SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc.(MATHEMATICS)
SEMESTER -I
FSMA-101
(ANALYTIC GEOMETRY AND COMPLEX NUMBERS)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100 (30 internl+70 external)

Unit 1

Sketching of curves using symmetry and horizontal and vertical asymptotes.; Equation of tangents and normal to curves given by parametric equations. Parametric equations of conics and other curves; Tangent parallel to the axes, Asymptotes: horizontal, vertical and oblique to a curve; cycloid and its application.

Unit 2

Polar coordinates in two dimensions; Relation between polar and Cartesian coordinates; Symmetry, extent and closedness of a curve, Limacons, Lemniscates, Rose curves and Spirals.

Unit 3

Polar equations of line, Circle and Conics, Reciprocal curves and their applications.

Unit 4

Complex numbers, Polar form of complex number. De Movire theorem, n^{th} roots of a complex number, Fundamental theorem of algebra (statement only), multiple roots and test for multiplicity.

Recommended Texts :

1. Vasavada H.M., Analytical geometry of two and three dimensions , 1992 Chapter 2(11,12,13), Chapter 3(2,3,4, except example 10,11,12,13), Chapter 4 (1,2,3,6,7(except example 8,9),8), Chapter 5(2,6,7,8)

2. Grewal, B.S., Higher engineering mathematics, Thirty fifth edition, Khanna publ. 2000.

3. The calculus with analytic geometry, Louis Leithod, Harper-Collins Pub.

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc.(MATHEMATICS)
SEMESTER -I
FSMA-102
(CALCULUS AND DIFFERENTIAL EQUATIONS)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100 (30 internl+70 external)

Unit 1

Successive derivative, Higher order derivatives: n^{th} derivatives of standard form. Leibnitz's theorem and its applications; Angles between radius vector and tangent to the curve.

Unit 2

Curvature, derivative of arc, radius of curvature for Cartesian, Parametric and polar equations. Rectification: Expression for the length of arcs given in Cartesian, parametric and polar forms; derivation of intrinsic equation for Cartesian and polar equations.

Unit 3

Limit and continuity of a functions of two variables; neighbourhood of a point; Partial derivatives; Euler's theorem on homogeneous functions of two and three Variables, Theorem on total differentials; differentiation of composite and implict functions.

Unit 4

Exact differential equations; integrating factors; differential equations of the first order but not of first degree solvable for p and for y; Clairaut's equation; Orthogonal trajectories in Cartesian coordinates.

Recommended Texts:

1. Introduction to calculus and differential equations, By D J Karia, N Y Patel, B P Patel, M L Patel [Standard Text]
   Articles: 8,9,10,17,18,19,49,50,51,20 to 25,26.2,54(case 6 only), 55 (method 1 only), 56,57,58,60, 62(only 62.1,62.2,62.4 to 62.7)

2. Differential Calculas. Shanti Narayan, Fourteenth Edition, Shamlal charitable trust, New Delhi, 1996

3. Integral Calculas. Shanti Narayan, Fourteenth Edition, Shamlal charitable trust, New Delhi, 1996

4. Higher Engineering Mathematics, Thirty-fifth edition. Grewal, B.S. [Khanna Publ]

5. The calculus with analytic geometry, Louis Leithod, Harper-Collins Pub.

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc.(MATHEMATICS)
SEMESTER -I
FSMA-103
(PROBLEMS AND EXERCISES IN MATHEMATICS)
FOUR HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100(30 internl+70 external)

- L'Hospital's rule and exercises
- Sketching of Cartesian curve, parametric curves, polar curves and reciprocal curves
- Angles between two curves
- Radius of curvature for Cartesian, Parametric and polar equations
- Arc length of the curves given in Cartesian, parametric and polar forms
- Intrinsic equation for Cartesian and polar equations
- Euler's theorem on homogeneous functions, Change of variables
- Maxima and minima for a function of two variables
- Taylor's expansion
- Exact Differential equations
- Differential equations of the first order but not of first degree solvable for p, for x and for y
- Orthogonal trajectories of a family of curves
- Algebra of complex numbers

NOTE:

- Problem solving skill in mathematics is an important aspect in the teaching of mathematics.
- There would be a batch of problem solving session will be of four hours per week and they will be conducted in batches of students of size 25 per batch.

Recommended Texts:

1. Introduction to calculus and differential equations, By D J Karia, N Y Patel, B P Patel, M L Patel [Standard Text]

2. Vasavada H.M., Analytical geometry of two and three dimensions, 1992

3. Differential Calculas. Shanti Narayan, Fourteenth Edition, Shamlal charitable trust, New Delhi, 1996

4. Integral Calculas. Shanti Narayan, Fourteenth Edition, Shamlal charitable trust, New Delhi, 1996

5. Higher Engineering Mathematics, Thirty-fifth edition. Grewal, B.S. [Khanna Publ]

6. The calculus with analytic geometry, Louis Leithod, Harper- Collins Pub.

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc.
SEMESTER -I
FSELE-101
(MATHEMATICS)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100(30 internl+70 external)

Unit-1

Function: Domain, Range, One-one, onto function, composition of functions, Complex number: Algebra of complex number.
Quadratic equation and its solution.

Unit-2

Exponential & Logarithmic function: Elementary properties.
Trigonometric functions: sine, cosine, tan, cot, cosec, sec and their inverse function. Formulae: $\cos(A\pm B)$, $\sin(A\pm B)$, $\tan(A\pm B)$, $\sin(2\theta)$, $\cos(2\theta)$, $\tan(2\theta)$.

Unit-3

Determinant: 2×2, 3×3 order, Expansion, elementary properties, Matrices: 2×2, 3×3 order, Algebra of matrices
(Addition, Scalar product, product of two matrices)

Unit-4

Vector algebra: Vector space R^2 and R^3, Operation: Addition, scalar multiplication and vector multiplication , magnitude of vector , Inner product, Box/Triple product, angle between two vectors.

Recommended Texts:

1. College Algebra, 2nd Edition, By Spiegel M.R., Moyer R.E., Tata Macgrow-hill Publishing Co. Ltd.
2. Analytic Calculus, Fuller and Parker.
3. Differential Calculus, By Shanti Narayana, S.Chand Publishing co.,
4. Vasavada H.M., Analytical geometry of two and three dimensions , 1992

SARDAR PATEL UNIVERSITY
F. Y. B. Sc. (Semester – I)
Syllabus of FSCH-101 (GENERAL CHEMISTRY)
[02 Credits]
(Effective from June – 2010)
Total Marks: 100 [30+70]

UNIT 1 Analytical Chemistry (07 hrs)

Introduction, Applications, Stages of analysis, Selecting the methods, Quantitative analysis, Limitations of analytical methods, classification of errors, accuracy, precision, how to reduce systematic errors, significant figures, mean and standard deviation, distribution of random errors, reliability of results.

Reference Book:
1. Vogel's textbook of quantitative chemical analysis, 6th Edition, J Mendham, R C Denney, J D Barnes, M J K Thomas

UNIT 2 Ionic Equilibria in Aqueous Solution (08 hrs)

Sparingly soluble salts, Common – ion effect, Selective precipitation, Arrhenious theory of Acids and Bases, The Lowry – Bronstred Concept, Strnegth of Acids and Bases, The Lewis concept, The pH Scale, Self Ionization of Water.

Reference Book:
1. University Chemistry By Bruce H Mahan 4th edition, Narosa Publishing House.

UNIT 3 Alkanes, Alkenes and Alkynes (08 hrs)

Introduction of Hydrocarbons, Physical properties of alkanes, Higher alkanes-The homologous series, Nomenclature, Alkyl groups, Common names of alkanes, IUPAC names of alkanes, Classes of carbon atom and H-atoms, Physical properties, Geometric Isomerism, Name of alkenes, Nomenclature.
Qualitative and quantitative analysis of organic compounds.
Molecular formula: its fundamental importance, Quantitative elemental analysis, Quantitative elemental analysis: Carbon, Hydrogen and Halogen (Carius Method), Empirical Formula, Molecular weight: molecular formula, Quantitative elemental analysis (kJeldahl & Dumas methods)

Reference Book:
1. Organic Chemistry by Morrison & Boyd 6th Edition.

UNIT 4 Basic Concepts of Coordination Chemistry (07 hrs)

Definition of Some Terms, Classification of Ligands, Chelation, Classification of Chelates, Uses of Chelates, Co-ordination Number and Steriochemistry of Complexes, Nomenclature of Co-ordination Compounds.

Reference Book:
1. Selected Topics in Inorganic Chemistry, Wahid U. Malik, G. D. Tuli, R. D. Madan.

SARDAR PATEL UNIVERSITY
F. Y. B. Sc. (Semester – I)
Syllabus of FSCH-102 (INORGANIC CHEMISTRY)
[02 Credits]
(Effective from June – 2010)
Total Marks: 100 [30+70]

UNIT 1 Atomic Structure (08 hrs)

De Broglie's Concept of Dual Character of Matter, De Broglie's Wave Equation, Derivation of De Broglie's Equation, Heisenberg's Uncertainty Principle, Problems Based on De Broglie's Wave Equation and Heisenberg's Uncertainty Principle, Schrodinger Wave Equation, Derivation of Schrodinger Wave Equation, Other Forms of Schrodinger Wave Equation, To Convert Cartesian Coordinates into Polar Coordinates, Schrodinger Wave Equation for H Atom in Cartesian and Polar Coordinates, Significance of Ψ and Ψ^2, Electron Probability Function D, Plot of $R_{n,l}$ against r and its Relation with the Electron Probability Density Around Point at a Distance of r from the Nucleus, Values of Angular Wave Function $\theta_{i,m}$ x Φ_m for s and p Orbitals and to their Shapes, Shielding Effect and Effective Nuclear Charge, Factors Affecting the Magnitude of σ and Z_{eff} and their Variation in the Periodic Table, Slater's Rule for Calculating σ and Z_{eff}, Problems.

Reference Book:
1. Advanced Inorganic Chemistry Volume I, Satyaprakash, G D Tuli, S K Basu, R D Madan.

UNIT 2 Periodic Properties (07 hrs)

Brief Introduction of Periodic Table, Ionization Energy, Successive Ionization Energies, factors Affecting Magnitude of Ionization Energy, Variation of IE Values in Main Group Elements, Variation of IE Values in Different Groups, Ionization Energies of Isoelectronic Species, to Find out the Order of Second IE Vaues of the Elements of Second Period, Difference Between Ionization Potential and Electrode Potential of a Metal.
Electron Affinity, Relation Between EA of $X_{(g)}$ Atom and IE of $X^-_{(g)}$ Ion, EA_2 Represents Energy Required, Factors Affecting the Magnitude of Electron Affinity, Variation of Electron Affinity in Main Group Elements of the Periodic Table, Variation of Electron Affinity Values of Elements of Different Groups.
Electronegativity, Different Methods Used for Calculating Electronegativity, Factors Affecting the Magnitude of Electronegativity, Variation of Electronegativity in a Group of s and p Block Elements, Variation of Electronegativity of The Elements of Different Group. Variation of Electronegativity in a Period of s and p Block Elements, Applications of Electronegativity.

Reference Book:
1. Advanced Inorganic Chemistry Volume I, Satyaprakash, G D Tuli, S K Basu, R D Madan.

UNIT 3 Chemical Bond 1 (07 hrs)

The Lewis Theory, Sidgwick – Powell Theory, Valence Shell Electron Pair Repulsion (VSEPR) Theory, effect of Lone Paris, Effect of Eletronegativity, Isoelectronic Principle, Some Example using VSEPR Theory, Valence Bond Theory (VBT), Hybridization involving s and p Orbitals (sp, sp^2, sp^3)

Reference Book:
1. Concise Inorganic Chemistry, 5^{th} Edition, J D Lee

UNIT 4 Chemical Bond 2 (08 hrs)

Molecular Orbital Method, LCAO Mehtod, s-s Combination of Orbital, s-p Combination of Orbitals, p-p Combination of Orbitals, Rules for Linear Combination of Atomic Orbitals, Examples of Molecular Orbital Treatment for Homo Nuclear Diatomic Molecules H_2+, H_2, He_2^+, He_2, Li_2, Be_2, B_2, C_2, N_2, O_2, O_2^-, O_2^{-2} and F_2.

Reference Book:
1. Concise Inorganic Chemistry, 5^{th} Edition, J D Lee

SARDAR PATEL UNIVERSITY
F. Y. B. Sc. (Semester – I)
Syllabus of FSCH-103 (Chemistry Practicals)
[02 Credits]
(Effective from June – 2010)
Total Marks: 100 [30+70]

[A] Volumetric

1. To determine amount Cu+2 by using Fast sulphon Black – F indicator
2. To determine amount of Ni+2 by EDTA using muroxiede indicator.
3. To determine amount of Mg+2 by EDTA using Eriochrom Black – T

[B] Analysis of Inorganic substances

$Pb(NO_3)_2$, $CdCl_2$, $Cu_3(PO_4)_2$, $CaCO_3$, $Al_2(SO_4)_3$, $MnSO_4$, $NiCO_3$, CuS, ZnS, $BaCl_2$, $Sr(NO_3)_2$, $ZnCO_3$, $MgSO_4$, $AlPO_4$, $K_2Cr_2O_7$, KBr, KCl/NH_4Cl, KI, $(NH_4)_3PO_4$, ZnO, MnO_2

Reference Book:

1. Vogel's textbook of quantitative chemical analysis, 6^{th} Edition, J Mendham, R C Denney, J D Barnes, M J K Thomas
2. Practical Chemistry, O P Pandy, D N Bajpai, S Giri
3. An Advanced course in Practical Chemistry, Ghoshal, Mahapatra, Nad.

SARDAR PATEL UNIVERSITY
Subject
: Physics:
First Semester
Course No. FSPH-101
(Effective from June – 2010)
Properties of Matter and Sound Wave
(Two Credit Course – 2 Hours per week)

UNIT:1 Elasticity -1

Introduction, Load, Stress and Strain, Hooke's Law & Stress-strain diagram Three types of elasticity, Work done per unit volume in elongation strain Deformation of a cube - Bulk modulus, Modulus of rigidity, Young modulus, Relation connecting the elastic constants, Poisson's ratio, Limiting values of σ, Determination of Poisson's ratio for rubber.

UNIT:2 Elasticity -2

Twisting couple on a cylinder (or wire), Torsional pendulum, Determination of η – Statistical method (Horizontal twisting apparatus for a rod), Maxwell's vibrating needle method, Determination of M.I with the help of torsional pendulum, Bending of beam, Bending moment, The cantilever - when the weight of beam is ineffective, Depression of a beam supported at the ends-when the beam is loaded at the centre

UNIT: 3 Sound -1

Introduction to transverse and longitudinal waves, Velocity of longitudinal waves in gaseous medium, Calculation of velocity of sound in air, Effect of pressure, temperature and humidity on the speed of sound, Velocity of sound in metal rod, Kundt's tube, Applications of Kundt's tube

UNIT: 4 Sound - 2

Doppler's effect, Applications of Doppler's principle, Musical sound and noises Characteristics of musical sounds, Intensity of sound, Measurement of intensity, Ultrasonic waves, Production of ultrasonic waves, Detection of ultrasonic waves, Properties of ultrasonic waves, outline of the applications of ultrasonic waves

Reference books:

1. Elements of properties of matter
   D. S. Matur, S. Chand & Co., New Delhi

2. Engineering Physics
   R. K. Gaur and S. L. Gupta
   Dhanpatrai Publication (P) Ltd., New Delhi

SARDAR PATEL UNIVERSITY
Subject
: Physics:
First Semester
Course No. FSPH-102
(Effective from June – 2010)
Network Analysis, Optics and Laser
(Two Credit Course – 2 Hours per week)

UNIT: 1 Network Analysis

Elementary Network Theory
Network terminology, Network analysis by mesh currents (two & three mesh network) Circuit analysis by Node-pair voltages (one & two node pair voltage method), Voltage divider theorem, Superposition theorem, Thevenin's theorem, Norton's theorem

UNIT: 2 Bridges and their application

DC bridges
Whetstone Bridge, Basic operation, Measurement errors, Thevenin equivalent circuit, Kelvin Bridge, Effects of connecting leads

AC bridges and their application
Condition for bridge balance, Application of the Balance equation, Maxwell Bridge, Hay Bridge, Schering Bridge, Wien Bridge

UNIT: 3 Optics

Interferometry:
Jamin's refractometer or interferometer, Rayleigh's refractometer, Michelson's Interferometer, Types of fringes, white light fringes, Uses: measurement of wavelength of light of a monochromatic source, measurement of refractive index of a thin plate

Resolving power of optical instruments:
Meaning of resolving power, Rayleigh's criterion for resolution, R. P. of Grating, R. P. of Prism, R. P. of Telescope, R. P. of Microscope

UNIT: 4 Lasers

Introduction & Properties of LASER, Stimulated absorption, Spontaneous emission and Stimulated emission, Relation between Einstein's A and B coefficients, Population Inversion and Pumping, Main components of LASER source, Nd:YAG LASER, CO_2 LASER, Application of LASER in material processing Holography and Other applications of Laser

Reference books:

1. Principles of Electrical Engineering (2nd Edition)
   Vincet Del Toro
   Prentice-Hall of India Private Ltd.

2. Electronic Instrumentation and Measurement Techniques (3rd Edition)
   W. D. Cooper and A. D. Helfrick,
   Prentice-Hall of India Private Ltd

3. A textbook of light
   D. N. Vasudeva (10th Edition)
   Atma Ram & Sons, New Delhi

4. Engineering Physics
   R. K. Gaur and S. L. Gupta
   Dhanpatrai Publication (P) Ltd.,New Delhi

5. Engineering Physics
   K. Rajagopal
   Prentice-Hall of India Private Ltd

SARDAR PATEL UNIVERSITY

Subject

: Physics (Practicals):

First Semester

Course No. FSPH-103

(Effective from June – 2010)

(Two Credit Course – 4 Hours per week)

1. η by statical method
2. Torsional pendulum
3. Melde's experiment
4. Sonometer
5. Y by cantilever
6. Poisson's ratio for rubber
7. η by Maxwell's needle
8. Resolving power of prism
9. Characteristics of PN junction diode(Forward & Reversed bias)
10. Half wave rectifier (Evaluation of A.C. components)
11. Full wave rectifier (Evaluation of A.C. components)
12. Zener diode characteristics
13. Conversion of galvanometer in to voltmeter
14. Conversion of galvanometer in to ammeter
15. Least square fitting for given linear data

Note: To provide flexibility, up to the maximum of 20% of total experiments can be replaced/ added to the list by the Board of Studies.

Communication Skills In English-1
(Semester 1)
FSEN-101
2 Credits: 4 hours a week

Internal – 30
External – 60
Total Marks: 90

1) Reading: The objectives are to enable the students to

   a) Read for information news features, articles, newspapers and texts
   b) Reading from a collection of units in a compiled text

Book Prescribed: 'Corridors to Communication' by Ranu Vanikar
(Orient Longman) Units 1 to 5

2) Writing: The objectives are to enable the students to

   a) Form words properly using prefixes/ suffixes
   b) Use phrasal verbs
   c) Use appropriate and related registers
   d) Writing paragraphs, developing points/ ideas
   e) Writing letters of invitations (inviting/ accepting/ decling), letters of complaimt to civil authorities.

Books Recommended:

1) Champa Tickoo and Jaya Sasikumar(2000). Writing with a Purpose. Chennai, OUP
2) David Jolly (1998). Writing Tasks: An authentic task approach to individual writing needs. (Cambridge University Press)

3) Listening: The objectives are to enable the students to listen and understand
   1) Short lectures, descriptions, and narrations, rapid talks, passages read aloud Spoken and/or dictated and identify Language functions
   2) Conversations based on familiar situation, and
   3) Note Making

Books Recommended:
1) English by D Sasikumar and P V Dhamija. (With Audio Cassette) (Tata McGraw Hill Publication Ltd, New Delhi.) (Units 1-13)
2) On We Go (A B.B.C. Video Course)

4) Speaking: The objectives are to enable the students to
   1) Use greetings and formulae in everyday conversations.
   2) Use notions and functions of common use
   3) Use grammatically correct and appropriate structures to organize Thoughts

Books Recommended:

1) Grant Taylor. English Conversation Practice. (Tata McGraw Hill, New Delhi)
2) R P Bhatnagar and R T Bell (1999) Communication in English, (Orient Longman, Hyderabad)

Evaluation:

Reading aloud	05 Marks
Reading Comprehension	10 Marks
Listening Comprehension	10 Marks
Speaking: (1) Viva (on the given topics)	10 Marks
Speaking: (2) Based on the Journal	05 Marks
Writing: (1) Letter Writing	10 Marks
Writing: (3) Concord	05 Marks
Writing: (4) Phrasal Verbs	05 Marks
Writing: (5) Prefix/Suffix	04 Marks
Writing: (6) Dialogue Writing	06 Marks
	---
	60 Marks

Information and Communication Technology
Semester-1
FSICT-101
(Effective from June-2010)
Detailed Syllabus

Unit 1

Components of a Computer System

1. Computer hardware and Software
2. Difference between hardware and software
3. Main components of a general purpose computer: CPU, main internal memory (including RAM and ROM), input devices, output devices and secondary/backing storage.
4. Basics of Windows operating systems: Nature and Function of OS, Basic Commands

Unit 2

Input and Output Devices

1. Input Devices: keyboards, numeric keypads, Pointing devices(mouse, touchpad), remote control, joysticks, touch screen, magnetic strip readers, chip readers, scanners, digital cameras, microphones, sensor, barcode reader, webcam, video camera etc.
2. Output Devices: Monitors(CRT, TFT, LCD), projectors, printers(laser, desk jet, dot matrix), plotters, speakers.
3. Uses of output devices stating the advantage and disadvantage of each.

Unit 3

Storage Devices

1. Common backing storage media (including CD and DVD (Rs and RWs), floppy disc, hard disc, memory sticks/pen drives, flash memory cards etc.
2. Comparative advantages and disadvantages of using different backing storage media.
3. Importance and need of backup
4. Difference between main/internal memory and backing storage: relative benefits of each in terms of speed and permanence.

Data Types

1. Data Types : logical/Boolean, alphanumerical/text, numeric (real and integer), date
2. File, record, field and key field.

Unit 4

Computer Networks

1. Modem and its purpose
2. Difference between analog data and digital data
3. Need for conversion between analog and digital data
4. Advantage and disadvantages of using common network environment such as internet
5. User id and password: Purpose and Use
6. Methods of communication such as fax, e-mail, bulletin boards and tele/video conferencing
7. Difference between Local Area Network (LAN), Wireless Local Area Network and Wide Area Network (WAN)
8. Network topologies like star, ring, bus and hybrid
9. The internet and intranets: Characteristics and purpose
10. Issues of confidentiality and data security surrounding common network environments
11. Encryption and authentication techniques.