br>Traversing with Theodolite – Method of included angles, locating details, checks in closed traverse, Calculation of bearings from angles.<br>Traverse Computation - Latitude, Departure Consecutive Coordinates error of Closure, Distribution of a angular error, balancing the traverse by Bowdich's rule and Transit Rule, Gale's traverse table. Simple problems on above topic. | **Practical**<br>1) Understanding the components of Theodolite and their functions, reading the vernier and temporary adjustments of Theodolite.<br>2) Measurement of Horizontal angle by using transit Theodolite. By method of Repetition with face left and face right Measurement of vertical angles by Theodolite. Measurement of Magnetic bearing of a line using Theodolite. Measurement of deflection angle by taking open traverse of 4 –5 sides. Extending a straight Line using Theodolite in Horizontal and Vertical plane |
| **Chapter 10: Tacheometric Survey**<br>1) Principles of Tacheometry. Essential requirements of Tacheometer.<br>2) Use of Transit Theodolite as a Tacheometer with staff held in vertical position and fixed hair method (No derivation).<br>3) Determination of Tacheometric constants, simple numerical problems on above topics | **Practical**<br>1) To find Reduced levels and horizontal distances using Theodolite as a Tacheometer.<br>2) To find constants of a given Tacheometer. |

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| **Chapter 11: Advanced Survey Equipments**<br>1) Construction and use of one second Micro Optic Theodolite<br>2) Electronic Digital Theodolite. Features of Electronic Theodolite<br>3) Principle of E.D.M, Components of E.D.M and their functions,<br>4) Use of EDM for finding horizontal and vertical distances and reduced levels.<br>5) Determine the geographical parameters by total station. | **Practical**<br>1) Operating Digital Theodolite<br>2) Operating Total Station |
| **Estimating and Costing - Introduction**<br>Meaning of Term Estimating, costing Types of Estimate<br>1.2.1. Approximate Estimate<br>1.2.2 Details Estimate | Practical<br>1. Reading of Building Drawing for measurement<br>2. Filling of Measurement Sheet |
| **Approximate Estimate**<br>2.1 Definition of approximate estimate<br>2.2 Uses of Approximate Estimate<br>2.3 Preparing Approximate Estimate for Building Methods of preparing Approximate Estimate for Buildings<br>2.3.1 Plinth Area Method<br>2.3.2 Cubical Unit<br>2.3.3 Service Unit<br>2.3.4 Bay Unit | **Practical**<br>1. Preparing approximate estimate of a building using approximate method. |

**Construction Surveying & Estimating Costing – 2nd year**

| Theory | Practical |
|---|---|
| **Detail Estimate**<br>3.1 Definition of Detail Estimate<br>3.2 Uses of Detail Estimate<br>3.3 Data required to prepare detailed estimate<br>3.4 Procedure of preparing detailed estimate of any work<br>3.4.1 Taking out quantities and entering the data in measurement sheet and completing abstract sheet.<br>3.4.2 Abstracting using Abstract sheet<br>3.5 List of items with their unit of measurement.<br>3.6 Definition of contingencies, work charge establishment<br>3.7 Provisions in details estimate for sanitary, water supply, Electrification.<br>3.8 Types of Estimates, Detail Estimate, Revised Estimate, Supplementary Estimate, Annual report and Maintenance Estimate, Special Report Estimate, Additions and Alteration Estimate.<br>3.10 Procedure of calculating Quantities for excavation, Foundation concrete, Foundation & plinth Masonry, Super Structure Masonry using<br>i) Long wall – Short Wall method<br>ii) Center Line Method<br>3.11 Rules for Deduction in concrete, Masonry, Pointing & Plastering, Painting,<br>3.12 Multiplying factor related to oil painting | **Practical**<br>1. Preparation of Detail Estimate of a Residential Building (Load Bearing Structure)<br>2. Details estimate of septic Tank<br>3. Details estimate of sump well<br>Note: No. 1 is Compulsory and any one out of<br>2 and 3 |

**List of Books**

**Estimating and Costing**

1] Estimating and Costing by B.N. Dutta and Dutta

2] B. S. Patil Estimating and Costing

**Surveying**

1] Kanetkar T. P & Kulkarni S. V, Surveying & leveling Part I & II, Pune Vidyarthi Griha Prakashan

2] Purnima B. C. Surveying Vol. I & II N. Delhi : Laxmi Publications, 2003

3] Sharma J. L. A Textbook of Advance Surveying Delhi : CBS Publications

4] Ray Fundamentals of Surveying N. Delhi : Phi Publishing

5] Bhasin S. K. A Textbook of Surveying S. Chand Publications

6] Shephard F. A. Engineering Surveying : Problems and Solutions Edward Arnold

7] Husein & Nagraj Text book of Surveying S. Chand & co. New Delhi

**List of Tools and Equipment**

**A] General Class room**

| Sr | Name of Item | No. |
|---|---|---|
| 1 | Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm) | 4 |
| 2 | Chair with writing pad | 25 |
| 3 | Steel almari with self 6.5’ x 3’ (18 gauge) | 2 |
| 4 | Steel table 4’ x 3’ | 2 |
| 5 | Teacher chair | 2 |

**E] For Surveying Practical**

| Sr | Name of Item | No. |
|---|---|---|
| 1 | Chain engg. 30 meter | 2 |
| 2 | Cross staff open | 2 |
| 3 | Measuring tape 30 m | 2 |
| 4 | Prismatic compass set | 10 |
| 5 | Ranging rods | 20 |
| 6 | Plane table set with alidade u frame | 2 |
| 7 | Dumpy level with (aluminum) | 1 |
| 8 | Leveling staff | 1 |
| 9 | Theodolite | 1 |
| 10 | Auto level | 1 |
| 11 | Measurement tape 03 mtr. | 5 |
| 12 | Wooden Pegs | 30 |
| 13 | Steel Arrow | 30 |
| 14 | Optical Square | 2 |
| 15 | Cross Staff | 2 |
| 16 | Through Compass | 2 |

**Additional Practical Reference Details:**

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| Drawing of conventional signs used in Engineering survey, cadastral survey. Topography and building drawing – Practice in map reading including contours and drainage. |
| Practice in unfolding and folding chain alignment of lines- measurements of distance between given points and their booking. |
| Practice in chaining and taking off- set, use of optical square and cross staff setting out right angles- booking of measurements testing of chain, tape, optical square and cross staff. |
| Procedure in conducting chain survey reconnaissance preparation of rough sketch selection of base lines and station points – fixing of stations etc. |
| Chain survey of small plots by triangulation, booking and plotting the same. |
| Chain survey of built up plots, locating details, booking and plotting the same. |
| Taking horizontal measurements on sloping ground over coming obstacles in chaining and aligning measuring distance between two points one of which is invissible or in accessible from the other |
| Chain survey of an extensive area, locating details plotting and finishing the same in ink and colour |
| Surveying of a tank, a route or obstructed field by chain traverse, method of finding height of inaccessible objects by using chain and its accessories. |
| Practice in chaining and taking off- set, use of optical square and cross staff setting out right angles- booking of measurements testing of chain, tape, optical square and cross staff. |
| Procedure in conducting chain survey reconnaissance preparation of rough sketch selection of base lines and station points – fixing of stations etc. |
| Chain survey of small plots by triangulation, booking and plotting the same. |
| Chain survey of built up plots, locating details, booking and plotting the same. |
| Taking horizontal measurements on sloping ground over coming obstacles in chaining and aligning measuring distance between two points one of which is invissible or in accessible from the other |
| Chain survey of an extensive area, locating details plotting and finishing the same in ink and colour |
| Surveying of a tank, a route or obstructed field by chain traverse, method of finding height of inaccessible objects by using chain and its accessories. |
| Practice in setting up a compass and checking its accuracy – taking bearings and calculating angles. |
| Determining the bearings of a given line and establishing lines of given bearings – laying out a recti- linear and polygonal plots of ground using a compass and a tape. |
| Determining meridian by shadow and watch methods carrying out a closed traverse of a given field with chain & compass and plotting the same. |
| Conducting closed traverse of built up fields and plotting the same. |
| Surveying an extensive built up area with compass booking plotting finish in ink and colour. |
| Setting up of plane cable levelling centering and orientation. |
| Surveying an area with plane table by radiation and intersection methods. |
| Traversing with plane table of built up areas. |

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| Running and open traverse with plane table and fixing details. |
| Inking , finishing, colouriong & tracing of plain table maps done in previous weeks. |
| Practice in finding the position of the table by three points.& two points problem & locate, Use of tangent clinometer – Dolesoles clinometer – Abney level for finding height of various surrounding points - use of telescopic alidade in fixing heights of surrounding points. |
| Practice in setting out a level and performing temporary adjustments practice in reading staff. |
| Demonstration of permanent adjustment of level ( at this stage, the students need not practice but only watch) |
| Practice in differential levelling including reciprocal levelling and establishment bench marks reading of inverted staff practice in booking and reduction checking level reading in height of collimation and rise and fall systems. |
| Performing permanent adjustment to various types of levelling instruments. |
| Establishing of alignment and grade for roads and drains. Method of centering in the field books. |
| Carrying out route survey longitudinal & cross section of a road project its plotting and calculation of earth work. |
| Practice in use of boning rods and ghat tracer for establishing grade lines for various types of work. |
| Road project reconnaissance preliminary and final location survey including preparation of route map to scale, taking profile and section with level plotting marking formation levels calculation of earthwork and other materials for laying road including estimation of earth work. |
| Practice in setting up a theodolite and taking readings. |
| Measurement of horizontal angles by repitition reiteration methods method of entering the same in the field book setting out given angles. |
| Practice in measuring vertical angles, setting out given vertical angles and entering in the field book. |
| Demonstration of permanent adjustment of theodolite ( at this stage the student need not practice but only watch) |
| Setting out a straight line over and across obstacles prolonging straight lines establishing lines at given angles with given lines setting out on around given recti linear figures. |
| Running a closed traverse over a given area, booking calculating the coordinates and plotting the traverse. |
| Running an open traverse calculate and plot the same and fix the details with plane table measuring a base line for triangulation. |
| Practice in performing permanent adjustment of theodolite. |
| Finding heights and distances of accessible and inaccessible objects with theodolite and chain and calculating the same, use of box sextant |
| Contouring by spot level method including interpolation |
| Contouring by cross section method including interpolation of contours ( grid methods) |
| Direct contouring using levels for vertical control plane table and telescopic alidade for horizontal control. |
| Conducting topographic survey of undulated area by theodolite triangulation and plane table resection and intersection method using Indian Pattern Clinometer. |

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| Carrying out topographical survey with the help of theodolite level and tape of a site of reservoir cross sectional drawing of different canals. |
| SURVEY CAMP :<br><br>In any suitable hilly place 3 week carrying out contour survey of a small area by tachometer working out proposed alignment on contoured maps ( project work ) on various curves and calculation , marking of alignment of road on it. |
| Setting out of simple curves by chain and tape with different methods setting out of curves by deflection methods with and without obstacles. |
| Setting out of a compound curves, transition curves with theodolite |
| Setting out of vertical curves |
| Reducing and enlarging the plain by pantograph and area by planimeter |
| Measurement off-set of obstructed lines, measurement of field both in the triangle and off-set system base line system, fixing, missing, land demarcation |
| To find the true north by observing stars and sun (current) with the help of Nantical Almanau. |
| CADASTAL SURVEY<br><br>Testing plotting of (1:4000) village map and locating errors in measurements |
| Typing field numbers, printing names and inserting topographical detail in maps –comparison of field and village boundaries and side measurement . |
| Tracing and inking taluk, district and state maps- tracing of maps –observation of substance bar and its calculation |
| Azimuth observation and computation- computation of latitudes and azimuths, solution of spherical triangles |