Maharashtra State Board of Vocational Examination, Mumbai 400 051

1	**Name of Course**	**Certificate Course in Landscape Architecture**
2	**Course Code**	**304414**
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 do construction related Landscape Work, To do work for various Landscape Architecture
11	**Employment opportunities**	Office of Architect, Office of Landscape Consultant, Office of Builder, any Garden Development Ferm, his own practice as Landscape Architecture Consultant
12	**Teachers Qualification**	1) For Vocational subject - B.E.Civil or Arch. 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 Estimating Costing**	30440003	3 Hrs	8 Hrs	11 Hrs
6	**Landscape Architecture**	30440017	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 Estimating Costing**	30440003	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
6	**Landscape Architecture**	30440017	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 NOUNS : KINDS OF NOUNS AND USAGES PRONOUNS PREPOSITIONS ADJECTIVES CONJUNCTION VERB ADVERB 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 NOUNS : KINDS OF NOUNS AND USAGES PRONOUNS PREPOSITIONS ADJECTIVES CONJUNCTION VERB ADVERB 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: **1.0. Trigonometric ratios** 1.1. Angles & its measurements 1.2. Trigonometric ratios 1.3. Relation between degree and radian. 1.4. Fundamental identities. 1.5. Examples based on Fundamental Identities 1.6. Trigonometric ratios of compound angles 1.7. Factorization formulae 1.8. Inverse trigonometric functions 1.9. Properties of a Triangle	**Detailed Syllabus:** Solve problems on: 1) Conversion of radian to degree 2) Conversion of degree to radian
2.0. Plane co-ordinate geometry 2.1. Locus 2.2. Line	
3.0 Vectors and Linear Equalities 3.1. Definition of vector, position vector 3.2. Algebra of vectors(Equality, addition, subtraction and scalar multiplication) 3.3. Dot (Scalar) product with properties. 3.4. Vector (Cross) product with properties. 3.5. Solutions of Linear inequalities in one variable and two variables	
4.0. Determinants and Matrices 4.1. Definition and expansion of determinants of order 2 and 3. 4.2. Cramer's rule to solve simultaneous equations in 2 and 3 unknowns 4.3. Definition of a matrix of order m x n. 4.4. Types of matrices. 4.5. Algebra of matrices such as equality, addition, Subtraction, scalar multiplication and multiplication. 4.6. Transpose of a matrix. 4.7. Minor, cofactor of an element of a matrix, adjoint Of matrix and inverse of matrix by adjoint method. 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 5.1. Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/grouped data. 5.2. Analysis of frequency distributions with equal means but different variances. 5.3. Random experiments: outcomes, sample spaces (set representation). 5.4. Events: occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events 5.5. Probability of an event, probability of 'not', 'and' & 'or' events.	State and prove Baye's theorem

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

Elective 1 : Applied Mathematics - 2 nd Year

(Subject code : 90000011)

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

2.0. Differentiation 2.1. Derivative using first principle 2.2. Rules of Differentiation 2.3. Derivatives of standard functions 2.4. Derivatives of logarithmic and exponential functions 2.5. Derivative of composite functions 2.6. Derivative of Inverse functions 2.7. Derivative of implicit and parametric functions 2.8. Second order derivatives	Proof of derivative using the first principle with the help of an example
3.0. Applications of Derivatives 3.1. Geometrical applications 3.2. Derivative as a rate of change measure 3.3. Approximations 3.4. Maxima and Minima	
4.0. Integration 4.1. Definition of an integral of a function 4.2. Integrals of some standard functions 4.3. Rules of integration 4.4. Indefinite Integration 4.5. Definite Integration	Solve problems on definite integration
5.0 Application of Definite Integrals 5.1. Area under the curve 5.2. Volume of solid of revolution	
6.0. Differential equations 6.1. Definition 6.2. Formation of differential equations 6.3. Solution of first order and first degree differential equations 6.4. Applications of differential equations	Solve problems on first order and first degree differential equations
7.0 Numerical Methods 7.1. Definition of various operators and relation between the operators 7.2. Interpolation methods 7.3. Numerical integration	
8.0. Mathematical Logic 8.1. Statements and logical connectives 8.2. Statement Pattern and Logical equivalence 8.3. Application of logic	
9.0. Geometry 9.1. Pair of straight lines passing & not passing through origin 9.2. **Circle**: definition, Tangent and Normal **9.3. Conic:** Equation of Conics 9.4. **Three Dimensional Geometry:** Direction Cosines and ratios, Line, Plane	
10.0. Linear Programming Problems 10.1. Linear Programming Problems 10.2. Simplex Method	Solve problems on simplex method
11.0. Boolean Algebra 11.1. Boolean Algebra as an algebraic structure Algebra 11.2. Principle of Duality 11.3. Boolean function & switching circuits 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 : 1. **Introduction to Economics** – 1.1 Meaning & Scope - 1.2 Relevance of Economics to different disciplines - Economics & Management, Economics & Law- Economics and Humanities – 1.3 Micro Economics and Macro economics	1) Prepare a project on usefulness of micro – economics. 2) Prepare a project on usefulness of micro – economics. 3) Conduct a GD on the importance of Micro Economics and Macro Economics
2. **Macro Economics** – 2.1 Meaning, Definition and Features. 2.2 Aggregates-Nature of Aggregates , problems of Aggregation. 2.3 National Income, Meaning, Definition of National Income Different National Income Concepts 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. 2) Prepare a chart on the circular flow of National Income. 3) Make a comparative study of closed economy and open economy. 4) Conduct a case study of 5 individual families and find out the Disposable income to the individuals.
3. **Determinants of Aggregates** 3.1. Aggregate Demand and their components 3.2 Aggregate Supply and their components .	Prepare a chart on the components of aggregate demand. Conduct a GD on Keynes theory of employment and principles of effective demand. Take 2 or 3 case studies on entrepreneurship and discuss to what extent they provide employment to people.
4. **Money and Banking** 4.1 Meaning, definitions and functions of Money 4.2 Commercial Banks: Meaning and Functions. 4.3 Central Banks: Meaning and Functions.	Find out RBIs concept of money supply. A visit to various financial institutions. A visit to a rural bank, cooperative bank, commercial bank. A visit to the RBI Training college, NABARD OR IDBI 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) how to open a bank account? different investments like – FD,MF facilities for financial inclusion

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

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

Elective - I - Business Economics – 2 nd year

(Subject Code – 90000012)

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

Factors of Production 5.1 Meaning and Features of Land as a factor of production, 5.2 Labour as a factor of production, 5.3 Capital as a factor of production, 5.4 Entrepreneur, Qualities and functions of entrepreneur.	1) A visit to SISI, DIC to study about entrepreneurship. practical will consist of: • Preparing a project report • How to start a business • Collecting information about Permission/ Licenses required from various government agencies/ authorities • Conducting proto type market surveys using the above statistical tools • Preparing questionnaires for different types of market surveys 2) Prepare a project report on how to start an industry with financial details. 3) Conduct an interview with successful entrepreneurs. 4) Prepare a questionnaire for entrepreneurs. 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. 2) Collect secondary data from journals, magazines and newspapers.
Collection and organization of data 7.1 Collection of data – primary and secondary 7.2 Methods of data collection – primary methods – Observation, Interview, Methods of secondary data – Census and sampling, Random sampling. 7.3 Organization of data – Census and sampling, Ramdom sampling.	1) Preparation of questionnaire for personal survey method, telephone interview and mail survey. 2) Select sample respondents and conduct socio – economic survey, marketing survey, etc. 3) Choose suitable sampling method to conduct the survey. **4)** Classification of collected data, tabulation of data and analysis and interpretation of data.
Graphical presentation of Data 8.1 Tables – Components and Types 8.2 Graphs – Curves, Bar diagrams, 8.3 Pie – diagrams.	1) Prepare a project report using statistical techniques, graphs, etc. 2) Prepare a bar diagram for the data collected. **3)** Prepare pie charts.
Measures of Central Tendency 9.1 Mean 9.2 Median 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 : **1.0. General Biology** 1.1. Definition and its concept 1.2. Living World: Nature and scope of Biology 1.3. Cell and Cell division: Structure of the cell, Cell division 1.4. Main features of life and its characteristics (Irritability, Homeostasis, Adaptations, Reproduction and Growth & death. 1.5. Origin and evaluation of life 1.6. Theories of evaluation of life, origin of life, special creation, spontaneous generation, Abiogenesis, Evidences of organic evolution paleontological anatomical & embryological 1.7. Study of Tissues	Study of cells and tissues
2.0. Introduction to Botany 2.1 Origin, development and scope of Botany 1.2 Classification and its need 1.3 Nomenclature 1.4.Taxonomic Hierarchy 1.5. Five Kingdom system of classification 1.6. Two Kingdom system of classification 1.7. Thallophyta, Bryophyta and Pteridophyta 1.8. Gymnosperms, Angiosperms	Study of angiosperms and gymnosperms
3.0. Vegetative Morphology of plants 3.1.Root: Root System – types, modifications of root (storage roots, velaman roots, photosynthetic roots, respiratory roots, parasitic roots, nodular roots) 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) 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 4.1. Inflorescence – Types (racemose, cymose, special) 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.	

SECTION B - ZOOLOGY **5.0. General Biology of Living world** 5.1. Main features of life and its characteristics (Irritability, Homeostasis, Adaptations, Reproduction and Growth & death. 5.2. Origin and evaluation of life 5.3. Theories of evaluation of life, origin of life, special creation, spontaneous generation, Abiogenesis, Evidences of organic evolution paleontological anatomical & embryological 5.4. Study of Tissues	
6.0 Diversity of life 6.1 Study and Classification of animals	Classification of animals
7.0. Genetics **7.1. Chromosomal basis of inheritance**	
7.0 Study of Phylum: Chordata 7.1 General characters and out line classification of Chordata up to classes with typical examples. 7.2 Fishes: Distinctive features of cartilaginous and Bony fishes with typical examples. 7.3 Amphibia: Distinctive features of Urodela, Anura and Apoda with typical examples	Study of amphibians
8.0 Study of Reptiles, Aves and Mammals 8.1 Reptiles: Distinctive characters of Squamata, Rhynchocephalia, Crocodilia and Chelonia with typical examples. 8.2 Identification of Poisonous and Non- Poisonous Snakes, Poison apparatus, toxicity of Snake venom and treatment of snake bite including the first aid. 8.3 Aves: Distintive features of Carinatae and Ratitae with typical examples. 8.4 Mammals: Distinctive features of Prototheria , Metatheria and Eutheria.	1) Study of mammals 2) study of reptiles
9.0 Anatomy of Earthworm 9.1. General characteristics of earthworm 9.2. Digestive and reproductive system 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 **1.0. Reproduction in Angiosperms** 1.1 Introduction 1.2 Microsporogenesis and development of male gametophyte 1.3 Ovule – structure, types, megasporogenesis, development of embryo sac 1.4 Pollination – Types, Contrivances of cross and self pollination. Agents of Pollination (definition with one example only) 1.5 Fertilization: Post Fertilization changes including seed structure (dicot, Monocot) and types of germination (epigeal, hypogeal & vivipary – definitions with one example)	Detailed Syllabus Study of reproduction in angiosperms in details

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 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 2.2 Study of Malvaceae 2.3 Study of Fabaceae 2.4 Study of Solanaceae 2.5 Study of Liliaceae	
3.0. Internal Organization of plants 3.1 Tissues – Types (meristematic and permanent) and Functions 3.2 Internal Structure of Dicot Root (Primary) and Monocot root 3.3 Internal Structure of Dicot Stem (Primary) and Monocot stem 3.4 Internal Structure of leaf (Dicot and Monocot) 3.5 Secondary Growth in Dicot Stem	Study of monocot and dicot stem
4.0. Genetics 4.1 Introduction to genetics 4.2 Mendel's Principles – Monohybrid, Dihybrid cross, Concept of probability in relation to Mendel's laws 4.3 Linkage and crossing over (only concept and significance) 4.4 Mutations – gene and chromosomal (only definitions of terms: – spontaneous, induced, chromosomal structural and chromosomal numerical changes)	**Mendel's principle**
SECTION B - ZOOLOGY **5.0. Morphology of Humans** 5.1. Nutrition and respiration in man 5.2. Locomotion in man 5.3. Study of Human Skeleton	**Study of human skeleton(Bone theory)**
6.0 Physiology of Humans 6.1. Circulation 6.2. Osmoregulation and excretion 6.3. Nervous co – ordination 6.4. Hormonal co – ordination	**1) Study of hormones** **2) study of circulation and excretion(diagrammatic chart)**
7.0 Reproduction, growth and development 7.1. Details of Reproduction and human development	**Study of reproduction in humans**
8.0 Biology in Human welfare 8.1. Aquaculture: List of animals of aquacultural importance in Tabular form only 8.2. Poultry: Poultry farming methods, Layers and Broilers, Poultry diseases (Bacterial,Viral and Fungal - Three each) 8.3. Study of diseases: AIDS, Cancer, Typhoid 8.4. Immunity system 8.5. Biotechnology (Elementary aspects) 8.6. Applications of Biology: Vermiculture and Fishery	**Study of various diseases**

Subject Name : ENTREPRENEURSHIP – 1st Year

(Subject code : 90000014)

Theory	Practical
Detailed Syllabus : **1.0. Entrepreneurship** 1.1. Concept, Functions and need 1.2. Entrepreneurship: Characteristics and Competency 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. 1.4. Process of Entrepreneurship Development.	**Detailed Syllabus** 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: 2.1. Nature, Purpose and pattern of Human Activities: Economic and Non-Economic, Need for innovation. 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 3.1 Entrepreneurial Values, Attitude and Motivation-Meaning and concept. 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. 3.3. Barriers to Entrepreneurship 3.4. Help and support to Entrepreneurs	
4.0. Introduction to Market Dynamics 4.1. Understanding a Market 4.2. Competitive Analysis of the Market 4.3. Patents, Trademarks and Copyright	
5.0. Project Selection 5.1. Product Identification 5.2. Project Formulation	

ENTREPRENEURSHIP – 2nd Year

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

Subject Name : Psychology – 1st Year

(Subject code : 90000015)

Theory	Practical
Detailed Syllabus : **1.0. Psychology Introduction :** 1.1. Definition of Psychology 1.2. Methods of Psychology 1.3. Subfields of Psychology 1.4. Schools of Psychology (a) Old (b) New	**Detailed Syllabus** 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 2.1 A Theory of General Memory Function 2.2 Information Processing Theories 2.3 The Levels of Processing Theories 2.4 The Organization of Long Term Memory 2.5 Retrieval From Long term memory. 2.6 Forgetting	**II.** Preparation of a brief report based on the observations made during case study-visit to an organization.
3.0 Learning 3.1 Definition 3.2 Classical Conditioning 3.3 Instrumental Conditioning 3.4 Escape Learning 3.5 Avoidance Learning 3.6 Signature of Instrumental Conditioning 3.7 Cognitive Learning	
4.0 Motivation 4.1 Definition 4.2 Motives as References, Explanations and Predictions. 4.3 Theories of Motivation 4.4 A Normal of Biological Motivation 4.5 Biological Motivation 4.6 Social Motives 4.7 Self-Actualization Motivation 4.8 Frustration and Conflict of motives	
5.0 Personality 5.1 Definition 5.2 Theories of Personality	
6.0 Motivation 6.1 Definition 6.2 Etiology 6.3 Diagnosis 6.4 Clinical Features 6.5 Treatment	
7.0 Perception and Attention 7.1 Definition of Perception 7.2 Sensory Processes 7.3 Illusions 7.4 Attention	

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

Abnormal Psychology - 2nd Year

Theory	Practical
Detailed Syllabus : **1.0. Abnormal Psychology** 1.1. Definition of Psychological Disorder 1.2. Classification of Psychological Disorder	**Detailed Syllabus** 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. Such a course would need to have an experimental component in the form of practical work. The objectives of the practical work are :- 1. To give the students firsthand experience in field work with hospitals / centers catering to the psycho-physiological needs of patients. 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. 3. To guide the students to prepare a project report. 4. To equip the students to make a note of patients psychological conditions in the case history of the patient. 5. To instill in the students the right values and a greater understanding of their patients.

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

13.0 Organic Psychosis 13.1 Definition 13.2 Symptoms 13.3 Types of Organic Psychosis (i) Causes (ii) Clinical Features (iii) Treatment (iv) Course and Prognosis	
14.0 Alcohol Related Mental Disorders 14.1 Definition 14.2 Etiology 14.3 Classification 14.4 Treatment and Rehabilitation.	
15.0 Epilepsy 15.1 Definition 15.2 Varieties / Types of epilepsy 15.3 Cause of epilepsy 15.4 Aggravating factors 15.5 Post-ictal disorders 15.6 Epilepsy Vs. Pseudo-seizures 15.7 Status Epilepticus & treatment 15.8 Treatment of Epilepsy	
16.0 Mental Retardation (MR) 16.1 Definition 16.2 Classification 16.3 Etiology 16.4 Diagnosis 16.5 Clinical Features 16.6 Treatment	
17.0 Frustration and conflict 17.1 Definition of Frustration 17.2 Sources of Frustration 17.3 Types of conflict	
18.0 Mental Mechanisms 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 : **SECTION A : PHYSICS** **1.0. Measurement, Units, and Dimension** 1.1 Introduction: Need for measurement, Units and documents, accuracy, precision of measuring instruments. 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. 1.3 Combination of Error: Error due to addition, subtraction, multiplication, division, powers of observed quantities. 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. 1.5 Dimensions: dimensional formulae and dimensional equations, dimensional constants and dimensionless quantities, principle of homogeneity of dimensions. 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. 1.7 Order of magnitude and significant figures 1.8 Concept of accuracy and estimation of errors	**Detailed Syllabus** Perform a simple experiment on measurement and error
2.0. Scalars and Vectors 2.1. Introduction to scalars and vectors 2.2. Addition and subtraction of vectors 2.3. Product of vectors	
3.0. Motion & Force 3.1. Definition of Motion, Uniformly accelerated motion along straight line 3.2. Position time graph and velocity-time graph 3.3. Equation of a projectile path 3.4. Time of light, Horizontal range, Maximum height of a projectile 3.5. Definition and types of forces 3.6. Introduction to gravitation, electromagnetic and nuclear forces 3.7. Law of conservation of momentum 3.8. Elastic and inelastic collisions 3.9. Momentum of force, couple and properties of couple 3.10. Centre of mass and gravity 3.11. Conditions of equilibrium of a rigid body	**Experiment on gravitational force(example of a ball falling from a certain height)**

4.0. Friction 4.1. Origin and nature of frictional forces 4.2. Laws of static and kinetic fictions 4.3. Pressure due to fluid column 4.4. Pascal's law and its applications 4.5. Newton's formula 4.6. Stoke's law 4.7. Equation for terminal velocity 4.8. Bernaulli's principle and its applications	**Proof of Stoke's theorem and Bernaulli's principle**
5.0. Dynamics 3.1 Introduction, Newton's Law of Motion. 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. 3.3 Impulse, Law of conservation of linear momentum, Conservation of linear momentum during collision. 3.4 Work, power, energy potential Energy (PE), Kinetic Energy (KE), definition & derivation for both, relation between KE & linear momentum. 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 6.1. Waves and oscillations 6.2. Progressive waves 6.3. Characteristics of transverse waves, longitudinal waves 6.4. Sound as longitudinal wave motion 6.5. Definition of period, frequency, wavelength giving their relations. 6.6. Newton's formula for velocity of sound, laplace's correction	
7.0. Thermal expansion 7.1. Expansion of solids, liquid 7.2. Linear expansion, area and volume expansion 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 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 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 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 8.4. Critical angle, Optical fiber, dispersion of light, Prism formula, angular dispersion and dispersive power	**Experiment on Refraction of light using a prism**

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

SECTION B – CHEMISTRY **1.0. Basics of Chemistry** 1.1. Importance of Chemistry 1.2. Fundamental and derived units and their SI units 1.3. Gay-Lussac's law, Avogadro's law 1.4. Derivation of molecular weight, gram molecular volume 1.5. Stoichiometry Mole concept 1.6. Equivalent weight, Atomic weight, Molecular weight 1.7. Percentage composition and molecular formula 1.8. Numerical based on weight-volume relationship	**Solve Problems based on weight – volume relationship**
2.0. Atomic Structure 2.1 Characteristics of electron, proton and neutron. 2.2 Rutherford model of an atom. 2.3 Nature of electromagnetic radiation, 2.4 Planck's quantum theory. 2.5 Explanation of photo electric effect. 2.6 Features of atomic spectra. 2.7 Characteristics of hydrogen spectrum. 2.8 Bohr's theory of the structure of the atom. 2.9 Bohr's explanation of spectral lines. 2.10 Failure of Bohr's theory. 2.11 Wave-particle nature of electron. 2.12 de Broglie's hypothesis, Heisenberg's uncertainty principle. 2.13 Important features of the quantum mechanical model of an atom. 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. 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**

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

7.15 Concept of hydrogen bond – Types of hydrogen bonds, inter and intra molecular hydrogen bonds. 7.16 Effect of hydrogen bonds on some properties of substances with examples. 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 8.1. Introduction to S & P blocks 8.2. Position in periodic table, general electronic configuration 8.3. Comparison between alkali and alkaline earth metals 8.4. Sodium occurrence, uses of sodium 8.5. Methods of extraction 8.6. Physical and chemical properties 8.7. Difficulties in isolation of fluorine 8.8. Methods of preparation 8.9. Uses of fluorine	

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

(Subject Code – 90000021)

Theory	Practical
Detailed Syllabus : **SECTION A - PHYSICS** **1.0. Electrostatics** 1.1 Gauss's theorem, proof and application 1.2 Mechanical force on unit area of a charged capacitor 1.3 Energy density of a medium 1.4 Concept of a condenser 1.5 Capacity of parallel plate condenser 1.6 Effect of dielectric on capacity 1.7 Energy of a charged condenser 1.8 Condensers in series and parallel	**Detailed Syllabus** **1) Proof of Gauss's theorem** **2) Solve numericals on series and parallel plate capacitors**
2.0. Current, Electricity and Magnetic effects of electric current <u>Part A – Current Electricity</u> 2.1. Ohm's Law 2.2. Ohmic and non-ohmic resistances , specific resistance, conductance, 2.3. Temperature dependence of resistivity 2.4. Thermistor 2.5. emf of a cell - internal resistance and back e.m.f's 2.6. Kirchoff's laws: statement and explanation, application to wheatstone's bridge for its balance conditions , metre bridge, principle of potentiometer 2.7. Comparison of e.m.f. of cell, determination of internal resistance of a primary cell, Series and parallel combination of cells. <u>Part B – Magnetic effects of electric current</u> 2.8. Biot Savart's law 2.9. Right hand Thumb rule 2.10. Magnetic induction at the center and at the point along the axis of circular coil carrying current	**1) Solve numericals on Ohm's law** **2) Experiment on wheatstone's bridge**

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

7.0 Communication 7.1. Space communication 7.2. Ground, sky and space wave propagation 7.3. Satellite communication 7.4. Line communication 7.5. Two wire lines 7.6. Cables 7.7. Optical communication	**Study of various types of cables and wires**
SECTION B - CHEMISTRY **6.0. Electrochemistry** 6.1 Electrolytes and Non-electrolytes. 6.2 Faraday's laws of electrolysis. 6.3 Galvanic & Voltaic cells representation 6.4 Nernst equation (No derivation) , e.m.f. calculations.	**Experiment on faraday's law of electroststics**
7.0 Nuclear Chemistry 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). 7.2 Radio-active disintegration and its rate-Half-life and average life. 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 8.1 Adsorption and absorption. Physical and chemical adsorption-distinguishing properties-Adsorption of gases on Metals Adsorption from solutions (Elementary treatment). 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. 8.3 Emulsions:- Emulsifying agent and emulsification - its applications. Cleansing action of soap. 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 9.1 Theories of Acids and Bases Lowry - Bronsted concept Lewis theory of acids and bases. 9.2 Ionic product of water, PH, Buffers - Numerical problems on these, Indicators - Choice of indicators, PH-range and uses. 9.3 Salt hydrolysis - Types of hydrolysis with examples.	**Solve numericals on pH value.**

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

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

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

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

Elective –II - Computer Applications– 2nd year

(Subject Code – 90000022)

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

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

Elective – II - Business Mathematics – 1st year

(Subject Code – 90000023)

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

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

Elective – II - Business Mathematics – 2nd year

(Subject Code – 90000023)

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

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

Subject - Building Material and Construction

Code No – 30440001

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

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

Chapter 8: Reinforced Cement Concrete 8.1) Different types of RCC members Definitions, its properties and its locations 8.2) Ingredients of for R. C. C. Concrete 8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing 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. 8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar 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** i) Visit to site for observing Bar bending, laying of Reinforcement bars ii) Observe method of providing cover, placing concrete in RCC Members iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft iv) Exercise on preparing standard Bar bending Schedule 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 1.1) Necessity and Purpose of Foundation 1.2) Shallow Foundation 1.2.1) Spread Foundation 1.2.1.1) Footing for load Bearing Structure 1.2.1.2) Column Footing and combined Footing 1.3) Raft Foundation 1.4) Grillage Foundation 1.5) Deep Foundation and its types 1.5.1) Cast in-situ R.C.C. concrete pile 1.5.2) Pre cast concrete piles 1.6) Foundation in Black cotton soil, Under reamed pile	**Practical** 1) Line out for 3 to 4 Room Load Bearing Building 2) Line out for Framed structure
Chapter 2: Excavation 2.1) Manual method of Excavation 2.2) Mechanical Method of Excavation 2.3) Machines used for excavation 2.4) Disposal of Excavated Material 2.5) Dewatering of trenches different methods used 2.6) Shoring and strutting of Trenches 3.0) Precaution while excavation, Fencing, caution signs, removing excavated material	**Practical** Visit to Site to study different methods of Excavation
Chapter 3: Plain cement concrete 3.1) Mix design of concrete and uses of different mix of concrete 3.2) Procedure of preparing concrete. Manual and machine mixing, Transporting Laying, compacting and curing of concrete 3.3) Admixtures used in concrete 3.4) Ready mix concrete	**Practical** 1) Visit to site showing ingredients and process of mixing, transportation, laying, compacting and curing of concrete

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

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

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

List of Books

Building Material

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3] Anand Gujrath Kulkarni G. J. A Textbook of engg. Materials

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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 Material and Construction
Code No – 30440001

Theory	Practical
Chapter 1: Stone and Coarse Aggregate 1.1. Classifications of Rocks 1.2. Quarrying for stone 1.3. Commonly used stones in building 1.4. Requirements of good building stone 1.5. Study of crushers for obtaining coarse Aggregate 1.6. Common sizes of coarse Aggregate used in concrete 1.7. Properties of coarse Aggregate	**Practical** 2) Visit to Quarry to observe quarrying operations 2) Conduct Compressive strength Test on stone 3) Conduct Abrasion Test of Metal
Chapter 2: Bricks 2.1. Study of earth (Soils) used in manufacturing of Brick 2.2. Procedure of manufacture of Bricks 2.3. Classification of Bricks 2.4. Properties of a good Brick 2.5. Other types of Brick	**Practical** 1. Field Tests of Brick 2. Conduct Compressive Test on Brick 3. Conduct Water absorption on Brick
Chapter 3: Cement 3.1 Grades of cement as per IS 12269 – 1987, IS 8182 - 1989 and IS 289 - 1989 3.2 Ingredients of Cement, Manufacture of Cement (only introduction) 3.3 Various Types of Cements and its uses 3.4 Effect of Cement on properties of concrete 3.5 Storing of Cement	**Practical** 1. Field Tests of Cement 2. Determining initial & final setting time of Cement 3. Determining fineness Modulus of Cement 4. Determination of Compressive strength of cement
Chapter 4: Fine Aggregates 4.1. Types of fine aggregates used in preparation of cement mortar and concrete 4.2. Sources of fine aggregate 4.3. Properties of River Sand 4.4. Silt content and necessity of Screening & Washing of fine Aggregates	**Practical** 1. Sieve Analysis of Sand for finding fineness modulus 2. Finding Silt content in Sand
Chapter 5: Cement Mortar 5.1. Ingredients of Cement Mortar 5.2. Preparation of Cement Mortar – Hand Mixing, Machine Mixing – Advantages and Disadvantages 5.3. Various Proportions of Cement Mortar 5.4. Lime Mortar, its properties and use	**Practical** 1. Preparation of Cement Mortar 1:6
Chapter 6: Concrete 6.1) Ingredients of Concrete 6.2) Types of Concrete Plain Cement Concrete, (PCC) and Reinforced cement concrete (RCC) 6.3) Various proportion of Concrete and its uses, Batching of concrete- Volume batching and weigh batching 6.4) Procedure for preparing concrete – Hand Mixing, Machine Mixing 6.5) Transportation of concrete, precautions to taken . 6.6) Laying of concrete & precautions to taken 6.7) Necessity of compacting of concrete, equipments used for compacting concrete 6.8) Necessity of curing, Methods of curing 6.9) Workability - water cement ratio and its importance 6.10) Hydration of Cement 6.11) Quality of water 6.12) Finishing of concrete surface 6.13) Admixtures used in concrete and properties of such concrete 6.14) Ready mix concrete, Properties, Manufacturing and its uses 6.15) Advances in concreting such as self compacted concrete, Trimix Concrete, etc	**Practical** 1) Conduct Compressive Test on Concrete (cube Test) 2) Conduct Test for Workability (slump test) 3) Conduct Compaction factor Test 4) Introduction to Non Destructive Tests on Concrete

Theory	Practical
Chapter 7: Steel 7.1) Types of steel used in RCC as per ISI 7.2) High Tensile Steel its properties, study of IS 1786 7.3) Cover for steel as per IS 456 - 2000 7.4) Types of sections used in Steel Structure and its properties 7.5) Rolled steel Joist of different sections and its uses	**Practical** 1) Conduct Tensile Test on mild steel bar / HYSD Bars
Chapter 8: Flooring Tiles 8.1) Shahabad Tiles, Kotah Tiles, Cuddappa Tiles, Marble Tiles, Granite, its occurrence, Sources of availability and its uses 8.2) Cutting of tiles 8.3) Cement tiles, marble mosaic tiles, chequered tiles- process of manufacture, and its uses 8.4) Ceramic Tiles, process of manufacture, Normal sizes & its uses 8.5) Cement mortar **Briquettes**, Process of manufactures and its uses	**Practical** 1) Conduct Bending Test of tiles 2) Conduct Abbreviation test of tile
Chapter 9: Timber 9.1) Types of Timber. 9.2) Sections of Timber. 9.3) Characteristics of Good Timber. 9.4) Defects in Timber. 9.5) Decay of Timber and remedies. 9.6) Seasoning of Timber, necessity and methods. 9.7) Preservation of Timber. 9.8) Timber based Product Plywood; Block Board, Veneers, Particle wood 9.9) Finishing to Timber a) Painting b) Polishing c) Sun mica	**Practical** Report on Visit to a Timber Factory
Advance Building Materials 10.1) Study of latest materials used in Flooring, Thermal Insulation, Sound proofing, Wall finishing, structural glazing, Metal Cladding & rendering, Partitioning, and Painting	
Chapter 8: Reinforced Cement Concrete 8.1) Different types of RCC members Definitions, its properties and its locations 8.2) Ingredients of for R. C. C. Concrete 8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing 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. 8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar 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** i) Visit to site for observing Bar bending, laying of Reinforcement bars ii) Observe method of providing cover, placing concrete in RCC Members iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft iv) Exercise on preparing standard Bar bending Schedule 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 1.1) Necessity and Purpose of Foundation 1.2) Shallow Foundation 1.2.1) Spread Foundation 1.2.1.1) Footing for load Bearing Structure 1.2.1.2) Column Footing and combined Footing 1.3) Raft Foundation 1.4) Grillage Foundation 1.5) Deep Foundation and its types 1.5.1) Cast in-situ R.C.C. concrete pile 1.5.2) Pre cast concrete piles 1.6) Foundation in Black cotton soil, Under reamed pile	**Practical** 2) Line out for 3 to 4 Room Load Bearing Building 2) Line out for Framed structure
Chapter 2: Excavation 2.1) Manual method of Excavation 2.2) Mechanical Method of Excavation 2.3) Machines used for excavation 2.4) Disposal of Excavated Material 2.5) Dewatering of trenches different methods used 2.6) Shoring and strutting of Trenches 3.0) Precaution while excavation, Fencing, caution signs, removing excavated material	**Practical** Visit to Site to study different methods of Excavation
Chapter 3: Plain cement concrete 3.1) Mix design of concrete and uses of different mix of concrete 3.2) Procedure of preparing concrete. Manual and machine mixing, Transporting Laying, compacting and curing of concrete 3.3) Admixtures used in concrete 3.4) Ready mix concrete	**Practical** 1) Visit to site showing ingredients and process of mixing, transportation, laying, compacting and curing of concrete
Chapter 4: Stone Masonry 4.1) Terms used in stone masonry 4.2) Procedure of constructing un coursed Rubble and Coursed masonry, purpose of through stone in stone masonry 4.3) Points to be observed while constructing stone Masonry	**Practical** 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 5.1) Terms used in Brick Masonry. 5.2) Construction of Brick Masonry in English bond and Flemish Bond in cement mortar, pre-construction preparation, procedure of construction, post construction precaution 5.3) Brick Masonry stretcher bond and half brick thick masonry. 5.4) Hollow and solid concrete block masonry 5.5) Fixing of Door and window Frame in masonry 5.6) Brief information of Siporex block masonry 5.7) Brief information of Concrete Block masonry	**Practical** 1) Construction of Burnt Brick Masonry in superstructures in English Bond / Flemish Bond 2) Construction of concrete block masonry in superstructure
Chapter 6: Scaffolding 6.1) Purpose and Necessity of Scaffolding 6.2) Single and Double Scaffolding, name of parts erecting Scaffolding. 6.3) Materials used for Scaffolding, Tubular steel scaffolding	**Practical** 1) Erecting Single Scaffolding up to G + 1 floor 2) Erecting Double Scaffolding up to G + 1 floor
Chapter 7: Lintels and Sills 7.1) Necessity of lintels 7.2) R.C.C. Lintels 7.3) Jambs, Sills, Head cladding, its purpose, materials used and construction procedures.	1) Study of Laying Lintels and Sills on Construction Site

Theory	Practical
Chapter 8: Reinforced Cement Concrete 8.1) Different types of RCC members Definitions, its properties and its locations 8.2) Ingredients of for R. C. C. Concrete 8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing 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. 8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar 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** i) Visit to site for observing Bar bending, laying of Reinforcement bars ii) Observe method of providing cover, placing concrete in RCC Members iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft iv) Exercise on preparing standard Bar bending Schedule 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 9.1) Definitions, Different members used in Form work and centering 9.2) Materials used in preparing centering and form work 9.3) Procedure of Erecting Centering and form work 9.4) Precautions while erecting centering and form for RCC work.	**Practical** 1) Draw Sketches of form work for column, Beams, Slab, Lintel and Chajja 2) Visit to site to study Centering and form work for abovementioned members and table formwork, Mivon formwork etc.
Chapter 10: Pointing and Plastering **10.1 Necessity of Pointing** 10.1.1) Materials used for Pointing 10.1.2) Procedure of applying Pointing, preparation of surface to receive pointing, Procedure of applying pointing & post applying precautions 10.1.3) Type of Pointing 10.2 Necessity of Plastering 10.2.1 Materials used for plastering 10.2.2 Types of plaster internal wall plaster, External wall plaster, Ceiling plaster, different types of furnishings, Stucco plaster. 10.2.3 Procedure of plastering for each of above type, Use of machines for plastering 10.2.4 P.O.P. finish to wall	**Practical** 1) Visit to site for observing procedure for different type of plaster work 2) Hands on experience of applying plaster of size 3m x 3 m on internal & external wall surface
Chapter 11: Painting 11.1. Necessity of painting, Types of paints, thinner, varnishes. Surface preparation, Use of Primers 11.2. Anti corrosive paints, its primers, its necessity 11.3. White Washing to walls and ceiling, Materials used, procedure for new and old surface 11.4. Applying Dry Distemper to walls, Material, Procedure for new and old surface 11.5. Applying Oil Bound Distemper and Emulsion, Materials used, Procedure for new and old surface 11.6. Applying Cement Paint to External walls, Materials used, Procedure for New and old surface 11.7. Applying Oil Paint Primer coat, procedure of applying oil paint to woodwork, steel work and walls. 11.8. Melamine / French polish, its application on old and new wooden surfaces	**Practical** Hands on experience of Painting of surface with a) White wash 3m x 3m surface area b) Dry Distemper 3m x 3m surface area c) Oil Bound Distemper 3m x 3m surface area d) Cement Paint 3m x 3m surface area e) Oil Paint on new Steel work and old wood work

Theory	Practical
Stairs 1.1) Definitions of Terms used in Stair. 1.2) Classification of stairs based on shape and materials used for construction. 1.3) Requirements of good stairs 1.4) Design of stair Thumb Rules for Design of Dog legged stair 1.5) Hand Rails Types and Fixing Procedure	**Practical** 1) Draw neat Sketches of any 4 types of stairs 2) Prepare design for RCC Dog-legged stair 3) Draw its plan and sectional elevation 4) Visit site to site for observing various type of stair

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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
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20	Hammer Mason	10
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33	Buckets 14 Lits.	10
34	Bar Bending Tools And Cutting Tools 6mm To 12 Mm	2 set
35	Screw Driver 12 Inch	5
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56	Top cover & bottom pan for sieves	1
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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

Building Drawing and Estimating Costing- 1st Year

Code No – 30440003

Theory	Practical
A] Building Drawing	**1 Year**
Chapter 1: Introduction to Drawing 1.1) Different Drawing Instrument and their use 1.2) Letters its types, Sizes and its use in Drawing 1.3) Convention of different lines 1.4) Giving dimensions 1.5) Scales and its uses 1.6) Study of IS 962	**Practical** 1) Prepare Sheet on lettering 2) Prepare Sheet on lines 3) Prepare Sheets on Geometrical Construction 4) Prepare Sheets on Conventional Sign and Symbols
Chapter 2: Orthographic Projection 2.1) Introduction to orthographic projections 2.2) First Angle Projections Method 2.3) Third Angle Projections Method 2.4) Drawing orthographic Projections of simple pictorial view	**Practical** 1) 1st Angle Projections ---------- 2 Solids 2) 3rd Angle Projections ---------- 2 Solids
Chapter 3: Isometric View 3.1) Method of Preparing Isometric Views 3.2) Isometric View of Rectangular Objects 3.3) Isometric View of Circular Objects 3.4) Isometric View of Building	**Practical** 1) Isometric View of Rectangular Objects 2) Isometric Vies of Circular Objects 3) Isometric View of Building
Chapter 4: Building Drawing 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** 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 3.1) Definitions of Plot Area, Plinth Area, Built up Area, Carpet Area, Floor Space Index (FSI) 3.3) Permissible Built up Area for Residential Bldg., Public Building 3.4) Definition of Marginal Distance and their necessity, Normal Marginal Distances provided for Residential Buildings 3.5) Definition and Necessity of Building Line, Development Line 3.6) Min Dimensions for following 3.6.1) Plinth height, Sill height, Head Room in Residential Bldg, Public Buildings, Mezzanine floor, Basements and stilts for car parking 3.7) Minimum Dimensions of: Living Room, Bed Room, Master Bed Room, W.C. Bath, Toilet. 3.7.1) Min. Width for passage and Balcony 3.8) Rules for Window Opening 3.9) Min. width of step and Landing, Head Room, Thumb Rules for fixing Rise and Tread. 3.9.1) Permissible Height of Pardi, of Building as per FSI and Road Width	**Practical** 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. a) Plan, b) Elevation c) Two sections d) Schedule of door and window e) Site plan, f) Area statement, g) Construction notes. h) Schedule of finishes
Chapter 6: Development of Line Plan of a Building 4.1) Symbols and notations as per BIS 696 in Civil Engg. Drawing. 4.2) Preparing Line Plan of Building, necessity of preparing line plan. 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 4.4) Working drawings and its necessity.	2) Draw tracing of above drawing 3) Prepare ammonia sheet 4) Prepare a working drawing for Staircase, Toilet block and kitchen

Building Drawing and Estimating Costing- 2nd Year

Theory	Practical
Introduction Meaning of Term Estimating, costing Types of Estimate 1.2.1. Approximate Estimate 1.2.2 Details Estimate	Practical 1. Reading of Building Drawing for measurement 2. Filling of Measurement Sheet
Approximate Estimate 2.1 Definition of approximate estimate 2.2 Uses of Approximate Estimate 2.3 Preparing Approximate Estimate for Building Methods of preparing Approximate Estimate for Buildings 2.3.1 Plinth Area Method 2.3.2 Cubical Unit 2.3.3 Service Unit 2.3.4 Bay Unit	**Practical** 1. Preparing approximate estimate of a building using approximate method.
Detail Estimate 3.1 Definition of Detail Estimate 3.2 Uses of Detail Estimate 3.3 Data required to prepare detailed estimate 3.4 Procedure of preparing detailed estimate of any work 3.4.1 Taking out quantities and entering the data in measurement sheet and completing abstract sheet. 3.4.2 Abstracting using Abstract sheet 3.5 List of items with their unit of measurement. 3.6 Definition of contingencies, work charge establishment 3.7 Provisions in details estimate for sanitary, water supply, Electrification. 3.8 Types of Estimates, Detail Estimate, Revised Estimate, Supplementary Estimate, Annual report and Maintenance Estimate, Special Report Estimate, Additions and Alteration Estimate. 3.10 Procedure of calculating Quantities for excavation, Foundation concrete, Foundation & plinth Masonry, Super Structure Masonry using i) Long wall – Short Wall method ii) Center Line Method 3.11 Rules for Deduction in concrete, Masonry, Pointing & Plastering, Painting, 3.12 Multiplying factor related to oil painting	**Practical** 1. Preparation of Detail Estimate of a Residential Building (Load Bearing Structure) 2. Details estimate of septic Tank 3. Details estimate of sump well Note: No. 1 is Compulsory and any one out of 2 and 3
Chapter No. 4: Working out of quantities of Steel for R.C.C work 12.1 Division of R.C.C work into concrete Steel and Form work 12.2 Study of Reinforced steel for Bar diameter, its weight, 12.3 Calculating Length and weight of steel for 12.3.1 Straight bas with hook or El at ends 12.3.2 Bent up bar with hook or EL at ends 12.3.3 Stirups 12.4 preparing Bar bending schedule and calculating Steel for: Footing, Column, Lintel, Beam, Slab, Chajja, Staircase etc	**Practicals** 1) Calculating Quantity of concrete & Steel for 2 to 3 room RCC Building or Hall.
Chapter No. 5: Modes of Measurements 4.1 Points Considered while fixing unit of measurement 4.2 Modes of measurements of item of work as per IS 1200 4.3 Desired Accuracy of measurement	

Building Drawing and Estimating Costing- 2nd Year

Theory	Practical
Chapter No. 6: Rate Analysis 5.1 Meaning of Term Rate Analysis 5.2 Necessity of Rate Analysis 5.3 Factors affecting Rate analysis 5.4 Rates of Material and Labor as per DSR. 5.5 Definition of Task work and factors affecting it. Task work for Excavation, Brick Masonry, Plastering, Wood work, centering & formwork, Steel work for RCC, Plain Concrete and RCC 5.6 Methods of payment to labor. 5.7 Transportation of material and its effect on rate analysis, Lead & lift 5.8 Preparing Rate Analysis of minimum 10 items, such As Excavation, Brick Masonry, Plastering, Wood work, Centering & formwork, Steel work for RCC, Plain Concrete and RCC 5.9 Standard schedule of Rate.	**Practicals :** 1. Collecting Market Rates and DSR rates for minimum 20 building materials and 10 categories of labors 2. Preparation of Rate analysis for at least 5 items of Building work.
Chapter 7: Specifications 6.1 Necessity of Specification 6.2 Points to be observed while framing specifications 6.3 Types of Specifications General, Details, Standard and manufactures Specifications 6.4 Writing detailed Specifications of minimum 5 important items of building work 6.5 Study of Standard specification Book from organizations such as PWD, MHADA, CIDCO etc.	**Practicals :** Preparation of Specification for 5 items.
Chapter 8 : Tender Document & Tender Notice 8.1 List of Tenders document 8.2 Necessity of Tender 8.3 Points to be observed while framing Tender Notice 8.4 Drafting of Tenders Notice 8.5 Explanation of Terms: Earned Money, Security Deposit, Validity Period, Right for Rejection of one or all tenders 8.6 Corrigendum to Tenders Notice 8.7 Procedure of Submitting filled Tender 8.8 Opening of Tender, Scrutiny of Tender 8.9 Comparative Statement, Finalizing Tender 8.10 Work order 8.11 Rejection of all tenders 8.12 Rejection of Lowest Tenders 8.13 Unbalanced Tender, Ring formation, Negotiations 8.14 Point to be observed by contractor while filling a tender.	**Practical:** Prepare set of full tender documents for Estimate prepared in second semester 1. Tender Notice 2. Tender Form 3. General Directions to Contractor 4. Schedule A 5. Schedule B 6. Schedule C 7. General terms and conditions of contract 8. Special conditions of contract **9.** Specifications
Chapter 9 : Conditions of Contract 9.1 Contract - Definition, its necessity and types 9.2 General Conditions of contract 9.2.1 Special conditions of contract 9.2.2 Contract Drawing 9.2.3 Bill of Quantity 9.2.4 site possession for execution 9.2.5 Inspection of Materials 9.2.6 Inspection of completed item of works 9.2.7 Water charges and Light Charges 9.2.8 Working on Holiday	**Practical:** 1. Study of contract conditions

Theory	Practical
9.2.9 Extension of Time Limit 9.2.10 Termination of Contract 9.2.11 Subletting of work 9.2.12 Suspension of work 9.2.13 Extra Item 9.2.14 Payment to contractor 9.2.15 Clearance of file & Completion Certificate 9.2.16 Defects Liability Period 9.2.17 Price Escalation Clause 9.2.18 Adherence to labor laws 9.2.19 Arbitration 9.3 Reward / Penalty clause	
Chapter 10: Payment to Contractors 10.1 Modes of Payment to contractor 10.1.1 Interim payments and its necessity 10.2 Types of interim payment 10.2.1 Advance payment 10.2.2 Secured Advance Payment 10.2.3 On Account Payment 10.3 Final Payment 10.4 First & final Payment 10.5 Retention Money and its Necessity 10.6 Reduced Rate Payment 10.7 Petty advance 10.8 Mobilization Advance 10.9 Measurement Book 10.10 Indent Invoice 10.11 Recoveries	

Chapter 11: **Procedure of Execution of work in P.W.D.** 11.1 Organization set up of PWD 11.2 PWD procedure of initiating work, Administrative Approval, Technical Sanction, Expenditure section, Budget Provision 11.3 Methods of Executing work 11.3.1 Contract Method 11.3.2 Departmental Method, Nominal Muster Roll 11.3.3 Rate List Method 11.3.4 Piece Work Method 11.3.5 Day Work Method	

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)

Estimating and Costing

1] B. S. Patil Estimating and Costing
2] Estimation and costing for civil engg. Dutta 2004 UBSPD Delhi
3] Estimation and costingspecialisation & valuation Chakraborti,M 2004 Author -
4] A textbook on Estimation and costing and accounting Kohli,D.D. 2005 S.Chand Mumbai

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

Landscape Architecture – (Theory & Practical) – 1st Year

Code No – 30440017

Ecological Basis of Environmental Issues.
Ecological concepts that form the basis for understanding environmental issues confronting Indian population growth, loss of diversity, resource limitation, pollution, and global climate change.

Design and the Environment.
The built environment and its effects on natural systems. Focus is on the design of the built environment as an ongoing activity integrating ecological, social, and cultural values. Topics include land use patterns and policies, development and resource management, community design issues, and strategies for improving environmental integrity and quality of life.

Reading the Landscape.
Approaches to perceiving and interpreting the landscape. Topics include the landscape in art and literature, visual assessment techniques, use of maps, field sketching, and photography.

Practical – Visit Report, Photograph report, Field Sketching Plates

Design Communication (Practical)
Manual drafting and design drawing skills with an emphasis on the development of basic drafting convention and graphic presentation literacy.

Landscape Construction Processes and Materials.
The range of natural processes and materials relevant to landscape architecture (e.g., climate, geomorphology, geology, hydrology, soils, and vegetation communities.) The relationship between these materials and natural processes. Exercises will include some conceptual manipulation of these materials. The range of materials used in the built environment by landscape architects: metals, concrete masonry, glass, plastics, wood. Emphasis on understanding the properties of these materials and the implications for design.

History of the Built Environment
Architecture, landscape architecture, and urban design from 1600 to the present. Emphasis is on the relationship between design on the built environment and socio-cultural, technological, aesthetic, and environmental factors.

Landscape Engineering Processes and Materials
The forming and building of landscapes with emphasis on the values of "sustainability." Includes introduction to landscape engineering: grading, drainage, and roadway alignment.

Applied Landscape Engineering.
Applied grading, drainage, and road alignment.

Plants of Asia.
A continuation of Plants of the Asia. Native and introduced species; including trees, shrubs, grasses, herbaceous annual and perennial plants, and commonly used indoor plants.

Planting Design .
Analysis of plant elements and form. Emphasis on plant function in the landscape composition. Basic problems in planting design of small scale areas with emphasis on orientation, arrangement, and human needs.

Residential Design. Use and selection of plants for environmental design.

Planning and Design.
Approaches to planning and design in landscape architecture. The relationship between applied theories and methods and the environmental, social, and cultural context of projects.

Dwelling and Community
Concepts and theories of residential and neighborhood form.

Urban Entomology.
Urban entomology, including identification, biology, and control of insects and selected arthropod pests with emphasis on the efficacy and environmental impact of pest control tactics in the urban habitat.

Garden Design in India.
Design traditions which have shaped Indian gardens over the past 200 years with emphasis on the twentieth century, and plants, uses, design forms, and environmental conditions through which these traditions have been expressed. Designing gardens informed by traditional models.

Healthcare and Therapeutic Garden Design.
Physical, psychological, perceptual influences of garden design on health, healing, and wellness with emphasis on design in hospital, health care institutions, treatment centers, and childcare facilities.

Architectural Design.
Major design determinants in architecture. Inquiry into structural, functional/programmatic, theoretical, and environmental issues will be focused on developing an understanding of the relationship between architecture and landscape.

Directed Study in GIS. An independent study on a single or multiple topics in GIS. Students will select a distance learning package provided by the ESRI corporation and complete an online course.

Design Communication (Practical)
Advanced multimedia and desktop publishing techniques and their application to environmental design projects.

Computer-Aided Design. (Practical)
use of computer-aided design software for the development of environmental design and land planning projects.

Landscape Architecture – (Theory & Practical) – 2nd Year

Applied Landscape Ecology.
The concept and functioning of ecosystems and how this understanding can be applied in environmental design. Review of adverse impacts that can result from failure to apply sound ecological principles. Exercises will include some conceptual manipulation of ecological processes and materials.

Applied Landscape Construction
Detailing of architectural and planting elements in the landscape with an emphasis on appropriate detailing for sustainability and longevity in urban contexts.

Landscape Architecture Implementation Documents.
Construction, engineering, and planting documents for implementing landscape architecture projects.

Landscape Architecture Post-Construction Documents and Processes.
Post-construction processes and documents relevant to the implementation and management of designed and natural landscapes. Includes development of landscape management plans, and post-construction evaluation.

Plant Communities of the India. The plant communities of the southeastern United States, with emphasis on botanical and aesthetic characteristics, factors affecting community composition, and community dynamics.

Soils in Natural and Managed Ecosystems.
Nature and properties of soils and their influence on and response to ecosystem properties and function. Topics include soil morphological, physical, chemical, and biological properties; soil genesis; and soil fertility and plant nutrition. Anthropogenic influences on soil properties, function, and management in urban environments will be discussed.

Region, Site and Place.
Physical and cultural determinants of landscape character from regional to site-specific scales.

Urban Design and Architecture
Urban design and architecture including analysis of various theories used as a framework for the development of architectural and urban form.

Contemporary Landscape Architecture
Contemporary issues and theories in landscape architecture. Emphasis is on the relationship between theoretical approaches and built form.

Landscapes in Painting, Poetry, Literature, and Design
The appreciation and understanding of nature, landscape, and garden in painting, poetry, and literature. Study of how changing attitudes to the environment affect aesthetic appreciation of landscape and are reflected in the design of gardens and the description of landscapes in art and literature.

Sustainable Building Design.
Design features and technologies contained in sustainable (green) building design and the process to create a green building to include commercial and residential construction. Topics include energy and water, construction materials, site work, indoor environmental quality, and how design practices fit into the overall picture of developing a more sustainable society.

Landscape Architecture Internship.
Professional office experience under the supervision of licensed landscape architect or related practitioner.

Field Study in Contemporary Landscape Architecture. (Practical)
Current and historic works and individuals in the fields of landscape architecture, architecture, historic preservation, and urban design in the India
The class will visit significant projects, offices, national parks, and landmarks during a ten to fourteen-day trip to another region of the country.

Field Study in Indian Garden Design. (Practical)
Recognized professional firms, garden designers, and gardens central to the evolution and current culture of garden design in India

Landscapes
Design, an appreciation of materials and an understanding of processes. Studio projects selected to expose students to the wide range of approaches to design and landscapes.

Gardens
The garden as the central image and metaphor in landscape architecture. Studio projects selected to explore the image and the metaphor in a variety of social and environmental contexts.

Nature and Sustainability.
Concepts of nature and their implications for landscape architecture, with particular attention to the issue of sustainability. Projects selected to investigate alternative design strategies in a variety of environments from wilderness to city center.

Community and Place
Concepts of community and place in architecture and urban design and their implications for landscape architecture. Projects selected to investigate alternative design strategies at a variety of scales and densities of habitation, from a single dwelling unit to a city.

Landscape Material and Process
Landforms, geology, hydrology, soils, and biotic communities, with an examination of ecological concepts and their application at the landscape scale.
The history and ecology of plants and related materials associated with the design of gardens.

Landscape Construction.
Landscape construction and engineering through inquiry into their ability to implement values of sustainability. Applications of landscape construction and engineering through inquiry into their ability to implement values of community and place.

Books:

1) “Landscape Architecture” by Simonds ‘Macgrow Hill”
2) “An Introduction to Landscape architecture” by Laurie Michael.
3) “Anatomy of a park” by Rultedge.
4) “Urban Landscape Design” by Cliff Tandy.

Books on Following Topics

01] The Landscape of Man-shaping the environment from prehistory to preset day.
02] The Western Tradition from Renaissance to Present day.
03] The Formal Garden
04] Garden Architecture in Europe
05] Complete Gardening in India
06] Tropical Garden Plants in colour
07] Beautiful shrubs
08] Some beautiful shrubs & climbers
09] Book on Plant Physiology
10] Landscape Handbook for the tropics.
11] Book on Geology and Soils
12] Time savers standard for Landscape Architecture
13] Book on Landscape Engineering
14] Landscape Handbook for the tropics.
15] Book on Climatology.
16] Book on Hydrology.
17] Landscape Handbook for the tropics.
18] Book on Geology and Soils.

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

General Items

Sr	Name of Item	No.
1	Sieve for soil (Two Type)	1 each
2	Pitching Tool (Mason)	1
3	Chisel Mason Hammer Headed Flat 200 Mm	5
4	Hammer Mason	5
5	Level Masons 36" (1 Metre)	5
6	Plumb Bob.	5
7	Square (Steel) 2' X 1'	5
8	Trowel Plastering Double Hand	5
9	Trowel Brick 10"	5
10	Tasla (Tin) Pans	5
11	Spade	5
12	Measuring Steel Tape 15 Mtr.	5
13	Measuring Steel Tape 30 Mtr.	5
14	Wooden Straight Edges For Ft.	5
15	Buckets 14 Lits.	5
16	Pocket Steel Tape 2 Mtr.	25
17	Pick Axes	5
18	Wheel Barrow	3
19	Mallet	5
20	Pane (Iron)	5
21	Handsaw 1'6"	5
22	Drilling Machines	1
23	Hacksaw frame	1
24	Pipe Tube Level	2

A) Tools & Implements

1.	Kassi / Spade	20 nos.
2.	Khurpi	20 nos.
3.	Hand hoe	20 nos.
4.	Saw	20 nos.
5.	Watering Can	05 nos.
6.	Rose Can	05 nos.
7.	Grass Cutter	20 nos.
8.	Budding & Grafting Knives	10 nos.
9.	Secateur	10 nos.
10.	Forceps	05 nos.
11.	Buckets	10 nos.
12.	Edge Cutter	02 nos.
13.	**Tree Pruner**	**02 nos.**

B) Farm Structures

14.	Green House	01 no.
15.	Poly House	01 no.
16.	Misting Unit	01 no.

C) Farm Equipment

17.	Power Triller with Bowing Attachment	01 no.
18.	Wheel Barrow	01 no.
19.	Hand Sprayer (Small)	05 nos.
20.	Foot Sprayer	02 nos.
21.	Hand Gloves	20 nos.
22.	Balance	01 no.
23.	Sieve / Stainer	02 nos.

D) Miscellaneous Farm Supplies

24.	Earthen Pots	100 nos.
25.	Plastic Pots	100 nos.
26.	Polythene Bags	500 nos.
27.	Seed Packets	1000 nos.
28.	Brown paper bags	1000 nos.
29.	Gunny bags	10 nos.
30.	Tags-labels	100 nos.
31.	Thread balls	12 nos.
32.	Budding-tape	10 nos.
33.	Sirki	10 nos.
34.	Bamboos	20 nos.
35.	Boxes (Packing)	10 nos.
36.	Sutli	05 kgs.
37.	Moss-grass	05 kgs.
38.	Polythene roll	01 no.
39.	Tags-label (Metallic)	100 nos.
40.	Tray	10 nos.
41.	Grass Mower	01 no.

E) Identification Materials

46.	Flower Germ Plasm	
47.	Seed material	
48.	Packing materials	
	I) Accessories for flower arrangement	
49.	Different types of flower containers	
50.	Flower vases	
51.	Pin holder	

F) Laboratory Misc. Supplies

52.	Duster	20 nos.
53.	Soap	20 nos.
54.	Cotton balls	10 nos.
55.	Filter paper (Packs)	10 nos.
56.	Filter cloth	10 mtrs.