Unit 1

Sphere, circles, family of spheres Passing through a circle, tangent planes and normal lines to a sphere.

Unit 2

Quadric surfaces: conicoids, their identifications, plane sections. Spherical and cylindrical polar coordinates; their relation with Cartesian coordinates, Jacobian.

Unit 3

Definition of a cone, vertex, guiding curve and generators; equations Cones, enveloping cone of a sphere; conditions for a cone to have three mutually perpendicular generators; tangent lines and plane at point.

Unit 4

Condition for tangency (statement only), reciprocal cones; intersection of two cones with a common vertex, Definition of a cylinder, its equations; enveloping cylinder of a sphere; the right circular cylinder and its equation.

Recommended Texts:

1. Vasavada H.M., Analytical geometry of two and three dimensions, 1992
   Chapter 8, Chapter 6(article 3.4 only)
3. Introduction to calculus and differential equations, By D J Karia, N Y Patel, B P Patel, M L Patel. Article 30 (only)
Unit 1

Review of matrix theory, algebra of matrices, special types of matrices, submatrices, determinant and minors of matrices.

Unit 2

Characteristic equation of a matrix; and Cayley-Hamilton theorem, eigenvalue and eigenvector of square matrices, eigenvalue of special type of matrices, The construction of orthogonal matrices.

Unit 3

Linear differential equations with constant coefficients; complimentary function and particular integral; operators; Products of operators, Determination of complimentary function. Inverse operators; determination of Particular integral and working rules for f(D)y = e^{mx}.

Unit 4

Determination of Particular integral and working rules for f(D)y = X where X = sinmx, cosmx, x^m, e^{ax}, xV (where V is a function of x only). Homogeneous linear differential equations. Method of variation of parameters for solving second order nonhomogeneous differential equation.

Recommended Texts:

   Chapter 1 (1.4 to 1.9), Chapter 2 (2.1 to 2.5, 2.7 to 2.10),
   Chapter 11 (11.1, 11.2 (only statements), 11.3, 11.6, 11.11)
2. Introduction to calculus and differential equations.
   - D J Karia, N Y Patel, B P Patel, M L Patel. Article: 63, 64, 65, 66
   Shamlal charitable trust, New Delhi, 1996
   Grewal, B.S. [Khanna Publ]
Integration of rational function of $x$ and a linear surd 
$(Ax + B)(ax^2 + bx + c)^{1/2}$ and $(Ax + B)(ax^2 + bx + c)^{-1/2}$.
Reduction formulae for integration of $\sin^n x$, $\cos^n x$, $\sin^p x\cos^q x$.
Solution of System of linear homogeneous algebraic equations.
Solution of System of linear non homogeneous algebraic equations.
Descarte’s rule of sign.
Solution of cubic equations (Cardan’s method).
Solution of biquadratic equations (Ferrari’s method).
Spheres.
Sketching of Quadric surfaces.
Cone.
Cylinder.
Rank of a matrix.
Normal form of matrix.
Elementary matrices and its relation with elementary operations.
Inverse of a nonsingular matrix by elementary row operation.
Eigenvalue and eigen vector of square matrices.
General solution of Linear differential equations $f(D)y=X$ where $X=\sin mx$, $\cos mx$, $x^m$, $e^{ax}V$, $xV$ (where $V$ is a function of $x$ only).

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. Vasavada H.M., Analytical geometry of two and three dimensions, 1992
5. Introduction to calculus and differential equations by D J Karia, N Y Patel, B P Patel, M L Patel
Unit-1

Limit: Definition & examples (without $\varepsilon$-$\delta$), Limit of Polynomial functions, rational functions, trigonometric functions.
Differentiation: Definition and examples, working rule of derivative, chain rule, derivative of inverse function, implicit function, parametric function, exponential function and logarithmic function.

Unit-2

Integration: Definition and examples, method of substitution for integration (trigonometric substitution), Integration by parts.

Unit-3

Definite Integration, Fundamental principle of definite integration.

Unit-4

Differential equations: Definition, Order & degree of differential equation, Solution of differential equation, differential equation of 1st order and 1st degree, variable separable method.

Recommended Texts:

2. Analytic Calculus, Fuller and Parker.
3. Integral Calculus, By Shanti Narayana, S.Chand Publishing co.,
4. Differential Calculus, By Shanti Narayana, S.Chand Publishing co.,
UNIT 1 ALKANES AND CYCLOALKANES


UNIT 2 ALKENE AND ALKYNE


UNIT 3 ALKYL AND ARYL HALIDES

Homolytic and Heterolytic chemistry, Classification, Preparation, Reaction: Nucleophilic aliphatic substitution, S_N2 Reaction: Mechanism & kinetics, S_N2 Reaction: Reactivity & steric hindrance, S_N1 Reaction: Mechanism & kinetics, Carbocation, Structure of carbocation, Relative stability of carbocations, Stability of carbocations, Stability of carbocation: polar effect, Rearrangement of carbocation, S_N2 Vs S_N1, Reaction, Low reactivity aryl and vinyl halides, Structure of aryl and vinyl halids, Nucleophilic aromatic substitution, Bimolecular displacement for nucleophilic aromatic substitution, Reactivity in nucleophilic aromatic substitution, Orientation in nucleophilic aromatic substitution, Electron withdrawal by resonance, Elimination-Addition mechanism, Benzyne, Problems.
UNIT 4 BENZENE AND THEIR DERIVATIVES


Reference Book:

SARDAR PATEL UNIVERSITY  
F.Y.B.Sc. [Semester-II]  
Syllabus of FSCH-202 (PHYSICAL CHEMISTRY)  
(02 Credits)  
(Effective from June-2010)  
Total Marks: 100 [70+30]

UNIT 1  Gaseous State  
[08 hrs]

UNIT 2  The Liquid State  
[07 hrs]
Vapour Pressure, Isoteniscopic method, Surface Tension and Surface Analysis, Effects of Temperature on Surface Tnesion, Capillary rise method an Double Capillary rise Method, Viscosity, The Ostwald’s Viscometer Method, Effects of Temperature on Viscosity, Reynolds Number, Refractive Index and its Measurements

UNIT 3  Chemical Thermodynamics  
[08 hrs]

UNIT 4  Chemical Kinetics  
[07 hrs]

Reference Book:
3. Physical Chemistry By G. M. Barrow
[A] Volumetric Analysis:
1. To determine the amount of carbonates and bicarbonates in mixture.
2. To determine the molarity and gm/lit of NaOH and Na$_2$CO$_3$ in mixture.
3. To determine amount of Fe$^{+2}$ by K$_2$Cr$_2$O$_7$ using diphenyl amine as an internal indicator.

[B] Organic Spotting:
Benzoic acid, Salicylic acid, ß-Naphthol, p-nitroaniline/m-nitroaniline, Acetanilide, Urea, Naphthaliene, p-dichlorobenzene, m-dinitronenzene, Acetone, Benzaldehyde, CHCl$_3$, CCl$_4$, Methanol, Toluene, Ethylacetate, Aniline, Benzamide, Nitrobenzene. The above compounds must be characterized by M.P. / B.P.

Reference Book:
3. An Advanced Course in Ractical Chemistry, Ghoshal, Mahapatra, Nad.
UNIT: 1 Vector algebra

Introduction to scalars and vectors, Surface area as a vector, Scalar triple product, Reciprocal vectors, Vector triple product, Gradient of a scalar point function, Divergence of a vector point function, Curl of a vector point function, Irrotational and solenoidal vectors, Gauss Theorem, Greens Theorem, Stokes Theorem

UNIT: 2 Mechanics of a particle

Introduction to mechanics, Mechanics of a particle, Equation of motion of a particle, Motion under constant force (Atwood’s machine), Motion under force which depends on time only, Motion of a charged particle in electromagnetic field, Motion in a constant electric field, Motion in a constant magnetic field (Derivation of cyclotron frequency), Motion in a crossed fields (Derivation of drift velocity)

UNIT: 3 Simple harmonic motion

Acceleration due to gravity, The simple pendulum, Drawbacks of a simple pendulum, Compound pendulum, Interchangeability of centers of suspension and oscillation, Centre of percussion, Other points, collinear with C.G. about which the time period is the same, Conditions for maximum and minimum time periods, Bar pendulum, Kater’s reversible pendulum

UNIT: 4 Special theory of relativity


Reference Books:

1. Introduction to Classical Mechanics
   R. G. Takwale & P. S. Puranik

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

3. Atomic and Nuclear Physics
   N. Subrahmanyan and Brijlal
   Revised by Jivan Seshan, S.Chand & Company Ltd, New Delhi
UNIT: 1 Electronics – 1

V-I characteristics of a PN junction diode
DC power supply: Use of diodes in rectifiers, Half wave rectifier, Full wave rectifier, Ripple factor and rectification efficiency, Performance of half wave rectifier, Performance of full wave rectifier
Filters: How to get better DC, Shunt capacitor filter, Series inductor filter, Choke - input LC filter, The CLC or PI filter

UNIT: 2 Electronics - 2

Diodes: Types of diodes, Signal diodes, Power diodes, Zener diode (Zener effect, Avalanche effect & Voltage regulation), Varactor diodes, Light emitting diodes
Transistor: Introduction to Transistor structure, The working of a transistor Relation between currents in a transistor, DC alpha, Transistor amplifying action, Transistor configurations, Transistor characteristics, Common-Emitter configuration, current relations, relation between alpha and beta, Input and output CE characteristics, Basic CE amplifier circuit, DC load line

UNIT: 3 Nuclear Structure and Nuclear Transformations

Nuclear Transformations: Radioactive decay, Half-life, Radiometric dating
Nuclear Structure: Nuclear composition Atomic masses, nuclear electrons, Some nuclear properties: spin and magnetic moment, Nuclear magnetic resonance, applications of NMR, Stable nuclei: nuclear decay, Binding energy: binding energy per nucleon, The strong interaction, Liquid drop model

UNIT: 4 Modern Physics


Reference Books:

1. Basic Electronics and Linear Circuits
   N. N. Bhargava, D.C. Kulshreshtha and S.C. Gupta
   Tata McGraw-Hill Ltd., New Delhi
2. Concepts of Modern Physics,
   Arthur Baiser, Tata McGraw Hill, New Delhi
3. Atomic Physics
   J. B. Rajam, S. Chand & Company Ltd., (7th Edition)
SARDAR PATEL UNIVERSITY
Subject
: Physics (Practicals):
Second Semester
Course No. FSPH-203
(Effective from June – 2010)
(Two Credit Course – 4 Hours per week)

1. Y by bending of beam
2. Bar pendulum
3. Flywheel
4. Resolving power of grating
5. Newton’s ring
6. λ by spectral line by diffraction photograph
7. Half wave rectifier with filters( L, C, LC, π )
8. Full wave rectifier with filters( L, C, LC, π )
9. Zener diode as voltage regulator
10. CE transistor characteristics(Input, Output & Transfer)
11. Measurement of self inductance
12. Measurement of capacitance
13. Study of probability distribution for two option system (coins)
14. Vibration magnetometer
15. Simulation of radioactive decay

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-II
(Semester 2)
FSEN-201 2 Credits: 4 hours a week

Internal – 30
External – 70
Total Marks : 100

I Reading: The objectives are to enable the learners
a) Read to skim and scan through a passage.
b) Read to get the over all idea, and comprehend the passage.
c) Reading from a collection of units in a compiled text and the lessons selected from it below.

Book Prescribed:
‘Corridors to Communication’ by Ranu Vanikar (Orient Longman) (Units 6-10)

II Writing: The objectives are to enable the students to
a) Write paragraphs on given topics.
b) Develop points/ideas into longer composition.
c) Write resume, job applications.

Books Recommended:
1) Champa Tickoo and Jaya Sasikumar (2000). ‘Writing with a Purpose’. Chennai, OUP

III Listening: The objectives are to enable the students to listen and understand
1) Narrations, dialogues, talks
2) Identify language functions.
3) Note making

Books Recommended:
1) ‘Spoken English’ by D Sasikumar and PV Dhamija (with audio cassettes) (Tata McGraw Hill Publication ltd, new Delhi) (Units 14-27)
2) ‘On We Go’ (A BBC Video Course)

IV Speaking: The objectives are to enable the students to
a) Use various notions
b) Give short formal and informal talks, speeches

Books Recommended:
1) Grant Taylor.English Conversation Practice.(Tata McGraw Hill, New Delhi)
Evaluation:

Reading aloud + Viva (based on the Text) 10 Marks
Listening Comprehension (based on video) 10 Marks
( Note making/Note taking)
Speaking: (1) Journal + Project (05 + 05 ) 10 Marks
Speaking: (2) Group Discussion 05 Marks
Writing: (1) Developing ideas 05 Marks
Writing: (2) Resume writing 10 Marks
Writing: (3) Connectives 05 Marks
Writing: (4) Registers 05 Marks

60 Marks
Information and Communication Technology
Semester-2
FSICT-201
(Effective from June – 2010)
Detailed Syllabus

Unit 1

Learning Essential Computer Softwares:

1. Microsoft Office Tools
   Word: Creating, Formatting, Saving documents in different types and destinations, identifying and converting file types like .doc, .pdf, .rtf etc

   Power Point: Preparation of power point slides, editing and formatting slides and making PPT presentation

   Excel: Preparing Excel Workbooks and learning its various functions.

Unit 2

Communication Technologies
1. E-mail: Writing e-mails to single and multiple users, Attaching a file, Marking CC and BCC, Creating exclusive communication groups.
2. LCD Projectors: Using LCD projectors for making an audio-visual presentation
3. Tele/Video Conferencing
4. Blogging and chatting
5. Fax and Mobiles

Unit 3

Internet Usage for E-learning
1. Introduction to Internet and Web Browsers
2. Search engines to locate information, saving web pages, downloading files, (pdf, mp3 etc) and software
3. Open learning sites- Wikipedia, Wikispaces, Wikieducator etc.
4. Open Free wares- Hot Potatoes, Audacity, and Wida.co.uk
5. Advanced Social Networking
6. Web page building with tailor-made website builders provided free by websites like google.com & webs.com
Unit 4

Effects of Using IT
1. Software copyright: Issues and formalities
2. The problem of Hacking and preventive measures
3. Computer virus and Anti-virus
4. Effect of ICT on patterns of employment including areas of work where there is increased unemployment
5. Effect of microprocessor-controlled devices, in the home including their effects on leisure time, social interaction etc
6. Capability and limitation of IT
7. Issues related to information found on net i.e. unreliability, undesirability and the security of data transfer
8. Potential health problems related to constant use of ICT, for example, repetitive strain injury (RSI), neck and back problems, eye problems and some simple strategies for preventing these problems.

Unit 5

Group Project
Students may be divided in small groups to work on projects based on the following:
1. A Power Point presentation based on review of a Website of their choice
2. An exhaustive blog created on issues of current socio-political, cultural, economic relevance
3. Building a web page on given topics with hyperlinks, jpg, mp3 files etc.