**INTERNAL ATKT SYLLABUS FOR THE ACADEMIC YEAR 2018-2019**

 **FYB.Sc**

 Paper – 1

**FYBSc (OLD SYLLABUS) Internal ATKT portion Sem-I**

Dot product, cross product of two vectors, unit vector in the direction of a given vector, direction ratio and direction cosine of a line, finding equation of plane, volume of parallelepiped, absolute value function and its properties, monotonic sequences, bounded sequences, Real number and its properties, Hausdorff’s property for real number, Problems on $ε-n\_{0}$ definition, Definition of limit in terms of $ε-δ$, finding value of $δ$ for given $ε$.

**FYBSc (OLD SYLLABUS) Internal ATKT portion Sem-II**

Definition of derivative, Finding derivative using definition of derivative, Left hand derivative, Right hand derivative, Finding derivative using rules of derivative, Differentiability implies continuity but converse is not true, Higher order derivatives, Problem based on Leibnitz rule, Lagrange’s Mean value theorem (Statement only), Rolle’s mean value theorem (Statement only), Problems based on Lagrange’s Mean value theorem and Rolle’s mean value theorem, Derivative of inverse function, Chain rule (Statement only), Concave upward and concave downward, Increasing and decreasing function, example of functions which are differentiable n times but not n+1 times.

**FYBSc (Current SYLLABUS) Internal ATKT portion Sem-I**

Homogeneous differential equation, order and degree of differential equation, Linear and Bernoulli differential equation, Solving differential equation by writing it in variable, separable form, exact, non-exact differential equation, Integrating factor, Solving a non-exact differential equation by multiplying with suitable integrating factor, Solving a homogeneous differential equation by making suitable substitution, Finding differential equation of a family of curves, Real numbers and its properties, $ε$-neighbourhood of a real number, AM-GM inequality (Statement only), Cauchy-Schwarz inequality (Statement only), Law of trichotomy, Problems based on AM-GM inequality and Cauchu Schwarz inequality

**FYBSC**

 **Paper II**

**Sem 1(Old and Current Syllabus)-**

Relations(reflexive,symmetric,transitive, equivalence relations, equivalence classes).

Functions( range of a function, direct inverse images , objective, subjective , bijective functions)

Divisibility in Integers ( first principal of mathematical induction , divisibility properties and examples, division algorithm statement and examples, finding gcd of integers a and b and expression the form

ma+ nb).

**Sem -2(Old Syllabus)**

Inclusion and exclusion principle, derangements on n symbols, the number dn of derangements of {1,2,3,………n}. Binomial theorem, Pascal’s triangle,

Multinomial theorem Permutations on n symbols. The set Sn

Compositions of two permutations,

Cycles and transpositions, representations of a permutation as a product of disjoint cycles

Sign of a permutation, sign of transposition

Polynomials ( Applications of Remainder and Factor theorems , multiplicity of roots, Rational Root theorem, finding nth root of unity, and solving equations with complex solutions ).

**SYBSC**

 **PAPER I**

 **Sem III**

Differential equations: Formulation of a differential equation, Variables separable form. Homogeneous equation, Exact equations, Use of integrating factors to convert a non exact equation to an exact equation. First order linear differential equation and Bernoulli’s equation.

Convergent sequences of real numbers and Cauchy sequences, Subsequence of a sequence. Limit superior and limit inferior.

Series of real numbers. Convergence of a real series. Geometric series and p-series. Cauchy condensation test, Leibnitz’ test for alternating series. Comparison test, ratio test and root test. Radius of convergence and interval of convergence of a series.

 **SYBSC**

**Sem IV**

Riemann Integration: Upper and lower sums with respect to a partition. Refinement of a partition, Upper and lower integrals. Riemann integrable functions. Riemann’s criterion. Monotonic functions, continuous functios. Fundamental theorem of calculus.

Double and triple integrations, volume of solid obtained by rotation of a curve about X-axis or Y-axis.

Use of polar coordinates, spherical coordinates, cylindrical coordinates in double and triple integration.

**PAPER II -**

**SEM III**

 Solving system of linear equations, expression of aninvertible matrix as aproductof elementarymatrices,Vectorspaces,subspace,Linearspan,linearlyindependentset,generating set,basis,innerproductspace,norm,identitiesrelatedtonormandinnerproduct

**Sem IV**

 Lineartransformation,ranknullitytheorem,nonsingularlineartransformation,isomorphismof vectorspaces,matrixassociatedwithalineartransformation,Cramer'srule,eigenvaluesand eigenvector,CayleyHamiltontheorem

**TYBSC**

**PAPER I**

**SEM 5-**

Entire Syllabus.

**TYBSC**

**PAPER II (SEM 5)**

Cosets and lagrange theorem and applications

Quotient spaces, orthogonal transformations , isometry.

Diagonalization, orthogonal diagonalization quadratic forms.

**PAPER III**

**Sem-V :**

Metric space examples, open ball, open set, limit points, boundary point, interior and closure, sequences in a metric space, complete metric space, Cantor's intersection theorem, continuous functions, characterization in terms of open sets closed sets and sequences. Uniformly continuous functions.

**Sem-VI** not given as no candidate.

**PAPER IV**

**..NO SYLLABUS AS THERE IS NO STUDENT FOR ATKT.**

**FYBCOM**

**Sem-I :**

Profit and loss, shares, addition and multiplication of matrices, arithmetic mean, median, Quartiles, mode, standard deviation, simple probability problems, problems on addition and multiplication principle, random variable

 **FYBCOM**

**Sem-II :**

Derivative of functions containing xn, logx, ex, total cost, average cost, marginal cost, Karl Pearson's coefficient of correlation, spearman's coefficient of rank correlation for non-repeated ranks, regression line of x on y, regression line of y on x, three yearly moving averages, Laspeyre's index number, Paasche's index number, Transportation problems- North West corner method, Decision theory- Maximax criteria, Laplace criteria.

 **FYCS**

 **SEM I ( Discrete Mathematics)**

One-one and onto functions, reflexive relations, symmetric relations, Equivalence relations, Hasse diagram, matrix of a relation, diagraph of relation, finding terms of recurrence relation, solution of homogeneous recurrence relation, binomial coefficients, degree of a graph, pre-order and post-order tree traversal.

**SEM- I**

**SUB: Descriptive Statistics and Introduction to Probability**

Measures of Central tendency: Mean, Median, mode for grouped frequency distribution. Measures dispersion: Variance, standard deviation, coefficient of variation for grouped frequency distribution,

Quartiles, quantiles Real life examples, correlation, Karl Pearson’s coefficients of correlation,Linear regression: fitting of linear regression using least square regression, coefficient of determination.

**SEM- II**

**SUB: Statistical Methods and Testing of Hypothesis:**

**Standard distributions:** Expectation and variance of a random variable, pmf, pdf, cdf, Introduction and properties without proof for following distributions; binomial, normal, chi-square, t, F. Examples

**Hypothesis testing:** one sided, two sided hypothesis, critical region, p-value, tests based on t, Normal and F, confidence intervals, one way analysis of variance.

 **FYCS**

**SEM II (Calculus** )

Increasing and decreasing functions, concavity of graph of function, local minima and maxima of one variable function, second derivative test for local extrema, Newton's method, Integration by parts, Integration by substitution method, Area between the curve, Definite integral, Simpson's rule of Numerical integration, Euler's method for solving differential equations, partial derivatives, chain rule, Gradient vectors, maxima and minima of functions of two variables.

**FYIT**

 **SEM I (Discrete Mathematics)**

Operations on sets, logical equivalence, converse, inverse and contrapositive of conditional statement, recurrence relations, elementary proofs on even numbers, odd numbers, prime numbers, irrationality of square root of 2, one-one functions, onto functions, composition of functions,reflexive, symmetric relations, degree of a graph,adjacency matrix of a graph, minimum spanning tree using prims algorithm.

 **SEM II (Numerical and Statistical Methods)**

Significant figures, types of errors, the Newton-Raphson method, Lagrange-interpolation formula, Gauss-Siedel method, Trapezoidal rule, Euler's method, Least square method for regression, Graphical method to solve LPP, Discrete Random variable, Binomial Distribution.

**SYCS**

**SEM- III**

**Combinatorics and Graph Theory**

Introduction to Combinatorics: Strings, Sets, and Binomial Coefficients: Strings- Combinations, Combinatorial, Induction: Introduction, The Positive Integers are Well Ordered,

Graph Theory: Eulerian and Hamiltonian Graphs, Graph Coloring, Planar Counting, Labeled Trees

Network Flows: Example on the Ford-Fulkerson Labeling Algorithm.

**SEM IV**

**Linear Algebra using Python**

Vector Space: Vectors are functions, Vector Space: Vectors are functions, Solving a triangular system of linear equations. Linear combination, Span, Linear systems, homogeneous, linearly dependent and linearly independent

Matrix: Matrices as vectors, vector-matrix multiplication in terms of linear combinations, Matrix-vector multiplication in terms of dot-products, Null space, Basis, Dimension: Dimension and rank, Direct sum, Dimension and linear functions, Gaussian elimination: Echelon form.

 **SYIT**

**SEM III**

**SUB: Applied Mathematics**

Matrices: Inverse of a matrix, Properties of matrices, Rank of Matrix, Characteristics roots and characteristics vectors, Cayley Hamilton Theorem

Differential Equation: Separation of Variables, Exact differential Equation, Linear differential equation f(D) y = X, The complimentary Function, , Particular integral : Short methods, Particular integral

The Laplace Transform: Properties of Laplace Transformation, First Shifting Theorem, Second Shifting Theorem, Laplace Transform of an Integral, Laplace Transform of Derivatives,

**SYIT**

**SEM IV**

**SUB: Computer Oriented Statistical Techniques**

The Mean, Median, Mode, and Other Measures of Central Tendency, Quartiles, Deciles, and Percentiles, statistical Decision Theory: Statistical Decisions, Statistical Hypotheses, Tests of Hypotheses and Significance, or Decision Rules, Type I and Type II Errors, Level of Significance, Tests Involving Normal Distributions, Two-Tailed and One-Tailed Tests; The Chi-Square Test for Goodness of Fit, Contingency Tables, The Least-Squares Regression Lines,

 **FYBFM**

**SEM I**

**UNIT 1**

**BUSINESS MATHEMATICS**

Ratio- Definition, Continued ratio, Inverse Ratio. Proportion - Continued proportion, Direct proportion, Inverse proportion, Variation - Inverse variation, Joint variation, Percentage - Meaning and computation of percentage Terms and formulae, Discount - Trade discount, Cash discount, problems involving cost price, selling price, trade discount, cash discount. Commission and brokerage Problems based on a mix of above types can be included.

**UNIT 2**

 **Financial Mathematics**

Interest - Simple interest, compound interest, Equated monthly instalments, reducing balance and flat rate of interest Annuity - Annuity immediate, present value and future value, Stated annual rate and effective annual rate Shares- Concept, face value, market value, dividend, Equity shares, preference shares, bonus shares. Mutual Fund- Simple problems on calculation of net income after considering entry load, exit load, dividend, change in net asset value

 **FYBFM**

**Subject: Business Statistics**

**SEM II**

Graphs- Histogram & frequency polygon, Digraph-Multiple bar, pie, subdivided bar

Mean (Arithmetic Mean & combined mean), Median, Mode, Quartiles & Quartiles Deviation with coefficient of Quartile, variance, Standard Deviation with coefficient of variance, Karl Pearson coefficient of correlation , Rank Correlation.

Linear programming problems: formulation of LPP, solution by graphical method, problems relating to two variables only.

**FYBMS**

**SEM- I**

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**Subject: Business Mathematics**

 **SEM II**

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Matrices - Types of matrices, matrix multiplication, transpose of a matrix, Inverse of a Matrix

(up to order three) using adjoint of a matrix and matrix inversion method

Determinant - Determinants of a matrix of order two or three: properties of Determinants.

 Solving a system of linear equations using Cramer’s rule

 **FYBAF**

**SEM-II Sub: Business Mathematics**

**UNIT 1**

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 **SYBAF**

 **SEMESTER III - IT IN ACCOUNTANCY- I**

**UNIT 1 Introduction to Computers**
History of Computers, Parts of Computers, Hardware: Specifications and Data Storage Management
Software: Concept of System Software and Applications, Networking: Introduction and types of network topologies

**UNIT 2 Office Productivity Tools**
**MS Word:** Creating, Editing, Formatting and Printing of Documents, Using Tools, Mailmerge and Print Review and Set-up
**MS Excel:** Creating Worksheet, Creating Various Formulae, Creating Charts, Rename and Copy of Worksheets, Using Tools, Printing Review and Set-up
**Power Point**: Create Project Report, Create Slides, Animation, Page Designing, Insert Image, View Page, Print Review and Set-up. Use of Tools In Accounting :– Preparation of vouchers, invoices and reports, Calculation of Interest, Depreciation,TDS, Salary, Taxes, inventory and reconciliation

**SYBAF**

**SEMESTER IV – IT IN ACCOUNTANCY- II**

**UNIT 1 Business Process**
Introduction, Definition and Meaning of business process, Flow of business process for accounting, purchase, sales and finance, Classification of business processes, Introduction, Definition and Meaning of Business Process Management, Principles and practices of Business Process Management, Business Process Management life cycle, Theories of Business Management Process
Implementation of Business process Management – need, key factors and importance
Automation of business Processes – benefits, risks, challenges, Accounting systems automation
IT and Business Process Management, Information systems – Meaning, Use of IT in accounacy

 **SYBAF**

**SEMESTER IV – IT IN ACCOUNTANCY- II**

**UNIT 2 Computerized accounting system**
Introduction and meaning, Uses and Benefits, Role, Need and requirements of computerized accounting, Basic requirements of computerized accounting system, Limitations of computerized accounting system, Understand the development and design of a computerized accounting
system; determining how the accounting data will be processed, i.e. what accounts and books are needed and what is the desired output i.e. financial reports and other reports. Accounting Software
Introduction and meaning Advantages of accounting software, Uses of Accounting software, Various accounting softwares, Accounting software TALLY – Accounting and reports

**SYBMS**

**SEMESTER III -IT IN BUSINESS MANAGEMENT - I**

**UNIT 1 Introduction to IT Support in Management**
**Information Technology concepts**
Concept of Data, Information and Knowledge, Concept of Database
**Introduction to Information Systems and its major components**.
Types and Levels of Information systems. Main types of IT Support systems
Computer based Information Systems (CBIS)
 Types of CBIS - brief descriptions and their interrelationships/hierarchies
Office Automation System(OAS), Transaction Processing System(TPS),Management Information System(MIS), Decision Support Systems (DSS), Executive Information System(EIS), Knowledge based system, Expert system,Success and Failure of Information Technology. IT Development Trends.
Major areas of IT Applications in Management, Concept of Digital Economy and Digital Organization.
 IT Resources,Open Source Software - Concept and Applications. Study of Different Operating Systems. (Windows / Linux/ DOS)

**SYBMS**

**SEMESTER III -IT IN BUSINESS MANAGEMENT - I**

**UNIT 2 Office Automation using MS Office**
• **Learn Word:** Creating/Saving of Document, Editing and Formatting Features, Designing a title page, Preparing Index, Use of SmartArt, Cross Reference, Bookmark and Hyperlink. Mail Merge Feature.
• **Spreadsheet application (e.g. MS-Excel/openoffice.org)**
Creating/Saving and editing spreadsheets, Drawing charts. Using Basic Functions: text, math & trig, statistical, date & time, database, financial, logical Using Advanced Functions : Use of VLookup/HLookup Data analysis – sorting data, filtering data (AutoFilter , Advanced Filter), data
validation, what-if analysis (using data tables/scenarios), creating sub-totals and grand totals, pivot table/chart, goal seek/solver,
• **Presentation Software**
Creating a presentation with minimum 20 slides with a script. Presenting in different views, Inserting Pictures, Videos, Creating animation effects on them Slide Transitions, Timed Presentations
Rehearsal of presentation

**SYBMS**

**SEMESTER IV -IT IN BUSINESS MANAGEMENT - II**

**UNIT 1 Management Information System**
Overview of MIS Definition, Characteristics, Subsystems of MIS (Activity and Functional subsystems), Structure of MIS, Reasons for failure of MIS. Understanding Major Functional Systems Marketing & Sales Systems, Finance & Accounting Systems, Manufacturing & Production Systems, Human Resource Systems, Inventory Systems. Sub systems, description and organizational levels, Decision support system Definition, Relationship with MIS
Evolution of DSS, Characteristics, classification, objectives, components, applications of DSS

**SYBMS**

**SEMESTER IV -IT IN BUSINESS MANAGEMENT - II**
**UNIT 2 ERP/E-SCM/E-CRM**
• **Concepts of ERP, Architecture of ERP,** Generic modules of ERP, **Applications of ERP, ERP Implementation concepts,** ERP lifecycle, **Concept of XRP** (extended ERP), **Features of commercial ERP software,**Study of SAP, Oracle Apps, MS Dynamics NAV, Peoplesoft **Concept of e-CRM**
E-CRM Solutions and its advantages, How technology helps? **CRM Capabilities and customer Life cycle,** Privacy Issues and CRM. **Data Mining and CRM** CRM and workflow Automation

**Concept of E-SCM,** Strategic advantages, benefits, E-SCM Components and Chain Architecture
**Major Trends in e-SCM, Case studies ERP/SCM/CRM**

**SYBFM**

**SEMESTER III- COMPUTER SKILLS**

**UNIT 1**

 **Advanced Spreadsheet**

 Pivot, Advanced formulae, Lookups, Macros, Working with other programmes, Inserting a spreadsheet sheet in word document, modifying an inserted spreadsheet, Inserting a linked chart in a Word Document, Inserting graphic in a spreadsheet

**UNIT 2**

 **Data Based Management Systems**
Concepts, Tables, Fields, Datatypes, RDBMS, Primary Key, Foreign Key

 **FY BSC Bio-Tech**

**Semester I Sub: Mathematics**

Logic,

Arithmetic and geometric progressions,

Matrices – addition and product of two matrices, transpose of a matrix, Determinant of square matrices, adjoint of a matrix, inverse of a non singular matrix