

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

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

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

(Subject Code – 90000021)

Theory	Practical
<p>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</p>	<p>Detailed Syllabus 1) Proof of Gauss's theorem 2) Solve numericals on series and parallel plate capacitors</p>
<p>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 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</p>	<p>1) Solve numericals on Ohm's law 2) Experiment on wheatstone's bridge</p>
<p>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</p>	

<p>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</p>	
<p>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</p>	<p>Solve numericals on power in a.c circuit, transformers and resonating circuits</p>
<p>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</p>	
<p>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</p>	<p>Study of various types of cables and wires</p>
<p>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.</p>	<p>Experiment on faraday's law of electrosttics</p>
<p>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.</p>	<p>Solve numericals on binding energy and half life rate</p>

<p>8.0 Surface Chemistry</p> <p>8.1 Adsorption and absorption. Physical and chemical adsorption-distinguishing properties- Adsorption of gases on Metals Adsorption from solutions (Elementary treatment).</p> <p>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.</p> <p>8.3 Emulsions:- Emulsifying agent and emulsification - its applications. Cleansing action of soap.</p> <p>8.4 Catalysis - Explanation of the terms – Homogeneous and Heterogeneous catalysis – distinctions with suitable Examples-auto catalysis with one example</p>	
<p>9.0. Acids and Bases</p> <p>9.1 Theories of Acids and Bases Lowry - Bronsted concept Lewis theory of acids and bases.</p> <p>9.2 Ionic product of water, PH, Buffers - Numerical problems on these, Indicators - Choice of indicators, PH-range and uses.</p> <p>9.3 Salt hydrolysis - Types of hydrolysis with examples.</p>	<p>Solve numericals on pH value.</p>
<p>10.0 Alkanes, Akkenes, Alkynes and Aromatic compounds</p> <p>10.1. Introduction and importance of organic chemistry</p> <p>10.2. General characteristics of organic compounds Classification of organic compounds</p>	
<p>11. Ethers</p> <p>11.1 Introduction:- Definition</p> <p>11.2 Classification:-</p> <p>11.3 Nomenclature and metamerism</p> <p>11.4 Preparation, Reactions & Uses</p>	<p>Study of Simple and mixed ethers with examples.</p>
<p>12. Aidehydes and Ketones</p> <p>12.1 Introduction</p> <p>12.2 Carbonyl Compounds & classification</p> <p>12.3 Nomenclature of aldehydes and ketones</p> <p>12.4 Preparation & reaction of Aldehydes and ketones</p>	
<p>13.0 Acids & Esters</p> <p>13.1. Introduction, Nomenclature, preparation, Reaction and uses of Acids & Easters</p>	<p>Study of various types of acids</p>
<p>14.0. Amines</p> <p>14.1. Introduction, Classification and Nomenclature</p> <p>14.2. Preparation of primary amines</p> <p>14.3. Reaction of amines</p>	
<p>15.0. Biomolecules & Synthetic Fibres</p> <p>15.1. Introduction</p> <p>15.2. Carbohydrates and Proteins</p> <p>15.3. Fats & Oils</p> <p>15.4. Classification of Fibres</p> <p>15.5. Preparation of fibres</p> <p>15.6. Physical properties and uses of fibres</p>	<p>Study of fibres</p>
<p>16.0. Chemistry in application</p> <p>16.1. Application of Chemicals in Medicine & healthcare</p> <p>16.2. Application of chemicals in Food preservatives</p> <p>16.3. Application of chemicals in Agricultural products</p>	

**Elective –II - Computer Applications– 1st year
(Subject Code – 9000022)**

Theory	Practical
<p>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</p>	<p>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</p>
<p>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</p>	<p>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</p>
<p>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.</p>	<p>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</p>
<p>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.</p>	<p>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</p>

Theory	Practical
<p>5.0. MS Power point</p> <p>5.1. General Introduction</p> <p>5.2. Features & Applications of MS Power point</p> <p>5.3. Creating Presentations</p> <p>5.4. Study of different layouts and making presentations using different layouts</p> <p>5.5. Using different animation effects.</p> <p>5.6. Add Audio/Voice and visual effects to slides.</p> <p>5.7. Filtration</p> <p>5.8. Converting presentations to PDF files.</p> <p>5.9. Inserting images, symbols to slides</p>	<p>5.0. Power Point practice</p> <p>5.1. Create Slides of different types</p> <p>5.2. Running presentations</p> <p>5.3. Add slide transition effects and run slide show</p> <p>5.4. Make presentations with audio/visual effects.</p> <p>5.5. Printing PPT files</p> <p>5.6. Making PDF format of PPT files</p>
<p>6.0. Networking & Internet Utilities</p> <p>6.1. General Introduction of Computer Networking</p> <p>6.2. Requirements/ Applications of Computer Networking</p> <p>6.3. Layouts of Different Networks</p> <p>6.4. Study of various Networking components</p> <p>6.5. Limitations and merits of different topologies</p> <p>6.6. Study of Server/client concept</p> <p>6.7. Internet & its applications</p> <p>6.8. Email and Chatting</p> <p>6.9. E-trading concepts</p> <p>6.10. Downloading files (Text and media files)</p>	<p>6.0. Networking practice</p> <p>6.1. Identifying different network components</p> <p>6.2. Collecting samples, charts, images of different networking components.</p> <p>6.3. Installation of Network Interface card</p> <p>6.4. Getting connected to Internet and accessing the internet</p> <p>6.5. Creating personalized Email account</p> <p>6.6. Chatting (Text and Voice chat)</p> <p>6.7. Searching/surfing for the information in different sites.</p> <p>6.8. Downloading</p>
<p>7.0. Project work</p> <p>7.1. Understand the concept of making projects and preparing the project reports.</p> <p>7.2. Preparation of a project using the software skills learned during the course.</p>	<p>7.0. Project Work</p> <p>7.1. Making a working model/project using MS Excel/Power Point</p> <p>7.2. Project Report</p>

Elective –II - Computer Applications– 2nd year
(Subject Code – 9000022)

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 – 9000023)

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 – 9000023)

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 4.5 Derivative 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